Title: Measuring the size and development of the informal economy in the countries of the Balkan peninsula using structural equation modelling approach

Name: Alban Asllani

University of Bedfordshire

Title: Measuring the Size and Development of the Informal Economy in the Countries of the Balkan Peninsula using Structural Equation Modelling approach

Name: Alban Asllani

Measuring the Size and Development of the Informal Economy in the Countries of the Balkan Peninsula using Structural Equation Modelling approach

Alban ASLLANI

PhD

January 2018

UNIVERSITY OF BEDFORDSHIRE, UK

Measuring the Size and Development of the Informal Economy in the Countries of the Balkan Peninsula using Structural Equation Modelling approach

By

Alban Asllani

BSc, MSc

A thesis submitted to the University of Bedfordshire in partial fulfilment of the requirements for the degree of Doctor of Philosophy

January 2018

Author's Declaration

I, Alban Asllani declare that this thesis and the work presented in it are my own and have been generated by myself as the result of my own original research. The title of the research is:

Measuring the Size and Development of the Informal Economy in the Countries of the Balkan Peninsula using Structural Equation Modelling approach

I confirm that:

1. This work was done wholly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have cited the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all primary sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. None of this work has been published before submission

Measuring the Size and Development of the Informal Economy in the Countries of the Balkan Peninsula using Structural Equation Modelling approach

Abstract

This thesis presents estimates and analysis of the informal economy for ten countries in the Balkan Peninsula region. It is the first attempt to study the size and development of the informal economy in these southeastern European countries from 1996 to 2014 using a special case of the Structural Equation modelling, which is the MIMIC model. There is currently a gap in the literature focusing on measuring the size of the informal economy in the Balkan countries especially after social, economic, political and judiciary reforms that the region has undergone. Such reforms are likely to influence the trend of the informal economy, and hence it is important to study the development of the informal economy. Different from existing literature, this research uses policy-driven indicators as well as macroeconomic variables in the model to estimate the size of the informal economy in this part of the world. The estimates indicate that there is a declining trend in the size of the informal economy in most of these countries. The yearly average size of the informal economy in these ten countries started from around 31 percent in 1996 and dropped to around 26 percent in 2014. However, the overall average size of the informal economy in these Balkan countries remains high relative to GDP, and it is just over 30 percent. The results indicate that countries, where the overall average size of the informal economy is found to be the highest as a proportion to their GDP, are FYR Macedonia, Bosnia and Herzegovina, Albania and Turkey with 38.4 percent, 33.3 percent, 33.0 percent, and 32.1 percent, respectively. Countries with the lowest informal economy, on the other hand, are Slovenia and Greece, with 25 percent and 26.9 percent, respectively. The average size of the informal economy in Serbia, Romania, Bulgaria, and Croatia approximates to slightly under or slightly over 30 percent. The analysis also reveals that the key driving causes of the informal economy in these countries are the regulation burden, level of corruption, the dominance of the agriculture sector, degree of urbanisation, macroeconomic developments and the size of the government. This research concludes with some recommendations.

Keywords: Informal economy, MIMIC model, Balkan countries, Structural Equation Modelling, policy indicators, government effectiveness, regulation burden, the rule of law, policy recommendations

Dedication

This dissertation is dedicated to my family – my wife, my son Albert, my parents, my brothers and my sister. Their support, constant encouragement, and unconditional love have sustained me throughout my life and have helped me stay focused on completing and submitting this PhD.

Acknowledgements

I am most grateful to the members of my committee, for their time, encouragement, and expertise throughout this project. Special thanks to the chairman of my committee, for their exquisite attention to detail and his demand for excellence.

For two consecutive years, my first supervisor has been Dr Socrates Karidis who has guided me throughout completion of this PhD. On my final year of studies, Dr Eleftherios Goulas has been my first supervisor while Dr Ourania Dimitraki has been my second supervisor. Both have been very helpful and have given me essential guidance and support throughout the completion of this PhD. In particular, I would like to thank Dr Goulas and Dr Ourania for their supervision that has been the key to the completion of my PhD. All my supervisors' help and support have been constant throughout the three years taken to complete the PhD.

A special thank you goes to prof. Dr Friedrich Schneider for his expert advice and direction, and for his feedback throughout my PhD work and upcoming publications. It has been a great honour and a great privilege to work and to be able to publish with prof. Dr Schneider. He is currently the most quoted researcher on the topic of the informal economy, who has published numerous important works on this field for many years. We are currently working on a paper together to measure the size of the informal economy in the countries of Europe and Balkan Peninsula as well as another paper with almost all countries worldwide. I would also like to thank him for arranging time for my visit to his office at the Johannes Kepler, the University of Linz in Austria, and for numerous Skype meetings in validating and discussing the results.

There are people in everyone's lives who make success both possible and rewarding. My wife and family (my parents, my two brothers and my sister) steadfastly supported and encouraged me throughout. Without their encouragement, the pursuit of this advanced degree would never have been started.

Publications to Date

Working Papers:

Currently working on the following studies for publications on the first and second quarter of 2018:

1. Alban Asllani, Friedrich Schneider, Ourania Dimitraki and Socrates Karidis (2018), The Size and Development of the Informal Economy from 1996 to 2014 in the Countries of the Balkan Peninsula using Structural Equation Modelling approach
2. Alban Asllani, Ourania Dimitraki and Friedrich Schneider (2018), The Size and Development of the Informal Economy in ten Balkan countries between 1996 to 2014 using Structural Equation Modelling approach: A comparative analysis
3. Alban Asllani and Friedrich Schneider (2018), The Size and Development of the Informal Economy in Europe between 1996 to 2014 using Structural Equation Modelling approach
4. Alban Asllani and Friedrich Schneider (2018), Measuring the size of the informal economy worldwide using MIMIC model

Table of contents

List of tables

List of figures

List of appendixes

Glossary

AGFI – Adjusted Goodness of Fit Index
ALMP – Active Labour Market Policies
B&H – Bosnia and Herzegovina
CD – Coefficient of Determination
CDA – Currency Demand Approach
CFI – Comparative Fit Index
CPI – Consumer Price Index
EBRD – European Bank for Reconstruction and Development
EC – European Commission
ECB – European Central Bank
EU – European Union
FDI – Foreign Direct Investment
FYR – Former Yugoslav Republic
FYROM – Former Yugoslav Republic of Macedonia
GDP – Gross Domestic Product
GFI – Goodness of Fit Index
GMM – Generalised Method of Moments
HFD – The Heritage Foundation Data
ILO – International Labour Organisation
IMF – International Monetary Fund
LISREL – Linear Independent Structural Relationship
MC – McDonald's Centrality Index
MIMIC – Multiple Indicators, Multiple Causes
ML – Maximum Likelihood
NFI – Normed Fit Index
OECD – The Organisation for Economic Co-operation and Development
PPP – Purchasing Power Parity
RMSEA – Root Mean Square Error of Approximation
SEM – Structural Equation Modelling
Spec – Specification
SRMR – Standardised Root Mean Square Residual
TLI – Tucker-Lewis Index
UN – United Nations
WB – World Bank
WBDI – World Bank Development Indicators
WIEGO – Women in Informal Employment, Globalising and Organising
WGI – World Governance Indicators

Word Count:

Chapter 1: 7,988 words

Chapter 2: 10,077 words

Chapter 3: 16,916 words

Chapter 4: 5,468 words

Chapter 5: 12,818 words

Chapter 6: 22,776 words

Chapter 7: 3,373 words

Total from all chapters: 79,416 words*

*The word count commences from the first word in the first chapter of the thesis through to the last word preceding the Bibliography and includes all words in Tables and Figure legends.

Chapter 1: Introduction

1.1. Introduction

The subject of informal economy has been of great interest to many scholars, regarding its development, causes and the impact it has on the overall economy of a country. The concept of informal economy is defined in some ways, from a broader definition to a narrower one. This thesis will adopt the narrower definition of the informal economy which is mainly about tax evasion. The broader definition of the informal economy is described as an economic sector that does not comply with any of the government regulations, norms or laws in the country (Hart, 2008a; Ihrig & Moe, 2004). It can involve illegal and legal activities from a monetary and non-monetary transactions point of view. The illegal activities involve those activities from trading of goods that were stolen, the production smuggling and dealing of drugs, as well as from prostitution to trafficking (Mirus & Smith, 1997). The legal but informal activities, according to Mirus & Smith (1997), can be characterised by tax evasion and tax avoidance categories from a monetary and non-monetary perspective. Tax evasion refers to the unreported income from different sources, while tax avoidance can refer to different employee discounts and fringe benefits from a monetary perspective, to all do-it-yourself and neighbour help activities from the non-monetary perspective[1].

The narrower definition of the informal economy that this thesis will follow is that suggested by Pedersen (2003) and Kazemier (2003). They refer to the informal economy as "…*all market-based legal production of goods and services that are deliberately concealed from public*

[1] See table 2.2.1.

authorities…" for tax evasion and avoidance reasons (Smith, 1994; p. 18). The informal economy is a fact of life in almost all countries worldwide (Schneider, 2000). It is an integral part of the economy and it does affect the development of a country in different ways dependant on their level of economic development (Nikopour et al., 2008).

Measuring the size of the informal economy in a country can be a challenging task since the very agents involved in informal economic activities are purposefully hiding from being identified (Gerxhani, 2004a, 2004b; Buehn & Schneider, 2011). Agents engaged in informal economic activities try to stay undetected from authorities to avoid paying taxes and operating by the rules and regulations imposed by governments (Medina & Schneider 2017). The existence of the informal economy, however, is known. The main evidence of the existence of the informal economy in a country in most cases comes from surveys of leading international organisations, such as the World Bank and International Labour Organisation. Their accuracy, however, is questionable, because surveys tend to produce biased results. Those engaged in informal economic activities will not be willing to answer all the questions that the survey may want to ask (Gerxhani, 2004b).

Since the size of the informal economy can distort the true state of the overall economy or the formal economy[2], their inaccurate statistics could potentially lead to inappropriate policies being implemented which may lead to misallocation and misuse of resources (Arby et al., 2012). Therefore, many indirect, direct and model approaches have been developed by economists to measure the size of the informal economy (Schneider & Enste 2000; Dell'Anno & Schneider, 2003)[3].

[2] Terms of Overall, Formal or Official Economy are used interchangeably throughout this thesis. This is the economy its economic agents fully operate within the norms, rules and government regulations.
[3] See section 2.5 and table 2.5.1.

Controlling economic informality is also a challenging task (Schneider & Enste, 2000). Most countries attempt to control economic informality through punitive measures rather than reforms in their tax systems, regulation, the rule of law and other bureaucracies involved with operating in the formal economy. Agents involved in the informal economy consider it as an opportunity cost in operating in the formal economy as opposed to the informal economy. Punitive measures such as punishments and prosecution may not be the appropriate measures to control informal economic activities (Frey & Schneider, 2000). Some countries try to use education to educate people not to engage in the informal economy, highlighting the punitive measures involved (la Porta & Schleifer, 2014).

Effective policies to control the informal economy in a country are essential. Such effective policies can be achieved if governments have consistent and reliable statistics to control and reduce the size of the informal economy. A growing size of the informal economy can be seen as a reaction of popular mistrust on the institutions and the government, as individuals may feel overburdened and may decide to engage in the informal economy, rather than raise their voices against the system which could result in reforms (Schneider & Enste, 2000). A sizeable informal economy may also compete with the formal economy. Firms who operate in the formal economy may find themselves in the unfair competitive environment (la Portes et al., 1989, p.11). However, according to Schneider & Enste (2000), the existence of the informal economy can have positive effects on the formal economy as most of the income earned from informal economic activities is spent immediately on the formal or official economy[4].

Effective government policies to control the size of the informal economy are particularly important for the countries of the Balkan Peninsula for the reasons discussed above. The size

[4] Advantages and disadvantages of informal economy are discussed in chapter two, and Appendix 2.2.1.

of the informal economy in the Balkan countries is high (Schneider et al., 2013). Providing estimates for the size and development of the informal economy in this region accompanied with some analytical discussion and policy recommendations are, in a nutshell, the contribution of this thesis.

1.2. Context and Aim of the research

This thesis will contribute to the literature of informal economy by providing estimates for the size and development of the informal economy in ten countries of the Balkan Peninsula. It will also provide analysis and discussion on the main drivers of economic informality in these countries. The main aim of this research is to explore the impact of the informal economy in the countries of the Balkan Peninsula[5] and analyse the main causes and consequences leading to relatively large informal economies relative to real GDP in these countries. In doing this, the primary objective is to provide some estimates of the informal economy in these countries using the model approach and a sample with only Balkan countries. In estimating the size of the informal economy in this region, this research will make use of the model approach (Multiple Indicators Multiple Causes (MIMIC) model[6]), which is a particular case of the Structural Equation Modelling (SEM hereafter).

The economies of the Balkan countries are characterised by informal activities typically in the form of tax evasion, unreported income and informal employment. Some other important factors drive economic informality in this region such as the level of regulation and bureaucracies for running a business, the cost of running a business formally, the rule of law,

[5] These are countries whose geographical territory is entirely within the Balkan Peninsula and those that are mostly or partially located within this region. Please refer to section 1.6 in chapter one of this document.
[6] The MIMIC model is part of the Structural Equation Modelling.

size of the government, high levels of corruption, the level of unemployment and inflation and the level of government integrity and effectiveness.

Data was gathered on the basis of the methodology that will be used in estimating the size of the informal economy. Panel data spanning from 1996 to the latest available data[7] for ten Balkan countries will be used to generate results for this part of the region. Earlier set of data for this part of the world is either incomplete, not found, or does not exist, as most of the countries part of this region have experienced severe political conflicts, wars and political turmoil in the past, and as such, data is unavailable[8] or unofficial.

Countries which are geographically part of the Balkan Peninsula include Serbia, Romania, Slovenia, Croatia, Bosnia and Herzegovina, Bulgaria, Montenegro, Kosovo, Albania, FYR of Macedonia, Greece, and Turkey. Part of this research will be all the countries indicated above except Kosovo and Montenegro[9], where most data does not exist as these two countries became independent in the last decade. Including all these countries, the data to be used is heterogeneous due to the differing characteristics of each of the above countries, yet with similarities regarding culture, ways in conducting economic activities, past conflicts and aspirations for European Union integration.

The economic informality in these ten Balkan countries is significant, often reaching levels of over 30 percent of their GDP (Gerxhani, 2004b; Schneider et al., 2010; Alm & Embaye, 2013; Hassan & Schneider, 2016a). The growth of the informal, underground, shadow or the illegal

[7] Currently full data without any missing values is available up to 2014. There are some missing values for some countries after 2014.
[8] In cases where data is available, there are many missing values.
[9] Kosovo and Montenegro are newly created countries from former Yugoslavia. Montenegro declared independence on 3rd of June 2006, whereas Kosovo declared independence on the 17th of February 2008.

economy or any other name[10] that is used, is a global phenomenon. Recent studies (Schneider, 2006, 2007a; Dell'Anno 2007; Torgler & Schneider, 2007; Schneider et al., 2010; Alm & Embaye, 2013; Hassan & Schneider, 2016a,) indicate that the size of the informal economy is higher than many economists thought. These studies, however, do not look into one particular region of the world and include the factors that are specifically relevant to those regions, but instead, they look at a large number of countries, often without any connections and at different stages of development. However, for countries at different levels of development different drivers can be attributed to the large size of the informal economy. This raises the question as to what would happen to the estimates of the size of the informal economy if we were to take one region or different countries but at a similar level of development at a time and estimate the size of the informal economy. Would the same drivers be as significant in this case or would different drivers of economic informality be more important? Furthermore, most studies concentrate on the use of Tax Rates as the main causal variable influencing informality. Balkan countries tend to have low tax rates in the first place. So this raises the question of what are some of the other factors, other than tax, as main causes of the large informal sector in this region. Thus, this research will concentrate on the ten Balkan countries, as most of them are found in similar levels of development[11].

The informal economy was not the centre of the attention of economists for research purposes until early seventies. In 1972, the International Labour Organization (ILO, hereafter) published a study[12] which draw the attention of researchers to the subject. The informal

[10] Other terminologies for the informal economies are discussed in detail in chapter two.
[11] A rationale for choosing Balkan countries for this research is provided below in section 1.6 of this chapter.
[12] This is the study by ILO on "Employment, incomes and equality: A strategy for increasing productive employment in Kenya" (published in Geneva, 1972). This as per ILO's website available at https://www.ilo.org/global/topics/dw4sd/themes/informal-economy/lang--en/index.htm (last accessed 16/12/2018)

economy is considered being of larger magnitude and size in developing and transitioning countries (Dell'Anno & Schneider, 2003; Schneider, 2007a, 2007b; Schneider et al., 2010; Buehn and Schneider 2012; Alm and Embaye, 2013; Hassan & Schneider, 2016a; Schneider & Buehn, 2016). The majority of countries, part of this research, are considered to be either in transition, developing or new EU countries (with the exception of Greece) (Bartlett, 2009; Penev, 2012), who are also considered countries with large informal economic sectors when compared to other European countries (Novkovska, 2008; Macias & Cazzavillan, 2009; Garvanlieva et al., 2012; Krstić & Stanišić, 2013; Boka & Torluccio, 2013; Manolas et al., 2013). The size of a country's informal economy is strongly correlated with low levels of economic development and low GDP per capita (Schneider, 2002, 2007a). Many studies suggest that the informal economy is associated with less development and transition economies (Schneider & Enste, 2000; Gërxhani, 2004; Williams, 2005; Dell'Anno, 2007; Andrei et al., 2010; Schneider et al., 2010; Schneider, 2014; la Porta & Shleifer, 2014).

This region too has been hit by the last global financial crisis and the subsequent Eurozone debt crisis[13]. Their formal economy indicators highlight the impact of this financial crisis on the levels of output, increased unemployment and worsening of the balance of payments. While in some countries the impact was felt mildly (Albania, Kosovo, FYR Macedonia, Montenegro), other Balkan countries experienced greater negative impacts on their economy (Greece, Croatia, and Serbia) (Bartlett, 2009; Micevska, 2004; Penev, 2012). It is recognised that economic crisis in general (and financial crisis in particular) can lead to a slowdown in the economic activity of a country, thus exacerbating poverty levels and income distribution. Moreover, labour market theories suggest that there will be an increase in informal activities

[13] Past financial crisis since 1996 have also had an impact on the region (Bartlett, 2009; Micevska, 2004; Penev, 2012).

as a result of economic crisis and hence increase the levels of informal economy (Hassan & Schneider, 2016a). As a consequence of economic crisis (particularly the financial crisis), it is expected that the unemployment rate in a country will increase as jobs will be lost during a recession or an economic downturn. The informal employment, on the other hand, is expected to increase as there will be new entrants into the informal economy for various economic, survival and social reasons (Finnegan & Singh 2004). It is assumed that the informal economy can act as a refuge in coping with the economic crisis which affects the formal economy directly (Cunningham & Maloney 2000; Cling et al. 2010).

If the informal economy was of significant size before the financial crisis of 2008, it is interesting to estimate the size of the informal economy some years after this crisis in an attempt to see the development of such economy in the ten Balkan countries. Different studies mentioned above and reviewed thoroughly in the literature review, have indicated a declining trend in the level of informal economy for some Balkan countries, due to a strengthening of the formal economy and reforms. However, with the severe impact of the financial crisis of 2008 on the formal economies of the Balkan countries, it would be interesting to see if this declining trend has continued after the crisis.

In general, the above aim can be divided into three main areas of research. The first aim is to explore the leading causes and consequences of the informal economy in Balkan countries by reviewing the existing literature on the field and by assessing and critically examining the theories of the informal economy. The second aim is to estimate the size and the development of the informal economy in the ten Balkan countries using a Structural Equation Modelling approach (MIMIC Model) for the period from 1996 to 2014 and evaluating the primary drivers of informality in these countries. Finally, the third aim is to analyse the impact

of such informality for the formal or official economies of these countries and provide some policy recommendations for their governments.

1.3. Objectives of the study

This research intends to address a number of objectives triggering some research questions. The first of these objectives is to critically review the existing theoretical and empirical literature on the relationship between the informal economy, the formal economy and economic development from 1996 to 2014 for the ten Balkan countries. The second objective is to obtain a clear understanding of how informality is present in the economies of these countries in question. The analysis will indicate the main causes or drivers of economic informality in these Balkan countries and will provide estimates of the size of their informal economies. The third objective is to assess the significance of informality and the significance of the causes and effects of such informality in these Balkan countries.

The next objective is to propose ways of reducing informality in these countries, considering the effects of that reduction in their national economies. Most of these countries have mainly concentrated on the use of punitive measures to control the size of the informal economy. Recommending effective policy measures to control the development of the informal economy in these countries may benefit these governments to be more efficient in controlling economic informality. Moreover, the final objective is to understand the different dynamics of the Balkan economies based on their economic and political trajectory (such as European Union Integrations and Post conflicts).

1.4. Research Questions

The above aims and objectives of this thesis introduce a number of research questions. This thesis will seek to answer the following research questions:

- What is the size of the informal economy in the ten countries of the Balkan Peninsula? Typically, the size of the informal economy is given as a percentage of the official or formal real GDP. In the methodology chapter, the model used for the estimation procedure will be outlined along with a rationale for its use. The model used for estimating the size of the informal economy is the MIMIC model followed by a benchmarking procedure to calibrate the size of the informal economy and visualise its trend and development (Schneider, 2000; Schneider & Enste, 2000; Dell'Anno & Schneider, 2003).
- What are the main drivers contributing to the size of the informal economy in the countries of the Balkans?

  Based on the causes, we will be able to measure the size of the informal economy and analyse the primary drivers behind informality. The model analysis using the MIMIC will be able to indicate how significant each of the causes of the informal economy is. The literature reviewed empirically showed and analysed a number of causes as the primary drivers of the informal economy. These main drivers tend to vary depending on the level of development a country finds itself. The main drivers of economic informality are often noted to be the level of taxation rate, government regulation and effectiveness, the rule of law, ease of doing business formally, the dominance of the agriculture sector, the strength of the formal economy or the macroeconomic indicators, and the overall regulatory quality in the country (Schneider, 2000; Dell'Anno, 2007; Schneider et al., 2010; Schneider & Enste, 2013; Alm & Embaye, 2013; Hassan & Schneider, 2016a).
- How has the size of the informal economy developed since 1996 to 2014 in the ten Balkan countries? To my knowledge, there has not been any research to estimate the

size of the informal economy in the ten Balkan countries from the period of 1996. After estimating the size of the informal economy for each of the ten countries, we will be able to see the trend and development of the informal economy over the years. Given the recent social, political and economic developments and reforms in this region, as a result of European integration (Anastasakis, 2013), and given the impact of the financial crisis of 2008 (Arvai et al., 2009; Bartlett & Monastiriotis, 2010; Stamatović & Zakić, 2010; Bartlett & Prica, 2013; Geshkov, 2014; Sadiku et al. 2014), this makes the region and interesting area for research and an important contribution to see how the trend and development of the informal economy has evolved from 1996 to 2014. Some studies that have attempted to estimate the size of the informal economy in the ten Balkan countries will be analysed and compared with the results of this study.

1.5. Contribution to knowledge and rationale for this research

For a long time, economic researchers condemned the existence of a significant informal economic sector, and have viewed it as a deterrent to investment, economic growth and development. However, this view has been confronted with strong criticism particularly in developing countries where formal unemployment is rapidly growing and poverty widely spreading. This, in turn, is leading to an expanding informal economy. Hence, alternative schools of thought that view the informal economy as a source of livelihood for people unemployed and from poorer background have subsequently been developed (Misati, 2007).

The concept of the informal economy worldwide has been widely researched by many scholars (such as Frey & Pommerehne, 1984; Feige, 1989a, 1989b; Thomas, 1999; Fleming et al., 2000; Pedersen, 2003; Del'Anno & Schneider, 2004; Ihrig & Moe 2004; Dell'Anno 2006,

2007; Feige, 2007; Schneider, 2007a, 2007b; Hart, 2008a; Buehn & Schneider, 2007; Schneider et al., 2010, Schneider, 2014). The above authors have also offered ways in measuring the informal economy in a country using the three main methodologies such as the direct, indirect and model approaches – discussed in more details in the theoretical background chapter. Studies have also tried to analyse empirically and theoretically the impact of the informal economy on economic growth and development of a country (such as Becker, 2004; Levy, 2010; Schneider et al., 2010; Chen, 2012).

Contribution to the literature on the size of the informal economy has been given by a number of studies on individual country basis, such as Schneider & Enste (2000), Pommerehne & Schneider (1985), Chen (2004) and more recent studies of Breusch (2005a, 2006), Andersdale et al. (2006), Dell'Anno et al. (2007), Buehn et al. (2009), Amendola & Dell'Anno (2010), Heinemann & Schneider (2011), Buehn & Schneider (2012), Hassan & Schneider (2016a, 2016b) and Medina & Schneider (2017).

There is a widespread assumption that informal economy has low productivity and, therefore, contributes to low growth and development (Levy 2007, 2008). Many studies suggest that the informal economy is associated with less development and transition economies (Schneider & Enste 2000; Gërxhani, 2004; Williams, 2005; Dell'Anno, 2007; Andrei et al., 2010; Schneider, 2014; la Porta & Shleifer, 2014). Furthermore, as a consequence of financial crisis, it is expected that the level of unemployment will increase, as jobs are lost in the formal economy, and at the same time the informal employment will increase as there will be new entrants into the informal economy for various economic, survival and social reasons (Cunningham & Maloney, 2000).

Other studies have looked at the relationship between the financial crises and the informal economy (such as Finnegan & Singh, 2004; Jutting & Laiglesia, 2009; Mehrotra, 2009; Cling et al., 2010; Horn, 2011; Garvanlieva et al., 2012; Blunch, 2015; Colombo et al., 2016). They suggest that at times of financial crisis and economic downturns people tend to turn to informal employment. However, informal employment is one factor of the overall informal economic activities. Other factors such as the level of public sector spending, equity and quality in the services provided by government at times of financial crisis and downturns as well as increasing trend of the informal economy are just as important. A study by Colombo et al. (2016) investigates the response of the informal economy to banking crises[14] suggesting that the informal sector is a powerful buffer, expanding at times of banking crises and absorbing a large proportion of the fall in the official output.

From the existing literature, it is evident that there has been much research about the informal economy. Research has been carried out in many areas relating to the informal economy, but with a special focus on the methods, the informal economy can be measured or estimated. The existing literature has also focused on the theory of informal economy, analysing the key drivers of economic informality and the leading indicators where that informality is manifested. However, having said this, there has not been any research regarding the informal economy of the countries of Balkan Peninsula. Balkan countries are characterised by a high degree of informality and as such more research and empirical analysis needs to be carried out. There is no literature which tries to estimate and critically examine the size and development, as well as the main driving forces behind the level of

[14] While crisis in general can be characterized into either economic or financial crisis, according to Reinhart & Rogoff (2009), Claessens & Kose (2013) and Carlin & Soskice (2015) there are four broad verities of financial crisis; inflation crisis, currency crisis, sovereign debt crisis and banking crisis.

economic informality in the Balkan countries. Different studies investigate the estimation of the informal economy worldwide using 'one size fits all' causes and indicators for the informal economy. However, it is difficult to measure the size and analyse the development of the informal economy for many countries especially if they are in different stages of development and in different parts of the world where cultures can play a role in their economic activities. The focus should be to estimate the size of the informal economy for a region at a time, in an attempt to capture the most important and key drivers of economic informality which are relevant to a particular region. To date, there is no research for the ten countries of Balkan Peninsula using a panel data and a MIMIC methodology.

The lack of such research has been the main rationale for the undertaking of this research, with emphasis on this region. Such analysis is also lacking for other parts of the world as well; but, the main contribution of this research would be for the region of the Balkan Peninsula. However, the methodologies applied in this research can contribute to other studies being undertaken for other parts of the world, or another block of countries worldwide. Indeed, in order to check the robustness of the results, this study will apply similar MIMIC model for another block of countries.

A further rationale for undertaking this research relates to the methodologies being applied to measure the size and development of the informal economy in the countries of the Balkans. There seems to be a lack of appropriate indirect methodologies for measuring the informal economy, such as the use of MIMIC model from the Structural Equation Modelling approach (SEM hereafter). In this research, the MIMIC model will be applied and the results generated will be analysed and tested for robustness. The use of MIMIC model rather than other models is as a result of the disadvantages that the other models have and the advantages that the

MIMIC model has. A rationale for using MIMIC model has been provided in the methodology chapter. A thorough discussion of all the methods to measure the informal economy has been provided in the theoretical background chapter.

With this rationale, this research will make a number of contributions to the existing literature on the informal economy. The contribution of this research is linked with the research questions identified above in this chapter. Even though the contribution of this research will be highlighted throughout this thesis, and more so in the Results and Analysis chapter, typically contributions to knowledge from research can be generalised to be conceptual, empirical and methodological. This research encompasses all three contributions to knowledge in the field of informal economy.

The first contribution of this research is a conceptual or theoretical one. This research contributes to the growing literature on informal economy for the countries of the Balkan Peninsula. Previous research that investigated all Balkan countries as a sample within one dataset has not been done to date. Furthermore, a critical and extensive review of all the literature referring to the informal economy and Balkan countries has also not been done to date. Therefore, this research will contribute to the literature by providing some insight into the level of the economic informality in these ten Balkan countries and will analyse in detail the main drivers of such informality for the Balkan countries. A further rationale and contribution for choosing Balkan countries as an area of research for this thesis has been provided in section 1.6.

The second contribution of this thesis is a methodological one. It has been argued several times that when it comes to measuring the informal economy is a complicated process (Schneider, 2002, 2014) and that estimating the size of the informal economy one has to

consider many factors (Dell'Anno, 2007; Schneider, 2007a, 2007b; Buehn & Schneider, 2012). The use of the model approach is justified in the literature, and this is the MIMIC model[15]. However, in the existing literature, the use of the model has mainly focused on macroeconomic indicators rather than policy indicators. The MIMIC model applied in this research uses both macroeconomic and policy variables to derive an estimate for the informal economy. From the literature review and the methodology chapter, it is evident to notice the difference between the model applied in this research (albeit with rationale and justification) and the models applied in other existing literature. The use of government effectiveness, the rule of law, level of corruption, regulatory quality and the ease of doing business variables are just as important as the macroeconomic variables in acting as causes of the informal economy.

This is a region that has a particular problem with policy indicators and the rule of law (Balfour & Stratulat, 2011; Anastasakis, 2013; Bartlett & Uvalic, 2013), which are considered to be the roots of the problems caused in the overall economy from which the macroeconomic indicators suffer as well. Furthermore, there seems to be a popular mistrust in the government institutions in these countries due to a high level of corruption (Bartlett, 2009; Penev, 2012; Anastasakis, 2013). This popular mistrust on the state coupled with high level of corruption, weak government effectiveness and the rule of law, can lead to a high level of informality. Thus, it is important to consider policy indicators as key causes to be used in the MIMIC model rather than relying only on macroeconomic indicators.

[15] The MIMIC model has been used extensively by Giles (1999a, 1999b, 1999c), Giles et al. (2002), Breusch (2005a, 2005b), Bajada & Schneider (2005a), (2005b), Dell'Anno (2003, 2007), Schneider (2005, 2006, 2007), Pickhardt & Sarda-Pous (2006), and by Pickhardt & Sarda-Pous (2006).

The empirical contribution of this thesis is to provide estimates on the size of the informal economy for the ten Balkan countries for the most prolonged period compared with existing literature. This study will provide estimates on the size of the informal economy over a period of 19 years – which has not been done before. The estimates from this study will be analysed with specific reference for each country, and compared with the estimates provided by Schneider (2007b, 2009), Schneider et al. (2010), Buehn and Schneider (2012), Schneider et al. (2013), Alm and Embaye (2013), Boka and Torluccio (2013), Hassan and Schneider (2016a) and Bitzenis et al. (2016)[16].

The final contribution of this thesis is to provide some policy recommendation to the governments of the ten Balkan countries considering the research carried out. Even though most of these ten Balkan countries have undergone some reforms influenced mainly by the European Union (as discussed in chapter 5), there is still much more to be done regarding reduction in corruption, level of economic informality and other reforms in the economy and judiciary sectors.

The research will be divided into several chapters as presented in section 1.7, and each of these chapters will have its rationale and subsections. In general, the study intends to understand and analyse the size and development of the informal economy in the Balkan countries. In doing so, this research will provide analysis of the leading causes and effects of economic informality in this region and provide some policy recommendations that might potentially be suitable and effective in controlling the level of the informal economy.

[16] Majority of these studies, however, uses a worldwide sample, not a sample which is specific to the region of Balkan Peninsula.

1.6. Rationale for choosing Balkan countries for this research

The Balkan Peninsula is an interesting area of the world for research, with its unique cultural development and ethnic diversity, which may have contributed to a series of conflicts and political unrest for decades. The countries of Balkan Peninsula experienced a dramatic shift from a region of wars, conflicts and continuous social and political unrest (Micevska, 2004). This is a region that has a history of bloodshed and conflicts, perhaps due to its cultural diversity with fundamental differences in culture, religion, political theories, and social structures that have often been the cause of armed conflicts. In this, both the ethnic and cultural diversity of the region and the geographical location have contributed to long periods of destabilised governments that have served poorly to protect innocent people residing in this region. Often this can lead to mistrust of citizens in their governments and often leads to people trying to avoid dealing with the state (Bartlett, 2009; Penev, 2012).

This is a region that recently started to understand the benefits of cooperation in ensuring economic prosperity for their citizens. This political and economic cooperation between the countries was essential in ensuring that the region could escape the levels of poverty, collapsed infrastructure from the wars and conflicts as well as ruined economies (Bartlett, 2009; Penev, 2012). Since the early 1990s, the region of South East Europe (SEE hereafter) and in particular countries in the Balkan Peninsula (including Turkey), have experienced dramatic transformation in their economies. The transformation from command to market economy produced remarkable changes in the social, political and economic infrastructure of SEE countries (Micevska, 2004).

This political and necessary change in the region was followed by increases in their GDP growth, and almost all other macroeconomic indicators were heading towards a direction

which benefited the people and economies of the Balkan countries. However, this momentum of growth and prosperity was interfered by the financial crises and the subsequent Eurozone debt crisis. Since 1996 this prosperity and economic growth were also interrupted by internal political conflicts and political instabilities. It was no coincidence that during early-2009 (albeit with delay), all of a sudden almost all the countries in the Balkan region experienced reduction in GDP growth, reduction in inward FDI reduction in incoming remittances, further disequilibrium of their balance of payments, less international trade, increases in the non-performing loans and other misbalances in the banking sector, etc. (World Bank Data, last accessed 20.06.2017).

Literature also classifies this region with a high degree of economic informality. The informal economy tends to be of more critical relevance to the countries in transition and developing or less developing economies. This is because of its size relative to the GDP (de Soto, 1989, 2000; Heintz & Pollin 2003; Williams, 2005; Ishengoma & Kappel, 2006; Levy, 2007, 2008; la Porta & Shleifer, 2014). Most of the Balkan countries are considered as either transition, emerging or peripheral economies in comparison to the rest of the European continent. Countries of the Balkan Peninsula are characterised by a high degree of informality – partly due to the lack of economic and development policies, lack of reforms, and cultural attributes. In almost all countries of the Balkan Peninsula, such as Bosnia and Herzegovina, FYR Macedonia, Albania, Bulgaria, Serbia, Romania, Turkey, and less for Slovenia, Greece and Croatia - tax evasion, market distortion, large number of bureaucracies, regulation burden, unfair competition, high level corruption and informal employment are some of the factors that constitute the informal economy (Novkovska, 2008; Macias & Cazzavillan, 2009; Garvanlieva et al., 2012; Krstić & Stanišić, 2013; Boka & Torluccio, 2013; Manolas et al., 2013).

Therefore, the main justification or reasons for choosing this part of the world for this research are many. One of the reasons, which are also discussed in the above paragraphs, is that this is a region where the informal economy is considered to be of significant size, but yet studies produce different results as indicated in the literature review chapter. Majority of these studies also use direct, indirect or model approaches usually with time series data. The lack of historical data for this part of the world creates problems in measuring or estimating the informal economy with a small number of observations and thus can lead to biased results.

According to Pichler & Wallace (2004), most of the post-communist and transition household economies rely on more than one form of economic activity. The households tend to develop a "portfolio of economies" at the micro-level, combining either formal economic activities with informal activities or combining different informal economic activities to get by. This makes the informal economic activities as a norm for survival reasons in these countries and therefore an important region to study and understand the size and development of the informal economy.

The other reason is that most of the Balkan countries and their economies are in the process of EU integration and they can be classified as part of the EU (Greece, Croatia, Slovenia, Bulgaria, and Romania), EU candidate or potential candidate members (all other countries part of the investigation). In the process of EU integrations, these countries are continually reforming policies to combat corruption and informality in an attempt to fulfil the joining criteria set out by the European Commission. Understanding the primary drivers of the economic informality in most of these countries could help draft policy recommendations in tackling it.

Finally, another reason for selecting this region for research is that there is a general lack of studies exploring the concept of economic informality in the post-Yugoslav countries, as well as the new EU member countries part of the Balkan Peninsula. Many scholars and researchers tend to avoid this region for research due to incomplete historical datasets available. However, one has to contribute in this area with the data that is available. Reference to the main reasons for selecting this part of the world for this research is made throughout this thesis.

1.7. Outline of the thesis

The outline for this thesis follows a standard format for research of this type and consults on the style guide published by the university. The main sections of this thesis are divided into chapters with the most essential chapters being the Literature Review, Methodology and the Results and Analysis chapters. Each chapter of the thesis has a brief introduction, or an outline of the chapter followed by subsections reflecting the main objectives of the research. This thesis comprises a total of seven chapters. First two chapters introduce the problem and provide a theoretical background to the informal economy, followed then by six other chapters for the literature review, methodology, social, political and economic developments in the Balkan countries, results and analysis and finally a chapter on conclusion and recommendations.

The first chapter will introduce the central research questions and objectives of the thesis. It will provide a rationale for undertaking this research and highlight the contribution of this research. It has to be taken into account that the contribution of this research will be highlighted throughout the thesis. A rationale behind the chosen geographical area for this study will also be provided in this chapter.

Before moving on to the literature review, it is important to provide some theoretical background to the topic addressed in a thesis. Therefore, the second chapter of this research will investigate the theoretical background of the informal economy. The chapter will start by introducing and defining the concept and looking into the leading causes and effects of economic informality from a theoretical point of view. It will look at the theory of the public sector and taxation as the leading cause and effect of informality. According to Schneider et al. (2010), the growth of the informal economy[17] can result in a decline in government revenues, which consequently reduces the provision and quality of public goods and services. Eventually, this will result in higher tax rates for economic agents operating formally or officially in the economy. There is also the potential that the porovision, quality and administration of pulic goods and services is deteriorated, resulting in stronger incentives for individuals or households and economic agents[18] to participate in the informal economy (Schneider et al., 2010). Other important factors such as the rule of law, government effectiveness and regulation or bureaucracies when it comes to the ease of doing business, the dominance of the agriculture sector, size of the government and electric consumption are also important factors and will be included in the model and described in this chapter. This chapter will also discuss in detail the main ways to measure the informal economy using empiric or econometric models and methodologies, highlighting the advantages and disadvantages of each approach or model in measuring the size of the informal economy, and at the same time providing a rationale for using the model approach for measuring the informal economy as opposed to other approaches available.

[17] Throughout this research only the term Informal Economy will be used, as opposed to existing literature which refers to the informal economy with other terminologies discussed in section 2.1 of Chapter 2.
[18] This is referring to Firms, Companies or any other for-profit organisation, including self-employment.

After establishing a theoretical background on the subject, the third chapter will turn the focus on the literature review. The literature review chapter is one of the most important parts of any research of this type. Hence, there is a need to give a brief overview of the main sub-sections composing the literature review. This chapter will begin by reviewing the existing literature on the informal economy, on the impact of the informal economy for development and the impact of financial crisis on the informal and formal sector worldwide with a focus in the Balkan countries part of the sample. It will also review the existing literature in measuring the informal economies worldwide, with emphasis on the countries of the Balkan Peninsula. This chapter will include a review of the main methodologies applied in measuring the informal economies and will focus on the model approach in measuring the informal economy. Two of the most extensively used methods to measure the informal economy are the Multiple Indicators Multiple causes model (MIMIC hereafter) and the Currency Demand Approach model (CDA hereafter) (Hassan & Schneider 2016a, 2016b)[19], and this is very evident from the literature. Therefore, this chapter will discuss in detail the use of these two models in the literature in separate subsections.

The fourth chapter contains the methodology applied in this research. Along with the previous chapter, this is also a very crucial part of the thesis, and therefore it is important to discuss all the sections and subsections of this chapter briefly. The methodology and data chapter will introduce the problem and discuss the research philosophy to be employed in this research. It will discuss the previous methodologies applied to measure the size and

[19] However, the most commonly used method is one that should encompass various indicators and causes that impact the informal economy in terms of its size and development. MIMIC (Multiple Indicators, Multiple causes) is such a model which can include various causal and indicator variables (Buehn and Schneider, 2012). This model has been used extensively by Giles (1999a, 1999b, 1999c), Giles et al. (2002), Breusch (2005a, 2005b), Bajada & Schneider (2005a), (2005b), Dell'Anno (2003, 2007), Schneider (2005, 2006, 2007), Pickhardt & Sarda-Pous (2006), and by Pickhardt & Sarda-Pous (2006).

development of the informal economy, and in light of this, provide a rationale for model selection for this research. The chapters then moves on to discuss the data and countries part of the sample and provide a rationale for the use of panel data with the methodology applied in this research. The model applied in this research is the MIMIC model, and it is based on a number of causes (as the primary drivers of informality) and indicators (effects of informality). Hence, it is essential to discuss in detail the use of main causes and indicators in a separate section in this chapter. An explicit discussion of all variables used in this research is provided along with the econometric and theoretical model applied. A graphical presentation of the model and different model specifications are provided in this chapter. This chapter concludes with a discussion about the ethical considerations, as suggested by the university style guide.

On the fifth chapter, this research will review the social, political and economic developments in the Balkan countries in the last two decades with a focus on the importance of these developments for the formal and informal economies. It will focus on reviewing and analysing the main reforms and developments in this region. This analysis is crucial as it can be used in the results and conclusion chapters.

The sixth chapter with the results and analysis is the most important chapter of this research. This chapter will be presenting all the results and analysis generated from the methodology applied in estimating the size of the informal economy in ten countries of the Balkan Peninsula. These results will be analysed and discussed in detail providing critical analysis. Post-estimation tests along with testing parameters for model fit statistics will be analysed to ensure that the model selection is justifiable and that the regression results presented are statistically significant. The impact of informal economy will be analysed on the economies of

the Balkan countries, as well as the effect of a possibly reduced informality on the economies of these countries will be evaluated.

The seventh, and final chapter, will provide the conclusion and the policy recommendations. These policy recommendations will be made based on the research and the analysis of the results. The discussion, in conclusion, will address the objectives, the research questions and the hypothesis of this thesis. This chapter will also provide direction for future research in this field.

1.8. Conclusion

Defining, measuring and controlling the size of the informal economy in a country is important for all governments to have a clear understanding of how their scarce resources are being allocated. Having reliable statistics and estimates of the size of the informal economy is the cornerstone of designing and implementing effective policy measures to control economic informality and address the mistrust of individuals on their governments.

Because of the impact the informal economy has on the official economy; there has been a growing interest in the literature to measure and study the informal economy worldwide. Several methods have been developed to measure the size of the informal economy from direct and indirect approaches to the model approach adopted from quantitative methods for social research, which is the Structural Equation Modelling with particular reference to the Multiple Indicators, Multiple Causes (MIMIC) model which allows for greater flexibility in measuring the relationship between the observed and latent (unobserved) variables. The unobserved variable in this case if the informal economy, since it is considered that the size of the informal economy is challenging to measure and surveys, as well as other methods, can result in biased results. This thesis will only make use of the MIMIC model, because of the

advantages of this model and the disadvantages of the other models. A rationale for the use of MIMIC model has been provided in a separate section within the Methodology chapter.

It is of particular interest to measure the size of the informal economy in the Balkan countries and to see its development through the years. The size of the informal economy in these transition economies (except Greece) is high. Cultural, political, social and economic factors are to blame for a relatively large size of the informal economy in these countries which is estimated to be on average of around 30 percent. This region has undergone several changes over the past decade, and some social, economic and judicial reforms have taken place, partly influenced by the European Union. Majority of these countries have also had the most prolonged relative political stability over the years and have undergone significant democratic reforms. It is the first attempt to measure the size and the development of the informal economy for the Balkan countries as one sample, and therefore be able to see the effects such reforms, if any, had on the size and developing trend of the informal economy in the region.

Chapter 2: Theoretical background

2.1. Introduction

This chapter investigates and reviews the theoretical literature of the informal economy by analysing the main theories underlying the informal economy. The chapter introduces and defines the concept of informal economy and analyses the main causes and effects of economic informality from a theoretical point of view. It will look at the theory of the public sector and taxation as the leading cause and effects of informality, considering the assumption that a growing informal economy reduces the government revenues which will have a negative impact on the provision and quality of public goods and services, and thus in turn exacerbating the incentives for economic agents to continue operating informally (Schneider et al., 2010). Other important factors such as the rule of law, government effectiveness and regulation or bureaucracies when it comes to the ease of doing business, the dominance of the agriculture sector, size of the government, level of corruption, and electric consumption are also important factors and will be included in the model and described in this chapter.

This chapter will also discuss in detail the main ways to measure the informal economy, using econometric models and methodologies, highlighting the advantages and disadvantages of each model in measuring the size of the informal economy. At the same time, this chapter provides a rationale for using the model approach (MIMIC model) for measuring the informal economy as opposed to other approaches available.

The size of the informal economy is higher in developing and transition economies, but it also exists in more advanced economies (Schneider, 2007; Schneider & Buehn, 2012; Hassan &

Schneider, 2016a). Its consequences, however, reflect in different countries with different intensity. The adverse effects resulting from a growing informal sector are plentiful and multi-layered; therefore, it is imperative for them to be identified and minimised (Schneider & Enste, 2000, Schneider, 2014). However, at times the informal economy, at controllable levels, can act as a cushion for survival for many people around the world (Finnegan & Singh's 2004; Chen, 2004, 2007, 2012). When the informal economy was first 'discovered' in the early 1970s, many observers argued in the notion that the informal economy was marginal, peripheral and not related or linked to the official economy of modern capitalist development (Becker, 2004). Today, however, as significant proportion of the global economy and workforce is informal, the topic of informal economy has received a lof of research interest around the world (Chen, 2012).

With the existence of the informal activities around the world, most countries worldwide invest in efforts to control such activities through various measures like punishment, prosecution, education or economic growth which tends to create more opportunities in the formal economy (Chen, 2012). It is understood that there is a negative relationship between the level of economic development or economic growth and informal economy (Schneider et al., 2010). As the economy grows, job opportunities grow, and as such people can get jobs in the formal rather than informal sector of the economy.

Collecting information about the size and the extent of the informal economy, the agents involved in informal activities, as well as the frequencies with which these activities are occurring is highly important in designing policies which are both efficient and effective in allocating a country's resources in dealing with informality (Dell'Anno & Schneider, 2003). However, getting accurate information about the size and extent of informal activities in a

country can be very challenging, and as such measuring the informal economy can be a challenging task because all those that are involved in such activities do not wish to be identified (Dell'Anno & Schneider, 2003).

In developing and transition countries, the poor and even the middle classes often produce and satisfy most of their financial and economic needs from the informal economy (Chen, 2012). Although informal economic activities present an alternative form of employment and production for many, they too impose considerable costs for the economy. Tax evasion, informal employment, disrespects for the rule of law, and unfair competition, among others, impose a big challenge for governments to face (Losby et al., 2002; Chen, 2012; Williams & Martinez, 2014). The nature and the characteristics of the informal economy have been debated both in policy and academic circles as discussed in some detail in the literature review chapter. There is no unique definition of the informal economy in the literature, and many terms have been used to define it.

2.2. Defining the informal economy

Defining the informal economy has posed to be a challenge for many scholars because its definition will affect how one measures it. Further to its definition, different terminology is used in different studies by different authors. When reviewing the literature, several terms are seen being commonly used to define what this thesis will refer to as the informal economy, such as the shadow economy, underground economy, black economy, grey economy, the non-observed economy, bazaar economy, the hidden economy etc. Schneider, for example, in almost all his studies, refers to the informal economy as the "shadow economy". The term informal economy will be used in this thesis, in light of its definition provided by Fiege (1990, p.10) and described below. The term informal economy mainly

relates to the scope of this thesis in analysing the impact of state burdens from taxation, social security contributions, regulation, the rule of law and administrative bureaucracies' perspectives in influencing individuals to engage in activities which do not comply with aforementioned burdens (Schneider, 2007).

Hart (2008a) has defined the informal economy as economic activities which are performed away from the bureaucracy of establishments. Similarly, Ihrig & Moe (2004) also define the informal sector, as a sector that does not comply with legal normal and regulations set out by the government, but it is a sector that produces legal goods and services. Another frequently used definition is that all informal economic activities are those that are unregistered economic activities which contribute to the national account identity (Fiege, 1989; Frey & Pommerehne, 1984; Schneider, 2007). The definition by Smith (1994) is that the informal economy is all "*market-based production of goods and services, whether legal or illegal, that escapes detection in the official estimates of GDP*" (Smith, 1994: p.18). A broader definition is provided by Fleming et al. (2000, p. 389), where they define it as…*"those economic activities and the income derived from them that circumvent or otherwise avoid government regulation, taxation or observation".*

A narrower definition of the informal economy has been provided by Pedersen (2003, p.13-19). According to them, the informal economy includes:

> *"…all market-based legal production of goods and services that are deliberately concealed from public authorities for the following reasons: to avoid payment of income, value added or other taxes, and as such tax evasion; to avoid payment of social security contributions and as such informal employment; to avoid having to meet certain legal labour market standards, such as minimum wages, maximum working*

hours, safety standards, etc.; and to avoid complying with certain administrative procedures, such as completing statistical questionnaires or other administrative forms" (Pedersen, 2003: p.13-19).

Similarly, Feige (1990, p.10) states that:

"*…the informal economy implies those economic activities that circumvent the costs and are excluded from the benefits and rights incorporated in the laws and administrative rules covering property relationships, labour contracts, financial credit, social security systems, etc"* (Feige, 1990; p.10).

A study by Lippert and Walker (1997) explains the definition of informal economy by referring to it as the underground economy and argues that this is a "…*reasonable consensus definition of the overall underground economy"* (Lippert and Walker, 1997: p.5). According to the "*taxonomy of types of underground economic activities"* (Lippert and Walker, 1997: p.5), the underground economy can involve illegal and legal activities from a monetary and non-monetary transactions perspective. The illegal activities involve those activities such as trading of stolen goods, drug dealing, manufacturing and smuggling as well as prostitution and trafficking (Lippert & Walker, 1997; Mirus & Smith, 1997). The legal but informal activities according to Mirus & Smith (1997) can be characterised by tax evasion and tax avoidance[20] categories from a monetary and non-monetary perspective.

[20] The tax evasion refers to the unreported income from different sources, while tax avoidance can refer to different employee discounts and fringe benefits from a monetary perspective, to all do-it-yourself and neighbour help activities from the non-monetary perspective.

Table 2.2. 1 - A Taxonomy of Informal Economic Activities, Source: Lippert and Walker (1997, p. 5)

	Monetary Transactions		Non-Monetary Transactions	
Illegal Activities	Trade in stolen goods, drugs; manufacture of drugs; prostitution, gambling, fraud		Barter, drugs, stolen goods, etc.	Produce or grow drugs for own use. Theft for own use.
	Tax Evasion	**Tax Avoidance**	**Tax Evasion**	**Tax Avoidance**
Legal Activities	Unreported income from self-employ-ment, wages, salaries, and assets	Employee discounts, fringe benefits (cars, subsidized food, etc.)	Barter of legal services and goods.	Do-it-yourself work

In most of the studies, the authors exclude illegal informal activities that are of the nature of serious crimes like drug dealing and trafficking, robbery and burglary, etc. Majority of studies also *"…exclude the informal household economy which consists of all household services and production and do-it-yourself services*" (Schneider and Buehn, 2009; p. 2). In most of the work the term "*informal economy*" is preferred more than the term "*informal sector*" because workers and enterprises in question do not belong to a single sector of economic activity but to many sectors (De Soto, 1989; Rauch, 1991). This thesis will, therefore, concentrate on the narrower definition provided by Pedersen (2003, p.13-19) and will consider the new institutional economics classification of the informal economy described in Fiege (1990).

2.3. Theory of the informal economy

Estimates of the size of the informal economy vary depending on its definition and the characteristics of different countries worldwide. Hence, there is growing literature in

analysing the theories and debates regarding the informal economy. According to Gibson & Kelley (1994), the underlying principles about the informal sector are that it arises from the capital-limited nature of the economy. If the capital was not in short supply, the authors argue that all economic activity would be formal.

How the Informal Economy arises?

There are different schools of thoughts regarding the informal economy. There are the dualists' views, the structuralists, the legalists and the voluntarists (Chen, 2012). Each of these schools of thought describes a different theory of how the informal economy arises. The dualists tend to argue in the lines that the informal agents are excluded from new economic opportunities as a result of *"….imbalances between the population growth rates and modern industrial employment"* (Chen, 2012; p.5), and *"…because of a mismatch between people's skills and the structure of modern economic opportunities"* (Chen, 2012; p.5).

The structuralists, on the other hand, argue that the tendency for capitalist growth can encourage and drive informality in countries. Chen (2012), describes this view in terms of the attempts made by formal firms to increase their profitability in capitalism;

> *"…by trying to reduce labour costs and increase competitiveness; and the reaction of formal firms to the power of organised labour, state regulation of the economy (notably, taxes and social legislation); to global competition;"* Chen (2012; p.5-8) and *"…to the process of industrialization…"* Chen (2012; p.5-8).

From the legalists' perspective, however, it is argued that a hostile legal system tends to drive people to work as self-employed and in doing so operate within the informal economy in their own terms and norms (Chen, 2012). Likewise, the voluntarists claim that the informal agents

choose to operate informally because they see that the costs associated with formality might be higher than the costs associated with informality (Chen, 2012).

The relationship between formal and informal economy

These four leading schools of thought about the theory of the informal sector have different perspectives regarding the linkages between the informal economy and the official or formal economy. For example, the dualists defend the notion that informal agents and their activities do not have many linkages or relationships with the formal economy but, instead, they tend to *"operate as a distinct"* and *"separate sector of the economy"* and that the workforce involved in informal activities who tend to be self-employed in most cases, comprise the *"less advantaged sector of a dualistic or segmented labour market" (Chen, 2012: p.5).* For dualists, the link between tax burden, burden of regulation and the informal economy is of less concern. They argue that it is the responisbility of governments to create new jobs and provide financial and professional support as well as the needed infrastructure and social services to informal agents and their families (Chen, 2012; la Porta & Schleifer, 2014).

Contrary to dualists, the structuralists regard the informal and formal economies as inherently linked. They argue that informal agents (firms and workers) are regarded as subordinates or inferior to the interests of capitalism, and that their existence is merely there for the provision of cheap services and production of goods at lower prices (De Soto, 1989; Chen, 2012). Structuralists maintain the view that *"…governments should address the unequal relationship between 'big business' and subordinated producers and workers by regulating both commercial and employment relationships"* (Chen, 2012: p.5-8).

The primary focus of legalists is on "…the formal regulatory environment to the relative neglect of informal wage workers and the formal economy per se" (Chen, 2012: p.5-8). They recognise that formal firms tend to collude with government to set the bureaucratic regulation in making it harder for new entrants, and at times creating barriers to entry and driving informality (De Soto, 1989; Chen, 2012). The Legalists…

> *"…argue that governments should introduce simplified bureaucratic procedures to encourage informal enterprises to register and extend legal property rights for the assets held by informal operators in order to unleash their productive potential and convert their assets into real capital"* (Chen, 2012: p.5-8).

The voluntarists, on the other hand, tend to subscribe to the belief that formal agents find it difficult to compete with informal agents as the latter avoid formal regulations, taxes, and other costs of production, thereby creating unfair competition (Chen, 2012). The voluntarists believe that informal agents should somehow be made to operate under the formal regulations and norms in order for the government to increase the tax revenue and reduce the unfair competition for formal agents (Chen, 2012).

Factors driving informality

Several other theories describe how the informal economy arises and what comprises it. According to Maloney (2004) the informal economy is made up of informal entrepreneurs who would either choose to work informally or would volunteer. While other researchers in this field argue that during economic crises or downturns the size of the informal employment increases, adding necessity and survival as the leading causes for informality (Chen, 2004, 2007, 2012; Finnegan & Singh's, 2004; Schneider, 2002, 2007; Cling et al., 2010). Other

studies, on the contrary, argue that informal employment and informality in general, are features of modern global economy and that the number of hired informal workers by formal firms is growing worldwide (Finnegan & Singh's, 2004; Cling et al., 2010). There is a growing acknowledgement that the informal economy is driven by many different factors, and therefore many scholars use MIMIC models to measure the informal economy (Schneider, 2002, 2007, 2014).

A number of developments have been done with regards to different methodologies that try to capture most of the theoretical factors that either drive or are affected by informality. Perry (2007) proposed model with regards to the composition and drivers of informality in which three economic agents were specified – such as the firms, micro-firms and the workers they employed. For the main causes or drivers of informality, Perry (2007) indicated that different factors affected informality differently depending whether it is a voluntary involuntary informality. Kanbur (2009), on the other hand, proposed a theoretical framework which differentiates between different types of how economic agents react to regulation, emphasising the importance of regulation in general, bureaucratic rules and norms and taxation in determining the size of the informality in developing countries, where informality is of significant size (Chen, 2012).

The importance of understanding the informal economy and its primary drivers is significant in combating, controlling and perhaps formalising it. The effects of the informal economy into the formal economy have been analysed to be significant. Loayza (1996) finds that the size of the informal economy and the activities within are positively correlated with the level of taxation, inefficient government institutions and labour market restrictions. In reaching this conclusion, Loayza (1996) has analysed data from Latin American countries. This is a

theoretical and empirical view that has been tested by many such as Loayza (1996) and Friedman et al. (2000). Friedman et al. (2000) on the other hand, find that costs of bureaucracy and the level of corruptive practices, rather than tax rates, are the main factors encouraging the existence of an informal sector. Friedman et al. (2000) claim that producers in the informal sector escape much of the burden or taxation and regulations, but contrary to formal producers, they will receive less or no assistance from public services and the government. Informal agents would have to take the risk of producing or operating without the protection of their property rights by the security forces and the judiciary system. Furthermore, public utilities, such as road infrastructure, sewages, clean water, and electricity might also be of lower quantity and quality (Friedman et al., 2000).

Azuma and Grossman (2002) investigate what drives producers into the informal sector, suggesting that high taxation burden, bribes, and the regulation burden are the leading cause. Using two different *"…models of the state (one assuming that the state is proprietary…"* (Azuma & Grossman, 2002: p.3) – that is a state as the instrument of the ruling elite which appropriates the net revenues of the state, after spending for public services; and the *"…other model considers a hypothetical benevolent state that would maximise the total net incomes of all producers)"* they show that…

> *"the existence of a large informal sector can be attributed to the fact that productive endowments contain important unobservable components, the state cannot adjust the amounts that it extracts from producers in the formal sector according to each producers endowment"* (Azuma & Grossman, 2002: p.3).

The informal economy has been considered as an exploitation of workers, with lower pay, and no rights or insurance involved in fraudulent and illegal activities by some authors such

as Williams (2005), while others have shown that some workers and producers choose informality rather than being forced into it (Williams & Renooy, 2008). For example, Williams & Renooy (2008) show that most of the undeclared work in 27 EU countries is conducted on a voluntary basis. Therefore, is the view of the authors is that the informal economy consists of many heterogeneous markets with different groups of agents engaged in a variety of informal activities, for various reasons and income levels (Andrews et al., 2011). Thus, designing effective policies, one needs to fully understand the precise nature and characteristics of informality in different markets, as this is likely to affect the shaping of such policies.

Main agents involved in informal economy

The informal economy is understood to be mainly housing the three types of actors or agents within it, who are involved in informal economic activities and are the primary drivers of the informal economy in general (Andrews et al., 2011). First, we have the informal workers employed by both the formal and informal firms. This would include jobs that re not declared to tax authorities, as well as those jobs for which employment regulations are either not applied or enforced. It typically includes illegal immigrant or migrant workers (this is more typical in developed countries), those individuals that are forced to work in the informal economy for the lack of opportunities in the formal economy (this is typical in developing countries), as well as those who are satisfied with conditions of informal employment (again this is more typical in developing countries).

Secondly, we have the workers who are self-employed who are mainly those self-employed workers without employees that tend to operate almost entirely informally (Andrews et al., 2011). It could also include self-employed workers who generate a portion of their earnings

from undeclared (usually cash-in-hand) work with the main purpose of avoiding paying any direct or indirect tax. Third and final group of agents driving the informal economy are the firms and their informal production. This type of economic informality is made up of formal or informal firms (with employees) generating or producing all or a portion of their business "*off-the-books*"; with the sole purpose to avoid paying VAT, under-report their earnings and profits and employ informal workers to avoid paying for any pension arrangements or contributions (Andrews et al., 2011).

From a behavioural point of view, participation in the informal economy by different actors (outlined above) is a decision mainly driven by cost-benefit analysis. There are a number of factors which can influence the decision of the above-mentioned agents to participate in informal economic activities, such as individual and firm characteristics, the market structure a firm or producers is in, social norms, institutional and policy establishment and the regulatory environment (Andrews et al., 2011).

Impact of the informal economy

The volume of informal activities and the size of the informal sector can generate externalities affecting actors within the informal economy but also in the formal economy. According to Enste (2010), a large overall informal sector can mean that formal firms and workers would have to contribute more in taxes to maintain a reasonable level of public services, which in turn reinforces the attractiveness of the informal sector and increases the opportunity cost of operating formally. Essentially this means that the government must rely more on formal firms and workers, and as such imposing them with higher taxation. Furthermore, large informal economy can reduce the popular trust in government institutions and services leading to social norms where tax evasion and therefore free-riding on public services is

acceptable. This, in turn, can further increase informality and externalities (Andrews et al., 2011; Enste, 2010). Because of these mechanisms, countries might find themselves stuck in an equilibrium with either low or high level of informal employment (Bovi & Dell'Anno, 2010).

However*, "…for countries in between the two extremes, measures reducing the extent of informality may have a multiplier effect, leading to improved finances and lower corruption, which triggers a further reduction in informality."* (Andrews et al., 2011: p.30-33). This enforces the view that the informal sector can have an impact on the level of economic growth and productivity (Andrews et al., 2011). Loayza, (1996) estimates the impact of informality on economic growth and find a negative cross-country correlation between the level of GDP per capita and informality. However, this relationship may not be causal because the higher the level of economic development in a country is the better the quality of institutions and as a result the lower the extent of informality (Andrews et al., 2011).

From the social benefits and costs point of view as well as public sector theory perspective, all informal market participants benefit from the informal economy. By working informally and avoiding paying taxes, individuals will end up receiving higher net incomes and can purchase goods and services at lower prices. Firms can produce at lower costs by avoiding time- and sometimes resource-intensive interaction with government officials and tax authorities and can generate higher net profits as a result of tax evasion. Corrupted government officials and politicians could end up receiving additional incomes (in the form of bribes) in exchange for accommodating favours for those participating and profiting from the informal economy (Olters, 2003). On the other hand, the costs associated with this tend to be public in nature which includes the reduction or deterioration of government revenues which consequently means lower expenditures on the provision of the quantity and quality of public

goods and services such as schools, healthcare, infrastructure, and essential utilities (Olters, 2003).

All economic agents and the government recognise that fact that everyone would be better off from a more formalised economic setting, with a minimal degree of tax evasion, and higher quality and quantity of public goods and services. However, economic agents participating in the informal economy are not genuinely going to voluntarily formalise their economic activities due to the conflict between private benefits and public costs (Olters, 2003). The potential reduced private benefits as a result of formalising the informal activities might be higher than the potential and yet uncertain expectation for improvements in the provision of public goods and services (Olters, 2003; Alesina, 1999). Thus, economies with a relatively large informal sector could be trapped in a 'vicious cycle' (Alesina, 1999), where high level of economic informality makes the task of the government to efficiently collect revenues challanging. Lower tax revenues could be translated into low expenditures for important public goods and services, impacting the quality and quantity of such goods and services. This will have a negative impact on the taxpayer discipline and weakens tax morality in the country, resulting in an economic fiscal trap (Alesina, 1999).

Different studies (de Soto, 1989; Neck et al., 1989; Asea, 1996; Loayza, 1997; Alesina, 1999; Abed & Gupta, 2002; Schneider & Enste, 2000; and Olters, 2003) tend to represent an economic fiscal trap by refering to a dual equilibrium model. Aneconomy *"…without credible, coordinated and efficient actions by all market participants will not be able to automatically find a path towards an outcome with high-quality public goods and services and a high degree of tax morale"* (Olters, 2003: p.5-7). Even in competitive market economies, the only actor capable of initiating and coordinating necessary measures is the government. As such, a

country with large informal sector and inadequate policies can be trapped in an equilibrium where the large size of the informal sector remains, thetax administration weakens, resulting in lower tax revenues and less public goods and services. This in turn strengthens the incentives for market participants to continue to operate informally or for new agents to enter the informal sector (Tanzi & Tsibouris, 2000; Olters, 2003).

Neck et al. (1989) and Schneider & Enste (2000) suggest that the existing incentive structure in countries with relatively large size of informal economy tend to resemble the prisoners dilemma discussed in game theory. This prevents economic agents to change their conduct, for a simple political-economic argument. As market participants in the informal economy is also a consumer, worker, voter, or taxpayer, who could benefit from the status-quo as much as firms or producers benefit from relatively lower labour costs, less regulations, and less tax obligations. Hence, the politicians elected from the economic agents indicated above have no incentive to reforming and proposing significant changes, because that could reduce their voter's economic advantages impacting negatively their own election results. This goes back to the leading causes of the informal economy discussed in an earlier part of this chapter, which was discussed to be as not only economic, legal and administrative but also as social and political ones.

Figure 2.3. 1 - The stylized Dual Economy adopted from Olters (2003)

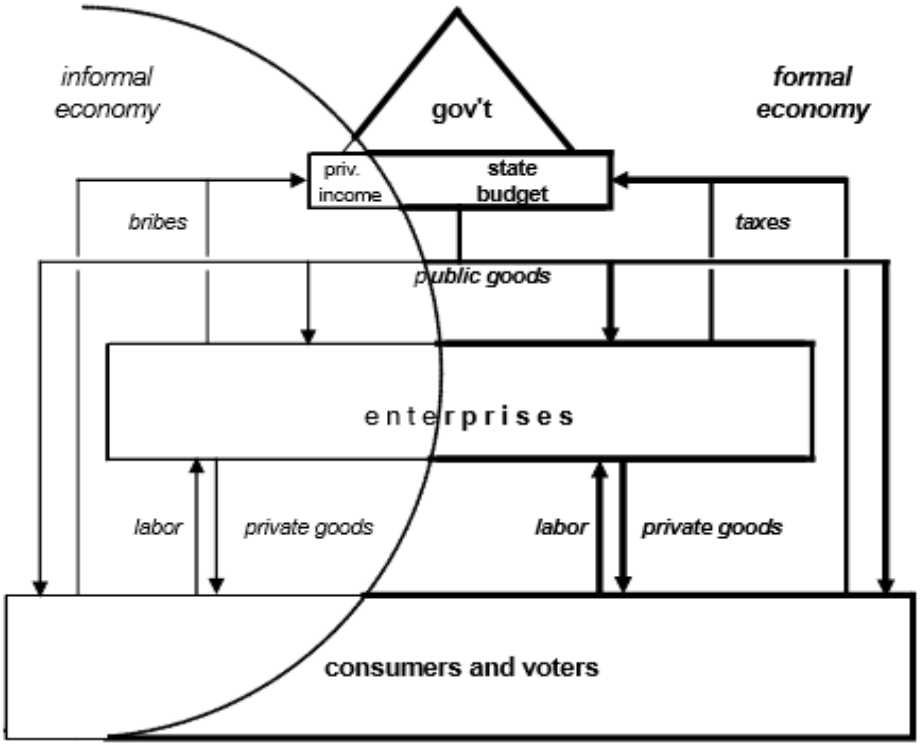
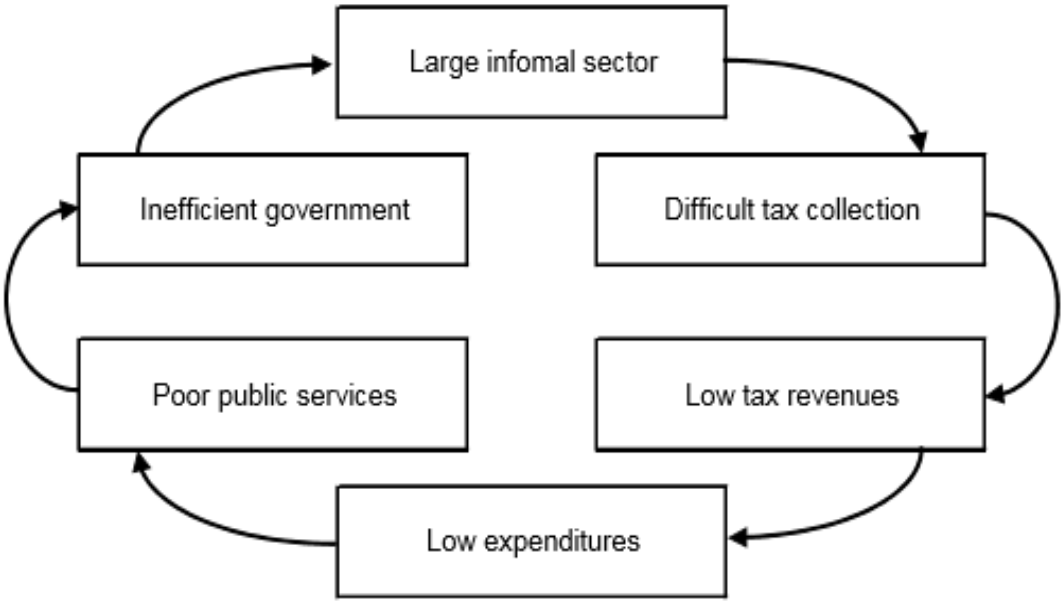


Figure 2.3. 2 - Vicious Cycle, adopted from Alesina (1999) and Olters (2003)



In general, there is already a common consent that the informal economy constitutes a significant part of the overall economy. The influence of the informal economy on the overall economy a country can be either positive or negative, however. There are a number of

advantages and disadvantages of the informal economy from three different perspectives; economic, social and political adopted from Harding & Jenkins (1989), Frey (1989), la Portes et al., (1989) and Gerxhani (2004b). According to Harding & Jenkins (1989) the informal activities may bring growth if supported and encouraged and will provide lower prices for goods and services as a result of lower labour costs, while la Portes et al., (1989) claim that despite various advantages, no development strategy and growth is expected from the informal sector as the informal sector can cause distortions in some leading economic indicators such as the unemployment rate, inflation rate, and growth rate. A full list of advantages and disadvantages of the informal economy is provided in a table format in appendix 2.2.1.

2.4. Reflection on different schools of thoughts

The general views of the different schools of thoughts have been discussed in the previous section. This research will take the stance on the views that the level of informal economy affects more significantly the level of formal economy rather than vice versa. In the countries of the Balkan Peninsula the level of informality is having a significant impact on the level of formal economy and hindering the much-needed economic development and prosperity in these countries. The view by dualists that the informal and formal economies are two separate entities does not hold very much for the countries part of this research. The agents involved in informal economic activities tend to engage often with those involved in formal economic activities. Schneider & Enste (2000) argue that the existence of the informal economy can have positive effects on the formal economy because most of the income earned from informal economic activities is spent immediately on the formal economy. However, it can also significantly impact the potential economic development of the country

in terms of its potential spending in public services and capital spending on ensuring popular trust in those governments.

The dualists also pay little attention to the linkages of the level of informality and government regulations, taxation burden and the rule of law. Different studies suggest that there is a clear link between the quality of institutions and rule of law as well as the level of regulations and the informality. Tax burden was also one important driver in many economies and was used as a causal variable in most studies. However, tax burden tends to be more of a driver in developed and high tax economies rather than less developed countries. To attract foreign direct investment and reduce unemployment, majority of less developed and transition economies tend apply fiscal policies which favours low taxation regimes, and yet the level of informality is significantly higher on these countries, despite the low level of taxation. Majority of Balkan economies are low tax economies and yet compared to other European countries, the level of informality is amongst the highest. This suggests that tax burden is not the main cause of informality for the countries of the Balkan Peninsula. But rather, other factors are more important, such as the legal system and level of regulations or bureaucracies, and people's trust in their institutions. When calculating the level of economic informality, specific factors relating to the country or group of countries should also be considered.

On the other hand, the structuralists who claim that the very nature of capitalism and struggle for growth can encourage and drive informality, and the legalists' perspective which argues that a hostile legal system tends to drive people to work as self-employed and engage in informal economic activities within their informal legal norms - are more in line with the stance of this research. This research will develop a theory which will suggest and test that the regulation burden and bureaucracies, trust in institutions, the structure of the economy

and its sectors (e.g. dominance of the agriculture sector), the level of corruption or government integrity, the size of the government and the stability of prices as well as the government effectiveness in providing public services are more important exogenous causal variables than the level of taxation.

In light of this, the narrow definition of the informal economy provided by Pedersen (2003), Kazemier (2003), which is mainly based on the level of tax evasion and administrative bureaucracies, should be expanded to include other important factors discussed above. Popular trust on governmental institutions and the quality of public services is also an important factor that forces many agents to engage in the informal economy. A potential belief that a government is not fit for purpose, is corrupt and it is not effective and efficient in providing qualitative public services for all citizens is makes paying taxes and obeying norms and regulations very undesirable.

2.5. Causes of the Informal Economy

According to Schneider and Enste (2000), Schneider (2014), Sarac and Basar (2014), there are a number of causes behind the existence of informal economy in many countries of the world. First, there are the general economic causes regarding the unjust distribution of income, high inflation or high unemployment levels, the taxation system and the existence of intense regulation and administrative bureaucracies. In the following pages the leading causes of the informal economy will be discussed.

Fiscal Policies

Fiscal policies are important causes of the informal economy in a country. High tax rates, deficiency in auditing, insufficient accounting services etc., are just some of the main factors

facilitating the size of the informal economy (Azuma and Grossman 2002 and Loayza 1996). Complicated regulations and unclear laws, frequent changes in laws and regulations and degeneration in the unitary structure are the legal causes of informality.

Schneider (2014) and Sarac & Basar (2014) also argue that there are administrative, social and political causes of informality. Regarding administrative causes, the organisation of tax authorities, technical structures and auditing mechanisms are the main causes of informality. While regarding social causes, the tax ethics and morale, taxpayer psychology and historical causes can trigger informal agents to undergo informal economic actives. In some cases, causes such as elections, government reforms, corruption, etc., are considered as the main political causes of informality.

According to Thomas (1992); Schneider (1994, 1997, 2003, 2005); Pozo (1996); Johnson et al. (1998); Giles (1997, 1999); Giles et al. (2002), Del'Anno (2003) the possible causes and the leading indicators of the informal economy are the burdens of direct and indirect taxation, both actual and perceived. A higher tax burden increases the incentive to work in the informal economy. Furthermore, increases in the level and bureaucracy of regulation increases the incentive to enter the informal economy (Friedman et al., 2000). Additionally,

> "*the 'tax morality' (citizens' attitudes toward the state), which describes the readiness of individuals (at least partly) to leave their official occupations and enter the informal economy: it is assumed that a declining tax morality tends to increase the size of the informal economy" (Schneider, 2006: p.49)*.

Public Sector Services

The provision and the quality of public sector services is also an important cause of the informal economy. The level of public sector services and their quality highly depend on the level of government revenues (Schneider et al., 2010; Schneider & Buehn, 2012). The larger the size of the informal economy is, the higher the level of tax evasion and avoidance will be - leading to a reduction in government revenues. This reduction in government revenues is likely to affect the provision and the quality of public sector services (Johnson et al. 1998). This could lead to higher tax rates which are likely to provide further incentives for firms and individuals to engage in the informal economic activities to avoid higher taxes.

Overall Economic wellbeing

The overall economic well-being and business cycles in a country are also crucial determinants of the level of the informality. Various studies suggest that during a recession people tend to engage in informal economic activities to compensate any income losses from the formal economy (Bajada & Schneider, 2005; Dell'Anno, 2007; Vuletin, 2008; Hassan & Schneider, 2016a). Thus, the level of unemployment can be considered as a cause of the informal economy. The level of GDP is also an important determinant. It indicates the level of overall economic well-being in a country and the availability of opportunities to work in the formal economy (Schneider et al., 2010).

According to Alm & Embaye (2013), the level of inflation also plays a vital role in providing an incentive to people to engage in informal economic activities. Inflation tends to reduce the real income firms and individuals can generate from the formal economy. This reduction in their real income is likely to incentivise some individuals to undertake additional economic

activities which might be informal in an attempt to compensate any reduction in their purchasing power (Vuletin, 2008; Elshamy, 2015).

Administrative Bureaucracies and Regulation burden

The level of regulatory burden and the level of administrative bureaucracies is another main driver of the level of informal economy (Gerxhani, 2004a; Schneider & Enste, 2000). There is significant empirical evidence that strict labour regulations can increase the size of the informal economy (Johnson et al., 1998; Schneider et al., 2010). Strict labour regulations in a country can fuel incentives for individuals to work in the informal economy since such regulations significantly increase labour costs which are shifted to employees from firms. Johnson et al. (1997), Friedman et al. (2000), Hassan & Schneider (2016) find significant empirical evidence that a country with a greater intensity of regulation tends to have a higher size of the informal economy relative to their GDP.

Effects of the informal economy

On the other hand, a change in the size of the informal economy may be reflected in some important effects or indicators (Schneider, 2005; Dell'Anno & Schneider, 2003). Such effects can be seen in monetary indicators. This is because if informal economic activities increase, there will be a requirement for additional monetary transactions (Schneider & Buehn, 2009). Development or changes in the labour market can also indicate how large will the size of the informal economy be. An increased participation of workers informally results in a decrease of workers' participation in the formal economy.

Developments in the production market can also indicate the level of informality in a country. Factors of production might be displaced from formal to informal economy as size of the latter

grows which could have a negative impact on the official growth rate of the economy (Dell'Anno, 2003; Chaudhuri et al., 2006; Dell'Anno et al., 2007; Dell'Anno, 2007; Schneider et al., 2010; Feld & Schneider, 2010; Buehn & Schneider, 2012; Barbosa et al., 2013; Nchor & Adamec, 2015).

The level of the official economy is also an important indicator of the informal economy. The level of GDP growth or the GDP per capita can be negatively affected by the size of the informal economy, and therefore, the impact of the informal economy will be reflected in the formal GDP (Dell'Anno & Schneider, 2003; Schneider, 2007; Schneider & Savasan, 2007; Feld & Schneider, 2010; Abdih & Medina, 2013; Vo & Ly, 2014; Nchor & Adamec, 2015). A further impact of the informal economy can be reflected in the Electric power consumption. The hypothesis here is that, the larger the size of the informal economy, the higher the electric consumption per capita, ceteris paribus. Assuming the unitary elasticity, the growth in electricity consumption is equal to the growth in the total real GDP (Schneider & Enste, 2000; Arby et al., 2012)

These are just some of the causes and effects of the informal economy, which underline the main theories in understanding the informal economy. Theories of informal economy are generated from the leading causes and effects of the informal economy.

2.6. Measuring the informal economy

It has been established in many studies that when it comes to measuring the size of the informal economy can be a very challenging task (Schneider & Enste, 2000; Schneider, 2014). More so, when different methodologies applied to measure the size of the informal economy can provide different results which can have a marginal error of about +/- 10 to 15 percent (Schneider, 2014). Nevertheless, once some studies define the informal economy, they

pursue to measure the size of the informal economy based on three main approaches. The use of a precise definition of the informal economy will help to assess or estimate its size because it will evade potential arising ambiguities and controversies (Schneider, 2014). Indeed, many studies (which have been identified in the literature review chapter of this thesis) have measured or estimated the size of the informal economy for many countries worldwide. The three main approaches for measuring the size of the informal economy in a country are distinguished between the direct or indirect approaches or the statistical modelling approach which estimates the informal economy as an unobserved variable.

The table below lists different methods currently being used to measure the size of the economy using different models under each of the three methods described above.

Table 2.5. 1 - Main approaches and their methods for measuring the Informal Economy

Approaches	**Methods available**
Direct Approach	• Survey method • Tax Auditing method

Indirect Approach	• The Discrepancy between National Expenditure and Income Statistics
	• The Discrepancy between official and actual Labour Statistics (Labour market analysis)
	• The Transactions method
	• The Currency Demand method
	• The Physical Input (Electricity Consumption) Method
	  ○ The Kaufmann – Kaliberda Method
	  ○ The Lackó Method

Modelling Approach	• The MIMIC (multiple indicators multiple causes) model

2.6.1. Direct Approach and methods available

Under the direct approach in measuring the size of the informal economy are the survey and tax auditing methods. In both methods, the results can generate biased outcomes (Schneider & Enste, 2000; Schneider, 2007, 2014).

Survey Method

The Survey method employs surveys which encompass some multiple-choice questions, open-ended questions and yes or no questions. These surveys have to be designed in a way that respondents are willing to answer the questions in it. Designed surveys to estimate the informal economy are widely used in a number of countries around the world and the majority of the countries they have the sample Labour Force Surveys which are performed every year (Schneider, 2006, 2007; Abdih & Medina, 2013; Vuletin, 2008). The central principle of these surveys is in selecting a representative sample of households and, in these selected households, to identify those own-account workers and employers who are thought to belong to the informal sector (Wallace et al., 2004). The main advantage of this, therefore, is that, if successful, information and data are derived from sources and as such can be very valuable for analysis (Kazemier, 2005).

However, an important disadvantage of this method, is that the results depend largely on the individual's willingness to participate. Thus, it usually is challenging to determine the level of undeclared work and other informal activities from a direct questionnaire as most participants in these questionnaire might be reluctant to admit to a potential fraudulent behaviour or provide any accurate information which would indicate such a behaviour (Schneider, 2007), , thus making it difficult to assess a real estimate of the extent of undeclared work or other informal activities (Schneider, 2007). Therefore, the results from these kinds of surveys are susceptible to the way the questionnaire is formulated (Mogensen et al., 1995; Pedersen, 2003; Feld & Larsen, 2005; and Kazemier, 2005). Furthermore, surveys only offer a snapshot hints relating to the level of informal economic activity, thus relying on

them makes it harder to extrapolate trends regarding its size over time (Schneider, 2002; Alderslade et al., 2006).

Tax Auditing Method

The estimation of the informal economy using the Tax auditing methodology is primarily based on the discrepancy between the level of taxable income declared and the level of income measured by random or selective checks by the tax administrative authorities (Thomas, 1992; Alderslade et al., 2006; Schneider, 2007). Software programs for auditing tax returns have been beneficial in recent years in measuring the amount of undeclared taxable income in many countries (Alderslade et al., 2006); however, there are some disadvantages of this method as well. Just like in a survey, using tax compliance data is equivalent to using a sample of the population which could be generating biased results.

Typically taxpayer selection for audits is not made based on random selection procedures, but rather it is based on submitted tax returns which indicate a certain likelihood of possible fraud. Usually, the tax returns are either filled by the accountants or the self-employed individual (Schneider, 2006, 2007, 2014; Aldersdale et al., 2006). As such, the estimates about the informal activities can be inaccurate and subject to be biased. Furthermore, using this method, one should be able to measure only a small fraction the informal economy which is successfully discovered by tax authorities (Aldersdale et al., 2006), which is caused by many other activities. If one should analyse the trends and development of the informal economy in a country over a longer period, then both methods explained above are unable to provide such estimates for analysis.

2.6.2. Indirect Approach and methods available

The indirect approaches sometimes referred as ‘indicator’ approaches use different

economic, social and other indicators which contain information about the development of the informal economy over a period (Schneider & Enste, 2000; Schneider, 2007; Abdih & Medina, 2013). As indicated above there are five primary methods for measuring the informal economy indirectly.

The Discrepancy between National Expenditure and Income Statistics

One of these methods is based on the discrepancies between the estimates using the income and expenditure approaches when measuring GDP. In general, according to national accounting terms and macroeconomic theory, the GDP of a country can be measured based on three main methods: the expenditure method; the income method; and the production method. Three methods of measuring GDP should result in the same number, with some possible differences caused by statistical and rounding differences (Carlin & Soskice, 2015). The three methods of measuring the GDP of a country are all identities, and each holds at each point in time. Therefore, the total income in the economy should be equal to the total expenditure because for every transaction there is both a buyer and a seller. What would be an expense for a buyer; it would be income for the seller. In practice, the size of the GDP using the three methods can differ (Carlin and Soskice, 2015, p.5). As such, the gap between the expenditure measure and the income measure of the GDP of a country can be used as an indicator of the extent of the informal economy (Thomas, 1992).

The advantage of this method is that *"…if all the components of the expenditure method are measured without errors…"* (Schneider, 2006; p. 40), then this approach would generate a reasonable *"…estimate of the scale of the informal economy".* But, often *"…this is not the case"* (Schneider, 2006; p. 40). The disadvantage of this method is that the discrepancy between expenditure and income reflects *"all omissions and errors everywhere in the national*

accounts statistics as well as the informal economic activity" (Schneider, 2006; p. 40). These estimates might, therefore, provide results that are not reliable (Schneider, 2007).

The Discrepancy between Official and Actual labour force statistics

The second method classified under the indirect approaches is the analysis of the labour market or the discrepancy between the official employment rate and the actual labour force of a country. Labour market analysis can provide strong indications regarding the size and composition of the informal economy workforce (Aldersdale et al., 2006). The declining labour force participation rate in the formal economy can be seen as an indication of increased activity in the informal economy (Schneider, 2006, 2007, 2014). According to Schneider & Enste (2000, p.93) and Schneider (2014, p.13), the hypothesis is that if the labour force participation ratio was assumed to be constant, any decrease in its official rate could potentially indicate an increase in the informal economy, ceteris paribus. Furthermore, the discrepancies between the recorded total employment and a total number of jobs reported by employers could also be an indication of possible informal employment.

Aldersdale et al., (2006; p.21) highlight one advantage of this method as it can…

> *"….be tracked to identify trends in causes, size and composition of the informal labour force, which is useful when considering and developing policy interventions"* (Aldersdale et al., 2006; p.21).

The immediate disadvantage of this method is that it fails to consider other causes that could lead to a reduction in the official employment participation from the total labour force (Schneider, 2007; Thomas, 1992). In addition to this, this method has the risk of double counting, as workers may be working in both the formal and informal economies (Aldersdale

et al., 2006; Thomas 1992).

The Transactions method

The third method under the indirect approach is the Transactions method. This method was first developed by the Feige (1996) on the assumption that over time there is a constant relationship between the official GDP of a country and the volume of transactions. This is summarised by the Fisher (1991, cited in Friedman, 1971) quantity equation of:

$$M*V = p*T \qquad (2.5.2.1)^{21}$$

This method holds on the assumptions on the *"…velocity of money and the relationships between the value of total transactions (p*T) and total nominal GDP…"* (Schneider, 2006; p. 41), as well as on the assumptions made about a base year in which there is no informal economy.

The disadvantage of this method lies with the assumptions that are made for it to yield results (Frey & Pommerehne, 1984; Tanzi, 1982; Thomas, 1999; Giles, 1999a; Pederson, 2003; Breusch, 2005a, 2006; Schneider, 2007; and Schneider & Enste, 2000). Moreover, accurate data about the level of total transactions should be available which might prove to be difficult for cash transactions. A further assumption that this method makes is that the ratio between the total value of transactions and the formal GDP are due to the informal economy, which means that a significant amount of data will be required to differentiate between formal and informal financial transactions. Therefore, despite that this method might look as providing a theoretically accurate account of the size of the informal economy, it might not be very plausible because the requirements in estimating the size of the informal economy empirically might be difficult to achieve (Schneider, 2007).

[21] (Where 'M' stands for money, 'V' is the velocity of money, 'p' are the prices, and 'T' are the total transactions).

The Currency Demand Method

The other method for generating estimations about the size of the informal economy is the CDA. This model assumes that transactions in the informal economy are typically made in cash (Cagan, 1958; Aldersdale et al., 2006). Tanzi (1980, 1983), estimated the currency demand function for the United States using data for the period of 1929 to 1980 which was then used to estimate the size of the informal economy. The main hypothesis under this method is that as the size of the informal economy increases so would the demand for currency (Schneider & Enste, 2000; Schneider, 2007).

Tanzi (1983) proposed the following regression model for the currency demand which controls for *"…factors such as the development of income, payment habits, interest rates,"* (Schneider, 2006; p.42), and includes variables such as the tax level (both direct and indirect), regulation and the complexity of the taxation system:

$$\text{"}Ln\ (C / M_2)_t = \beta_O + \beta_1\ ln\ (1 + TW)_t + \beta_2\ ln\ (WS / Y)_t + \beta_3\ ln\ R_T + \beta_4\ ln\ (Y / N)_t + u_t\text{"}$$

(Schneider, 2006; p.42) (2.5.2.2)

$$\text{"With } \beta_1 > 0,\ \beta_2 > 0,\ \beta_3 < 0,\text{ and } \beta_4 > 0\text{"}$$

(Schneider, 2006; p.42) (2.5.2.3)[22]

Estimates about the size of the informal economy *"…can be calculated by comparing the difference between the development of currency when direct and indirect tax rates (and government regulations) are kept at its lowest value, and the development of currency with the current tax rates…"* and government regulations (Schneider, 2006; p. 42). Although this

[22] (As per Tanzi (1983) where: *"'Ln' is the natural logarithms, 'C / M2' is the ratio of cash holdings to current and deposit accounts, 'TW' is a weighted average tax rate (to proxy changes in the size of the informal economy), 'WS / Y' is a proportion of wages and salaries in national income (to capture changing payment and money holding patterns), 'R' is the interest paid on savings deposits (to capture the opportunity cost of holding cash), 't' represents the years, Y / N is the income per capita, and 'u' is the error term"* (Schneider, 2006; p. 42).

method has been used extensively by many, there are also criticisms of this method. The main criticism is that not all transactions are made in cash (Schneider, 2007a) and that the other factors, except the tax burden, are not considered. Factors such as the tax morality, the trust of taxpayers on the state or the government, the impact of regulations, other government incentives etc., are not considered by this method and are essential factors. According to Blades (1982) and Feige (1986, 1996), the regression model proposed by Tanzi (1983) should have controlled for the use of US dollars, since they are accepted internationally and, in many countries, worldwide they are held as foreign reserve.

Physical input or the Electricity Consumption method

The final method under the indirect approaches is the Physical input or the Electricity Consumption method. This method has been developed in two ways by Kaufmann and Kaliberda (1996) and by Lackó (1996, 1998, 1999, and 2000). According to Kaufmann and Kaliberda (1996), electric-power consumption can be considered as the best physical indicator of the overall economic activity. In general, this method looks at the relationship between electric power consumption and the level of GDP since both share the same elasticity. Any difference between the electric power usage and the growth rate of GDP can be attributed to the informal economy (Schneider, 2007; and Aldersdale et al., 2006). Electricity consumption is regarded to be one of the essential physical indicators of overall economic activity with a unit-elasticity between the two (with one as the coefficient of elasticity between electricity and GDP). Kaufmann and Kaliberda (1996) derive this proxy measurement for the overall economy and then subtract the official GDP from it, resulting in the unofficial GDP, which is an indication of the informal economy. Based on this, it can be seen as a very simple and straightforward method in deriving some measurement for the size

of the informal economy.

However, the main criticism of this method is that it does not offer an overall measure of the informal economy, as different informal economic activities may not require electricity at all, or could be using a different source of energy (Aldersdale et al., 2006; Lackó, 1998; Johnson et al., 1997; Gerxhani, 2004b). In 1999, Lackó worked out a new method, and named it as the household electricity approach in an attempt to avoid the inconsistencies of the method developed by Kaufmann and Kaliberda (1996). This modified method assumes that part of informality is directly linked with the household consumption of electricity. As the informal economy is present in all sectors of the economy, including households. Lackó (1998, 1999) derives an econometric two model process (by substituting equation (2.5.2.5) into (2.5.2.4) as follows:

$$\text{“}Ln\ E_i = \alpha_1\ ln\ C_i + \alpha_2\ ln\ PR_i + \alpha_3\ G_i + \alpha_4\ Q_i + \alpha_5\ H_i + u_i \qquad (2.5.2.4)^{23}$$

$$With\ \alpha_1 > 0,\ \alpha_2 < 0,\ \alpha_3 > 0,\ \alpha_4 < 0,\ and\ \alpha_5 > 0$$

$$Hi = \beta_1 T_i + \beta_2 (S_i - T_i) + \beta_3 D_i \qquad (2.5.2.5)$$

$$With\ \beta_1 > 0,\ \beta_2 < 0,\ \beta_3 > 0\text{”}$$ (Lackó, 1998: p.133; Schneider, 2004: p.38).

Using United States and a value of 10.5 percent of GDP as the reference, this econometric estimation was used to identify countries' use of electricity by their respective informal

[23] *Where: "'i' is the number assigned to the country; 'E_i' is per capita household electricity consumption in country 'i' in Mtoe; 'C_i' is per capita real consumption of households without the consumption of electricity in country 'i' in US dollars (at purchasing power parity); 'PR_i'- the real price of consumption of 1 kWh of residential electricity in US dollars (at purchasing power parity), 'G_i' is the relative frequency of months with the need of heating in houses in country 'i'; 'Q_i' is the ratio of energy sources other than electrical energy to all energy sources in household energy consumption; 'H_i' is the per capita output of the hidden economy; 'T_i' is the ratio of the sum of personal income, corporate profit and taxes on goods and services to GDP; 'S_i' is the ratio of public social welfare expenditures to GDP; and 'Di' is the sum dependants over 14 years of age and of inactive earners, both per 100 active earners"* (Lackó, 1998: p.133; Schneider, 2004: p.38).

economies, in order to calculate the level of GDP produced from one unit of electricity in the informal economy of each country (Schneider, 2007). However, even this method has been criticised because it is not only in the household sector that the informal economic activities take place, and even then, informal economic activities might not require a large use of electricity, as other sources of energy can be used (Schneider, 2007).

2.6.3. Modelling Approach

Because of the disadvantages and criticisms of the above five indirect approaches, a model approach has been established. The model approach has now been widely used in many studies for many countries –refer to literature review chapter. The effects of the informal economy tend to be manifested instantaneously in many areas, such as the labour market, production of goods and services, as well as the money markets and money supply, and as such are not simply a single indicator and one cause which in many cases is the tax regime of a country (Dell'Anno, 2006; Schneider, 2007). Therefore, the model approach considers multiple causes driving the existence and development of the informal economy, and multiple indicators of the informal economy over a period of time – known as a MIMIC method.

MIMIC method

This method is based on Structural Equation Models (SEM), representing statistical relationships among latent (unobserved) and manifest (observed) variables (Dell'Anno, 2006; Schneider, 2007). The Multiple Indicators and Multiple Causes (MIMIC hereafter) Model received its name from Jöreskog and Goldberger (1975), albeit it had previously been discussed by Zellner (1970)[24], Jöreskog (1970) and Hauser & Goldberger (1971).

[24] Cited in Jöreskog and Goldberger (1975)

The MIMIC model considers the informal economy as a latent or unobserved variable linked, to a number of observable indicators (reflecting movements of informal economy) and to a set of observed causal variables, which are regarded as some key drivers of informality. The MIMIC model, therefore, explains the relationship between observed variables and the latent or the unobserved variable by minimising the distance between the sample covariance matrix and the covariance matrix predicted by the model (Dell'Anno, 2006; Buehn & Schneider, 2008). The observable variables are divided into the causes of the latent variable and its indicators.

The MIMIC model consists of two parts: the structural equation model and the measurement model (Schneider et al., 2010). A mathematical presentation of the MIMIC model is provided in many different studies such as Dell'Anno (2006, 2007), Schneider (2006, 2007), Buehn and Schneider (2008), Schneider et al., (2010), and Hassan and Schneider (2016a). The mathematical equation will depend on the causes and indicators one would argue to use in a country. The econometric theory relating to the MIMIC model has been provided in the methodology chapter.

MIMIC models can be applied to time series data as well as panel data to derive estimates on the size and development of the informal economy over time. A MIMIC model which uses first differences from their variables is known as the DYMIMIC[25] model (Aigner et al., 1988). Using the variables in first differences in the DYMIMIC model, however, the long-run information from data can be lost although they are co-integrated. The MIMIC model is the central method applied in this research. Therefore, more about the MIMIC model and the

[25] This stands for Dynamic MIMIC model.

rationale for the use of this model will be provided on the following pages.

2.7. Conclusion

The impact of the informal economy on the overall economy can be seen from different perspectives. There are different schools of thought in describing how the informal economy arises. There are the dualists' views, the structuralists', the legalists' and the voluntarists' schools of thought. This chapter discusses all four of these schools of thoughts underlying the leading theories of the informal economy.

Understanding how the informal economy arises in a country, and as to which factors are the main drivers of that informality is key in developing effective policies to control it. It is also important to understand the size and development of the informal economy. In order to estimate the size of the informal economy, several methods have been developed and tested. These models have been discussed in detail in this chapter, highlighting their advantages and disadvantages. Theory agrees that measuring the size of the informal economy is a difficult task, and often the estimates are very vulnerable to the method and the data used for estimation. However, estimation of the size of the informal economy can lead to some understanding of the level of economic informality in a country and can result in policy decision making which addresses it. Whether these policies are effective or not, then further estimation would be able to highlight the development trend of the informal economy.

Chapter 3: Literature Review

3.1. Introduction

After reviewing the theoretical literature and the leading theories of informal economy, this chapter turns its focus on the empirical literature. The empirical literature relates to the methods applied in measuring the informal economy worldwide, and in the countries of the Balkan Peninsula in particular. Particular attention has also been paid to the impact of the informal economy on the development of a country, and how such economic informality affects countries worldwide depending on their level of development based on empirical findings from the literature. A detailed analysis of the primary studies in measuring the informal economy has been provided in the following pages along with a discussion of the empirical results.

3.2. The informal economy around the world

There have been numerous studies providing insight into the nature, characteristics and size of the informal economy around the world and in particular for developing and the transition countries (Schneider & Enste, 2000). However, the informal economy was also investigated to a great extent for the developed countries of the world, but the main purpose of this was for comparative reasons – such as comparing the size of the informal economy in the developed world with the less developed world (Schneider & Enste, 2000; Gerxhani, 2004b; Dell'Anno, 2007; Andrei et al., 2010; Schneider, 2011; Schneider, 2014; la Porta & Shleifer, 2014; Hassan & Schneider, 2016a).

In earlier literature, the informal activities became increasingly recognised, and research was done by various scholars such as Blau & Scott (1963), and Hart (1970, 1973). Different scholars refer differently to the informal economy regarding its terminology. Some refer to it as the Shadow Economy (Shneider 2000, 2014; Herwartz et al., 2009), others refer to it as the underground economy, grey economy (Marcelli, 2004) or black market (Smithies, 1984), or some of the earlier work refer to the informal economy as the 'bazaar economy' (Geertz, 1963).

The literature seems to address some disagreements between the scholars on the definition of the informal economy (Frey & Pommerehne, 1984; Feige 1989, 1994; Gërxhani, 2004; Schneider, 2014). The importance of defining the informal economy is linked directly with all the methodologies in measuring the size and the impact of the informal economy in a country.

The definitions provided by the literature are based on three main criteria which describe the *"institutional patterns with which the society shapes the informal sector" (*Gerxhani (2004b; p.267) – and these are *"political, economic and social"* (adopted from Harding and Jerkins (1989) by Gerxhani (2004b[26]). These general criteria then have their sub-criteria for defining the informal economy. The political criteria are comprised of the government regulation and illegal activities outside the rule of law. The economic criteria, on the other hand, comprises of the labour market or the status of labour, tax evasion or unreported income, the size of activity, professional status (such as self-employed, family worker, etc.), regulation or the registration of the activity and national statistics such as the GNP. The social criteria, on the other hand, comprises of the social networks and the ease of entry, survival, and autonomy and flexibility (Gerxhani, 2004b). Thus, the focus of this part of the research review will be

[26] Gërxhani, K. Public Choice (2004) 120: 267. https://doi.org/10.1023/B:PUCH.0000044287.88147.5e

based on the majority of the sub-criteria identified under the general economic criteria for defining the informal economy[27].

Nature, size, causes and consequences of informality may vary for different countries, but a handful of comparisons can be made. As mentioned above the informal economy can have different effects on the formal economy of a country depending on the characteristics of that country. In developing countries, many people depend on the informal economy for their livelihood (Mehrotra, 2009; Cling et al., 2010; Blades et al., 2011; Schneider & Enste, 2000, 2013; la Porta & Shleifer, 2014). Also, the informal firms account for almost half of the economic activity (la Porta & Shleifer, 2014), even though measuring the informal activities in these countries can be a massive task due to the lack of data. Further to this gathering information about the informal economic activities can be difficult as nobody wants to be identified (Shneider & Enste, 2000), and therefore even survey results can be hard to be collected. These data are crucially essential for the governments to make adequate economic policy decisions.

In most studies, the central hypothesis is that the lower the country's level of development, the higher is the size and importance of the informal economy. However, the level of informal economy can also be found in transition economies as well as previously centrally planned or command economies (Schneider, 1997). The majority of then centrally planned economies are now either transition, mixed or market economies – such as the ten Balkan countries part of this research – and where the informal economy is of a large scale and importance as a

[27] This literature review will touch base on all three criteria; however, emphasis will be paid to the economic and to some extent to the political criteria. This literature will not review the illegal activities such as drug manufacturing and dealing, human trafficking, robbery, burglary, etc.

contribution to GDP (Novkovska, 2008; Macias & Cazzavillan, 2009; Garvanlieva et al., 2012; Krstić & Stanišić, 2013; Boka & Torluccio, 2013; Manolas et al., 2013).

Most developing countries have sizeable informal employment according to some studies. For example, recent estimates by the International Labour Organization (ILO) suggest that the share of informal employment in Latin American and Caribbean countries reaches up to 75.1 percent in non-agricultural activities in countries such as Bolivia. While in many African countries the share of informal employment can reach up to 82 percent in countries like Mali and about 76 percent in Tanzania. The report also shows that most North African and Middle East countries also report a high portion of informal employment ranging from 30 to 70 percent, (ILO[28], 2015). The situation in East Asia is similar, where a substantial share of employment is considered to be of informal nature. Of the most important characteristics of the informal economy from an economic standpoint are the informal employment and tax evasion.

Informality can be a significant cause of poverty as most informal workers are insufficiently protected from illness or health problems, unsafe working conditions and possible loss of earnings due to sudden dismissal (Gërxhani, 2004; Parlevliet et al., 2008). Informal workers earn less, and their fundamental rights are more vulnerable and difficult to defend. This is particularly important for the poor; whose labour is their most significant asset. Persistently high levels of informal employment, as well as tax evasion, also reduce fiscal revenues and the state's ability to develop social security systems (Jütting & Laiglesia, 2009).

[28] International Labour Organisation report, available at: http://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/publication/wcms_234413.pdf, and http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_222979.pdf (last accessed on: 10/10/2017)

The informal economy also exists in developed countries, but its impact is much lower than in underdeveloped countries (Williams, 2005). The size of the informal economy is also provided by various ILO reports and various other authors, not just for the developing countries but also for other country groups. A study by Schneider et al. (2010) estimates the size and development of the informal economy as a percentage of the GDP for various country groups during the years 1999, 2003 and 2007 using the weighted average of official GDP of 2005. According to their results, in all country groups, there has been a decrease in the level of the informal economy.

Contribution to the literature on the size of the informal economy has been given by a number of other studies on individual country basis, such as Pommerehne & Schneider (1985), Schneider et al., (1989), Schneider & Neck (1993), Schneider & Enste (2000), and more recent studies of Chen (2004), Andersdale et al. (2006), Dell'Anno (2003, 2007), Buehn et al. (2009), Bovi & Dell'Anno (2010), Dell'Anno & Halicioglu (2010), Schneider et al., (2010), Buehn & Schneider (2012), Alm & Embaye (2013), Hassan & Schneider (2016a), and Medina and Schneider (2017). A detailed table highlighting selected literature has been provided in appendix 3.5.1. This table lists some important studies which employ different methods for different samples and countries in estimating the size of the informal economy.

3.3. The informal economy in the Balkan countries

Since the 1990s, the region of South East Europe (SEE) and countries in the Balkan Peninsula (including Turkey), have experienced dramatic transformation in their economies. The transformation from command to market economy produced remarkable changes in the social, political and economic infrastructure of SEE countries (Micevska, 2004). These countries, especially the ones that suffer from the transition period in most cases are faced

with a higher level of corruption, organised crime and tax evasion[29].. All these factors can contribute to the size of the informal economy in this part of the world. Other factors, such as informal employment and inward remittances from abroad play a role in the economies of the Balkan countries.

Schneider et al. (2010) estimate the informal economy of different samples of 162 countries worldwide using a MIMIC model. Their estimates also capture the countries of the Balkan Peninsula. Their study and estimates (the most cited and known paper) indicate that the size of the informal economy in the ten Balkan countries part of this research between 1999 and 2007 is on average about 30 percent relative to their GDPs. This study shows that Albania had an informal economy of 35.7 percent in 1999 and it decreased to about 32.9 percent in 2007; Bulgaria's informal economy amounted to 37.3 percent of GDP in 1999 and then followed a declining trend and decreased to 32.7 percent in 2007; the informal economy in Greece was estimated to be below 30 percent, with 28.5 percent and 26.5 percent in 1999 and 2007, respectively; Bosnia and Herzegovina's size of the informal economy was estimated to be between 34.3 percent in 1999 and 32.8 in 2007; the informal economy in Croatia was estimated to be between 33.8 percent in 1999 to 30.4 percent in 2007; FYR Macedonia's informal economy followed a declining trend from 1999 to 2007, although was amongst the highest in Europe with 39 percent in 1999 and 34.9 percent in 2007; the informal economy in Romania was estimated using the MIMIC model to be around 34.3 percent in 1999 and 30.2 percent in 2007; Turkey's informal economy was estimated to be on average of 31.3 percent between 1999 and 2007, with 32.7 percent in 1999 and 29.1 percent in 2007; the informal

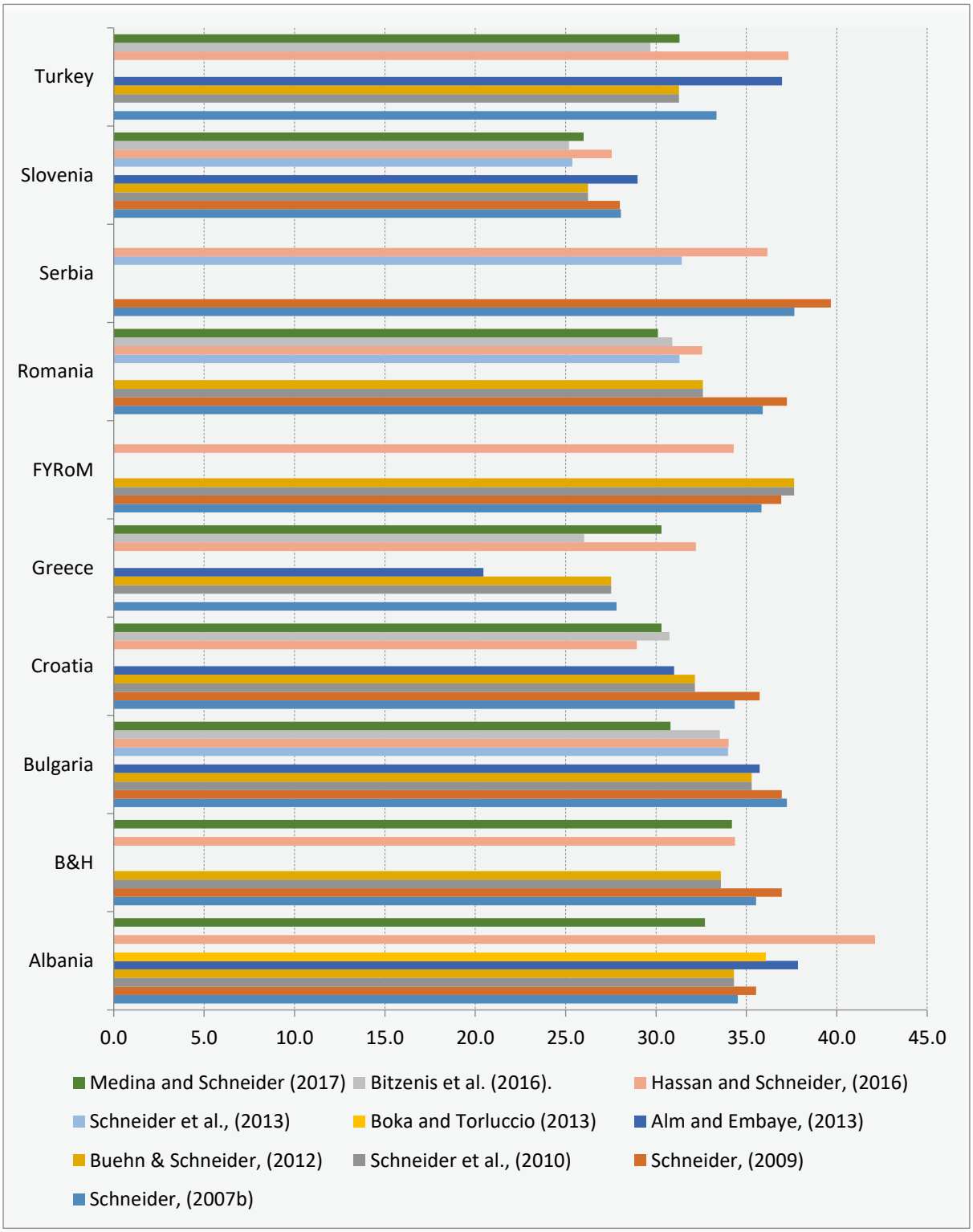
[29] As tax evasion is illegal by law, it is therefore difficult to precisely estimate its size in the overall economy. Although, Tanzi (1983), Giles (1999), and Faal (2003) conduct some estimates for the size of tax evasion in various countries based on their estimates of the size of the informal economy by assuming that the informal economic activities would have been taxed at the same rates as the official economic activities.

economy in Slovenia was estimated to be the lowest amongst all the Balkan countries, with an average of 26.2 percent between the years of 1999 to 2007, with values of 27.3 percent in 1999 and 24.7 percent in 2007. The informal economy in Serbia was not measured in this study.

Other studies also measure the informal economy worldwide including countries of the Balkan Peninsula, such as Schneider (2007a)[30]; Schneider (2009)[31]; Buehn and Schneider (2012)[32]; Schneider et al. (2013)[33]; Alm and Embaye (2013)[34]; Hassan and Schneider (2016a)[35]; Bitzenis et al., (2016)[36]; and Medina and Schneider (2017)[37]. Figure 3.3.1 below shows the size and development of the informal economy measured by various studies using the MIMIC, CDA or other methods. The estimates from these empirical studies are then compared with the estimates of this research in section 6.12.

[30] Schneider (2007a) measures the size of the informal economy between 1999 and 2005 for 145 countries worldwide.
[31] Schneider (2009) estimates the size of the informal economy from 2000 to 2006/07 for 25 transition countries.
[32] Buehn and Schneider (2010) estimate the size of the informal economy from 1999 to 2007 for 162 countries worldwide.
[33] Schneider et al. (2013) measure the size and development of the informal economy from 2001 to 2010 for Serbia, Bulgaria, Romania, Slovenia and several other East European countries.
[34] Alm and Embaye (2013) measure the size of the informal economy for 111 countries worldwide (but excluding some Balkan countries such as FYR Macedonia, Bosnia and Herzegovina, Serbia and Romania) between 1984 and 2006. However, due to data availability they do not provide estimates from 1984 to 2006 for all countries.
[35] Hassan and Schneider (2016a) is a recent study which estimates the size of the informal economy in 157 countries from 1999 to 2013.
[36] Bitzenis et al. (2016) focus mainly on estimating the size of the informal economy for Greece, but in their MIMIC regression and then benchmark estimation they estimate the size of the informal economy for 36 countries in Europe and North America.
[37] Medina and Schneider (2017) this is the most recent working paper which attempts to measure the size of the informal economy in 158 countries worldwide between 1991 and 2015. This study is the first to investigate the informal economy since 1991 in 158 countries using the MIMIC model. They do not yet however provide the whole table with results and estimates in their working paper. They only show the averages. They do not estimate the informal economy in FYR Macedonia and Serbia.

Figure 3.3. 1 - The size and development of the informal economy measured by various studies using the MIMIC, CDA or other methods.



In the following pages, this thesis reviews the main empirical studies to measure the size of the informal economy in each of the ten Balkan countries.

Romania

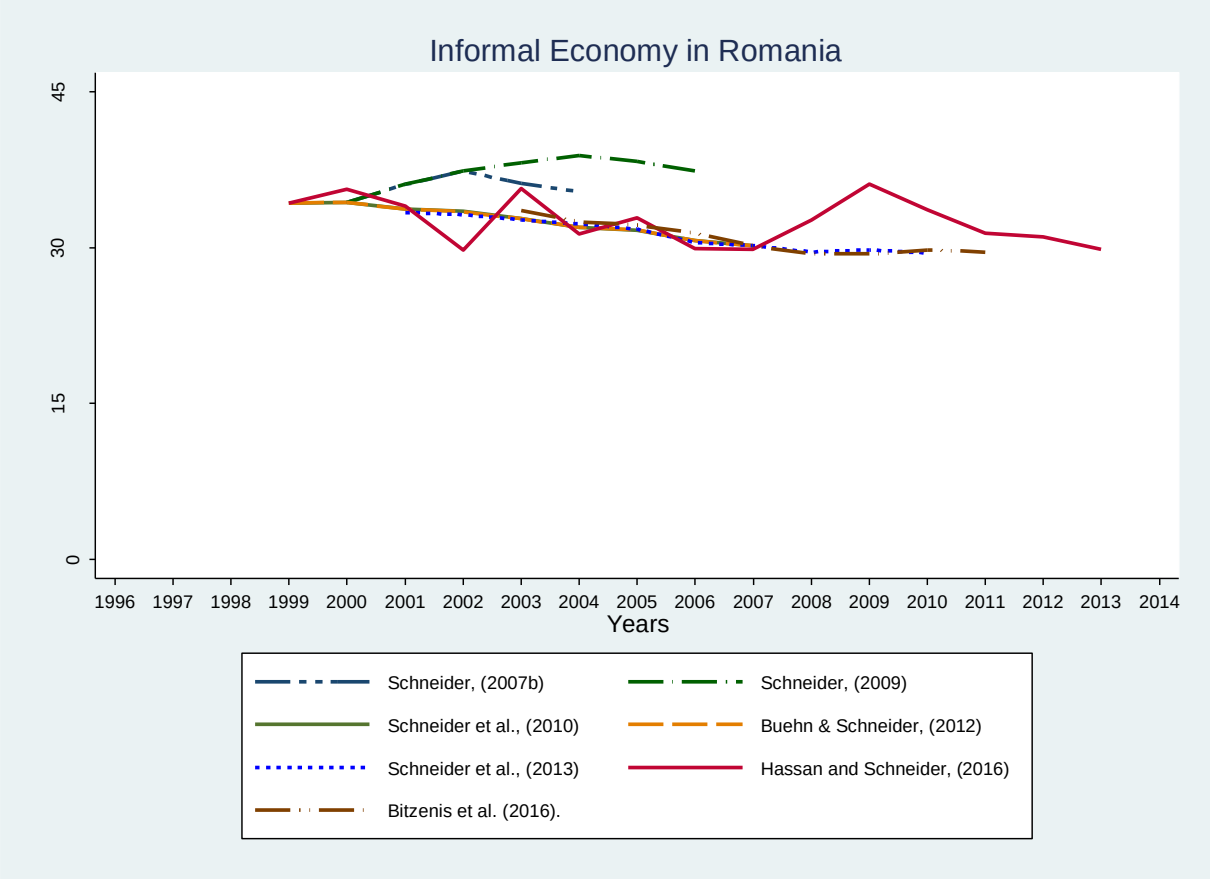
A study by Andrei et al. (2010) showed that the size of the informal economy and the arrangements in its activities differ from one country to another and that the transition from the economies of the former socialist countries has led to an increase in the size of the informal economy. They investigated the informal economy for Romania and found out that it accounts for about 30 percent of GDP. They evaluate this by analysing the cash outside the banking sector. However, different studies, depending on the use of methodology or model for measuring the size of the informal economy, can provide different results. This is particularly the case for transition economies, where the quality of data can be an issue (Andrei et al., 2010). For example, in Romania's case, the size of the informal economy as a share of its GDP is around 20 percent when estimated using the energy consumption method (Schneider & Enste, 2000), whereas using the monetary approaches the size of the GDP is around 45percent (French et al., 1999). Even though different methodologies for the same country can generate different results for the countries in transition, of which most of the Balkan countries could be considered as part of, one can still conclude its size and its role in the economy of a country.

Romania's informal economy has also been analysed by Albu (2004). The author uses household surveys to analyse the households' income structure and estimate the size of the informal economy. Albu (2004) finds that the main participants in the informal economy are the poor or the working class, concluding that the survival motive is one important driver of economic informality in Romania. Therefore, subsistence was the main determinant of poor people's involvement in the informal economy. However, this study also revealed that the middle class and the rich were also involved in the informal economy to exploit the legislative

incoherence. According to Albu (2004), the share of income from informal economy accounted for as much as 25 percent of the total household income. The author does find an increasing trend in in the size of the informal economy from 1995 to the end of 2002. The author concludes that taxation is the leading cause of the informal economy in Romania.

Alexandru (2013) and Alexandru et al. (2015) also measure the size of the informal economy in Romania using the simple currency ratio method between the years of 2000 to 2014. Their empirical results indicate that the size of the informal economy in Romania has followed a decreasing trend from 2000 to 2008, and then an increasing trend from 2008 onwards. Their estimates show that the size of the informal economy in Romania was about 19 percent of GDP in 2000 to 13 percent in 2014. The authors, however, do not provide any explanation as to why this trend of the informal economy in Romania persists. Their results also vary with other studies, as this study tends to underestimate the size of the informal economy relative to other studies such as Albu (2004), Alexandru and Dobre (2013) or Schneider et al. (2010). Alexandru and Dobre (2013) find that the size of the informal economy has decreased in Romania, but from 36.5 percent in 2000 to 31.5 percent of real GDP in 2010. This study seems to be in line with other studies that measured the informal economy as indicated in the figure above. Romania's informal economy has also been estimated as part of a larger panel data set by various other authors, which have been presented below in figure 3.3.2.

Figure 3.3. 2 – Empirical studies and the size of the informal economy in Romania from various sources



Serbia

Blunch (2015) analyses the informal economy in Serbia. According to the author, the informal sector in Serbia is quite 'pervasive' which employs about a quarter of the private sector in the country. Several other studies indicate that the informal economy is significant in Serbia and the region as a whole – such as Kogan (2011), Koettl (2010), Krstić et al. (2010), Sanfey (2010) and Macias & Cazzavillan (2009). According to the October 2008 LFS[38], around 650,000 people worked informally. That means that about 10 percent of the Serbian working-age population—aged 15 or older—were working informally. According to this survey and the data from World Bank, 2.2 million people were formally employed (which constitutes about

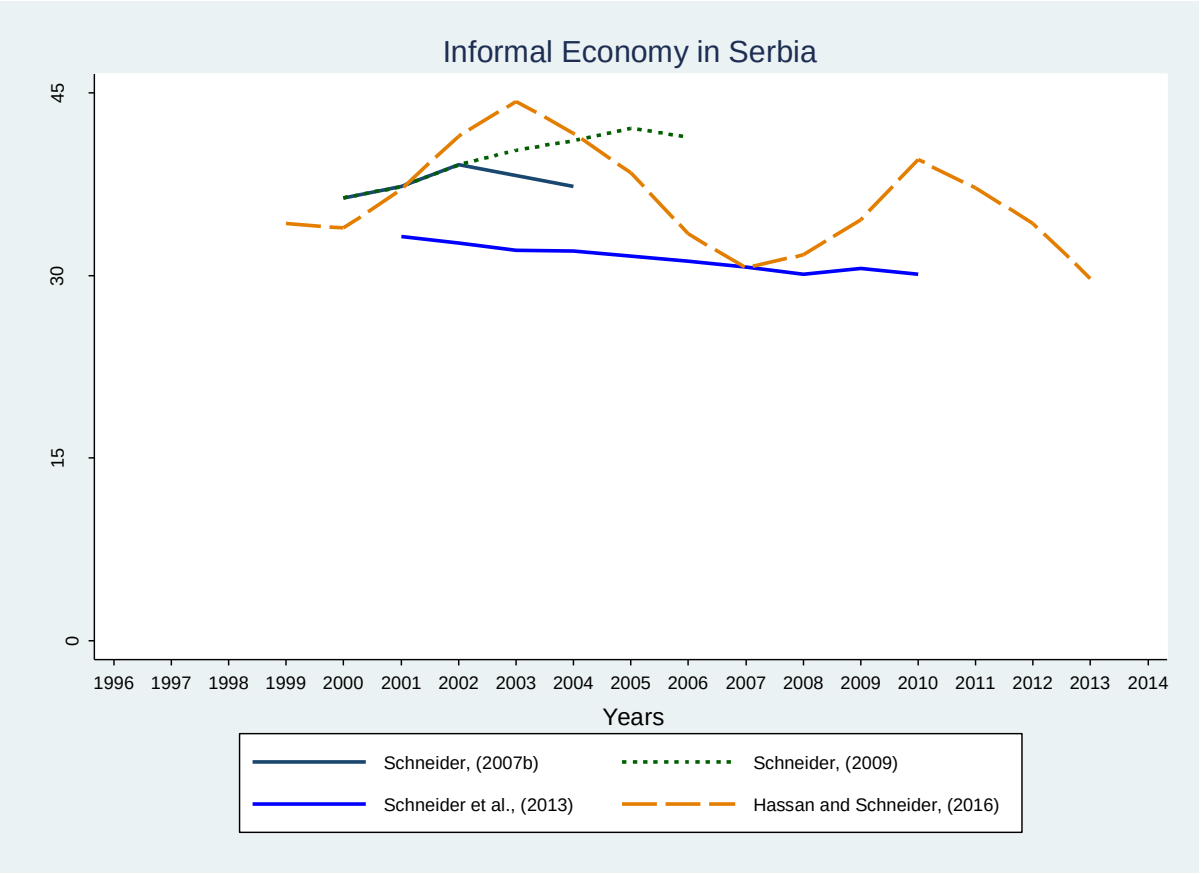
[38] The Serbian Labour Force Survey (LFS)

34 percent of the working-age population) while 3.1 million were inactive (this is equivalent to 49 percent) and 460,000 were unemployed (just 7 percent). It also means that 23percent, which is almost a quarter of all employed people in Serbia work informally (Koettl, 2010).

According to a USAID report by Schneider et al. (2013), the size of the informal economy in Serbia decreased from just over 33 percent in 2001 to around 30 percent of GDP nine years later in 2010. Their results indicate that Serbia's informal economy decreased during the period of economic growth, but it remained almost unaffected from the beginning of the financial crisis and the subsequent economic downturn. However, according to the same report (Schneider et al., 2013); the three methods applied to measure the size of the informal economy generated different results. The above results were generated using the MIMIC approach. However, using the Household Tax Compliance model and Surveys, the informal economy in Serbia accounted for 23.6 percent in 2010 and 21 percent in 2012, respectively. This extensive report highlights that the declining informal economy in Serbia could improve public revenues and with that the provision of qualitative and more public goods and services. They estimate that public revenues will increase between 0.8 percent and 1.1 percent of GDP within three years and up to two percent of GDP within seven years. The report also offers some recommendations for government institutions such as labour market reforms and social security reforms.

Several other authors, indicated in the figure below, have estimated the size of the informal economy in Serbia. Figure 3.3.3 below compares these estimates which use a much larger panel datasets comprising of various countries.

Figure 3.3. 3 – Empirical studies and the size of the informal economy in Serbia from various sources



FYR Macedonia

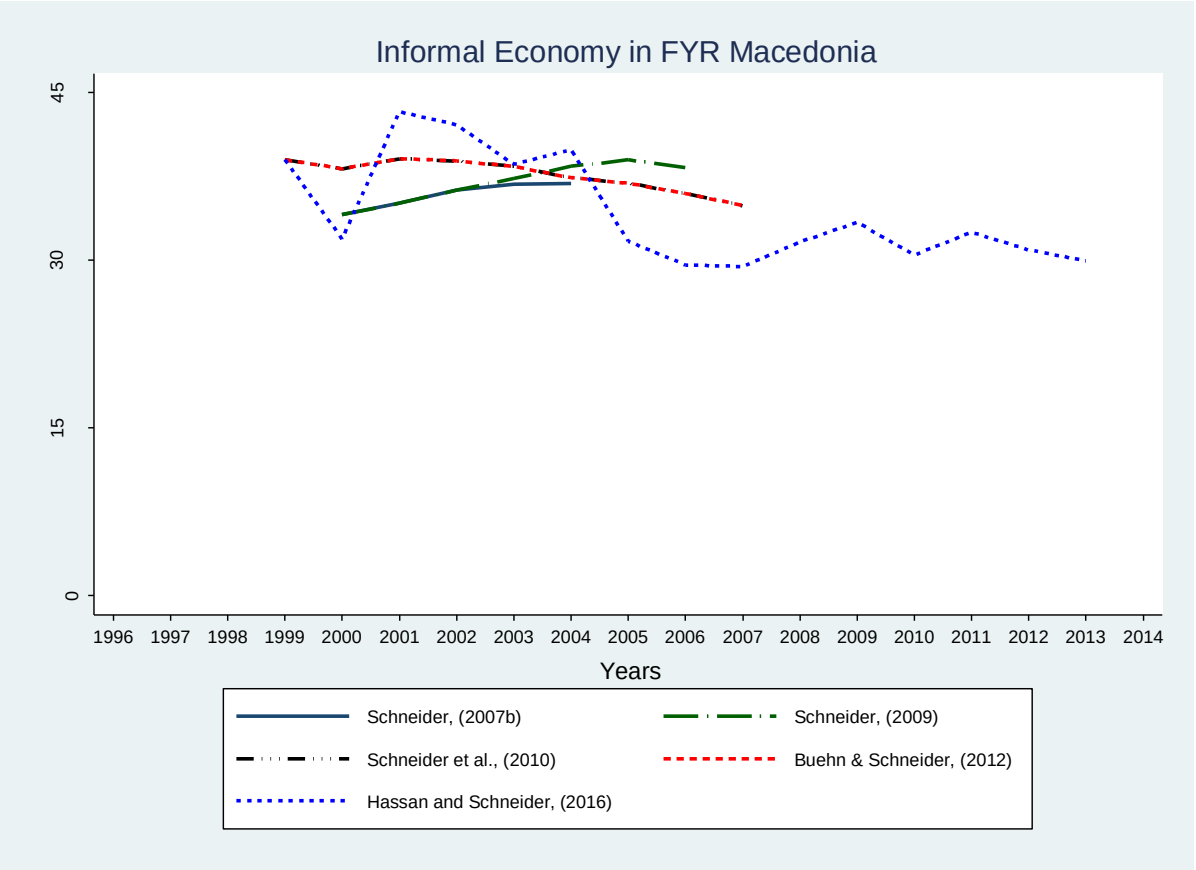
According to the results presented in a paper by Garvanlieva, Andonov and Nikolov (2012) the relative size of the informal economy in FYR Macedonia has decreased over the last decade (2000-2010) from 34 percent of GDP in 2000 to 24 percent of GDP in 2010. These estimates have been provided by the authors using the Electricity Consumption Method. However, they also employ the MIMIC approach in their analysis, and it shows an increase of the informal economy to 52 percent in 2007 and then reduces to 47 percent in 2011. This undoubtedly is a significantly high informal economic activity. The main characteristics of the informal economy in this country are taxes, unemployment, regulation intensity, bureaucracy and social transfers paid by the government (Garvanlieva et al. 2012, Novkovska 2008, and

Dzhekova et al. 2014). The authors indicated above provide some conclusions and recommendations in tackling the informal economy in this country. The problem of the informal economy is exacerbated even further by the existence of a significant degree of corruption in the country (Novkovska 2008).

FYR Macedonia has a problem with informal employment also. According to Novkovska (2008), the estimates of formal and informal employment for this country show that the total formal employment is 72.3percent of total employment and 27.7percent is the participation of informal employment. Some widely cited international measurements that cover FYR Macedonia find that the share of its informal economy is larger than in all EU countries, estimated at around 35percent of GDP in 2007 (Schneider et al., 2010). Also, data from the most recent national Labour Force Survey suggests that in 2012 around 22.5percent of the workforce was engaged in undeclared work, and therefore was not covered by any social or legal protection (Dzhekova et al. 2014).

The informal economy in FYR Macedonia has been measured by Schneider (2007a), Schneider (2009), Schneider et al. (2010), Buehn and Schneider (2012) and Hassan and Schneider (2016a). The estimates from the above studies, which in their regression uses panel datasets of various other countries, have been presented in the figure below.

Figure 3.3. 4 – Empirical studies and the size of the informal economy in FYR Macedonia from various sources



Albania

Albania's economy is characterised by a considerable degree of informality. Boka & Torluccio (2013) have shown a high percentage of the informal economy relative to GDP, reaching the highest informality in the years of conflict and country's financial sector crises 1997-1999, although it has followed a decreasing trend. Using the national accounts discrepancies method, the informal economy was 36.2 percent of GDP on average over the period from 1996 to 2012 (Boka & Torluccio, 2013). Boka & Torluccio (2013) in their study of the informal economy of Albania use some methods to measure the size of the informal economy. In all the methods they find a significant size of the informal economy (on average exceeding 30percent of GDP).

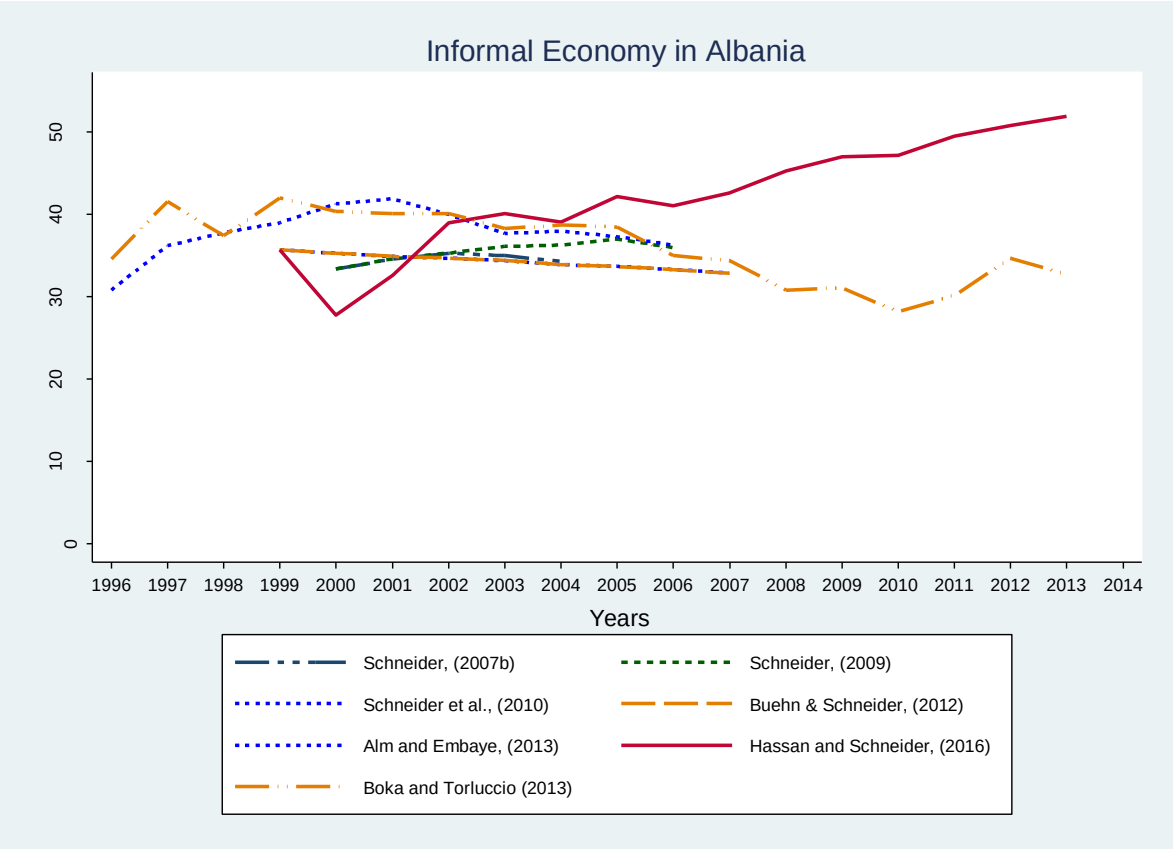
Numerous studies attempted to measure the size of informality and informal employment in Albania, generating differing results where the range of 30 to 60 percent of total employment was of informal character (Jütting and Laiglesia 2009, Sisevic 2008, Baliu 2008, Kamenicy 2009, Pfau-Effinger et al. 2009). Even though, according to Gërxhani (2003) the informal sector helped the Albanian economy during the first years of transition by providing households with employment and supplementary income in the absence of other opportunities – the level of the informal employment is significant forcing the Albania government to introduce a detailed action plan in 2004 in an attempt to reduce informal employment and encoruage informal workers to go formal (Mihes, 2011).

The informal economy in Albania is quite significant, and this has been indicated in various studies where the size of the informal economy in Albania has been measured as part of a larger sample of countries or where its size has been measured by either direct or indirect methodology. Muceku and Muca (2014) investigate the costs associated with the informal economy and economic development in Albania. They conclude that the large size of the informal economy should be considered as a threat to the overall economic development in Albania and recommend some reforms mainly in the rule of law and legislative stability. Bello et al. (2011) also arrived at similar conclusions. Both studies did not measure the size of the informal economy in Albania.

Olters (2003) provides a detailed discussion of the informal economy in Albania. Although Olters (2003) does not provide any calculations or estimations of the size of the informal economy, this study provided a detailed analysis of the existing empirical literature on the size and development of the informal economy in Albania. He argues that in the case of Albania it is not the tax rate that drivers agents to engage in informal economic activities, but

instead it is the *"…ineffectual and discretionary application of tax laws and governmental regulations that create conditions under…"* which the size of the informal economy in Albania has grown (Olters, 2003, p. 12). Hence, Olters (2003), Bello et al. (2011) and Muceku and Muca (2014) argue for reforms and government effectiveness. Figure 3.3.5 below shows other measures of the size of the informal economy in Albania. These studies have measured the informal economy in Albania using a more extensive panel sample of countries, except Boka and Torluccio (2013) who used time series data and the discrepancy between National Expenditure and Income Statistics method.

Figure 3.3. 5 – Empirical studies and the size of the informal economy in Albania from various sources

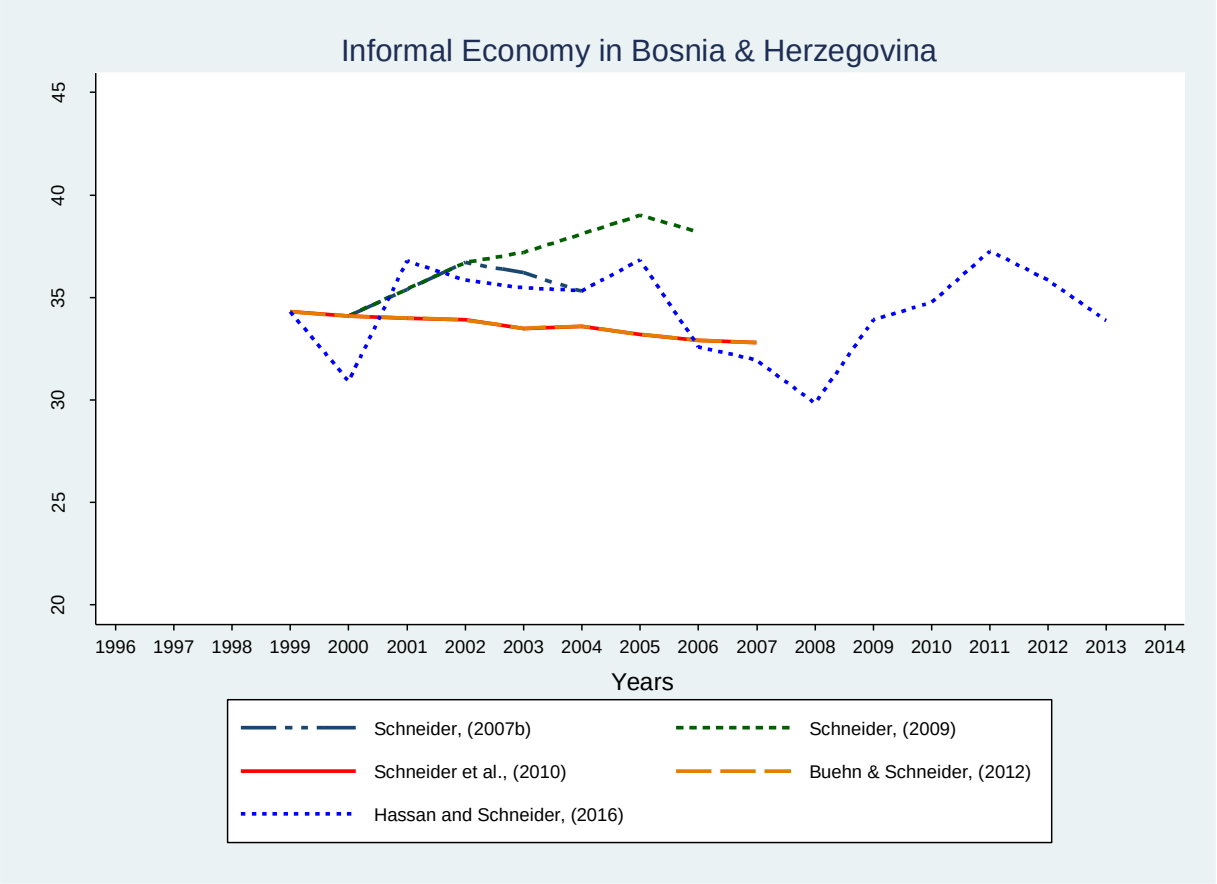


Bosnia and Herzegovina

The informal economy is quite significant and pervasive in Bosnia and Herzegovina. Research undertaken by various authors indicate that the informal employment in Bosnia and Herzegovina comprises around one-third of all employment (Rosas, Corbanese, O`Higgins, Roland, and Tanovic, 2009). In a study by Krstić et al. (2006, 2007) a significant informal sector remains in Bosnia and Herzegovina — representing nearly 43 percent of total employment in 2004, although its size as a percentage of total employment has fallen between 2001 and 2004.

The informal economy in Bosnia and Herzegovina has received further attention from Dell'Anno and Piirisild (2004). Their estimates of the size of the informal economy using MIMIC model showed a fluctuation from 57.74 percent to 52.6 percent between 2001 and 2003, respectively. There is no other specific study which provides empirical results for the size of the informal economy in Bosnia and Herzegovina. Other studies that have empirically measured the size of the informal economy in Bosnia and Herzegovina using a larger panel sample with many other countries have been included in figure 3.3.6 below.

Figure 3.3. 6 – Empirical studies and the size of the informal economy in Bosnia and Herzegovina from various sources



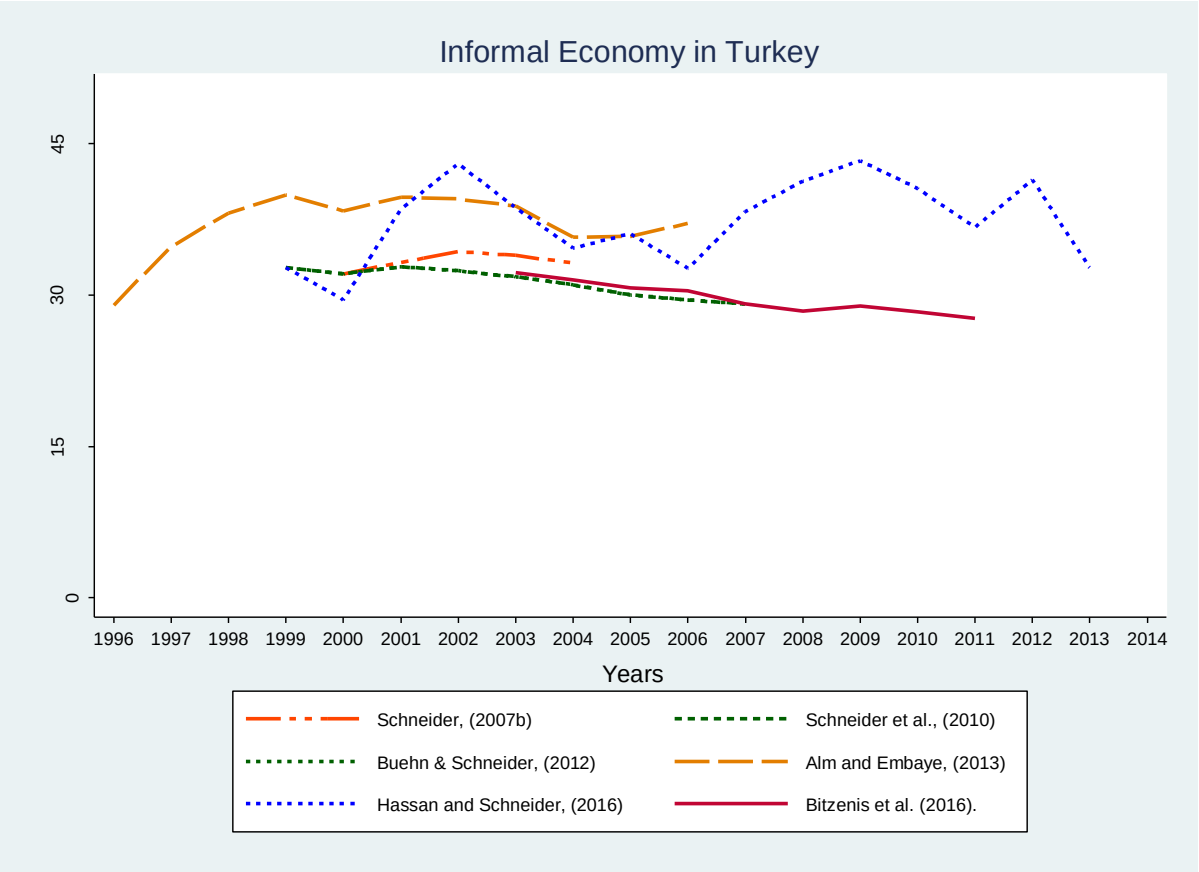
Turkey

In Turkey, it is well known that the informal economy is very high. Regarding its reasons, it is classified into four groups as economic, financial, political and administrative, moral and psychological (Ela 2003). Economic reasons that lead to the informal economy are specific to Turkey. Since 1970, there is a high inflationary trend in Turkey, and so it increases informal economy (Ela 2003). Because of high inflation, producer and consumer's fictive profit is taxed, and therefore they choose activities in the informal economy. According to a paper by Oviedo (2009) economic informality, by various definitions, is widespread in Turkey. The author computes the results from the data taken from Loayza and Rigolini (2006) using methodologies from Schneider (2004) and derives and estimate of 33.2 percent of the

informal economy relative to GDP. According to this study, independent and informal sector workers comprise between 24 and 44 percent of all the labour force in the country. The level of self-employment was relatively constant in Turkey of around 25 percent for the past decade (Oviedo, 2009). Other authors such as Ela (2003) also investigate the link between the level of informal economy and informal employment with the educational level in the country. According to Ela (2003), increased educational attainment and provision of contemporary educational programs should be considered as important factors to reduce the size and negative impact of the informal economy. Increased educational attainment should also contribute to the resolution of such social problems as economic growth and unfair income distribution in the country.

Turkey's informal economy has also been investigated by some other studies. Gunes et al. (2013) estimate the size of the informal economy in Turkey using monetary and expenditures approach. They find that the informal economy in Turkey is between 41 percent in 2003 to 35 percent in 2006. According to a study by Schneider & Savasan (2007), the size of Turkey's informal economy was 31.1 percent (of official GDP) in 1999 and rose to 35.1 percent in 2005. Ogunc and Yilmaz (2000) also report different estimates on the size of the informal economy for Turkey. They estimate the size of the informal economy to be above 30 percent using the transactions approach, while below 20 percent using the simple currency ratio method. Yildiz (2013) estimates of Turkey's informal economy using the currency demand approach, on the other hand, show a low size of the informal economy, with less than 5 percent from 2001 to 2012. The informal economy in Turkey was estimated in other studies as well, which used a panel data of many other countries to estimate the size of their informal economy. These estimates have been presented in figure 3.3.7 below.

Figure 3.3. 7 – Empirical studies and the size of the informal economy in Turkey from various sources



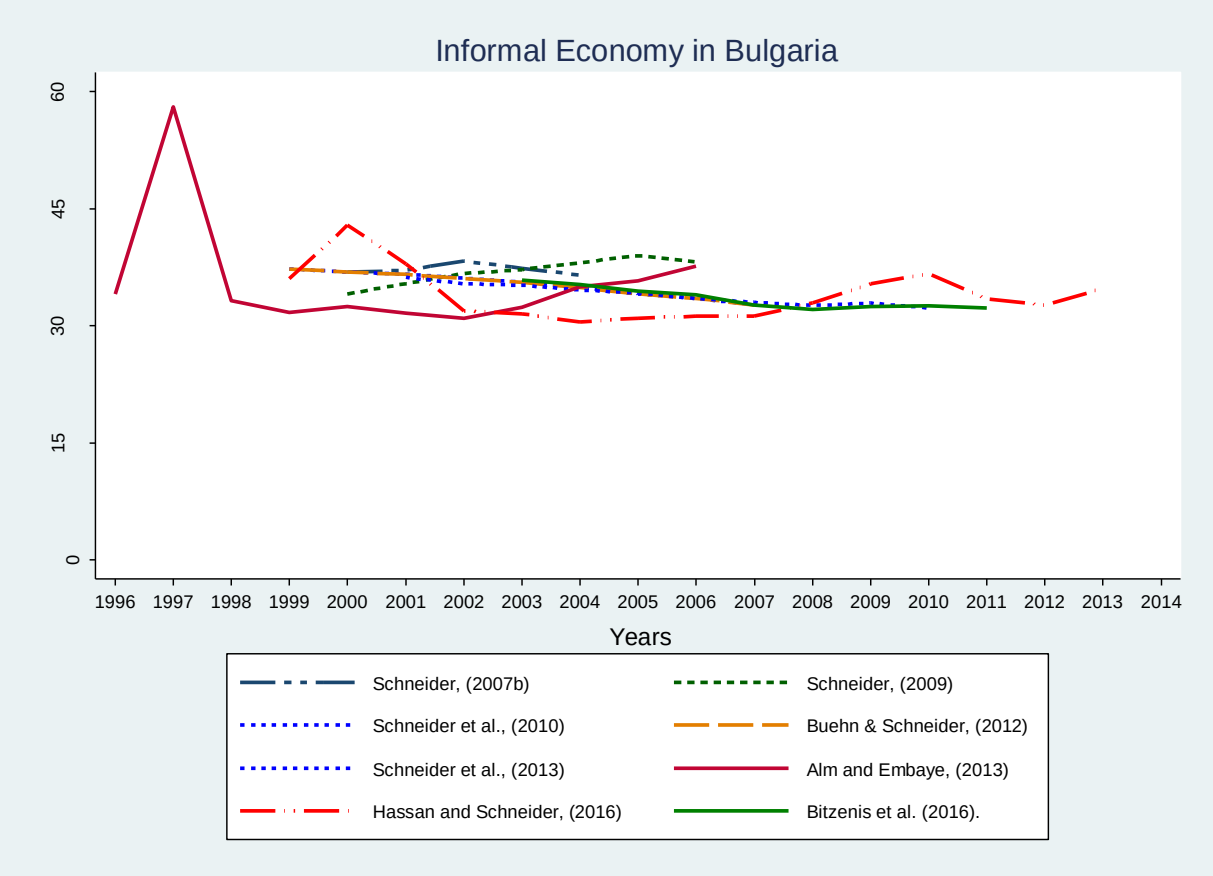
Bulgaria

Bulgaria is often recognised as having one of the largest undeclared economies when compared to other South-East European countries (Bogdanov & Stanchev, 2010; Schneider, 2013; Williams et al., 2014; Elgin & Öztunali, 2014). Kyle et al. (2001) estimate the size of the informal economy, its structure, the incentives for its development and its effect on the economic growth and the competitiveness of the Bulgarian economy. According to their estimates, in the size of the informal economy in Bulgaria in 1998 was 22 percent of GDP. The most substantial size of the informal economy relative to GDP was observed in 1990 (with just over 32 percent) and 1996 (with just over 34 percent), and then declining after that. The latest analysis and estimates take the Bulgarian informal economy to around 35.3 percent for

2012 (Murphy, 2012), while according to Schneider (2013) the size of the informal economy was reduced to 31.2 percent of GDP.

Bulgaria's informal economy has also been estimated as part of a larger panel data sample by other authors, which have been presented in figure 3.3.8 below, and indicate fluctuating results depending on the model and the number of observations used. Alm and Embaye's (2013) results show that the size of the informal economy jumped in 1997 to 58.1 percent from 34.1 percent in 1996, then went back down to 33.2 percent in 1998. The authors do not offer any explanation for such significant jump.

Figure 3.3. 8 – Empirical studies and the size of the informal economy in Bulgaria from various sources



Greece, Slovenia and Croatia

Schneider (2013) (in a VISA Europe and ATKearney report) has estimated that the informal economy in 2013 was 28.4 percent of GDP in Croatia, 23.6 percent in Greece and 23.1 percent in Slovenia. Meanwhile, Williams (2014) estimates that the share of employment which is in the undeclared economy in 2013 as 22.7 percent in Croatia, 19.6 percent in Slovenia, and 15.0 percent in Greece. From this analysis, we can see that the level of the informal economy is slightly lower in the countries of Slovenia, Croatia, and Greece than the other seven countries part of this study.

Greece, compared to the countries mentioned above, presents a lower percentage in the informal sector. This percentage of the informal economy due to the economic crisis, increased initially (up from 24.3percent of the recorded GDP in 2008 to 25.2percent in 2010) (Manolas et al., 2013), and currently, has reduced to around 23.6percent in 2013 (Schneider, 2013). Despite the facts, that compared to other Balkan countries Greece has a higher GDP per capita, and a higher standard of living has shown a considerable high percentage in the informal economy.

The informal economy in Greece has also been estimated by Bitzenis et al. (2016). Using a MIMIC model, the author estimates that the informal economy decreased from 28.2 percent in 2003 to 24.3 percent of GDP in 2011. The author indicates that the most important determinants of Greece's informal economy are factors related to macroeconomic conditions, namely the unemployment rate and GDP growth, and institutional factors, such as tax morale and the rule of law.

Croatia's informal economy was studied in a number of studies. The level of informal economy in Croatia has negatively impacted on the economic development of the country (Madžarevic-Šujster, 2002; Bejakovic, 2004). Klaric (2011) estimates the size of the informal economy using a MIMIC model for the period of 1998 to 2009. The estimates from this study indicate that the size of the informal economy in Croatia between 1998 and 2009 is about 15 percent and 12 percent, respectively. Although this is on the low side of estimates compared to the other studies outlined above, such as that from Schneider et al. (2010). Madžarevic-Šujster, (2002), Bejakovic (2004) and Klaric (2011) blame the inefficient taxation system in the country for the existence of informal economy.

Slovenia's informal economy according to Nastav and Bojnec (2005) is lower than in other Balkan countries. According to Nastav and Bojnec (2005), the informal economy in Slovenia fluctuates between 10 and 21 percent of GDP. Using labour market analysis or the discrepancy between the Official and Actual Labour Force approach, they estimate the size of the informal economy and indicate that it had increased from 10 percent in 1993 to about 21 percent in 2014. There are some studies that have measured the size of the informal economy in Slovenia using a large sample of countries such as that by Schneider et al. (2010) or the study by Hassan and Schneider (2016a).

The size of the informal economy for Slovenia, Greece and Croatia has been analysed by other authors as well, some of which discussed above. These studies have been presented in figures 3.3.9, 3.3.10, and 3.3.11 below.

Figure 3.3. 9 – Empirical studies and the size of the informal economy in Croatia from various sources

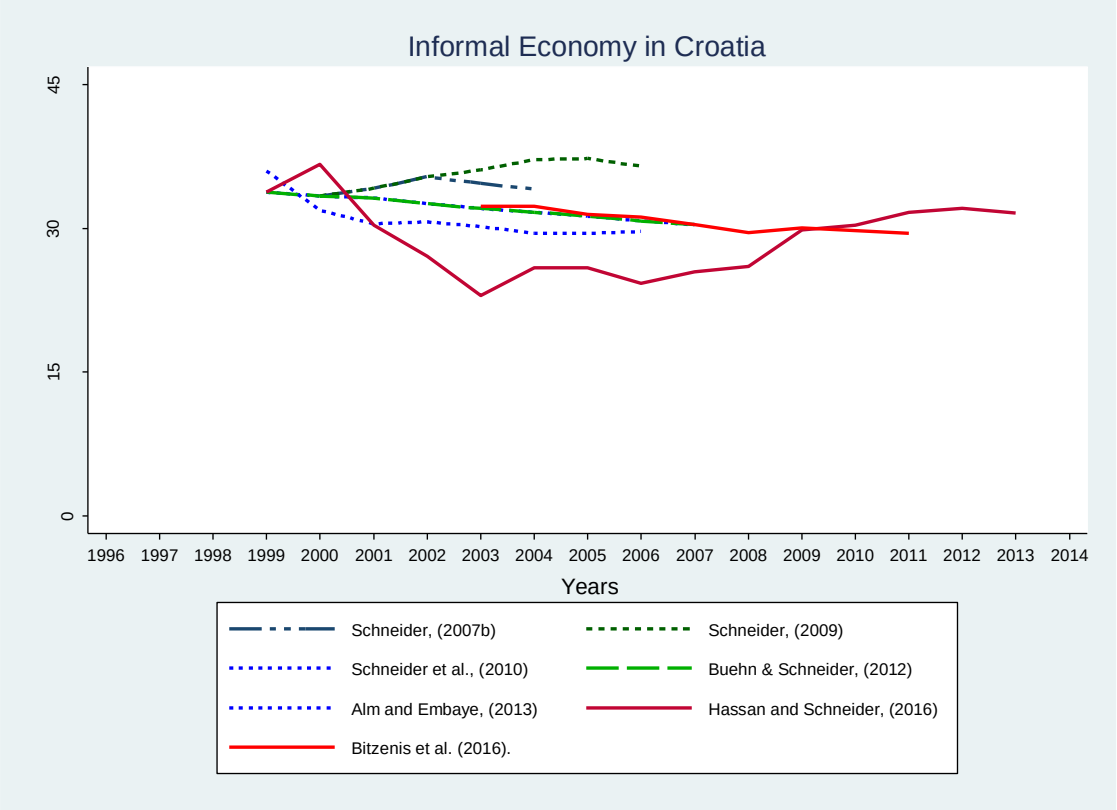


Figure 3.3. 10 – Empirical studies and the size of the informal economy in Greece from various sources

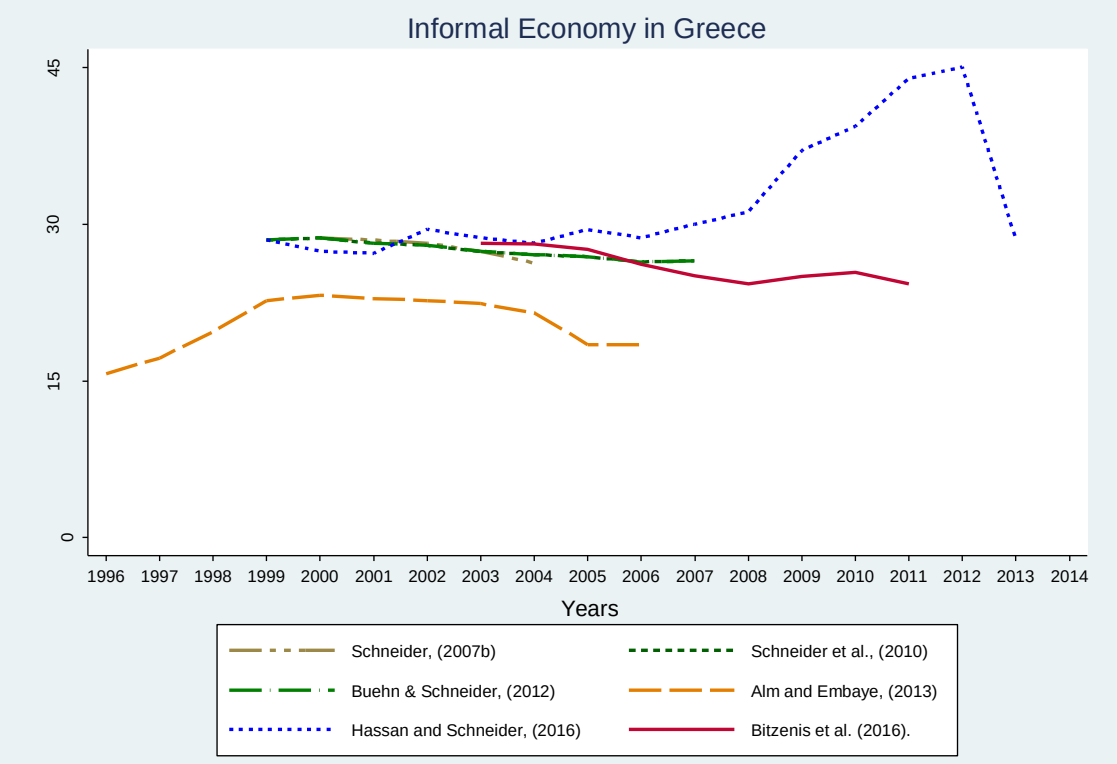
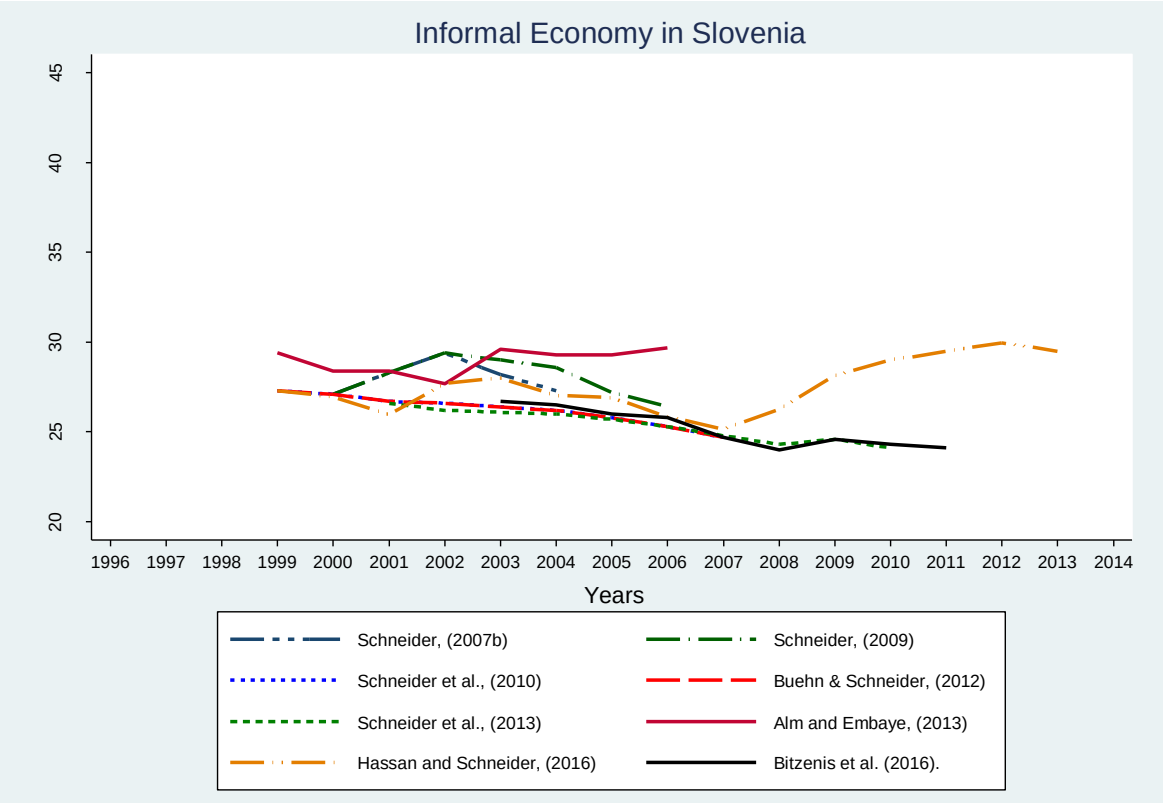


Figure 3.3. 11 – Empirical studies and the size of the informal economy in Slovenia from various sources



The existence of informal economy in a country is highly influenced and correlated by factors such as the historical background specific to one country, the level of development a country is in, cultural characteristics, as well as the economic system and the overall political and social environment (Williams et al., 2014). There has been growing acknowledgement that the informal economy is a significant component of South-East European economies, and in particular, the countries of the Balkan Peninsula (Williams et al., 2014). Informal economies of this magnitude have significant implications for governments and societies.

3.4. Economic Informality and Development

There is a shared assumption among the literature that the informal economy is associated with low productivity levels and therefore, contributes to slow economic growth and economic development in a country (Levy 2007, 2008). The low productivity is an important issue because it sets a limit on a country's or individual's living standards. Usually when one refers to the informal economy, immediately one can think of developing or less developed countries, as well as those countries in transition. However, the informal economic activities (although at different levels and volumes) can be found in all countries worldwide (Schneider, 2007a).

In developing countries, informal firms and informal economic activities account for up to half of overall economic activity, and they provide a livelihood for millions of people (la Porta & Shleifer, 2014). However, the role of the informal economy in economic development remains controversial among scholars. According to De Soto (1989, 2000), informal firms are *"untapped reservoir of entrepreneurial energy, held back by government regulations"*. As such, unleashing this energy by reducing entry regulations or improving property rights would fuel growth and development. De Soto (1989) has argued that informal firms would like to become formal but are held back by corruption and government regulation. Others, such as Rauch (1991), Farrell (2004) and Levy (2008), see informality as a by-product of poverty and something that should be suppressed, not unleashed.

Heintz and Pollin (2003) analysed the relationship between the level of informality and the level of economic growth for two time periods in twenty developing countries. They found that most developing countries from their sample (around 70 percent) experienced some economic growth in a situation of informality; Four experienced a decline in economic growth,

while the other two experienced no change in the rate of growth. The level of informality increased in three countries of their sample which had good economic growth rates per capita (above two percent increase), while declining in two countries with low growth per capita (about less than one percent) (Heintz and Pollin, 2003).

Galli and Kucera (2003) conducted a similar study for 14 Latin American countries and found both countercyclical and pro-cyclical characteristics of informality (survival and subordinated activities and independent and subordinated activities, respectively). Galli and Kucera (2003) conclude that the nature of informality during business cycles tends to change where often the informal economy is heavely saturated during recessions and has a limited capacity to absorb any losses in the formal economy.

Loayza and Rigolini (2006) assessed the relationship between informality and economic growth and development for 42 countries (of which 18 were developing and 24 developed countries). Their results indicate that the informal economy tends to expand during economic recessions and adjusts during high tax regimes. Loayza and Rigolini (2006) find that the informal economy is much higher in countries where the GDP per capita is low, there are significant opportunity costs of operating formally because of strict and often bureocratic employment and business regulations, and weak monitoring of informality which are associated with weak policy and judicial systems.

While in some parts of the world the size of the informal economy has been increasing relative to the formal economy, the size of it has been reducing in Europe over the past decade, but still, its size as of 2013 is estimated to be at around €2.15 trillion. On average this constitutes as much as 18.5 percent of economic activity across Europe (according to a report by Schneider (2013) for Visa Europe and ATKearney). This report shows that almost two-thirds

of the informal economy is concentrated in Europe's largest countries such as Germany, France, Italy, Spain and UK, however, in countries of Eastern Europe the size of the informal economy relative to the formal economy is much higher than in Western Europe. According to the same source, the informal economy accounts for as much as 30 percent in countries such as Croatia and Bulgaria, and far more in other Balkan countries. From these results, one could conclude that the size of the informal economy in a country is negatively correlated with the economic development in that country.

Even though in general terms the size of the informal economy reduced slowly in the continent of Europe over the past decade, the Mediterranean countries still experience a growing informal sector. Many companies still operate under the informal economy where they can avoid some taxes, misreport employment, ignore safety regulation and product quality standards, violate copyright and intellectual property laws, as well as avoid registration as legal entities (Ishengoma & Kappel, 2006). This problem is particularly worse in countries with less economic development, in transition and the developing countries. Informal economic activities and informal companies tend to be of larger volume and number, respectively, in countries where there is a lack of development or where there is poverty (Ishengoma & Kappel, 2006). However, in turn, the author argues that it is the informal sector that causes further underdevelopment and poverty. It is therefore understood by governments that formalisation rather than informality is more beneficial for an economy attempting to increase economic growth and reducing poverty.

As an agent's engagement in informal economic activities violates the legal norm (Olters, 2003), these activities are usually supplemented by higher levels of public corruption, where bribes are accepted from government officials in exchange for favours at the disadvantage of

the state (Tanzi, 1998). There is a growing literature which shows that, in a a corrupt system, there is a distortion of economic incentives, resulting in lower state revenues lower private investments, and increased poverty and inequality (Gupta et al., 2002; Olters, 2003). Most of the above studies confirm the presence of a negative correlation between the informal economy and corruption in one hand and growth as well as development on the other, thereby highlighting the importance of effective and efficient governance as a crucial element of successfully tackling informal economic activities in a country through various reforms.

According to Singh et al. (2012), a large size of the informal economy will limit the capacity of the state to bring about strong institutions with effective governance capabilities for many developing and less developed countries worldwide, which in turn is likely to discourage the involvement of individuals and businesses in a formal economy where legal norm is fully respected. Singh et al. (2012), analyse the main factors influencing the growing size of the informal economy by emphasising the role of institutions and the rule of law. The authors argue that when individuals and businesses are faced with higher regulation burden, and a corruptive environment, as well as inefficient enforcement, they have an incentive to hide their economic activities. Singh et al. (2012), argue that institutions are imperative determinants that influence the size of the informal economy, by more than tax rates.

However, in turn, the development and the effectiveness of government institutions will depend on the ability of governments to collect revenues, which in a country with high level of informal economy can be challenging. Therefore, countries with a large informal sector are faced with the risk of being stuck in a 'vicious cycle' (Alesina, 1999), where the large size of the informal sector is more likely to complicate revenue collection from government authorities leading to relatively poor provision of qualitative public goods and services

(Alesina, 1999). Such inefficient public sector will reduce taxpayer discipline and tax morale, directing the economy towards a fiscal or informality trap (Naylor, 2002).

Wallace et al. (2004) investigate the informal economy in East and Central Europe between 1991 and 1998. They find that the informal economy was an essential part of the former countries of the Communist block of Central and Eastern Europe throughout their transition period. They consider the size and development of the informal economy in these countries during their transition period, the forms of participation in the informal economy and its role in economic and political developments in the region.

Wallace et al. (2004) also investigate whether the informal economy in East and Central Europe can undermine economic growth and development in those countries. By using annual growth as a dependent variable, the authors use first bivariate analysis and then multivariate OLS-regression to measure the consequences of different kinds of economies and different kinds of social capital on economic growth. They find a positive correlation between the level of GDP per capita and those employed in the formal economy. They also find a robust negative correlation between the economic growth and informal economy. As per their results, the informal economy is, therefore, most associated with lack of growth in the household economy as economic growth is associated with increasing formalisation.

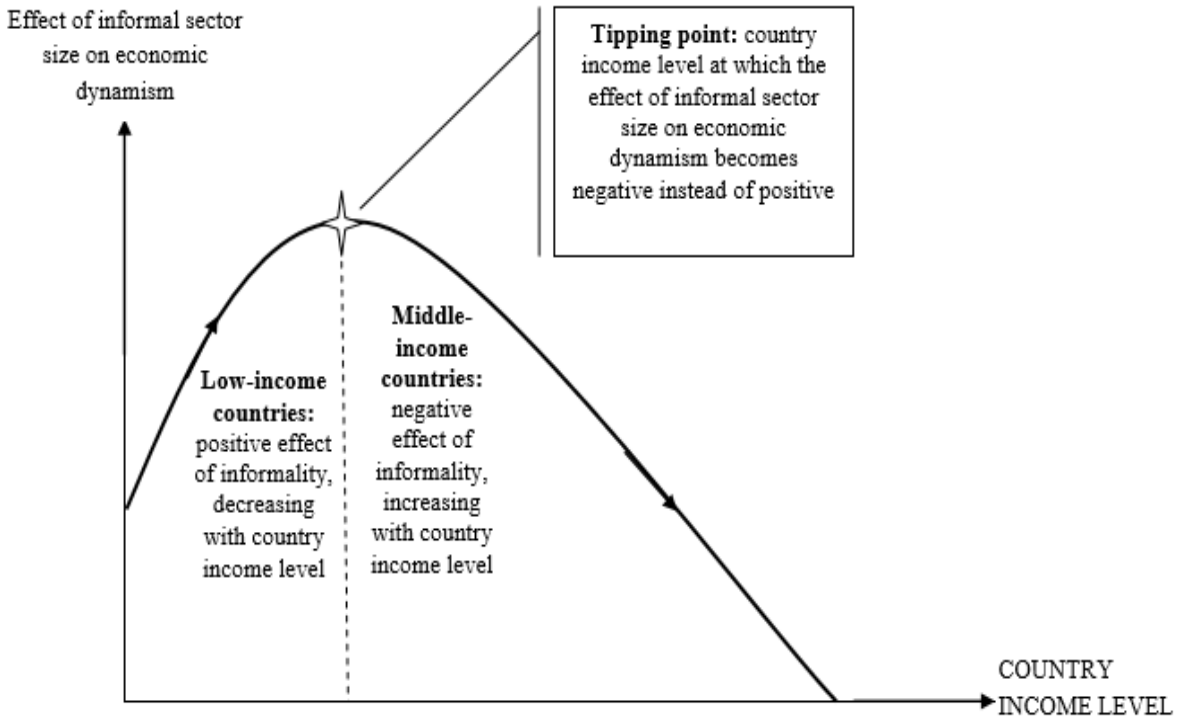
Some argue that granting access to formal credit markets to potential entrepreneurs, by improving public institutions and specific regulations, is an essential condition for economic development (De Soto 1990, 2000). In particular, reforms allowing economic agents to formalise and thus better collateralise their assets should naturally lead them to invest more, increase their productivity, and ultimately the benefit of higher overall growth and development would follow. However, these views were questioned by Massenot & Straub

(2011), where they argue that this conclusion may not hold in countries with a where financial openness is low and financial sector is concentrated. With the growth of the formal sector in those countries, more entrepreneurs and individuals might become creditworthy, which result in interest rate due to higher demand for credit, and this in turn is likely to reduce future accumulation of capital (Massenot & Straub, 2011).

In a study by Nikopour et al. (2008) the correlation between the degree of economic development and the size of the informal economy is investigated. In their study, they analyse the Kuznets curve[39] of the informal economy for a panel of 21 OECD countries across 11 years (from 1995 to 2006). Their results indicate that the cubic functional (N shaped) form of the Kuznets curve justifies the relationship between the level of economic growth and development and the size of the informal economy better than the inverted (U shaped) curve. The authors also indicate that the level of the informal economy in a country has a relatively positive effect on the formal economy in the initial phases of the development and has a negative impact on economic growth on later stages of development. Bhattacharya (2011), Elgin and Oztunali (2014a, 2014b) agrees with such conclusions about the informal sector and economic development. Figure 3.4.1 below highlights the impact of the informality on economic growth at different stages of development.

[39] Kuznets (1955) developed the so called Kuznets curve, which is also known as the inverse U-shaped pattern of inequality. Using cross-country and time series data Kuznets (1955) concluded that as countries developed, income inequality first increased, peaked and then decreased. More about the Kuznets curve is found at Acemoglu and Robinson (2002).

Figure 3.4. 1 – Kuznets Curve of Informal Economy. Source: Biau (2011, p.8) adopted from Environment degradation Kuznets curve, and Inequality Kuznets curve as suggested by Kuznets (1955)

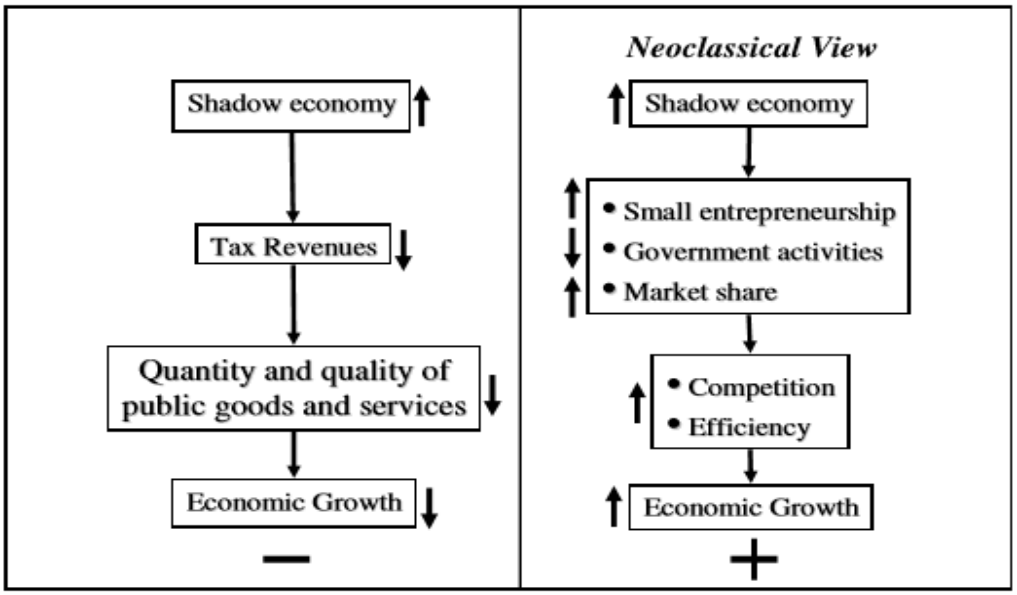


The relationship between the informal economy and the level of economic growth at different stages of a country's development can be summarised in figure 3.4.2 below taken from Nikopour et al. (2008). From a neoclassical point of view, Nikopour et al. (2008) argue that the existence of the informal sector in a country can lead to higher competition and efficiency. Asea (1996) argues on the same lines, suggesting that the informal sector may also lead new markets being created, increased capital and financial resources, and a transformation of the socio-economic and legal institutions. Therefore, the authors argue that a positive relationship can exist between the informal sector and the economic growth for a country which finds itself at a lower level of development[40].

[40] Other authors tend to agree on the positive relationship of the informal economy on the official economy, such as Adam and Ginsburgh (1985), Schneider (1998), Giles et al. (2002), Gillman and Cziraky (2004), Schneider (2004), Schneider and Hametner (2007), and Bhattacharya (2011)

However, there are also those that indicate that a high level of economic informality can have a negative impact on the level of economic growth. For example, Loayza (1996) argues that a high level of informal economy will impact the provision of public services for everyone negatively. Furthermore, Keefer & Knack (1997) also agree with such conclusion that the level of informal economy will adversely affect the level of economic growth as government's tax revenues are reduced and as such the quantity and quality of public services and infrastructure will be affected negatively. Therefore, there are two views about the relationship of the informal economy and economic growth. One argues that the relationship between the informal and the official economy is negative, while the other view emphasises that is positive. These two views are summarised in the figure below.

Figure 3.4. 2 - Views on the relationship between the informal economy and economic growth, Source: Nikopour et al. (2008, p.6)



3.5. Estimation of the informal economy using different approaches

This section will provide a detailed review of the existing literature on estimating the size and development of the informal economy using different approaches. It must be said that the

main approaches used in the literature are the MIMIC and the CDA model. Hence, this review of the literature will be mainly focused on these two methods.

The available approaches or models to estimate the size of the informal economy described in the theoretical background chapter, together with their primary methods are designed to calculate the size of the informal economy by considering only one indicator, which usually is the general economic output. This indicator must capture all the effects of the informal economy in a country. However, the effects of the informal economy tend to show up simultaneously in other areas of the economy such as production, labour markets, and money supply (Schneider, 2006, 2007b). The direct and indirect approaches described in the earlier chapters have shortcomings in that they do not foresee multiple factors impacting the size of the informal economy. Furthermore, one of the main disadvantages of using the direct approach methods is that they are unable to estimate the development of the informal economy over a longer period.

There are also some other obstacles to these methods. Those who are associated with the informal economy in any way may not be willing to share any information, and thus achieving results will strictly depend on the formulation of questionnaires or it could be impossible altogether. Further to this, a number of questionnaires will need to be formulated to capture information about different characteristics of the informal economy (Schneider, 2002, 2014). Another substantial criticism of the direct and indirect approaches is that the the main factors or causes that can potentially have an impact on the size of the informal economy are only taken into account in the monetary approach methodologies, and even here mainly one cause, the burden of taxation is considered but not multiple causes that could potentially

lead to the movements in the size and developments of the informal economy (Dell'Anno, 2007; Schneider, 2007).

The use of the MIMIC Model

The most commonly used method is one that should indicate various indicators and causes that impact the informal economy regarding its size and development. Such model is the MIMIC. This model has been used extensively by Giles et al. (2002); Dell'Anno (2003, 2007); Breusch (2005); Bajada & Schneider (2005a), (2005b); Pickhardt & Sarda-Pous (2006); Schneider (2005, 2006, 2007b). The literature also makes good use of the CDA model. Although these methods are similar in their fundamentals, they can be used with different specifications (Buehn & Schneider, 2012). Both these methods can be used with longitudinal or panel data (Buehn & Schneider, 2012; Alm & Embaye 2013).

The MIMIC model has been used for the first time by Zellner (1970)[41] and Goldberger (1972), and later by Frey and Weck-Hanneman (1984) are considered the pioneers on the application of the MIMIC model who used it to evaluate the relative size of the informal economy in seventeen OECD countries. Basic idea of this model is to consider the informal economy as a latent variable or index that has caused noticeable effects, but that cannot be measured directly.

The MIMIC model has a number of components, such as Cash in circulation, Real GDP and Real private consumption. A major assumption in most studies of the informal economy is that a considerable portion of informal transactions is carried out in cash so that to prevent detection, i.e. the money supply is a potential accurate indicator of the informal economy.

[41] Cited in Jöreskog and Goldberger (1975)

The money in circulation is a variable which is typically calculated through the levels, and dynamic patterns of the money aggregate M0, M1, M2 and M3. Within the framework of the currency board arrangements, the central bank does not have powers to control the money supply and the growth of money aggregates and therefore any increase can be correlated only to the real money demand in the country (Dell'Anno 2003, 2007; Schneider, 2006, 2007b, 2014). Furthermore, a reference variable is needed in estimating the informal economy so that to set a measurement scale. As the real GDP is adjusted for inflation, it reports the actual volume of overall formal economic activity performance. Real private consumption, on the other hand, is considered as an essential component of the informal economy. Working in the informal sector of the economy generates income for people. Following the conventional economic theory of the positive relationship between income and consumption, an increase in the size of the informal economy will be reflected in a proportional increase in real consumption.

Thomas (1992), Pozo (1996), Giles (1997a, 1997b, 1999a, 1999b), Johnson et al. (1998), Giles et al. (2002), Del'Anno (2003), Del'Anno and Schneider (2004) and Schneider (2003, 2005, 2006 and 2007b), indicate that there are a number of multiple causes and indicators which can potentially influence or be influenced by the informal economy, from which three main types of causes are defined. One is the actual level of taxation burden from direct and indirect taxes. A rising burden of taxation provides a strong incentive to work in the informal economy. According to Djankov et al. (2003), all informal activity has one common feature, and that is that those operating in the informal economy perceive that the benefits of doing so, outweigh the costs of operating within the legal norms and regulations.

Secondly, the burden of regulation is considered as an important cause of informality where a positive correlation is assumed, meaning that as the level of regulations intensifies, and the burden increases there will be solid incentive for individuals and businesses to enter the informal economy (Schneider and Enste, 2000). Further recent studies agree with this cause and have outlined some motives why some economic activities are performed informally. Key factors are the the costly, time consuming and bureocracy of government regulations and taxation system (Johnson et al., 1997; Johnson et al., 2000; Schneider and Enste, 2000).

A third driver which can affect the size of the informal economy and its development over time, are the attitudes of citizens towards their state. This has been termed as the "tax morality", and it describes the willingness of individuals and businesses to leave their formal activities and enter the informal economy. The assumption is that as tax morality declines there will be an increase in the size of the informal economy (Schneider, 2006 and 2007b).

Other causes such as economic downturns, as a result of various forms or types of financial crises, can affect the informal economy. Many studies suggest that at times of economic crisis people turn to their informal networks of family and friends for support, as well as the level of employment increases in the informal sector at times of economic uncertainty and crisis (Cunningham & Maloney 2000; Finnegan & Singh's, 2004; Mehrotra, 2009; Cling et al. 2010). A study by Colombo et al. (2013) suggests that the informal sector is a powerful buffer, which expands at times of banking crises and absorbs a large proportion of the fall in official output.

Economic and financial crises, in general, can result in higher official unemployment levels as jobs in the formal economy are lost and as new entrants into the informal economy increase (Schneider, 2002). As such the government's public expenditure can be affected and this could further exacerbate the crisis. The government will receive fewer revenues from taxes

and has to support a growing number of people out of work with social benefits. The underlying assumption here is that as people lose jobs in the formal sector of the economy they can move to informal sector as the latter can cope better and adjusts quicker with business cycle shocks as a result of economic downturns or crises (Cunningham & Maloney, 2000). The size of a country's informal economy is therefore strongly correlated with low levels of economic development and low GDP per capita (Schneider, 2002, 2007b).

Many studies also suggest that the informal economy is associated with less development and transition economies (Schneider & Enste 2000; Gërxhani, 2004; Williams, 2005; Dell'Anno, 2007; Andrei et al., 2010; Schneider, 2011; Schneider, 2014; la Porta & Shleifer 2014). Most of the Balkan countries are either post-communist or transitioning countries. These countries experienced a dramatic shift from a region of wars, conflicts and continuous social and political unrest to a region which started to understand the benefits of cooperation and working together to ensure economic prosperity for their societies (Bartlett, 2010; Penev, 2012). As such, as part of the causes of informality for the countries of Balkan, it is important to consider the political climate and account for conflicts and wars in the regions when addressing the size and the development of the informal economy.

From a public sector services perspective, a growing size of the informal economy can reduce government tax revenues, which usually leads to a reduction in the quality and in most cases the quantity of goods and services publicly provided by the state (Alesina, 1999; Azuma & Grossman, 2002; Enste, 2010; Andrews et al., 2011). Consequently, this could result in higher taxes for firms and individuals operating in line with legal norms and regulations in the formal sector of the economy. This is also often combined with a deterioration of the publicly provided goods and services and their administration (such as public infrastructure,

healthcare, etc.), resulting in lower tax morality and stronger incentives to enter the informal sector.

Johnson et al., (1998) present a simple model of the relationship between public services, tax rates and the informal economy. Their results indicate that countries with lower tax rates, fewer laws and bureocratic regulations, as well as less corruption, tend to achieve higher tax revenues, and therefore find themselves with asmaller informal sector. Balkan countries on the other hand, as mentioned previously, experience a higher informal economy than most of other European countries, which can be partially blamed on the above mentioned causes.

Countries with strong and effective rule of law, which is mainly financed by the government revenues from taxes, also tend to have a lower size of the informal economy (Schneider, 2006, 2007b). According to Johnson et al., (1998) and Schneider (2007a), countries which are in the process of transition have a greater number of procedures and regulations which are discretionary, followed by higher effective tax rates - resulting in higher instances where bribes and other corruptive behaviour takes place to bypass complex tax regime, regulations and procedures which, consequently results in an even higher informal sector. Johnson et al., (1998; p. 1) conclusion is that:

> *"…wealthier countries of the OECD, as well as some in Eastern Europe, find themselves in the 'good equilibrium' of relatively low tax and regulatory burden, sizeable revenue mobilization, the good rule of law and corruption control, and a relatively small informal economy. By contrast, a number of countries in South America and the former Soviet Union exhibit characteristics consistent with a 'bad equilibrium': tax and regulatory discretion and burden on the firm are high, there is a weak rule of law, and*

> *a high incidence of bribery leading to a high share of the informal economy"* (Johnson et al., 1998; p. 1).

Quality of public goods and services offered by the state can also be an important and crucial casual variable indicating whether people want to work or not in the informal economy. Accounting for this effect, Schneider (2007a) uses a variable called the Government Effectiveness Index from World Bank Governance Indicators.

> "*This index captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political interference, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies"*(World Bank Governance Indicators, Online[42]: p.1).

This will be an important variable for the Balkan countries as perceptions about the rule of law, and the degree of institutional independence from political pressure, as well as corruption, are very high.

On the other hand, the size and development of the informal economy are usually determined by three main indicators. One of these indicators is the change in monetary indicators. With a rise in the economic activities in the informal economy, it is expected that the monetary transactions will also increase (Schneider, 2007a). Changes in the labour market are also important indicators of the size and development of the informal economy (Dell'Anno, 2007; Schneider, 2007a). If more and more people are working in the informal sector of the economy, this can result in a decrease in the number of those working in the formally. Moreover, if informal activities increase, this affects the working hours in the formal

[42] Available from https://info.worldbank.org/governance/wgi/pdf/ge.pdf (Last accessed on 21.12.2018)

economy. The number of self-employed is another crucial factor to be considered here as pointed out by Dell'Anno (2007). Changes or developments in the production market are also important indicators of the informal economy. If the informal economy increases, this means that the inputs move out of the official economy into the informal economy and this movement could potentially have a negative impact on the growth rate of the official economy.

In studies by Bajada and Schneider (2005), Schneider and Enste (2006), Feld and Schneider (2009), the developments and the business cycle of the formal economy is also significant in people's decision to work or not in the informal economy. If the formal economy is experiencing a boom, people have many opportunities to earn a good salary in it. Conversely, for many people, this is not the case if the formal economy is in recession or heading towards it, as more people will try to recompense their income losses from the formal economy by taking additional work informally (Feld and Schneider, 2009). However, Taylor (1996) provides empirical evidence arguing that people's movements into the informal economy are pro-cyclical. Following the work of Schneider & Enste (2000), this research in its MIMIC model will use variables such as the GDP per capita, GDP per capita as per Purchasing Power Parity (PPP) and the labour force participation ratio in capturing such effects.

Empirical studies with MIMIC models

Hassan & Schneider (2016a) use a panel data of 157 countries worldwide to calculate the size of the informal economy using a MIMIC model from 1999 to 2013 on an annual basis. For the cause variables, they use tax burden, regulation burden, Unemployment rate, self-employment rate, economic freedom index and business freedom index, whereas for the indicator variables they use GDP growth, currency in circulation and labour force participation

ratio. They find that higher tax and regulatory burden, unemployment and self-employment rates are the main drivers of the informal economy, meaning that an increase in these causal variables increases the informal economy. Our result also confirms previous findings from Schneider et al. (2010). The estimated average of the informality of 157 countries around the world, including developing, East European, central Asian and high-income OECD countries averaged over 1999 to 2013 is 33.77percent of official GDP. Calculating the informal economy using a sample of 157 countries, could pose the risk of using similar causes and indicators for countries at different stages of development and countries with different political, social and economic systems. This could produce some biased results.

Another study by Hassan & Schneider (2016b) estimate and analyse the size of the informal economy for Egypt using a MIMIC. They use time series data from 1976 to 2013. In their estimation, they use variables specific to the Egyptian economy in the MIMIC regression, such as the dominance of the agriculture sector in the economy and the level of institutional quality. Other variables used include the tax burden, unemployment rate and the self-employment in one side as the causes while using real GDP, total employment and money in circulation as indicators.

Elshamy (2015) also uses MIMIC model to estimate the size of the informal economy for Egypt over a time series data from 1980 to 2012. In this study the author is using the following causes; average of corporate and personal marginal income tax rate, the importance of agriculture sector to GDP and the inflation rate; while using the following indicators; gross enrolment ratio for secondary school and the labour force contribution to the social security system. The results indicate an increasing trend of the informal economy in Egypt. The results show that the informal economy increased from 27.2 percent in 1980 to 37.4 percent in 2012.

Elshamy (2015) blames a strict tax system, high inflation, and relatively large agriculture sector as the leading causal factors driving the size of the informal economy. Elshamy (2015) also provides empirical evidence which suggest that a large informal sector is likely to reduce contributions for social security systems, and negatively impacts on the education enrolment rates in Egypt. This agrees with Vuletin (2008) and his conclusion for another study about Latin American and Caribbean countries.

Schneider (2007a) estimates the size of the informal economy for 145 countries worldwide using panel data and MIMIC as the main methodology over a period of 6 years – from 1999 to 2005. These countries include developing, transition economies as well as highly developed OECD countries. Schneider (2007a) uses direct taxation, indirect taxation, regulation burden index, unemployment quota, quality of institutions, tax morality, average working time per week as the leading causes for informality in all his MIMIC specifications, whereas uses GDP per capita, Employment rate, annual rate of GDP, and change of currency per capita as the leading indicators of the informal economy and controls GDP per capita in the regression. The results show the average size of the informal economy relative to the GDP in 2004/05 in 96 developing countries to be around 37percent, in 25 transition countries at 39percent while in 21 highly developed OECD countries to be around 15percent. The regression results indicate that tax and social security burdens, as well as complex labour market regulations are key forces driving informality.

Using a 5-1-3 MIMIC specification, Schneider (2009) also estimates the size of the informal economy for 25 central and eastern European countries. For the indicator variables, Schneider (2009) uses GDP growth rate, employment to population ratio, change in currency in circulation per capita and controls for the GDP growth rate, by restricting the coefficient to

-1. For the causes variables, this paper uses the level of direct and indirect taxation, state regulation burden, GDP per capita and the unemployment rate. In this study, the author reaches some conclusions. The first conclusion comes from the estimates on the size of the informal economy (where Schneider in all his studies refers mainly to as the shadow economy). The estimates show that for the countries part of this investigation the informal economy over the period of 6 years (from 1999 to 2006/2007) reached a significant size where the average informal economy of these transition countries was just over 38 percent of the GDP in year 1999/2000, rising to around41percent in 2004/2005. As a result of growing official economy in 2006 and 2007 the size of the informal economy decreased to just under 40 percent. The second conclusion is that the level of taxation and regulation burden was the most significant factors affecting the informality in these countries. The study argues that the governments wanting to reduce the level of informality must be very careful in their policy making because of the links of the informal economy with the formal or official economy. The study goes on to argue that the informal economy can raise living standards in these countries because of the income that different economic agents gain from the informal economy. Furthermore, with people's engagement in the informal economy, they will have less time to express their popular discontent or mistrust in the state institutions and go to streets for protests.

Schneider et al. (2010) and Buehn & Schneider (2012) using same variables for causes and indicators estimate the size of the informal economy for 162 countries worldwide. Using various specifications of the MIMIC model they estimate the size of the informal economy for the panel of 98 developing countries, 88 developing countries, 21 transition countries, 25 high-income OECD countries, 151 countries worldwide and for a sample of 120 countries.

Over a period of 6 years (from 1999 to 2006/7), they estimate that the weighted average size of the informal economy (as a percentage of GDP) in Sub-Saharan Africa is around 38percent, in Europe and Central Asia (mostly transition countries) just over 36percent and in high-income OECD countries just over 13percent. Their studies argued the that most essential drivers of the informality were the level of direct and indirect taxation, labour market regulations, the provision of qualitative public goods and services as well as the level of the formal economy, such as the unemployment level and the GDP per capita (Schneider et al., 2010; Buehn & Schneider, 2012). In their different MIMIC specifications, they use causes such as the size of government, total tax burden, direct taxation, indirect taxation, fiscal freedom index, business freedom index, economic freedom index, unemployment rate, GDP per capita, regulatory quality, government effectiveness, openness and the inflation rate. Whereas for the indicators they use GDP per capita growth rate, GDP per capita, Labour force participation ratio, the growth rate of the labour force and currency in circulation.

Schneider et al. (2013) calculate the size of the informal economy for Serbia using a MIMIC model. They use the following causes and indicators for the model: direct and indirect taxation, marginal income tax burden, effective income tax rate, regulatory effectiveness index, the rule of law index, corruption index, self-employment and the unemployment rate. For the indicators, they use cash per capita growth rate, employment rate and GDP per capita. In an attempt to increase the degrees of freedom and number of observations their analysis includes a panel data of 11 countries from Balkan, central Europe and Baltic countries. Their estimates are calculated from 2001 to 2010 and show that the informal economy in Serbia on average over the period of the study is about 31.5percent. It also showed a declining trend from 2001 at 33percent to 30percent in 2010. The most significant causes of the informal

economy were the level of corruption, level of indirect taxation, income tax and the level of unemployment.

In another study, the size of the informal economy is measured using a MIMIC model with panel data. This study by Dell'Anno & Schneider (2008) estimate the informal economy for 151 countries worldwide using the size of the government, share of direct taxation, fiscal and business freedom, rate of unemployment, government effectiveness index and sub-national government employment as the leading causes for the MIMIC regression, while using currency in circulation, GDP per capita and labour force participation ratio as the primary indicators. In their study, they also demonstrate some advantaged and disadvantages in measuring the informal economy using the MIMIC modelling approach.

Arby et al. (2012) also measure the size of the informal economy for Pakistan using three main models: the CDA model, the MIMIC model and the Electricity Consumption Approach (which is also known as the physical input model). For the MIMIC model, Arby et al. (2012) apply regime durability as a potential cause to informality in Pakistan, as well as tax to GDP ratio and M2 to GDP ratio. For the indicators, they use currency in circulation as a ratio of M2 and electricity consumption for the regression. This is the first time that the regime durability[43] variable has been used from the Polity IV project. The authors are also introducing the use of electricity consumption variable as an indicator of the informal economy for Pakistan as suggested by Aldersdale et al. (2006), Kaliberda (1996), Lackó (1996, 1998, 1999, and 2000), and Kaufmann and Kaliberda (1996). The authors use data from 1973 for the MIMIC

[43] Regime Durability from Polity IV Project – This is defined as: *"The number of years since the most recent regime change (defined by a three point change in the POLITY score over a period of three years or less) or the end of transition period defined by the lack of stable political institutions (denoted by a standardized authority score)" (SystemicPeace.org, 2016, p.17) available at: https://www.systemicpeace.org/inscr/p4manualv2016.pdf (last accessed: 21.12.2018).*

regression. Their results indicate an average of around 30 percent of informal economy relative to the formal GDP and show a declining trend in the years beginning of 2000s. However, there does seem to be differences of about 10 to 15percent between the results depending which model is used.

Buehn & Schneider (2009) investigate the relationship between corruption and the level of informal economy for 51 countries worldwide using panel data and MIMIC methodology. Their MIMIC model involves two latent variables – one is the informal economy and the other is the corruption. For the informal economy, the authors use Business regulation, unemployment rate, transfers and subsidies and government consumption as causes while using GDP growth, labour force participation ratio and the ratio of M0 to M1 as indicators. For the latent variable of corruption, the authors use Government effectiveness, Fiscal freedom, the rule of law and bureaucracy costs for causes, while they use Real GDP per capita, bribes and judicial independence as indicators. Their results provide empirical evidence of a positive relationship between the informal economy and the level of corruption. Their results also indicated that the informal economy influences corruption more than the other way around.

A study by Vuletin (2008) measures the size and development of the informal economy for almost all Latin American and Caribbean countries during early 2000s. Vuletin (2008) uses a MIMIC model for regression analysis and find that rigorous tax system, relatively intensive regulatory framework, combined with high or volatile inflation rate as well as the dominant agriculture sector are the leading and most significant drivers of the informal economy. He uses three specification models for the MIMIC, 4-1-3, 4-1-3 and 5-1-3. His results show that Fiji, Nicaragua and Paraguay have the highest level of the informal economy. In the MIMIC

regression analysis, Vuletin (2008) uses labour Rigidity index, Burden of Taxation (Tax rates), Percentage of the agriculture sector relative to other sectors, inflation and the strength of enforcement system as causes; and for indicators, this study uses workers social security contributions, the degree of unionisation and gross enrolment ratio at secondary schools.

The MIMIC methodology in measuring the size of the informal economy has been applied by Vo & Ly (2014) for the South East Asian countries[44] with emphasis on Vietnam. For the cause variables, the authors use the tax rate, Fiscal freedom index, business freedom index, labour freedom index, government spending index and the unemployment rate, while for indicators in the model they use a ratio of M0 to M1, labour market index, tax revenue and GDP per capita. The findings from this study indicate that the informal economy for Vietnam lies between 25 percent and 30 percent of the official economy for the period from 1995 to 2014. Other countries (part of the study) experience a lower informal economy, below 20 percent on average, according to this paper and the regression applied. Findings from this study also present evidence that tax rate, labour freedom, and business freedom have provided a significant effect on the informal economy of the south-east Asian countries.

Dell'Anno & Schneider (2006) critically address the issues whether it is reliable to use MIMIC model for measuring or estimating the size of the informal economy. Their study is a response to Breusch (2005). Dell'Anno and Schneider (2006) conclude that the MIMIC model is still one of the best approaches to this purpose. Breusch (2005) main critique is with regards to the use of the benchmarking model. However, Dell'Anno and Schneider (2006) address this issue

[44] All countries part of the ASEAN including Vietnam.

by proposing an alternative benchmarking methodology which provides better reliability of results.

Nchor & Adamec (2015) apply the use of the MIMIC model to estimate the size of the informal economy for four African countries: Kenya, Namibia, Ghana and Nigeria. The model involves two sets of variables: the observed variables and the indicator variables, which are used to estimate the latent variable – the informal economy. For the causes the authors use the relative size of government, total taxation rates (which include direct and indirect taxation rates), regulatory framework for business operations, the level of interest rates on deposits, GDP per capita, the rate of unemployment, and a proxy for the quality of public services. The indicator variables included in the MIMIC analysis are the labour force participation ratio in the formal economy, cash held outside banks, and the GDP per capita growth rate. The results indicate that the size of the informal economy in Kenya, Namibia, Ghana and Nigeria on average is 33.7 percent, 29.1 percent, 36 percent and 47 percent, respectively.

Barbosa et al. (2013) following the work of Dell'Anno (2007) analyse the development of the informal economy from 1977 to 2011 using the MIMIC model for Portugal. For the Causes the authors use Government employment relative to the labour force, tax burden as a percentage of GDP, subsidies as a percentage to GDP, social benefits paid by the government relative to GDP, self-employment as a percentage of the labour force and the unemployment rate. Whereas for the indicators they use Index of real GDP and the Labour force participation ratio. The authors find that the rate of unemployment and the provision of grants as subsidies to enterprises are the main contributing factors to the size and development of the informal economy in Portugal. According to the authors, there were many fluctuations in the size of

the informal economy, and since 2001 the informal economy increased, accentuating its growth rate after 2007, and it reached a peak of 24.2percent of the GDP in 2011.

Abdih & Medina (2013) use a MIMIC model for the Caucasus and Central Asian countries. They estimate the size of the informal economy in these countries for 2008 using as cause variables the tax burden, labour rigidity index, institutional quality, regulatory burden in financial and product markets, control of corruption, the rule of law and government effectiveness index, while use as indicator variables self-employment, M0 over M1 and GDP per capita. They find that a burdensome tax system, rigid labour market, inadequate institutional quality, excessive regulation in markets are leading factors in explaining the size of the informal economy, which ranges from 26 percent of GDP in the Kyrgyz Republic to around 35 percent of GDP in Armenia.

Trebicka (2014) is the first author to use MIMIC model for a time series data for Albania. She estimates the informal economy in Albania using a 6-1-2 MIMIC model specification which is made up of the following causes and indicators: Causes: Government employment relative to the labour force, tax burden, subsidies relative to the GDP, Social benefits paid by the government as a ratio to GDP, self-employment as a ratio of GDP and the unemployment rate. Indicators: Index of Real GDP and Labour force participation ratio. She does not use the benchmarking procedure to estimate the size of the informal economy but does highlight that the level of unemployment, regulation and government spending regarding subsidies are the main drivers of the informal in Albania according to her model.

Dell'Anno (2003) investigates the size of the informal economy for Italy using a MIMIC model. The author uses the following causes: Government employment relative to the labour force, Tax burden, Subsidies relative to the GDP, Social benefits paid by the government as a ratio

to GDP, self-employment as a ratio of GDP, Unemployment rate; and the following Indicators: Index of Real GDP, Labour force participation ratio. His results indicate a declining trend in the Italian informal economy for the years of the study period. Similarly, Dell'Anno et al. (2007) offer estimations of the development of the informal economy for France, Spain and Greece. They use a MIMIC model similar to that established by Giles (1995), which includes the tax burden, a proxy of regulatory burden, the unemployment rate and self-employment as causes of the informal economy and the GDP growth rate, the labour force participation ratio and the currency ratio as indicators of the informal economy. The results generated confirm that the unemployment rate, the fiscal burden and self-employment rate can be attributed as the leading causes of the informal economy in the countries part of this study.

Chaudhuri et al. (2006) use data from all states in India and estimate the size of the informal economy from 1974 to 1996.Using a MIMIC model their results indicate that the size of the informal economy has gradually decreased since 1991/1992 when the government decided to liberalise the economy. This study is among the first to analyse the impact of the political economy on the level of the informal economy. Their results indicate that during election years the informal economy tends to reduce by as much as 4 percent, compared with all other years. Furthermore, the results indicate that the growth of the informal economy is much lower in states where there is a coalition government in power. A significant improvement in the media sector, especially for the printed media and the increased level of literacy rates influence individuals to participate less in the informal economic activities.

The use of CDA model

The CDA model has been widely used to measure the informal economy worldwide. However, most cases, except Alm and Embaye (2013), have estimated the informal economy with the

CDA model using time series data. Alm and Embaye (2013), on the other hand, use a panel data to estimate the informal economy for 111 countries worldwide from 1984 to 2006 using the General Method of Moments (GMM hereafter) as suggested by Arellano and Bover (1995). To date, there is no evidence in the literature that one has estimated the informal economy for the countries of Balkan using this methodology with panel data. Furthermore, there is no evidence that there has been a comparative analysis between the estimates of the informal economy generated using the MIMIC model as described above and the CDA model based on the GMM.

The CDA model is a macro model and has been first used by Cagan (1958) where he measured main determinants for currency ratio to M2 for the USA, and found that the main driving factors in the demand for currency were the level of interest rates, tax rates, and the level of per capita income. Based on such assumptions more research about the informal economy followed based on the assumption that the higher the rate of taxation in an economy the higher the incentive to hold currency (Alm and Embaye, 2013). Extensive research about the CDA has been done since the first use of the model such as the work by Tanzi (1980, 1983), Klovland (1984) for Norway and Sweden, Bhattacharyya (1999) for the United Kingdom, Bajada (1999) for Australia, Giles (1999b, 1999c) for New Zealand, Schneider (1997, 2002) and Johnson et al. (1998) for OECD countries, Dell'Anno and Schneider (2008, 2009) and Alm and Embaye (2013) for a large number of countries worldwide, Williams and Windebank (1995) for EU countries, and Giles et al. (2002) for Canada, etc. Along with the MIMIC model, the CDA model has been the most widely used method to estimate the size of the informal economy.

The first important factor in the calculation of the informal economy using the CDA model is the total tax rate. Some papers use indirect plus direct tax rates (Alm and Embaye, 2013;

Hassan and Schneider, 2016), while others use total tax rate (Yin and Jiangsu, 2009; Hernandez, 2009; Asiedu and Stengos, 2014) and others use total government revenues as a percentage of GDP (Vo and Ly, 2014; Gamal and Dahalan, 2015, 2016). Whichever variable is used it is expected that there is a positive relationship between the tax rate and the currency ratio. It is argued that a higher tax rate will increase the potential gain from tax evasion as individuals who wish to evade taxes will use more currency and less demand deposits (Ahmed and Hussain, 2008; Ahumada et al., 2004; Andrei et al., 2010; Arby et al., 2012; Alm and Embaye, 2013; Asiedu and Stengos, 2014; Hassan and Schneider, 2016a). Since currency provides anonymity, it is expected that a higher tax rate will increase the currency ratio and hence the informal economy, ceteris paribus. As part of this study, the total government revenues as a percentage of GDP will be used in the estimation and simulation procedure under this model. It is argued that this variable captures all taxes (direct and indirect), contributions and trade tariffs, and therefore is a better measure of the tax regime in a country (Buehn & Schneider, 2012; Schneider & Buehn, 2016).

Inflation is another factor that affects the currency ratio and is used in the CDA model. Inflation is thought to have either a positive or a negative impact on the currency ratio. Inflation tends to encourage individuals to evade paying taxes and engage in informal economic activities because inflation tends to wear down the real value of disposable income. It also tends to increase the tax liabilities of taxpayers by distorting the real value of their income, thus reducing the purchasing power of individuals (Ahmed & Hussain, 2008; Hernandez, 2009; Alm & Embaye 2013; Elshamy, 2015). However, the level of inflation can also have a negative impact on the currency ratio if individuals substitute currency holdings

for assets which are interest-bearing, in an attempt to prevent the inflationary erosion of the purchasing power of their wealth by inflation.

In the same line, it is also argued that interest rates are also an important factor. The rate of interest is the opportunity cost of holding currency rather than interest-bearing assets. Therefore, there is a negative relationship between the currency ratio and the level of interest rates. Many studies use interest rates in their regression either time series or panel data (Hernandez, 2009; Hassan & Schneider, 2016b). Some studies use deposit interest rates (Ahmed and Hussain 2008; Ahumada et al., 2004; Nhavira, 2016), while others use either nominal or real interest rates (Gamal & Dahalan, 2015; 2016). In this study, the rate of real interest rates will be used in the estimation. However, the level of interest rates is not considered to be a significant causal factor for the informal economy. Instead, they are an important factor in estimating the demand for currency.

A further important factor is the level of income per capita in a country. The higher the GDP per capita is in a country and the higher the economic development is then there will be a greater need for currency as households can afford to engage in more transactions. Similar to the rate of interest, GDP per capita is not the main factor which encourages or discourages people from informality. Hence, many studies do not use this variable for simulating the estimated for the informal economy (Schneider & Savasan, 2007; Feld & Schneider, 2010). Instead, they use this variable for parity in the equation.

The other important factor is the government bureaucracy and the enforcement strength of the tax administration. In other words, the higher the government regulations and more bureaucratic tax administrative regulations there is the higher could be the tax evasion and hence the higher the level of the informal economy. In the majority of the cases, index

variables are used which measure the level of government regulations and the level of bureaucratic administrative procedures (Buehn & Schneider, 2009). For currency this variable is also important as it is expected that the more government bureaucracy and the higher the government regulations are, the more currency will be demanded in informal economic activity, as some individuals will prefer to avoid autocracy and thus save on transaction costs (Buehn & Schneider, 2009).

The size and dominance of the agriculture sector play an important role in the size of the informal economy in many countries worldwide (Chen, 2007; Vuletin, 2008; and more recently Hassan & Schneider 2016b). Chen (2007) argues that most of the informal economic activities take place in the agriculture sector, especially in the developing or transitional countries. Vuletin (2008) on the other hand argues that the agricultural sector is difficult to regulate by governments which indicates that the higher the importance of this sector, the larger is the informal economy, ceteris paribus. It has been proven by some studies (such as Vuletin (2008) for South American countries, Elshamy (2015) and Hassan & Schneider (2016b) for Egypt) that there is a positive relationship between the size of the agriculture sector and the informal economy. The size of the agriculture sector in Europe is not as large as in many other countries around the world; however, it is quite substantial in many of the Balkan countries (World Bank, 2014). Majority of the people working in the agriculture sector worldwide are either self-employed or are employed by family, which makes it difficult to regulate (Vuletin, 2008).

Empirical studies with CDA models

Using panel data regression techniques such as the GMM[45], Alm and Embaye (2013) estimate the size of the informal economy for 111 countries worldwide from 1984 to 2006 based on the CDA model as suggested by Tanzi (1983). Using independent variables such as tax rate, enforcement variable, per capita Income, inflation rate, interest rate and degree of urbanisation, they estimate the regression on the dependent variable of Currency ratio to M2 and find that the informal economy ranges from 10percent to 86percent on average for the 111 countries worldwide. Their results indicate that the size of the informal economy varies significantly between countries depending on the income group – with the higher level of informality being found in low-income countries.

Using the currency demand approach Schneider (2013) and Schneider & Hemetner (2013) estimate the size of informal economy in Columbia. Their results indicate that the level of informality in Columbia varies between 27 and 56 percent of GDP over the period of 1980 to 2012. Key drivers of such informality according to the authors are indirect taxation and the high unemployment rate in the country. The authors find that the average GDP growth rate is around 1.86 percent for the period analysed, which would have been slightly higher had the informal economy been much lower.

Nhavira (2016) estimates the size of the informal economy for the country of Tanzania using a CDA model as suggested by Tanzi (1980, 1983) for the period from 1996 to 2013. The results show that the size of the informal economy has increased as a proportion of GDP from 10.3 percent in 1996 to 15.5 percent of GDP in 2013, followed by an increase in the amount of tax

[45] GMM stands for Generalised Method of Moments. More about this model can be found from Roodman (2009) and Alm and Embaye (2013).

evasion. In the OLS regression model Nhavira (2016) uses currency holdings ratio as the dependent variable, while uses real GDP per capita growth rate, Government expenditure as a percentage of GDP, Real interest rate, and deposit interest rate as independent variables.

Andrei et al. (2010) use the CDA model to measure the size of the informal economy for Romania. They use as the independent variable Cash outside the banking system, whereas as the dependent variables they use the total government expenses, Real GDP, short-term interest rate, inflation rate as per CPI and taxes on products. Their results indicate that the informal economy in Romania accounts on average for approximately 30percent of the GDP from 2000 to 2009.

Yin & Jiangsu (2009) use CDA model to measure the size of the informal economy in China over a period of 5 years, from 2002 to 2006. Their results indicate an increasing trend of the informal economy and recommend that the government develops a sound public service department and a fair and reasonable tax system. This study makes use of the following variables in his CDA model regression: currency in circulation, Money supply M2, the rate of taxation, interest rates on deposits, net income and consumption level per capita at the national level. However, the number of observations used in this study is minimal, which can severely affect the reliability of the results.

Ahumada et al. (2004) follow the work by Cagan (1958) to provide a possible new measure of the informal economy for various countries worldwide using the CDA model. The authors provide a formal aggregation framework and highlight the main steps to follow in the process of measuring the size of the informal economy using the CDA model. They also analyse the main assumptions of the model and demonstrate that the method has been used implicitly assuming that the income-elasticity of currency demand is one, even for such cases when it

is not one (Ahumada et al., 2004). The authors also show that when a dependant lagged variable in the regression is included; there is a need to a known initial condition, for which the authors assume that this initial condition is the period in history in which no hidden transactions took place.

Asiedu & Stengos (2014) estimate the size of the informal economy in Ghana from 1983 to 2003 using the CDA model. As the dependent variable, they use the ratio of currency in circulation to M2, while for the independent variables they use the average tax rate, of the level of wages to national income, the average rate of return on deposits and the GDP per capita. According to the authors' calculations, the estimated size of the informal economy as a percentage of GDP for Ghana over the sample period is 40 percent on average. Over the period, there has been a declining trend in the size of the informal economy in Ghana. The level of the informal economy is found to vary from a high of 54percent in 1985 to low size of 25 percent in 1999.

Gamal & Dahalan (2015) measure the size of the informal economy in UAE, while Gamal & Dahalan (2016) measure the size of the informal economy for Saudi Arabia. Both studies use a similar model, which is the CDA and time series data. Gamal & Dahalan (2015) estimate the size of the informal economy and tax evasion in the UAE from 1991 to 2010 on a quarterly basis. The same authors one year later (Gamal & Dahalan, 2016) estimate the size of the informal economy in Saudi Arabia from 1980 to 2010 on an annual basis. The results of Gamal & Dahalan (2015) indicate that the size of the informal economy (to which the authors refer to as the underground economy) in the UAE increased significantly on average of 10.34percent of the GDP over the sample period. Tax evasion on the non-oil tax revenues reached, on average, 10.34 percent over the study period. The estimated results of Gamal &

Dahalan (2016) indicate that the size of the informal economy in Saudi Arabia is about 47.07 percent of the official GDP. The authors blame high levels of public expenditure for this high level of informality. They recommend that the Saudi government should restrict the expansion of its public expenditure policy.

Using the CDA model Hernandez (2009) estimates the size of the informal economy in Peru from 1979 to 2005 based on time series annual data. The variables that they use, apart from the dependent variable which is the currency in circulation as a ratio to M2, are Interest rates, inflation rate, real GDP and the tax rate. The results from this study indicate that the share of the informal economy in Peru has varied between 44 and 50 percent of total GDP.

Ahmed & Hussain (2008) also use the CDA model to estimate the size of the informal economy. They use Pakistan as the country to estimate the development of its informal sector from 1960 to 2003. Their estimates indicate that the size of the informal economy in Pakistan from 1960 to 2003 has decreased from over 60 percent to just over 27 percent of the GDP, respectively. For this decrease, the authors attribute the merits to the tax and tariff reforms in the country during the 1990s.

The study by Hassan & Schneider (2016b) estimates and analyse the size of the informal economy for Egypt using a CDA model as well. They use time series data from 1976 to 2013. In their estimation, they use variables such as tax burden, interest rates, public employment, real income and self-employment as independent variables while for the dependent variable they use real currency outside a bank in their regression. They find a declining trend in the Egyptian economy over the years in both estimates of the informal economy.

Empirical studies with other models and approaches

Boka & Torluccio (2013) estimate the size of the informal sector of the economy in Albania by using indirect approaches such as the national accounts discrepancies, simple currency ratio, electrical energy consumption and some evidence by the labour market developments. Their results indicate that on average there is a declining trend in the size of the informal economy relative to GDP over the period 1996 – 2012. They attribute this decline to the reforms that the government has done over the last decade – reforms driven by the EU integration process. However, other studies such as that of Hassan and Schneider (2016), Alm & Embaye (2013), or that of Schneider et al. (2010) show higher figures for the informal economy for Albania using the MIMIC or the CDA model. The results obtained using the national accounts discrepancies method are somehow similar to those obtained from the electricity consumption method, and both of them are reliable compared to Schneider et al. (2010). However, the results using the simple CDA method indicate a much lower informal economy ratio to GDP.

Ogunc & Yilmaz (2000) use three indirect approaches to measure the informal economy and its development in Turkey. They use time series data from 1980 to 1998 to estimate the informal economy using the National Accounts discrepancies method, the Employment method and the CDA model. The results generated in this study do differ significantly with one another, and hence the authors state that the results generated are not to be taken as precise measurements to the informal economy in Turkey.

Arby et al. (2012) also estimate the size of the informal economy for Pakistan using the Electricity Consumption method as well (which is also known as the physical input model). Using Electricity consumption, GDP growth, real GDP as the main variables from 1975, the

authors estimate the size of the informal economy. Their results show that the size of the informal economy is on average around 30 percent of the formal GDP and show a declining trend in the years 2000s. However, there does seem to be differences of about 10 to 15 percent between the results depending which model they used – since they used CDA and MIMIC as well in their study. The electricity model did understate the informal economy in the earlier years, before the 2000s, while the CDA model understated the informal economy after 2000s when compared with the MIMIC results. The MIMIC results, on the other hand, returned more stable and balanced results throughout the years of the sample.

3.6. Conclusion

From the above review of the existing literature, it can bee see that there is a lack of a study that has investigated and estimated the size and development of the informal economy in the countries of the Balkan Peninsula in one sample, considering the leading causes and indicators suited to these countries. To date, there has not been any report or study published about the informal economy using the MIMIC model with a sample of Balkan countries from 1996 to 2014. Therefore, this thesis will be able to contribute to the literature of the use of the MIMIC model to measure the informal economy in the Balkan countries. It will be able to highlight the leading causes of the informal economy and based on that offer some policy recommendations. The use of MIMIC and CDA model has been applied for Balkan countries but in a broader sample context, where many other countries from all over the world and at different stages of development, as well as with different social, political and cultural characteristics have been used in the same regression analysis. The MIMIC to be applied in this thesis will be using only the main factors that in theory can drive and affect the size of the informal economy in the ten Balkan countries part of this study.

From the empirical literature, it is clear that this thesis will contribute to the literature by concentrating their focus on the Balkan countries. The methodology used in this thesis follows that of the existing literature but uses more enforcement, the rule of law and government effectiveness indicators in the regression analysis. This thesis also looks at a great time frame for analysis which will show not only the size of the informal economy in this region, but it will also show its development over the years. There have been several reforms and developments in the region and in particular in the ten countries part of this research. In light of these social, political and economic reforms and developments, it is of interest to see how the informal economy has been developing over the years, since 1996 to 2014.

Chapter 4: Political, Social and Economic developments in the Balkan countries

4.1. Introduction

This chapter briefly introduces the political and economic development in the Balkan region for the ten countries part of this research[46]. It will focus briefly on the political developments that happened in the Balkan countries since the 1980s onwards. It will then analyse at the developments of the macroeconomic indicators in the Balkan countries over the years and analyse the impact of the financial crisis of 2008, followed by the subsequent sovereign debt crisis and the Greek debt crisis. The political, social and economic developments, reforms and changes over the years, make this region an interesting topic to be studied. As mentioned in the previous chapters, these countries are faced with a significant degree of informality and corruption, coupled with popular discontent and mistrust in the state institutions, which can significantly influence the size of the informal economy.

4.2. Political developments and reforms in the Balkan countries

The major political developments and reforms in the Balkan countries can be summarised into two main periods, the period pre-2000 and post 2000. Similarly, the main features of the political crisis in the Balkans after 1990 can be categorised into two underlying issues. The first being the history of communism in the former Soviet Union and the creation of new blocs, and the second is the collapse of nationalism and tendencies for independence and the collapse of the former Yugoslav federation. Some authors refer to the developments and

[46] A rationale for selecting Balkan countries has been provided in section 1.6 of the introduction chapter.

reforms in the Balkans as post-communism and post-conflict transition (Kostovicova & Dzelilovic, 2006).

The collapse of communism and the disintegration of communism in the Balkan countries were followed by a movement for democracy, which naturally emerged from the former USSR republics, while in the former Yugoslav Republics the transition was followed by the outbreak of nationalism that caused wars of devastating proportions that were not seen since the Second World War (Anastasakis, 2013). The transformation from socialism or communism to democracy and market economy in some Balkan countries was straightforward, while for others it was difficult leading to an explosion of violence. Albania is the most typical example where the transition from Communism to capitalism included explosions of violence, which took many human lives. Even Romania did not escape without violence in the streets which led to the execution of their president. After World War II, states reached a significant economic development. The problems of the wartime period along with the low development were reduced, except some countries such as Albania and FYR Macedonia and even Bosnia and Herzegovina (Balfour & Stratulat, 2011; Anastasakis, 2013).

The consumer dissatisfaction (measured by Western standards) played a significant role in the 1989 revolutions in Eastern Europe and even in Hungary; in the Balkans, only Greece with its ties to the West survived the revolution. However, it can be argued from many points of view that political rather than economic issues caused a crisis, revolution and war in the Balkans (Bartlett & Uvalic, 2013). Differences in the Balkan political systems can rarely be translated into socioeconomic differences that are in contrast or differ from neighbouring countries, at least briefly (Balfour & Stratulat, 2011). The communist history of the Balkans has caused various types of national communism. The transition is classified as a…

> *"…historical sequence of political events, usually associated with the latest phases of autocratic/totalitarian regimes through to the introduction of a more liberal, pluralist or democratic system"* (Anastasakis, 2013: p.92-93).

Each Balkan country had developed its own national brand of communism, *"…from Albania to nationalist Romania, to Bulgarian Orthodox communism, and to Yugoslavia that seemed more open to the West and more liberal"* (Anastasakis, 2013; p.94). Thus, the moment of revolution in 1989 was, an experience of its own for each country - with violence and anarchy in some countries, and relatively peaceful in some other countries.

Yugoslavia can be considered as a type of sui-generis experiment. This was a socialist but non-Soviet state, a state that had avoided the centralised economy by applying self-government; which had characterized the so-called *"brotherhood and union"* of peoples, which had allowed free movement of citizens abroad, etc., but which had never been able to remove from the ego itself, the tendencies of the creation of independent states, which also happened with the outbreak of war first in Slovenia, then Croatia, followed by Bosnia & Herzegovina and which ended with the war of Kosovo (in 1999) and its independence in 2008 (Bartlett & Uvalic, 2013).

The trends of the establishment of Greater Serbia and Croatia were embraced by extreme nationalist agendas, the consequences of which are still present in these territories. These nationalist agendas also aroused the historical memory of the crimes that had occurred during World War II, attributed to the Chetnik Movement in Serbia and the Ustase Movement in Croatia and fuelled the conflicts within Yugoslavia which led to wars and many lives being lost. The result was a creation of new countries in the Balkan which declared independence from Yugoslavia (Balfour & Stratulat, 2011).

The post-2000 period can be characterized as the backdrop of the normalization of political pluralism, peaceful change of powers, the reformation of nationalist parties, the appearance of new political elites, pro-European consensus and perhaps even more modern politics (Glenny, 2000; Balfour & Stratulat, 2011; Anastasakis, 2013; Stiks & Horvat, 2014). This involved almost all the elites of the national communist political system to reform themselves and their political discourse to a more moderate and democratic thinking ideologies (Anastasakis, 2013).

The EU as the most influential actor from the outside, engaging in constructive engagement, made Bulgaria and Romania join in, which continued with the further implementation of the Stabilization and Association Process for the remaining Balkan countries from which Slovenia and Croatia joined the EU in 2004 and 2013, respectively (Europa.eu, last accessed on 04.11.2017).

This period from the *"…political extremism of the years 1990 to a political moderation…"* was referred to as the period of "*the second transition*" by Bunce (2003; p.50). This second transition phase has also been characterised with political parties having a more open and democratic relationship with the media, showing more respect for human rights and advocating the rights of different minorities. However, this period of transition was *"…accompanied by a consolidation of democratic deficits and dysfunctional practices and attitudes…"* (Anastasakis, 2013; p. 107), with origins from the years of transition and can be found even today in five main ways such as personal feuds, nationalist and ethnic agendas, a high level of corruption, citizens' discontent and mistrust (Anastasakis, 2013; p. 107).

To some extent, informality is also an important legacy of this transition phase. High levels of corruption, popular discontent and mistrust in the institutions can lead to significant

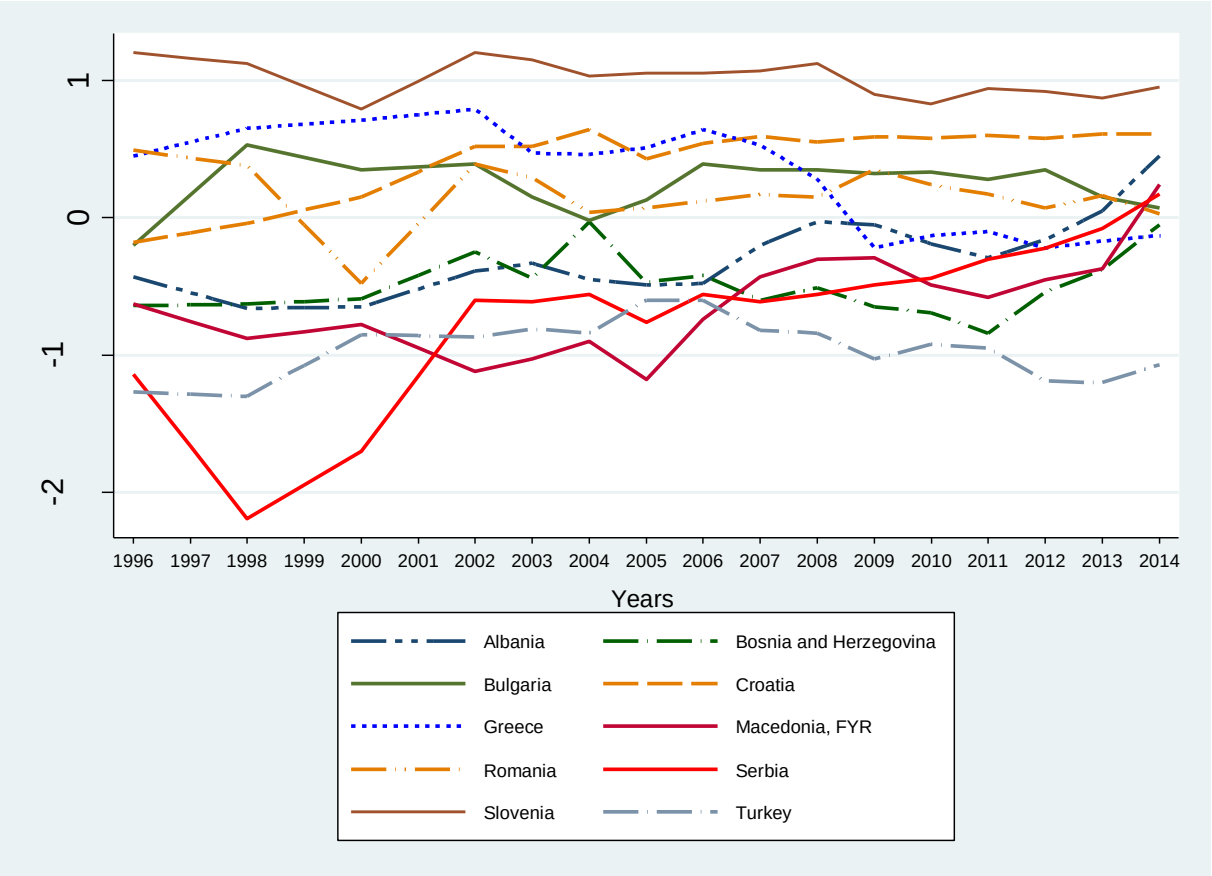
economic informality (Schneider et al., 2010). This makes Balkan countries an interesting area to research as one can be able to see the developments of the size of the economy over the years and attribute any changes in the size of the informal economy to changes and transition reforms in these countries.

Turkey too has experienced dramatic changes and reforms in their political system. They had to make significant democratic and political reforms to attain EU candidacy in the second half of the 1990s. However, the EU does not quite know yet what to do precisely with the potential membership of Turkey into EU (Müftüler-Baç, 1998). Müftüler-Baç (2009) analyses the political reforms in Turkey in the light of EU membership and argues that Turkey's Europeanization is substantially motivated by the EU. However, the very recent political developments in Turkey have only distanced the potential membership of Turkey into the EU.

Greece, on the other hand, has been a member of the EU since 1981. They joined the Eurozone in 2001 along with other countries. Greece's entry into the EU raised a lot of scepticism among then France (who was worried about the potential impact it would have on their farmers), Germany (who worried about the cheap migrant labour) and other members who worried about the potential involvements in the Greek and Turkish disputes (Rankin, 2015). Greece was also characterised by a high degree of corruption which was higher than the average in other European members, and by the inability of the government to collect taxes. However, Greece's entry into the EU was a way to ensure democracy and stability in the Balkans and beyond at the height of the cold war (Rankin, 2015). Later, Greece was significantly affected by the financial crisis of 2008 and the subsequent sovereign debt crisis that followed. It received two major bailouts in 2010 and 2012, and the economy decreased by around a quarter, and the youth unemployment has increased significantly.

Despite all the reforms and the transition period, the Balkan countries remain a volatile region compared to other regions of Europe, in political and economic terms. While some countries are more stable than the others (e.g. Greece, Slovenia, Croatia, Romania, and Bulgaria), others still face legitimacy problems (e.g. Bosnia and Herzegovina, FYR Macedonia, and Kosovo), and then others are still struggling with ethnic politics (e.g. FYR Macedonia, Kosovo, Serbia and Bosnia and Herzegovina). There are also countries that have been severely affected by the financial crisis of 2008 (e.g. Greece), and those countries that are coping with external fragility such as terrorism (e.g. Turkey).

Figure 4.2. 1 - Political Stability Index for the 10 Balkan countries. Source: World Bank Governance Indicators.



World Bank in their World Governance Indicators database provides an index[47] to capture the fragility of countries and the perceptions of possible politically motivated conflicts. Although the index does indicate some improvements over the years, especially post 2000, the index is still wary of the political stability in the region. The development of this index has been provided in figure 4.2.1 above.

Thus, the region is influenced by the inner factors, and their fragility depends on the factors within. For example, some countries have their political problems challenging to overcome, especially when considering separatist tendencies, such as the Serb part of Bosnia and Herzegovina. On the other hand, the crisis in the Balkans is also kept from the outside, as we still notice the trends of a '*cold war*' divided between Russia and the West, where Russian influence, especially on Serbian politics, continues to be quite sensitive. All these fragilities and transition reforms will have an impact on the size of the informal economy in these countries.

4.3. Social and Economic Reforms in Balkan countries

Reforms in the countries of Balkan Peninsula can be attributed to the EU. The EU's policy for enlargement has influenced the Balkan countries to undergo reforms in the judiciary system and have intensified the fight against corruption (EU, 2013). Some of the Balkan countries have made significant progress in this regard and are all in various stages of dialogue concerning future membership in the EU. Those that have made significant progress in their reforms have received full membership into the EU, such as Slovenia, Bulgaria, Romania and

[47] Political Stability and Absence of Violence/Terrorism *"…measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. Estimates give the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5."* (World Bank, Online at: https://datacatalog.worldbank.org/political-stability-and-absence-violenceterrorism-estimate, last accessed on 21.12.2018)

Croatia. Greece was already a member of the EU. Other countries such as Turkey, Serbia, Bosnia and Herzegovina, Albania, and FYR Macedonia are either candidates, potential candidate or will be applying to become potential candidate countries to join the EU.

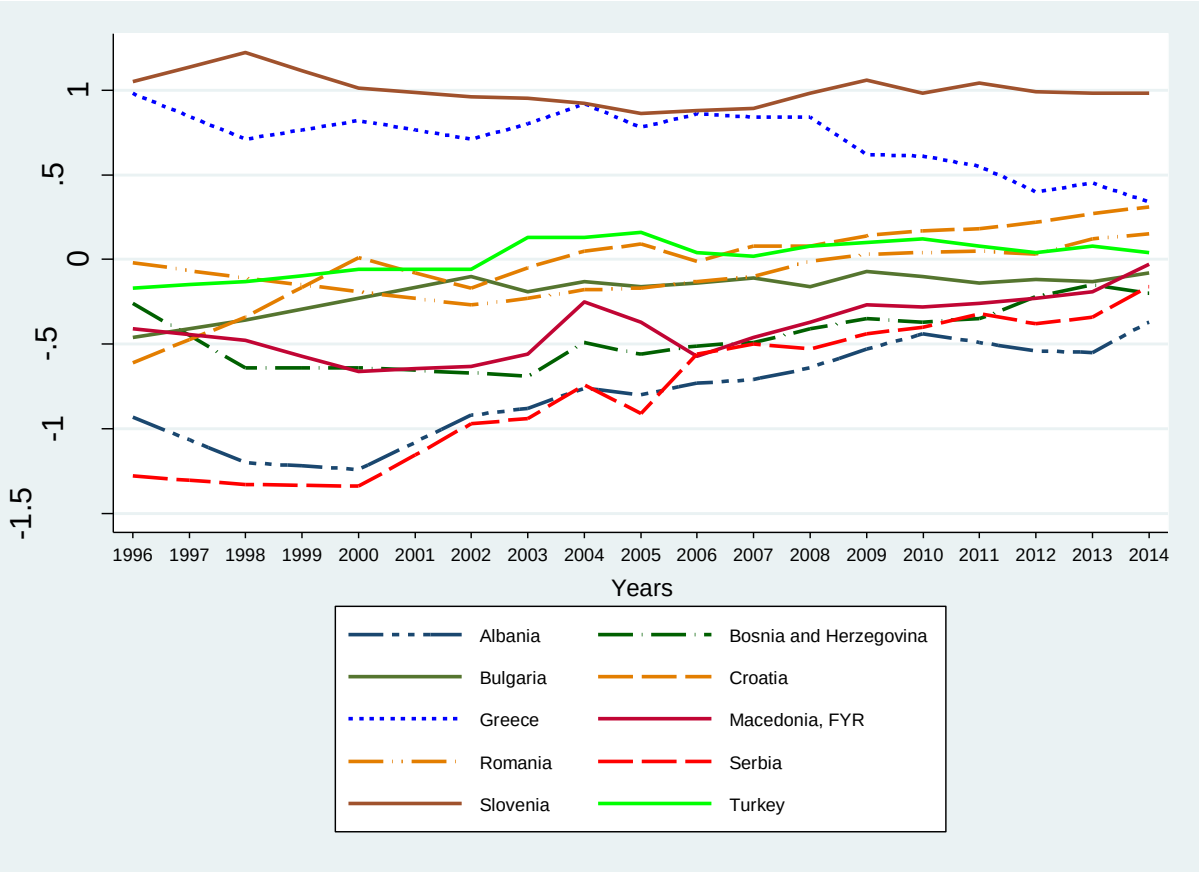
The main reforms that Balkan countries have worked towards were the enforcement of the rule of law, through the reforms they have achieved in the judiciary systems, fight against corruption and organised crime, fiscal reforms and cross-border cooperation (EU, 2013). EU has supported the Balkan countries financially to undergo reforms and has supported them throughout to undertake their reforms. Balkan countries' aspirations to become members of the EU have resulted in improved indicators with regards to the fight against corruption, effective rule of law, and government effectiveness.

With regards to the rule of law, according to the data from World Bank Governance Indicators[48], almost all countries of the Balkans have achieved some progress. In this context, significant progress was seen from Serbia and Albania. Both Serbia and Albania, with the support of the EU funding, have undergone reforms in the judiciary independence, training of judges and prosecutors, judiciary transparency, adoption of the reforms as suggested by the Copenhagen criteria from the EU, etc. (Mehmetaj, 2014). FYR Macedonia, on the other hand, has not seen significant progress when it comes to enforcing the rule of law in practice, despite efforts from the civil sector. Even though in theory, the country has undergone a process of reforming the legal framework in various sectors. In general, as figure 4.3.1 below highlights, almost all Balkan countries (except Greece) have experienced some improvements

[48] Rule of Law index *"captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5."* (World Bank, online at: http://info.worldbank.org/governance/wgi/index.aspx#doc, last accessed on 21.12.2018)

in the enforcement of the rule of law. Majority of the countries find themselves on a similar level on this index, apart from Slovenia, which has the highest Rule of Law index, indicating a well-established and the enforced rule of law in the country. This index has been presented below in figure 4.3.1.

Figure 4.3. 1 - Rule of Law Index. Source: World Bank Governance Indicators.



Fiege and Ott (1999) argues that in transition countries with potentially weak institutional ability, framework and structure to support market economic activity, the presence of informal economy to a high degree relative to the GDP of that country, poses a grave danger in terms of undermining the establishment of the rule of law, which is considered to be a crucial component in transition economies for a successful transition (Fleming et al., 2000).

Reforms in the rule of law in the Balkan countries are essential for another reason. Without the adequately established judicial system, and a well-functioning rule of law, the level of

Foreign Direct Investments, as well as access to capital will be limited. This would also result in further popular discontent and mistrust in the state institutions. This could exacerbate the level of informality in a country (Loayza, 1996; Fleming et al., 2000). Seeing some improvements in the rule of law reforms in the Balkan countries, one could assume that the estimates for the informal economy will indicate a declining trend, ceteris paribus.

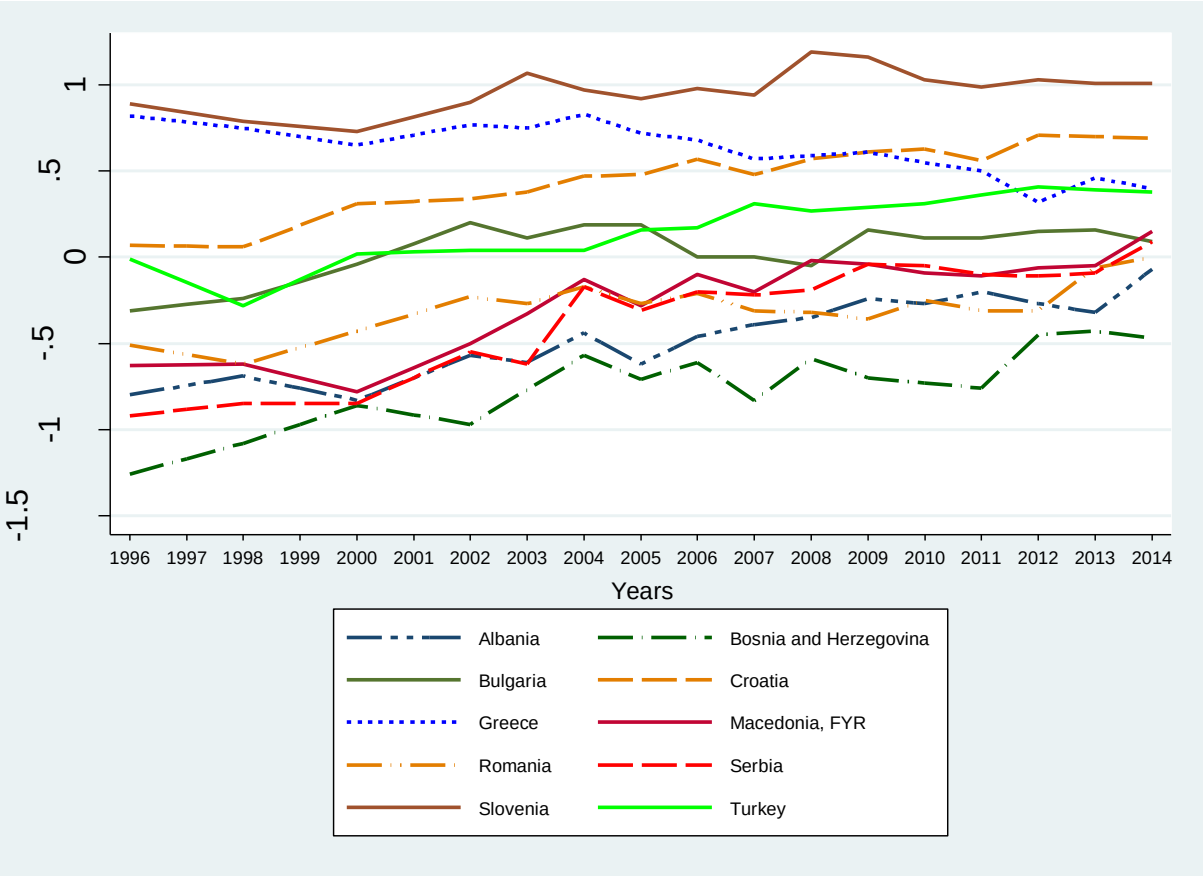
These improvements across Balkan countries have been achieved in the areas of; improvements in transparency in the judicial system, accountability of state institutions, fair hearing and witness protection programmes, less political interference into the prosecution and judicial systems, fair and democratic local and national elections, adoption of EU laws on several sectors, administrative reforms in the criminal justice by reforming criminal laws, improvements in the provision of continues education and training for all the stakeholders etc (Milosevic & Muk, 2016).

However, even though the progress with regards to the efficiency of the judiciary system has taken place, in most Balkan countries no significant progress has been made when it comes to the independence of the judiciary system from political pressure. The Effective rule of law and anti-corruption efforts by the governments are also captured by the Government Effectiveness Index and the Control of Corruption index from the World Bank Governance Indicators, shown in figures 4.3.2 and 4.3.3 below. An equivalent index to capture the efforts of governments to control corruption is also provided by the Heritage Foundation and is called the Freedom from Corruption Index and the Government Integrity Index.

Even though there has been some progress in the fight against corruption in most of the Balkan countries, there is still lack of final convictions of high-profile cases which have been accused of corruption and misuse of public finances. Most of these high-profile corruption

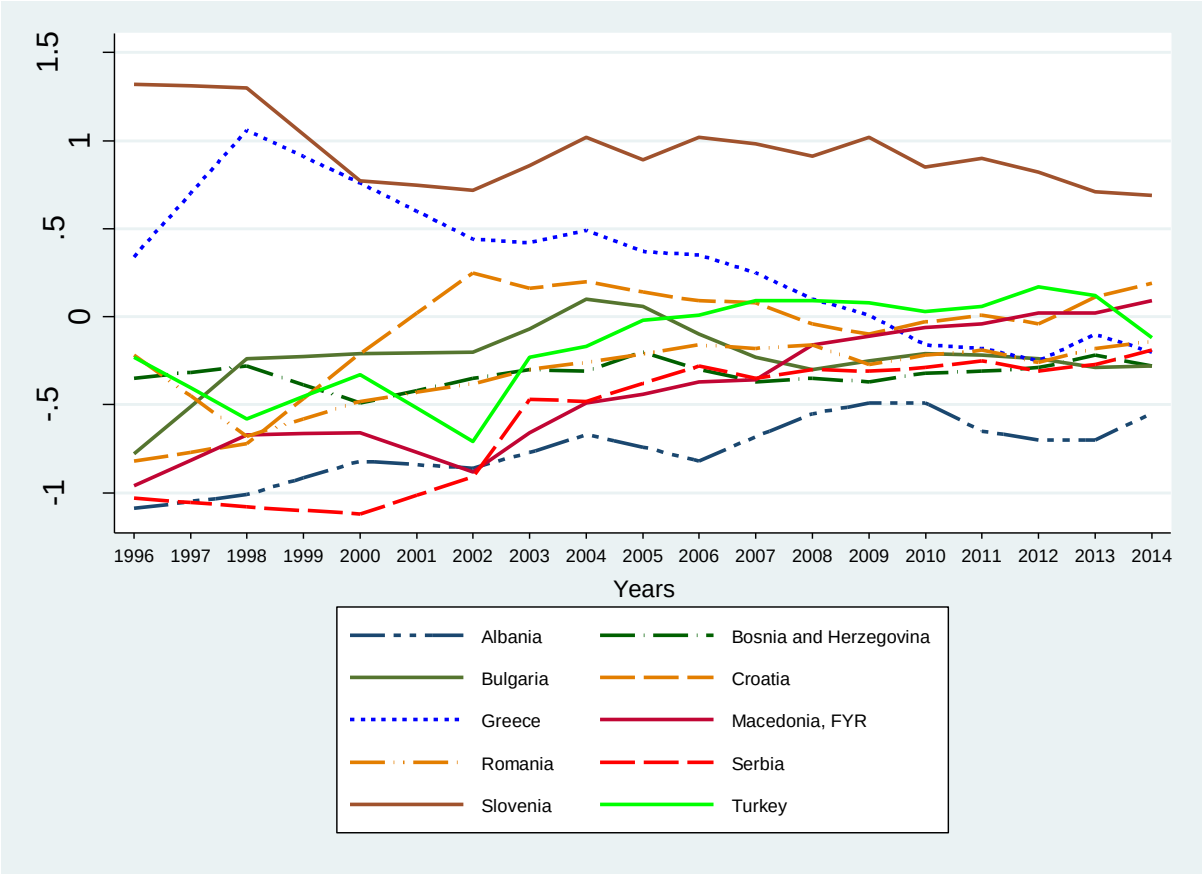
cases (e.g. in Serbia, Croatia, Albania, and FYR Macedonia) involve highly ranked current or past government officials. The inability of the judicial system to finalise convictions on these cases causes mistrust and discontent among the people, often resulting in protests and riots (e.g. the case of FYR Macedonia and Albania) (Buscaglia 2003, 2008; European Commission Report, 2012[49]; Mehmetaj, 2014; Areizaga, 2017).

Figure 4.3. 2 - Government Effectiveness Index. Source: World Bank Governance Indicators.



[49] Available from https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/pdf/financial_assistance/phare/evaluation/2012_final_report_lot_2.pdf, last accessed on 12.11.2017)

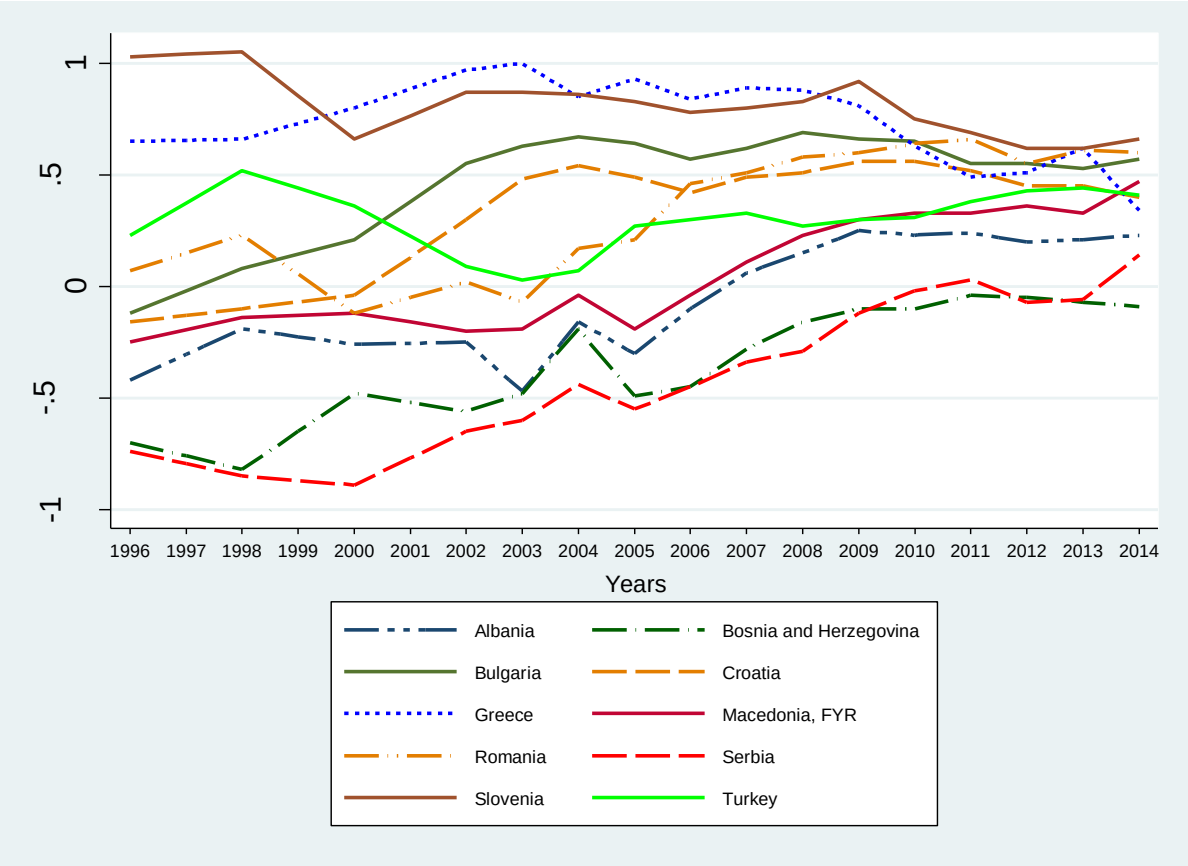
Figure 4.3. 3 - Control of Corruption. Source: World Bank Governance Indicators.



The enforcement of the rule of law, judicial reforms and control of corruption efforts by the governments is also captured by the Regulatory Quality Index[50] from the World Bank Governance Indicators. Figure 4.3.4 below shows the development of this index over the years for the ten Balkan countries part of this research.

[50] Regulatory Quality *"captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5."* (World Bank, online at: https://info.worldbank.org/governance/wgi/pdf/rq.pdf, last accessed on 21.12.2018)

Figure 4.3. 4 - Regulatory Quality. Source: World Bank Governance Indicators.



When it comes to doing business and the ease of doing business, the Balkan countries have achieved some progress according to the Heritage Foundation indexes, such as the Business Freedom Index[51] (shown in figure 4.3.5 below) and the World Bank's Doing Business reports over the years. The relaxation of different bureaucratic procedures to register a business, reduction in the number of forms to complete and submit in registering businesses, a transparent and improved process of applying and setting up a business, a relaxation of procedures to close a business, digitised administrative procedures and an attempt by governments to enforce that all businesses use fiscal tills[52] to prevent tax evasion and create

[51] The business freedom index *"measures the extent to which the regulatory and infrastructure environments constrain the efficient operation of businesses. The quantitative score is derived from an array of factors that affect the ease of starting, operating, and closing a business. The business freedom score for each country is a number between 0 and 100, with 100 indicating the freest business environment. The score is based on 13 sub-factors, all of which are weighted equally, using data from the World Bank's Doing Business report"* (The Heritage Foundation: Online at https://www.heritage.org/index/business-freedom, last accessed on 22.12.2018)

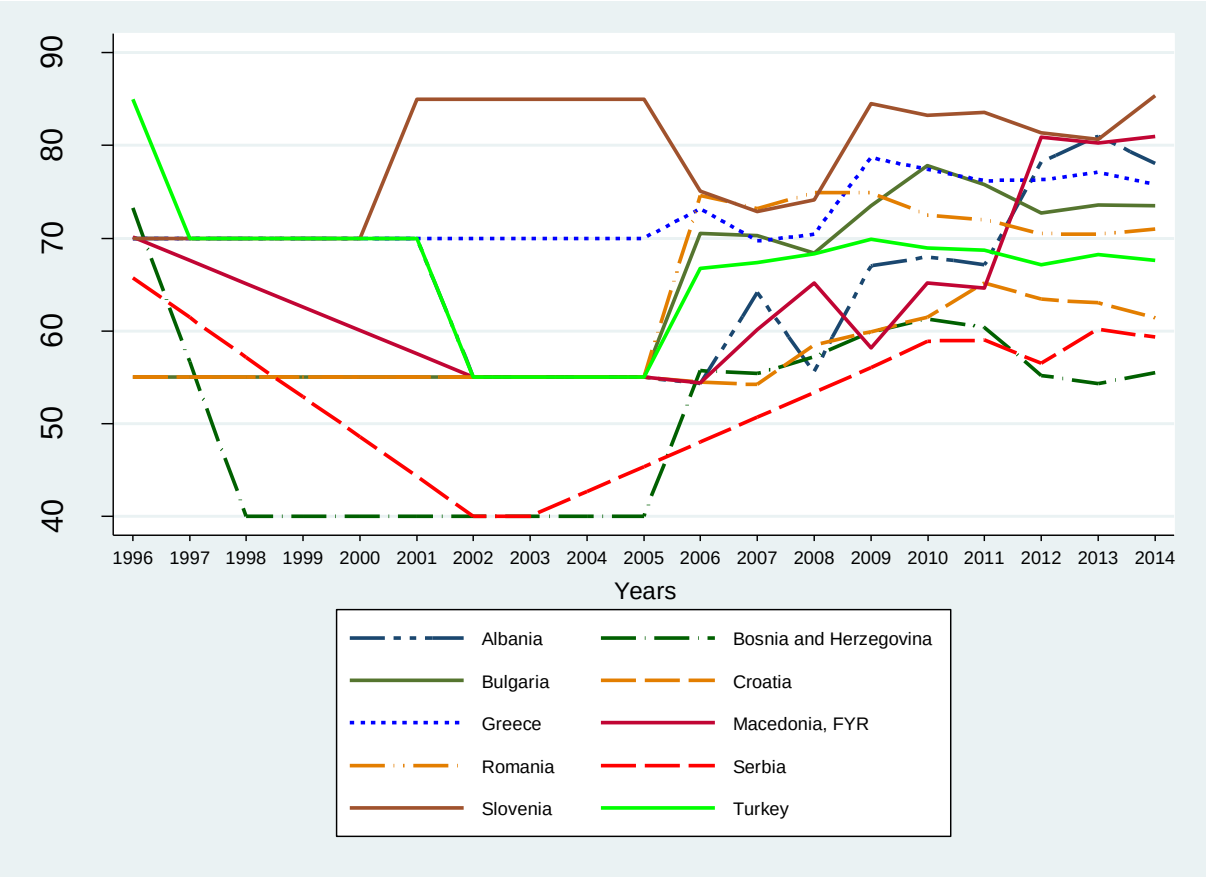
[52] Also known as Fiscal Cash Registers or Electronic Fiscal Devices

a free and fair competitive market for all businesses, have been just some of the backbone of the reforms in the countries of the Balkans, according to World Bank Doing Business reports, Heritage Foundation reports.

This improvement in doing business in the Balkan countries has been made as a result of countries competing with each other in an attempt to attract inward foreign direct investments and increase the investment component. In almost all Balkan countries, one can conclude that there is a positive trend in the number of registered businesses according to country reports available from the Ministry of Finance in each of the Balkan countries.

Reducing the regulatory burden for businesses and the bureaucratic procedures for business to operate formally, will mean that the opportunity cost of conducting economic activities formally rather than informally is reduced and hence the tendency of business to operate informally is demotivated. This should result in a lower size of the informal economy relative to the GDP, ceteris paribus (Schneider, 2000; Dell'Anno, 2007; Schneider et al., 2010; Buehn & Schneider, 2010).

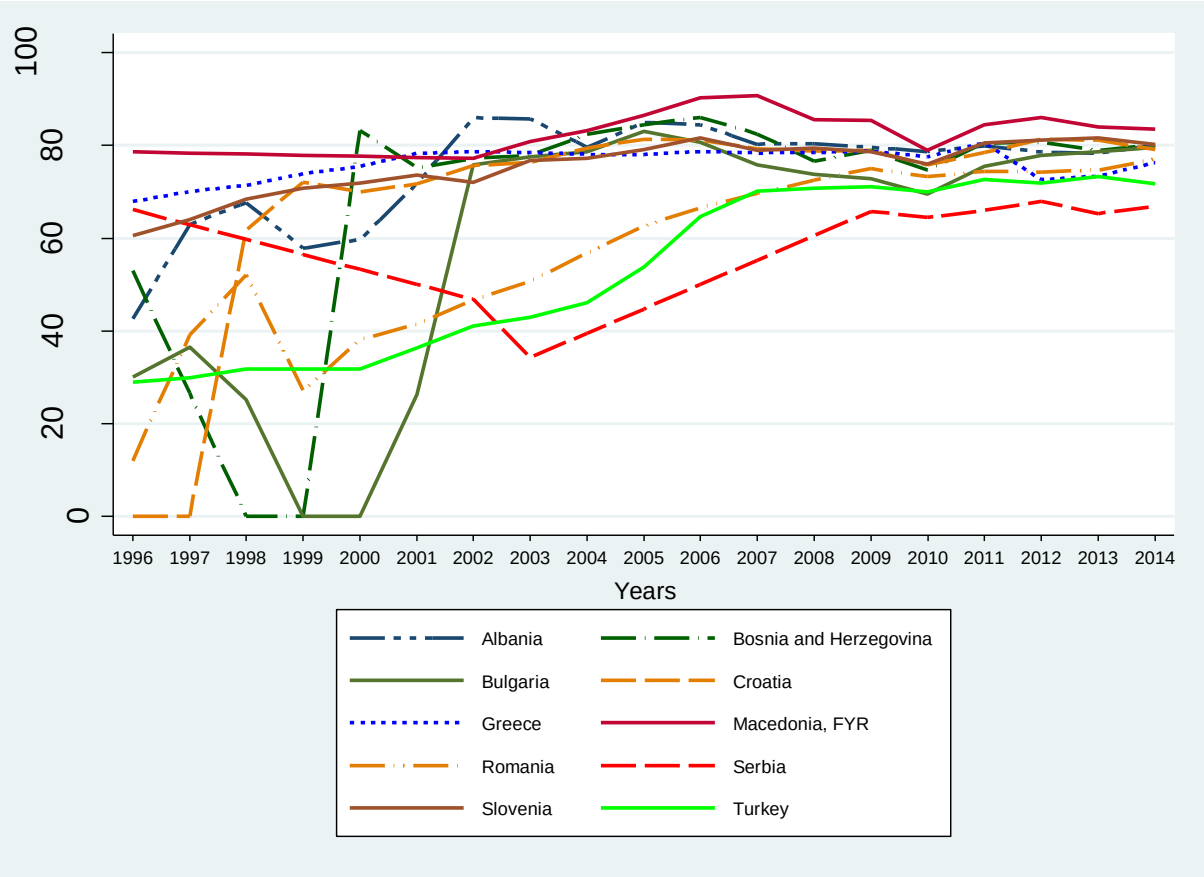
Figure 4.3. 5 - Business Freedom Index. Source: The Heritage Foundation



Another important indicator which can show potential progress regarding economic reforms and less government intervention in a free market is the monetary freedom Index[53] (shown in figure 4.3.6 below) from the Heritage Foundation. This index also shows an improvement for most of the Balkan countries. In relation to the informal economy, the more stable and less volatile prices are, and the less government intervention in a free and competitive market system there is, the lower will be the size of the informal sector, ceteris paribus. Therefore, one would expect to see a declining trend in the estimates of the informal economy over the years, ceteris paribus.

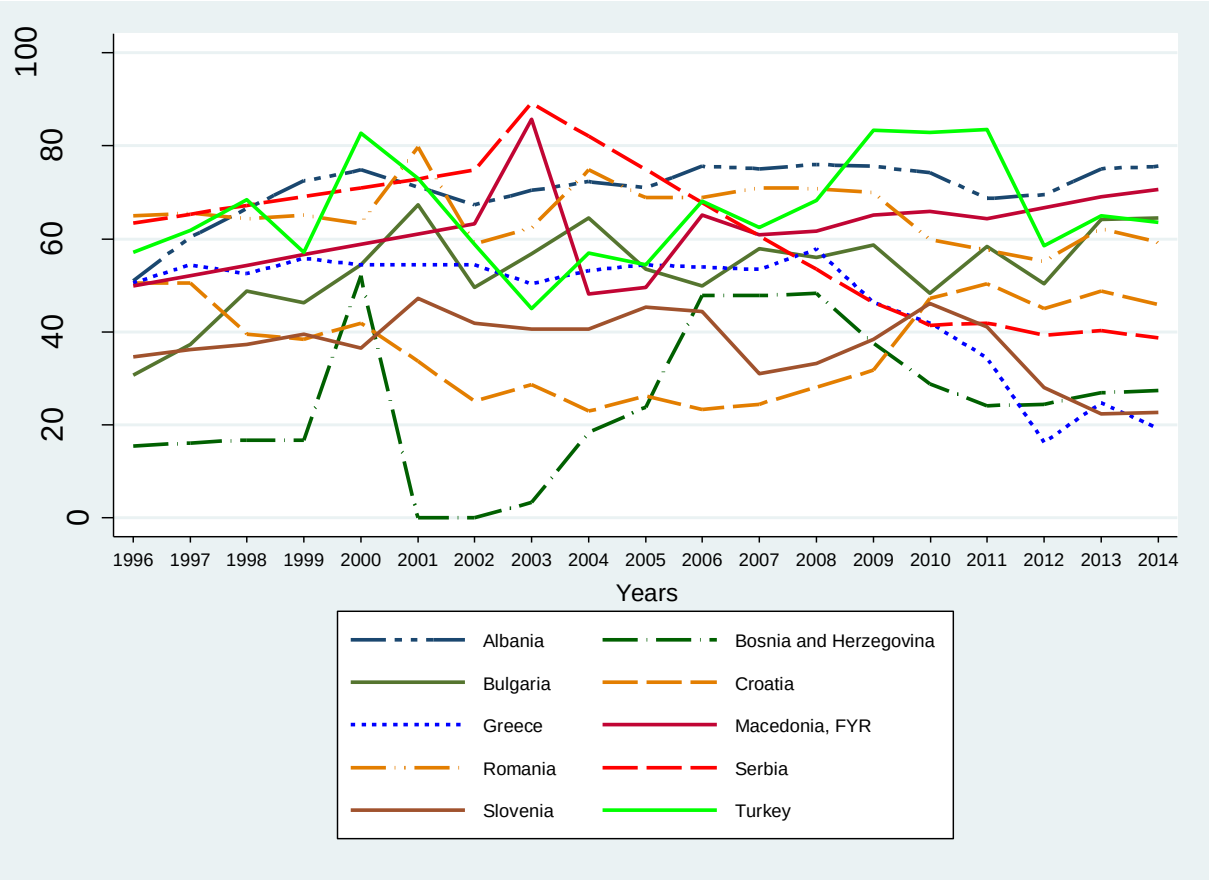
[53] Monetary freedom is a *"…measure of price stability with an assessment of price controls. Both inflation and price controls distort market activity. Price stability without sector-specific government intervention is the ideal state for the free market."* (The Heritage Foundation, online at: https://www.heritage.org/index/monetary-freedom, last accessed on 22.12.2018)

Figure 4.3. 6 - Monetary Freedom Index. Source: The Heritage Foundation



Balkan countries have somehow remained the same over the years when it comes to the burden levied by the government spending on the budget, which includes the state expenditure on transfer payments related to various social and welfare schemes (Bartlett & Prica, 2013). This is captured by the government spending index (shown in figure 4.3.7 below), available from the Heritage Foundation. A higher burden from government expenditure translated in the form of higher tax rates and social security contributions could increase the opportunity cost of operating formally and drives businesses and people to enter the informal economy (Schneider & Enste, 2000). Most of the governments of the Balkan countries rely heavily on taxation and tariff income and to a minimal degree on the ability for them to create income from production and exports (Bartlett & Prica, 2013).

Figure 4.3. 7 - Government Spending Index. Source: The Heritage Foundation



4.4. Economic developments in the Balkan countries

In this section, a review of the recent macroeconomic developments in the Balkan countries will be analysed. Countries of the Balkan Peninsula were not immune to the global financial crisis and the subsequent Eurozone debt crisis (Bartlett & Prica, 2013). Although the impact of the crisis was direct and indirect, the indirect impact of both crises was more significant for the countries of the Balkans. The global financial crisis of 2008 has been transmitted to the real economies of developed, developing and emerging countries as both an internal and external shock, thus affecting the economic activity mainly through channels of trade, finance, employment and production (Wincoop, 2011).

Arvai et al. (2009), Bartlett and Monastiriotis (2010), Stamatović et al. (2010), Bartlett & Prica (2013), Geshkov (2014), and Sadiku et al. (2014) investigate the impact of global financial crisis and the subsequent Eurozone debt crisis for all countries of the Balkan Peninsula. Geshkov (2014) provides a comparative analysis and empirically tests the theoretical findings of the impact of the recent financial crisis on the business environment in the Eastern European countries with a primary emphasis on the countries of the Balkan region by using the data on GDP per capita, unemployment rate, and inflation rate before and after the crisis. Greece undoubtedly is one of the countries in the Balkan region that has been most affected by the recent financial crisis. However, according to Gezhkov (2014), Bosnia and Herzegovina also show significant signs of recession during the 2009 to 2012 period.

All economies of the Balkan countries (Greece, Turkey, Romania, Slovenia, Bulgaria, Serbia, Montenegro, Croatia, Bosnia, and Herzegovina, FYR Macedonia, Kosovo, and Albania) reported adverse effects on macroeconomic indicators as a consequence of the financial crisis and the subsequent global recession, some more than others. Even though some countries such as Albania, Kosovo, FYR Macedonia, Montenegro and Bulgaria showed signs of stable economies during 2009 to 2012 as presented by Greshkov (2014), they too reported a delayed negative impact by the recent financial crisis.

In a study by Bartlett and Prica (2013) it is argued that Balkan countries make up the so-called 'super-periphery' of Europe, and as a result, this area is a highly vulnerable to the effects of the Eurozone debt crisis as well. Despite this fact, of the Balkan countries investigated by Bartlett and Prica (2013) only Croatia is part of the EU, although most of the other countries are either potential candidates or candidates for membership, and yet they lack support from the EU bailout funds and policy instruments that are available to ease the negative impact of

either the financial crisis or the Eurozone crises to the 'peripheral' EU Member States. The financial and Eurozone crisis has been transmitted to the Balkan countries via a number of channels including exports and trade with the EU, inward remittances, foreign direct investment and bank credit flows. Bartlett and Prica (2013) investigate the impact of the Eurozone crisis on the region in a comparative perspective, considering the crisis effects in six countries (Albania, Bosnia and Herzegovina, Croatia, Macedonia, and Serbia). Their paper questions whether the EU accession process continues to offer hope of economic prosperity in the future or whether the countries of the 'super-periphery' should rely purely on their resources, macroeconomic policies, new strategic alliances, and an ever-increasing need for integrated regional cooperation to support future economic growth and unemployment reduction (Bartlett and Prica, 2013).

Figure 4.4. 1 - Economic Growth in the region from 1996 to 2014, Source: World Bank Data

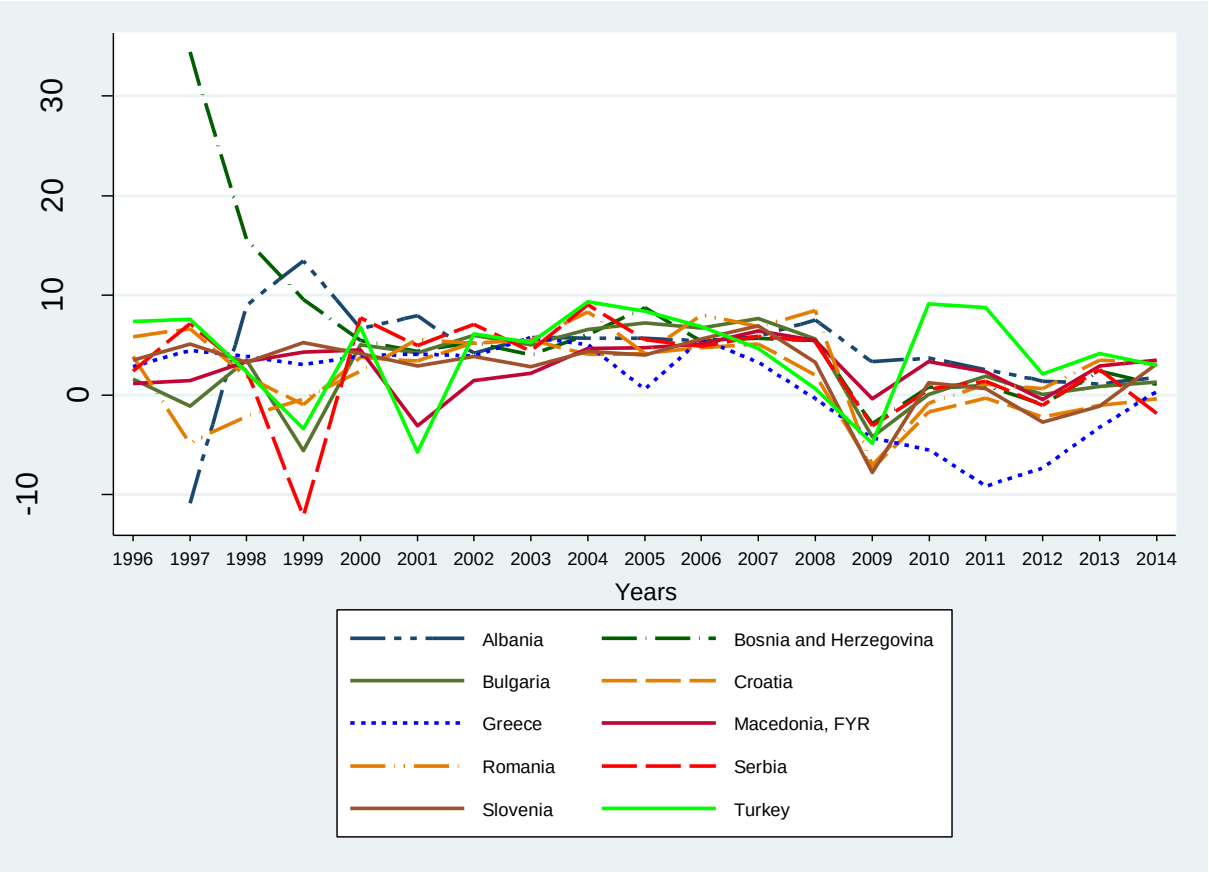
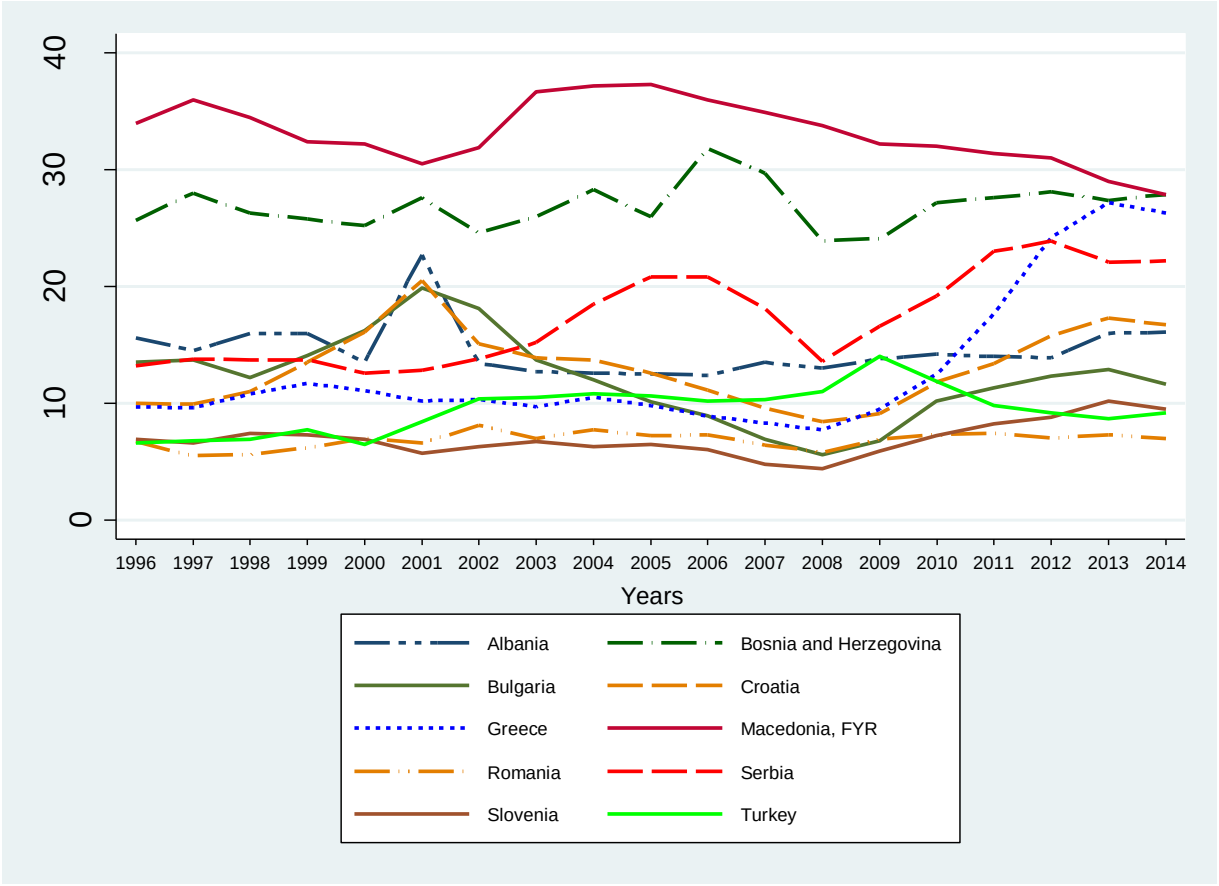


Figure 4.4.1 shows the GDP growth rates for the Balkan countries and the Eurozone area. The GDP for this region declined in 2009, which marked the end to a steady economic growth for almost a decade (although Albania and Kosovo experienced some GDP growth in 2009; albeit the growth reported was mild and heading towards a slowdown in its momentum). As expected the data indicated that Greece was amongst the most affected countries from the financial crisis of 2008 and the subsequent debt crisis, whose GDP fell drastically from 2008 all the way to 2013, recovering in 2014. All countries part of the study experienced a recession in 2009 (except Kosovo and Albania), with Greece, Croatia, and Romania experiencing recessing in the following years as well.

Figure 4.4. 2 - Unemployment, total (percentage of the total labour force) (modelled ILO estimate), from 1996 to 2014. Source: World Bank Data.



The recent financial crisis had a delayed impact on the level of unemployment in the countries of Balkan. Unemployment in the recent years has been starting to grow as it can be seen in figure 4.4.2. This growth in unemployment levels in the region can be attributed to the reduction in capital inflows, inward FDI, reduction in international trade etc. Again, Greece was the most affected by unemployment figures progressively increasing each year since 2008. Almost all countries experienced some rise in unemployment rate in either 2009 or 2010 from the 2008 level.

In all the countries part of this research, the unemployment figures currently exceed 25 percentage points (World Bank, 2014). Youth unemployment is even worse. This vast youth unemployment has many other social and economic costs for the countries in the region, including social and ethnic unrests (for example Kosovo recent protests, illegal immigration from Macedonia, Albania, and Kosovo to the EU member states, and anti-government protests and other social unrests in FYR Macedonia). Countries in the super-periphery are especially exposed to the negative effects of the Eurozone debt crisis because of increasing cooperation and engagement with rest of the Eurozone countries and through the process of EU integrations, which is particularly pronounced in the Balkan countries. In Serbia, for example, more than 80 percent of all private sector loans are denominated in a foreign currency (EBRD, 2010[54]).

The inflow of Foreign Direct Investments (FDI hereafter) was also adversely affected by the financial crisis of 2008 and the subsequent Eurozone debt crisis.

[54] Available www.ebrd.com/downloads/research/economics/workingpapers/wp0120.pdf (accessed 06.12.2016)

Figure 4.4. 3 - Foreign direct investment, net inflows (BoP, current US$), Source: World Bank Databank 2005-2013.

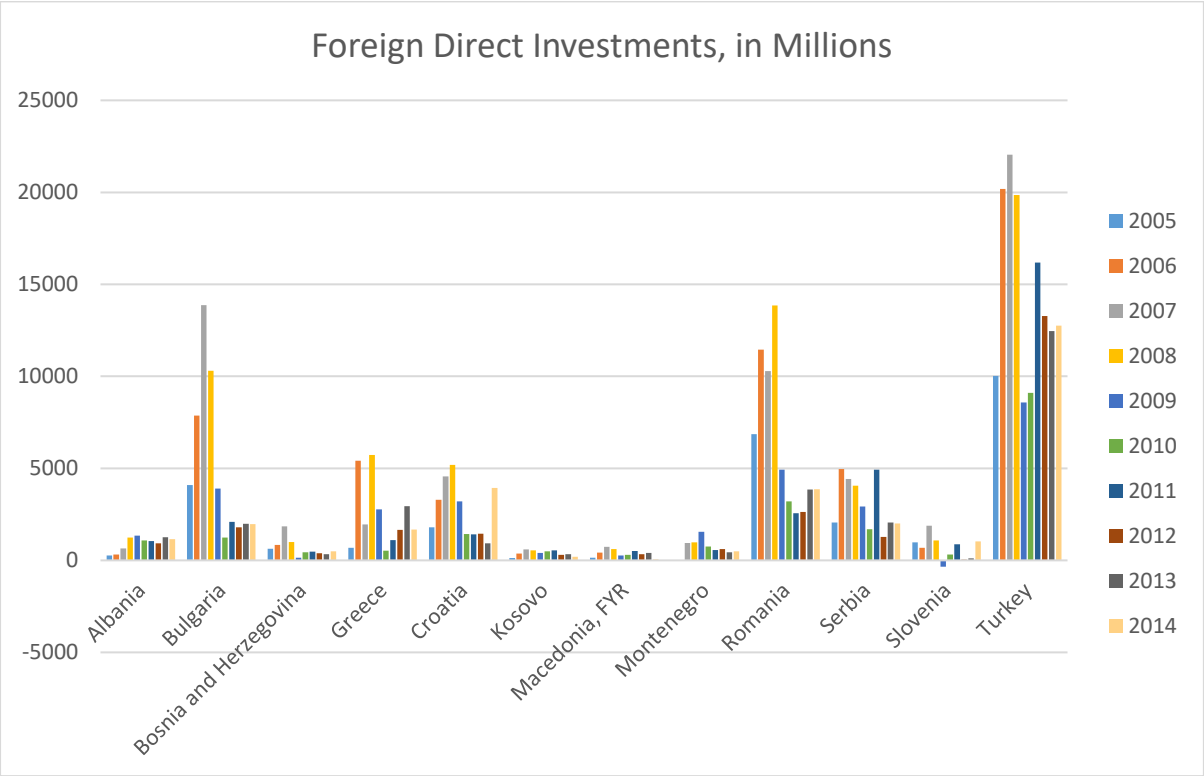


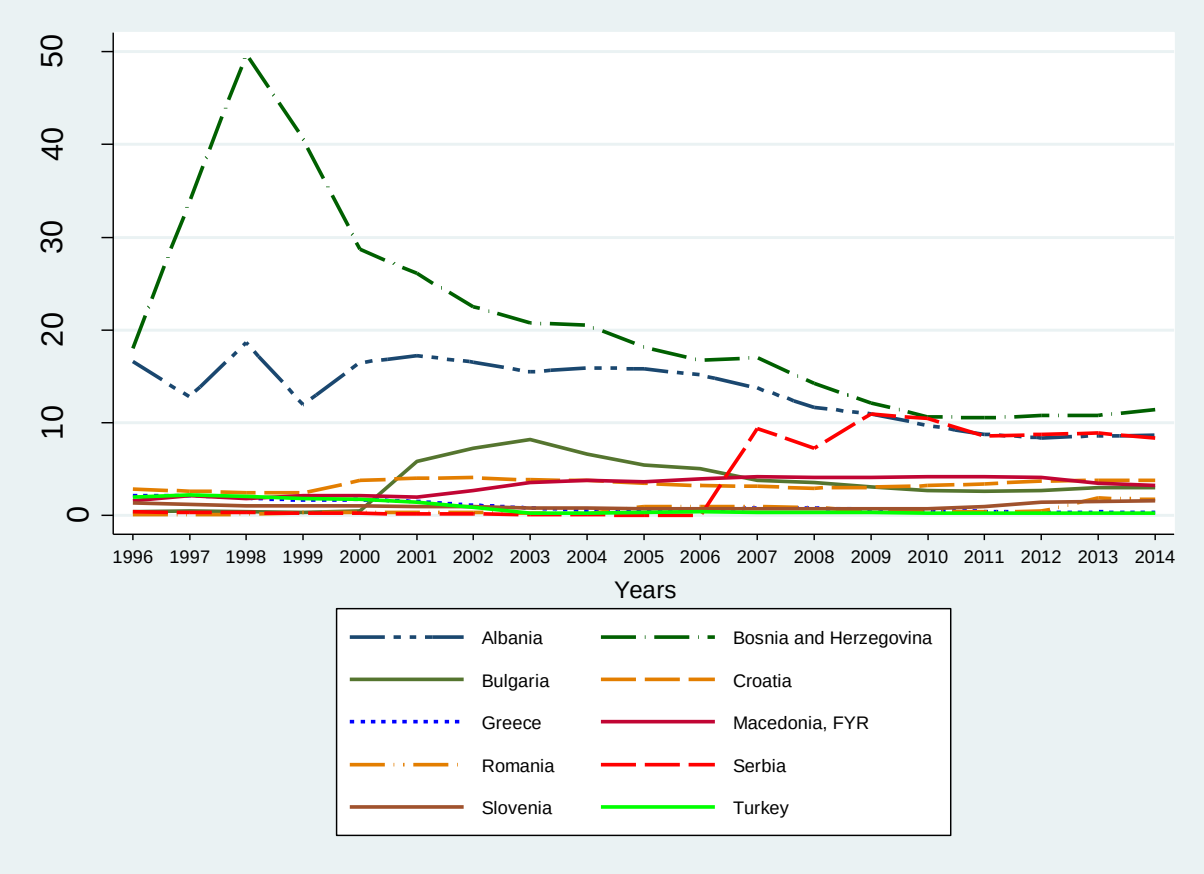
Figure 4.4.3 above shows a decline in the FDI inflows in the years of 2008, 2009 and 2010. FDI inflows started to pick up again after 2010 but not at the previous levels for most of the countries of the region. The regional average FDI in the Balkan countries was significantly affected with almost half of the value of investments declining from around $27.8 billion in 2007/ 2008 to around $14.3 billion in 2009 (World Bank Databank, 2005-2013).

Financial crisis of 2008 has also affected the volume of inward remittances, causing them to decline during this and later years. The diaspora has been crucial as a remitter and as investor to many economies and the welfare of its citizens of the region especially to the economies mentioned above. Some research has shown that most remittances are spent for domestic consumption, but there are significant investments made by the diaspora, through the

privatisation of previously owned enterprises (Llorca & Redžepagić, 2009; Burgess & Körner 2012).

The effect on remittances and other macroeconomic factors for some countries in the region deteriorated further with the Eurozone debt crisis, and with the Greek crisis. Although the Greek economy is small compared with other major Eurozone economies, it can significantly affect other Balkan economies as there are hundreds of thousands of migrant workers in Greece from the region (Burgess & Körner, 2012). Figure 4.4.4 best illustrates the importance of remittances for the countries of the region and their percentage of GDP. The level of remittances has been slightly declining for the countries heavily reliant on remittances.

Figure 4.4. 4 - Personal remittances, received (percentage of GDP), from 1996 to 2014. Source: World Bank Databank



Although the effects of the crisis in the region are not as severe as in other parts of the EU such as Greece and other countries of the EU periphery, the region is relatively uncertain about their economic future. The economic difficulties for the region have not been due to the recent global financial crisis and Eurozone debt crisis on its own, although the effects of the latter have exacerbated the situation. The economics of the Balkan countries would have been hit harder had there not been support and effective policy response with the help of institutions such as the IMF, the EBRD and the World Bank (Bartlett and Monastiriotis, 2010; Bartlett and Uvalic, 2013). These international institutions helped by coordinating agreements for continued lending to the region and helped secure bank deposits (Bartlett and Prica, 2013).

4.5. Conclusion

Political, social and economic developments and reforms can affect the level of formal and informal economy in countries. The developments in the Balkan countries have been of transitionary nature in most part leaving positive and negative legacies behind. This can in turn influence the level of informal economy in a country. Balkan countries are particularly appealing to research to analyse how such transition period and the political, social, judicial and economic reforms affected the size and development of the informal economy.

While financial crisis has common elements, they can occur in different forms, but often financial crisis is associated with the; substantial changes to the volume of credit and assets prices; severe disruptions in the function of financial institutions as intermediaries in supplying credit to economic agents, such as helping firms with balance sheet problemslending to other financial intermediaries and sovereign government; followed by extensive provision of liquidity funding to economic agents by governments (Claessens &

Kose, 2013). This makes financial crisis multidimensional and as such challenging to characterise using a single indicator. However, events leading to a financial crisis and developments in the financial system can easily be identified and chronologically explained.

High level of unemployment, a fall in FDI and remittances, and general economic conditions experienced in almost all countries part of this research can contribute to the high level of informal economy in the Balkan region. Moreover, if the financial crisis can exacerbate the economic problems these countries face, then this, in turn, could mean that the size of the informal economy increases further. Thus, the macroeconomic indicators have all experienced significant changes in the last two decades in this region. Social factors have also experienced changes in almost all countries part of this sample have experienced improvements in their rule of law, government effectiveness in the reduction of corruption and informality and improvements in doing business. These improvements in the social factors could lead to a reduction in the size of the informal economy in the region.

In light of the above, it is interesting to estimate the size of the informal economy and analyse its development over the years. The research contributes significantly to see whether the social and economic reforms, as well as law enforcement policies and reforms, have impacted or contributed towards a declining trend of the informal economic activities in the Balkan countries.

Chapter 5: Methodology and Data

5.1. Introduction

The definition of the informal economy provided by Pedersen (2003), Kazemier (2003), and Schneider (2007, 2014) and described in section 2.2 of chapter two, will be used in this research. This topic has been widely and extensively researched in the literature using different methodologies. These methodologies have been discussed in detail in chapter two and three.

This chapter will provide some theoretical considerations with regards to the methodology and the model to be applied in measuring the size and development of the informal economy. All variables to be used in the model will be explained, and data sources will be highlighted. In this chapter, the methodological framework of the model has been provided along with a discussion of the main steps to be taken when using the model and data for regressions. The model is mathematically and graphically presented following the identification of the leading causes and indicators of the informal economy for the Balkan countries. The methodological process for estimating the size of the informal economy using the MIMIC model has been presented in diagram 5.10 in this chapter.

5.2. Research Philosophy

Measuring the size and development of the informal economy and empirically assessing the primary drivers of it, is a process that has usually been undertaken from positivist epistemological philosophy[55]. Studies that try to understand the causes of the informal

[55] More about research philosophy has been provided in Appendix 5.2.1.

economy directly from the agents involved in it using direct approaches (such as surveys) use pragmatism research philosophies combining both the positivist and interpretivist research methods. This research, however, is based on only the positivist philosophy since it is using indirect approaches to measure the size of the informal economy and impacts on it. It is based on the positivism philosophy using a deductive research approach and a quantitative research strategy.

The positivist philosophy and the deductive approaches are prevalent in literature. *"Positivism has a long and rich historical tradition. It is so embedded in our society that knowledge claims not grounded in positivist thought are simply dismissed as a scientific and therefore invalid"* (Hirschheim, 1985, p.33). Alavi and Carlson (1992) support this view who argue that most empirical studies follow a positivist approach. Alavi and Carlson (1992) also defend the notion that positivism has been successfully associated with those empirical studies that make use of econometrics.

After discussing the philosophical research assumptions of the approach adopted in this research, the focus now turns to a review of the model specifications and the justification for using the Structural Equation Modelling (in particular the MIMIC model) in measuring the size and development of the informal economy in the Balkan countries.

5.3. Rationale for model selection

In measuring the size of the informal economy in a country or for a group of countries, one model must account for multiple causes of the informal economy. The informal economy as discussed in the previous chapters cannot be measured directly. Instead, it is a phenomenon that is caused by a number of other variables and which produces effects. This thesis is attempting to understand the main factors driving the informal economy and measuring the size of it in the countries of the Balkan Peninsula.

The approaches described in the theoretical background chapter[56] and their methods are designed to calculate the size of the informal economy by considering predominantly a single indicator or a cause which must consider all the factors that drive and effect informality in a country. However, as many studies suggest (Schneider, 2006, 2007b) the informal economy effects show up concurrently in the labour markets, production of goods and services, the use of electricity and money markets (Schneider, 2006) as well as many causes can affect it or can influence agents to enter the informal economy. The direct and the indirect approaches described in chapter two have shortcomings in that they do not foresee multiple factors impacting the size and development of the informal economy.

The main disadvantage of using the direct approach methods is that it cannot provide estimates of the development of the informal economy over lengthy period (Schneider, 2014, 2002). Additionally, those who are associated with the informal economy in any way may not be willing to share any information, and thus achieving results will strictly depend on the formulation of questionnaires[57] or it could be impossible altogether. Another important

[56] Section 2.5 in chapter two

[57] Thus, several questionnaires will need to be formulated to capture information about different characteristics of the informal economy (Schneider, 2002; 2014).

criticism of the direct and indirect approaches is that the very causes that drive informality are only taken into account in a few studies that make use of the monetary approach model and usually consider one cause of informality – typically the tax rate or tax burden, but fail to consider multiple causes that could potentially drive movements in the size and development of the informal economy (Dell'Anno, 2007; Schneider, 2007a).

The use of data in conjunction with the methodology is also an important factor to consider. Both direct and indirect approaches and their models described in detail in chapter two mainly rely on time series data usually spanning over many years. Models such as the Currency Demand Approach, the Physical Input model, and the Transactions approach almost all require time series data[58], measuring the size of the informal economy for one individual country at a time (Buehn & Schneider, 2012).

The availability of data for most of the Balkan countries is available only for a short period of time, as many of the countries part of this sample are new countries formed after the breaking of Yugoslavia. Moreover, political instability in some of the countries of the Balkan Peninsula has affected the reporting of the data, and essential macroeconomic and social data is missing. With a low number of observations and as a result low degrees of freedom research based on other models will produce biased results (Schneider & Enste, 2000).

The other models such as the Survey method and the Tax Auditing method require much time to gather the data, and even then, the data can be highly biased and understated as it relies on the willingness of the respondents to provide trustworthy answers (Schneider, 2000, 2007b, 2014). Furthermore, these models will not provide any evidence of the main factors

[58] An explanation of these models has been provided in section 2.5 of chapter two.

that drive or motivate households and other economic agents to engage in informal activities.

The CDA model can use panel data methodologies such as Fixed Effects, or the Generalised Method of Moments (GMM hereafter) model (Alm & Embaye, 2013) but the ability to include many factors which are considered as main drivers of the informal economy can somehow be restrictive to a few of them. In majority of the cases this model is applied to time series data with a large number of overall observations (Frey & Weck, 1983; Schneider, 1986; Schneider & Enste, 2000; Schneider, 2005; Ahumada et al., 2004; Hernandez, 2009; Ardizzi et al., 2013; Schneider & Enste, 2013; Hassan & Schneider, 2016a, 2016b).

Other models also require the absence of multicollinearity[59] in the sample amongst the independent variables to be used in a multiple regression. Some variables to be used in the estimation of the informal economy have the problem of multicollinearity as shown in the correlation and covariance table in appendix 6.3.3. Therefore, the use of other models, other than Structural Equation Modelling (SEM) approach (from which the MIMIC model is developed) can deliver biased results. The primary purpose of SEM is to test hypotheses from correlational data allowing for formal specification of the model and the use of latent variables[60].

Therefore, the most commonly used method is the one that should encompass various effects[61] and causes that impact the informal economy regarding its size and development. Such model is the MIMIC. The MIMIC model can be used with panel data, thus increasing the

[59] Multicollinearity is a situation where there is a high degree of correlation between several independent variables and can occur mainly when many independent variables are incorporated into a regression model (Belsley et al. 2005)
[60] A discussion to treat potential multicollinearity and stationarity in variables is included in section 5.12 and 6.3.1.
[61] Will be referred to as Indicators of the informal economy hereafter

number of observations and degrees of freedom. This model can consider several other factors that the other direct or indirect models are unable to account for in the same regression.

In general, the MIMIC model provides a wider approach than most other methods discussed in section 2.6, as it allows the use of multiple indicators and causes into consideration simultaneously (Giles et al., 2002). The MIMIC model allows for flexibility when choosing variables for causes and indicators in accordance with the economic characteristics of the countries under investigation, as well as the availability of data and the size of the sample (Dell'Anno & Schneider, 2003). This method is flexible in its application, allowing it to derive robust estimation results and overcoming some of the problems and disadvantages of other models discussed in section 2.6 (Schneider and Enste, 2000; Cassar, 2001). According to Thomas (1992), the MIMIC model does not need any strict assumptions – significant enough to limit the models use in its analysis (with the exception of the benchmarking procedure) where the only limitation of this model is not its conceptual structure, but the selection of causal and indicator variables.

Thus, the primary justification or the rationale for the use of this model lies with the shortcomings that the other methods and approaches have when compared to the MIMIC, as well as the advantages the model has. The MIMIC model is better equipped than the other methods as various observed causes and indicators are considered simultaneously with regards to the multifaceted nature of the informal economy (Dell'Anno, 2007; Buehn & Schneider, 2012; Schneider, 2014; Medina & Schneider, 2017).

5.4. Countries and Data

The research is about the ten Balkan countries outlined in previous sections, for which a rationale for their selection has been provided in chapter one. The research will be carried out using panel data spanning from 1996 to 2014 on an annual basis for the above ten Balkan countries. Countries which are part of the Balkan Peninsula but are being excluded from this study for the reason of data unavailability are Kosovo and Montenegro.

This research will be based on secondary data sets comprised from various sources, such as the World Bank Development Indicators, World Bank Governance Indicators, Central banks from the Balkan countries, the Heritage Foundation, and advanced datasets provided by IMF[62], EBRD[63], ECB[64], and Polity. The model presented in the following pages is reached in accordance with the leading causes and indicators of the informal economy and the paper by Breusch (2005) who critically evaluates the application of the MIMIC model and the ways it was applied by Giles et al. (2002), Dell'Anno & Schneider (2003), Bajada & Schneider (2005a), (2005b), Schneider et al. (2010), Buehn & Schneider (2012) and Dell'Anno (2007). The leading causes and indicators for the latent variable in this MIMIC model are comprised of different enforcement factors and the rule of law.

5.5. Rationale for the use of Panel data

There are a number of advantages for using panel data rather than cross-sectional or time series. The first rationale can be classified as empirical one, while the other rationales for using panel data are theoretical. The first rationale for the use of panel data in this study relates to the fact that there is lack of research which makes use of panel data for the MIMIC

[62] International Monetary Fund
[63] European Bank for Reconstruction and Development
[64] European Central Bank

regressions to estimate the size of the informal economy in the countries of the Balkan Peninsula. There has been researching in the past regarding the estimation of the informal economy using MIMIC model, but this research was done mainly for the developed countries or other groups of countries such as the work by Tanzi (1980, 1983); Bajada (1999); Giles (1999); Schneider (2002, 2003); Giles et al. (2002), or more recent studies by Vuletin (2008), Schneider et al. (2010), Buehn & Schneider (2012), Alm & Embaye (2013), and Hassan and Schneider (2016), but never has there been an analysis of the informal economy using the countries of the Balkans as a panel dataset.

Secondly, for many of the countries part of the Balkan Peninsula, data spanning back an extended period of time are simply not available, as many of these countries were either part of a confederation of states (e.g. Yugoslavia) or experienced dramatic wars and civil conflicts. The lack of data prevents one from applying robust time-series models in analysing the informal economy and its dynamics over time on a country by country basis, thus incorporating all the necessary country-specific factors. However, the use of panel data – whether it is static or dynamic, helps to overcome this problem of data availability spanning back a long period of time, by providing additional degrees of freedom for the MIMIC model. Hsiao (2003) argue that the use of panel data improves the efficiency of econometric estimates, as panel data tend to encompass more degrees of freedom and sample variation than the time series and the cross-sectional data, reducing collinearity amongst explanatory variables (Wooldridge, 2001). At the same time, by considering the heterogeneity of Balkan countries with the use of panel data, both developed (in this case Greece, Slovenia and Croatia) and developing countries or transitioning economies (such as Albania, FYR

Macedonia, Serbia and Bosnia and Herzegovina) are included in the same regression, which will again increase the degrees of freedom.

The third advantage on the use of panel data, is that it allows for the inclusion of additional variables to the regression of the Structural Equation Model for the MIMIC, which would have not been available with time-series data modelling because such variables would not have much cross-country variation over time, meaning that it could lead to misspecification bias. The use of panel data overcomes this problem by incorporating cross-sectional variation (Wooldrige, 2009, p. 484-582). With panel data, we can construct and test the more complicated hypothesis and can control the impact of any omitted variables (Hsiao, 2003; Baltagi, 2008, p.6).

Fourthly, with panel data, we are able to use more variables and proxy variables to capture different factors that could potentially affect the size of the informal economy using a MIMIC model, such as institutional quality or government effectiveness, the rule of law, corruption, size of the agriculture sector, and all other potential causes discusses in section 5.6 below. Furthermore, the latent variable for the MIMIC model better accounts for the persistence and the development over time with the use of panel data. Therefore, the use of MIMIC model allows for the calculation of various sets of estimates of the size of informal economy for various countries and sample sizes.

Finally, using panel data can simplify the calculation and statistical inference (Hsiao, 2003, 2007). The use of panel data involves two dimensions - that of a cross-section N, and of time-series T. One could assume that the calculation of panel data estimators is more complex than the calculation of a cross-sectional data alone or time series alone. In some cases, however,

it is argued (Hsiao, 2003, 2007) that the availability of panel data can result in a simpler computation and less statistical inference.

5.6. Causes and Indicators for the MIMIC model

The MIMIC model generally comprises two parts - a measurement model which links the observed and measurable indicator variables with the unobserved variable, and the structural equation model which links the causal relationships among the observed variables and the one latent or unobserved variable. In this case there is one latent variable and that is the size of the informal economy. The size of such unobserved variable is presumed to be influenced by a the indicator variables and *"…that the interaction over time between the causes* $x_{it}(i = 1,2,3,\dots,k)$ *the size of the informal economy* η_t*in time* t *and the indicators* $y_{it}(i = 1,2,3,\dots,k)$*…"*can be mathematically expressed and empirically measured (Schneider, 2006; p.48). It is important to note here that the observable causes are exogenous, while the observable indicators are endogenous.

Before providing the econometric theory behind the model to be used, the research must consider the leading causes and indicators for the latent variable. The main causes included in the MIMIC model for estimating the informal economy are listed below, while a detailed explanation and description of the variables associated with the causes and indicators is presented in table 5.7.1 in section 5.7.

5.6.1. Causes

I. The burden of direct and indirect taxation provides a strong incentive to work in the informal economy. Social security burden is also an important factor at this point. For this research, two variables will be used as a proxy to capture the social security and

taxation burden: Government Revenues as a percentage of GDP, Government Spending Index and the Fiscal Freedom Index. Majority of studies use the tax rate such as Thomas (1992), Schneider (2006, 2007), Pozo (1996), Johnson et al. (1998), Giles (1997a, 1999a), Giles et al. (2002) and Del'Anno (2003, 2007). Other studies use government revenues, government spending and the Fiscal Freedom Index such as Buehn & Schneider (2012). The use of government revenues as a percentage of GDP, government spending and tax revenues as a percentage of GDP, rather than the tax rates is justified by existing literature and because data for some Balkan countries for taxation rates is missing from 1996. Only recent official data for such a variable is available. This study will make use of the tax revenues as a percentage of GDP, as this variable does not have any missing values for the time period of this study.

II. The burden of regulation will provide a strong incentives for economic agents to enter the informal economy. The high intensity of legal and administrative regulations has been analysed to be a leading cause of informality in many countries (Dell'Anno, 2007). The higher the degree of regulations such requirements for registering a business, getting a license or permit, restrictions relating to the labour market, trade barriers, etc. the higher the motive for operating informally. Different studies also suggest that the rule of law, not just the intensity of regulations, may be the main cause for this. To capture this Business Freedom Index from Heritage Foundation has been used. Such variable to capture the burden of regulation has also been used and justified by Schneider (2007a), Dell'Anno (2007), and Vo & Ly (2014).

III. The *'tax morality'* - which is the willingness of individuals and businesses to leave their formal activities and enter the informal economy. The assumption is that as tax morality declines there will be an increase in the size of the informal economy

(Schneider, 2000; Schneider & Enste, 2000; Schneider, 2006 and 2007b). However, obtaining reliable data for this variable is difficult and such data is not available for Balkan countries. Therefore, this study will make use of Government Spending Index, and the Government Effectiveness Index as a proxy to capture this potential driver of economic informality.

IV. Institutional and government effectiveness is an important cause of informality in many countries (Schneider, 2007a; Buehn & Schneider 2012; Aydin, 2017; Medina & Schneider, 2017). The quality of public services and the ability of a government to fight corruption as well as provide the necessary protection to those in the formal sector is an important cause of informality. This will be reflected in the Government Effectiveness Index variable from the World Bank World Governance Indicators.

V. According to Giles (1999) and later Vuletin (2008), Hernandez (2009), Alm & Embaye (2013) and Elshamy (2015), the level of Inflation is also an important cause of informality. Inflation tends to alter income distribution, which could induce disrespect for tax law. The hypothesis is that the higher the rate of inflation is, the higher the informal sector. This is captured by an Inflation, GDP deflator (annual percentage) variable or the Monetary Freedom Index from the Heritage Foundation.

VI. The political climate is another important factor or cause of the informal economy. The region has experienced dramatic political changes in the past decades. In most cases, these changes have been brought about by internal conflicts, revolutions, civil wars or wars. As such, uncertainty and unstable government institutions can impact the economic development of a country and can potentially affect the size and

development of the informal economic activities (Teobaldelli & Schneider, 2012)[65]. This could be captured by the Political Stability and Absence of Violence /Terrorism variable from the World Bank World Governance Indicators, but also from the Rule of Law Index from the same source. This study will make use of Rule of Law Index and the Government Integrity Index as proxies for this potential driver of informality.

VII. Institutional trust is another important cause of informality in the region of Balkan Peninsula. Most of Balkan countries perform very poorly when it comes to people trusting their governments. Corruption is usually high in most of these countries and it usually includes the court system, complex legislation, and bureaucratic procedures. This is a particular problem for the countries of the Balkan Peninsula. This is measured by the Government Integrity Index, Rule of Law Index, Control of Corruption Index or Regulatory Quality variables (Schneider & Enste, 2000; Buehn & Schneider, 2012).

VIII. The size of the agriculture sector in an economy is an important determinant of the level of informality in an economy (Vuletin, 2008; Elshamy, 2015; Hassan & Schneider, 2016a, 2016b). The more dominant the agriculture sector is, the larger the size of the informal economy would be, ceteris paribus. Agriculture value added (percentage of GDP) will be used from the WBDI to capture the size of the agriculture sector.

IX. According to Alm & Embaye (2013), the degree of urbanisation in a country could also potentially drive the level of informality in an economy. The higher the size of the urban population relative to rural population, the smaller the size of the informal economy, ceteris paribus (Alm & Embaye, 2013). To capture this, urban population as a percentage of total population from World Bank Development Indicators will be

[65] Teobaldelli & Schneider (2012) have found that there is a statistically significant negative relationship between direct democracy and the size of the informal economy.

used in the regression.

X. The level of Unemployment in a country has been a significant driver of economic informality in a country. It is argued that the higher the rate of unemployment is in a country, the higher the potential for individuals to engage or enter the informal economy (Feld & Schneider, 2010; Buehn & Schneider, 2012; Schneider & Williams, 2013; Hassan & Schneider, 2016a). Furthermore, various studies suggest that during a recession people tend to engage in informal economic activities to compensate any income losses from the formal economy (Bajada & Schneider, 2005; Dell'Anno, 2007; Vuletin, 2008; Hassan & Schneider, 2016a). Thus, the level of unemployment can be considered as a cause of the informal economy. In capturing this, this study makes use of unemployment rate from the International Labour Organisation. It also makes use of the Employment to Population Ratio from World Bank, in order to capture the opposite effect. While for the Unemployment rate the relationship with the informal economy is positive, it is expected that the relationship between the employment to population ratio and the level of the informal economy is negative. People who are showing in the official statistics as employed and paying taxes accordingly, may not be involved in the informal economy at the same time (Schneider & Enste, 2000). Using one or the other variable can be justified on the basis of ensuring robustness.

5.6.2. Indicators

A change in the size and development of the informal economy within a country can also be reflected in the following indicators:

I. The currency in circulation. If activities in the informal economy rise, then there is a need for additional monetary transactions in the form of cash. As such developments

of the monetary indicators are important to be considered (Schneider, 2007a; Dell'Anno, 2003, 2007; Schneider et al. 2010; Buehn & Schneider, 2012). This is usually captured by the Money and quasi-money (M2) as a percentage of GDP variable, the ratio of M1 to M2, or Cash in circulation (M0) (Buehn & Schneider, 2012). This study will make use of M1[66] and/or M2 components as data for M0 is currently either unavailable for most of the countries part of this research or there are many missing values. Previous studies that have used M1 and M2 components instead of M0 are many (discussed and listed in Appendix 3.5.1 and section 3.5, which justify their use in this study.

II. Labour market activities and developments in the employment rate can be an important indicator (Schneider, 2007; Dell'Anno, 2003, 2007; Schneider et al. 2010; Buehn & Schneider, 2012). An increase in the workers' participation in the informal sector could decrease the participation of workers in the formal economy. This has usually been captured by the Labour force participation ratio.

III. Developments in the production market are considered as an important indicator by Schneider (2007a), Dell'Anno (2007), Schneider et al. (2010); and Buehn & Schneider, (2012). An increase in the size of the informal economy will displace key inputs from formal into informal economy, thus affectinbg the level of official economic growth. This will be captured by the GDP Growth rate or the GDP per capita.

IV. According to Kaufmann & Kaliberda (1996), electricity consumption is an important physical indicator of total economic activities in a country. In general, this method looks at the relationship between electric consumption and GDP, since they have the

[66] Money components of M0 and M1, include notes and coins in circulation and other instant liquid assets. M2, on the other hand, includes the M1 and other time deposits with banks.

same elasticity. The difference in GDP growth and the use of electricity can be ascribed to the informal economy (Schneider 2007, 2006, and Aldersdale et al., 2006). Kaufmann and Kaliberda (1996) derive this proxy measurement for the overall economy and then subtract the official GDP from it, resulting in the unofficial GDP, which is an indication of the informal economy. Based on this, it can be seen as a very simple and straightforward method for deriving some measurement for the size of the informal economy. This has been used as an indicator in the MIMIC model approach in the past by Arby et al. (2012); and it is also a separate measurement of the informal economy that has been widely used by many scholars (Kaliberda 1996; Lackó 1996, 1998, 1999, and 2000; Schneider, 2007a; Aldersdale et al., 2006) and has been considered to be an important indicator of the informal economy particularly in transition and developing countries. To capture this indicator the Electric power consumption (kWh per capita) from World Bank Development Indicators will be used.

5.7. Description of Variables and Data sources

Description of variables is provided below along with an explanation for each one of them and the data source. A rationale for the use of each of these variables was provided in the above section.

Table 5.7. 1 - Description of variables and data sources

Causal Variables	**Description/Explanation[67]**	**Source**	**Literature[68]**
Business Freedom index	*"Business freedom Index is an indicator measuring the degree to which the government is efficient in regulating businesses. It has a number between 0 and 100, with 100 equalling the freest business environment".*	Heritage Foundation data (HFD hereafter)	Dell'Anno and Schneider (2008), Schneider et al. (2010), Buehn and Schneider (2012), Vo & Ly (2014), Hassan and Schneider (2016a)
Tax Revenue (% of GDP)	*"Tax revenue refers to compulsory transfers to the central government for public purposes. Certain compulsory transfers such as fines, penalties, and most social security contributions are excluded. Refunds and corrections of erroneously collected tax revenue are treated as negative revenue".*	World Bank Development Indicators (WBDI hereafter)	Thomas (1992), Giles (1999a), Tanzi (1999), Schneider (2003, 2005), Dell'Anno (2007), Dell'Anno et al. (2007), Arby et al. (2012), Alm and Embaye 2013
Government spending Index	*"The government spending component captures the burden imposed by government expenditures, which includes consumption by the state and all transfer payments related to various entitlement programs".*	HFD	Schneider et al. (2010), Buehn and Schneider (2012), Barbosa et al. (2013), Vo and Ly (2014), Trebicka (2014), Nchor and Adamec (2015),

[67] Definition and explanation of the variables has been used exactly as indicated by the respective sources of it. For HFD, explanation of variables is taken from http://www.heritage.org/index/book/methodology. For WBDI variables have been defined and explained using https://data.worldbank.org/data-catalog/world-development-indicators, and for WGI variables are explained using http://info.worldbank.org/governance/wgi/#home.

[68] Only a selected literature has been provided here. Chapters two and three provide in-depth analysis of literature.

Government Effectiveness Index	*"Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. The estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5".*	World Bank Governance Indicators (WGI hereafter)	Johnson et al. (1998), Losby et al. (2002), Dreher & Schneider (2010), Schneider et al. (2010), Teobaldelli (2011), Buehn & Schneider (2012), Teobaldelli & Schneider (2012), Amendola & Dell'Anno (2010), Abdih an&d Medina (2013), Hassan & Schneider (2016a)
Rule of Law Index	*"Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. The estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5".*	WGI	Johnson et al. (1998), Losby et al. (2002), Dreher & Schneider (2010), Schneider et al. (2010), Teobaldelli (2011), Buehn & Schneider (2012), Teobaldelli & Schneider (2012), Amendola & Dell'Anno (2010), Abdih an&d Medina (2013), Hassan & Schneider (2016a)
Control of Corruption	*"Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. The estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5".*	WGI	Buehn and Schneider (2009), Abdih and Medina (2013), Schneider et al. (2013), Dreher et al. (2009)
Government Integrity index	*"Corruption erodes economic freedom by introducing insecurity and uncertainty into economic relations. Of greatest concern is the*	HFD	Schneider (2002), Dreher & Schneider (2010), Schneider et al. (2010), Teobaldelli

	systemic corruption of government institutions such practices as bribery, extortion, nepotism, cronyism, patronage, embezzlement, and graft. The lack of government integrity caused by such practices reduces economic vitality by increasing costs and shifting resources into unproductive activities".		(2011), Buehn & Schneider (2012), Teobaldelli & Schneider (2012)
Unemployment Rate	*"Unemployment refers to the share of the labour force that is without work but available for and seeking employment".*	WBDI	Feld and Schneider (2010), Buehn and Schneider (2012), Schneider and Williams (2013), Hassan and Schneider (2016a, 20016b)
Employment to Population Ratio	*"Employment to population ratio is the proportion of a country's population that is employed. Ages 15 and older are generally considered the working-age population".*	WBDI	Feld and Schneider (2010), Buehn and Schneider (2012), Schneider and Williams (2013), Hassan and Schneider (2016a, 20016b)
Monetary Freedom Index	*"Monetary freedom combines a measure of price stability with an assessment of price controls. Both inflation and price controls distort market activity. Price stability without sector-specific government intervention is the ideal state for the free market".*	HFD	Vuletin (2008), Schneider et al. (2010), Elshamy (2015),
Financial Freedom Index	*"Financial freedom is an indicator of banking efficiency as well as a measure of independence from government control and interference in the financial sector. State ownership of banks and other financial institutions such as insurers and capital markets reduces competition and generally lowers the level of access to credit".*	HFD	Buehn and Schneider (2012)

Agriculture Sector Dominance (percentage of GDP)	*"Agriculture corresponds to ISIC divisions 1-5 and includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources".*	WBDI	Hassan and Schneider (2016b), Elshamy (2015), Vuletin (2008)
Degree of Urbanisation	*"Urban population refers to people living in urban areas as defined by national statistical offices. The data are collected and smoothed by United Nations Population Division".*	WBDI	Alm and Embaye (2013)
Inflation, GDP deflator	*"Inflation, as measured by the annual growth rate of the GDP implicit deflator, shows the rate of price change in the economy as a whole. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency".*	WBDI	Giles (1999), Vuletin (2008), Hernandez (2009), Alm & Embaye (2013) and Elshamy (2015),
Indicator Variables	**Description/Explanation[69]**	**Source**	**Literature**
GDP per Capita, PPP[70]	*"GDP per capita based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. GDP at purchaser's prices is the sum of gross value added by all resident producers in the*	WBDI	Dell'Anno and Schneider (2006), Schneider and Savasan (2007), Schneider et al. (2010), Feld and Schneider (2010), Buehn and Schneider (2012), Abdih and Medina (2013), Vo and Ly (2014), Nchor and Adamec (2015),

[69] Definition and explanation of the variables has been used exactly as indicated by the respective sources of it. For HFD, explanation of variables is taken from http://www.heritage.org/index/book/methodology. For WBDI variables have been defined and explained using https://data.worldbank.org/data-catalog/world-development-indicators, and for WGI variables are explained using http://info.worldbank.org/governance/wgi/#home.

[70] Based on Purchasing Power Parity

	economy plus any product taxes and minus any subsidies not included in the value of the products".		
Labour Force Participation ratio	*"Labour force participation rate is the proportion of the population ages 15 and older that is economically active: all people who supply labour to produce goods and services during a specified period".*	WBDI	Chaudhuri et al (2006), Dell'Anno and Schneider (2006), Schneider and Savasan (2007), Schneider et al. (2010), Feld and Schneider (2010), Buehn and Schneider (2012), Abdih and Medina (2013), Barbosa et al (2013), Vo and Ly (2014), Nchor and Adamec (2015),
Money and quasi money (M2) growth rate	*"Money and quasi-money comprise of the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government. This definition of money supply is frequently called M2".*	WBDI	Schneider and Enste (2000), Dell'Anno and Schneider (2006), Yin and Jiangsu (2009), Buehn and Schneider (2009, 2012), Arby et al. (2012), Schneider (2015), Hassan and Schneider (2016a, 2016b)
Electric power consumption (kWh per capita)	*"Electric power consumption measures the production of power plants and combined heat and power plants less transmission, distribution, and transformation losses and own use by heat and power plants".*	WBDI	Schneider and Enste (2000), Arby et al. (2012),
Ratio of M1 over M2	*"M1 over M2 money components"*	WBDI	Schneider and Enste (2000), Dell'Anno and Schneider (2006), Yin and Jiangsu (2009), Buehn and Schneider (2009, 2012), Arby et al. (2012), Schneider (2015), Hassan and Schneider (2016a, 2016b)

5.8. Econometric Model

Having identified the main causes and indicators and discussed them above, we can now capture them by a model, which is presented below. The starting point is the SEM which gives us the necessary empirical equation of a latent variable and examines the interrelationship with other variables with covariance structures. The structural equation model consists of two parts: The Structural Equation Model and the Measurement Model. The specification of the SEM model has been provided initially from Jöreskog and Goldberg (1975)[71]. This specification considers a latent variable η that is linearly determined, and is subject to a disturbanceξ, by a set of observable exogenous causes $x_1, \dots, x_k$:

$$\eta = \alpha + \gamma_1 x_1 + \cdots + \gamma_k x_k + \cdots + \xi \qquad \text{(Eq. 5.1)}$$

In estimating the informal economy in the countries of the Balkans, the model starts with a 6-1-2 MIMIC[72] model (that is six causes, one latent variable, and two indicators identified above in the causes and indicators of the informal economy). The variables which are not significant are gradually omitted until the best fitting model is reached. The informal economy is considered by the latent variable in this model.

Initially, the SEM to be estimated presents the relationship between the latent variable (informal economy) and its causes, includes the causes of the informal economy as indicated in the equation in (5.1). The MIMIC model is described in Giles et al. (2002, chapter 6) as a relationship between a vector *y* (p×1) of indicator variables and another vector *x* (*q*×1) of

[71] The MIMIC model has been used for the first time by Goldberger (1972) and Zellner (1970). Frey and Weck-Hanneman (1984), who are considered the pioneers on the application of this model, have used the model to evaluate the relative size of the informal economy in 17 OECD countries. The idea of this model is to represent the informal economy as a latent variable or index that has caused noticeable effects, but that cannot be measured directly.

[72] All the fourteen variables will be tested to see their significance in the overall fit model. They will be removed gradually as results are performed to get the maximum model fit.

causal variables. They are connected by an unobserved latent variable η (sometimes referred to as scaler) (Breusch, 2005a).

The equation of the model showing the relationships between the latent variable η (informal economy) and the X_q (causes of informality) (with the i, t subscripts are used for countries and time, respectively) following SEM classification is:

$$\eta_{it} = \alpha + \gamma_{1it}x_{1it} + \gamma_{2it}x_{2it} + \gamma_{3it}x_{3it} + \gamma_{4it}x_{4it} + \gamma_{5it}x_{5it} + \gamma_{6it}x_{6it} + \cdots + \xi_{it} \quad \text{(Eq. 5.2)}$$

The equations system (Dell'Anno, 2007) that links the two indicators and the unobservable variable (η) is the Measurement Model:

$$Y_1 = \delta_1 + \lambda_1\eta + \varepsilon_1 \quad \text{(Eq. 5.3)}$$

$$Y_2 = \delta_2 + \lambda_2\eta + \varepsilon_2 \quad \text{(Eq. 5.4)}$$

Where *Y*1 and *Y*2 represent the possible observable indicators of the informal economy (identified in section 5.6 of this chapter) and η is the latent variable (the informal economy). The expression of ε is the random error term, and finally λ are the structural parameters of the measurement model. The equations above can be generalised as follows:

$$\eta_p = \alpha + \sum \gamma_p x_p + \xi_p \quad \text{(Eq. 5.5)}$$

$$Y_p = \delta_p + \lambda_p\eta_p + \varepsilon_p \quad \text{(Eq. 5.6)}$$

In this case errors and disturbances are assumed to be independent between each other, where, E (ξε') =0', E (ξ^2) = σ^2 and E (εε') = θ. The term of θ stands for the covariance matrix along its diagonal of the measurement errors. Subscript $'p'$ represents the i, t described

above. To solve the model, equation (5.5) can be substituted into equation (5.6) to obtain a function of observable variables, that is:

$$Y_p = \delta_p + \lambda_p(\alpha + \sum \gamma_p x_p + \xi_p) + \varepsilon_p \qquad \text{(Eq. 5.7)}$$

Where γ(p×1) and λ(*p*×1) are the unknown parameter vectors. The error terms ε(*p*×1) and ξ*t* (scalar) are assumed to have zero means, variances Θ = *diag* (θ1,...,θ*p*) and ψ, and to be uncorrelated with each other. The model in equation (5.2) cannot determine the scale of all the parameters, so a *"…normalisation condition is required"* (Tahmasebi, 2015; p. 190-191). Even though there are many options for a *"normalization condition" (ibid),* Giles et al. (2002) apply a condition by setting the first element of λ to be unity, as λ1 =1 in order to quantify the impact of another indicator. The parameters of this model can be estimated using the Maximum Likelihood (ML hereafter) methodology[73]. Following the work and methodology of Buehn and Schneider (2008), the model (5.2) can be expressed in terms of covariance matrix as follows:

$$\sum = \begin{bmatrix} var\ (\gamma_p) & cov\ (\gamma_p, x_p) \\ cov\ (x_p, \gamma_p) & var\ (x_p) \end{bmatrix} = E\left[\begin{bmatrix} \gamma_p \\ x_p \end{bmatrix}\begin{bmatrix} \gamma_p \\ x_p \end{bmatrix}\right] \qquad \text{(Eq. 5.8)}$$

$$E\left(\gamma_p, \gamma'_p\right) = \lambda\ (\gamma'\ \theta\ \gamma + \Psi)\lambda' + \Theta_p$$

(Eq. 5.9)

$$E\left(x_p, \gamma'_p\right) = \theta\ \gamma\ \lambda'$$

$$E(\gamma_p, x_p) = \lambda\gamma'\theta$$

[73] The ML method will be applied in accordance with Jöreskog and Goldberg (1975), Hayduk (1987), and Breusch (2005a).

$$E(x_p, x'_p) = \theta$$

Therefore, we have: $\sum = \begin{bmatrix} \lambda \left(\gamma' \ \theta \ \gamma + \Psi \right) \lambda' + \Theta_p & \lambda \gamma' \theta \\ \theta \ \gamma \ \lambda' & \theta \end{bmatrix}$ (Eq. 5.10)

It is essential to estimate γ, λ, and covariances that produce the estimate of Σ that is as close as possible to the sample cov (Y, X). In equation (5.9), Θ_q represents the "*covariance matrix of the error terms in the measurement model, Ψ represents the variance of the error term in the structural equation and θ is the covariance matrix of the causal variables"* (Buehn and Schneider, 2008; p. 24).

The structural part of the equation as indicated in equation (5.5) and the measurement part of the equation presented in equation (5.6) above can also be expressed in the following way:

Part 1: The Structural Equation model:

$$Informal\ Economy = [\gamma_{1it}, \gamma_{2it}, \gamma_{3it}, \gamma_{4it}, \gamma_{5it}, \gamma_{6it}, \dots \gamma_{kit}] \begin{bmatrix} Business\ Freedom\ Index \\ Government\ Effectiveness \\ Dominance\ of\ the\ Agriculture\ sector \\ Unemployment\ Rate \\ Rule\ of\ Law \\ Degree\ of\ Urbanisation \\ Government\ Spending \\ Control\ of\ Corruption \\ Monetary\ Freedom\ Index \\ Tax\ revenue \\ Inflation \\ - \\ - \\ - \\ - \\ etc. \end{bmatrix} + \xi_{it}$$

(Eq. 5.11)

Part 2: The Measurement Equation model:

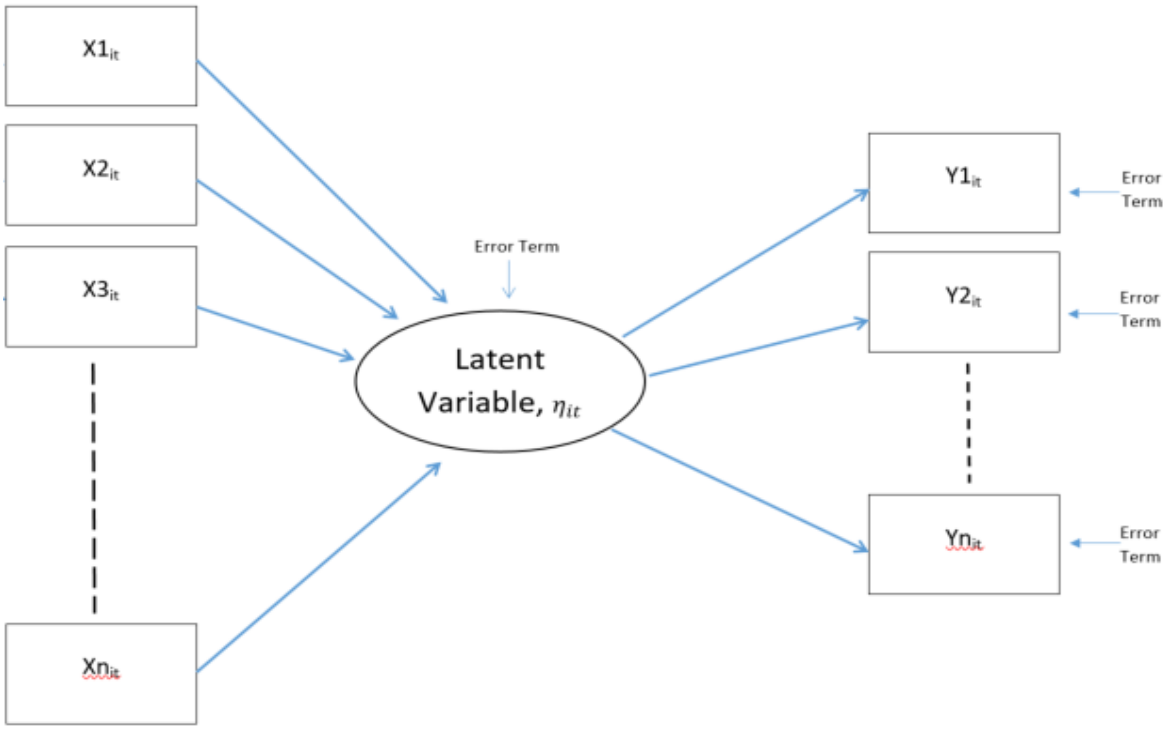
$$\begin{bmatrix} GDP\ per\ Capita \\ Labour\ Force\ Participation\ Ratio \\ Electric\ Power\ Consumption \\ M2growth \\ - \\ - \\ - \\ etc \end{bmatrix} = \begin{bmatrix} -1 \\ \lambda_{2it} \\ \lambda_{3it} \\ \lambda_{4it} \\ - \\ - \\ - \\ \lambda_p \end{bmatrix} Informal\ Economy + \varepsilon_{it} \qquad \text{(Eq. 5.12)}$$

Specifically, the MIMIC model can be mathematically expressed for each MIMIC specification used, as shown in the following section (5.9).

5.9. Graphical presentation of the MIMIC Model

Irrespective of the specification of the MIMIC model itself, one can generalise a graphical presentation of the MIMIC model in general terms which follows an SEM structure with one latent variable, a number of causal variables, and the indicators to the right. Each of the casual variables and indicators has been described in detail (including their descriptive statistics) as well as their corresponding hypothesis. Mathematically this has been expressed in equations 5.11 and 5.12 above. A general graphical presentation of a MIMIC model is presented below:

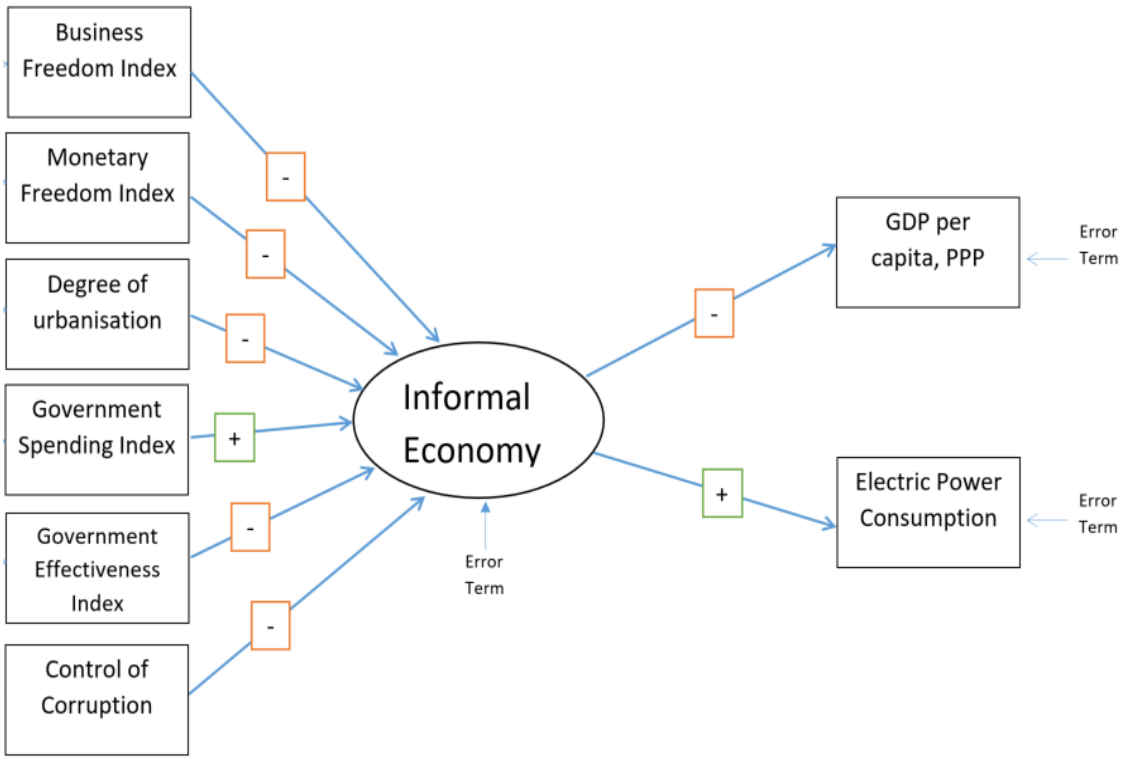
Figure 5.9. 1 - Generalised graphical presentation of the MIMIC Model with one latent variable, Source: Author's presentation



The MIMIC specifications can be graphically presented depending on the number of causes and indicators. The following diagrams show graphical presentation for a 6-1-2, 5-1-2, and 4-1-2 MIMIC specifications for the countries of Balkans to be used in MIMIC regression analysis along with the expected causality for the coefficients. Here we present only some of the specifications from the Results and Analysis Chapter. They correspond to MIMIC Specification 2, MIMIC Specification 5 and MIMIC Specification 4. To calculate the size of the informal economy, this study will make use of the 6-1-2 MIMIC model, which included more causes, and therefore able to offer better estimates for the latent variable (Joreskog & Goldberger, 1975; Dell'Anno & Schneider, 2003).

6-1-2 MIMIC Model

Figure 5.9. 2 - Graphical presentation of the 6-1-2 MIMIC Model, Source: Author's presentation



A mathematical presentation of this particular MIMIC model specification is expressed as follows:

6-1-2 MIMIC Model - Part 1: The Structural Equation model:

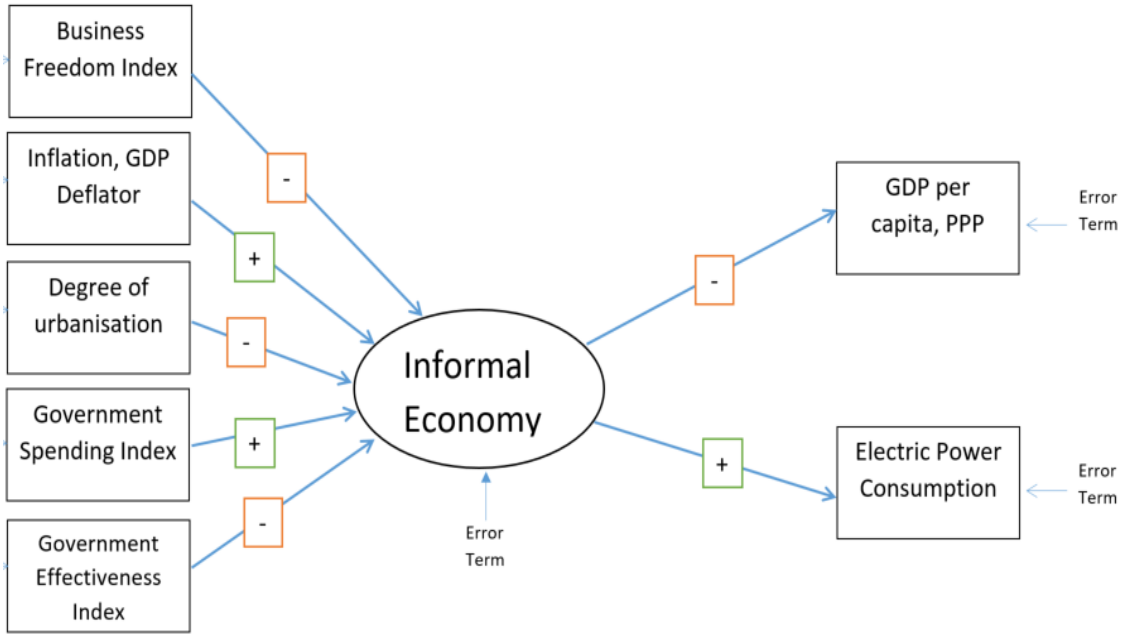
$$Informal\ Economy = [\gamma_{1it}, \gamma_{2it}, \gamma_{3it}, \gamma_{4it}, \gamma_{5it}, \gamma_{6it}] \begin{bmatrix} Business\ Freedom\ Index \\ Monetary\ Freedom\ Index \\ Degree\ of\ Urbanisation \\ Government\ Spending\ Index \\ Government\ Effectiveness \\ Control\ of\ Corruption \end{bmatrix} + \xi_{it} \quad \text{(Eq. 5.13)}$$

6-1-2 MIMIC Model - Part 2: The Measurement Equation model:

$$\begin{bmatrix} GDP\ per\ capita \\ Electric\ Power\ Consusumption \end{bmatrix} = \begin{bmatrix} -1 \\ \lambda_{2it} \end{bmatrix} Informal\ Economy + \varepsilon_{it} \quad \text{(Eq. 5.14)}$$

5-1-2 MIMIC Model

Figure 5.9. 3- Graphical presentation of the 5-1-2 MIMIC Model, Source: Author's presentation



A mathematical presentation of this particular MIMIC model specification is expressed as follows:

5-1-2 MIMIC Model - Part 1: The Structural Equation model:

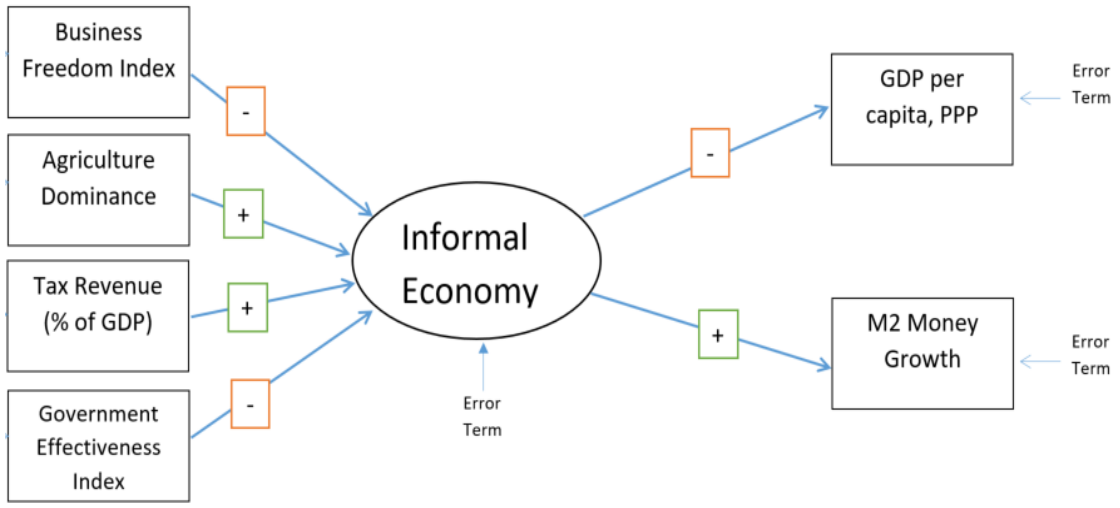
$$Informal\ Economy = [\gamma_{1it}, \gamma_{2it}, \gamma_{3it}, \gamma_{4it}, \gamma_{5it}] \begin{bmatrix} Business\ Freedom\ Index \\ Inflation \\ Degree\ of\ Urbanisation \\ Government\ Spending\ Index \\ Government\ Effectiveness \end{bmatrix} + \xi_{it} \quad \text{(Eq. 5.15)}$$

5-1-2 MIMIC Model - Part 2: The Measurement Equation model:

$$\begin{bmatrix} GDP\ per\ capita \\ Electric\ Power\ Consusumption \end{bmatrix} = \begin{bmatrix} -1 \\ \lambda_{2it} \end{bmatrix} Informal\ Economy + \varepsilon_{it} \quad \text{(Eq. 5.16)}$$

4-1-2 MIMIC Model

Figure 5.9. 4 - Graphical presentation of the 4-1-2 MIMIC Model, Source: Author's presentation



A mathematical presentation of this MIMIC model specification is expressed as follows:

4-1-2 MIMIC Model - Part 1: The Structural Equation model:

$$Informal\ Economy = [\gamma_{1it}, \gamma_{2it}, \gamma_{3it}, \gamma_{4it}] \begin{bmatrix} Business\ Freedom\ Index \\ Dominance\ of\ the\ Agriculture\ sector \\ Government\ Effectiveness \\ Tax\ revenue \end{bmatrix} + \xi_{it}$$

(Eq. 5.17)

4-1-2 MIMIC Model - Part 2: The Measurement Equation model:

$$\begin{bmatrix} GDP\ per\ capita \\ M2\ growth \end{bmatrix} = \begin{bmatrix} -1 \\ \lambda_{2it} \end{bmatrix} Informal\ Economy + \varepsilon_{it} \qquad \text{(Eq. 5.18)}$$

The estimations using the MIMIC approach will be able to show what the average size of the informal economy is in the countries of Balkans individually as a percentage of the overall official GDP following the MIMIC model estimation procedures as shown in figure 5.10.1 below. Equipped with this econometric theory, this research will apply a number of specifications to the MIMIC model for measuring the informal economy in the countries of

the Balkan Peninsula. These specifications refer to the casual variables and indicators to be used. Since there are a number of casual variables one could use, then a number of specifications can generate good model fit analysis. For example, Dell'Anno and Schneider (2008), Schneider et al. (2010), Buehn & Schneider (2012), Hassan and Schneider (2016a), and Medina and Schneider (2017) use different MIMIC model specifications – that is different types of casual variables to achieve model fit results for the SEM and then using a benchmark procedure to calibrate the informal economy estimates for each year. They demonstrate the use of their specifications for the MIMIC model dependant on the country's or countries' specific characteristics theoretically. To date, different MIMIC model specifications which are relevant to the countries of Balkan Peninsula have not been employed and tested.

5.10. Benchmarking procedures for the MIMIC model

After the MIMIC regression has been completed, one must use those results to calibrate the size of the informal economy using a benchmarking procedure. There are a number of benchmarking procedures that use an exogenous value of the informal economy as the base year and calibrates the index values generated from the MIMIC results into absolute values of the informal economy converted into percentages. It is preferred that the exogenous base value of the informal economy is taken from the first year of the dataset, in order to understand and capture the dynamics and development of the informal economy across the periods in the dataset (Dell'Anno & Schneider, 2003; Schneider et al., 2010; Buehn & Schneider, 2012).

One benchmarking procedure was initially developed and applied by Giles et al. (2002):

$$\left(\frac{\eta}{\mathrm{GDP}}\right)_{t}^{\mathrm{final}} = \mu \left(\frac{\eta}{\mathrm{GDP}}\right)_{t}^{\mathrm{ordinal}} \qquad \text{(Eq. 5.19)}$$

Where $\left(\frac{\eta}{\mathrm{GDP}}\right)_{\mathrm{t}}^{\mathrm{ordinal}}$ is the value of the MIMIC index of the informal economy per GDP estimated at time t by using SEM expressed in general terms in (equation 5.7), and where $\mu = \frac{\left(\frac{\eta}{\mathrm{GDP}}\right)_{\overline{\mathrm{T}}}^{*}}{\left(\frac{\eta}{\mathrm{GDP}}\right)_{\overline{\mathrm{T}}}^{\mathrm{ordinal}}}$ is constant, while $\overline{\mathrm{T}}$ is used to indicate the base period chosen where there is the exogenous value of the informal economy. $\left(\frac{\eta}{\mathrm{GDP}}\right)_{\overline{\mathrm{T}}}^{*}$ is the size of the informal economy expressed in percentage of the formal GDP estimated by an auxiliary method at the base-period $\overline{\mathrm{T}}$, which usually is the currency demand method.

The second benchmarking procedure is proposed by Dell'Anno and Schneider (2003) by applying an additive constant. Firstly, they estimate the index of the informal economy $\eta_{\mathrm{t}}^{\mathrm{ordinal}}$ by a structural equation of $\Delta\eta_{\mathrm{t}}^{\mathrm{ordinal}} = \hat{\gamma}'\Delta\mathrm{x}_{\mathrm{t}}$. By applying the additive constant of τ, Dell'Anno and Schneider (2003) meet the condition in which the estimated value of the informal economy is equal to the informal economy as a percentage of GDP in the base year as follows:

$$\left(\frac{\eta}{\mathrm{GDP}}\right)_{\overline{\mathrm{T}}}^{*} = \frac{\eta_{\overline{\mathrm{T}}}^{\mathrm{ordinal}} + \tau}{\mathrm{GDP}_{\overline{\mathrm{T}}}} = \frac{\eta_{0}^{\mathrm{ordinal}} + \tau + \hat{\gamma}'(\mathrm{x}_{\mathrm{T}} - \mathrm{x}_{0})}{\mathrm{GDP}_{\overline{\mathrm{T}}}} \qquad \text{(Eq. 5.20)}$$

Where $\hat{\gamma}'$ is the *"vector (of dimension q) of structural coefficients as estimated by the MIMIC model while x_t is the vector of the q-causes observed at time t, GDP is the reference indicator"* (Dell'Anno and Schneider, 2003; p.6-9). Dell'Anno and Schneider (2003) define $\tilde{\tau} = (\tau + \eta_{0}^{\mathrm{ordinal}})$ from which the absolute value of the informal economy is then calculated using

$$\eta_{\mathrm{t}} = \tilde{\tau} + \hat{\gamma}'(\mathrm{x}_{\mathrm{t}} - \mathrm{x}_{0}) \qquad \text{(Eq. 5.21)}$$

The third benchmarking procedure was developed by Bajada and Schneider (2005). They estimate the absolute values of the informal economy using the following calibration method:

$$g_t^{final} = g^*_{\bar{T}} + \hat{\gamma}' \Delta x_t \quad \text{(Eq. 5.22)}$$

Where Bajada and Schneider (2005) choose $g^*_{\bar{T}}$ to meet the condition of $g_{\bar{T}}^{final} = g^*_{\bar{T}} + \hat{\gamma}' \Delta x_T$. While g_t^{final} represents the growth rate of the informal economy, $g_{\bar{T}}^{final}$ is the growth value of the informal economy in the base year that is estimated from a secondary source or auxiliary method.

The fourth model was developed and proposed by Dell'Anno (2007). This benchmark procedure involves transforming the reference indicator variable (which is the formal or official GDP of a country) from absolute to an index value of $GDP_t/GDP_{\bar{T}}$. Following an identification rule of $\lambda_1 = -1$, the index of the informal economy expressed as a percentage of GDP in the base year is linked to the index of Real GDP using a measurement equation of (Dell'Anno, 2007):

$$\frac{GDP_t - GDP_{t-1}}{GDP_{\bar{T}}} = -\frac{\hat{\eta}_t - \hat{\eta}_{t-1}}{GDP_{\bar{T}}} \quad \text{(Eq. 5.23)}$$

While the estimates from the structural equation model are utilised in obtaining the ordinal index values for the latent variable (the informal economy) as follows:

$$\frac{\hat{\eta}_t}{GDP_{\bar{T}}} = \hat{\gamma}' x_t \quad \text{(Eq. 5.24)}$$

A further step to this is the following calculation to generate the size of the informal economy as a percentage of GDP:

$$\frac{\eta_t}{GDP_t} = \frac{\hat{\eta}_t}{GDP_{\bar{T}}} \left[\frac{\eta^*_{\bar{T}}}{GDP_{\bar{T}}} \frac{GDP_{\bar{T}}}{\hat{\eta}_{\bar{T}}} \right] \frac{GDP_{\bar{T}}}{GDP_t} \quad \text{(Eq. 5.25)}$$

Where $\frac{\widehat{\eta}_t}{GDP_{\overline{T}}}$ is the index calculated from equation (5.24), $\frac{\eta^*_{\overline{T}}}{GDP_{\overline{T}}}$ is the exogenous size of the informal economy at the base year $\overline{T}$, $\frac{GDP_{\overline{T}}}{GDP_t}$ converts the index of changes to the base year into a ratio between the informal economy and a country's GDP, and finally the $\frac{\eta_t}{GDP_t}$ indicated the informal economy as a percentage of a country's GDP at a given period of time t.

The fifth or the latest benchmarking procedure is developed by Schneider et al. (2010) and later applied and finalised by Buehn and Schneider (2012). This procedure is applied to calibrate the ordinal estimates into cardinal values and convert this index to percentage units. This procedure, therefore, requires that a prior estimation of a country's informal economy be calculated. The formula is as follows:

$$\eta_{it} = \frac{\tilde{\eta}_{it}}{\tilde{\eta}_{i,\text{the base year}}} \eta^*_{i,\text{the base year}} \qquad \text{(Eq. 5.26)}$$

Where $\tilde{\eta}_t$ denotes the value of the MIMIC index at time t according to SEM expressed in general terms in (equation 5.7), $\tilde{\eta}_{i,\text{the base year}}$ is the value of the MIMIC index in the base year selected for calibration procedure, $\eta^*_{i,\text{the base year}}$ is the exogenous value of the informal economy based on a base year and usually this either is taken as a secondary value from existing literature, or it can be calculated using the currency demand method, and then a base year value used as the benchmark for calculations (Buehn and Schneider 2012, Hassan and Schneider 2016). The subscript of 'i' used in the equation represents individual countries. The application of the method described in equation (5.26) can be used to calculate the absolute values of the informal economy in a given period for a given country.

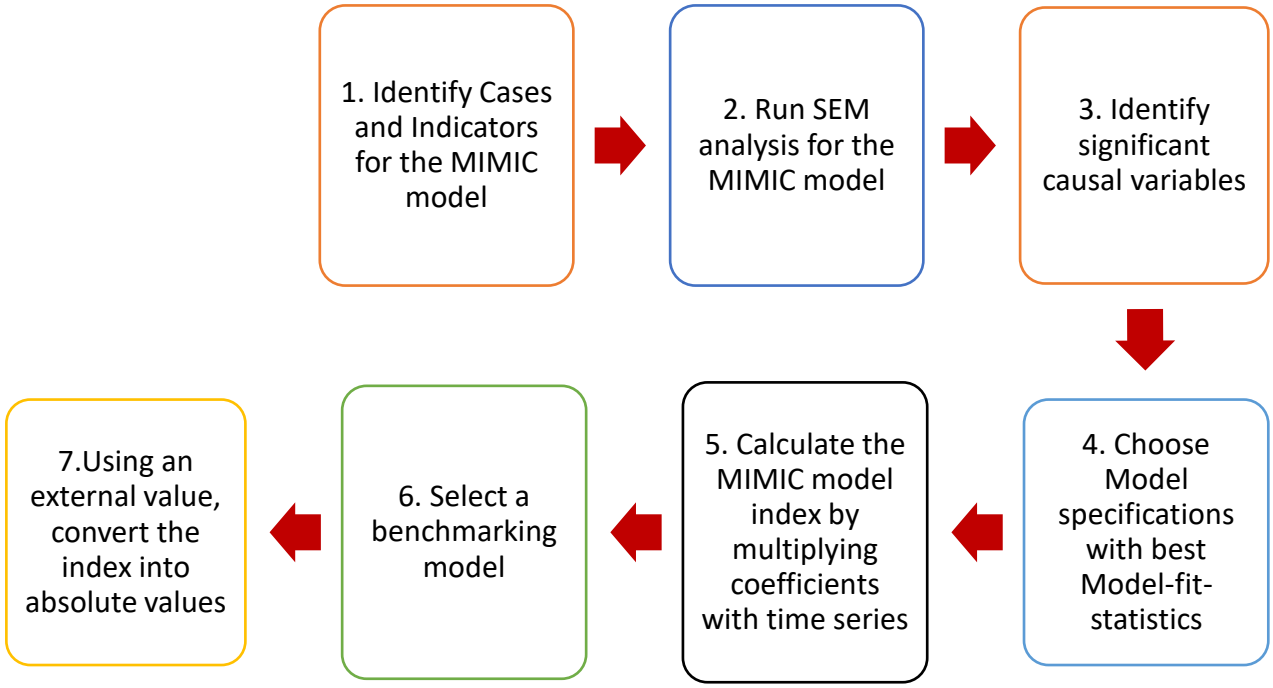
Currently, there does not seem to be any clear consensus in the literature as to which of the above benchmarking procedures, or sometimes referred to as calibration methods, to use in order to calculate the absolute values of the informal economy from the MIMIC results (Buehn and Schneider, 2012). However, the most widely used method is the benchmarking procedure proposed by Buehn and Schneider (2012) following the work by Schneider et al. (2010). Later Hassan and Schneider (2016) also confirm the use of the first benchmarking model as the one that is most widely used in literature because it overcomes the criticism by Breusch (2005) in assigning a monetary unit value from the reference indicator to the unobserved or the latent variable.

Dell'Anno & Schneider (2008) argue that standardisation of any of the benchmark procedures does require thorough experimentation, different comparisons and debate among academics to get a clear understanding of which of the benchmarking methodologies is the most adequate or most reliable to use. One method which has been widely used and less criticised is the one presented by Schneider et al. (2010) and later applied and finalised by Buehn and Schneider (2012) – which has been mathematically expressed in equation (5.26) above. This study will make use of this calibration procedure as presented in equation (5.26).

Whichever model is applied, there are two main estimation and calibration procedures. The first one is that the MIMIC model index of the informal economy has to be calculated using the structural equation, presented and discussed in section 5.8 of this chapter. This is done by multiplying the coefficients of the significant causal variables with the respective time series for each country (Schneider & Enste, 2000; Schneider et al., 2010; Buehn & Schneider, 2012). The second estimation of the calibration procedure is to convert the index into absolute values of the informal economy. In doing so, one has to take a base value for a

particular year (Buehn & Schneider, 2012). Usually, this base value is taken externally from another source, and then the index values are calibrated following the external value and the chosen method. This study will make use of the most cited and known work on the informal economy by Schneider et al., (2010) and Buehn & Schneider, (2012). In diagram 5.10 below, a generalised process for the MIMIC model has been presented.

Figure 5.10. 1 - A generalised process for the MIMIC model. Source: Own work



5.11. MIMIC post-estimation analysis: Testing parameters and model fit statistics

To understand how the model fits the data and by what accuracy of prediction one should test how well the observed covariance matrix for the variables in the MIMIC model matches that which we would expect if the model was an accurate representation of the data. The most basic fit statistic for any path analysis model, SEM analysis model or the MIMIC analysis model is the chi-square statistic (Fornell & Larcker, 1981; Hu & Bentler, 1998, 1999; Byrne, 2011). This is applied in a wide range of statistical test scenarios in order to test whether the

observed variables depart from what is expected under the proposed model. If the chi-square statistic is significant, then this would indicate that the relationships between the variables in the model are significantly different from what we would have expected if the model was an accurate representation (Bollen & Long, 1993). However, when the sample of observations is even moderately significant, differences between the observed and the expected covariance matrices that are small enough to be considered as trivial can cause very significant chi-square statistics (Bollen, 1989; Bollen & Long, 1993; Kaplan, 2008; Kline, 2015).

Hence other indices have been developed to assess the fit of a model. These fit indices use a variety of methods, such as the comparison against the independence model, assessing residuals and errors, and can be classified into two distinct types. One type is the Absolute fit indices, and the other is the incremental fit indices. The absolute fit indices are derived from the fit of the observed and expected covariance matrices and the ML function. Examples of absolute fit indices which are mainly used include the AGFI[74], MC, Hoelter's CN[75], AIC, BIC, ECVI, RMR, SRMR, and RMSEA[76] (Hu & Bentler, 1999).

Incremental fit indices compare a chi-square for the model tested with the chi-square from the so-called null model (also called a baseline or independence model). The null model specifies that all observed variables are uncorrelated (there are no latent variables). Most of

[74] AGFI = Adjusted Goodness of Fit Index, MC=McDonald's Centrality Index; AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion, ECVI = Expected cross validation index, SRMR = standardized root mean squared residual; RMR = root mean squared residual.

[75] Hoelter's CN = Hoelter's Critical N, is defined as the largest sample size for which one would accept the hypothesis for a model to be correct. Hoelter (1983) uses .05 level to be considered as significant in determining the critical N.

[76] The Root Mean Squared Error of Approximation (RMSE) is the square root of the variance of the residuals. It shows how closely the predicted values of the model are to the observed data points. In other words, this shows the absolute fit of the proposed model in relation to the data. Currently, the RMSEA is the most used measure of model fit and majority of papers using SEM, CFA or MIMIC models report it. The closer to 0.00 this ratio is the better and more significant is the model fit (Schneider, 2006, 2007; Dell'Anno, 2007; Vuletin, 2008; Abdih & Medina, 2013; Elshamy, 2015). MacCallum et al. (1996) have used 0.01, 0.05, and 0.08 to indicate excellent, good, and mediocre fit, respectively.

these incremental fit indices are computed by using ratios of the model chi-square and the null model chi-square and the degrees of freedom for the models and take values ranging between 0 and 1 approximately. Examples of such fit indices which are also used the most are the IFI, CFI, TLI, RNI and the NFI[77] (Hu & Bentler, 1999).

There has been much research regarding which fit indices to use and the suitable cut-off levels for each fit index which indicate a good fitting model. Hu & Bentler (1999) examine various cut offs for many of the indices highlighted above and concluded that although it is difficult to designate a specific cut-off value for each fit index because it does not work equally well with various conditions, a cut-off value close to 0.95 for the ML – based TLI, IFI, CFI, RNI, and Gamma Hat; a cut off value close to 0.90 for MC; a cut off value close to 0.08 for SRMR; and a cut off value close to 0.06 for RMSEA[78] which result in lower Type II error rates. They also suggest that to minimise Type I and Type II errors, one should make use of a combination of one incremental fit index (typically the CFI is used, with a value of > 0.95, indicating a good model), alongside one of the absolute fit indexes such as the SRMR or the RMSEA, indicating a good fitted model of <0.08 or <0.06, respectively (Hu & Bentler, 1999).

Further analysis regarding the model fit and the analysis of hypothesis for each variable contributing to the latent variable are the coefficients, their signs and their z scores or values as well as the p-values for those z-scores. High, low or negative Z scores, accompanying small p-values, are usually found in the tails of a normal distribution (Gujarati, 2009). Thus, the

77 TLI =Tucker-Lewis Index; NFI = Non-normed Fit Index; IFI = Incremental Fit Index; RNI = Relative Noncentrality Index; CFI = Comparative Fit Index

[78] Therefore, a model with RMSEA above 0.10 is mainly considered as a poor fit. The RMSEA reported above indicates a value greater than 0.10, and as such the overall model fit is poor. This is supported by the p close value which tests the correctness of RMSEA. Other measures of goodness of model fit, are also large as seen above, such as the chi-square, AIC, BIC, CFI, TLI and the SRMR. However, this can be justified by a small sample of data. In order to increase the number of cases, this research will be considering adding more countries to this research.

higher the z scores in absolute values, the better as we can accept the hypothesis that a variable predicts the latent variable, or the latent variable effects the indicator variables. Coefficients on the other hand matter in terms of analysing the impact of variables on the latent variable and their sign matters in accordance with the hypothesis mentioned in section 5.13 below. The path coefficients presented above indicate the impact of each of the causes and indicators to the latent variable and the direction of it.

R-squared is also measured in testing the model fit. R-squared measures statistically how close the data is to the fitted regression line. When running multiple regression (such as SEM) it is also called the coefficient of determination (CD), or the coefficient of multiple determination. However, this percentage can be increased by simply adding more predictors or variables as causes and indicators (Hair et al., 2016). Table 5.11.1 below includes the good fitting values and the acceptable values for some of the most commonly used fit indices for SEM models.

Table 5.11. 1 - Selected Goodness of Fit indices for model assessment (Source: Hu & Bentler, 1999; Bollen & Long, 1993)

Index Type	Index Name	Good Fitting	Acceptable Value
Incremental Fit Indices	CFI[79]	≥ 0.97	≥ 0.90
	TLI[80]	≥ 0.97	≥ 0.90
Absolute Fit Indices	RMSEA[81]	≤ 0.05	≤ 0.08
	SRMR	≤ 0.05	≤ 0.08
	MC	≥ 0.90	≥ 0.90
R-squared	CD	≥ 0.90	≥ 0.90

[79] Also known as Noncentrality-based Indices
[80] Also known as Relative Fit Indices
[81] Also known as Noncentrality-based Indices

5.12. Running robust analysis for SEM

Before conducting the MIMIC regression, we must test the panel data for normality (Hassan and Schneider, 2016a, 2016b; Aydin, 2017). Normality[82] is considered as a potential problem by some since it is an essential assumption required to perform SEM analysis (Byrne, 2010). In order to test for normality and subsequently for stationarity in variables, we must conduct unit root tests[83] (Breusch, 2005a, 2006; Dell'Anno & Schneider, 2003). Majority of social sciences data often have a non-normal distribution (Barnes et al., 2001) and one must be able to account for such non-normality. Bollen (1989; p. 108), Marsh et al. (2004; p. 275-300) and Diamantopoulos et al. (2000; p. 57) suggest that the ML estimator used in SEM *"is considered relatively robust to violations of normality assumptions".* Furthermore, the Monte-Carlo experiments by Reinartz et al. (2009) could not find any significant differences in the results produced by SEM analysis using the ML methodology with different size samples which had different kurtosis and skewness levels.

Additionally, two additional checks for the panel data must be performed. Firstly, before performing any MIMIC or SEM analysis, assumptions of multivariate normality must be considered. Secondly, SEM is based on the covariance matrix, and covariance can be less stable for small samples (Aydin, 2017, p.19), and therefore the sample size can strongly influence the chi-square statistic, and as such we must use robust regression analysis for the

[82] For data to meet the condition of Normality, its distribution must be normally distributed with a mean value of zero, a standard deviation of 1 and a symmetric bell-shaped curve. To check for normality, one could check for the skewness and kurtosis in variables. For skewness, the value must be between -1 and +1 for a normal distribution, whereas for kurtosis; the value must be between a range of ±3 for a normal distribution. Values for skewness and kurtosis are provided in appendix

[83] In the Results and Analysis chapter, the results of the two most commonly used panel data unit root tests will be displayed and analysed.

MIMIC model. Such checks and analysis can be performed using STATA 14 software. STATA 14 can accommodate any violations regarding sample size and normality in variables.

To relax the assumption of multivariate normality, STATA 14 SEM module allows for the use of the Satorra-Bentler option in order to improve the chi-square statistic of the goodness of fit in case of non-normal and non-stationary variables (Satorra & Bentler, 1994). This option is used along with the Maximum Likelihood (ML) estimation and has been applied in several other studies such as Dell'Anno (2007), Dell'Anno et al. (2007), Hassan and Schneider (2016b), and Aydin (2017).

The likelihood-ratio test comparing the estimated model to the saturated model is derived under the assumption that the observed variables (which in this case are the variables used for the causes and the indicators) in the MIMIC model are normally distributed (Satorra & Bentler, 1994). If they are not normally distributed, then the likelihood-ratio test is not appropriate. Satorra-Bentler scaled chi-squared is robust with variables which are not normally distributed. This also means that other goodness of fit statistics (such as the RMSEA, CFI and TLI) will also be robust to non-normality in variables because the same adjustment that provides the Satorra-Bentler scaled chi-squared test also derive the other goodness-of-fit statistics.

A furtherrobust regression is to check for heteroscedasticity of the errors. STATA 14 provides the option of computing the Huber-White robust estimates of the standard errors. The variance-covariance estimation obtained using the Huber-White robust test is valid if the errors are independently distributed. It is not required that the errors follow a normal

distribution, nor is it required that they are identically distributed from one observation to the next[84].

In order to control for small samples when running SEM or MIMIC regressions, one can use Swain scaling factor (Antonakis & Bastardoz, 2013). This option is also available in STATA 14 SEM module, and it is used to correct for the chi-square statistic in small samples and complex models. Such option was used by Johnson et al. (1997) and Hassan & Schneider (2016a, 2016b). Swain corrects the chi-square *"likelihood ratio test of fit for SEM models with or without latent variables"* (Herzog et al., 2007; 363-365). *"The chi-square statistic is asymptotically correct; but it does not behave as expected with small samples and when the model is complex"* (Herzog et al., 2007; 363-378). In reaching an improved *"approximation for the distribution of the chi-square statistic, Swain (1975) developed a scaling factor, which converges to 1 asymptotically, and is multiplied with the chi-square statistic"* (Herzog et al., 2007; 363-378). Such correction is a *"closer approximations of the chi-square distribution, resulting in more appropriate Type 1 reject error rates"* (Antonakis & Bastardoz, 2013; p. 141).

5.13. Fixing a reference variable

In the MIMIC regression estimation for the model, an indicator variable needs to be fixed and used as a reference variable (Dell'Anno et al., 2007). This is required in order to set unit of measurement for the informal economy, as it is an unobserved or latent variable. Dell'Anno (2007) and Hassan & Schneider (2016a, 2016b) use either GDP per capita or GDP growth as their reference variable by fixing the value of it to -1. According to Dell'Anno (2003, 2007), the choice for the value of the reference variable is limited *"between two alternatives (+1 or*

[84] STATA 14 Manual, available from https://www.stata.com/manuals14/semintro8.pdf[84], last accessed 13.12.2017

-1) because, by using a unitary base for normalisation, the estimated coefficients are more easily comparable" (Dell'Anno, 2007; p.262). Dell'Anno (2003, 2007) and Hassan & Schneider (2016a, 2016b) use a strategy called *reductio ad absurdum* to determine the sign of the value based on the theoretical assumptions regarding the relationship between the exogenous variables and the latent variable, which is the informal economy.

According to Dell'Anno (2007, p.260), in the MIMIC model…

> "*…the vector of structural coefficients is proportional to the coefficient of scale, when the sign of* λ_1*is changed, the structural parameters* λ_q *of the causes change from positive to negative (and vice versa) keeping the same absolute values"* (Dell'Anno, 2007; p.260).

Based on this…

> "*…if the signs of the coefficients from the regression linking the latent variable with its causes are different from known theories and empirical studies in one case (e.g.,* λ_1*= +1) ...then the hypothesis supporting the opposite sign for the relationships between shadow economy and reference variable should be accepted as more rational"* (Dell'Anno, 2007, p.260).

The existing literature currently does not give a definitive view regarding the sign of the relationship between the formal and the informal economy (Dell'Anno, 2007). For example, different empirical studies tend to provide contrasting answers to whether an economic downturn in the formal or official economy (which could lead to a rise in the rate of unemployment) is going to drive more people to enter the informal economy, or whether the reduction in GDP during an economic downturn would reduce the demand for goods and

services produced in the informal economy. Adam & Ginsburgh (1985) for Belgium, Giles et al. (2002) for Canada, Schneider et al. (2003) for Asian countries, find a positive relationship between the informal economy and the formal economy, while on the other hand, Loayza (1996) for 14 Latin America countries, Kaufmann & Kaliberda (1996) for Transition countries, Eilat & Zinnes (2000) for transition countries, Schneider & Enste (2000) for 76 Countries, Dell'Anno (2003; 2007) for Italy and Spain, France and Greece, respectively, find a negative relationship. Furthermore, Schneider (2005) estimation and analysis shows a negative relationship for transition and developing countries but a positive relationship in developed countries.

5.14. Potential Endogeneity Problem

There are endogeneity concerns regarding the use of GDP or related variables as cause and indicators in the MIMIC model. Surprisingly, the endogeneity problem is not addressed in majority of the existing literature which makes use of GDP, GDP per capita or GDP growth in their model. One exception is the study by Medina & Schneider (2018) which make use of the Night Lights intensity approach suggested by Henderson et al. (2012). This approach uses data on light intensity from outer space as a proxy of economic growth of countries, instead of GDP related variables. However, such data for the countries of the Balkan Peninsula does not exist for the time period of this research. Furthermore, this method seems to neglect the fact that some economic activity does take place in the absence of additional light, especially in rural areas. Countries of the Balkan Peninsula are more dependent on rural economic activities, such as agriculture, when compared to other European countries, for example, and as such this approach could underestimate the level of the informal economy in the country.

Another methodology suggested by Medina & Schneider (2018) is the Predictive Mean Matching procedure. This methodology treats the informal economy as missing, and then using some available estimates of the informal economy from surveys for some countries, computes the missing values for the rest of sample. The immediate problem with this is the lack of survey data for the countries in question for the time period of this research, and that the nature of institutional, political, economic and social differences in these countries could potentially result in under or over computation of missing values for the informal economy.

One could also exclude the use of GDP related variables as causes and indicators completely from the MIMIC model and test the robustness of the model results. However, it has to be noted here that the characteristics of the countries chosen is a major factor when dealing with the endogeneity problem. Countries of the Balkan Peninsula are faced with a large informal economy. Previous studies indicate that the informal economy in the countries part of this research is on average over 30 percent of GDP. The size of the informal economy directly impacts the level of GDP, rather than GDP having an impact in the level of informal economy. Exogenous causal factors such as the rule of law, burden of government regulations, level of agriculture and people's attitude towards their institutions and government are much greater causes than the level of GDP growth. GDP growth or related variables could potentially play only a marginal role in causing the informal economy; rather they are reflections of large informal economy.

5.15. Excepted results and hypothesis for each variable

Expected results for each variable to be used in the MIMIC regressions have been provided below, along with the expected sign for the causality in coefficients in relation to the literature review discussed in section 2.4, 3.5 and 5.6.

Table 5.15. 1 - Expected results and hypothesis for each variable

Definition and expected sign	Hypothesis[85]
Business Freedom index ***Expected Sign Negative***	Hypothesis 1: The higher is the index of business freedom, the lower would the size of the informal economy be, ceteris paribus.
Tax Revenue (% of GDP) ***Expected Sign Positive***	Hypothesis 1: The higher the level of taxation in a country, the higher the size of the informal economy, ceteris paribus.
Government spending Index ***Expected sign Positive***	Hypothesis 3: The higher the government spending or expenditure, the higher the size of the government and the size of the informal economy, ceteris paribus.
Government Effectiveness Index ***Expected sign Negative***	Hypothesis 4: The better the quality of democratic institutions, the smaller the size of the informal economy is, ceteris paribus.
Rule of Law Index ***Expected sign Negative***	Hypothesis 5: The better the quality of democratic institutions, the smaller the size of the informal economy is, ceteris paribus.
Control of Corruption ***Expected sign Negative***	Hypothesis 6: The greater the control for corruption is in a country, the lower will corruption be and as such the lower the size of the informal economy. Several studies, discussed in the literature review, have indicated that there is a positive relationship between the corruption level and the size of economic informality. Therefore, the lower the corruption level is in a country and the greater the government integrity, the smaller the size of the informal economy, ceteris paribus.
Government Integrity index ***Expected sign Negative***	Hypothesis 7: The lack of government integrity caused by practices of systemic corruption of government institutions such as bribery, extortion, nepotism, cronyism, patronage, embezzlement, and graft[86], reduces economic vitality by increasing costs and shifting resources into unproductive activities, and

[85] Definition and explanation of the variables has been used exactly as indicated by the respective sources of it. For HFD, explanation of variables is taken from http://www.heritage.org/index/book/methodology. For WBDI variables have been defined and explained using https://data.worldbank.org/data-catalog/world-development-indicators, and for WGI variables are explained using http://info.worldbank.org/governance/wgi/#home.
[86] Ibid

	increases economic informality, ceteris paribus. The higher this index is, the lower the size of the informal economy, ceteris paribus.
Unemployment Rate ***Expected sign Positive***	Hypothesis 8: The higher the unemployment, the larger the size of the informal economy is, ceteris paribus.
Employment to Population Ratio ***Expected sign Negative***	Hypothesis 9: The higher the employment to population ratio is, the lower the size of the informal economy is, ceteris paribus.
Monetary Freedom Index ***Expected sign Negative***	Hypothesis 10: The more stable and less volatile are prices, coupled with minimum government intervention in a free market system, the smaller will be the size of the informal economy, ceteris paribus.
Financial Freedom Index ***Expected sign Negative***	Hypothesis 11: The higher the financial freedom index, the lower the size of the informal economy is expected to be, ceteris paribus.
Agriculture, value added (percentage of GDP) ***Expected sign Positive***	Hypothesis 12: The more dominant the agriculture sector, the larger the size of the informal economy is, ceteris paribus.
Degree of Urbanisation ***Expected sign Negative***	Hypothesis 13: The higher the size of the urban population relative to rural population, the smaller the size of the informal economy, ceteris paribus.
Inflation, GDP deflator ***Expected sign Positive***	Hypothesis 14: The more stable and less volatile prices are, the smaller will be the size of the informal economy, ceteris paribus.
GDP per Capita, PPP[87] ***Expected sign Negative***	Hypothesis 15: The larger the size of the informal economy, the lower the GDP is, ceteris paribus.
Labour Force Participation ratio ***Expected sign Negative***	Hypothesis 16: the more significant the informal economy, the lower total employment is, ceteris paribus.
Money and quasi money (M2) growth rate ***Expected sign Positive***	Hypothesis 17: The larger the size of the informal economy, the larger the size of M2 is, ceteris paribus
Electric power consumption (kWh per capita) ***Expected sign Positive***	Hypothesis 18: The larger the size of the informal economy, the higher the electric consumption per capita, ceteris paribus

5.16. Ethical considerations

The data to be used in this research will be of secondary nature and as such this research does not involve human participation via surveys, interviews or questionnaires. The data used in

[87] Based on Purchasing Power Parity

this research is public data accessible to all and that the research draws upon adequate record keeping, proper storage of data in line with confidentiality, statute, and University policy. All references will be made to highlight where the data came from. The research has been carried out rigorously and professionally, and due credit has been attributed to all parties involved. Proper acknowledgement has been given to the authorship of data and ideas by referencing all literature used. There are no financial and professional conflicts of interest by engaging in this research. Furthermore, in line with University regulation, proper consideration has been given to all ethical issues, and appropriate approval sought and received from all relevant stakeholders. In general, all the procedures regarding ethical issues of the university have been followed in accordance with the Ethical Procedures, Good Research Practice & Research Misconduct.

5.17. Conclusion

Measuring the size of the informal economy can be a challenging task, and at the same time can produce different estimates depending on the causes and indicators used in the MIMIC model. The results tend to vary based on the adoption of the method for measuring the informal economy. This methodology is based on the use of the MIMIC model, which is a special case of SEM, to measure the size and development of the informal economy in the countries of the Balkan Peninsula. The methodology does provide some contribution to the existing literature in that it uses well-justified enforcement variables as the leading causes of informality for this region. This methodology also shows ways to overcome some of the problems with the panel data samples. Finally, this methodology will be applied for the first time for the ten Balkan countries.

Chapter 6: Results and Analysis

6.1. Introduction

This chapter presents the estimation results of the size and development of the informal economy for ten Balkan countries and provides analysis on the size and the development of the informal economy in these countries. It will also evaluate the primary drivers of economic informality in these countries, which will then be used to justify a number of policy recommendations. The chapter will begin by providing some descriptive statistics for the main variables used in the model, and other statistical tests to ensure that the data is reliable for regression. The model results along with the use of the benchmarking procedure will be provided in this chapter, as well as estimation results on the size of the informal economy from 1996 to 2014 for the ten Balkan countries.

6.2. Summary of data collection

The dataset is comprised of 10 panels (countries) and 19 periods (years). Therefore, in total, there are 190 observations. Countries parts of this investigation are the Balkan Peninsula countries (Albania, Greece, Slovenia, Turkey, Romania, Bulgaria, Bosnia and Herzegovina, Serbia, and FYR Macedonia) and the period of study is from 1996 to 2014.

Determining sample size requirements for SEM (and for MIMIC) is a challenge. Flexibility is a key advantage of SEM, allowing for the examination of complex relations, and the use of different types of data. SEM also allows forcomparisons across other alternative models (Wolf et al., 2013[88]). But this very flexibility of SEM makes it challenging to develop generalised

[88] Available online at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4334479/ (last accessed on 21.12.2018)

requirements and guidelines with regards to the sample size (MacCallum et al., 1996). Despite this, various rules-of-thumb have been developed, such as Boomsma (1985), proposing a minimum sample size of at least 100 or 200 observations ; Bentler & Chou (1987) and Bollen (1989) arguing that a sample size of 5 or 10 observations per estimated parameter should be the minimum norm; or the proposed minimum sample size requirement by Bollen (1989) indicating that the sample size for SEM analysis should ecompass at least 10 cases per variable. These minimum requirement rules or proposals, however, are not specific to the model one applies which could potentially result in either overestimation or underestimation of sample size requirements. It is demonstrated that:

> *"….model characteristics such as the level of communality across the variables, sample size, and degree of factor determinacy all affect the accuracy of the parameter estimates and model fit statistics, which raises doubts about applying sample size rules-of-thumb to a specific SEM"* (Wolf et al., 2013[89]; Online; MacCallum et al., 1996; p.130-149).

In light of the above, the number of observations in this study comply with the studies referenced above.

In ensuring robustness, this study has used the Swain scaling factor option in STATA as explained and discussed in section 5.12 in the methodology chapter. Furthermore, in order to relax the assumption of multivariate normality, this study has made use of the Satorra-Bentler option in STATA 14 SEM module, which improves the chi-square statistic of the goodness of fit in case of non-normal variables (Satorra & Bentler, 1994).

[89] Available online at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4334479/ (last accessed on 21.12.2018)

6.3. Descriptive Statistics

Table 6.3.1 below shows the descriptive statistics for the variables used in the regression estimation as causes and indicators of the latent variable. Different MIMIC model specifications have been generated and have made use of the variables below. A total number of observations for this study was 190, where the number of countries was 10 (i.e. N=10) and the number of time periods was 19 (i.e. T=19). The choice of period coverage was constrained by the availability and completeness of data, as well as the interest in researching these ten Balkan countries.

The table below shows a significant deviation from the mean for GDP per capita and Electricity Consumption, which can be explained due to differences among countries used in the data sample (inclusion Balkan countries). Inflation and M2 money growth variables also show relatively high standard deviation, and again the differences can be justified with the inclusion of different Balkan countries within the same sample.

It is also interesting to note from these descriptive statistics the difference between the maximum and minimum values for Business Freedom Index, Monetary Freedom Index, Government Effectiveness Index and Financial Freedom Index. These indexes measure the level of economic freedom in 186 countries worldwide provided by the Heritage Foundation. The maximum and minimum value differences are also partly due to the inclusion of transition and EU countries of the Balkan Peninsula into one sample. The index of Economic freedom has improved for most of the Balkan countries, as it has been discussed in detail in chapter 5. Appendix 6.3.1 provides descriptive statistics for the overall sample for each country from 1996 to 2014.

Apart from simple descriptive statistics provided below, this thesis has also performed other analysis on the data, such as tests of multicollinearity and unit root tests.

Table 6.3. 1 - Descriptive Statistics for all variables

Variable Description[90]	Obs	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis
Business Freedom Index	190	63.53	11.09	40.00	85.40	-0.08	2.50
Monetary Freedom Index	190	67.01	19.86	0.00	90.70	-1.74	5.59
Degree of Urbanisation	190	57.18	10.69	39.16	77.68	0.12	2.22
Government Spending Index	190	52.35	18.04	0.00	89.20	-0.54	2.87
Government Effectiveness Index	190	-0.01	0.57	-1.26	1.19	0.15	2.17
Agriculture Sector Dominance	190	10.54	6.66	1.89	37.48	1.17	4.36
Unemployment Rate	190	15.33	8.69	4.40	37.30	0.95	2.75
Control of Corruption	190	-0.16	0.53	-1.12	1.32	0.76	3.40
Government Integrity Index	190	35.58	13.64	10.00	76.80	0.16	3.26
Financial Freedom Index	190	52.84	13.19	10.00	78.57	-0.53	3.21
Rule of Law Index	190	-0.10	0.59	-1.34	1.22	0.33	2.73
Taxation Revenues (% of GDP)	190	18.59	5.20	0.23	35.76	-2.03	9.09
Inflation (GDP deflator)	190	16.62	72.06	-17.06	958.65	11.93	155.50
Employment to Population Ratio	190	45.57	7.16	29.60	62.70	-0.20	2.53
GDP per Capita (PPP)	190	14925.40	7069.26	3481.71	32073.96	0.70	2.54
Electricity Consumption	190	3497.20	1478.28	680.69	7137.82	0.46	2.65
Ratio of M1 over M2	190	0.43	0.16	0.11	0.88	0.08	2.79
Labour Force Participation Rate	190	62.51	5.84	49.20	71.90	-0.79	2.77
M2 money growth rate	190	23.24	34.53	-14.56	351.45	5.45	46.32

In appendix 6.3.2, histograms for all the variables have been provided. These histograms summarise the data graphically for the density from a normal and kernel distribution perspective. Most of the variables have a relatively normal distribution, such as that of Business Freedom Index, Government Effectiveness Index, Tax Revenue (as a percentage of GDP), Employment to population ratio, and the M1 over M2 ratio. A right-skewed distribution can be found in the Agriculture Sector Dominance variable, the Unemployment rate, GDP per capita and the M2 money growth, while a left-skewed distribution is found in Monetary

[90] Full description of each variable has been provided in section 5.7 of chapter five.

Freedom Index and the Government Spending index. A double-peaked or bimodal distribution is found in the Degree of Urbanisation variable, Control of Corruption, Rule of Law Index, and the labour force participation ratio. For non-normal distribution in some variables, all MIMIC regressions for all the specifications shown in section 6.4 below have made use of Satorra-Bentler option as well as the Robust option in STATA (discussed in section 5.12 of the methodology chapter).

6.3.1. Multicollinearity

Collinearity is a term that refers to two explanatory variables being perfectly (or close to perfect) linear combinations of each other[91]. Thus, two variables can be described as perfectly collinear if the correlation statistic is exactly 1 or -1 (Gujarati, 2009). Close to these ranges, the two variables can be classified as near perfect linear relationship and collinear. When we include more than two explanatory variables and they tend to have features described above, then that is referred to as multicollinearity. If the level of multicollinearity increases between variables used in the same sample, the coefficient estimates from a regression or SEM analysis could become unbalanced with potentially inflated coefficients of the standard errors (Gujarati, 2009). Therefore, detecting multicollinearity in variables is essential.

Appendix 6.3.3 shows the correlation matrix corresponding to variance matrix for the variables used in the MIMIC specifications. According to the results, there does not seem to be a significant problem of multicollinearity. The results indicate a significant positive correlation between the Rule of Law Index and Control of Corruption, as well as Government Effectiveness Index. There is a significant negative correlation between the rate of

[91] Conversely, if there is no relationship between two or more variables, they are classified as orthogonal.

unemployment and the employment to population ratio. Variables with significant correlations have not been used in the same regression.

A further check for multicollinearity has been performed in STATA using the "_rmcoll" command. This command will omit or remove any variables due to collinearity/multicollinearity. When this command was applied to all the MIMIC specifications, no variable was removed or omitted, indicating that there is no multicollinearity on the used variables.

6.3.2. Unit root tests

Unit root for panel data analysis has been conducted in STATA and eViews in order to check for stationarity of the data and to check whether the assumption about multi-variate normality is not violated. Helberger and Knepel (1988) claim that MIMIC estimations can result in unbalanced coefficients being estimated concerning any changes to the size of a sample and the use of alternative specifications of the MIMIC model. However, if data are stationary and normally distributed then the instability disappears asymptotically (Dell'Anno, 2003).

The stationarity of a series strongly influences its behaviour and properties. Further to this in case of spurious regression, *"…if two variables are trending over time, regression of one on the other could have a high R^2 even if the two are completely unrelated"* (Brooks, 2014; p.354). In cases where the variables used in the regression models (and this includes SEM analysis) are non-stationary, *"…then it can be proved that the standard assumptions for asymptotic analysis will not be valid"* (Brooks, 2014; p.354). This means that *"…the usual "t-ratios" will not follow a t-distribution, so we cannot validly undertake hypothesis tests about the regression parameters"* (Brooks, 2014; p.354-355). Several macroeconomic and financial data

in the form of time series tend to exhibit some trending movement or non-stationarity in their mean. For instance, security prices, macroeconomic indicators and aggregates such as the real GDP, as well as exchange rates are some examples of variables which exhibit trends in their behaviour. Thus, it is important to undertake such unit root tests for this dataset, as this dataset encompasses some macroeconomic variables in it, such as the GDP growth, unemployment figures, inflation, taxation and money circulation. Having said this, for SEM regressions, such tests are not a pre-requisite and are not initial assumptions made about data (Ciraki, 2007; Kline, 2015).

STATA[92] implements a number of tests for unit roots or stationarity in panel datasets such as the Levin–Lin–Chu (2002), Harris and Tzavalis (1999), Breitung and Das (2005), Im–Pesaran–Shin (2003), and Fisher-type tests (Choi, 2001), which have as the null hypothesis that all the panels contain a unit root. The Hadri (2000) Lagrange multiplier (LM) test, on the other hand, has the null hypothesis that all the panels are (trend) stationary. eViews also performs some well-known unit root tests for panel data, such as the Im–Pesaran–Shin (2003) and Maddala & Wu (1999).

These tests make different asymptotic assumptions about the number of panels and time periods in each panel. Most of the tests assume that the panel dataset is balanced, except for the Im–Pesaran–Shin and Fisher-type tests which can allow unbalanced panels to be tested. Each of the tests above has their advantages and disadvantages as described in Tzavalis (2002), Hall and Mairesse (2002) and the papers highlighted above, as well as detailed discussion provided by Baltagi (2008, p.6), Hsiao (2003) and Arellano (2003).

[92] As per STATA's website available at: https://www.stata.com/features/overview/panel-data-unit-root-tests/ Last accessed on 23.12.2018)

The test by Levin–Lin–Chu (2002) performs well when the number of panels lies between 10 and 250 and when the number of periods lies between 5 and 250. If the number of periods is minimal, the test will be undersized and will have low statistical power. The dataset for this study has ten panels and 19 periods (i.e. N=10 and T=19) (Hsiao, 2003; Arellano, 2003). It is also important to mention that this test depends on the independence assumption across cross-sections and it is not applicable if the cross-sectional correlation is present.

The Im–Pesaran–Shin (2003) test tends to perform better than Levin-Lin-Chu test with small samples according to Monto Carlo simulations (Hsiao, 2003; Arellano, 2003). However, if the number of panels is very large or small relative to the number of periods, then both Im-Pesaran-Shin and Levin-Lin-Chu tests show size distortions, implying that the null is rejected too often. This is not the case for this sample as N is 10 and T is 19. Therefore, this study has made use of the Im–Pesaran–Shin (2003) test.

Similarly, this study has also run the first-generation test by Maddala and Wu (1999). Maddala and Wu (1999) proposed the use of the Fisher test which is mainly based on combining the p-values of the test-statistic for a unit root in each of the cross-sectional units. The main advantage of this test is that it does not require a balanced panel and that T can differ over cross-sections (Hoang and McNown, 2006).

The results provided in Appendix 6.3.4 show the test statistics for the unit root using the following two tests: Im–Pesaran–Shin (2003) and Maddala and Wu (1999). The results from the Im–Pesaran–Shin (2003) indicate that most of the variables used do not contain unit root and that the panels are stationary. There are some variables however that do contain a unit root, but not for their first differences or when data is converted in growth rates. Maddala

and Wu (1999) test come to a similar conclusion as the test by Im–Pesaran–Shin (2003) with regards to the data sample used in this study. This study has applied the Satorra & Bentler, (1994) option from STATA to accommodate for those variables which are non-stationary as discussed in section 5.12 of the methodology chapter.

6.4. Running the model and analysis

SEM analysis have been conducted using equation (5.5) and (5.6) outlined in chapter five. These analyses have been performed using STATA 14 package, in which SEM is an integrated option. Table 6.4.1 below shows the selected MIMIC specifications for the benchmarking procedure, to convert the MIMIC model indexes into absolute value for the size of the informal economy for the ten countries of the Balkan Peninsula. These three MIMIC specifications were chosen for the benchmarking procedure as they are associated with the best model fit statistics as shown in section 6.5 of this chapter.

MIMIC specification 1, uses six causes and two indicators in the model analysis. The six causes used for this specification are the Business Freedom Index, Degree of Urbanisation, Government Effectiveness Index, Monetary Freedom Index, Government Spending Index and Financial Freedom Index. The two indicators used in the analysis are the GDP per capita and the Electric Power consumption. The reference indicator variable which has been constrained to -1 is the GDP per capita, in line with the justification provided in section 5.13 of the methodology chapter.

MIMIC specification 2 is also a 6-1-2 model, which makes use of six causes and two indicators in the SEM analysis. The six causes used for this specification similar to MIMIC Specification 1 except the use of Control of Corruption variable instead of the Financial Freedom Index. MIMIC specification 3, similar to other two specifications, also uses six causes and two

indicators in the model analysis. Instead of the Control of Corruption or the Financial Freedom Index, this specification makes use of the Employment to Population Ratio, for the reasons provided in section 5.6 of the methodology chapter.

All the MIMIC regressions have been run using the robust options available for SEM. Those robust model analyses have been discussed in section 5.12, of the methodology chapter. In order to relax the assumption of multivariate normality, this study makes use of the Satorra-Bentler option to improve the chi-square statistic of the goodness of fit in case of non-normal and non-stationary variables (Satorra & Bentler, 1994). This option was crucial here because histograms and the panel unit root tests reveal that some variables are not normally distributed and are non-stationary. The regressions are also robust to heteroscedasticity. Furthermore, to control for small samples when running SEM or MIMIC models, this study has made use of the Swain scaling factor (Antonakis & Bastardoz, 2013).

Table 6.4. 1 - Selected MIMIC Specifications for benchmarking procedure

Selected MIMIC Specifications for benchmarking procedure		
MIMIC (6-1-2)	**MIMIC (6-1-2)**	**MIMIC (6-1-2)**
Specification 1	**Specification 2**	**Specification 3**
Causal variables	***Causal variables***	***Causal variables***
- -	- -	Employment to Population ratio
Business Freedom Index	Business Freedom Index	Business Freedom Index
Degree of Urbanisation	Degree of Urbanisation	Degree of Urbanisation
Government Effectiveness Index	Government Effectiveness Index	Government Effectiveness Index
Monetary Freedom Index	Monetary Freedom Index	Monetary Freedom Index
Government Spending Index	Government Spending Index	Government Spending Index

Financial Freedom Index	Control of Corruption	- -
Indicator variables	***Indicator variables***	***Indicator variables***
GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)
Electric Power Consumption	Electric Power Consumption	Electric Power Consumption

The analyses for the MIMIC specification have generated path coefficients which indicate the impact of each of the causes and indicators of the latent variable and the direction of it. The use of these variables for the MIMIC model analysis is supported by literature (Schneider, 2006, 2007a; Dell'Anno, 2007; Vuletin, 2008; Schneider et al., 2010; Abdih & Medina, 2013; Hassan & Schneider, 2016a, 2016b; Bitzenis et al., 12016; Medina & Schneider, 2017; and many others discussed in the literature review chapter). The use of these variables in the MIMIC model analysis, justified in the methodology chapter[93], is also supported by the statistics they produce and by the chi-square and the model fit statistics. Tables 6.4.2 and 6.4.3 below show all MIMIC specifications that have been run for analysis. All MIMIC specifications below show significant coefficients with correct signs on the direction of the causality of each variable. Model fit statistics for each of the MIMIC specifications have been provided in section 6.5 of this chapter.

[93] A justification for the use of variables for MIMIC specifications has been provided in section 5.6. of the methodology chapter. A discussion of previous studies that have made use of similar variables as causes and indicators has been listed in Appendix 3.5.1 and discussed in some detail in section 3.5 of the literature review chapter.

Table 6.4. 2 - All MIMIC Specifications with best Model fit statistics.

MIMIC Specifications with best Model fit statistics							
MIMIC	**MIMIC**	**MIMIC**	**MIMIC**	**MIMIC**	**MIMIC**	**MIMIC**	**MIMIC**
Specification 1	**Specification 2**	**Specification 3**	**Specification 4**	**Specification 5**	**Specification 6**	**Specification 7**	**Specification 8**
Causal variables	***Causal variables***	***Causal variables***	***Causal variables***	***Causal variables***	***Causal variables***	***Causal variables***	***Causal variables***
-	-	Employment to Population ratio	-	-	-	Rule of Law Index	Unemployment Rate
Business Freedom Index	Business Freedom Index	Business Freedom Index	Business Freedom Index	Business Freedom Index	Business Freedom Index	Business Freedom Index	Business Freedom Index
Degree of Urbanisation	Degree of Urbanisation	Degree of Urbanisation	Agriculture Sector Dominance	Degree of Urbanisation	Agriculture Sector Dominance	Agriculture Sector Dominance	Agriculture Sector Dominance
Government Effectiveness Index	Government Effectiveness Index	Government Effectiveness Index	Government Effectiveness Index	Government Effectiveness Index	Government Effectiveness Index	Government Effectiveness Index	Government Effectiveness Index
Monetary Freedom Index	Monetary Freedom Index	Monetary Freedom Index	Tax Revenue (% of GDP)	Inflation, GDP Deflator	Tax Revenue (% of GDP)	-	-
Government Spending Index	Government Spending Index	Government Spending Index	-	Government Spending Index	Government Integrity Index	Government Integrity Index	Government Integrity Index
Financial Freedom Index	Control of Corruption	-	-	-	-	-	Rule of Law Index
Indicator variables	***Indicator variables***	***Indicator variables***	***Indicator variables***	***Indicator variables***	***Indicator variables***	***Indicator variables***	***Indicator variables***
GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)

Electric Power Consumption	Electric Power Consumption	Electric Power Consumption	Electric Power Consumption	Electric Power Consumption	M2 Money growth	Electric Power Consumption	Electric Power Consumption

Table 6.4. 3 - Regression results for all MIMIC specifications.

	Model Specifications (Balkan countries, 190 observations)	**MIMIC Specification 1 6-1-2^**	**MIMIC Specification 2 6-1-2^**	**MIMIC Specification 3 6-1-2^**	**MIMIC Specification 4 4-1-2**	**MIMIC Specification 5 5-1-2**	**MIMIC Specification 6 5-1-2**	**MIMIC Specification 7 5-1-2**	**MIMIC Specification 8 4-1-2**
Causal variables	**Business Freedom Index**	-0.106*** (-4.86)	-0.088*** (-3.69)	-0.066*** (-2.900)	-0.115*** (-6.33)	-0.118*** (-5.19)	-0.132*** (-5.68)	-0.098*** (-4.46)	-0.091*** (-4.29)
	Monetary Freedom Index	-0.039*** (-3.94)	-0.017* (-1.77)	-0.037*** (-3.210)	- -	- -	- -	- -	- -
	Degree of Urbanisation	-0.061** (-2.48)	-0.063** (-2.43)	-0.086*** (-2.980)	- -	-0.051** (-1.99)	- -	- -	- -
	Government Spending Index	0.052*** (5.59)	0.044*** (3.81)	0.077*** (6.500)	- -	0.053*** (5.66)	- -	- -	- -
	Government Effectiveness Index	-0.914*** -22.960	-0.789*** (-12.57)	-0.817*** (-16.070)	-0.665*** (-14.86)	-0.938*** (-22.09)	-0.665*** (-13.54)	-0.536*** (-11.58)	-0.461*** (-11.13)
	Agriculture Sector Dominance	- -	- -	- -	0.349*** (12.62)	- -	0.364*** (9.98)	0.267*** (8.40)	0.295*** (8.58)
	Control of Corruption	- -	-0.175** (-2.38)	- -	- -	- -	- -	- -	- -
	Inflation, GDP deflator (annual %)	- -	- -	- -	- -	0.003*** (3.28)	- -	- -	- -
	Tax revenue (% of GDP)	- -	- -	- -	0.130*** (3.47)	- -	0.136*** (3.57)	- -	- -
		-	-	-0.164***	-	-	-	-	-

	Employment to population ratio	-	-	(-5.140)	-	-	-	-	-
	Financial Freedom Index	0.091[94] (5.59)	- -	- -	- -	- -	- -	- -	- -
	Unemployment Rate	- -	- -	- -	- -	- -	- -	- -	0.0916*** (4.91)
	Government Integrity Index	- -	- -	- -	- -	- -	-0.0213 (1.13)	-0.0465** (2.41)	-0.0348** (1.72)
	Rule of Law Index							-0.355*** (-4.02)	-0.326*** (-3.65)
Indicator Variables	**GDP per capita, PPP**	-1.000 -	-1.000 -	-1.000 -	-1.000 -	-1.000 -	-1.000 -	-1.000 -	-1.000 -
	Electric Power Consumption	-0.164*** (-15.47)	-0.164*** (-14.42)	-0.161*** (-14.86)	-0.162*** (-14.93)	-0.162*** (-15.11)	- -	-0.159*** (-13.85)	-0.154*** (-13.63)
	M2 money growth (%)	- -	- -	- -	- -	- -	1.354*** (3.61)	- -	- -
	Labour Force Participation Ratio	- -	- -	- -	- -	- -	- -	- -	- -

[94] The sign of the coefficient is not in line with hypothesis.

The results from the above regressions indicate that the coefficients of variables used in the model presented in the methodology chapter for all MIMIC specifications are almost all statistically significant at 1 percent, 5 percent or the 10 percent levels. This is shown in table 6.4.3 above. This table shows that there is a significant negative relationship between Business Freedom Index, Monetary Freedom Index, Degree of Urbanisation, Government Effectiveness Index, Employment to Population Ratio, Control of Corruption, Government Integrity and the Rule of Law index with the latent variable (i.e. the informal economy). There is also a positive relationship between Government Spending Index, Tax revenues, Unemployment Rate, Agriculture Sector Dominance and the level of inflation.

However, the Financial Freedom Index shows a positive relationship with the informal economy, which is not in line with expectations. The coefficient of this variable is significant but not its causality. This index measures the extent of the regulatory burden and government intervention in the financial system with a scale of 0 to 100, where a score of 0 indicates a high level of government intervention and regulation, and 100 indicates low level or negligible government interference. Therefore, in line with theory, one would expect that there would be a negative relationship between this index and the size of the informal economy.

An impact of the informal economy is argued to be reflected in the Electric power consumption (Kaufmann & Kaliberda, 1996; Schneider & Enste, 2000; Aldersdale et al., 2006; Arby et al., 2012). The hypothesis is that, the larger the size of the informal economy, the higher the electric consumption per capita, ceteris paribus. Assuming the unitary elasticity, the growth in electricity consumption is equal to the growth in the total real GDP (Schneider & Enste, 2000; Arby et al., 2012). Contrary to Arby et al. (2012) and this hypothesis, the results indicate a negative relationship between the Electric Power consumption and the size of the

informal economy for the countries of the Balkan Peninsula. An explanation for this is that people, who are involved in the informal economic activities, tend to be mainly involved in low skilled and low technologically intensive economic activities, requiring minimum if not zero amount of electricity for their activities. Individuals and businesses that require a high source of electricity for their economic activities tend to operate within the rules and regulations. Since individuals and businesses tend to operate hidden from authorities, high use of energy and electricity would send signals to authorities who would then be able to detect those involved in the informal economy. This is also supported by the fact that the results indicate a significant positive relationship between the size of the agriculture sector and the level of the informal economy. Majority of agriculture activities do not need as much electricity as other sectors do. Instead, they depend on other sources of energy such as petrol and gas. Furthermore, there is a statistically significant relationship between the degree of urbanisation and the size of the informal economy, indicating that people living in urban areas are engaged in other economic activities than agriculture and those activities tend to be more in the formal rather than informal economy. Therefore, the use of the Dominance of the Agriculture sector variable and the Degree of Urbanisation variable can be used as proxies for one another.

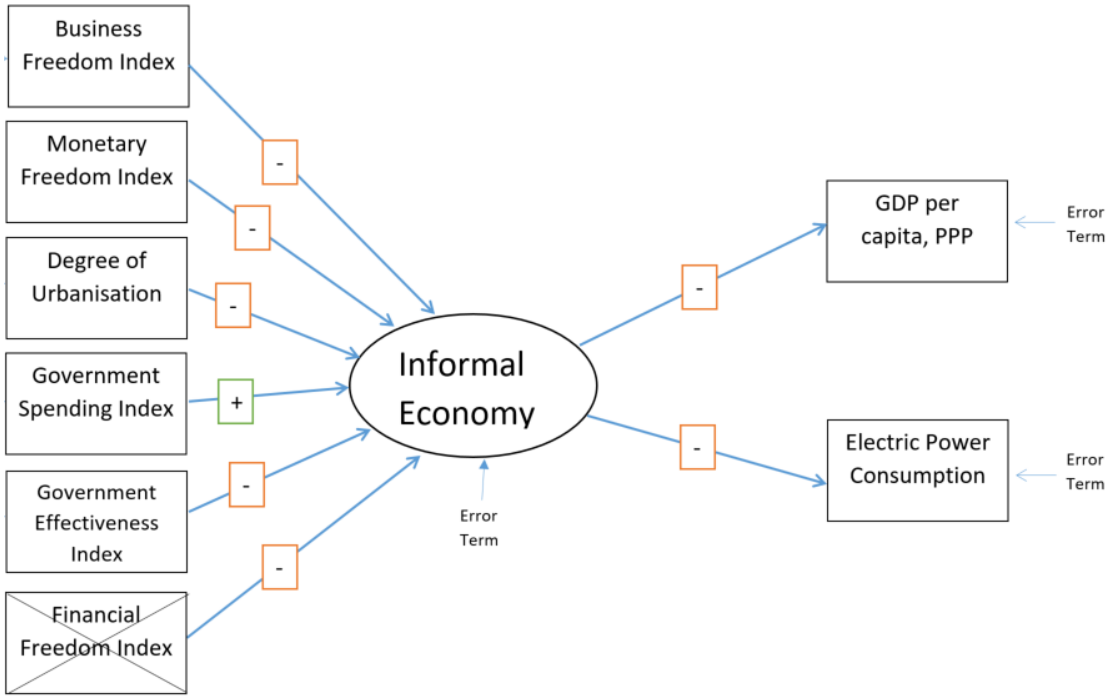
The results indicated in Table 6.4.3 support the causality between money in circulation and the level of the informal economy. The relationship between M2 money growth and the informal economy is positive. The higher the size of the informal economy, the higher will the need for liquidity or currency be, ceteris paribus, as individuals or businesses involved in informal economic activities prefer payments for transactions in cash or the most liquid

payment forms. This hypothesis is supported by literature discussed in the literature review chapter and the results presented in the table above.

The relationship between GDP per capita and informal economy is negative. Following the work by Dell'Anno (2003, 2007) and Hassan & Schneider (2016a, 2016b), GDP per capita variable has been set as the reference indicator variable and restricted to -1 in this analysis as per the explanation in section 5.13 of the methodology chapter. A graphical and mathematical presentation of the above selected three MIMIC specifications for the benchmarking procedure can be presented as follows:

MIMIC Specification 1: 6-1-2 MIMIC Model

Figure 6.4. 1 - Graphical presentation of the MIMIC Spec 1 (a 6-1-2 MIMIC Model)



A mathematical presentation of this MIMIC model specification can be expressed as per below, where only the Structural Equation part of the model is used to calculate the MIMIC model index. The MIMIC model index then is converted into absolute values for the informal economy using the benchmarking procedure and an initial external value for the size of the

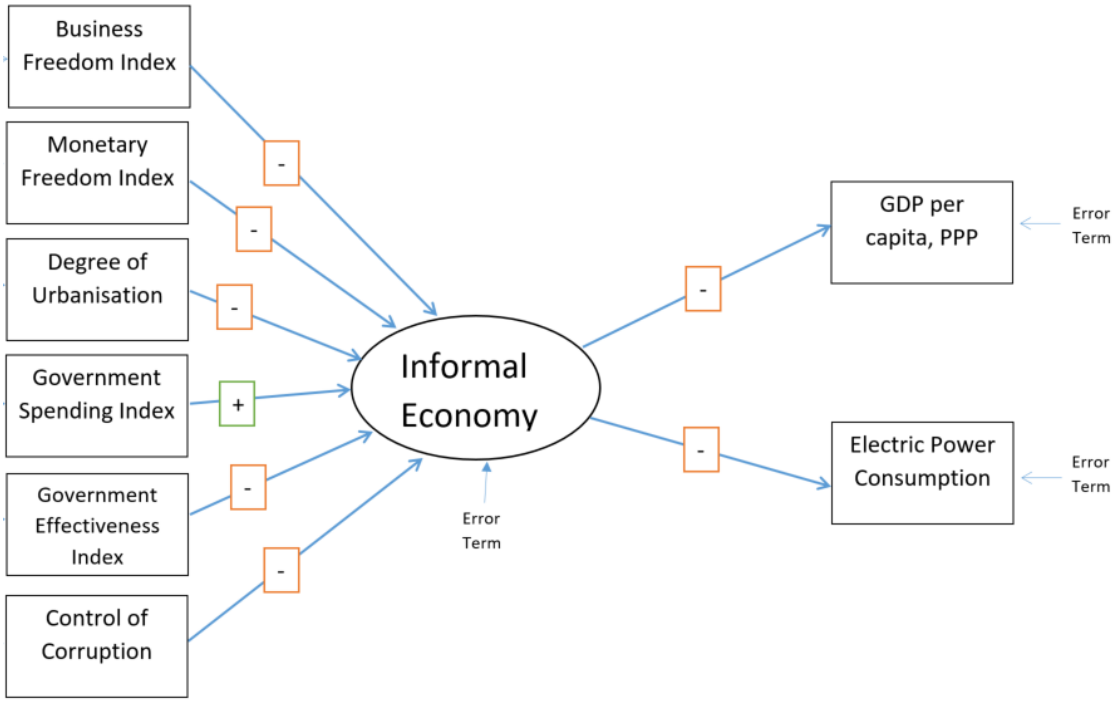
informal economy. This study has made use of the Schneider et al. (2010) and Buehn and Schneider (2012) (equation 5.26) initial external value for the benchmarking or calibration procedure for the year 1999 as discussed in detail in section 5.10 of the methodology chapter.

6-1-2 MIMIC Model - Part 1: The Structural Equation model:

$$MIMIC\ index = [-0.106_{it}, -0.039_{it}, -0.061_{it}, 0.052_{it}, -0.914_{it}] \begin{bmatrix} Business\ Freedom\ Index \\ Monetary\ Freedom\ Index \\ Degree\ of\ Urbanisation \\ Government\ Spending\ Index \\ Government\ Effectiveness \\ \sout{Financial\ Freedom\ Index} \end{bmatrix}$$

MIMIC Specification 2: 6-1-2 MIMIC Model

Figure 6.4. 2 - Graphical presentation of the MIMIC Spec 2 (a 6-1-2 MIMIC Model)



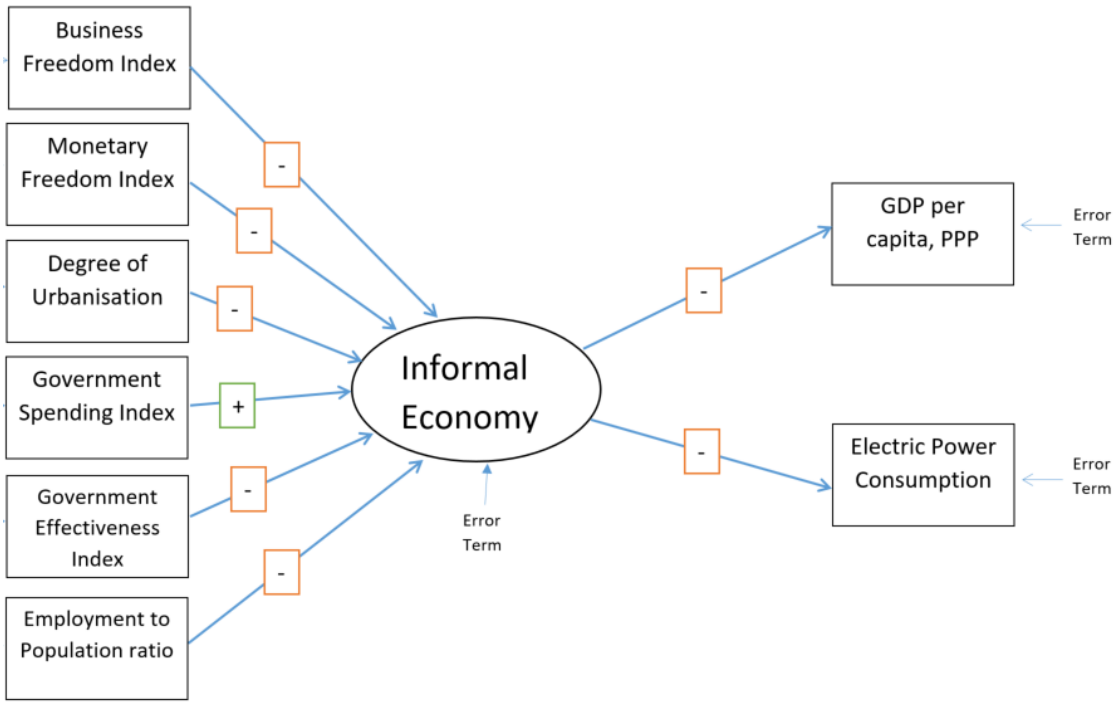
A mathematical presentation of this MIMIC model specification is expressed as follows:

6-1-2 MIMIC Model - Part 1: The Structural Equation model:

$$MIMIC\ Index = [-0.088_{it}, -0.017_{it}, -0.063_{it}, 0.044_{it}, -0.789_{it}, -0.175_{it}] \begin{bmatrix} Business\ Freedom\ Index \\ Monetary\ Freedom\ Index \\ Degree\ of\ Urbanisation \\ Government\ Spending\ Index \\ Government\ Effectiveness \\ Control\ of\ Corruption \end{bmatrix}$$

MIMIC Specification 3: 6-1-2 MIMIC Model

Figure 6.4. 3 - Graphical presentation of the MIMIC Spec 3 (a 6-1-2 MIMIC Model)



A mathematical presentation of this MIMIC model specification is expressed as follows:

6-1-2 MIMIC Model - Part 1: The Structural Equation model:

$$MIMIC\ Index = [-0.066_{it}, -0.037_{it}, -0.086_{it}, 0.077_{it}, -0.817_{it}, -0.164_{it}] \begin{bmatrix} Business\ Freedom\ Index \\ Monetary\ Freedom\ Index \\ Degree\ of\ Urbanisation \\ Government\ Spending\ Index \\ Government\ Effectiveness \\ Employment\ to\ Population\ Ratio \end{bmatrix}$$

6.5. Model fit statistics and evaluation of results

Full set of model fit statistics (discussed in section 5.11 of the methodology chapter) for all MIMIC specifications have been presented in table 6.5.3 below, while selected model fit statistics for MIMIC Spec 1, 2 and 3, have been presented in table 6.5.1 below. These two tables provide the most popular and reported indices in the literature. A justification for not providing other model fit indices can be found in table 6.5.2 below.

The model fit statistics for all MIMIC specifications are highly significant and within the acceptable values as discussed in section 5.11 of the methodology chapter. The rationale behind the chosen three MIMIC specifications for the benchmarking procedure in converting the MIMIC model indexes into absolute values for the informal economy has been done in accordance with these statistics. The model fit statistics for MIMIC Spec 1, 2 and 3, are slightly better than the model fit statistics for the other MIMIC specifications.

The value of RMSEA for MIMIC Spec 1 is 0.04, for MIMIC Spec 2 is 0.06 and for MIMIC Spec 3 is 0.06, indicating a good model fit for each of the specifications (MacCallum et al., 1996). Similarly, a value less than 0.08 for SRMR is considered a good fit (Hu & Bentler, 1999). RMSEA is among the most reported in the literature, and its correctness is measured by the p-close (Kenny, 2015)[95]. The p-close for MIMIC Spec 1, 2 and 3, indicate that the models' RMSEA is correct and that the fit of the model is right. A further parameter indicating good model fit in

[95] (Kenny, 2015, Available online at http://davidakenny.net/cm/fit.htm). This measure is *"…one-sided test of the null hypothesis that the RMSEA equals .05, which is called a close-fitting model. The alternative, one-sided hypothesis is that the RMSEA is greater than 0.05.'* Therefore, *"…. if the p is greater than .05 (i.e., not statistically significant), then it is concluded that the fit of the model is 'close'. If the p is less than .05, it is concluded that the model's fit is worse than close fitting (i.e., the RMSEA is greater than 0.05)*" (Kenny, 2015, Available online at http://davidakenny.net/cm/fit.htm).

the MIMIC specifications is the R-squared or the CD. This value shows that the model explains over 90 percent of the data around its mean.

Table 6.5. 1 - Selected Satorra-Bentler Model Fit Statistics for MIMIC Spec 1, 2 and 3.

Index Type	Index Name	MIMIC Spec 1 value[96]	MIMIC Spec 2 value	MIMIC Spec 3 value	Acceptable Value
Incremental Fit Indices	CFI[97]	1.00	0.99	0.99	≥ 0.90
	TLI	0.99	0.98	0.98	≥ 0.90
Absolute Fit Indices	RMSEA	0.04**	0.06*	0.06*	≤ 0.08
	SRMR	0.02**	0.02**	0.03**	≤ 0.08
	MC	0.97	0.96	0.96	≥ 0.90
R-squared	CD	0.94	0.92	0.92	≥ 0.90

Table 6.5. 2 - Reasons for not using other model fit parameters

Model Fit Index Name	Explanation	Reference
Normed Fit Index (NFI)	*One major disadvantage of this model fit index is that it cannot be low, when more parameters are added to the model. This is because the more parameters are added to the model, the greater will the index be. Therefore this index is not recommended.*	*Kenny (2015)*
The Goodness of Fit Index (GFI)	*This measure is affected by the size of the sample. The current consensus is not to use this measure. This is only available in LISREL software package.*	*Sharma et al. (2005); Kenny (2015)*
Adjusted Goodness of Fit Index (AGFI)	*This measure is affected by the size of the sample. The current consensus is not to use this measure. This is only available in LISREL software package.*	*Sharma et al. (2005); Kenny (2015)*
Hoelter's CN	*The use of Hoelter's CN is only recommended to be used when N > 200 and the chi-square is statistically significant.*	*Hu and Bentler (1998)*

[96] Model Fit Statistics presented in this table are those using the Satorra & Bentler option. Full set of Model Fit statistics has been provided in Table 6.5.2 below.

[97] CFI and RMSEA are also known as Noncentrality-based Indices, TLI is also known as a Relative Fit Index

Table 6.5. 3 - Full set of model fit statistics for all MIMIC specifications shown in table 6.4.2.

Model Fit Statistics (Balkan countries, 190 observations)		MIMIC Specification 1 5-1-2^	MIMIC Specification 2 6-1-2^	MIMIC Specification 3 6-1-2^	MIMIC Specification 4 4-1-2	MIMIC Specification 5 5-1-2	MIMIC Specification 6 4-1-2	MIMIC Specification 7 5-1-2	MIMIC Specification 8 6-1-2
Model Fit Statistics	Chi2	6.41	7.76	7.51	4.57	6.72	9.10	12.74	25.96
	p > chi2	0.27	0.17	0.19	0.21	0.24	0.06	0.01	0.00
	Swain corrected Chi2	6.28	7.60	7.35	4.49	6.58	8.93	12.50	25.40
	p > chi2	0.28	0.18	0.20	0.21	0.25	0.06	0.01	0.00
	Satorra-Bentler Chi2	6.71	8.83	8.33	5.29	5.96	7.81	15.35	31.47
	p > chi2	0.24	0.12	0.14	0.15	0.31	0.10	0.00	0.00
	RMSEA	0.04**	0.05**	0.05**	0.05**	0.04**	0.08*	0.11	0.15
	pclose	0.51	0.39	0.41	0.39	0.48	0.18	0.06	0.00
	Satorra-Bentler RMSEA	0.04**	0.06*	0.06*	0.06*	0.03**	0.07*	0.12	0.17
	CFI	1.00	0.99	1.00	1.00	1.00	0.99	0.98	0.96
	Satorra-Bentler CFI	1.00	0.99	0.99	1.00	1.00	0.99	0.98	0.96
	TLI	0.99	0.99	0.99	0.99	0.99	0.97	0.96	0.90
	Satorra-Bentler TLI	0.99	0.98	0.98	0.99	1.00	0.97	0.95	0.89
	SRMR	0.02**	0.02**	0.03**	0.02**	0.02**	0.03**	0.02**	0.03**
	CD	0.94	0.92	0.92	0.94	0.92	0.99	0.93	0.92
	R_square	0.94	0.92	0.92	0.94	0.92	0.99	0.93	0.92
	mc	0.97	0.96	0.96	0.97	0.96	0.99	0.93	0.92
	mc_square	0.94	0.92	0.92	0.94	0.92	0.99	0.93	0.92
Number of observations		190	190	190	190	190	190	190	190

^ Models specifications to be used for calibration procedure since their model fit statistics are most significant, such as the RMSEA, SRMR, CFI, TLI and Chi-squared

• Values presented in parentheses are the absolute z values. Values without any types of brackets are coefficients

• *** significant at 1 percent level, ** significant at 5% level, * significant at 10% level

6.6. Robust analysis and discussion of the results

Conducting robust analysis with MIMIC is challenging as the estimation results are quite often not robust (Schneider, 2015; Medina & Schneider, 2017). There are not many tests that are available for robust analysis other than robust standards errors estimates from statistical packages (Schneider, 2015). However, robust tests and analysis have been completed from different perspectives, and they relate to the use of the MIMIC specifications outlined above. First, robust tests and analysis investigated whether the changes in the indicators used in each of the MIMIC specifications for regression would generate any changes to the coefficients' statistical significance of the variables used as causes of the informal economy and whether there would be any changes in the causality of these coefficients. Second, the analysis wanted to understand whether the model specifications are robust when we change the number of indicators for regression and whether such changes would affect the statistical significance and causality of the coefficients on the variables used as causes and indicators in the MIMIC model. Third, the robust tests and analysis applied the same MIMIC specifications to another data sample to understand their robustness with different samples and different countries or a larger sample. Fourth, we can apply the robust command[98] in STATA which computes the Huber-White robust estimates of the standard errors. Similar robust tests have been applied by Schneider (2015), Hassan & Schneider (2016a, 2016b), and Medina & Schneider (2017).

The robustness of the MIMIC specifications used can also be analysed using the model fit statistics discussed in the Methodology chapter. There are a number of model fit statistics that provide information on how accurately is predicted that the observed covariance matrix for the variables in the MIMIC model matches that which we would expect if the model was

[98] vce(robust) option, available at https://www.stata.com/manuals13/xtvce_options.pdf (last accessed on 20.09.2017)

an accurate representation of the data. Such model fits statistics are the absolute fit indices, the chi-square and incremental fit indices, which will be analysed and discussed concerning each of the MIMIC specifications. From the MIMIC specifications above, the model fit statistics indicate that the three best specifications are MIMIC specification 1, 2 and 3. For this thesis, the robust tests and analysis will be performed for the first three MIMIC specifications presented in the tables above.

6.6.1. MIMIC Specification 1

Table 6.6.1.1 shows that this model specification (MIMIC Specification 1) made up of six causes is robust when changing the indicators, as well as changing the number of indicators applied in the MIMIC regression analysis. Furthermore, the model seems to be robust when changing one of the causes or replacing one of the causes used in the regression. It is evident from the regression results that even when we allow for a change in the indicators, the results indicate significant coefficients for all causes and indicators in this specification. For example, MIMIC specification 1 A, 1 B and 1 C generate significant coefficients and correct causality for all the causes and indicators applied in this MIMIC specification, for the situation with two indicators (GDP per capita with Electricity consumption, and GDP per capita with Labour force participation ratio) and for the situation with three indicators (GDP per capita with Electricity consumption and Labour force participation ratio), respectively. Equally, the model is robust in statistical significance and causality of causes and indicators when we change one of the causes, which is the change from Financial Freedom Index to the Unemployment Rate. Regression results are presented in the table below. However, there are some changes to the model fit statistics as highlighted and discussed below.

Table 6.6.1. 1 - Robust Checks for MIMIC Spec 1 – Changing causes and indicators used in the MIMIC regression

MIMIC Specification 1 and robust analysis					
MIMIC Specification 1, A 6-1-2[99]	**MIMIC Specification 1, B 6-1-2**	**MIMIC Specification 1, C 6-1-3**	**MIMIC Specification 1, D 6-1-3**	**MIMIC Specification 1, E 6-1-2**	**MIMIC Specification 1, F 6-1-2**
Causal variables	***Causal variables***	***Causal variables***	***Causal variables***	***Causal variables***	***Causal variables***
-	-	-	Unemployment Rate	Unemployment Rate	Unemployment Rate
Business Freedom Index	Business Freedom Index	Business Freedom Index	Business Freedom Index	Business Freedom Index	Business Freedom Index
Degree of Urbanisation	Degree of Urbanisation	Degree of Urbanisation	Degree of Urbanisation	Degree of Urbanisation	Degree of Urbanisation
Government Effectiveness	Government Effectiveness	Government Effectiveness	Government Effectiveness	Government Effectiveness	Government Effectiveness
Monetary Freedom Index	Monetary Freedom Index	Monetary Freedom Index	Monetary Freedom Index	Monetary Freedom Index	Monetary Freedom Index
Government Spending Index	Government Spending Index	Government Spending Index	Government Spending Index	Government Spending Index	Government Spending Index
Financial Freedom Index	Financial Freedom Index	Financial Freedom Index	-	-	-
Indicator variables	***Indicator variables***[100]	***Indicator variables***	***Indicator variables***	***Indicator variables***	***Indicator variables***
GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)
Electric Power Consumption	Labour Force Participation Ratio	Electric Power Consumption	Electric Power Consumption	Labour Force Participation Ratio	Electric Power Consumption
-	-	Labour Force Participation Ratio	Labour Force Participation Ratio	-	-

[99] Models specifications to be used for calibration procedure since their model fit statistics are most significant, such as the RMSEA, SRMR, CFI, TLI and Chi-squared

[100] We tried to use monetary aggregates, such as the M1 over M2 ratio (which represents the liquid currency in circulation), as well as M2 growth rate or the M2 as a percentage of GDP, but this indicator does not return to be significant at any of the 1 percent, 5 percent or the 10 percent levels, in the MIMIC regression analysis. Same holds for MIMIC specification 2 and 3, discussed and presented below.

Table 6.6.1. 2 - Robust Checks for MIMIC Spec 1 – Regression results

		MIMIC Specification 1, A 6-1-2[101]	MIMIC Specification 1, B 6-1-2	MIMIC Specification 1, C 6-1-3	MIMIC Specification 1, D 6-1-3	MIMIC Specification 1, E 6-1-2	MIMIC Specification 1, F 6-1-2
Causal variables	Business Freedom Index	-0.106*** (-4.86)	-0.115*** (-5.35)	-0.110*** (-5.29)	-0.081*** (-3.69)	-0.083*** (-3.82)	-0.079*** (-3.53)
	Monetary Freedom Index	-0.039*** (-3.94)	-0.0351*** (-3.18)	-0.038*** (-3.92)	-0.040*** (-3.33)	-0.042*** (-3.34)	-0.041*** (-3.32)
	Degree of Urbanisation	-0.061** (-2.48)	-0.0575** (-2.27)	-0.054** (-2.29)	-0.058** (-2.10)	-0.060** (-2.07)	-0.064** (-2.27)
	Government Spending Index	0.052*** (5.59)	0.0440 (4.83)	0.0482*** (5.31)	0.066*** (5.73)	0.064*** (5.51)	0.069*** (5.93)
	Government Effectiveness Index	-0.914*** -22.960	-0.917*** (-23.05)	-0.918*** (-22.59)	-0.801*** (-15.29)	-0.781*** (-14.60)	-0.795*** (-14.94)
	Agriculture Sector Dominance	- -	- -	- -	- -	- -	- -
	Control of Corruption	- -	- -	- -	- -	- -	- -
	Inflation, GDP deflator (annual %)	- -	- -	- -	- -	- -	- -
	Tax revenue (% of GDP)	- -	- -	- -	- -	- -	- -
	Employment to population ratio	- -	- -	- -	- -	- -	- -

[101] Models specifications to be used for calibration procedure since their model fit statistics are most significant, such as the RMSEA, SRMR, CFI, TLI and Chi-squared

	Financial Freedom Index	0.091[102] (5.59)	0.090[103] (5.92)	0.092[104] (5.62)	- -	- -	- -
	Unemployment Rate	- -	- -	- -	0.146*** (6.13)	0.165*** (6.54)	0.148*** (5.92)
	Government Integrity Index	- -	- -	- -	- -	- -	- -
	Rule of Law Index	- -	- -	- -	- -	- -	- -
Indicator Variables	**GDP per capita, PPP**	-1.000 -	-1.000 -	-1.000 -	-1.000 -	-1.000 -	-1.000 -
	Electric Power Consumption	-0.164*** (-15.47)	- -	-0.165*** (-15.70)	-0.158*** (-14.75)	- -	-0.156*** (-14.32)
	M2 money growth (%)	- -	- -	- -	- -	- -	- -
	Labour Force Participation Ratio	- -	-0.378*** (-6.99)	-0.390*** (-7.54)	-0.384*** (-7.49)	-0.382*** (-7.14)	- -

The table below shows the model fit statistics for the above MIMIC regression results – MIMIC Specification 1.

[102] The sign of the coefficient is not in line with hypothesis.
[103] Same as previous footnote
[104] Same as previous footnote

Table 6.6.1. 3 - Robust Checks for MIMIC Spec 1 – Model fit statistics

Model Fit Statistics (Balkan countries, 190 observations)	MIMIC Specification 1, A 6-1-2[105]	MIMIC Specification 1, B 6-1-2	MIMIC Specification 1, C 6-1-3	MIMIC Specification 1, D 6-1-3	MIMIC Specification 1, E 6-1-2	MIMIC Specification 1, F 6-1-2
Chi2	6.41	19.76	58.90	84.22	20.43	22.00
p > chi2	0.27	0.00	0.00	0.00	0.00	0.00
Swain corrected Chi2	6.28	19.33	57.54	82.25	19.99	21.52
p > chi2	0.28	0.00	0.00	0.00	0.00	0.00
Satorra-Bentler Chi2	6.71	18.52	58.95	97.75	21.31	25.11
p > chi2	0.24	0.00	0.00	0.00	0.00	0.00
RMSEA	0.04**	0.13	0.14	0.18	0.13	0.13
Satorra-Bentler RMSEA	0.04**	0.12	0.14	0.19	0.13	0.15
CFI	1.00	0.96	0.92	0.88	0.96	0.97
Satorra-Bentler CFI	1.00	0.97	0.92	0.88	0.96	0.96
TLI	0.99	0.91	0.86	0.78	0.90	0.91
Satorra-Bentler TLI	0.99	0.92	0.86	0.79	0.91	0.91
SRMR	0.02**	0.04**	0.05**	0.06*	0.04**	0.04**
CD	0.94	0.93	0.93	0.91	0.93	0.90
R_square	0.94	0.93	0.93	0.91	0.93	0.90
mc	0.97	0.93	0.93	0.91	0.93	0.90
mc_square	0.94	0.93	0.93	0.91	0.93	0.90
Number of observations	190	190	190	190	190	190

^ Models specifications to be used for calibration procedure since their model fit statistics are most significant, such as the RMSEA, SRMR, CFI, TLI and Chi-squared

• Values presented in parentheses are the absolute z values.

• Values without any types of brackets are coefficients

• *** significant at 1 percent level, ** significant at 5% level, * significant at 10% level

[105] Models specifications to be used for calibration procedure since their model fit statistics are most significant, such as the RMSEA, SRMR, CFI, TLI and Chi-squared

6.6.2. MIMIC Specification 2

Table 6.6.2.1 below shows MIMIC Specification 2 which is also made up of six causes. The regressions results indicate that this specification is also robust when changing the variables used as indicators or their number applied in the MIMIC regression analysis. This model specification is also robust when changing one of the causes used in the regression. The regression results show that even when we allow for a change in the indicators, the coefficients for all causes and indicators in this specification are still significant. For example, MIMIC specification 2 A, 2 B and 2 C generate significant coefficients and correct causality for all the causes and indicators applied in this MIMIC specification, for the situation with two indicators (GDP per capita with Electricity consumption, and GDP per capita with Labour force participation ratio) and for the situation with three indicators (GDP per capita with Electricity consumption and Labour force participation ratio), respectively. Equally, the model is robust in statistical significance and causality of causes and indicators when we change casual variables or add additional ones. In this specification, the Employment to Population Ratio has been switched with the Unemployment rate to test for robustness indicated in section 5.6 of the methodology chapter[106]. However, model fit statistics change as we include additional indicators, as illustrated and discussed below in table 6.6.2.3.

[106] While for the Unemployment rate the relationship with the informal economy is positive, it is expected that the relationship between the employment to population ratio and the informal economy is negative (Schneider & Enste, 2000). Using one or the other variable can be justified on the basis of ensuring robustness.

Table 6.6.2. 1 - Robust Checks for MIMIC Spec 2 – Changing causes and variables for MIMIC regression

MIMIC Specification 2 and robust analysis					
MIMIC Specification 2, A 6-1-2[108]	**MIMIC Specification 2, B 6-1-2**	**MIMIC Specification 2, C 6-1-3**	**MIMIC Specification 2, D**[107] **7-1-3**	**MIMIC Specification 2, E* 7-1-2**	**MIMIC Specification 2, F* 7-1-2**
Causal variables	***Causal variables***	***Causal variables***	***Causal variables***	***Causal variables***	***Causal variables***
-	-	-	Unemployment Rate	Unemployment Rate	Unemployment Rate
Business Freedom Index	Business Freedom Index	Business Freedom Index	Business Freedom Index	Business Freedom Index	Business Freedom Index
Degree of Urbanisation	Degree of Urbanisation	Degree of Urbanisation	Degree of Urbanisation	Degree of Urbanisation	Degree of Urbanisation
Government Effectiveness Index	Government Effectiveness Index	Government Effectiveness Index	Government Effectiveness Index	Government Effectiveness Index	Government Effectiveness Index
Monetary Freedom Index	Monetary Freedom Index	Monetary Freedom Index	Monetary Freedom Index	Monetary Freedom Index	Monetary Freedom Index
Government Spending Index	Government Spending Index	Government Spending Index	Government Spending Index	Government Spending Index	Government Spending Index
Control of Corruption	Control of Corruption	Control of Corruption	Control of Corruption	Control of Corruption	Control of Corruption
Indicator variables	***Indicator variables***	***Indicator variables***	***Indicator variables***	***Indicator variables***	***Indicator variables***
GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)
Electric Power Consumption	Labour Force Participation Ratio	Electric Power Consumption	Electric Power Consumption	Labour Force Participation Ratio	Electric Power Consumption
-	-	Labour Force Participation Ratio	Labour Force Participation Ratio	-	-

[107] This model specification is robust with or without Monetary Freedom Index. The results generated are in line with theory in terms of causality of each of the causes and indicators as well as statistical significance of the coefficients at the 1 percent, 5 percent or the 10 percent levels.

[108] Models specifications to be used for calibration procedure since their model fit statistics are most significant, such as the RMSEA, SRMR, CFI, TLI and Chi-squared

Table 6.6.2. 2 - Robust Checks for MIMIC Spec 2 – Regression results

		MIMIC Specification 2, A 6-1-2[110]	MIMIC Specification 2, B 6-1-2	MIMIC Specification 2, C 6-1-3	MIMIC Specification 2, D[109] 7-1-3	MIMIC Specification 2, E 7-1-2	MIMIC Specification 2, F 7-1-2
Causal variables	Business Freedom Index	-0.088*** (-3.69)	-0.095*** (-4.13)	-0.092*** (-3.96)	-0.077*** (-3.42)	-0.078*** (-3.51)	-0.074*** (-3.25)
	Monetary Freedom Index	-0.017* (-1.77)	-0.014* (-1.31)	-0.016** (-1.68)	-0.041*** (-3.39)	-0.043*** (-3.35)	-0.042*** (-3.40)
	Degree of Urbanisation	-0.063** (-2.43)	-0.060** (-2.25)	-0.053** (-2.11)	-0.075*** (-2.66)	-0.077*** (-2.61)	-0.082*** (-2.84)
	Government Spending Index	0.044*** (3.81)	0.039*** (3.46)	0.041*** (3.58)	0.060*** (4.82)	0.060*** (4.84)	0.062*** (4.98)
	Government Effectiveness Index	-0.789*** (-12.57)	-0.819*** (-12.82)	-0.817*** (-12.97)	-0.673*** (-9.64)	-0.667*** (-9.03)	-0.655*** (-9.15)
	Agriculture Sector Dominance	- -	- -	- -	- -	- -	- -
	Control of Corruption	-0.175** (-2.38)	-1.401** (-1.86)	-1.462** (-1.99)	-1.517** (-2.08)	-1.356** (-1.77)	-1.695** (-2.23)
	Inflation, GDP deflator (annual %)	- -	- -	- -	- -	- -	- -
	Tax revenue (% of GDP)	- -	- -	- -	- -	- -	- -
	Employment to population ratio	- -	- -	- -	- -	- -	- -

[109] This model specification is robust with or without Monetary Freedom Index. The results generated are in line with theory in terms of causality of each of the causes and indicators as well as statistical significance of the coefficients at the 1 percent, 5 percent or the 10 percent levels.
[110] Models specifications to be used for calibration procedure since their model fit statistics are most significant, such as the RMSEA, SRMR, CFI, TLI and Chi-squared

	Financial Freedom Index	- -	- -	- -	- -	- -	- -
	Unemployment Rate	- -	- -	- -	0.147*** (6.11)	0.165*** (6.48)	0.146*** (5.90)
	Government Integrity Index	- -	- -	- -	- -	- -	- -
	Rule of Law Index	- -	- -	- -	- -	- -	- -
Indicator Variables	**GDP per capita, PPP**	-1.000 -	-1.000 -	-1.000 -	-1.000 -	-1.000 -	-1.000 -
	Electric Power Consumption	-0.164*** (-14.42)	- -	-0.164*** (-14.75)	-0.159*** (-14.57)	- -	-0.157*** (-14.23)
	M2 money growth (%)	- -	- -	- -	- -	- -	- -
	Labour Force Participation Ratio	- -	-0.359*** (-6.40)	-0.385*** (-7.26)	-0.379*** (-7.40)	-0.370*** (-6.90)	- -

The table below shows the model fit statistics for the above MIMIC regression results – MIMIC Specification 2.

Table 6.6.2. 3 - Robust Checks for MIMIC Spec 2 – Model fit statistics

	MIMIC Specification 2, A 6-1-2[111]	MIMIC Specification 2, B 6-1-2	MIMIC Specification 2, C 6-1-3	MIMIC Specification 2, D 7-1-3	MIMIC Specification 2, E 7-1-2	MIMIC Specification 2, F 7-1-2
Chi2	7.76	32.95	85.20	110.20	33.94	23.65
p > chi2	0.17	0.00	0.00	0.00	0.00	0.00
Swain corrected Chi2	7.60	32.23	83.22	107.36	33.12	23.08
p > chi2	0.18	0.00	0.00	0.00	0.00	0.00
Satorra-Bentler Chi2	8.83	33.07	95.14	128.55	36.81	27.59
p > chi2	0.12	0.00	0.00	0.00	0.00	0.00
RMSEA	0.05**	0.17	0.18	0.19	0.16	0.12
Satorra-Bentler RMSEA	0.06*	0.17	0.19	0.21	0.16	0.14
CFI	0.99	0.93	0.88	0.85	0.96	0.97
Satorra-Bentler CFI	0.99	0.94	0.87	0.84	0.94	0.96
TLI	0.99	0.82	0.78	0.74	0.84	0.91
Satorra-Bentler TLI	0.98	0.83	0.77	0.73	0.84	0.90
SRMR	0.02**	0.04**	0.05**	0.06*	0.04**	0.03**
CD	0.92	0.86	0.91	0.91	0.91	0.90
R_square	0.92	0.86	0.91	0.91	0.91	0.90
mc	0.96	0.86	0.91	0.91	0.91	0.90
mc_square	0.92	0.86	0.91	0.91	0.91	0.90
Number of observations	190	190	190	190	190	190

^ Models specifications to be used for calibration procedure since their model fit statistics are most significant, such as the RMSEA, SRMR, CFI, TLI and Chi-squared

• Values presented in parentheses are the absolute z values.

• Values without any types of brackets are coefficients

• *** significant at 1 percent level, ** significant at 5% level, * significant at 10% level

[111] Models specifications to be used for calibration procedure since their model fit statistics are most significant, such as the RMSEA, SRMR, CFI, TLI and Chi-squared

6.6.3. MIMIC specification 3

For MIMIC specification 3, the robust test analyses indicate that the specification is also robust when applying different indicators and causes, or when changing the number of causes and indicators used in the MIMIC regression. In the analysis below, we switched the use of Degree of Urbanisation with the size of the Agriculture sector. The degree of urbanisation and the size of the agriculture sector in a country can be negatively related. As such, one could use one or the other as a proxy. This was the case in the work done by Hassan and Schneider (2016a, 2016b), Alm and Embaye (2013), Vuletin (2008) and Elshamy (2015). The hypothesis, on the other hand, can differ. One would expect a positive relationship between the size of the agriculture sector and the informal economy, and a negative relationship between the degree of urbanisation and the size of the informal economy, ceteris paribus (Hassan and Schneider, 2016a, 2016b; Alm and Embaye, 2013). The coefficients are all significant (as indicated in the table below) and at the same time, their causality is in line with the hypothesis raised above.

Table 6.6.3. 1 - Robust Checks for MIMIC Spec 3 – Changing causes and variables for MIMIC regression

MIMIC Specification 3 and robust analysis					
MIMIC Specification 3, A 6-1-2[112]	**MIMIC Specification 3, B 6-1-2**	**MIMIC Specification 3, C 6-1-3**	**MIMIC Specification 3, D 6-1-3**	**MIMIC Specification 3, E 6-1-2**	**MIMIC Specification 3, F 6-1-2**
Causal variables	***Causal variables***	***Causal variables***	***Causal variables***	***Causal variables***	***Causal variables***
Employment to Population ratio	Unemployment Rate	Unemployment Rate	Unemployment Rate	Unemployment Rate	Unemployment Rate
Business Freedom Index	Business Freedom Index	Business Freedom Index	Business Freedom Index	Business Freedom Index	Business Freedom Index
Degree of Urbanisation	Degree of Urbanisation	Degree of Urbanisation	Agriculture Sector Dominance	Agriculture Sector Dominance	Agriculture Sector Dominance

[112] Model specification to be used for calibration procedure since their model fit statistics are most significant, such as the RMSEA, SRMR, CFI, TLI and Chi-squared

Government Effectiveness Index	Government Effectiveness Index	Government Effectiveness Index	Government Effectiveness Index	Government Effectiveness Index	Government Effectiveness Index
Monetary Freedom Index	Monetary Freedom Index	Monetary Freedom Index	Monetary Freedom Index	Monetary Freedom Index	Monetary Freedom Index
Government Spending Index	Government Spending Index	Government Spending Index	Government Spending Index	Government Spending Index	Government Spending Index
Indicator variables	***Indicator variables***	***Indicator variables***	***Indicator variables***	***Indicator variables***	***Indicator variables***
GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)	GDP per capita, PPP (constrained)
Electric Power Consumption	Labour Force Participation Ratio	Electric Power Consumption	Electric Power Consumption	Labour Force Participation Ratio	Electric Power Consumption
-	-	Labour Force Participation Ratio	Labour Force Participation Ratio	-	-

Table 6.6.3. 2 - Robust Checks for MIMIC Spec 3 – Regression results

		MIMIC Specification 3, A 6-1-2[113]	MIMIC Specification 3, B 6-1-2	MIMIC Specification 3, C 6-1-3	MIMIC Specification 3, D 6-1-3	MIMIC Specification 3, E 6-1-2	MIMIC Specification 3, F 6-1-2
Causal variables	Business Freedom Index	-0.066*** (-2.900)	-0.083*** (-3.82)	-0.081*** (-3.69)	-0.104*** (-5.58)	-0.103*** (-5.61)	-0.102*** (-5.51)
	Monetary Freedom Index	-0.037*** (-3.210)	-0.042*** (-3.34)	-0.040*** (-3.33)	-0.022** (-2.36)	-0.023** (-2.34)	-0.021** (-2.27)
	Degree of Urbanisation	-0.086*** (-2.980)	-0.060** (-2.07)	-0.058** (-2.10)	- -	- -	- -
	Government Spending Index	0.077*** (6.500)	0.064*** (5.51)	0.066*** (5.73)	0.028*** (2.95)	0.027*** (2.90)	0.028*** (2.98)
	Government Effectiveness Index	-0.817*** (-16.070)	-0.781*** (-14.60)	-0.801*** (-15.29)	-0.610*** (-13.43)	-0.592*** (-12.12)	-0.605*** (-13.28)
	Agriculture Sector Dominance	- -	- -	- -	0.306*** (9.62)	0.314*** (9.37)	0.317*** (9.98)
	Control of Corruption	- -	- -	- -	- -	- -	- -
	Inflation, GDP deflator (annual %)	- -	- -	- -	- -	- -	- -
	Tax revenue (% of GDP)	- -	- -	- -	- -	- -	- -
	Employment to population ratio	-0.164*** (-5.140)	- -	- -	- -	- -	- -
	Financial Freedom Index	- -	- -	- -	- -	- -	- -

[113] Model specification to be used for calibration procedure since their model fit statistics are most significant, such as the RMSEA, SRMR, CFI, TLI and Chi-squared

	Unemployment Rate	- -	0.165*** (6.54)	0.146*** (6.13)	0.143*** (7.32)	0.156*** (7.68)	0.139*** (7.06)
	Government Integrity Index	- -	- -	- -	- -	- -	- -
	Rule of Law Index	- -	- -	- -	- -	- -	- -
Indicator Variables	**GDP per capita, PPP**	-1.000 -	-1.000 -	-1.000 -	-1.000 -	-1.000 -	-1.000 -
	Electric Power Consumption	-0.161*** (-14.86)	- -	-0.158*** (-14.75)	-0.158*** (-14.44)	- -	-0.158*** (-14.27)
	M2 money growth (%)	- -	- -	- -	- -	- -	- -
	Labour Force Participation Ratio	- -	-0.382*** (-7.14)	-0.384*** (-7.49)	-0.369*** (-7.21)	-0.350*** (-6.39)	- -

The table below shows the model fit statistics for the above MIMIC regression results – MIMIC Specification 3.

Table 6.6.3. 3 - Robust Checks for MIMIC Spec 3 – Model fit statistics

	MIMIC Specification 2, A 6-1-2[114]	**MIMIC Specification 2, B 6-1-2**	**MIMIC Specification 2, C 6-1-3**	**MIMIC Specification 2, D 7-1-3**	**MIMIC Specification 2, E 7-1-2**	**MIMIC Specification 2, F 7-1-2**
Chi2	7.51	20.43	84.22	99.69	27.24	20.55
p > chi2	0.19	0.00	0.00	0.00	0.00	0.00
Swain corrected Chi2	7.35	19.99	82.26	97.37	26.66	20.10
p > chi2	0.20	0.00	0.00	0.00	0.00	0.00

[114] Models specifications to be used for calibration procedure since their model fit statistics are most significant, such as the RMSEA, SRMR, CFI, TLI and Chi-squared

Satorra-Bentler Chi2	8.33	21.31	95.75	103.98	26.31	23.12
p > chi2	0.14	0.00	0.00	0.00	0.00	0.00
RMSEA	0.05**	0.13	0.18	0.20	0.15	0.13
Satorra-Bentler RMSEA	0.06*	0.13	0.19	0.20	0.15	0.14
CFI	1.00	0.96	0.88	0.87	0.95	0.97
Satorra-Bentler CFI	0.99	0.96	0.88	0.87	0.96	0.97
TLI	0.99	0.90	0.80	0.77	0.87	0.93
Satorra-Bentler TLI	0.98	0.91	0.78	0.77	0.89	0.92
SRMR	0.03**	0.04**	0.06*	0.07*	0.05**	0.04**
CD	0.92	0.94	0.91	0.93	0.87	0.93
R_square	0.92	0.94	0.91	0.93	0.87	0.93
mc	0.96	0.94	0.91	0.93	0.87	0.93
mc_square	0.92	0.94	0.91	0.93	0.87	0.93
Number of observations	190	190	190	190	190	190

^ Models specifications to be used for calibration procedure since their model fit statistics are most significant, such as the RMSEA, SRMR, CFI, TLI and Chi-squared

• Values presented in parentheses are the absolute z values.

• Values without any types of brackets are coefficients

• *** significant at 1 percent level, ** significant at 5% level, * significant at 10% level

6.6.4. MIMIC specifications using Europe data sample

For this analysis, this study makes use of another data sample comprised of all continental Europe's countries. This Europe Data sample is made up of 760 observations, where N is 40 and T is 19, which is larger than the Balkan dataset. This sample is made up of 40 continental Europe countries (including Balkan countries). In this section, this study uses the same specifications as in MIMIC Spec 1, 2 and 3 (referred to table 6.4.1 above). The results provided below show similar causality for most of the variables as in the Balkan dataset. Two things to be noted from these results are that the Business Freedom Index is no longer statistically significant in the models. Government Effectiveness is also not statistically significant for MIMIC Spec 2. Furthermore, the causality between Government Spending index and the latent variable is negative. It is expected that this variable has a positive relationship with the informal economy as discussed in the methodology chapter. However, it is important to mention here that the models of MIMIC Spec 1, 2 and 3 converge with other datasets and hence provide evidence that the models used for the Balkan countries converge with other datasets. The model fit statistics, on the other hand, are not what would constitute a good model fit. However, the SRMR is statistically significant and in line with accepted values.

Table 6.6.4. 1 - Robust Checks for MIMIC Specifications using another data sample – Regression Results

		MIMIC Specification 1, Europe Dataset 6-1-2[115]	MIMIC Specification 2, Europe Dataset 6-1-2	MIMIC Specification 3, Europe Dataset 6-1-2
Causal variables	Business Freedom Index	-0.052 (-1.62)	-0.011 (-0.38)	-0.015 (-0.49)
	Monetary Freedom Index	-0.046*** (-2.81)	-0.040*** (-2.74)	-0.054*** (-3.02)
	Degree of Urbanisation	-0.295*** (-8.62)	-0.311*** (-10.18)	-0.278*** (-6.94)
	Government Spending Index	-0.072*** (-3.59)	-0.096*** (-4.82)	-0.042** (-1.93)
	Government Effectiveness Index	-1.205*** (-18.89)	-0.099 (-0.95)	-1.028*** (-14.17)
	Agriculture Sector Dominance	- -	- -	- -
	Control of Corruption	- -	-0.992*** (-9.16)	- -
	Inflation, GDP deflator (annual %)	- -	- -	- -
	Tax revenue (% of GDP)	- -	- -	- -
	Employment to population ratio	- -	- -	-0.208*** (-4.08)
	Financial Freedom Index	0.080*** (3.24)	- -	- -
	Unemployment Rate	- -	- -	- -
	Government Integrity Index	- -	- -	- -
	Rule of Law Index	- -	- -	- -
Indicator Variables	GDP per capita, PPP	-1.000 -	-1.000 -	-1.000 -
	Electric Power Consumption	-0.280*** (-15.12)	-0.287*** (-14.03)	-0.285*** (-13.48)
	M2 money growth (%)	- -	- -	- -
	Labour Force Participation Ratio	- -	- -	- -

[115] Model specification to be used for calibration procedure since their model fit statistics are most significant, such as the RMSEA, SRMR, CFI, TLI and Chi-squared

The table below shows the model fit statistics for the above three MIMIC specifications.

Table 6.6.4. 2 - Robust Checks for MIMIC Specifications using another data sample – Model fit statistics

	MIMIC Specification 1, Europe Dataset 6-1-2[116]	**MIMIC Specification 2, Europe Dataset 6-1-2**	**MIMIC Specification 3, Europe Dataset 6-1-2**
Chi2	91.80	72.20	125.92
p > chi2	0.00	0.00	0.00
Swain corrected Chi2	91.31	71.81	125.24
p > chi2	0.00	0.00	0.00
Satorra-Bentler Chi2	92.75	74.20	104.12
p > chi2	0.00	0.00	0.00
RMSEA	0.15	0.13	0.18
Satorra-Bentler RMSEA	0.15	0.13	0.16
CFI	0.93	0.95	0.90
Satorra-Bentler CFI	0.93	0.95	0.91
TLI	0.83	0.87	0.76
Satorra-Bentler TLI	0.82	0.86	0.77
SRMR	0.04**	0.03**	0.04**
CD	0.85	0.91	0.86
R_square	0.85	0.91	0.86
mc	0.85	0.91	0.86
mc_square	0.85	0.91	0.86
Number of observations	760	760	760

^ Models specifications to be used for calibration procedure since their model fit statistics are most significant, such as the RMSEA, SRMR, CFI, TLI and Chi-squared

- Values presented in parentheses are the absolute z values.
- Values without any types of brackets are coefficients
- *** significant at 1 percent level, ** significant at 5% level, * significant at 10% level

6.7. The Benchmarking procedure

When it comes to the use of the benchmarking procedure to convert the MIMIC model index into absolute values for the informal economy, there does not seem to be any clear consensus in the literature as to which of the benchmarking procedures outlined and discussed in section

[116] Models specifications to be used for calibration procedure since their model fit statistics are most significant, such as the RMSEA, SRMR, CFI, TLI and Chi-squared

5.10 of the methodology chapter to use (Buehn & Schneider, 2012). However, the most widely used method is the benchmarking procedure proposed by Buehn & Schneider (2012) following the work by Schneider et al. (2010). Later Hassan & Schneider (2016a, 2016b), Medina & Schneider (2017) and Aydin (2017) also confirm the use of the benchmarking model outlined in equation (5.26) in section 5.10 of the methodology chapter, like the one that is most widely used in the literature because it overcomes the criticism by Breusch (2005a) in assigning a monetary value to the latent variable from the reference indicator.

For the benchmarking procedure as per equation (5.26), this study has made use of the external results estimated from Schneider et al. (2010) and later confirmed by Buehn and Schneider (2012). This study has used the earliest available external value for the informal economy from these two studies. Their earliest available estimated figure of the informal economy is for 1999. However, these two studies do not provide estimates for the informal economy in Serbia. As such, this study has made use of the Schneider et al. (2013) estimates as an external value to convert the MIMIC model index into absolute values for the size of the informal economy.

6.8. Estimation results for the size of the informal economy

The results reveal that the size of the informal economy in the ten countries of the Balkan Peninsula has followed a declining trend from 1996 to 2014. Figures 6.8.1, 6.8.3 and 6.8.5 show the development of the informal economy over the same period (1996 to 2014) in the ten Balkan countries for the three chosen MIMIC specifications.

As it can be seen from figure 6.8.1, 6.8.3 and 6.8.5 below[117], the size of the informal economy for each country has been declining over the years, as the countries of the Balkan Peninsula have undergone significant reforms from a political, social, judicial and economic perspective. Such reforms have been partly financed and influenced by the EU and the European Commission as well as the IMF. Countries such as Albania, FYR Macedonia, Serbia and Bosnia & Herzegovina are either potential candidate or candidate countries to join the EU. Albania, FYR Macedonia and Serbia are candidate countries to join the EU, while Bosnia and Herzegovina is a potential country for EU membership (European Commission[118], 2017).

According to the Treaty on the European Union, countries wishing to join the European Union must meet specific criteria. The whole process for EU membership takes years as countries try to reform their democracies in line with the EU. All countries must invest heavily in ensuring stable institutions which guarantee democratic institutions promoting and securing human rights and respect for and protection of minorities, as well as ensuring a well-functioning rule of law[119]. Countries that aspire to integrate and join the EU must also have a functioning market economy and be able to cope with competition from the rest of the EU[120]. Countries should also have the ability to effectively implement all the obligations of EU membership, which include adherence to the aims of the political, economic and monetary union. In this process, Balkan countries not already part of the EU, have made significant progress in their reforms. Such reforms, discussed in chapter four as well, have led to a falling economic informality in the region.

[117] Alternatively, the size of the informal economy has been illustrated in graphs for each country separately in section 6.10.
[118] Available from https://ec.europa.eu/commission/sites/beta-political/files/western-balkans-enlargement_en.pdf (last accessed on 24.11.2017)
[119] Ibid.
[120] Ibid.

Countries which are already members of the EU have also made significant progress with their reforms. This progress is reflected in all the variables used in the MIMIC specifications. Business Freedom Index, which essentially measures the ease of doing business and the regulatory burden in a country, as well as most other variables that have improved in all the countries of the Balkan Peninsula, have influenced the size of the informal economy. Data from World Bank's Doing Business reports indicate a significant improvement over the years for all the Balkan countries. Such reforms will have an impact on the level of informality in the Balkan countries. This impact is therefore reflected in the results.

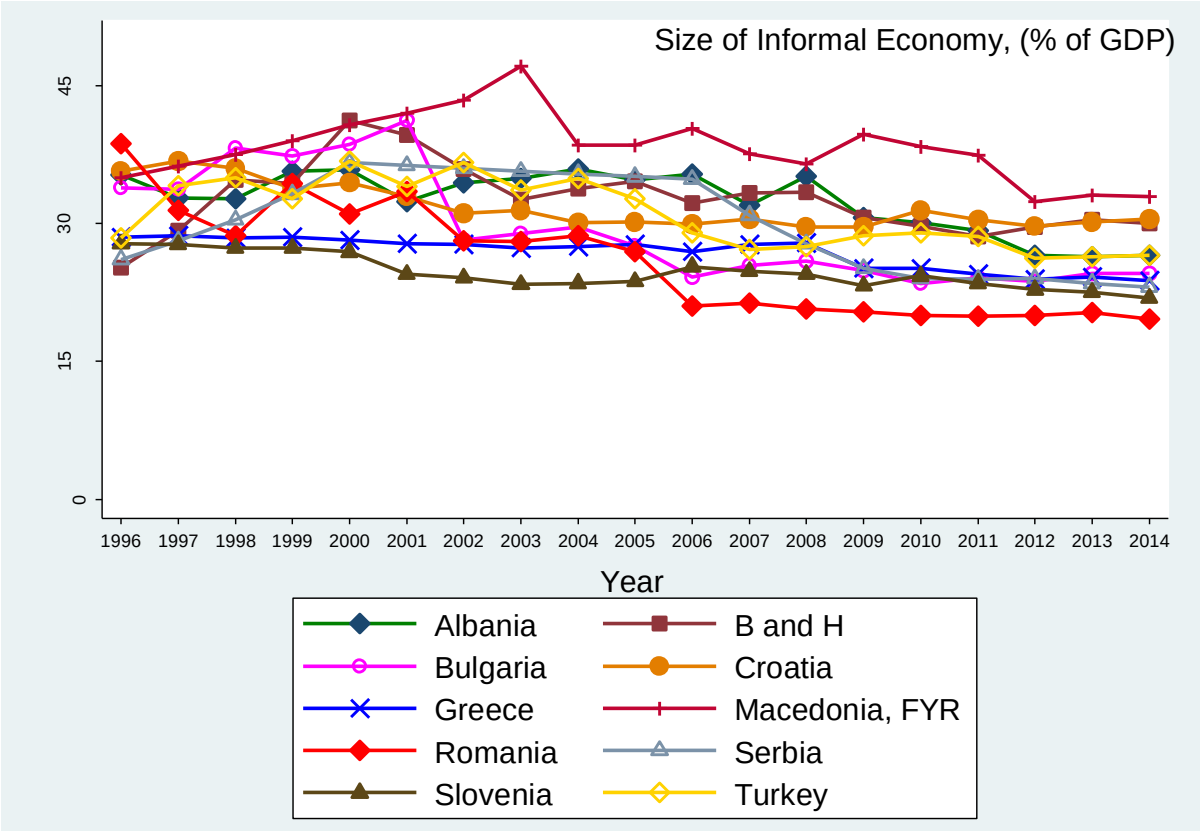
However, the financial crisis of 2008 has had an impact on the overall economy in the Balkan countries as well, particularly in Greece. A review of macroeconomic indicators and economic developments in the ten countries of the Balkan Peninsula has been provided in chapter four. The financial crisis led to an increased unemployment rate in almost all countries of the Balkan Peninsula, as well an overall economic downturn, which affected the speed and the implementation of some of the ongoing reforms in these countries (European Commission Occasional paper 46, 2009; Radulescu, 2012; Panagiotou, 2012; Jeleva, 2012; Murgasova et al., 2015). Again, this is reflected in the MIMIC specifications and the results. Even though the results reveal a declining trend in the size of the informal economy, the decline in these Balkan countries is not very significant.

Results from the MIMIC Spec 1 and MIMIC Spec 2 reveal that the informal economy in Balkan countries is just over 30 percent of GDP. MIMIC Spec 2 indicates that the size of the informal economy in these countries is around 32 percent on average. Full results have been provided in Appendix 6.8.1. Whereas, the impact of the informal economy on the formal economy, regarding the potential government revenues, have been provided in Appendix 6.8.5.

Table 6.8. 1 - Descriptive statistics for the size of the informal economy for each MIMIC specification.

Model Specifications	Observations	Mean	Std. Dev.	Min	Max
MIMIC Spec 1	190	30.3	5.4	19.6	47.1
MIMIC Spec 2	190	30.7	5.5	20.4	50.2
MIMIC Spec 3	190	32.3	4.4	24.0	49.4

Figure 6.8. 1 - Development on the size of the informal economy for Balkan countries, using MIMIC spec 1[121]

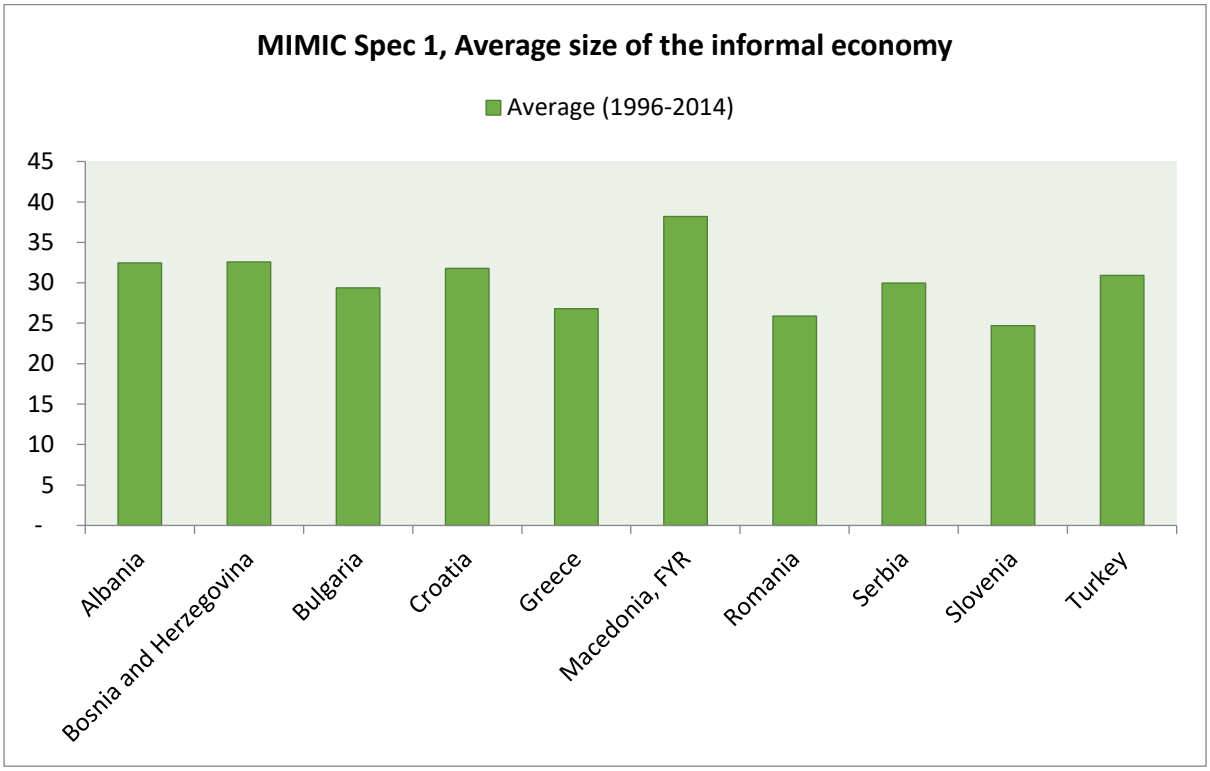


MIMIC Spec 1 results, presented in figure 6.8.2 below, show that the informal economy in Greece, Slovenia and Romania is amongst the lowest in the region, with values of around 27 percent, 25 percent, and 26 percent of GDP on average, respectively. On the other hand, the size of the informal economy on average in FYR Macedonia is amongst the highest in the region, with a value of 38 percent of GDP. The informal economy in Albania, Bosnia and

[121] Where B and H stand for Bosnia and Herzegovina.

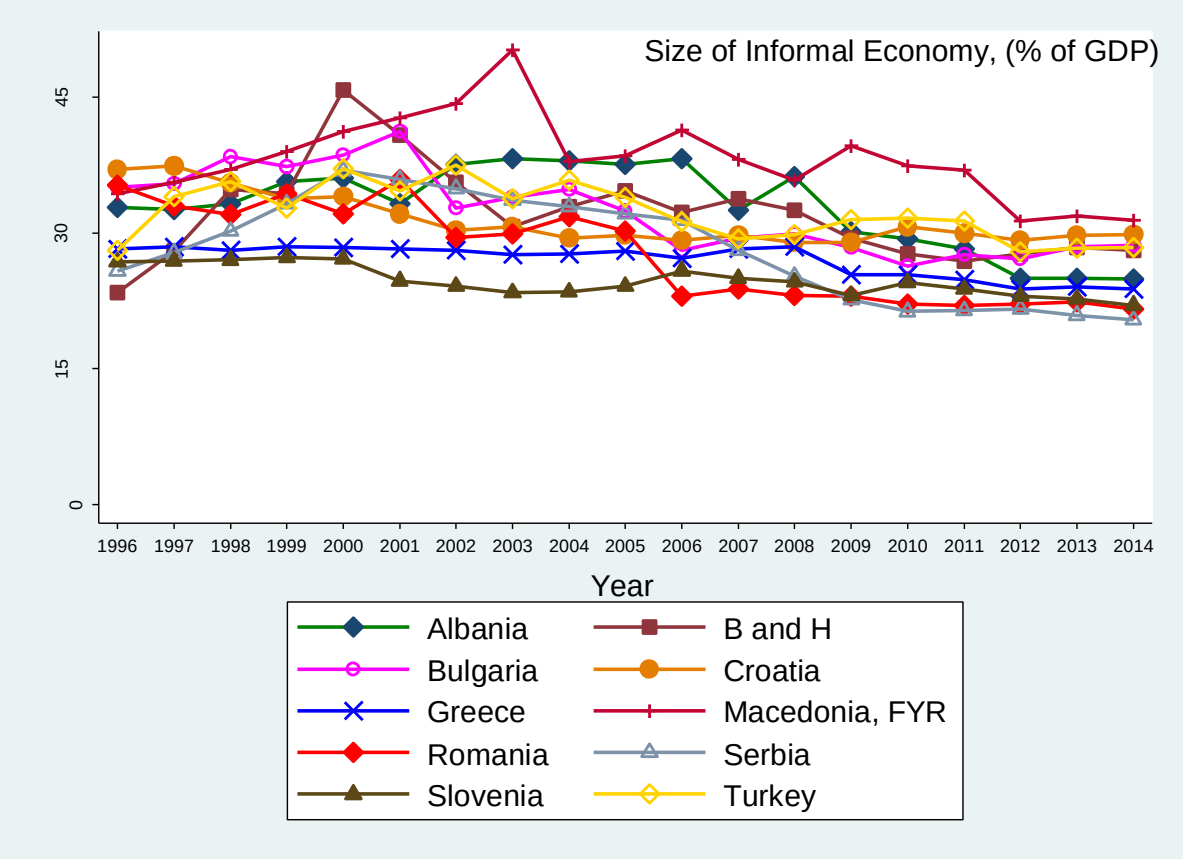
Herzegovina, Turkey, Croatia and Serbia are above 30 percent of GDP. The informal economy in Bulgaria, as per MIMIC Spec 1 results, is just under 30 percent, at a value of 29 percent on average.

Figure 6.8. 2 - Average size of the informal economy in ten Balkan countries between 1996 and 2014.



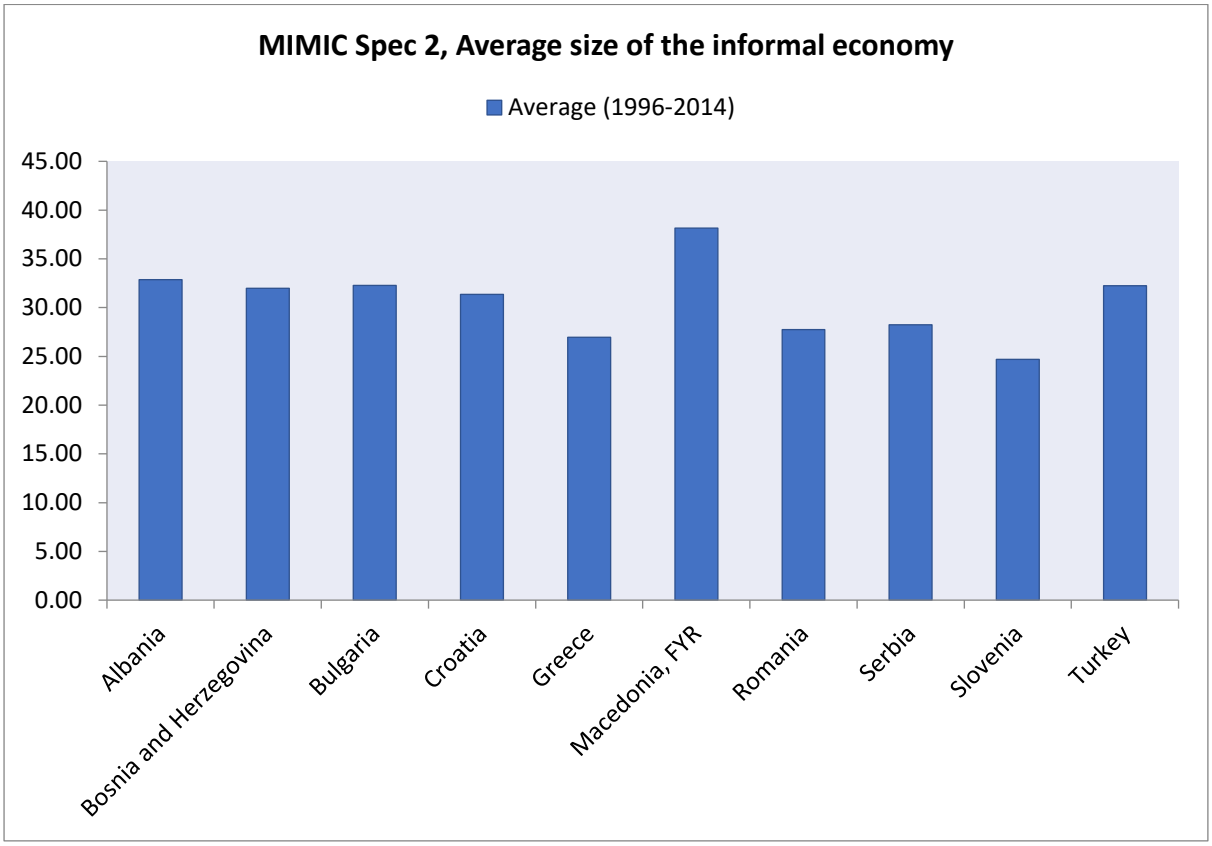
MIMIC Spec 2 results also indicate a declining trend, albeit small, in the size of the informal economy in the ten Balkan countries. Figure 6.8.3 shows the development of the size of the informal economy over the period of study.

Figure 6.8. 3 - Development on the size of the informal economy for Balkan countries, using MIMIC spec 2



The size of the informal economy in the Balkan countries estimated using MIMIC Spec 2 generates similar average results to MIMIC Spec 1. The estimation using this specification shows that the informal economy is lowest in Greece and Slovenia, with values of 27 percent and 25 percent of GDP, respectively. The highest size of the informal economy on average terms between 1996 and 2014 is found in FYR Macedonia and Albania, with values of 38 percent and around 33 percent of GDP, respectively. The estimations indicate that the size of the informal economy on average fluctuates between 28 percent and 32 percent of GDP in countries of Serbia, Bulgaria, Turkey, Romania, Croatia and Bosnia and Herzegovina. Averages from the estimates using MIMIC Spec 2 have been presented in the figure below.

Figure 6.8. 4 - Average size of the informal economy in ten Balkan countries between 1996 and 2014.



MIMIC Spec 3 estimates, presented in the following graphs (figure 6.8.5 and 6.8.6) indicate a slightly higher informal economy in the ten Balkan countries, albeit they too indicate a declining trend in the size of the informal economy. The results show that the size of the informal economy on average as a percentage of GDP is around 39 percent in FYR Macedonia, 35 percent in Bosnia & Herzegovina, 34 percent in Albania, 33 percent in Bulgaria, Romania, Turkey and Croatia, about 31 percent in Serbia, 27 percent in Greece and 26 percent in Slovenia.

Figure 6.8. 5 - Development on the size of the informal economy for Balkan countries, using MIMIC spec 3

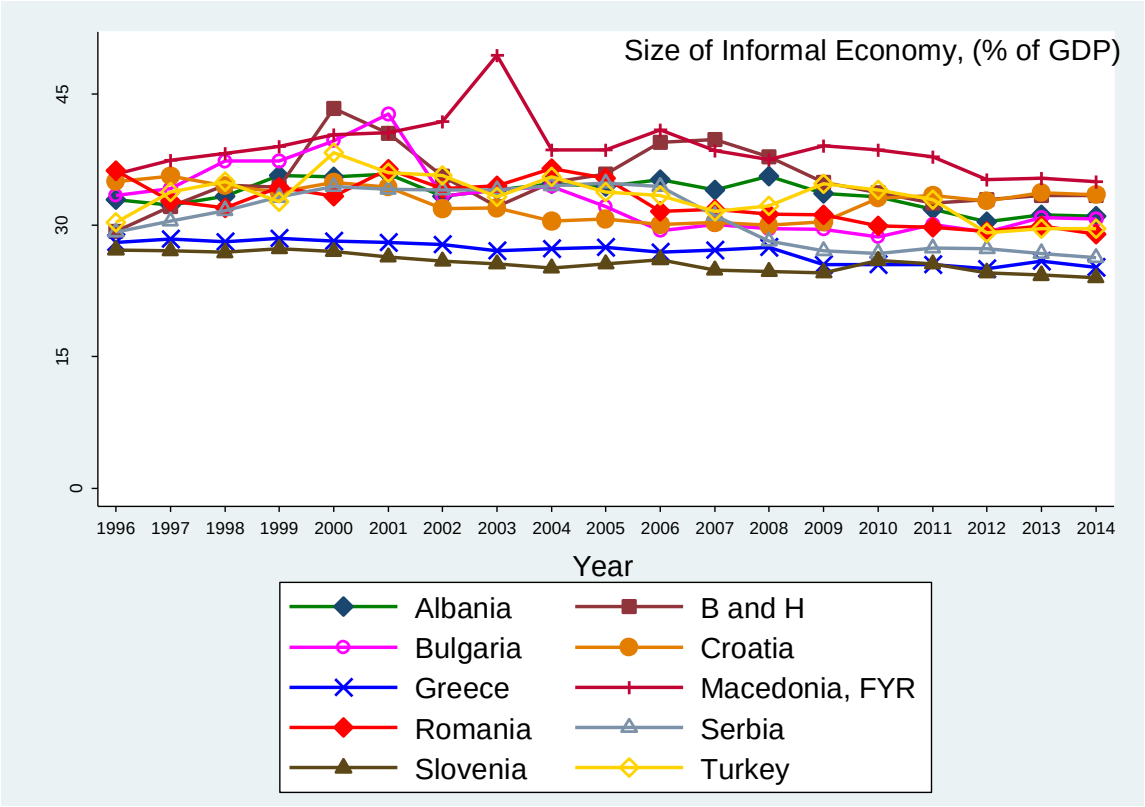
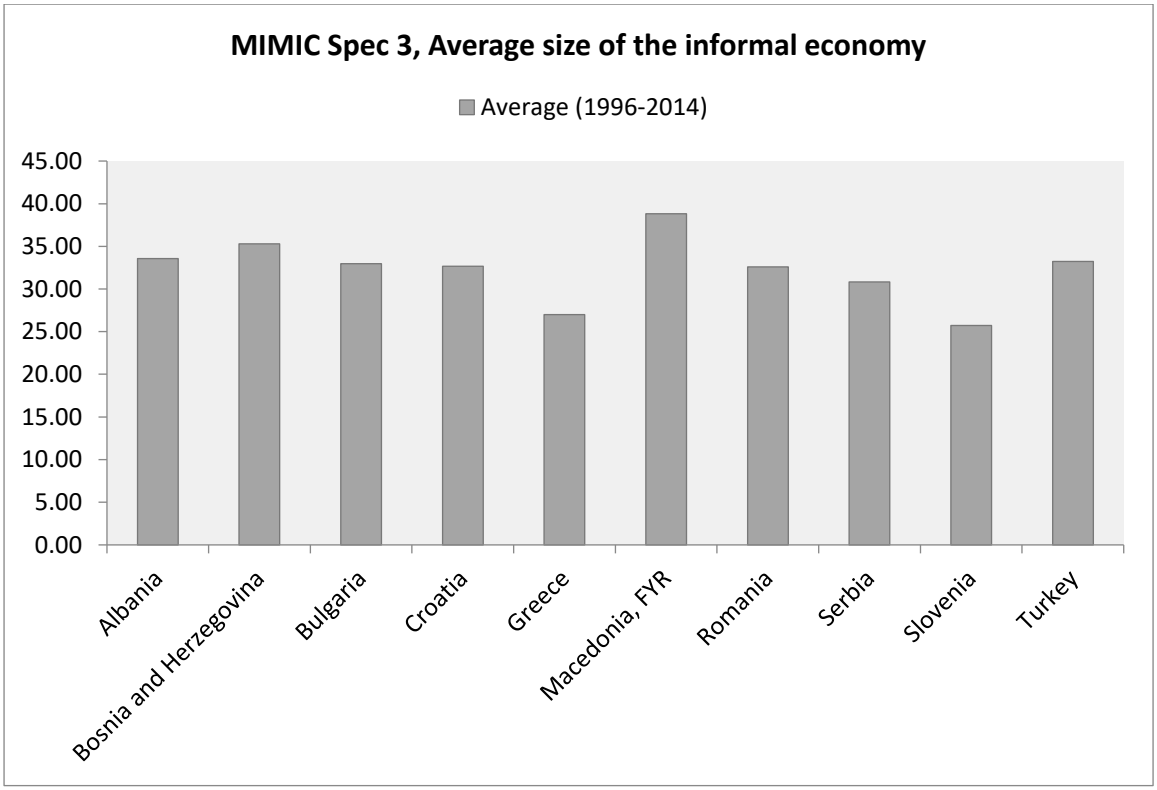


Figure 6.8. 6 - Average size of the informal economy in ten Balkan countries between 1996 and 2014.



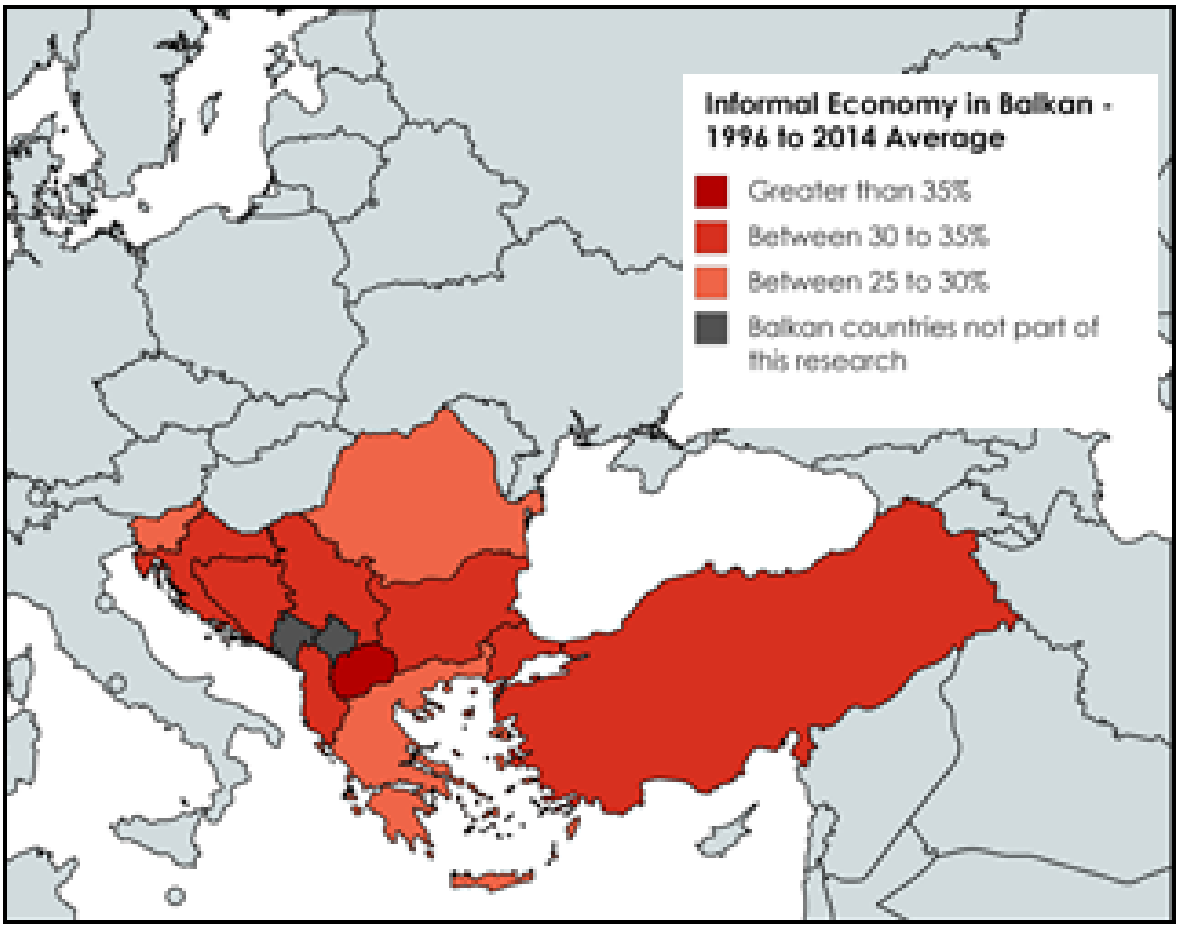
The table below shows the average values from the estimates of the three MIMIC specifications. The informal economy ranges between 25 to 30 percent of GDP in Slovenia, Greece and Romania; ranges between 30 to 35 percent of GDP in Serbia, Bulgaria, Croatia, Turkey, Albania and Bosnia and Herzegovina; and above 35 percent of GDP in FYR Macedonia. Three and five-year averages from the three MIMIC specifications indicate that the highest size of the informal economy can be found in FYR Macedonia.

Table 6.8. 2 - Average size of the informal economy in Balkan countries from three MIMIC specifications

Country	Average	Three year Average	Five year Average
Albania	33.0	27.4	28.6
Bosnia and Herzegovina	33.3	30.4	30.2
Bulgaria	31.5	27.5	27.2
Croatia	31.9	31.0	31.2
Greece	26.9	24.4	24.7
Macedonia, FYR	38.4	33.2	35.0
Romania	28.7	23.8	23.9
Serbia	29.7	23.8	23.9
Slovenia	25.0	23.1	23.7
Turkey	32.1	28.0	29.3

Country	Average	Range
Slovenia	25	25-30%
Greece	27	25-30%
Romania	29	25-30%
Serbia	30	30-35%
Bulgaria	32	30-35%
Croatia	32	30-35%
Turkey	32	30-35%
Albania	33	30-35%
Bosnia and Herzegovina	33	30-35%
Macedonia, FYR	38	>35%

Figure 6.8. 7 - Map of the Balkan countries and the range of the average size of the informal economy.



6.9. Confirmation of hypotheses

In this section, we confirm whether the hypothesis for each variable used is confirmed using the MIMIC methodology and the estimation results. This section will also provide the correlation analysis between the estimated size of the informal economy and the primary drivers of economic informality in the Balkan countries.

Table 6.9. 1 - Confirmation of the hypothesis

Definition and expected sign	Hypothesis	Confirmation of results
Business Freedom index ***Expected Sign Negative***	Hypothesis 1: The higher is the index of business freedom, the lower would the size of the informal economy be, ceteris paribus.	**Confirmed from all MIMIC Specifications**

Tax Revenue (% of GDP) ***Expected Sign Positive***	Hypothesis 1: The higher the level of taxation in a country, the higher the size of the informal economy, ceteris paribus.	**Confirmed by MIMIC Spec 4 and 6**
Government spending Index ***Expected sign Positive***	Hypothesis 3: The higher the government spending or expenditure, the higher the size of the government and the size of the informal economy, ceteris paribus.	**Confirmed by MIMIC Spec 1, 2, 3 and 5**
Government Effectiveness Index ***Expected sign Negative***	Hypothesis 4: The better the quality of democratic institutions, the smaller the size of the informal economy is, ceteris paribus.	**Confirmed from all MIMIC Specifications**
Rule of Law Index ***Expected sign Negative***	Hypothesis 5: The better the quality of democratic institutions, the smaller the size of the informal economy is, ceteris paribus.	**Confirmed by MIMIC Spec 8**
Control of Corruption ***Expected sign Negative***	Hypothesis 6: The greater the control for corruption is in a country, the lower will corruption be and as such the lower the size of the informal economy. Several studies, discussed in the literature review, have indicated that there is a positive relationship between the corruption level and the size of economic informality. Therefore, the lower the corruption level is in a country and the greater the government integrity, the smaller the size of the informal economy, ceteris paribus.	**Confirmed by MIMIC Spec 2**
Government Integrity index ***Expected sign Negative***	Hypothesis 7: The lack of government integrity caused by practices of systemic corruption of government institutions such as bribery, extortion, nepotism, cronyism, patronage, embezzlement, and graft, reduces economic vitality by increasing costs and shifting resources into unproductive activities, and increases economic informality, ceteris paribus. The higher this index is, the lower the size of the informal economy, ceteris paribus.	**Confirmed by MIMIC Spec 6, 7 and 8**
Unemployment Rate ***Expected sign Positive***	Hypothesis 8: The higher the unemployment, the larger the size of the informal economy is, ceteris paribus.	**Confirmed by MIMIC Spec 3 and 8**
Employment to Population Ratio ***Expected sign Negative***	Hypothesis 9: The higher the employment to population ratio is, the lower the size of the informal economy is, ceteris paribus.	**Confirmed by MIMIC Spec 3**
Monetary Freedom Index ***Expected sign Negative***	Hypothesis 10: The more stable and less volatile are prices, and the less state intervention in a free market system, the smaller will be the size of the informal economy, ceteris paribus.	**Confirmed by MIMIC Spec 1, 2 and 3**

Financial Freedom Index ***Expected sign Negative***	Hypothesis 11: The higher the financial freedom index, the lower the size of the informal economy is expected to be, ceteris paribus.	**Not confirmed. The casual sign is different from expectations.**
Agriculture, value added (percentage of GDP) ***Expected sign Positive***	Hypothesis 12: The more dominant the agriculture sector, the larger the size of the informal economy is, ceteris paribus.	**Confirmed by MIMIC Spec 4, 6, 7 and 8**
Degree of Urbanisation ***Expected sign Negative***	Hypothesis 13: The higher the size of the urban population relative to rural population, the smaller the size of the informal economy, ceteris paribus.	**Confirmed by MIMIC Spec 1, 2, 3 and 5**
Inflation, GDP deflator ***Expected sign Positive***	Hypothesis 14: The more stable and less volatile prices are, and the less state intervention in a free market system, the smaller will be the size of the informal economy, ceteris paribus.	**Confirmed by MIMIC Spec 5**
GDP per Capita, PPP[122] ***Expected sign Negative***	Hypothesis 15: The larger the size of the informal economy, the lower the GDP is, ceteris paribus.	**Confirmed by all MIMIC Specifications** **Used as reference indicator**
Labour Force Participation ratio ***Expected sign Negative***	Hypothesis 16: the more extensive the informal economy, the lower total employment is, ceteris paribus.	**Confirmed by all robust MIMIC Specifications**
Money and quasi money (M2) growth rate ***Expected sign Positive***	Hypothesis 17: The larger the size of the informal economy, the larger the money held by the public is, ceteris paribus	**Confirmed by MIMIC Spec 6**
Electric power consumption (kWh per capita) ***Expected sign Positive***	Hypothesis 18: The larger the size of the informal economy, the higher the electric consumption per capita, ceteris paribus	**Unconfirmed. The casual sign of the coefficient is negative.**

Table 6.9.2 below shows the correlation matrix between the size of the informal economy and other variables. Theory suggests that there should be a correlation between the size of the informal economy and the variables used as causes and indicators in the MIMIC model regressions. The table below shows that there is a correlation between the estimations from

[122] Based on Purchasing Power Parity

the three MIMIC specifications. In line with theory discussed in previous chapters, there is a correlation between the size of the informal economy and the regulatory burden as measured by the Business Freedom Index. There is a negative correlation between the freedom from the high regulation intensity in a country and the level of the informal economy. High regulation and bureaucracies tend to create additional costs and transactions costs to operate formally, so individuals and business might prefer to deal informally. There is also a negative correlation between the Rule of Law, Government Effectiveness, and the level of corruption measured by either the Government Integrity index or the Control of Corruption index. The correlations between all other variables show correct causality in relation to their impact on the size of the informal economy.

Table 6.9. 2 - Correlation matrix between the size of the informal economy and other variables

	MIMIC Spec 1	MIMIC Spec 2	MIMIC Spec 3
MIMIC Spec 1	1.0000		
MIMIC Spec 2	0.9483	1.0000	
MIMIC Spec 3	0.8558	0.8831	1.0000
Business Freedom Index	-0.6120	-0.5761	-0.5740
Government Integrity	-0.3808	-0.3650	-0.4256
Government Effectiveness	-0.4700	-0.4553	-0.6194
Government Spending Index	0.1898	0.2862	0.3384
Unemployment Rate	0.5242	0.4133	0.5528
Employment to Population Rate	-0.4058	-0.3248	-0.4806
Control of Corruption	-0.4829	-0.4892	-0.5852
Size of Agriculture sector	0.4604	0.4310	0.4456
Degree of Urbanisation	-0.1867	-0.0805	-0.2258
Labour Force Participation Ratio	-0.2827	-0.2680	-0.4250
Regulatory Quality	-0.5645	-0.4796	-0.5601
Rule of Law	-0.5350	-0.5172	-0.6336
Monetary Freedom Index	-0.2793	-0.2365	-0.1977
M2 Growth	0.2470	0.2577	0.1818
Tax Revenue	0.1301	0.1250	0.2135
Level of Exports	-0.3353	-0.3011	-0.2918
Inflation	0.1003	0.1197	0.0702
Electric Power Consumption	-0.4454	-0.4813	-0.6225

GDP per Capita	-0.6046	-0.5850	-0.7242
	MIMIC Spec 1	**MIMIC Spec 2**	**MIMIC Spec 3**
MIMIC Spec 1	1.0000		
MIMIC Spec 2	0.9483	1.0000	
MIMIC Spec 3	0.8558	0.8831	1.0000
State Fragility Index	0.4890	0.4973	0.5344
Political Stability Index	-0.4620	-0.4455	-0.5169
Banking Crisis	-0.1739	-0.1793	-0.0997
Institutionalised Democracy	-0.1803	-0.1193	-0.2541
Voice and Accountability	-0.5142	-0.4805	-0.5910
Overall Economic Freedom	-0.3807	-0.3172	-0.2527

It is important to note from these tables the relationship of the estimates from three MIMIC specifications and other variables not used in the MIMIC regressions. Variables such as the State fragility index and Institutionalised Democracy index (from Polity IV project) indicate that there is some correlation between them and the estimates of the informal economy. While there is a positive correlation between State fragility index and the size of the informal economy, there is a negative correlation between the institutionalised democracy index and the size of the informal economy. Furthermore, there is also a negative relationship between the Political stability index, Voice and accountability and Banking crisis (from World Bank Governance Indicators data) and the size of the informal economy. Uncertainty surrounding the security and potential political fragility, as well as unstable government institutions can impact the economic development of a country, the well-functioning of the rule of law, which can potentially affect the size and development of the informal economic activities (Teobaldelli & Schneider, 2012). Teobaldelli & Schneider (2012) have found that there is a statistically significant negative relationship between direct democracy and the size of the informal economy.

The financial crisis, and in particular banking crisis, can affect the wellbeing of the official or the formal economy directly, but they can also affect adversely to some degree those involved in the informal economy. As a consequence of the financial crisis, it is expected that the level of unemployment will increase as jobs are lost in the formal economy, and at the same time, the informal employment will increase as there will be new entrants into the informal economy for various economic, survival and social reasons. It is assumed that the informal economy can act as a refuge in coping with the economic crisis which affects the formal economy directly (Cunningham and Maloney, 2000). Finnegan and Singh's (2004) agree with such conclusions. At times of crisis, they argue that people turned to their informal networks of family and friends for support. Hence, the size of the informal economy proliferated as people were forced to enter the informal economy in these countries for survival reasons.

The study by Colombo et al. (2016) also investigate how banking crisis in a country can impact the level of informal economy. Using a large sample of countries for their empirical analysis, the authors find that the informal sector is a powerful buffer, which tends to expand during banking crises, thereby absorbing considerable amount of the fall in the official economic output (Colombo et al. 2016). However, the results of the correlation above indicate that there is a negative relationship between banking crisis and the level of economic informality, albeit there is not a significant correlation. This is also supported by the literature. During an economic or financial crisis, informal workers are often the first to lose their jobs as businesses tend to make redundancies amongst their informally employed workforce before making any other redundancies to other workers who are more formally employed (Jutting and Laiglesia, 2009).

Likewise, during the financial crisis of 2008 and the subsequent economic recession that followed, in some Latin American countries, workers with irregular or atypical contracts were the first ones to be made redundant (Jutting and Laiglesia, 2009). Furthermore, a study by Horn (2011: p.3) suggests that informal economy:

> *"should not be viewed as a 'cushion' for retrenched formal workers during crises'* but, rather……*'the impacts of global economic trends and events since the beginning of the crisis on the informal workers and enterprises … need to be understood and addressed*' (Horn, 2011: p.3).

6.10. Country-specific analysis

Albania

The informal economy in Albania, according to the estimates of this study, followed an increasing trend from 1997 to 2006, and then a declining trend between 2007 and 2014. There was a slight increase in the informal economy in Albania between 2008 and 2009, indicating the potential impact of the 2008 financial crisis. Over the period of this study, Albania experienced an informal economy between a minimum of 24.9 and a maximum of 38.2 percent of GDP as per MIMIC Spec 2 estimation results presented below. On average, the size of the informal economy in Albania ranges between 32 and almost 34 percent of GDP.

Albania experienced significant isolation from a totalitarian regime until 1992 (Schautzer, 2005). There were severe transitioning problems after 1992, which culminated in 1997, with a severe financial, political and social crisis. There was a significant mistrust in governmental institutions from the people who took to the streets protesting, which then turned into

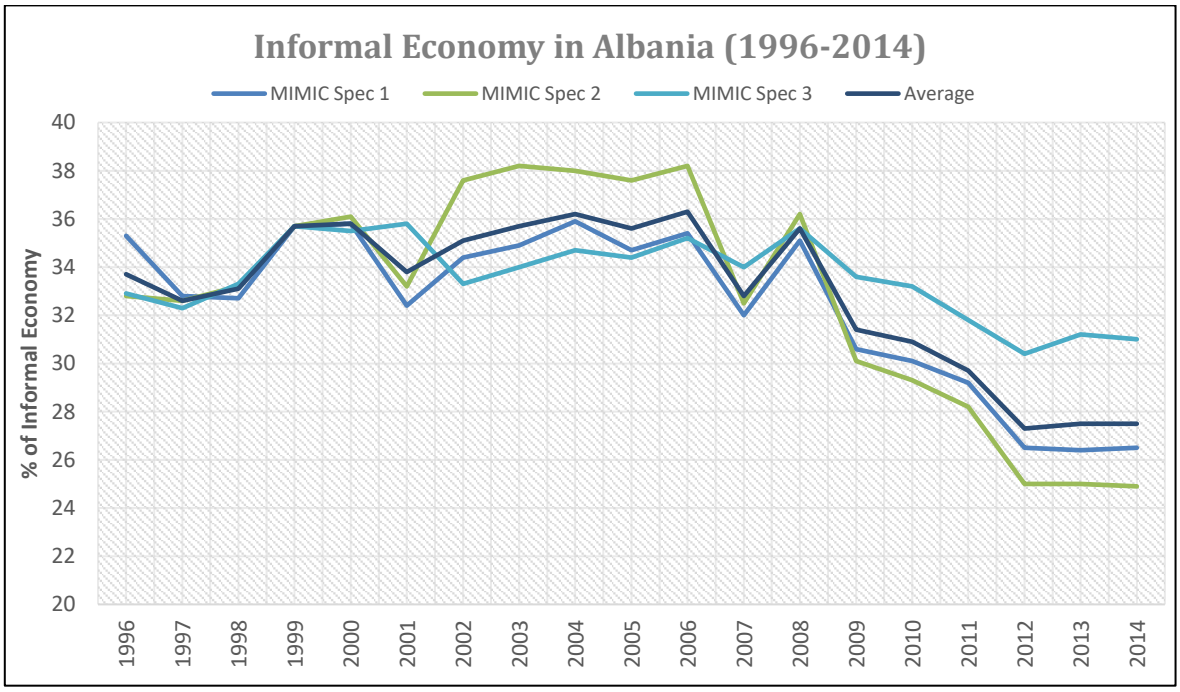
violent riots. There was a total collapse of the institutions which required UN intervention to stabilise the country over the following years (Schautzer, 2005; Anastasakis, 2013).

Such mistrust from people in their government and the failing of the government to be effective in the circular flow of the economy, and in ensuring a well-functioning rule of law in Albania could potentially be the cause of the increasing trend of the informal economy in the country between 1997 and 2006. Since then, Albania has been working towards fulfilling all the criteria in becoming a candidate EU country, to start the negotiation process for full EU membership. In this process, significant reforms discussed in chapter four have taken place. All these developments have been reflected in the variables used in the MIMIC regressions. It is important to note here that there have been significant improvements in the Government Effectiveness (World Bank, 2017[123]), Rule of Law, Control of Corruption, and Business Freedom index for Albania. These indexes indicate the reforms that were carried out in Albania over the years.

The results from the three MIMIC specifications (shown below) are not very different between them. Level of informality is high in all three specifications reaching levels of above 30 percent of GDP. MIMIC Spec 3 produces a slightly higher average estimate than the other two specifications, and this is mostly down to the fact that MIMIC Spec 3 captures in its causal variables the level of unemployment. The level of unemployment is high in Albania, and theoretically this is positively correlated with informality. This is therefore supported by the empirical estimates of this study.

[123] Available from http://www.worldbank.org/en/country/albania/overview (last accessed on 22.11.2017)

Figure 6.10. 1 - The development of the informal economy in Albania with estimates from three MIMIC models and their descriptive statistics.



Albania:	Mean	Std. Dev.	Min	Max
MIMIC Spec 1	32.44	3.33	26.4	35.9
MIMIC Spec 2	32.86	4.64	24.9	38.2
MIMIC Spec 3	33.57	1.67	30.4	35.8

Bosnia and Herzegovina

The development of the size of the informal economy in Bosnia and Herzegovina has followed a declining trend from 2008 onwards. However, from 1996 to 2000 there was a significant increase of the informal economy in Bosnia and Herzegovina, according to the estimation results from the three MIMIC specifications. The fluctuation of the informal economy has been presented in the below statistics indicating the minimum and maximum values as well as averages for each of the three MIMIC specifications. The average size of the informal economy according to these results ranges between 32 and just over 35 percent of GDP.

Bosnia and Herzegovina came out of a terrible war in late 1995. The war started in Bosnia and Herzegovina in 1992 when they declared independence from Yugoslavia. Before this, there was political and economic chaos, leading to a brutal war in Bosnia and Herzegovina, and Croatia. The economic situation in Bosnia and Herzegovina after the war has been characterised by many mutually conflicting goals between the different ethnicities in the country who share the power in a complex arrangement of political framework and system of government (Zupcevic & Causevic, 2009). There are currently two entities in Bosnia and Herzegovina, the Republika Srpska and the Federation of Bosnia and Herzegovina. Within this system there is the constant backdrop of different aspirations: for example, Republika Srpska seeks greater autonomy, Croats seek a third entity, and the Bosniaks hoping for a more centrally governed country (Nardelli et al. 2014). This complicated government system and differing aspirations have severely affected economic growth and the labour market equilibrium in the country (Zupcevic & Causevic, 2009).

This complicated government system creates additional bureaucracies and regulation, making it harder and more expensive for companies or individuals to operate freely in the official or formal economy. This means that they can turn to informal economic activities to avoid such regulation burden. This potentially explains why the size of the informal economy in the country has increased significantly from 1996 to 2001. The low level of informal economy in 1996 before it started to increase indicates that the disastrous war in Bosnia and Herzegovina affected not only the formal economy but the informal one too.

From 2008 onwards, the level of informal economy in Bosnia and Herzegovina has followed a declining trend. The country has been working hard to implement reforms to join the EU. As discussed in detail in chapter four, these reforms are reflected in the variables used in the

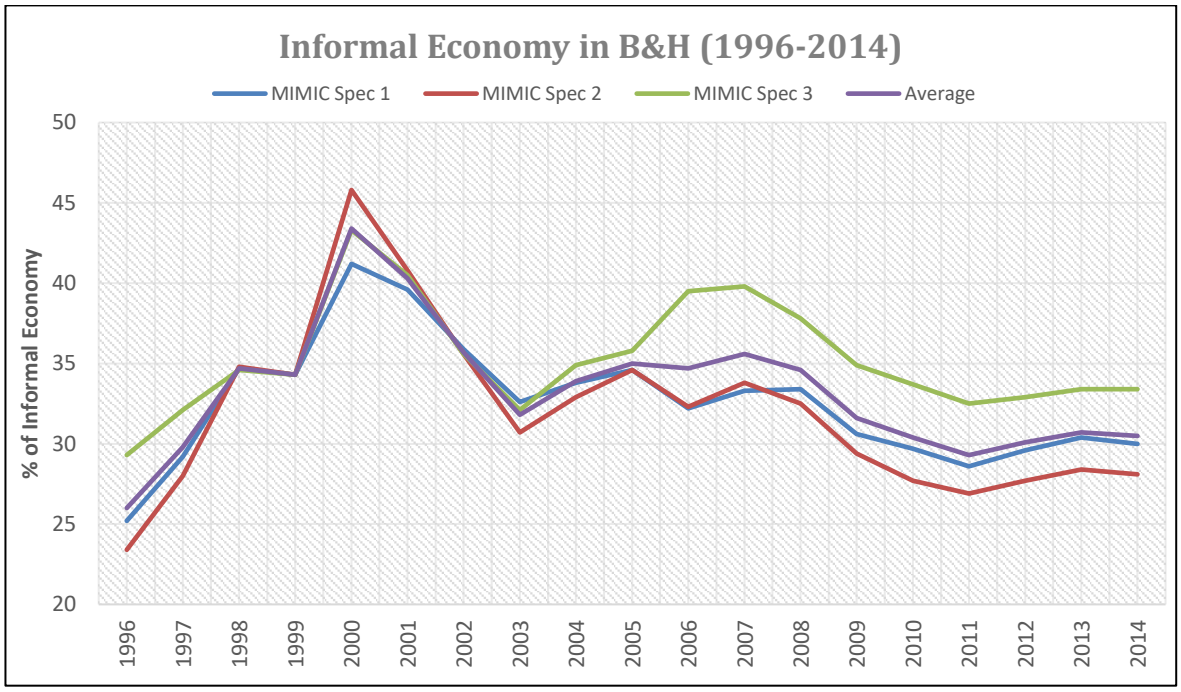
MIMIC regressions, such as that of Control of Corruption Index, Business Freedom Index and Government effectiveness index, which indicate significant improvements in the country. This explains why the size of the informal economy has started to decline over the years after 2001.

However, the size of the informal economy can be considered as high according to the results from the MIMIC specifications. Such levels of economic informality can be explained by the ongoing existence of barriers which tend to prolong economic development in the country such as inefficient administration and regulation burden, political instability and complexity leading to popular mistrust, corruption, government instability and ineffectiveness, and fiscal burden. Despite this, the entities that constitute Bosnia and Herzegovina adopted a joint program of structural reforms known as the reform agenda, which is partly influenced by the EU (World Bank, 2017[124]).

There is no significant variance between the results or estimates provided by the three MIMIC models for Bosnia and Herzegovina. MIMIC Spec 3 for Bosnia and Herzegovina too produces a slightly higher average estimate than the other two specifications, and this is mostly down to the fact that MIMIC Spec 3 captures in its causal variables the level of unemployment. The level of unemployment is still high in this country, driving people to work informally.

[124] Available from http://www.worldbank.org/en/country/bosniaandherzegovina/overview (last accessed on 20.11.2017)

Figure 6.10. 2 - The development of the informal economy in Bosnia and Herzegovina with estimates from three MIMIC models and their descriptive statistics.



B and H:	Mean	Std. Dev.	Min	Max
MIMIC Spec 1	32.57	3.82	25.2	41.2
MIMIC Spec 2	31.98	5.24	23.4	45.8
MIMIC Spec 3	35.28	3.47	29.3	43.3

Bulgaria

According to estimates from the MIMIC specifications, the informal economy in Bulgaria has declined significantly from 2002 onwards. Before 2002, there was an expanding informal economy in the country as indicated in the results in Appendix 6.8.1 and illustrated in the figure below. On average the size of the informal economy in Bulgaria circulates between 29.3 to almost 33 percent of GDP. The results from the three MIMIC specifications do not vary significantly between them.

Bulgaria, along with other EU member states from the Balkan Peninsula, has undergone a significant transformation and structural reforms over the past three decades and in

particular from 2000 onwards. Such reforms and transformation secured Bulgaria's membership in the EU on the 1st of January 2007 (World Bank, 2017[125]).

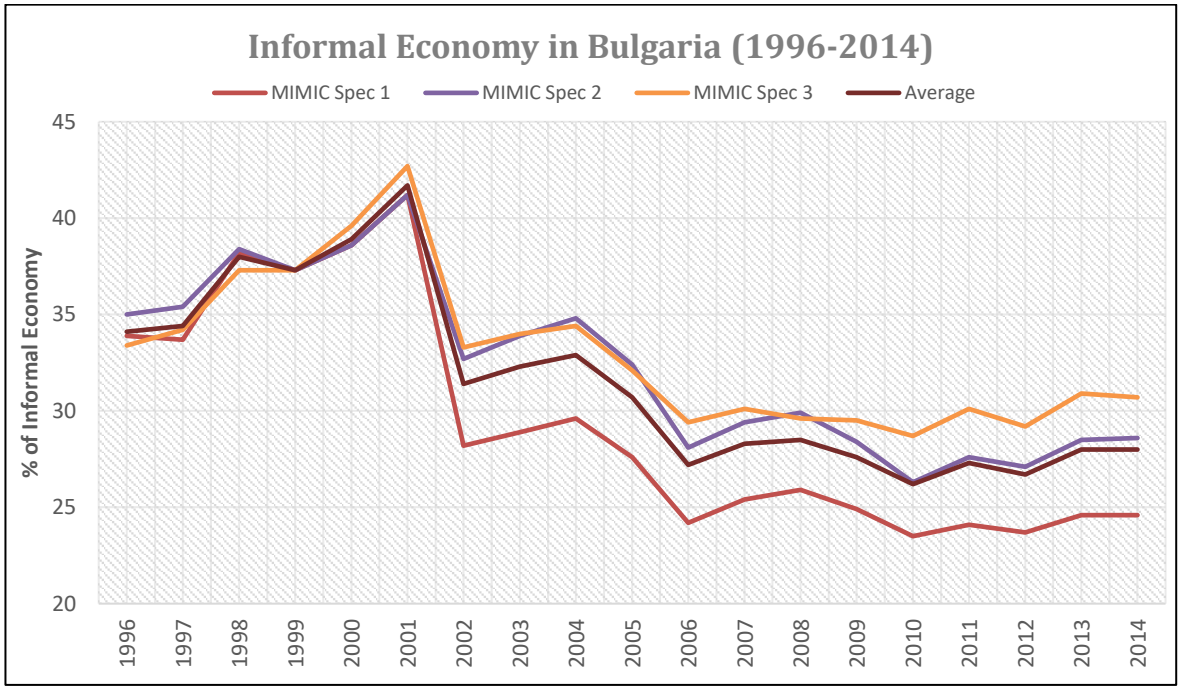
The country has managed to speed up the process of transition from a highly centralised, planned economic system to an open, market-based economy. B&H is an upper-middle-income economy according to World Bank. However, after many years of reasonably high economic growth and job creation, Bulgaria was affected by the 2008 financial crisis. The level of GDP and incomes decreased in Bulgaria in 2009, causing the unemployment rate to increase. However, Bulgaria was able to recover relatively quickly, and the current trends in the Bulgarian labour market show a growing number of employed and a decreasing unemployment rate (Mitra & Pauvelle, 2012).

Bulgaria has restructured and reformed the active labour market activities over the years from 2001 onwards, as well as reforming the regulation and taxation burden in the country. Reforms have also taken place in the employment laws (Loukanova & Tzanov, 2017). Such reforms are reflected in the data used for the MIMIC specifications as well, and discussed in detail in chapter four. The Bulgarian economy has been growing for four consecutive years after 2012 as indicated in section 4.4 of chapter four. Furthermore, the number of employed over 15 years of age began to increase in 2012 and passed over the 3 million thresholds after 2014 (Loukanova & Tzanov, 2017). Since joining EU, Bulgaria has seen significant numbers of citizens emigrate from the country to other EU countries for employment opportunities. All these factors can explain and justify the lower size of the informal economy in Bulgaria after 2001.

[125] Available from http://www.worldbank.org/en/country/bulgaria/overview (last accessed on 22.11.2017)

Although the size of the informal economy has shown a declining trend over the years in Bulgaria according to the results from the MIMIC Specifications, its size is still large compared with other EU members from the Balkan peninsula and the rest of the union. Such large size of the informal economy can potentially be explained by the problems related to poverty and social inclusions in a country (Milanovic, 1999). The overall scope of poverty is estimated to be over 20 percent of the population in Bulgaria (Loukanova & Tzanov, 2017). The risks of poverty and social exclusion in Bulgaria are considerably higher than in the other EU countries.

Figure 6.10. 3 - The development of the informal economy in Bulgaria with estimates from three MIMIC models and their descriptive statistics.



Bulgaria:	Mean	Std. Dev.	Min	Max
MIMIC Spec 1	29.37	5.89	23.5	41.2
MIMIC Spec 2	32.29	4.52	26.3	41.2
MIMIC Spec 3	32.97	3.92	28.7	42.7

Croatia

The informal economy in Croatia has fluctuated between 29 percent and 37 percent of GDP. The development of the informal economy in Croatia followed a declining trend from 1996 to 2009, and then a slightly increasing trend from 2010 onwards, as per the results of the MIMIC specifications, presented in the figure below. World Bank classifies Croatia as an upper middle-income country. The average size of the informal economy in Croatia ranges between 32 and 33 percent of GDP, as indicated by the results of this study. There is no significant difference in the estimates provided by the three MIMIC specifications.

Before 1997, Croatia's economy suffered a great deal from the war after their declaration of independence from Yugoslavia. The war that started in 1992 dragged for over three years. However, after the war, Croatia's economy grew significantly over the years preceding the global financial crisis of 2008. This growth was driven by a boom in domestic consumption and investment which were predominantly financed by foreign capital. This economic growth could potentially explain the declining trend of the informal economy in the country from 1997 onwards.

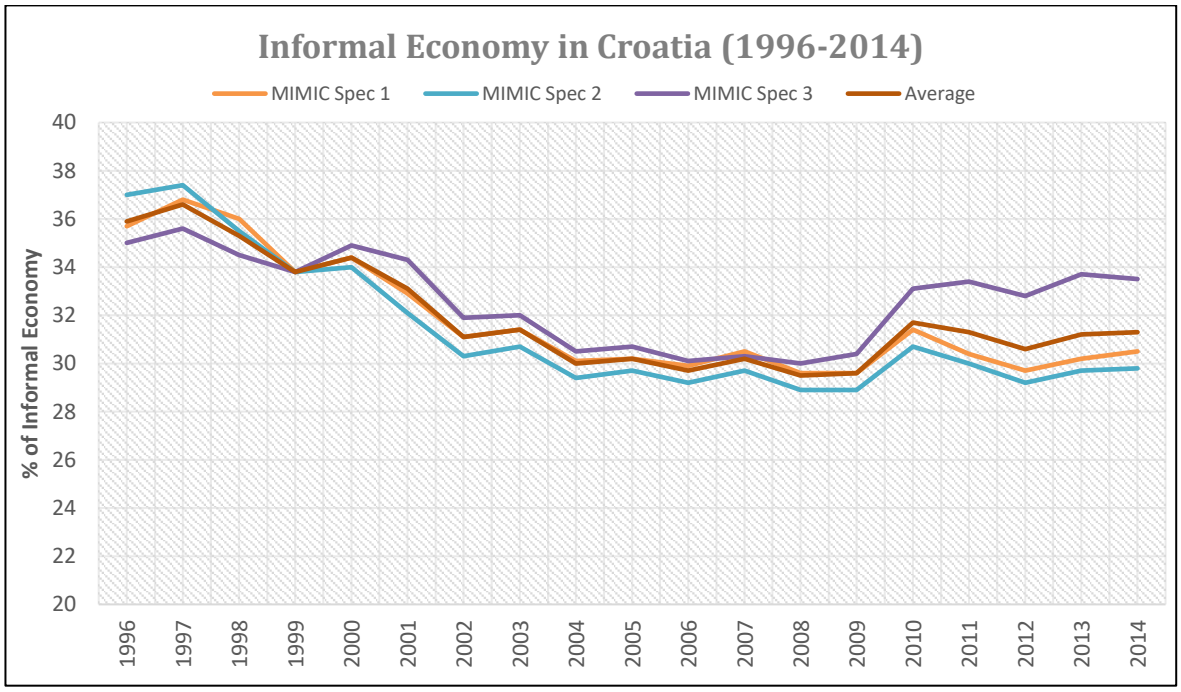
Like many other countries in Europe, Croatia too was affected by the financial crisis of 2008. According to World Bank data, between 2009 and 2010, the GDP in Croatia contracted by about 7 percent, and then a further contraction of 0.7 percent in 2011 (World Bank, 2017[126]). Such economic downturn had other consequences such as rising unemployment and low productivity, which made a recovery challenging in the country. This also affected the development and structural reforms that were taking place in Croatia over the years,

[126] Available from http://www.worldbank.org/en/country/croatia/overview (last accessed on 22.11.2017)

especially after the war. Such effects are reflected in the data used in the regressions for the MIMIC specifications, which then affected the estimates of the informal economy. The estimates of the size of the informal economy show that there was an increasing trend of the informal economy in Croatia from 2009 onwards.

Croatia is an EU member since July 2013. In order to join the EU, Croatia had to undergo significant reforms in the rule of law, democratic accountability and had to show significant results in the fight against corruption with particular emphasis on the fight against high-level political corruption (Elbasani & Sabic, 2017). These reforms and the wide-ranging legal and institutional anti-corruption framework have significantly improved the public trust in the government institutions in the country. Other reforms in favour of competition and market-oriented economy have developed, such as tax reforms and the creation of a more favourable environment for doing business. Such reforms are also reflected in the data used in the MIMIC specifications and the estimates on the size of the informal economy illustrated in the figure below.

Figure 6.10. 4 - The development of the informal economy in Croatia with estimates from three MIMIC models and their descriptive statistics.



Croatia:	Mean	Std. Dev.	Min	Max
MIMIC Spec 1	31.80	2.38	29.60	36.80
MIMIC Spec 2	31.37	2.78	28.90	37.40
MIMIC Spec 3	32.66	1.87	30.00	35.60

Greece

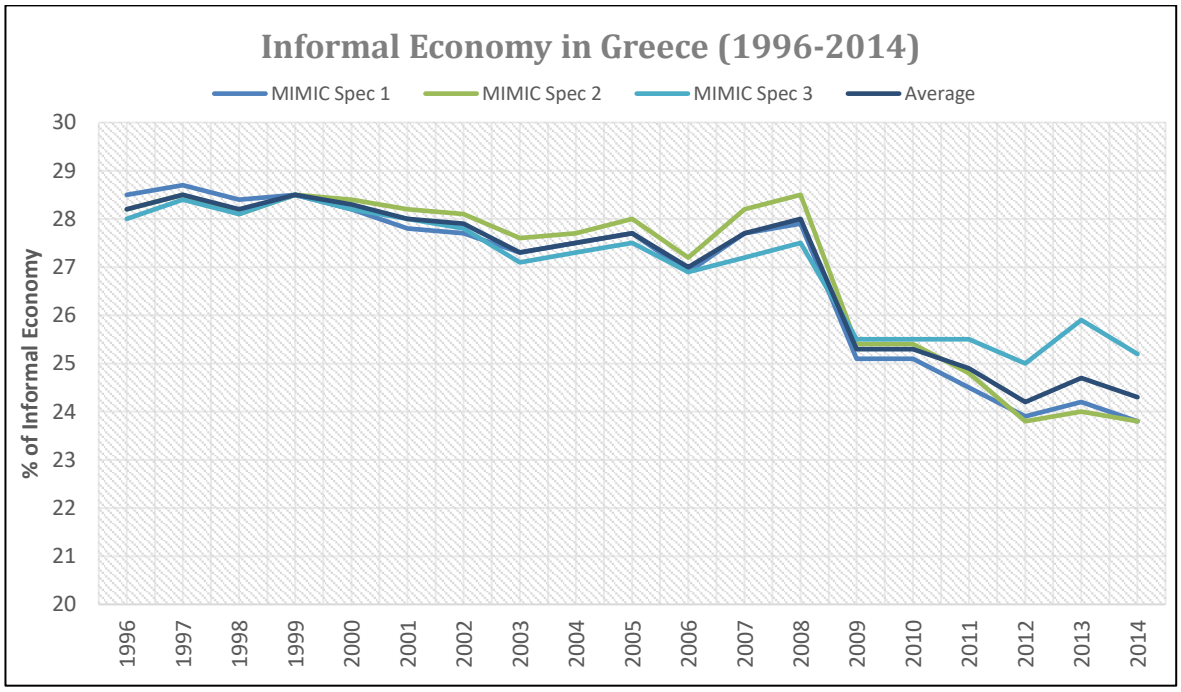
Greece's informal economy had followed a declining trend throughout the years, except 2008, when the size of the informal economy increased slightly, as indicated by the estimates of this study. The size of the informal economy in Greece has been and still is considered to be high in relation to other developed OECD and EU countries. Greece's informal economy, according to the results from MIMIC Spec 1, 2 and 3, ranges between 26 and 27 percent of GDP. Three MIMIC Specifications produce relative similar results, with no significant differences between them on average terms.

As a high-income country and highly integrated with the rest of the EU and the world, Greece was severely affected by the global financial crisis of 2008. Recession in the country resulted in rising unemployment rate and falling aggregate demand. This exacerbated the sovereign debt crisis in the country, and after six years of externally-supervised adjustment and financial support, the economy of Greece shows little sign of improvements, according to the data from World Bank[127]. Such, recovery was not easy for Greece, as they had to implement a number of measures to reduce sovereign debt. Measures such as increasing the rate of taxation on income and the reduction of public workers' salaries, can lead to an increase in the size of the informal economy (Bizenis et al., 2016). Other government policies such as severe austerity measures can also encourage people to enter the informal economy.

The results presented in the figure below, indicate a slightly increasing trend of the informal economy in Greece after 2008. The estimates using MIMIC Spec 3, show that the size of the informal economy has started to pick up from 2008 onwards. There was a rise in the number of people employed in the informal economy, and this can lead to an overall increase in the size of the informal economy in the country (Bizenis et al., 2016). Bitzenis et al. (2016) criticise the lack of adequate policies for tax collection, tax auditing and tax enforcement in Greece for high levels of the informal economy relative to other EU and OECD countries. They argue that policy enforcement has to be strict since tax enforcement, effective auditing and tax collection, are negatively correlated with the size of the informal economy and can improve the tax morale and public trust in governmental institutions.

[127] Available from http://www.worldbank.org/en/country/greece/overview (last accessed on 21.11.2017)

Figure 6.10. 5 - The development of the informal economy in Greece with estimates from three MIMIC models and their descriptive statistics.



Greece:	Mean	Std. Dev.	Min	Max
MIMIC Spec 1	26.81	1.74	23.80	28.70
MIMIC Spec 2	26.97	1.78	23.80	28.50
MIMIC Spec 3	27.01	1.19	25.00	28.50

FYR Macedonia

The size of the informal economy in FYR Macedonia remained higher than all other countries part of this study throughout the period of this study. The results from the three MIMIC specifications reveal that there was a significant increase in the size of the informal economy between 1996 to a peak in 2003, as illustrated in the figure below. The average size of the informal economy in this country ranges between 38 and 39 percent of GDP, according to results of this study.

Since 2003, the informal economy in FYR Macedonia has started to decline, albeit there was a slight increase in 2009. The peak in the size of the informal economy in FYR Macedonia from

2000 to 2003 could be explained by severe ethnic tensions in the country between a sizeable ethnic Albanians and majority Macedonians, which resulted in ethnic conflict with severe casualties. The uncertainty created as a result of the conflict and the tensions that followed until the Ohrid Framework Agreement in 2001, affected the macroeconomic developments in the country significantly (Reka, 2011). Such effects could have potentially fuelled the increase in the size of the informal economy in the country, due to popular mistrust in the government institutions, predominately by the Albanian community.

Since then, however, FYR Macedonia is classified as an upper-middle-income country by the World Bank and a country which has made significant progress in reforming its economy over the past decade. The country experienced good economic growth from 2002 to 2008 according to section 4.4 of chapter four. The growth of GDP from 2002 to 2008 with an average of 4.3 percent, can potentially explain the declining trend of the informal economy in the country over these same years, as illustrated in the figure below (World Bank, 2017[128]). However, since 2009, the annual growth rate of GDP has decreased by just over 2 percent every year, which could potentially explain the increased size of the informal economy in 2009.

Since 2009, the estimates from the MIMIC specifications show that the size of the informal economy in FYR Macedonia has been declining. The main reform agenda concerning the government of FYR Macedonia is working towards implementing all the reforms for the EU membership. FYR Macedonia became an EU candidate country in 2005 and since 2009 the European Commission (EC hereafter) has recommended opening accession negotiations. The EC provides funding and has an active program of assistance to FYR Macedonia, influencing

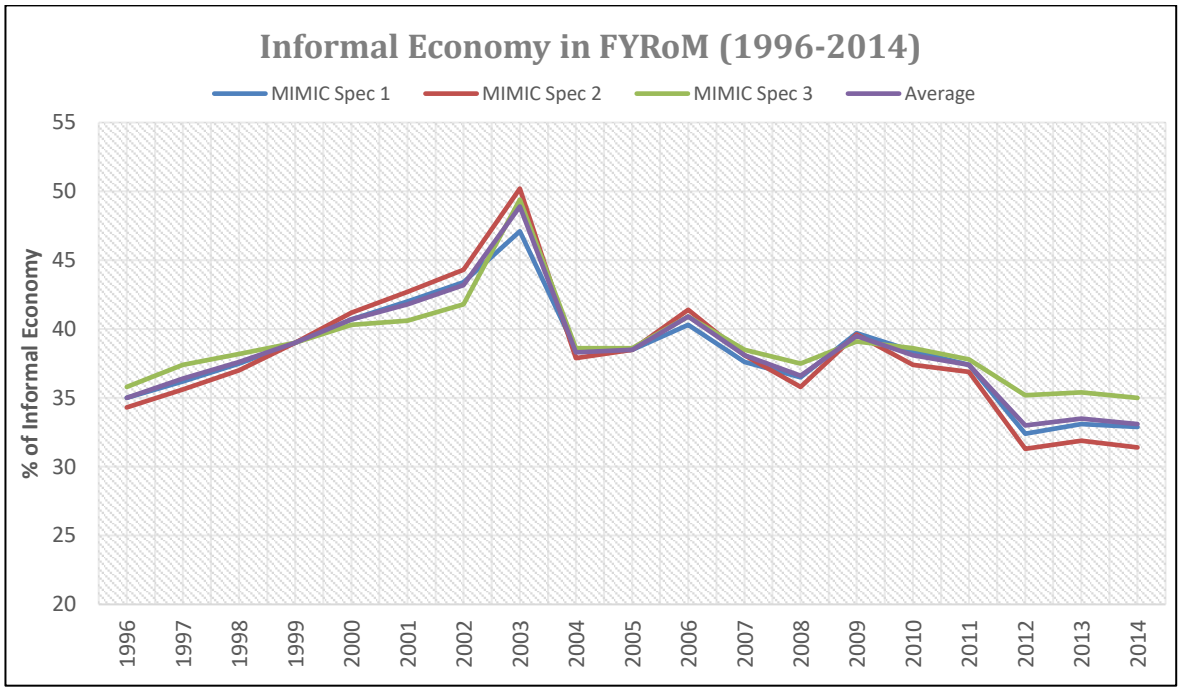
[128] Available from http://www.worldbank.org/en/country/macedonia/overview, (last accessed on 19.11.2017)

and helping with significant reforms in the country. Such reforms are reflected in the variables and data used in MIMIC specifications and hence have been reflected in the results on the size of the informal economy shown below. The results from the three MIMIC specifications show very similar results for FYR Macedonia, indicating similar influence from all causal variables.

The economic growth from 2002 to 2008, did not translate into significant poverty reduction in FYR Macedonia. However, the poverty levels have declined slightly in recent years (World Bank, 2016[129]). This could potentially explain the declining trend of the informal economy in recent years. Even though there is a declining trend in the size of the informal economy in FYR Macedonia, its size remains high according to these estimates. FYR Macedonia's informal economy is found to be the highest amongst the other Balkan countries. For this, we can blame the prolonged political uncertainties in the country that to date are present. Such political uncertainties can potentially affect investment decisions and slow economic activity as well as create widespread mistrust in the governmental institutions, forcing people to enter the informal economy.

[129] Available from http://pubdocs.worldbank.org/en/698951475670457231/Macedonia-Snapshot-Oct2016FINAL.pdf (Last accessed on 19.11.2017)

Figure 6.10. 6 - The development of the informal economy in FYR Macedonia with estimates from three MIMIC models and their descriptive statistics.



FYR Macedonia:	Mean	Std. Dev.	Min	Max
MIMIC Spec 1	38.22	3.66	32.40	47.10
MIMIC Spec 2	38.13	4.65	31.30	50.20
MIMIC Spec 3	38.83	3.20	35.00	49.40

Romania

Romania's informal economy has declined significantly over the years. This significant decline in the size of the informal economy in Romania was more significant momentum from 2004 onwards, as shown in the figure from the estimates of the MIMIC specifications. MIMIC Spec 3 estimates, however, indicate a much lower reduction in this declining trend in the informal economy in Romania. MIMIC Spec 3 results are in line with other studies discussed in section 6.12.

Romania, just like other East and Central European countries, started a slow and lengthy process of transition and democratisation after the collapse of communism. During this

transition period, Romania's economic and employment structure shifted from one based on industry and agriculture towards one relying more on services. In the process of significant social, judicial and economic reforms Romania was allowed to join the EU in 2007. Romania's focus in the fight against corruption was also significant over the years, receiving strong public support. The data from World Bank shows that Romania has enjoyed gradual but continuous growth in most of their macroeconomic indicators in recent years (World Bank, 2017[130]). This has been mainly driven by the level of investments and exports mainly to the EU (World Bank, 2017[131]). This explains the declining trend of the informal economy in Romania over the years.

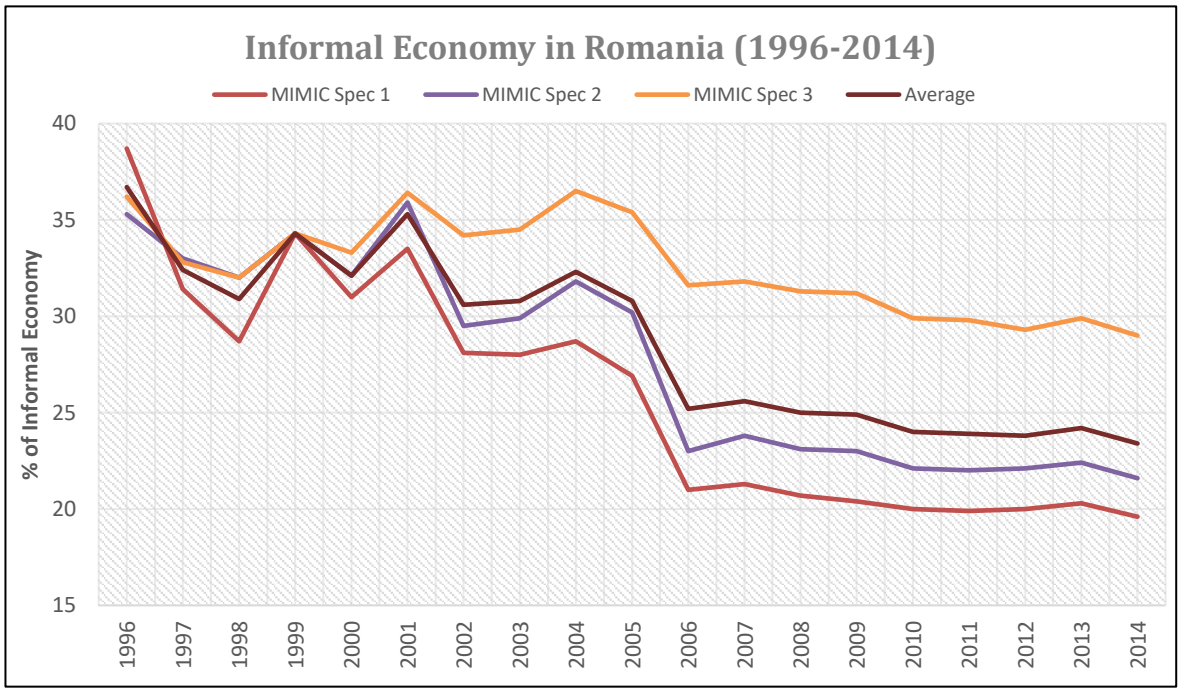
Despite this, the size of the informal economy in Romania is still considered to be high. The results presented below in the figure reveal that on average, the informal economy in Romania ranges from almost 26 percent to almost 33 percent of GDP. Such figures can be explained by the fact that, according to World Bank data, Romania has one of the highest poverty rates in the EU.

It is important to note here the difference in the size of the informal economy varying in the three MIMIC specifications presented below. MIMIC Spec 1 produces an average of 25.92 percent for the size of the informal economy, which is in line with MIMIC Spec 2 average estimate of 27.74 percent. However, both MIMIC Spec 1 and Spec 2 vary quite significantly with the average estimate produced by MIMIC Spec 3. MIMIC Spec 3 has an average estimate for the size of the informal economy of almost 33 percent of GDP as shown below in figure 6.10.7. MIMIC Spec 3 uses same causal variables as MIMIC Spec 1 and 2, with the exception of a proxy for unemployment. MIMIC Spec 3 makes use of the employment to population

[130] Available from http://www.worldbank.org/en/country/romania (Last accessed on 20.11.2017)
[131] Ibid.

ratio to capture the effect of unemployment in the country. This signifies the importance of level of unemployment in forcing people to work in the informal sector.

Figure 6.10. 7 - The development of the informal economy in Romania with estimates from three MIMIC models and their descriptive statistics.



Romania:	Mean	Std. Dev.	Min	Max
MIMIC Spec 1	25.92	6.03	19.60	38.70
MIMIC Spec 2	27.74	5.31	21.60	35.90
MIMIC Spec 3	32.60	2.49	29.00	36.50

Serbia

The informal economy in Serbia also followed a significant decline from 2006 onwards, as shown in the figure below. The results show that there was, however, a significant increase in the size of the informal economy between 1996 and 2000. Results of this study indicate that the size of the informal economy in Serbia ranges between 28 percent and 31 percent of GDP.

Serbia is classified as a middle-income country from the World Bank. It is also a candidate for EU membership. The early 1990s, as well as late 1990s, found Serbia involved in several wars in the region, as former republics and federative provinces in Yugoslavia declared independence. There were several economic sanctions placed on Serbia for waging these wars. Political, social and economic instability during the 1990s could potentially explain the relatively large and increasing size of the informal economy in Serbia until 2000 (World Bank, 2017[132]). The basis for social and economic reforms as well as effective governance and other structural reforms for changing Serbia's path towards EU integration, were laid with the ousting of the president of Serbia, Slobodan Milosevic in October 2000.

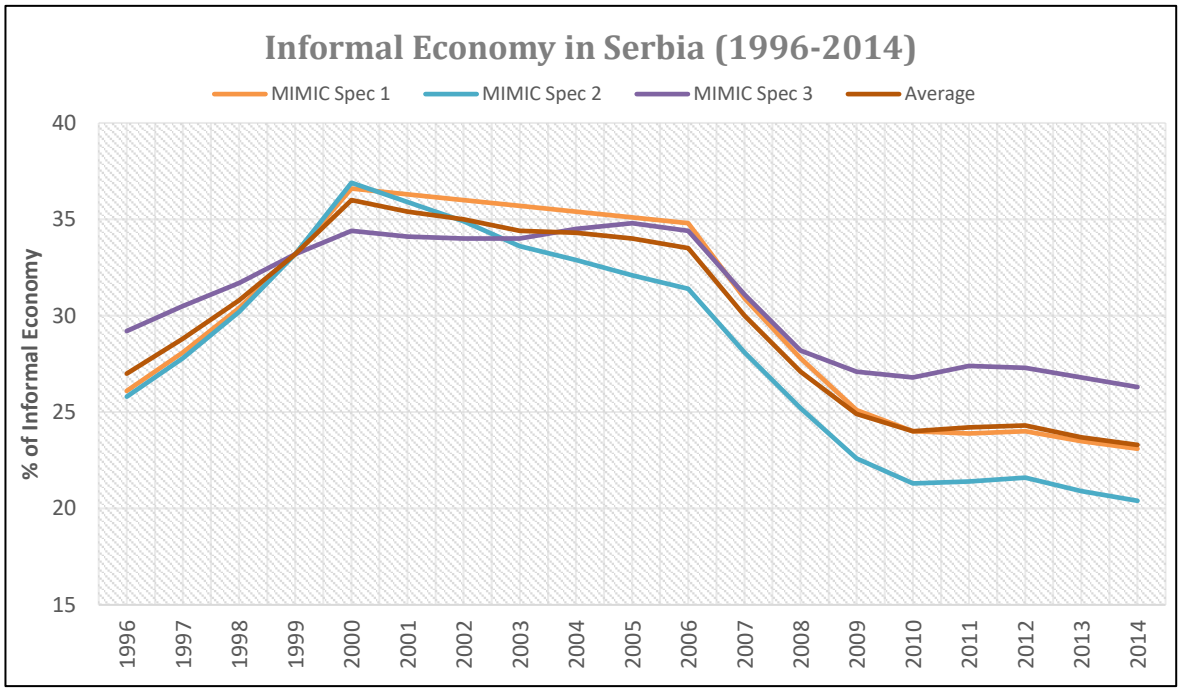
From 2001 onwards, Serbia has made considerable progress on various economic and social reforms, despite political instability. Such reforms have been one of the main reasons that in June 2013 the European Council endorsed the Council of Minister's conclusions and recommendations to open accession negotiations with Serbia for EU membership. Furthermore, the social and economic reforms have resulted in relatively more democracy, thus improving further the capacity of the country to steadily work towards EU integrations and further reforms (World Bank, 2017[133]). Such developments are reflected in the data used for regressions in the MIMIC models. Such developments in Serbia are also reflected in the results of the informal economy, whose estimates have been generated using the MIMIC specifications.

Serbia's informal economy estimated using MIMIC Spec 2 varies with the estimates produced from MIMIC Spec 1 and 3. MIMIC Spec 2 uses Corruption as one of the causal variables of

[132] Available from http://www.worldbank.org/en/country/serbia/overview (last accessed 20.11.2017)
[133] Ibid.

informality. Other two specifications do not use this variable. The level of corruption is quite high in Serbia and other Western Balkan countries. Indeed, one of the most important criteria for Serbia's EU integration is the fight against corruption. These results indicate that corruption is a key driver of informality in Serbia and tends to be more so in those countries where the level of corruption is high.

Figure 6.10. 8 - The development of the informal economy in Serbia with estimates from three MIMIC models and their descriptive statistics.



Serbia:	Mean	Std. Dev.	Min	Max
MIMIC Spec 1	30.00	5.21	23.10	36.60
MIMIC Spec 2	28.22	5.69	20.40	36.90
MIMIC Spec 3	30.83	3.27	26.30	34.80

Slovenia

Slovenia's informal economy has remained lower than the rest of the other 9 Balkan countries in these estimates provided by the three MIMIC specifications. Overall the estimates reveal a declining trend in the size of the informal economy in Slovenia. On average terms, the size of the informal economy in Slovenia ranges between 24 and 26 percent of GDP, as per the results of this study. There is no significant difference in the estimates produced from three MIMIC specifications.

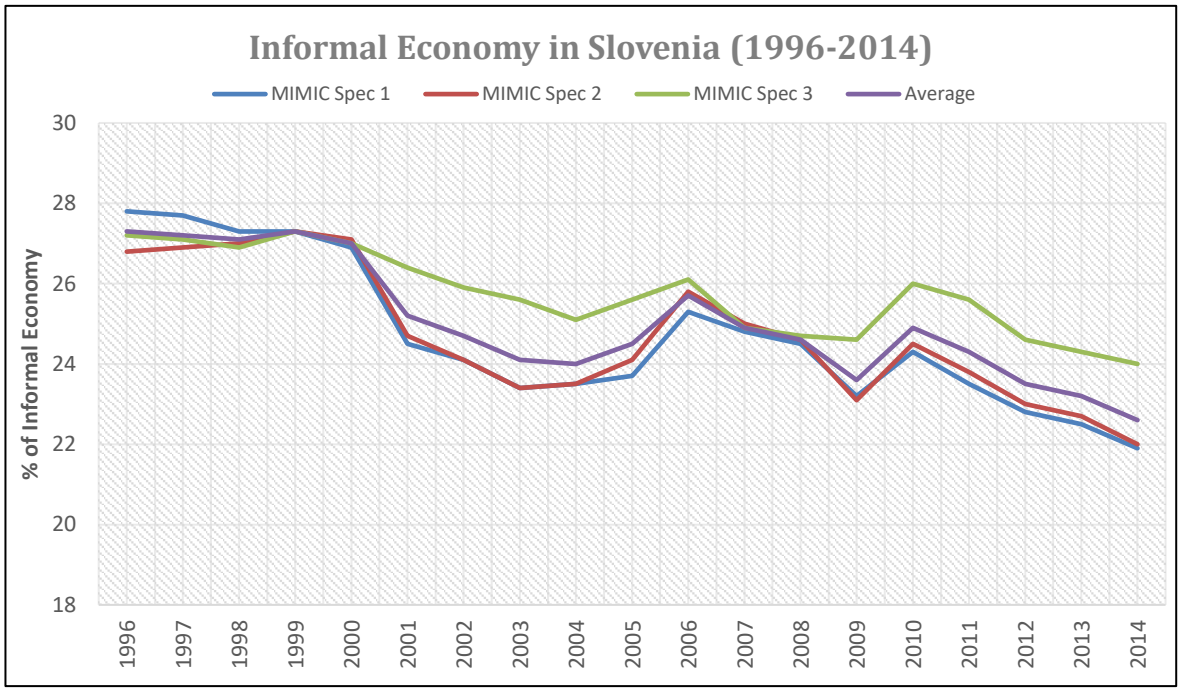
Slovenia formally declared independence from Yugoslavia in 1991. The country approved new constitution introducing a parliamentary political system. Before independence, membership in the EU was one of the main aims politically and economically for Slovenia, encouraging the government to focus on reforms which would make their aspirations towards EU membership a reality (Verbic et al., 2016). Slovenia joined EU in 2004 and became a full member of OECD in 2010. In these processes, Slovenia had undergone several social, judicial and economic reforms in line with the criteria of EU and OCED membership. Such reforms are reflected in the data used to estimate the size of the informal economy in the country.

The slight increase in the informal economy between 2008 and 2010 signifies the potential impact of the global financial crisis of 2008 for Slovenia (World Bank, 2017[134]). A reduction in GDP growth and rising unemployment as well as rising government debt adversely affected and exacerbated the impact of the financial crisis in the country (Verbic et al., 2016). The size of the informal economy is still considered as high in comparison with other EU and OECD countries. According to Heritage Foundation, one reason for this could be that institutional

[134] Available from http://www.worldbank.org/en/country/slovenia/overview (last accessed on 22.11.2017)

weaknesses continue to have a negative impact on the long-term economic development. Particularly, the Heritage Foundation has noticed instances where there are still some political interferences in the judicial system, and this coupled with higher level of corruption in comparison to other EU members continue to be disruptive to the overal judicial system in Slovenia.

Figure 6.10. 9 - The development of the informal economy in Slovenia with estimates from three MIMIC models and their descriptive statistics.



Slovenia:	Mean	Std. Dev.	Min	Max
MIMIC Spec 1	24.68	1.86	21.90	27.80
MIMIC Spec 2	24.71	1.66	22.00	27.30
MIMIC Spec 3	25.73	1.05	24.00	27.30

Turkey

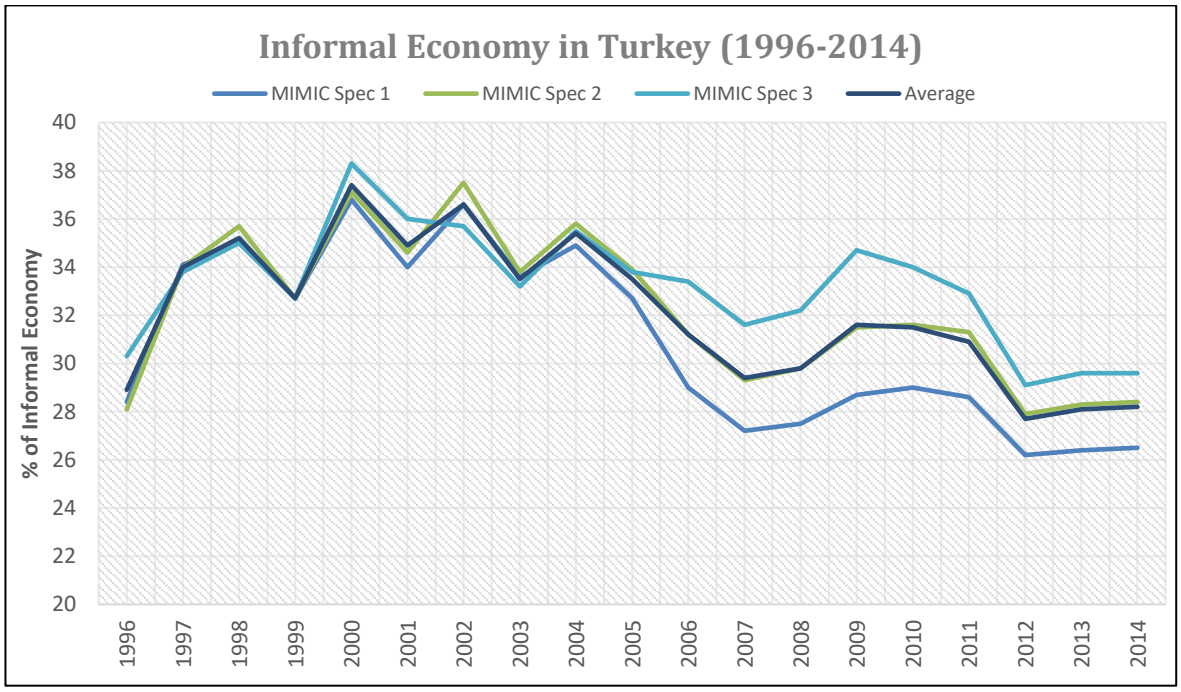
The size of the informal economy in Turkey reached more than 38 percent in 2000 according to the estimates provided from MIMIC Spec 2. Turkey's size of the informal economy has followed more of a bumpy ride from 1996 to 2011. Since then its size has declined, as indicated by the results from the estimates generated using the three MIMIC specifications.

Turkey's economic performance since 2000 has been very significant with macroeconomic and fiscal stability. This steady economic progress was translated into increased employment and incomes. World Bank now classifies Turkey as an upper middle-income country (World Bank, 2017[135]). This economic performance explains the declining trend of the informal economy in the estimates presented in the figure below. Improvements in the government effectiveness and the rule of law indexes as well as reforms in the business environment can also lead to a reduction of the informal economy over the years. However, the size of the informal economy in Turkey is still high. Turkey's informal economy ranges between just under 31 and over 33 percent of GDP, as per the results of this study. This is blamed mainly on the geopolitical climate in the country which prolongs the momentum of reforms and economic development in Turkey.

MIMIC Spec 2 and 3 produce a slightly higher informal economy results than MIMIC Spec 1. MIMIC Spec 2 uses Corruption as one of the causal variables, while other MIMIC Specifications do not. MIMIC Spec 3 uses a proxy for unemployment, while other specifications do not. In both cases therefore we can indirectly see the impact of corruption and unemployment on the level of informality for Turkey.

[135] Available from http://www.worldbank.org/en/country/turkey/overview (Last accessed 01.12.2017)

Figure 6.10. 10 - The development of the informal economy in Turkey with estimates from three MIMIC models and their descriptive statistics.



Turkey:	Mean	Std. Dev.	Min	Max
MIMIC Spec 1	30.94	3.68	26.20	36.80
MIMIC Spec 2	32.24	3.11	27.90	37.50
MIMIC Spec 3	33.23	2.44	29.10	38.30

6.11. Impact of informality on Government Revenues

The size of the informal economy has an impact on the level of the tax revenues that a government can collect and then spend on the provision of public goods, services and infrastructure. Tanzi (1983), Giles (1999), and Faal (2003) conduct some estimates for the size of lost tax revenues for governments in various countries based on their estimates of the size of the informal economy, by assuming that the informal economic activities would have been taxed at the same rates as the official economic activities. Based on this approach, this thesis presents the impact of the level of informal economy on tax revenues.

This approach has used tax revenues (as percentage of GDP)[136] to derive a value that governments part of this research loose in tax revenues as a result of the informal economy. It has first calculated the level of current government revenues based on this tax rate and then calculated the level of the informal economy using the average percentage of GDP rate from the three MIMIC specifications. It then derived the potential government revenues by adding the lost revenues as a result of informality and the current level of government revenues based on the tax rate. Appendix 6.12.5 shows the results of the impact of informal economy on the level of government revenues.

The first part on the graphs shows the different between lost government revenues (in yellow) and the current government revenues (in blue). The line in the first part of the graph (orange) shows the level of lost revenues as percentage of current government revenues based on the tax rate. Government revenues from taxation for all countries of the Balkan

[136] Tax Revenue as a percentage of GDP has been taken from World Bank Development Indicators database. This variable has been used as a proxy for the true level of tax rate in the Balkan economies.

Peninsula have been increasing as illustrated in the graph. While the value of the lost government revenues from taxation as a result of informality has also increased in absolute values, the percentage of lost revenues is falling for all the countries part of this research, as a direct result of slight falling levels in the size of the informal economy.

Part two on each of the graphs in Figures 6.11.1 to 6.11.10 shows the tax revenues gap for all the countries part of this research. The tax revenues gap is the difference between the Potential Tax revenues as percentage of GDP and the Current Tax revenues as percentage of GDP. It must be noted that the size of the tax revenues gap is gradually reducing in all the countries, as the level of informal economy is also slightly declining on average terms from 1996 to 2014.

Nevertheless, the size of lost government revenues from taxation is significant. On average just over six percent[137] of GDP in government revenues from taxation is being lost due to informality. During the period of 1996 to 2014, Albania's tax revenues gap was approximately 7% on average; Bosnia and Herzegovina's tax revenues gap was 7.17% on average; Bulgaria's tax revenues gap was about 5.88%; Croatia's tax revenues gap was 6.61% for the period; Greece's tax revenues gap was 5.63% on average over the period, FYR Macedonia's tax revenues gap was almost 7.35% on average; Romania's tax revenues gap was just over 4.9% on average; Serbia's tax revenues gap was 5.7% on average; Slovenia's tax revenues gap was 4.92% on average; and Turkey's tax revenues gap was 5.55% on average.

[137] The 6.07% of GDP in government tax revenues being lost as a result of informality was calculated by taking the different between the potential tax revenues (as % of GDP) and subtracting it from current tax revenues (as % of GDP) for each country and for each year and then taking the overall average. Alternatively, this the average of Lost Government Tax Revenues as a % of GDP for the 10 Balkan countries part of this research. The range is between 4.91% and 7.34% of GDP on average in government tax revenues being lost as a result of informality for the period from 1996 to 2014.

Figure 6.11. 1 – Impact of informality on Government Revenues – Albania

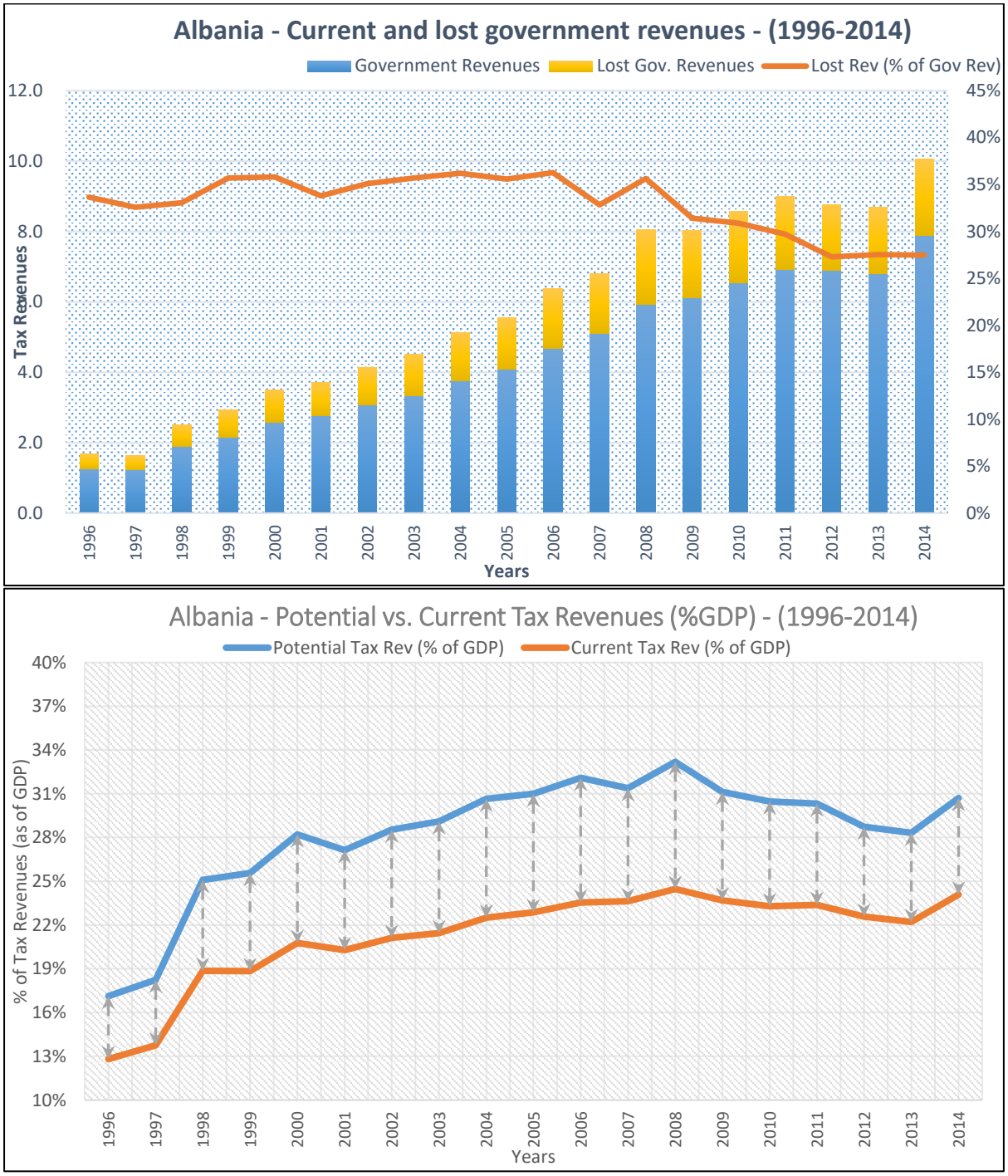


Figure 6.11. 2 – Impact of informality on Government Revenues – Bosnia and Herzegovina

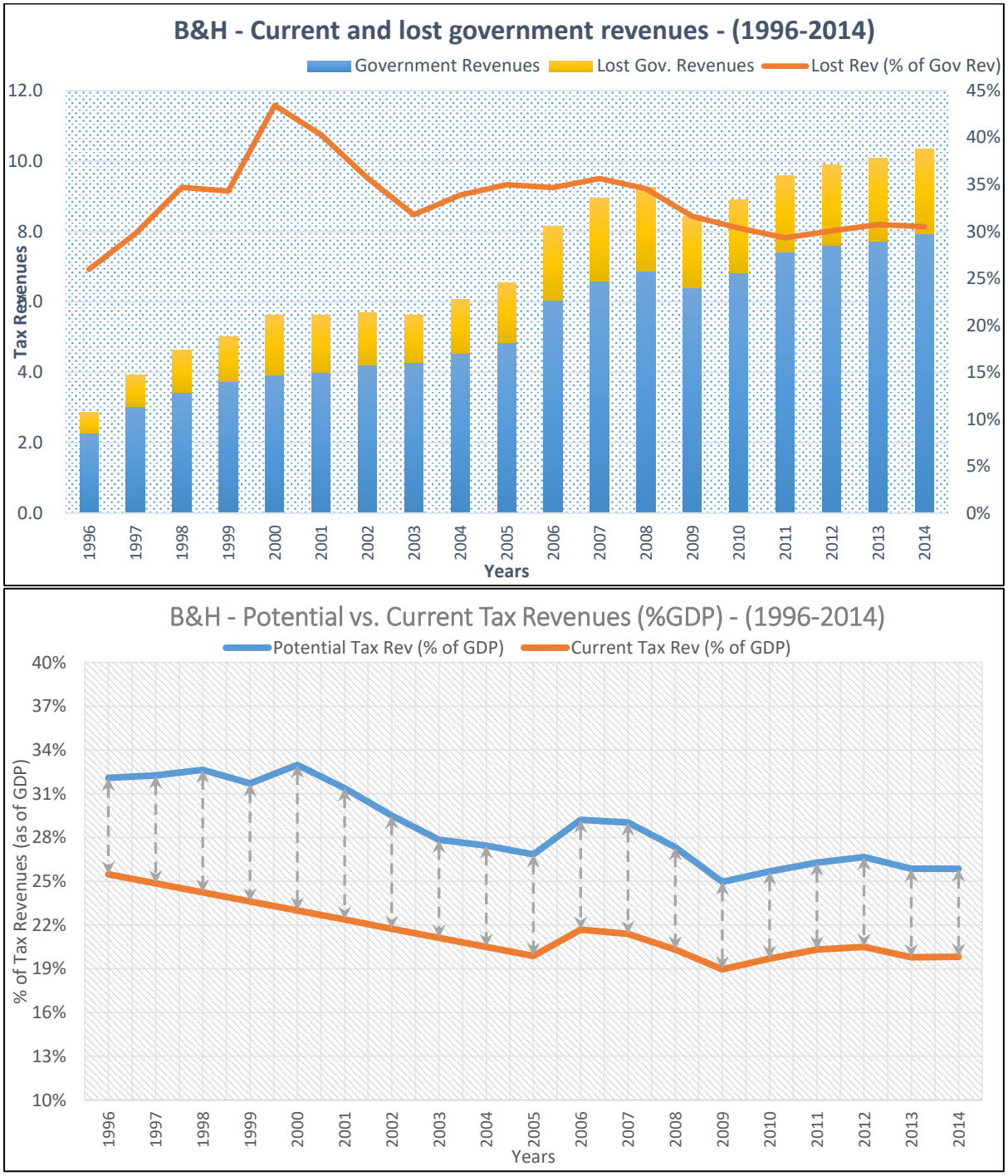
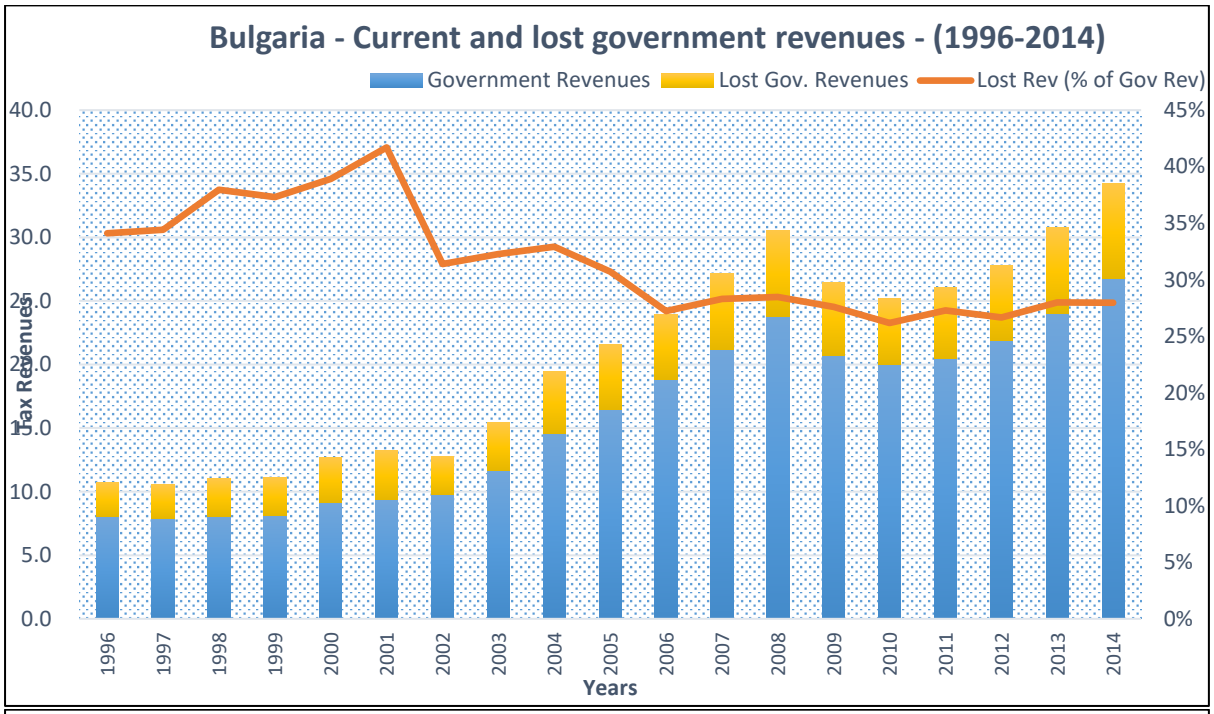


Figure 6.11. 3 – Impact of informality on Government Revenues – Bulgaria



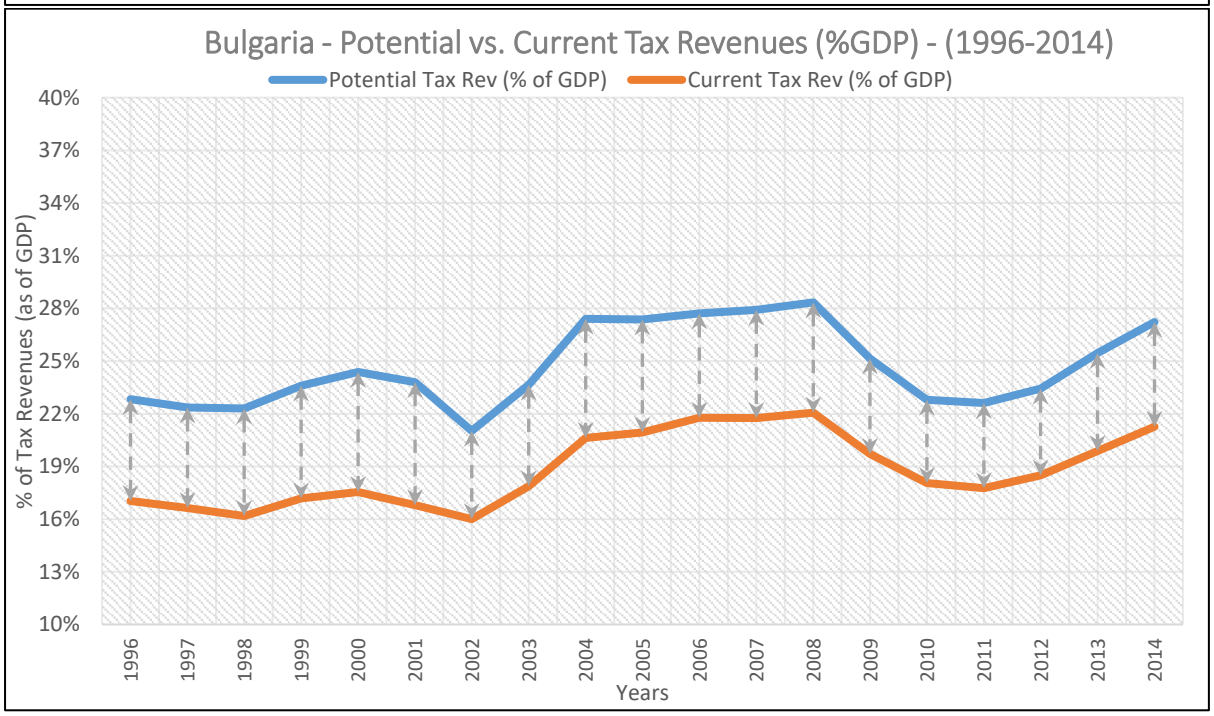
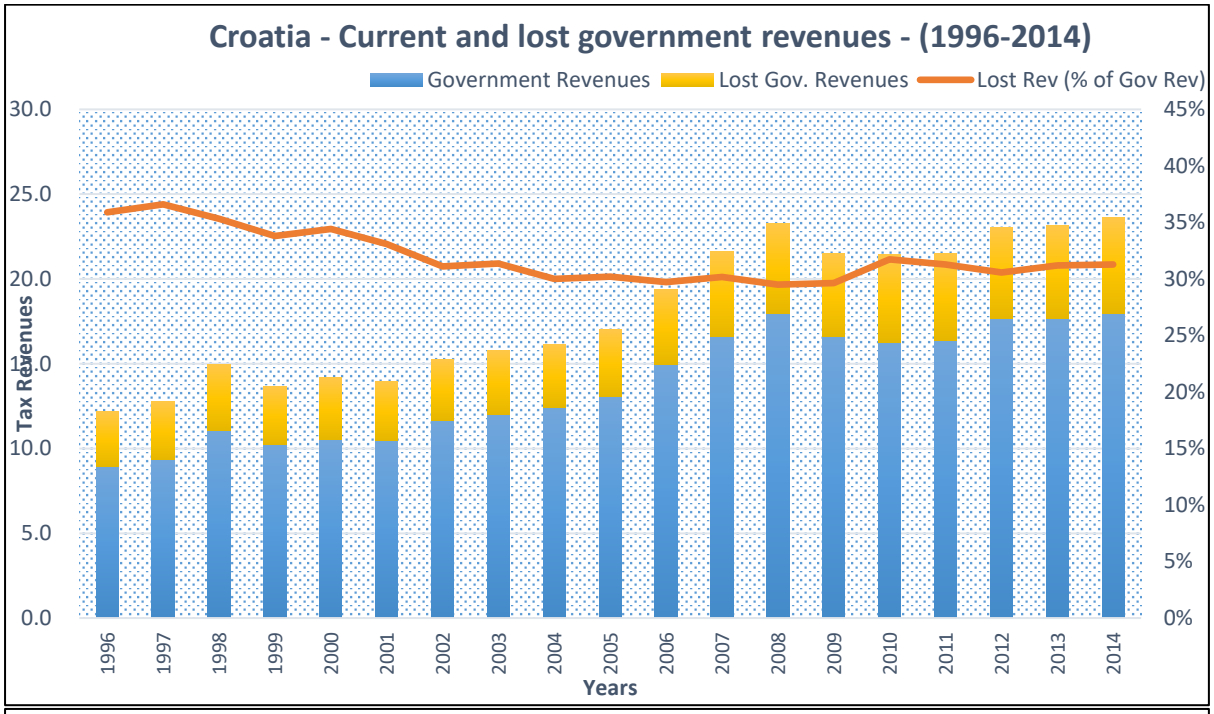


Figure 6.11. 4 – Impact of informality on Government Revenues – Croatia



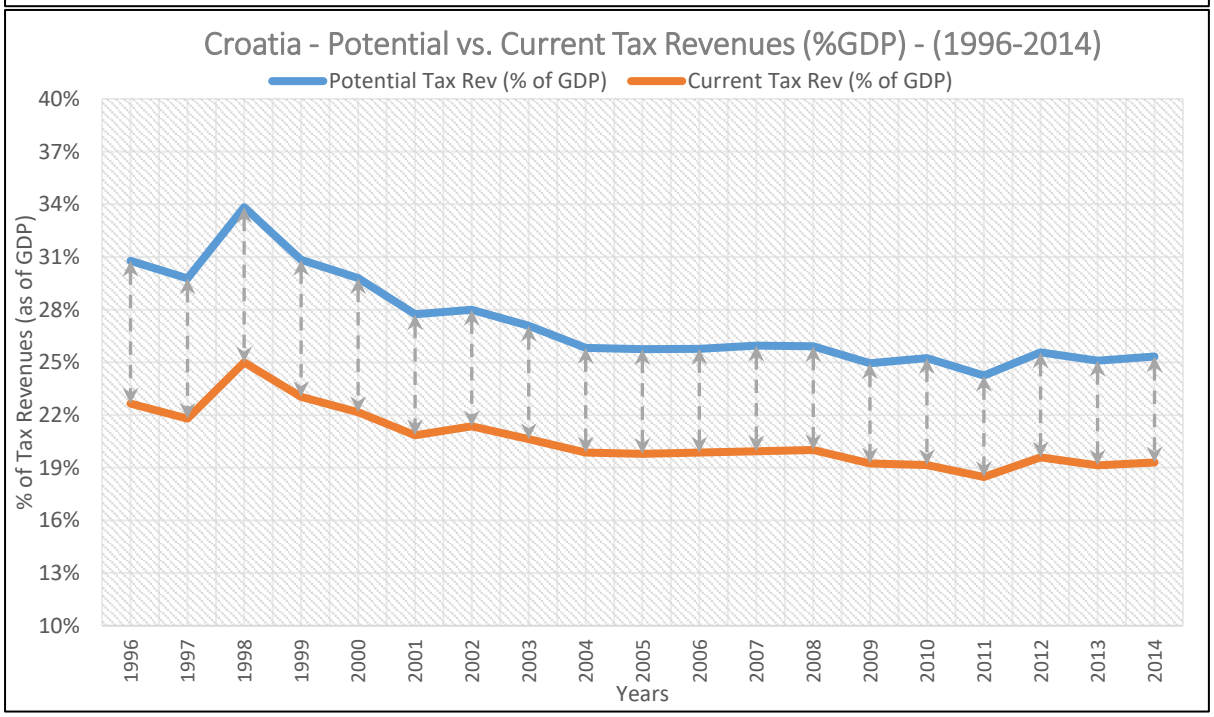
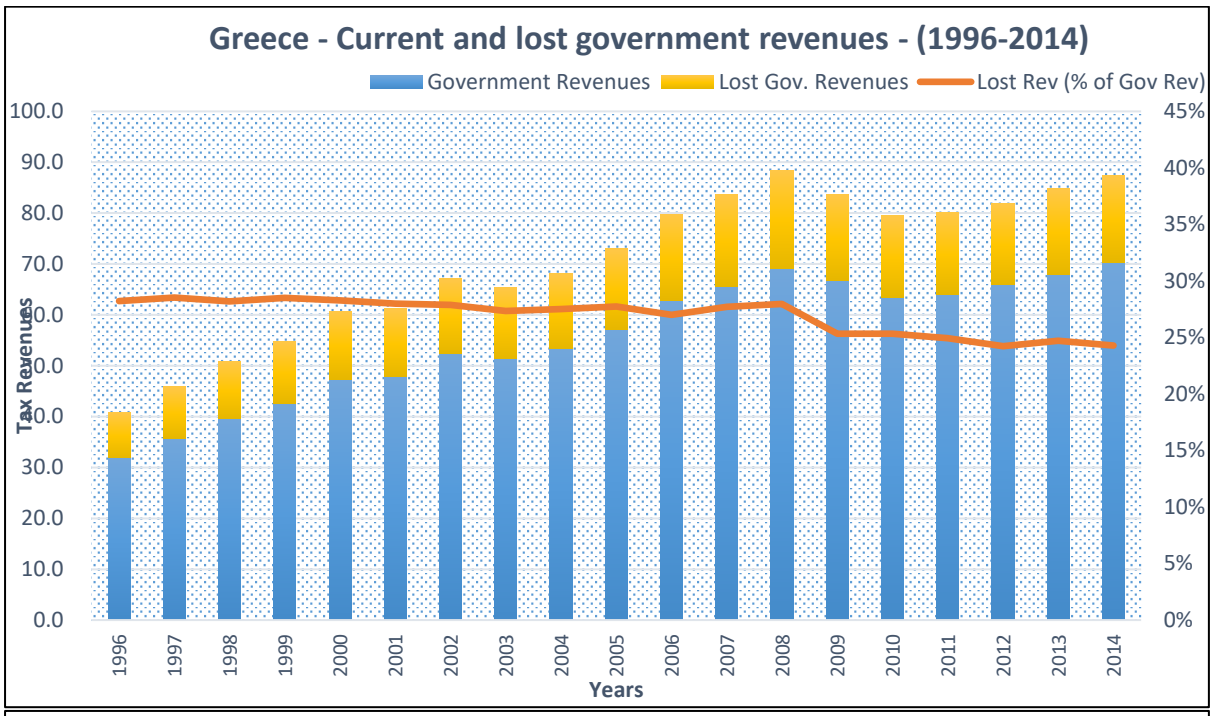


Figure 6.11. 5 – Impact of informality on Government Revenues – Greece



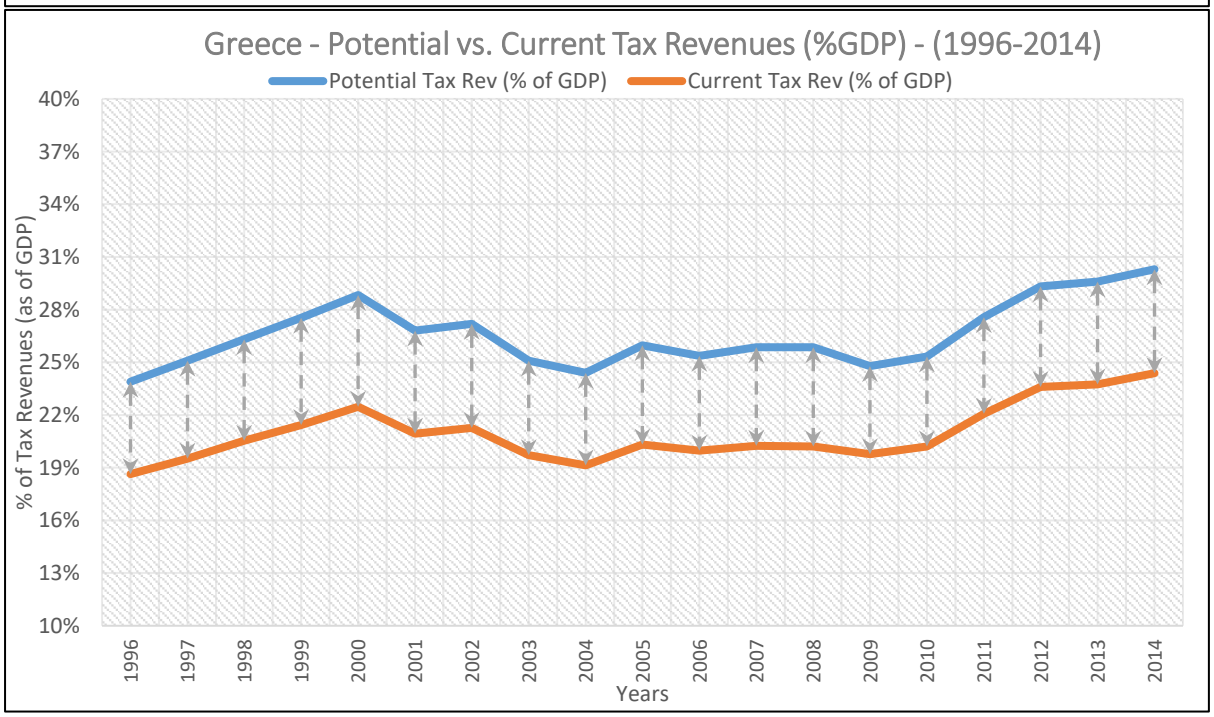
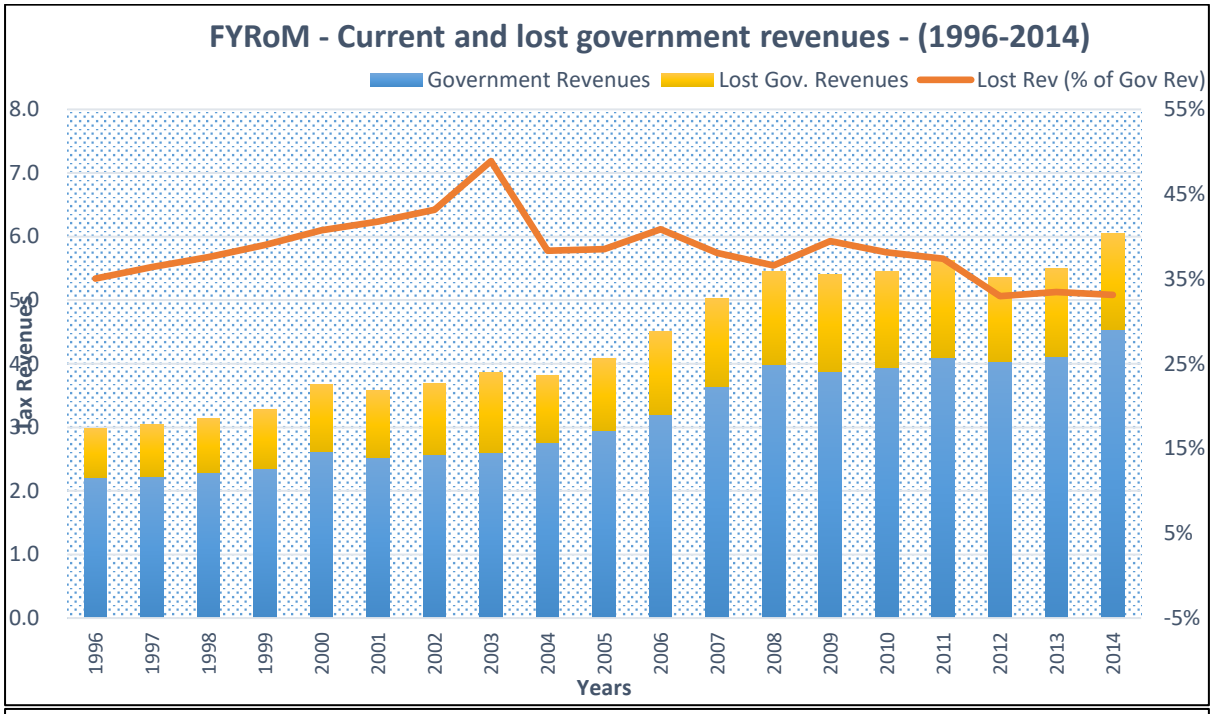


Figure 6.11. 6 – Impact of informality on Government Revenues – FYR Macedonia



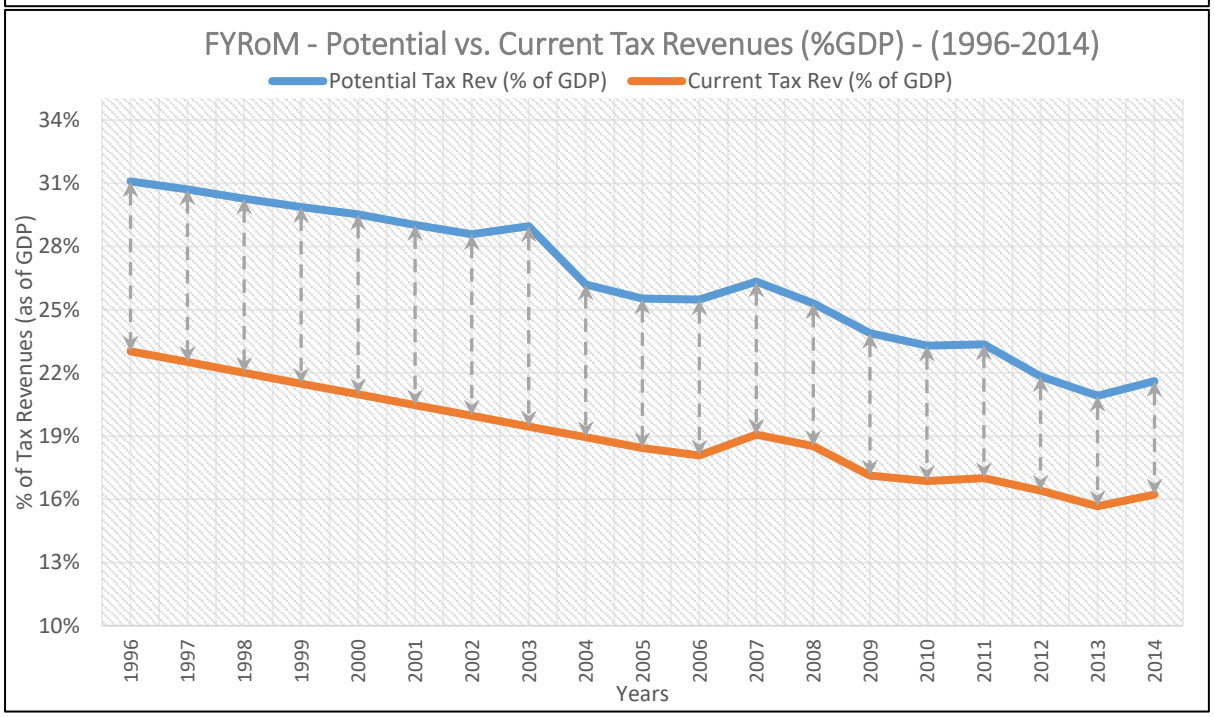
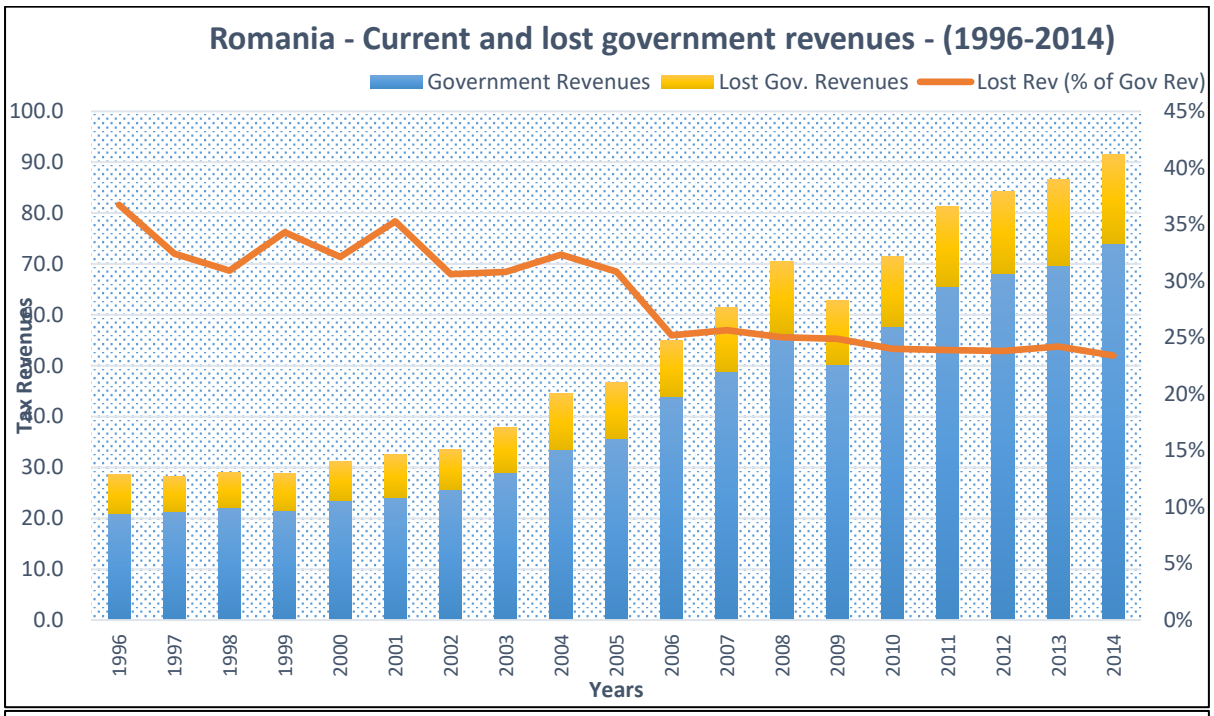


Figure 6.11. 7 – Impact of informality on Government Revenues – Romania



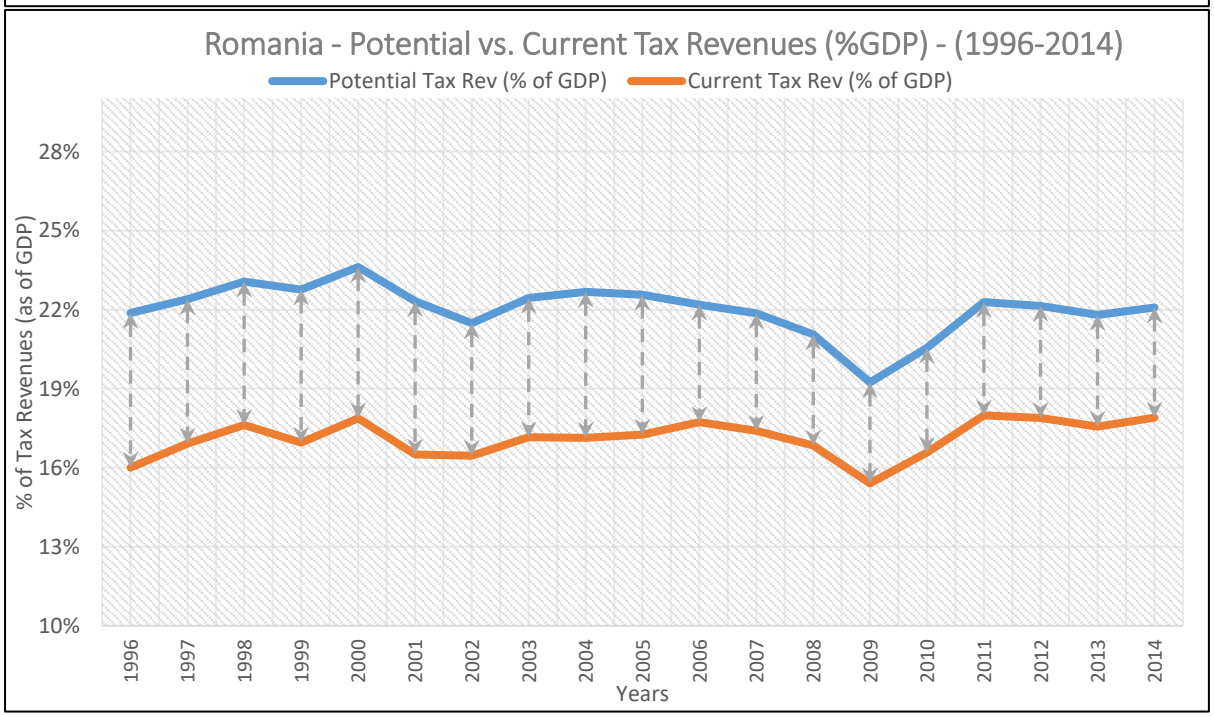


Figure 6.11. 8 – Impact of informality on Government Revenues – Serbia

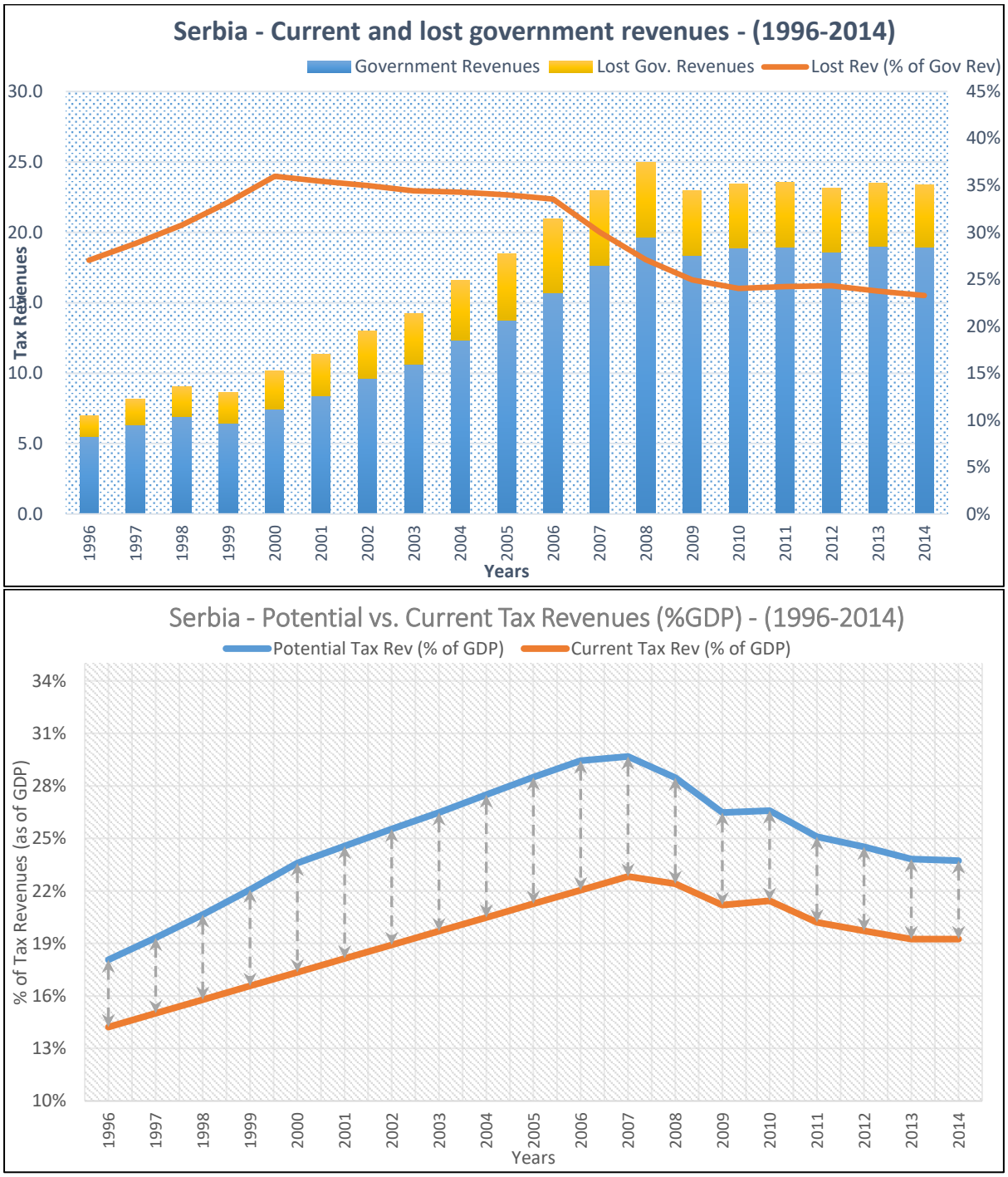


Figure 6.11. 9 – Impact of informality on Government Revenues – Slovenia

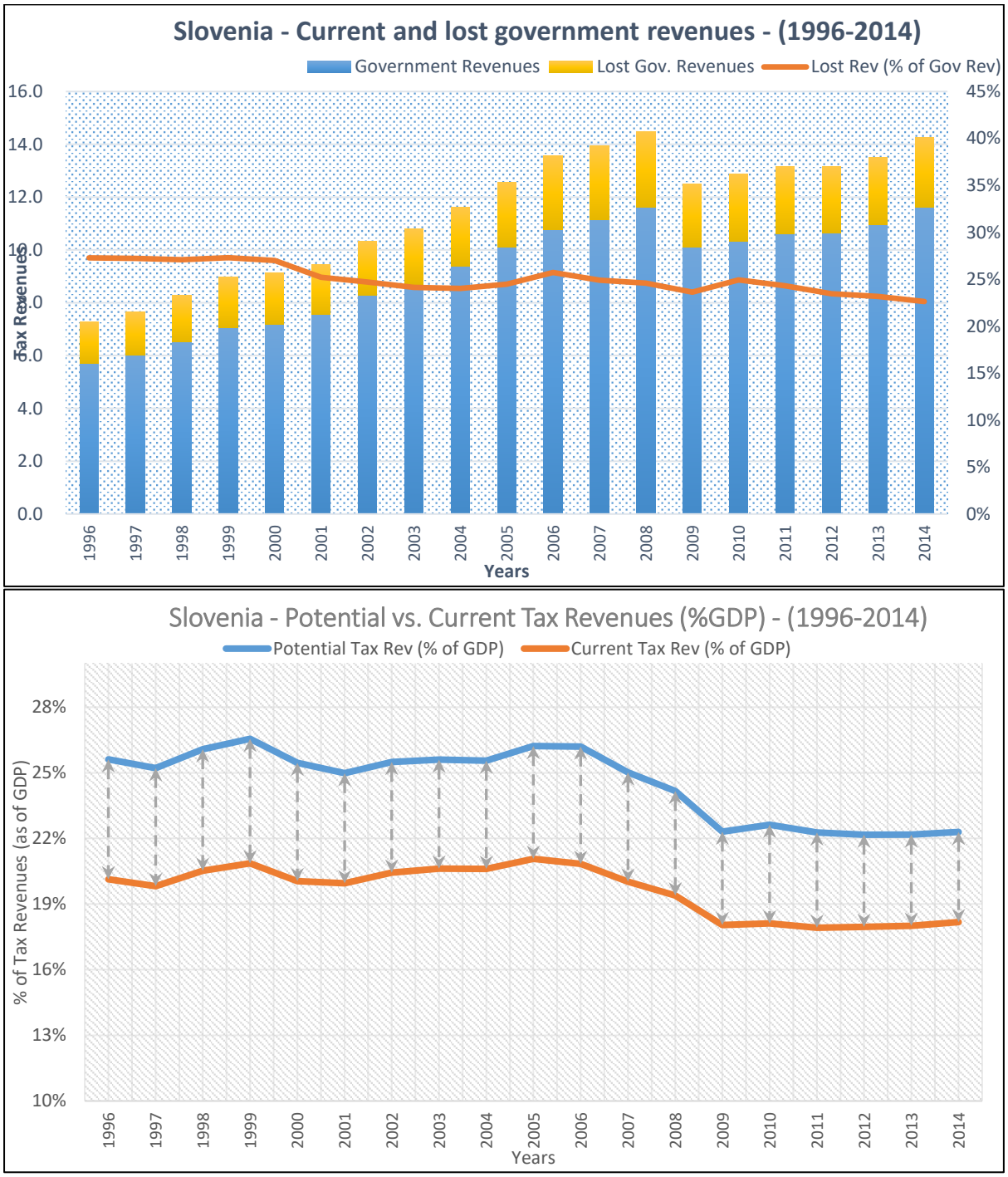
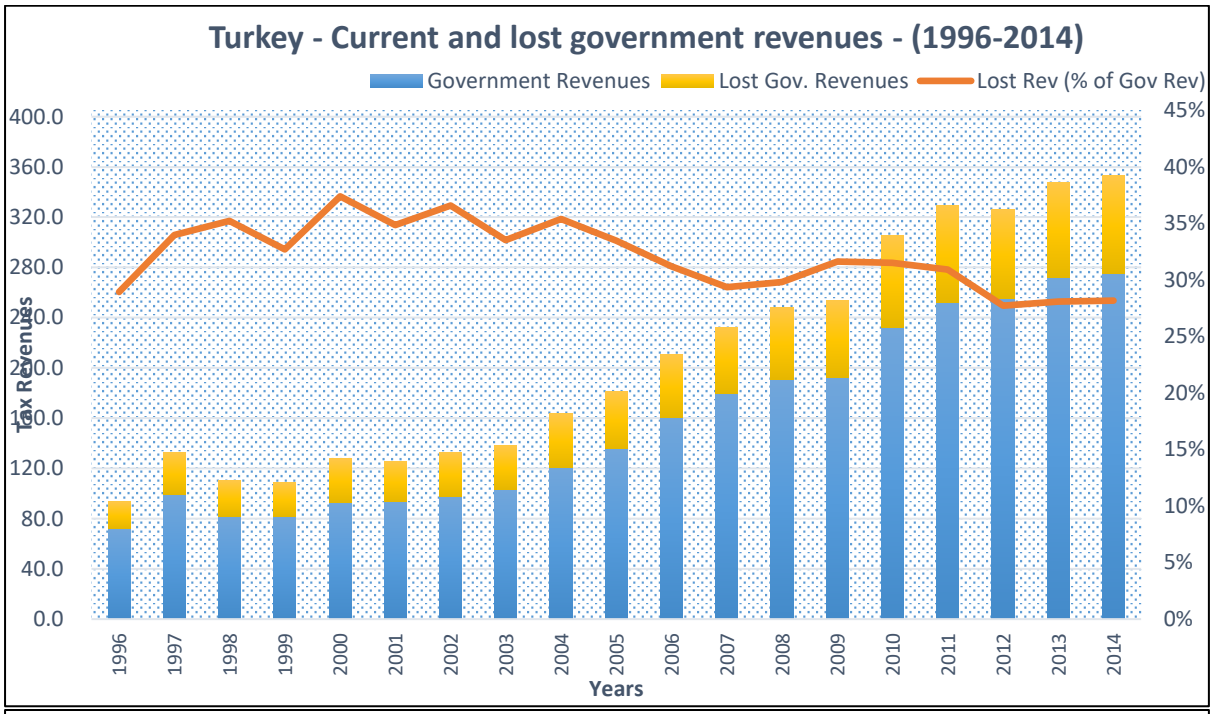
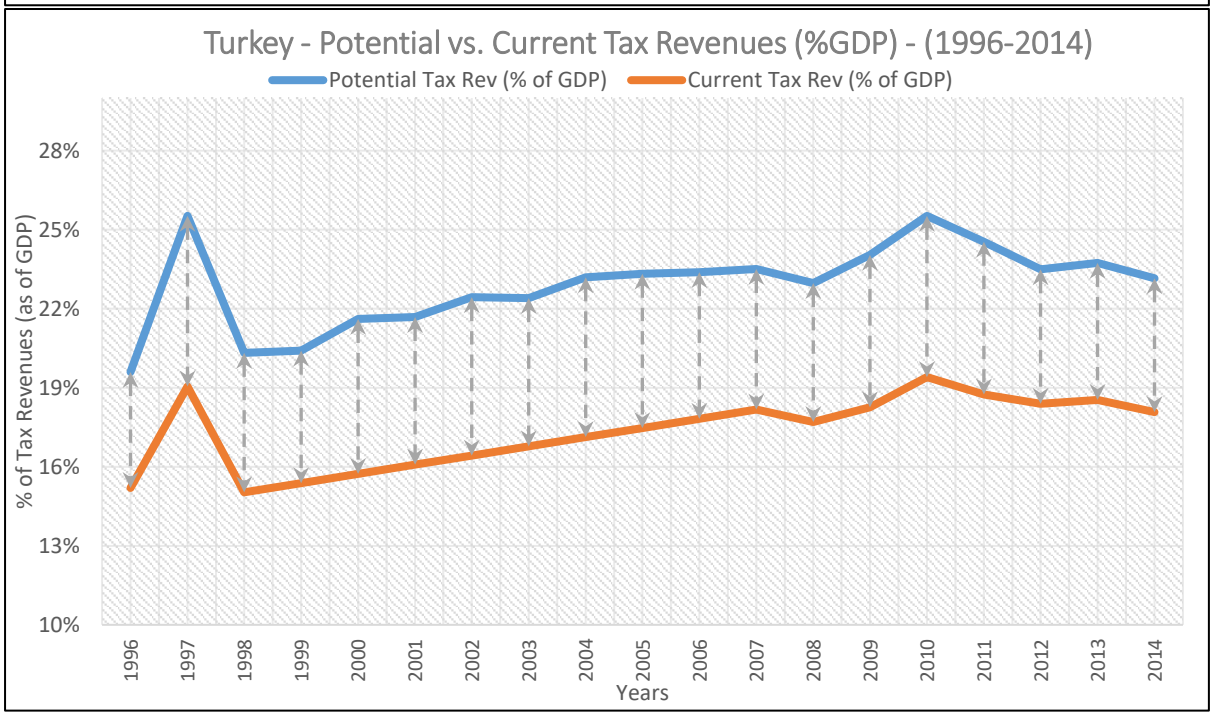


Figure 6.11. 10 – Impact of informality on Government Revenues – Turkey





6.12. Comparative analysis

This section presents and analyses the estimated results from the three MIMIC specifications and the empirical studies by Schneider (2007b, 2009), Schneider et al. (2010), Buehn and Schneider (2012), Schneider et al. (2013), Alm and Embaye (2013), Boka and Torluccio (2013), Hassan and Schneider (2016a) and Bitzenis et al. (2016). This section also provides comparative analysis on the mean values from the empirical studies indicated above, and detailed analysis on the descriptive statistics between the studies mentioned above and the MIMIC specifications are provided in Appendix 6.12.1. It must be noted that the studies included here for comparative reasons do not account for the full timeframe of this thesis, however, currently, there are no studies that investigate the size of the informal economy from 1996 to 2014 for the countries of the Balkan Peninsula.

It is also important to note that, there is a strong correlation between the MIMIC specifications used to estimate the size of the informal economy for the countries of Balkan Peninsula. Correlations are shown in appendix 6.12.2. Similarly, as shown in Appendix 6.12.3 there is also a significant correlation between the MIMIC specifications and the empirical studies of Schneider (2007b, 2009), Schneider et al. (2010), Buehn and Schneider (2012), Schneider et al. (2013), Alm and Embaye (2013), Hassan and Schneider (2016a) and Bitzenis et al. (2016). This indicates that the development of the informal economy in these countries is similar in all three MIMIC specifications.

Before the comparative analysis are presented in the following pages for each country, it is important to discuss the differences in the methodologies applied by each of the studies above and the MIMIC Specifications used in the calibration procedure in this study. Such

methodological differences can account for the differing results across difference studies when compare with the MIMIC specifications of this study.

Table below highlights the differences in the use of causes and indicators in the above-mentioned studies and the three MIMIC specifications used for calibration procedure in this country to derive the values for the size of the informal economy as percentage of GDP.

Table 6.12. 1 – Use of variables by studies used for comparative analysis

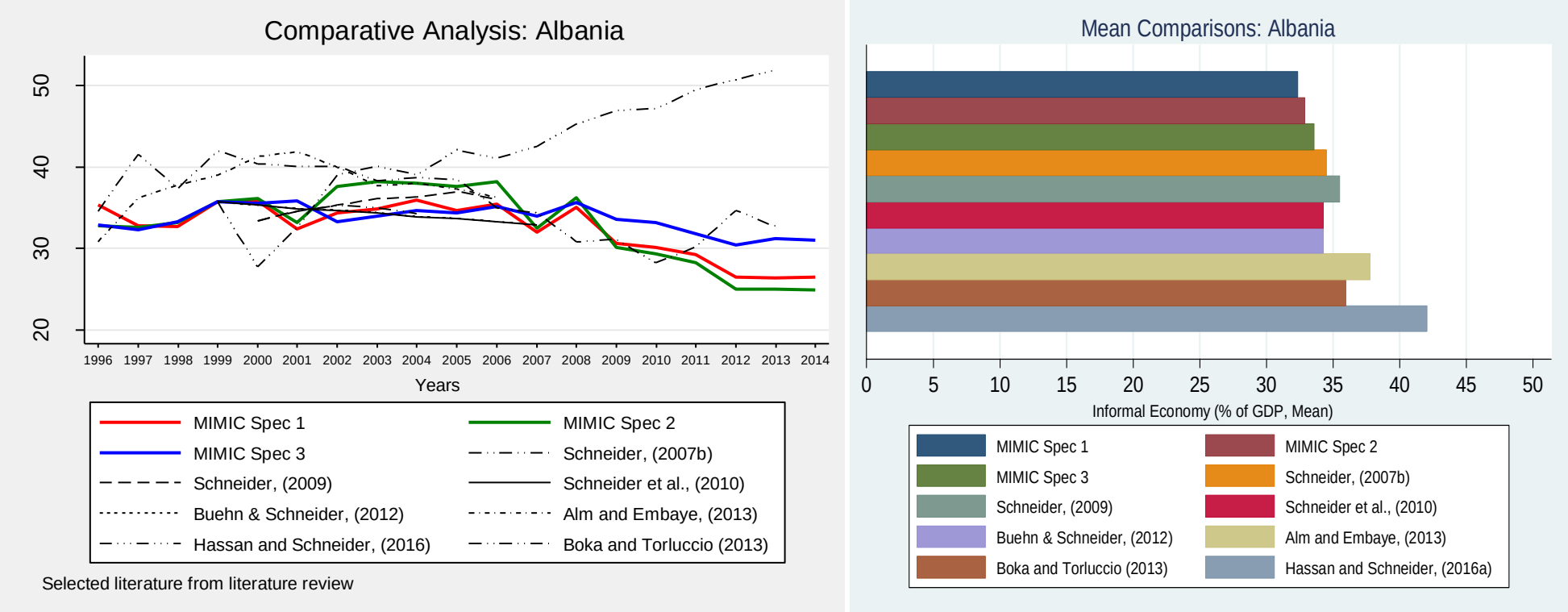
Causal Variables	**MIMIC Spec 1***	**MIMIC Spec 2***	**MIMIC Spec 3***	**Schneider (2007b, 2009)**	**Schneider et al. (2010)**	**Buehn & Schneider (2012)**	**Schneider et al. (2013)**	**Alm & Embaye (2013)****	**Boka & Torluccio (2013)*****	**Hassan & Schneider (2016a)**	**Bitzenis et al. (2016)**
Business Freedom Index	√	√	√		√	√				√	√
Regulation Burden				√						√	
Degree of Urbanisation	√	√	√					√			
Rule of Law Index							√	√			√
Size of the Government					√	√					
Size of the Agriculture sector										√	
Quality of Institutions				√						√	
Government Effectiveness Index	√	√	√		√	√		√			
Tax Rate					√		√	√		√	
Direct and Indirect taxes				√	√	√					√
Marginal income tax burden							√				
Personal Income and Payroll Tax											√
Tax Morality				√							√
Regulatory quality					√		√	√			
Monetary Freedom Index	√	√	√								
Inflation Rate					√			√			
Government Spending Index	√	√	√								
Unemployment Rate				√		√	√				√
Financial Freedom Index	√										
Employment to population ratio			√								
Self-employment rate							√			√	√
Control of Corruption Index		√					√				
Fiscal freedom index					√	√	√				

Economic freedom index					√					√	
Interest Rate								√			
Education level											√
Average Working time per week				√							
GDP Growth rate											√
Sub-national government employment						√					
Indicator Variables											
Real GDP									√	√	
GDP per capita, PPP (constrained)	√	√	√	√		√	√	√			√
GDP per capita growth rate					√						
Cash in circulation							√				
Currency in circulation				√	√	√				√	√
Change in currency in circulation per capita				√			√				
Electric Power Consumption	√	√	√						√		
M1/M2 rate					√						
Currency Ratio to M2								√			
Labour Force Participation Ratio					√	√				√	√
GDP Growth rate				√					√		
Employment Rate							√				
Growth rate of the labour force					√						

* MIMIC Specifications are robust to using more than two indicators. They are also robust to using other causal variables.
** Alm and Embaye (2013) use the CDA model to measure the size of the informal economy.
*** Boka and Torluccio (2013) use the Physical Input Model to measure the size of the informal economy in Albania only.

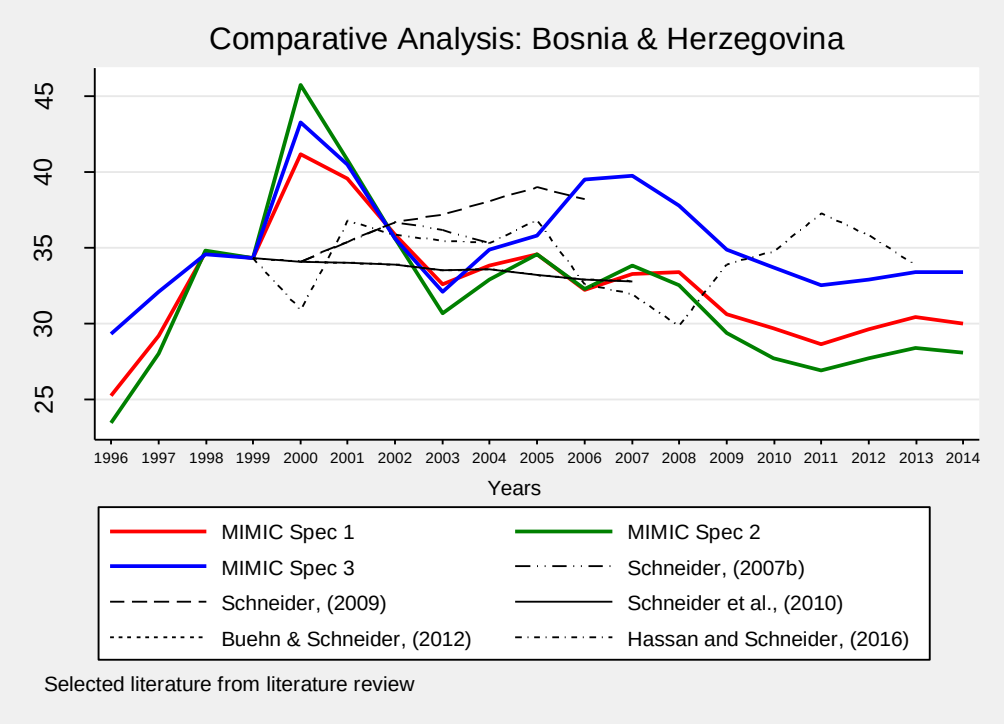
The table above shows that most of the studies used for comparisons in this thesis uses the rate of taxation (direct or indirect) or other taxation variables as main causal determinant of informality. Section 2.4 of Chapter 2, discusses and justifies reasons why the MIMIC specifications of this study have not made use of the tax rates in the model. Any differences provided in the estimates of the MIMIC specifications and other studies are mainly due to the theoretical and empirical model applied with respect to the use of the causal and indicator variables. Even though some differences can be seen in the estimates provided by the three MIMIC specifications and the other studies (namely the study by Hassan & Schneider (2016a)), these differences are not more than +/- 5 percent for majority of countries, with some exceptions as illustrated and discussed in the following pages.

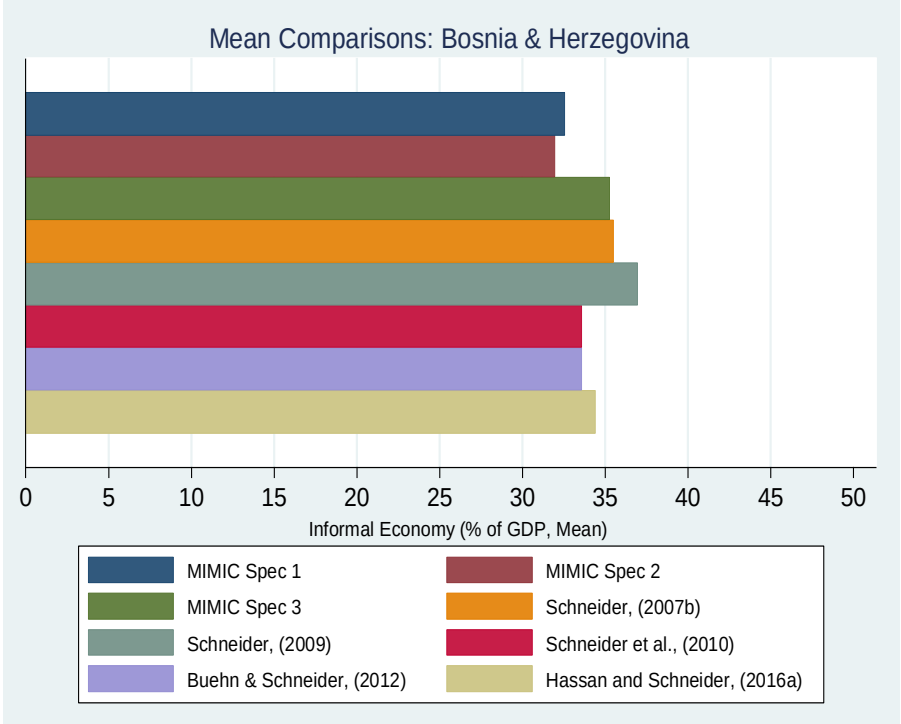
Figure 6.12. 11 - Comparisons on the size of the informal economy between MIMIC specifications of this study and other empirical studies – Albania



This figure shows the development of the informal economy for Albania from 1996 to 2014. There is the very negligible difference between the estimates of the MIMIC specifications and other empirical studies. The estimates using the MIMIC specifications as well as the studies indicated above show on average a declining trend in the size of the informal economy from 2006 onwards. However, the estimates from Hassan and Schneider (2016a) show an increasing trend in the size of the informal economy from 2006 onwards. The mean comparisons between the MIMIC specifications of this study and the other studies indicate that the informal economy in Albania is between 32 to 40 percent.

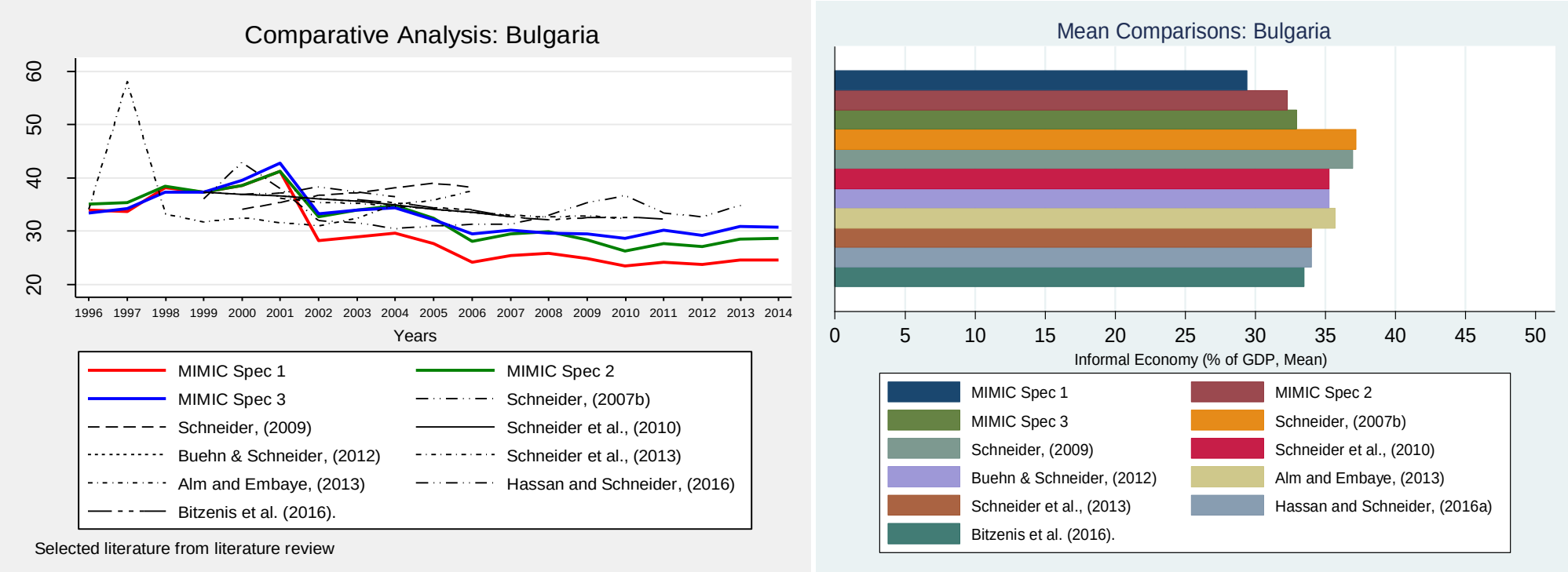
Figure 6.12. 12 - Comparisons on the size of the informal economy between MIMIC specifications of this study and other empirical studies – B&H





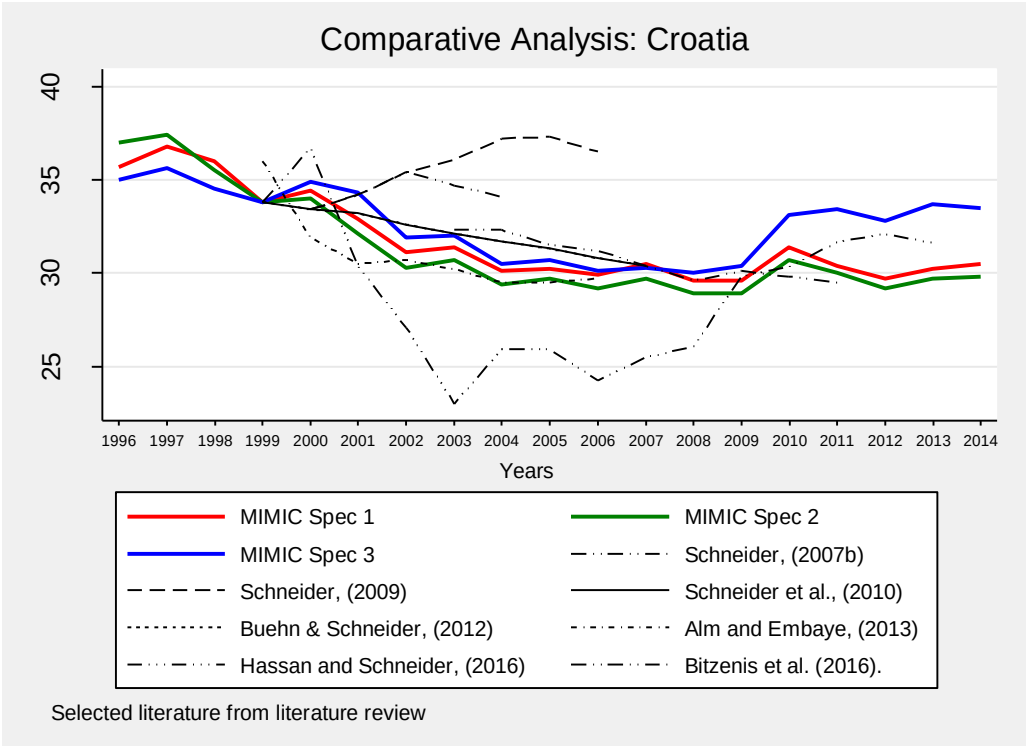
The estimates of the size of the informal economy using the three MIMIC specifications show more fluctuating results than the empirical studies. The results from the MIMIC specifications indicate an increase in the size of the informal economy in Bosnia & Herzegovina between 1999 and 2001. Hassan and Schneider (2016a) on the other hand estimate that the size of the informal economy for Bosnia and Herzegovina rises between 2008 and 2011, and then starts to decrease. On average terms, both the estimates from the MIMIC specifications and the studies shown in the figure show a declining trend in the size of the informal economy for this country. The mean comparisons show a relatively similar size of the informal economy for Bosnia and Herzegovina, which tends to fluctuate between 32 to 38 percent of GDP.

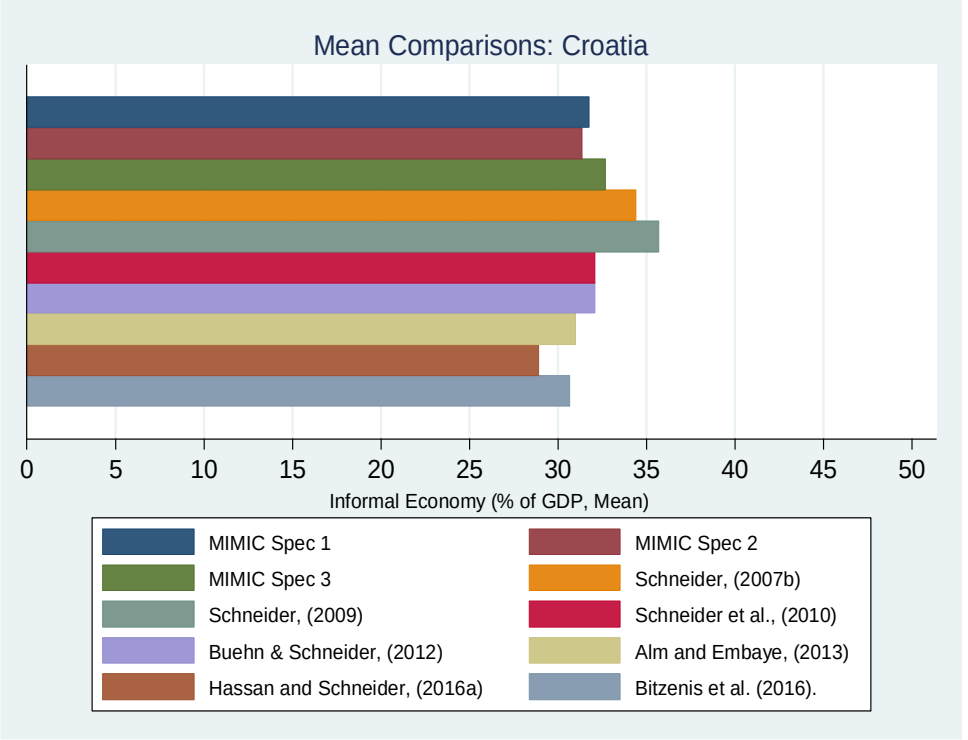
Figure 6.12. 13 - Comparisons on the size of the informal economy between MIMIC specifications of this study and other empirical studies – Bulgaria



The size and development of the informal economy across the studies highlighted in the figure above follow a relatively similar trend, with the exception of the estimates from Alm & Embaye (2013) who for 1997 provide a value for the size of the informal economy in the region of 58 percent of GDP for Bulgaria followed by an immediate and significant decrease the following year. They do not explain this surge and fluctuation. The estimates using the MIMIC specifications tend to be in line with the empirical studies as shown in the graphs above, indicating a declining trend in the size of the informal economy for Bulgaria over the years. According to the mean of each of the estimates, including the MIMIC specifications of this study, the informal economy in Bulgaria fluctuated between 28 to 37 percent in the years the studies were conducted.

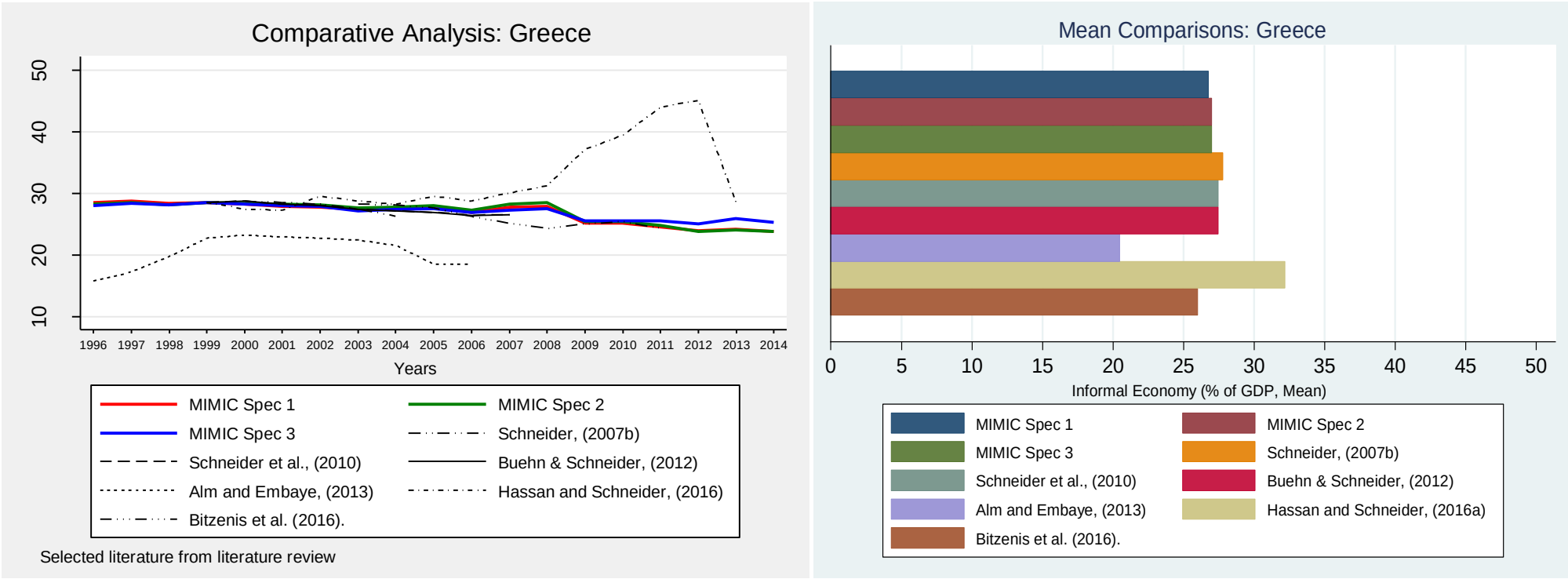
Figure 6.12. 14 - Comparisons on the size of the informal economy between MIMIC specifications of this study and other empirical studies – Croatia





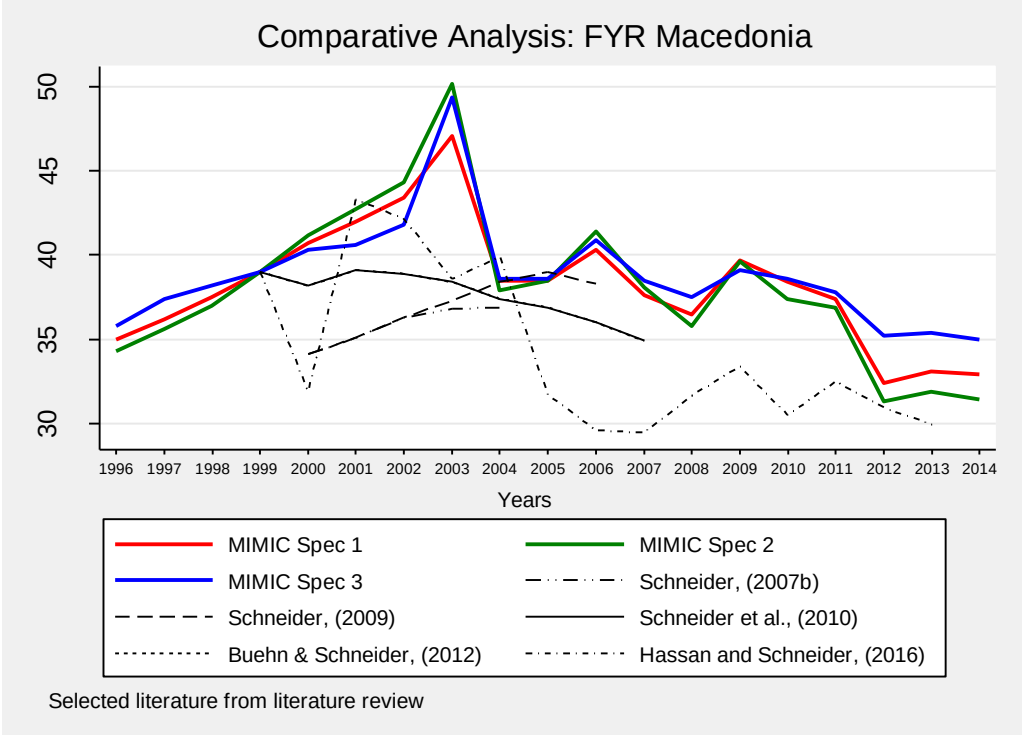
The size and development of the informal economy in Croatia has followed a relatively similar trend, according to the results from the MIMIC specifications, but also the estimates from other sources and studies, as indicated in the graphs above. One exception here is the study by Hassan & Schneider (2016a) who show a significantly lower informal economy relative to GDP between 2001 and 2008. Conversely, the estimates from Schneider (2009) indicate an increase in the size of the informal economy for Croatia between roughly the same years. The estimates from the MIMIC specifications are in line with the other studies which tend to follow a less fluctuating movement in the size of the informal economy for Croatia. Mean comparisons show that the size of the informal economy in Croatia was between 28 and 36 percent of GDP in the time frame of each study.

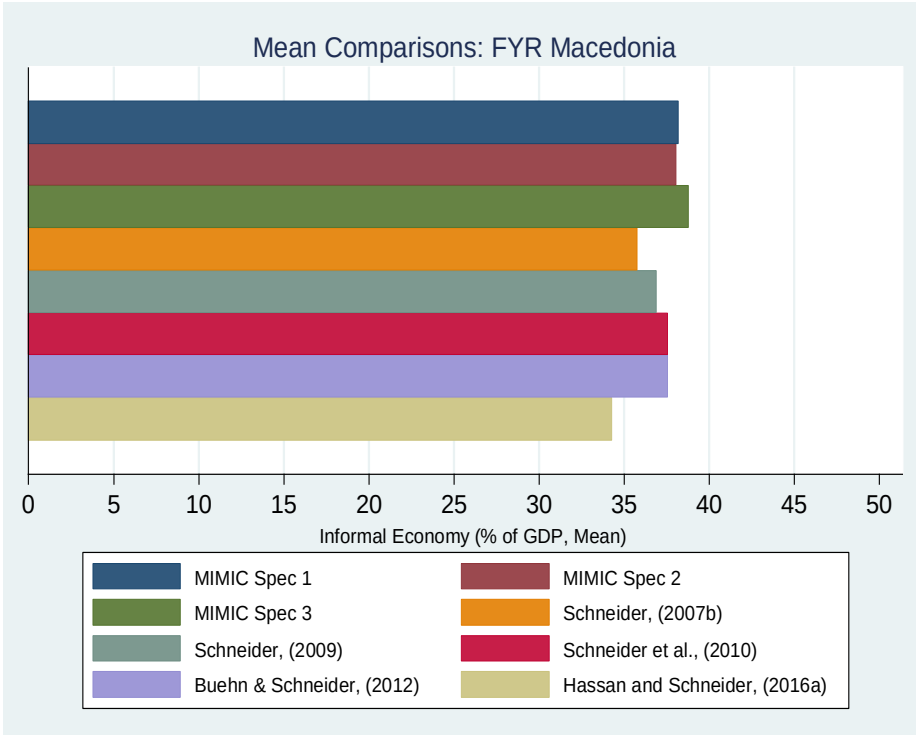
Figure 6.12. 15 - Comparisons on the size of the informal economy between MIMIC specifications of this study and other empirical studies – Greece



The study by Alm and Embaye (2013) shows a much lower size of the informal economy for Greece between 1996 and 2006 than all the other studies including the MIMIC specifications. It is also important to note from the graphs that Hassan & Schneider (2016a) show a higher size of the informal economy compared to other studies between 2007 and 2012. According to their estimates, the informal economy in Greece increased from 28.7 percent in 2006 to almost 46 percent in 2012. This is a significant increase for an EU country such as Greece. This increase could be attributed to the sovereign debt crisis that Greece has been facing, but such an impact on the increase needs to be empirically proved. The MIMIC specifications are in line with other studies and that the mean comparisons indicate that the size of the informal economy in Greece from 1996 to 2014 was between 22 to 32 percent.

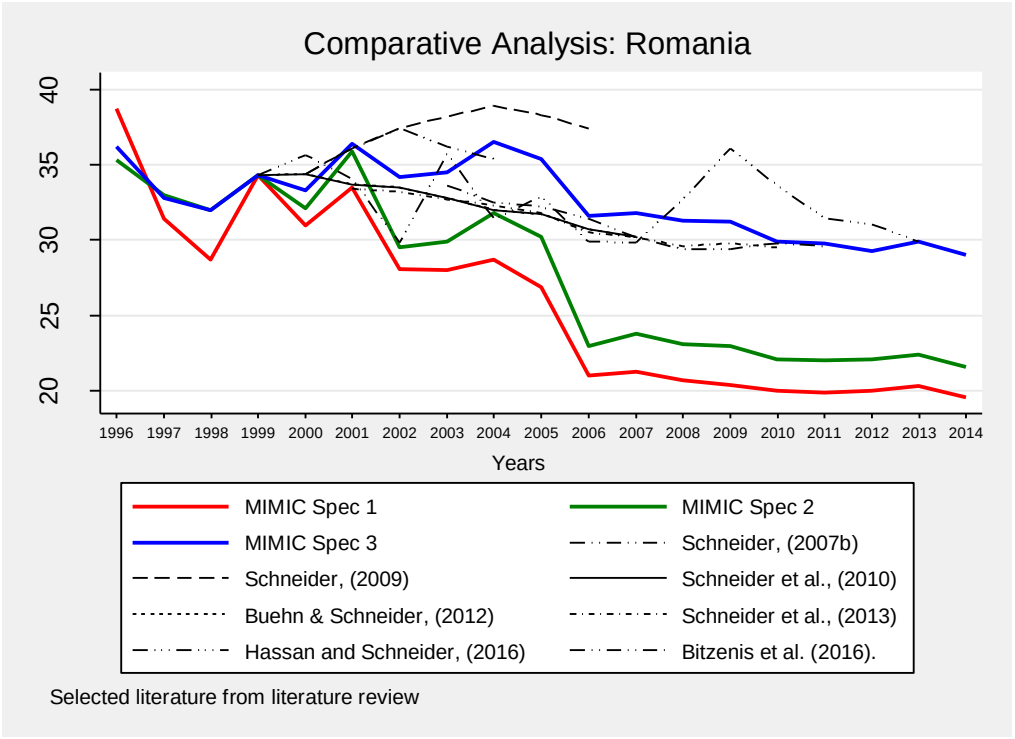
Figure 6.12. 16 - Comparisons on the size of the informal economy between MIMIC specifications of this study and other empirical studies – FYR Macedonia

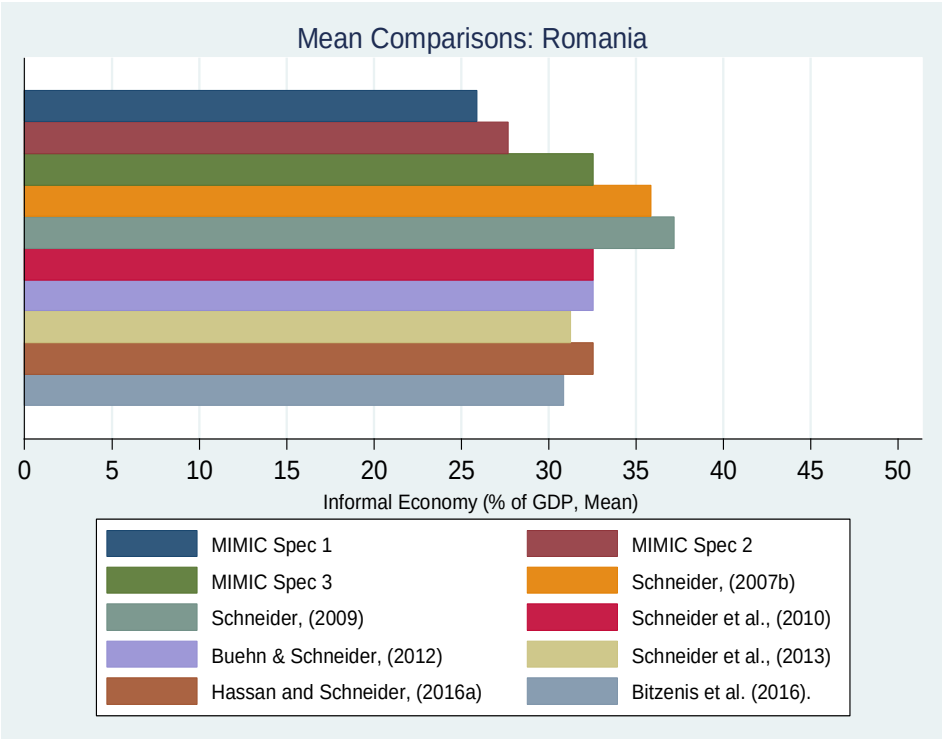




The results from the MIMIC specifications as well as other studies shown in the figure above, show relatively considerable fluctuations in the size of the informal economy for FYR Macedonia. The mean comparisons between different studies and the MIMIC specifications show that the informal economy in FYR Macedonia fluctuated between 34 to 38 percent of GDP for the period of their study. It has been confirmed by the other studies that the size of the informal economy in FYR Macedonia is amongst the highest in the Balkan region. The study from Hassan & Schneider (2016a) shows a lower informal economy than the MIMIC specifications of this study between 2004 and 2012. Overall the estimates indicate a declining trend in the size of the informal economy in FYR Macedonia over the years during their study timeframe.

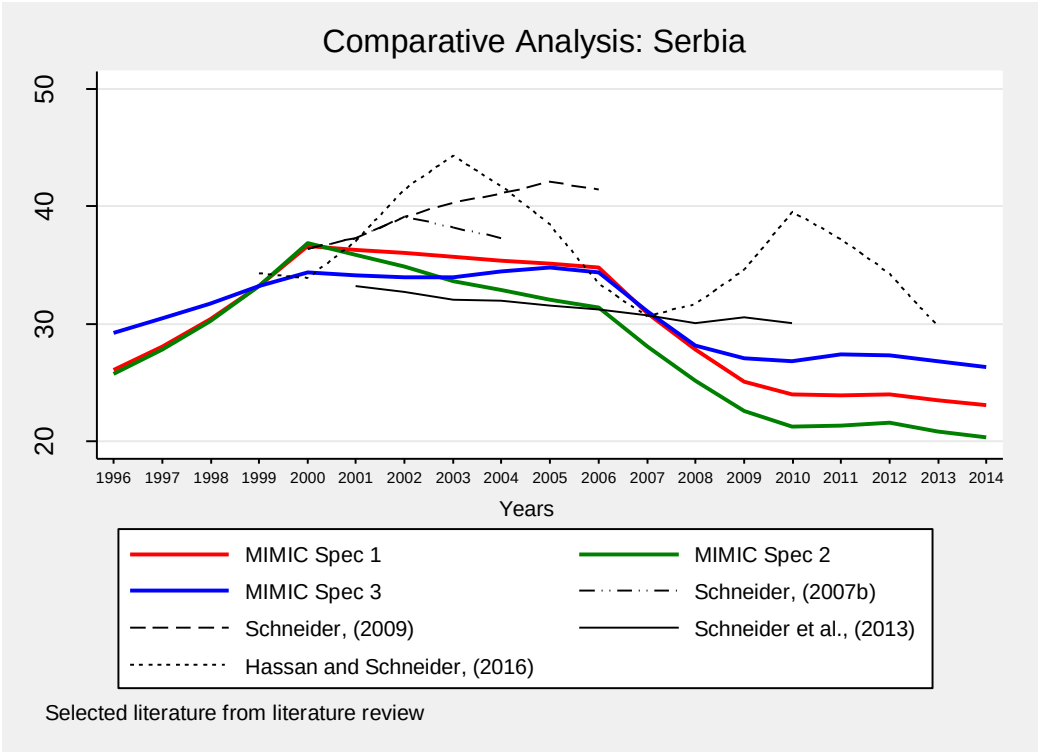
Figure 6.12. 17 - Comparisons on the size of the informal economy between MIMIC specifications of this study and other empirical studies – Romania

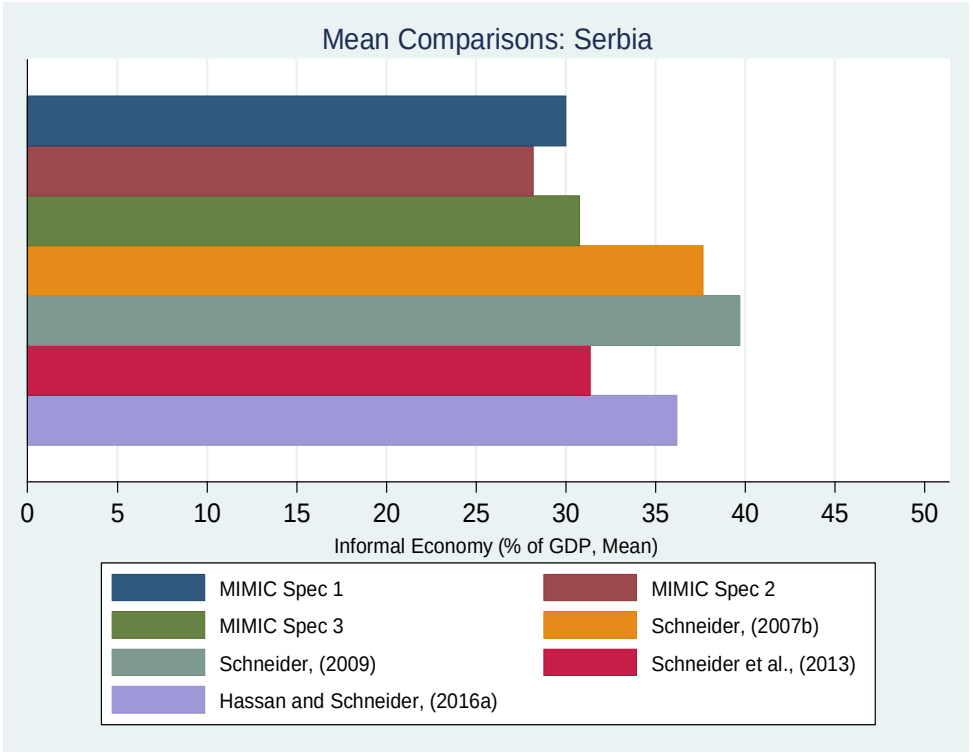




The estimates for the size of the informal economy for Romania using the three MIMIC specifications show some differing results between 1996 and 2014. MIMIC Spec 1 and MIMIC Spec 2, show that the declining trend in the size of the informal economy for Romania is higher, while MIMIC Spec 3 estimates provide a more reasonable and comparable trend of the size and development of the informal economy between 1996 and 2014. MIMIC Spec 3 tended to be in line with the other studies indicated in the Literature Review chapter and illustrated in the figure above. Mean comparisons show that the size of the informal economy in the EU member has fluctuated between 26 to 37 percent for the years of the studies.

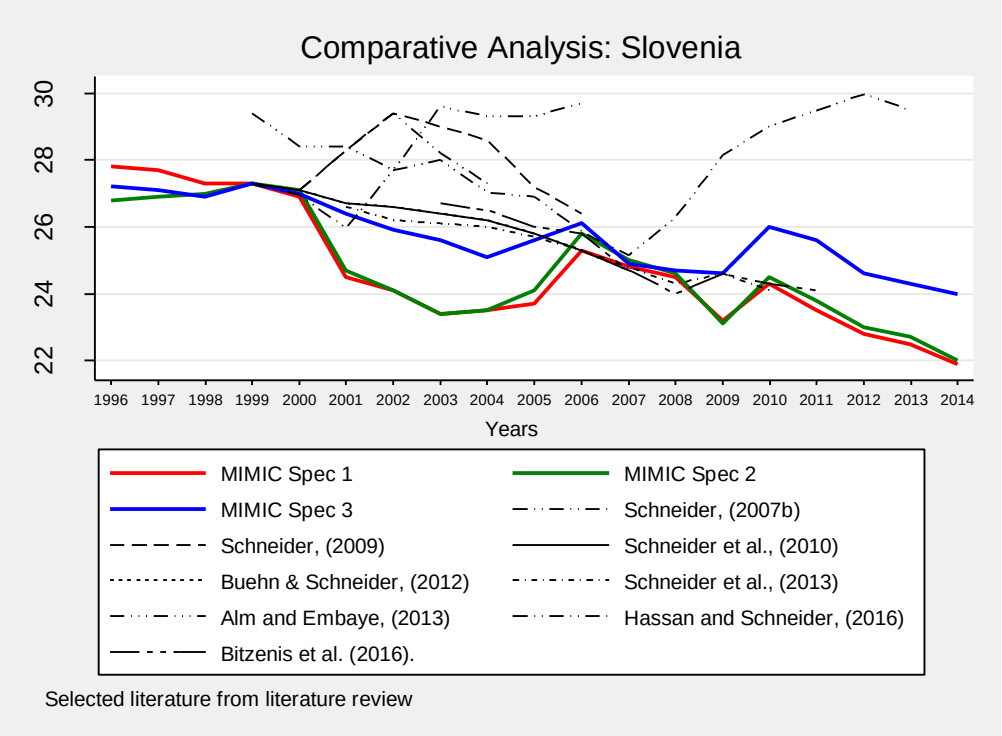
Figure 6.12. 18 - Comparisons on the size of the informal economy between MIMIC specifications of this study and other empirical studies – Serbia

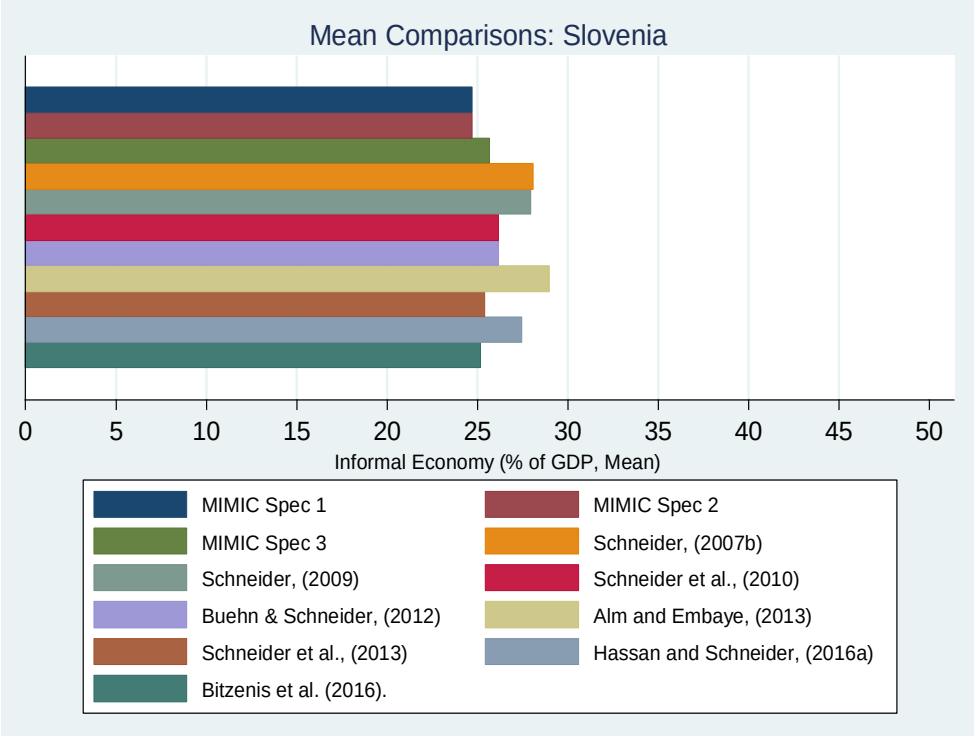




The informal economy in Serbia can be considered as of significant size according to the results from a number of studies. Its size fluctuates between 27 and almost 40 percent of GDP according to different studies discussed in the Literature Review chapter and illustrated above in figure 6.12.8. MIMIC Spec 3 offer estimates which are more in line with the other studies, shown graphically above. It has to be noted that the number of studies which have attempted to estimate the size of the informal economy in Serbia is deficient. The only comprehensive study that has concentrated on estimating and analysing the size of economic informality in Serbia is that of Schneider et al. (2013). The estimates from this study are relatively in line with the estimates provided from MIMIC Spec 3. From a general point of view, the size of the informal economy in Serbia has followed a declining trend as well.

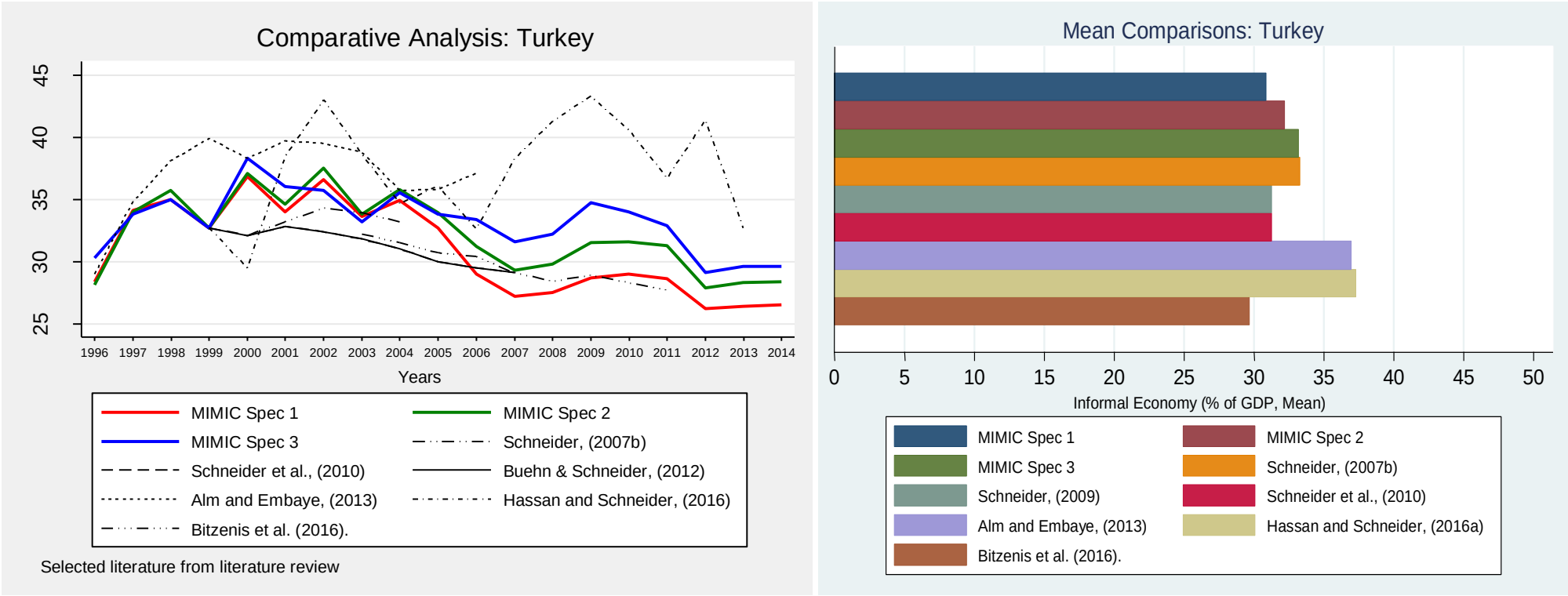
Figure 6.12. 19 - Comparisons on the size of the informal economy between MIMIC specifications of this study and other empirical studies – Slovenia





The informal economy in Slovenia is the lowest among the other Balkan countries according to the results from the MIMIC specifications and the other studies which have attempted to estimate the size of the informal economy in this country. MIMIC Spec 3, offers estimates which are in line and comparable to the other empirical studies such as that of Schneider et al. (2010), Buehn and Schneider (2012), and Schneider et al. (2013). Hassan and Schneider (2016a) on the other hand, show that the size of the informal economy has increased rather than decreased between 2008 and 2012. The study by Bitzenis et al. (2016) show estimates which are relatively in line with MIMIC Specifications, and in particular with MIMIC Spec 3. The size of the informal economy has fluctuated between 24 and 28 percent of GDP in Slovenia over the period of the studies indicated above.

Figure 6.12. 20 - Comparisons on the size of the informal economy between MIMIC specifications of this study and other empirical studies – Turkey



Turkey's informal economy relative to GDP has fluctuated on average between 29 to 37 percent as illustrated in the graphs above. All studies shown in the figure and discussed in detail in the Literature Review chapter show a declining trend in the size of the informal economy in Turkey. All MIMIC specifications seem to be in line with other studies except estimates provided by Hassan & Schneider (2016a), who indicate an increasing informal economy between 2006 and 2009, and between 2011 and 2012. The studies of Buehn & Schneider (2012) and Bitzenis et al. (2016) show a similar trend in the size of the informal economy to the MIMIC Specifications, in particular, MIMIC Spec 1 and 2.

6.13. Conclusion

This chapter has provided the estimates and discussions of the results for the size and development of the informal economy in ten Balkan countries from 1996 to 2014. The estimates calibrated from the chosen MIMIC specifications with best model fit statistics indicate that the size of the informal economy in the ten Balkan countries has followed a declining trend over the years. Several causes remain as the key determinants of economic informality in the region such as the regulatory burden, the effectiveness of governments in enforcing tax collection and tax enforcement and controlling the development of the informal economy, as well as the overall economic wellbeing. The different hypothesis set out in the methodology chapter, have been almost all confirmed with these results, indicating that the estimates are reliable and in line with theory. The estimates are also very comparable with the estimates from other empirical studies.

The estimates of this study indicate that the size of the informal economy in the ten Balkan countries on average ranges as follows: Albania - between 32 and almost 34 percent of GDP; Bosnia and Herzegovina - between 32 and just over 35 percent of GDP; Bulgaria - between 29.3 to almost 33 percent of GDP; Croatia - between 32 and 33 percent of GDP; Greece - between 26 and 27 percent of GDP; FYR Macedonia - between 38 and 39 percent of GDP; Romania - from almost 26 percent to almost 33 percent of GDP; Serbia - between 28 percent and 31 percent of GDP; Slovenia - between 24 and 26 percent of GDP; and in Turkey - between just under 31 and over 33 percent of GDP.

The estimated results have been compared with some previous studies in section 6.12. Generally, results presented here tend to follow a similar trend to other studies, with few differences, such as the cases of Greece, Turkey and Slovenia which tend to show some

differences with other studies. On the other hand, the cases of Romania, Croatia and Serbia show substantial differences across MIMIC models.

The results presented and discussed in detal above are significant in that they show estimates of the scale of the informal economy in the ten Balkan countries. The impact of such informality is significant in terms of government revenues in these countries too, which in turn could affect the level of governments' provision of public goods and services. The results also revealed that the size of the informal economy in these countries increased slightly between 2008 and 2010. This could potentially indicate the impact of the financial crisis in the formal economy, forcing people to enter the informal economy. However, in order to understand the direct impact of financial crisis in the size of the informal economy a model needs to apply a structural break. Having said this, it is very challenging to apply a structural brake in MIMIC models and to date this has not been attempted. A further structural break could have been applied to the data by distinguishing countries at different stages of EU integrations, for example. Such analyses leave room for future research.

Chapter 7: Conclusions and Discussions

7.1. A review of main findings and conclusions

At the outset of this study, the aim was to understand the development of the size of the informal economy for the ten countries of the Balkan Peninsula. In particular, the study intended to investigate and answer a number of research questions. The study intended to estimate the size of the informal economy in the ten Balkan countries, and understand its primary drivers contributing to a large size of the informal economy relative to formal GDP, and be able to provide some analysis as well as comparisons with other estimates on the changes in the size of the informal economy since 1996 to 2014 in the ten Balkan countries.

This research used the MIMIC model to estimate the size and analyse the development of the informal economy in the ten countries of the Balkan Peninsula from 1996 to 2014. The results indicate that the informal economy in the Balkan countries has on average terms followed a declining trend over the years. One would expect such a declining trend since the region has gone through a significant transition phase and has progressed regarding reforms influenced by the European Union policies on enlargement. Index indicators on the rule of law and general government effectiveness have all improved for almost all countries part of this research, and this has influenced growth in the formal economy and at the same time a decrease in the size of the informal economy.

The informal economy in the ten Balkan countries started from a yearly average size of around 31 percent in 1996 and dropped to around 26 percent in 2014. However, the overall average size of the informal economy in the Balkan region remains high to just over 30 percent. Countries, where the overall average size of the informal economy is found to be the highest

as a proportion to their GDP, are FYR Macedonia, Bosnia and Herzegovina, Albania and Turkey with 38.4 percent, 33.3 percent, 33.0 percent, and 32.1 percent, respectively. Countries with the lowest informal economy are Slovenia and Greece, with 25 percent and 26.9 percent, respectively. The average size of the informal economy in Serbia, Romania, Bulgaria and Croatia approximates to under or slightly over 30 percent.

These results highlight that the size of the informal economy on average terms seems to be comparable with existing estimates for these countries, such as the recent work by Schneider et al. (2013), Alm & Embaye (2013), Hassan & Schneider (2016a) and Bitzenis et al. (2016), or earlier work by Schneider (2007b, 2009), Schneider et al. (2010), and other research done by various other authors discussed in detail in the literature review and the results and analysis chapters.

The results reveal that the main driving factors of the informal economy in the countries of the Balkan Peninsula are the regulation burden, level of corruption, the dominance of the agriculture sector, degree of urbanisation, macroeconomic developments and the size of the government. The level of taxation in these countries does not seem to be very significant as most of these countries have had low direct and indirect taxation rates. The most important issue in most of these countries is the trust of the public in the government and its institutions. Improvements in the rule of law, which involve a fight against corruption with emphasis fight against high-level corruption, government effectiveness, judiciary and regulatory quality, are the most important determinants of economic informality in these countries.

The impact of reduced informality could be directly and indirectly reflected in the government revenues and public services (Schneider et al., 2010). Reduced Informality could potentially lead to higher government revenues in a country (more in Section 6.11, Appendix 6.12.5).

Higher government revenues and the provision of quality public goods and services in a country are positively correlated. Higher government revenues in the countries of the Balkan Peninsula could also mean that they can progress further with their reforms and economic developments.

The main rationale behind this study was the lack of research in measuring the size of the informal economy in this region. Studies that have attempted to measure the size of the informal economy in this region have done without particularly focusing on the Balkan countries, or they have used other methodologies for measuring the size of the informal economy. Often the existing literature does not compare results and offer analysis on results focusing mainly on the Balkan countries. Therefore, this research has offered a number of contributions from a conceptual or theoretical one to a methodological and empirical contribution.

The conceptual or theoretical contribution has been offered by clearly analysing and reviewing the existing literature on the informal economy with emphasis on the ten Balkan countries part of this research, from a theoretical and empirical perspective. Theories regarding the informal economy have been discussed in detail and empirical studies which have estimated the size of the informal economy in Balkan countries over the years has been analysed and compared with each other and with the estimates of this research. The methodological and empirical contribution of this research has been achieved by using a MIMIC model which is made up of mainly enforcement causes, to measure the size of the informal economy. Estimates were provided for the three MIMIC specifications used in the benchmarking procedure with the best model fit statistics.

Many studies have argued that countries tend to use mainly punitive and enforcement measures to combat the high level of informal economy (Schneider & Enste, 2000; Frey & Schneider, 2000; la Porta & Schleifer, 2014). High economic growth and development tend to have an inverse relationship with the size of the informal economy, and many developed countries with substantial growth are minimal and can be controlled through a combination of punitive measures and incentives to enter a growing formal economy with many opportunities. Majority of Balkan countries, however, are relatively small economies and therefore the size of their formal economy might not be an option in controlling the level of economic informality. This study expected that the use of mainly enforcement causes in the MIMIC regression was important in estimating and explaining the size and development of the informal economy. Their hypotheses[138] raised in the methodology chapter in light of the developments in the Balkan countries have been tested, and almost all confirmed in this study.

The Balkan region has undergone significant changes in the last couple of decades. In most of the Balkan countries part of this research, transformations in their political and economic systems have all happened in the last two decades. The transformation from socialism or communism to democracy and the market economy in some countries (mainly from the former republics of Yugoslavia, and Albania) was challenging and was not overcome without the explosion of violence and social unrest. Therefore, it was interesting to see the development of the informal economy in the last two decades.

Majority of the estimates provided in this study, also directly or indirectly indicate the impact of the financial crisis of 2008. The momentum on the declining trend in the size of the informal

[138] Hypothesis for each variable used as causes and indicators in the MIMIC model and different specifications

economy for the region was slowed down during the years immediately after the financial crisis of 2008. The financial crisis of 2008 slowed down economic growth and development in almost all countries of the Balkan Peninsula. Such impact was also reflected in higher unemployment rates. The level of unemployment in a country is positively related to the level of the informal economy, as indicated by the causality in MIMIC regressions of this study.

In conclusion, this study has provided estimates on the size of the informal economy for ten Balkan countries, using a MIMIC model comprised of mainly enforcement causal variables. It has shown that the size of the informal economy over the years has been declining on average terms, which could be explained by economic, political and social developments in these countries. However, having said this, the size of the informal economy in these countries is still high averaging just over 30 percent of GDP. The governments in these ten countries are, therefore, still faced with a challenge on how to reduce such level of economic informality. This study has aimed to provide some policy recommendations on reducing the level of the informal economy.

7.2. Policy Recommendations

The estimates about the size of the informal economy provided in the previous chapter indicate that the level of informal economy in the ten countries of the Balkan Peninsula is declining, albeit the estimates still reveal that its size is still significant. It is also evident from data that the ten countries part of this research has undergone significant reforms in their economies, political and judiciary systems. Majority of these reforms have been influenced by the EU and the integration processes. However, Balkan countries should continue to work on reforms to encourage a transition of a relatively large informal economy into the formal

economy. There could be several avenues for government to consider in tackling the large size of the informal economy.

Fight against corruption

The level of corruption in Balkan countries is of significant size. Corruption tends to be positively correlated with the level of informal economy (Schneider & Enste, 2000; Schneider, 2007a; Buehn & Schneider 2012; Aydin, 2017; Medina & Schneider, 2017). Governments in the Balkan countries should focus on tackling high-level corruption, which could act as a signal to all that no one is above the law. Majority of these high-profile corruption cases (e.g. in Serbia, Croatia, Albania, and FYR Macedonia) involve highly ranked current or past government officials.

The inability of the judicial system to finalise convictions on these cases causes mistrust and discontent among the people, often resulting in protests and riots (Buscaglia 2003, 2008; European Commission Report, 2012[139]; Mehmetaj, 2014; Areizaga, 2017). In tackling corruption, full judiciary independence should be given to combat any corruptive practices which could influence existing and new participants in the informal economy. The results also indicate that the higher the level of corruption in a country is, the higher the size of the informal economy is expected to be, ceteris paribus. Therefore, a reduction in the level of corruption will have a direct impact on the size of the informal economy.

[139] Available from https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/pdf/financial_assistance/phare/evaluation/2012_final_report_lot_2.pdf, last accessed on 12.11.2017)

Strengthening the rule of law

The rule of law is linked with the fight against corruption, ensuring that all those who do not comply with a country's laws will face the consequences. A well-functioning rule of law could ensure that there are no new entrants into the informal economy. The effective rule of law, which ensures the protection of property rights and the enforceability of contracts, increases the benefits to participants to remain in the formal economy and at the same time can increase the costs of informality (Hassan and Schneider, 2016b).

Strengthening tax enforcement, tax auditing and control

Countries that experience high levels of unemployment should strengthen tax enforcement and increase the number of audits and control measures (Bitzenis et al. 2016). Strong and effective tax enforcement increase the opportunity cost of operating in the informal economy and will influence participants to shift from informal to formal economic activities. Policy enforcement has to be strict since tax enforcement measures are negatively correlated with the size of the informal economy (Buehn and Schneider 2012).

According to Alm and Torgler (2011), tax enforcement policies should be followed by a tax administration that works towards promoting trust and simultaneously discouraging corruption. Efficient tax administration could improve the attitudes of citizens towards paying their taxes, reflecting the popular trust in public institutions a fair and equal tax regime (Ritsatos, 2014). Improvements in tax administration and enforcement policies could potentially improve individuals' tax morality because according to Frey and Torgler, (2007) and Bizenis et al. (2016), the apparent tax evasion of others is positively linked with an individual's tax morality. Furthermore, the policies adopted by some Balkan countries (and

other countries worldwide) for implementing tax amnesties and debt settlements is likely to encourage individuals not to pay taxes when due, hoping for an amnesty or debt settlement. This is also likely to exacerbate the negative perception that some individuals might adopt regarding the unfairness of the tax system if the government amnesty does not benefit them.

Reduction in the size of the government

The size of government indicating the extent to which countries rely on the political process to allocate resources and provide public goods and services is an essential determinant in reducing the level of economic informality in a country (Medina & Schneider, 2017). Government interference in fairly allocating the public resources is likely to affect the tax morale as well as the perception of individuals' trust in government institutions. This could potentially lead to popular mistrust and encourage people to engage in informal economic activities. Governments of the ten Balkan countries should consider reducing the size of their government and decentralising much of their power to local authorities.

Reduction in regulation burden

Despite the improvements in the ease of doing business, there are still administrative bureaucracies in most of the Balkan countries (Schneider et al. 2013, Krstic & Sanfey, 2011). Such bureaucracies can potentially lead to increased labour costs in the formal economy, which are usually shifted to the employees, providing another incentive for people to work in the informal economy (Schneider & Enste, 2000). Governments should, therefore, work towards reducing the density of regulations and improving the enforcement of regulations, as opposed to increasing the number of regulations.

A better system in place to control the production of agricultural products

Since the size of the agriculture sector is relatively large in almost all Balkan countries when compared to the EU or other developed countries, the governments of these countries should have a better system in place to control the production of agricultural products. Farmers and those involved with the production of agricultural products should be incentivised in reporting all their production. Help and support should be given to those that are unable to compete with imported agricultural products. All those involved in the production of agricultural products should be equipped with fiscal recorders, and a dedicated team within the tax administration should be activated in supporting all those that operate formally rather than informally. This is likely to create incentives for those involved in the informal economy to enter the formal economy.

Active Labour market policies (ALMPs)

Countries with high unemployment levels must spend more in active labour market policies and programmes to help those unemployed find work. Most Balkan countries lack effective ALMPs to combat unemployment levels, and as such this could encourage people to enter informal economy because they cannot find opportunities in the formal economy. These ten Balkan countries should provide efficient and effective public employment services, where those that are unemployed can improve their job search efforts from the information about open vacancies provided by job centres, and the help and advice that they could get from these centres will encourage them to search for employment in the formal rather than informal economy.

Low skilled labour tends to be mainly engaged in the informal economy as suggested by theory (Dell'Anno, 2007; Buehn & Schneider, 2012). The government provided training schemes such as classes and apprenticeships can potentially help the unemployed improve their vocational skills and increase their employability in higher paid jobs, which in turn raise standards and encourage formal employment. Governments should also try to provide employment subsidies which could potentially create jobs in the formal economy for the unemployed.

Less punitive measures but more active and effective measures

As discussed previously in other chapters, most countries attempt to control the size of the informal economy through punitive measures such as punishments and prosecution. These may not be the most appropriate measures to control informal economic activities (Frey & Schneider, 2000). These punitive measures alone might not be sufficient. These must be coupled with adequate tax enforcement and auditing policies discussed above. Some countries try to use education to educate people not to engage in the informal economy, highlighting the punitive measures involved (la Porta & Schleifer, 2014). Education and informative campaigns about tax enforcement policies are likely to deter people from entering the informal economy.

These policy recommendations should be accompanied by clear strategies and measures to be successful. Successful policy for formalisation of the informal economy should entail the implementation and application of measures and policies that should discourage new participants entering into the informal economy and to design policies that attempt to formalise the economic activities of the existing participants. Alongside such policies,

countries should create favourable conditions to achieve and maintain economic growth through macroeconomic stability and reforms.

7.3. Recommendations for Future Research

This study has added to the literature of informal economy, by estimating the size and development of the informal economy in ten Balkan countries. It has analysed the existing literature on the informal economy, reviewed the theories available and evaluated the leading causes of informal economy for the countries of the Balkan Peninsula. The research has shown some fluctuations in the trend of the informal economy.

Further research may be required to understand these fluctuations by applying different structural brakes. For example, the size of the informal economy in almost all countries part of this research has increased slightly between 2008 and 2010. Future research may need to investigate the impact of the global financial crisis of 2008 and the subsequent Eurozone debt crisis on the level of the informal economy.

The level of immigration in a country and its relationship with the level of the informal economy is also an interesting area for future research. There does not seem to be significant research on this area in the existing literature. Studies such as that of Bohn & Owens (2009) and Bosh & Farre (2013) indicate a highly positive relationship between the level of immigration in a country and the size of the informal economy, in particular, the level of informal employment. The level of immigration could be used as a cause of informal economy in the MIMIC regression. It has not been used in this case, as immigration is not very common in the countries of Balkan Peninsula; rather it is emigration a more common factor. However, one could investigate this relationship for highly developed countries or a more substantial sample which includes countries worldwide.

This study has provided measures on the size of the informal economy for ten Balkan countries excluding Kosovo and Montenegro. Future research should also investigate and measure the size and development of the informal economy in Kosovo and Montenegro, using a MIMIC model. These two countries are characterised by a high degree of corruption, which could potentially have the highest level of economic informality in the region. Due to data unavailability and a significant percentage of missing data, these two countries were excluded from this research.

Further research may involve a survey to understand the main drivers of economic informality. Using Confirmatory Factor Analysis and Explanatory Factor Analysis one could determine all the potential factors and sub-factors influencing individuals in different countries to undertake informal economic activities. This research would not be concerned with the size of the informal economy, but instead, it would be concerned with the main drivers of informality.

Following the work of Elgin and Oztunali (2014) on the application of environmental Kuznets curve to the informal economy for Turkey for the period of 1950 to 2009, one could expand on this analysis to include more countries in the sample, in order to understand the relationship and the impact of the informal economy to the formal economy at different stages of a country's economic development. Nikopour et al. (2008) and Elgin & Oztunali (2014) indicate that the level of the informal economy in a country has a positive effect on the formal economy in the first stages of the development and has a negative impact on economic growth on later stages of development. Such conclusion should be tested further. The question of how much of informal economy ends up being spent in the formal economy is also an interesting topic for future research.

References and Bibliography

Abdih, M. Y., and Medina, L. (2013). Measuring the Informal Economy in the Caucasus and Central Asia (No. 13-137). *International Monetary Fund.*

Abed, M.G.T., and Gupta, M.S. (2002). Governance, corruption, and economic performance. *International Monetary Fund.*

Acemoglu, D. and Robinson, J.A., (2002). The political economy of the Kuznets curve. *Review of development economics*, 6(2), pp.183-203.

Adam, M.C. and Ginsburgh, V., (1985). The effects of irregular markets on macroeconomic policy: some estimates for Belgium. *European Economic Review,* 29(1), pp.15-33.

Agbi, S., (2014). The virtuous and the variance of the various approaches for measuring shadow economy around the world-implications for policymakers. *European Journal of Business and Innovation Research*, *2*(6), pp.40-55.

Ahumada, H., Alvaredo, F., Canavese, A., and Canavese, P. (2004). The Demand for Currency Approach and the Size of the Shadow Economy: A Critical Assessment. *Delta Ecole. Normale Superieure*, Paris, Discussion Paper.

Ahmed, Q.M. and Hussain, M.H., (2006). Estimating the black economy through monetary approach: a case study of Pakistan. *Economic Issues.* Vol. 13, Part 1.

Aigner, D., Schneider, F., and G., Damayanti (1988). Me and my Shadow: Estimating the Size of the US Hidden Economy from Time Series Data. In: *Dynamic econometric modelling*, ed. by W.A. Barnett and E.R. Berndt and H. White, pp. 224–243, Cambridge (Mass.): *Cambridge University Press.*

Alderslade, J., Talmage, J., and Freeman, Y. (2006). Measuring the Informal Economy: One Neighborhood at a Time. *The Brooking Institution Metropolitan Policy Program,* Discussion Paper. Washington D.C., September 2006. Available at: https://www.brookings.edu/metro/umi/pubs/20060905_informaleconomy.pdf (Last accessed: 22.04.2017)

Alesina, Alberto, (1999), Too Large and Too Small Governments, in Vito Tanzi, Ke-young Chu, and Sanjeev Gupta, ed., *Economic Policy and Equity* (Washington: International Monetary Fund).

Alm, J. and Embaye, A., (2013). Using dynamic panel methods to estimate shadow economies around the world, 1984–2006. *Public Finance Review*, *41*(5), pp.510-543.

Anastasakis, O., (2013). Post-1989 political change in the Balkan states: the legacy of the early illiberal transition years. *Perceptions*, *18*(2), pp.91.

Andrei, T., Iacob, A.I., Profiroiu, A. and Dananaum, F., (2011). Some Comments Concerning Informal Economy, Unemployment and Inflation Rates–Romania's Case. *Economic Computation and Economic Cybernetics Studies and Research, ASE Publishing*, *45*(3), pp.127-142.

Andrei, T., Ştefănescu, D., and Oancea, B. (2010). Quantitative Methods for Evaluating the Informal Economy. Case Study at the Level of Romania. *Theoretical and Applied Economics,* 7(7), 15.

Andrews, D., Sánchez, A.C. and Johansson, A., (2011). Towards a better understanding of the informal economy. *OECD Economics Department Working Papers*, http://dx.doi.org/10.1787/18151973

Antonakis, J. and Bastardoz, N., (2013). Swain: Stata module to correct the SEM chi-square overidentification test in small sample sizes or complex models. Statistical Software Components.

Arby, Muhammad Farooq, Muhammad Jahanzeb Malik, and Muhammad Nadim Hanif. (2012). The size of the informal economy in Pakistan. *Finance Research*, Vol1 No2, April 2012, ISSN: 2165-8226

Areizaga, L., S. (2017). Albania´s Progress on Rule of Law, Democracy and Fundamental rights - A Comparison between the EU and Council of Europe' Monitoring Instruments. *Albania Law Journal* (1), February 2017

Arellano, M., (2003). Panel data econometrics. *Oxford university press.*

Arellano, M. and Bover, O., (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68(1), pp.29-51.

Árvai, Z., Driessen, K. and Ötker, I., (2009). Regional financial interlinkages and financial contagion Within Europe. *International Monetary Fund.*

Asiedu, E. and Stengos, T., (2014). An empirical estimation of the underground economy in Ghana. *Economics Research International*, Volume 2014 (2014), http://dx.doi.org/10.1155/2014/891237

Asea, P. K. (1996), The informal sector: Baby or bath water? A comment. In *Carnegie-Rochester Conference Series on Public Policy* (Vol. 45, pp. 163-171). North-Holland.

Aydin, N. (2017). Analyzing the Shadow Economy of Selected Transition Economies by a Mimic Model, in Zortuk, M., (2017). *Applied Economics for Development.* Vernon Press.

Azuma, Y., and Grossman, H. I. (2002). A theory of the informal sector (No. w8823). National Bureau of Economic Research.

Baltagi, B., (2008). Econometric analysis of panel data. John Wiley & Sons. 4th Edition.

Bajada, C., 1999. Estimates of the underground economy in Australia. *Economic Record*, 75(4), pp.369-384.

Bajada, C. and Schneider, F., (2005). Size, Causes and Consequences of the Underground Economy: An International Perspective. Aldershot (GB): *Ashgate Publishing Company.*

Bajada, C. and Schneider, F., (2009). Unemployment and the Shadow Economy in the OECD. *Revue économique*, *60*(5), pp.1033-1067.

Balfour, R. and Stratulat, C., (2011). The democratic transformation of the Balkans. *EPC Issue Paper*, *66*.

Baliu, Q., Kamenica, A., Pfau-Effinger, B., Salvini, A., Stribu, E., Roch, S., and Sisevic, B. (2011). A comparative overview of informal employment in Albania, Bosnia and Herzegovina, Moldova and Montenegro. *ILO*, 13, 3.

Barbosa, E., Pereira, S. and Brandão, E., (2013). The Shadow Economy in Portugal: An Analysis Using the MIMIC Model. *School of Economics and Management Working Papers, University of Porto*, (514).

Barnes, J., Cote, J., Cudeck, R. and Malthouse, E. (2001). Checking Assumptions of Normality before Conducting Factor Analyses. *Journal of Consumer Psychology*, 10(1/2), pp. 79-81.

Bartlett, W., (2009). Economic development in the European super-periphery: Evidence from the Western Balkans. *Economic annals*, *54*(181), pp.21-44.

Bartlett, W. and Monastiriotis, V., (2010). South Eastern Europe after the economic crisis: a new dawn or back to business as usual? *LSE Research on South Eastern Europe.*

Bartlett, W. and Prica, I., (2013). The deepening crisis in the European super-periphery. *Journal of Balkan and Near Eastern Studies*, *15*(4), pp.367-382.

Bartlett, W. and Uvalic, M., (2013). Social consequences of the global economic crisis in South East Europe. *London: London School of Economics and Political Science, LSEE-Research on South Eastern Europe*.

Becker, K. F. (2004). The informal economy: fact-finding study. *Sida*.

Belev, B. (2003). The Informal Economy in the EU Accession Countries: Size, Scope, Trends and Challenges to the Process of EU Enlargement. *Centre for Study of Democracy,* Sofia.

Bejakovic, P., (2004). The informal economy in Croatia and economic development. *South East Europe Review for Labour and Social Affairs*, 3, pp.69-78.

Bentler, P.M., & Chou, C.-P. (1987). Practical issues in structural modelling. *Sociological Methods & Research*, 16, pp. 78-117.

Bhattacharya, P.C., (2011). The informal sector, income inequality and economic development. *Economic Modelling,* 28(3), pp.820-830.

Bhattacharyya, D.K. (1999). On the Economic Rationale of Estimating the Hidden Economy. *Economic Journal,* 109(456): F348-359. http://ideas.repec.org/a/ecj/econjl/v109y1999i456pf348-59.html

Biau, J., (2011). Engine for growth or drag on productivity? The informal sector and domestic investment in developing countries. *Georgetown University*.

Bitzenis, A., Vlachos, V. and Schneider, F., (2016). An exploration of the Greek shadow economy: can its transfer into the official economy provide economic relief amid the crisis? *Journal of Economic Issues,* 50(1), pp.165-196.

Blades, D. (1982). The Hidden Economy and the National Accounts. OECD, Occasional Studies.

Blades, D., Ferreira, F. H., and Lugo, M. A. (2011). The informal economy in developing countries: an introduction. *Review of Income and Wealth,* 57(s1), S1-S7.

Blau, P.M. and Scott, W.R., 1962. Formal organizations: A comparative approach. *Stanford University Press.*

Blunch, N.H., (2015). Bound to lose, bound to win? The financial crisis and the informal-formal sector earnings gap in Serbia. *Journal of Labour and Development,* 4(1), p.13.

Bogdanov, L., and Stanchev, K. (2010). The grey economy in Bulgaria: situation as of 2010]. Sofia: *Institute for Market Economics.*

Bohn, S. and Owens, E.G., 2009. Immigration and the Informal Economy. Available online at http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.492.7248&rep=rep1&type=pdf (Last accessed on 28.12.2017)

Boka, Merita and Torluccio, Giuseppe (2008), The Informal Economy in Albania: Genesis and Development, *Academic Journal of Interdisciplinary Studies*, MCSER Publishing, Rome-Italy, E-ISSN 2281-4612 ISSN 2281-3993, Vol 2 No 8 October 2008.

Bollen, K.A., (1989). A new incremental fit index for general structural equation models. *Sociological Methods & Research,* 17(3), pp.303-316.

Bollen, K.A., Long, JS (1993). Testing structural equation models. *A Sage Focus Edition.*

Bosch, M. and Farré, L., (2013). Immigration and the informal labour market. *IZA Discussion Paper* No. 7843, available from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2374624 (Last accessed on 28.12.2017)

Bovi, M., and Dell'Anno, R. (2010). The changing nature of the OECD shadow economy. *Journal of Evolutionary Economics,* 20(1), 19-48.

Box-Steffensmeier, J. M., Brady, H. E., and Collier, D. (2008). The Oxford handbook of political methodology (Vol. 10). *Oxford University Press.*

Breitung, J. and Das, S., (2005). Panel unit root tests under cross-sectional dependence. *Statistica Neerlandica,* 59(4), pp.414-433.

Breitung, J. and Pesaran, M.H., (2008). Unit roots and cointegration in panels. In *The econometrics of panel data* (pp. 279-322). Springer Berlin Heidelberg.

Breusch, Trevor (2005a). Estimating the Underground Economy using MIMIC Models. EconWPA, *Econometrics* 0507003. http://ideas.repec.org/p/wpa/wuwpem/0507003.html

Breusch, Trevor, (2005b). Fragility of Tanzi's method of estimating the underground economy. *The Australian National University, mimeo*.

Breusch, Trevor, (2005c). The Canadian Underground Economy: An Examination of Giles and Tedds. *Canadian Tax Journal*, 53(2):367-391.

Breusch, Trevor, (2006) Size, Causes and Consequences of the Underground Economy: An International Perspective. *Economic Record,* Vol. 82(259), December. 492-494.

Bryman, A. and Bell, E. (2011). Business research strategies, Business research methods, OUP Oxford; 3rd edition, ISBN: 0199583404

Boomsma, A., (1985). Non-convergence, improper solutions, and starting values in LISREL maximum likelihood estimation. *Psychometrika*, 50(2), pp.229-242.

Buehn, A., and Schneider, F. (2007). Shadow economies and corruption all over the world: Revised estimates for 120 countries. *Economics: The Open-Access, Open-Assessment E-Journal,* 1(9), 1-66.

Buehn, A., and Schneider, F. (2009). Corruption and the Shadow Economy: A Structural Equation Model Approach. *Institute for the Study of Labour* (IZA), IZA Discussion Papers 4182. http://ideas.repec.org/p/iza/izadps/dp4182.html

Buehn, A., Karmann, A., and F., Schneider (2009). Shadow Economy and Do-it-yourself Activities: The German Case. *Journal of Institutional and Theoretical Economics*, 165(4):701-722.

Buehn, A. and Schneider, F., (2011). A preliminary attempt to estimate the financial flows of transnational crime using the MIMIC method. *Research Handbook on Money Laundering*, pp.172-189.

Buehn, A. and Schneider, F., (2012). Shadow economies around the world: novel insights, accepted knowledge, and new estimates. *International Tax and Public Finance*, 19(1), pp.139-171.

Burgess, R., and Körner, K. (2012). Western Balkans: Bumps on the road to EU accession. *Deutsche Bank Research–Emerging Markets*, August.

Buscaglia, E., (2003). Controlling Organized Crime and Corruption in the Public Sector. *Forum on Crime and Society*, Vol. 3, Nos. 1/2, December 2003. Available at SSRN: https://ssrn.com/abstract=931046

Buscaglia, E., (2008). The paradox of expected punishment: legal and economic factors determining success and failure in the fight against organised crime. *Review of Law & Economics*, 4(1), pp.290-317.

Byrne, B.M. (1998). Structural Equation Modelling with LISREL, PRELIS and SIMPLIS: Basic Concepts, Applications and Programming. Mahwah, NJ: *Lawrence Erlbaum Associates.*

Cagan, P. (1958). The Demand for Currency Relative to the Total Money Supply. *Journal of Political Economy*, 66(3):302-328.

Carlin, W. and Soskice, D.W., (2015). Macroeconomics: Institutions, instability, and the financial system. *Oxford University Press*, ISBN: 9780199655793.

Cassar, A., (2001). An index of the underground economy in Malta. *Bank of Valletta Review*, 23(2), pp.44-62.

Chaudhuri, K., Schneider, F. and Chattopadhyay, S., (2006). The size and development of the shadow economy: An empirical investigation from states of India. *Journal of Development Economics,* 80(2), pp.428-443.

Charmes, J. (2012), The Informal Economy Worldwide: Trends and Characteristics, *The Journal of Applied Economic Research*, May 2012, 6: 103-132

Chen, Martha (2004). Rethinking the Informal Economy: Linkages with the Formal Economy and the Formal Regulatory Environment. In: *Paper presented at the EGDI-WIDR Conference 'unleashing human potential: linking the informal and formal sectors, Helsinki, Finland*. Available at: http://www.un.org/esa/desa/papers/2007/wp46_2007.pdf (Accessed: 30.06.2017).

Chen, Martha (2007), Rethinking the Informal Economy: Linkages with the Formal Economy and the Formal Regulatory Environment, *DESA Working Paper* No. 46 ST/ESA/2007/DWP/46, July 2007.

Chen, Martha (2012), The Informal Economy: Definitions, Theories and Policies, *WIEGO Working* Paper No. 1, ISBN: ISBN 978-92-95095-41-0

Choi, I., (2001). Unit root tests for panel data. *Journal of international money and Finance,* 20(2), pp.249-272.

Choi, J., and Thum, M. (2005). Corruption and the Shadow Economy. *International Economic Review*, 12(4):308-342.

Ciraki, D., (2007). Dynamic structural equation models: estimation and interference. *London School of Economics and Political Science* (United Kingdom).

Claessens, S. and Kose, M.M.A., (2013). Financial crises explanations, types, and implications (No. 13-28). *International Monetary Fund.*

Cling, J.P., Razafindrakoto, M. and Roubaud, F., (2010). Assessing the potential impact of the global crisis on the labour market and the informal sector in Vietnam. *Journal of Economics and Development*, 38, pp.16-25.

Colombo, E., Onnis, L., and Tirelli, P. (2016). Shadow economies at times of banking crises: Empirics and theory. *Journal of Banking and Finance*, 62, 180-190.

Corsetti, G., Pesenti, P., and Roubini, N. (1999). What caused the Asian currency and financial crisis? *Japan and the world economy*, 11(3), 305-373.

Cunningham, W. and Maloney, W.F., (2000). Measuring vulnerability: who suffered in the 1995 Mexican crisis? *World Bank*, available at http://web.worldbank.org/archive/website00895A/WEB/PDF/VULNER-2.PDF (Last accessed: 05.06.2017)

De Soto, H. (1989). The other path: The invisible revolution in the third world. *Development Southern Africa*, Volume 6, 1989 - Issue 3, pp. 390-392

De Soto, H. (2000). The mystery of capital: Why capitalism triumphs in the West and fails everywhere else. *Basic Books*. ISBN: 0-552-99923-7.

Del´Anno, R., and Schneider, F.G. (2006). Estimating the Underground Economy by Using MIMIC Models: A Response to T. Breusch´s Critique. *Department of Economics, Johannes Kepler University Linz, Austria, Economics working papers* 2006-07.

Del'Anno, R., and Schneider, F. (2009). A Complex Approach to Estimate the Shadow Economy: The Structural Equation Modelling. In: *Coping with the Complexity of Economics*, ed. by Marzia Faggini and Thomas Lux, pp. 110–130, Heidelberg: Springer Publ. Comp.

Del'Anno, R. (2003). Estimating the Shadow Economy in Italy: A Structural Equation Approach. *School of Economics and Management, University of Aarhus, Economics Working Papers* 2003-7. http://ideas.repec.org/p/aah/aarhec/2003-7.html

Dell'Anno, R. and Piirisild, M., (2004). Estimate of non-observed economy in Bosnia and Herzegovina. *USAID paper presented in Sarajevo, Bosnia and Herzegovina.* Available from http://pdf.usaid.gov/pdf_docs/PNADG958.pdf (Last accessed on 17.09.2017

Dell'Anno, R. (2009). Tax evasion, tax morale and policy maker's effectiveness. *The Journal of Socio-Economics*, *38*(6), pp.988-997.

Dell'Anno, R., (2010). Institutions and human development in the Latin American informal economy. *Constitutional Political Economy*, *21*(3), pp.207-230.

Dell'Anno, R., and Schneider, F. (2003), The Shadow Economy of Italy and other OECD Countries: What do we know? *Journal of Public Finance and Public Choice*, XXI (2-3), pp. 97-120.

Dell'Anno, R., Gómez-Antonio, M., and Pardo, A. (2007). The shadow economy in three Mediterranean countries: France, Spain and Greece. A MIMIC approach. *Empirical Economics*, 33(1), 51-84.

Dell'Anno, R. (2007). The shadow economy in Portugal: an analysis with the MIMIC approach. *Journal of Applied Economics*, *10*(2), 253.

Dell'Anno, R., and Halicioglu, F. (2010). An ARDL model of unrecorded and recorded economies in Turkey. *Journal of Economic Studies*, 37(6), 627-646.

Diamantopoulos, A., Siguaw, J. & Siguaw, J. A. (2000). Introducing LISREL: A guide for the uninitiated, *Sage Publications.*

Djankov, S., Glaeser, E., La Porta, R., Lopez-de-Silanes, F., and Shleifer, A. (2003). The new comparative economics. *Journal of Comparative Economics*, 31(4), 595-619.

Dreher, A., and Schneider, F. (2010). Corruption and the shadow economy: an empirical analysis. *Public Choice*, 144(1-2), 215-238.

Dreher, A., Kotsogiannis, C., and McCorriston, S. (2009). How do institutions affect corruption and the shadow economy? *International Tax and Public Finance*, 16(6), 773-796.

Drukker, D.M., (2003). Testing for serial correlation in linear panel-data models. *Stata Journal*, 3(2), pp.168-177.

Dzhekova, R., Franic, J., Mishkov, L., and Williams, C. C. (2014). Tackling the Undeclared Economy in FYR Macedonia: a baseline assessment. Available at SSRN 2479905.

Echazu, L., and Bose, P. (2008). Corruption, Centralization, and the Shadow Economy. *Southern Economic Journal,* 75(2):524-537.

Eichengreen, B and R. Porter (1987) "The Anatomy of Financial Crises" in Richard Portes and Alexander Swoboda, eds. Threats to International Financial Stability, *Cambridge University Press,* Cambridge 1987, pp. 10-58.

Elbasani, A. and Šabić, S.Š., (2017). The rule of law, corruption and democratic accountability in the course of EU enlargement. *Journal of European Public Policy*, pp.1-19.

Elgin, C. and Öztunali, O., (2014a). Institutions, informal economy, and economic development. *Emerging Markets Finance and Trade*, 50(4), pp.145-162.

Elgin, C. and Öztunali, O., (2014b). Environmental Kuznets curve for the informal sector of Turkey (1950-2009). *Panoeconomicus*, 61(4), p.471.

Elshamy, H.M., (2015). Measuring the Informal Economy in Egypt. In conference proceedings IRC-2014 (p. 167).

Enste, D. H. (2010). Regulation and shadow economy: empirical evidence for 25 OECD-countries. *Constitutional Political Economy*, *21*(3), 231-248.

Farrell, D. (2004). The hidden dangers of the informal economy. *McKinsey Quarterly*, 26-37.

Feige, E. (1989a) The Underground Economies: Tax Evasion and Information Distortion, *Cambridge University Press,* Cambridge, UK.

Feige, E. (1989b). The UK´s Unobserved Economy: A Preliminary Assessment. *Journal of Economic Affairs* 1, pp. 205-212.

Feige, E. (1990). Defining and estimating underground and informal economies: The new institutional economics approach. *World development*, *18*(7), pp.989-1002.

Feige, E. (1994). The underground economy and the currency enigma. *Public Finance*, *49* (Supplement), pp.119-36.

Feige, E. (1996) Overseas Holdings of U.S. Currency and the Underground Economy in S. Pozo (ed. 1996) Exploring the Underground Economy, W.E. *Upjohn Institute for Employment Research*, 5-62.

Feige, E. (1997). Underground activity and institutional change: Productive, protective and predatory behaviour in transition economies. *Transforming post-communist political economies*, *21*, 34.

Feige, E. (2003) The Dynamics of Currency Substitution, Asset Substitution and de facto Dollarization and Euroization in Transition Countries, *Comparative Economic Studies* 45,3 September 358-383

Feige, E. (2005a). A Re-Examination of the 'Underground Economy' in the United States; A Comment on Tanzi. EconWPA, *Macroeconomics*.

Feige, E. (2005b). Overseas Holdings of U.S. Currency and The Underground Economy. EconWPA, *Macroeconomics*. http://ideas.repec.org/p/wpa/wuwpma/0501022.html

Feige, E.L. ed., (2007). The underground economies: Tax evasion and information distortion. *Cambridge University Press.*

Feige, E.L. and Ott, K., (1999). Underground Economies in Transition: Unrecorded Activity, Tax Evasion, Corruption, and Organized Crime. *Ashgate Publishing.*

Feld, L., and Larsen, C. (2005). *Black Activities in Germany in 2001 and 2004: A Comparison Based on Survey Data*. *The Rockwool Foundation Research Unit,* Copenhagen (DK).

Feld, L.P. and Schneider, F., (2010). Survey on the shadow economy and undeclared earnings in OECD countries. *German Economic Review*, *11*(2), pp.109-149.

Feld, L.P., and Frey, B.S. (2002). Trust Breeds Trust: How Taxpayers Are Treated. *Economics of Governance,* 3(2):87-99. http://ideas.repec.org/a/spr/ecogov/v3y2002i2p87-99.html

Finnegan, G., and Singh, A. (2004). Role of the informal sector in coping with economic crisis in Thailand and Zambia (No. 365701). *International Labour Organization*.

Flaming, D., Hayolamak, B., and Jossart, P. (2005). Hopeful Workers, Marginal Jobs: LA's Off-The-Books Labour Force. *Economic Roundtable*, Los Angeles, CA.

Fleming, M.H., Roman, J. and Farrell, G., (2000). The shadow economy. *Journal of International Affairs*, pp.387-409.

Fornell, C. and Larcker, D.F., (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research*, pp.382-388.

Frederic S. Mishkin (2015), The Economics of Money, Banking and Financial Markets (11th Edition) (The Pearson Series in Economics), *Pearson*; 11 edition (January 6, 2015)

French, R., Balaita, M., and Ticsa, M. (1999). Estimating the size and policy implications of the underground economy in Romania. *US Department of the Treasury, Office of Technical Assistance*.

Frey, B. (1997). Not just for the Money: An Economic Theory of Personal Motivation. Cheltonham (UK): *Edward Elgar.*

Frey, B. and Pommerehne, W. W. (1984). The Hidden Economy: State and Prospects for Measurement. *Review of Income and Wealth*, 30(1), pp. 1-23.

Frey, B.S. and Schneider, F., 2000. Informal and underground economy. Working Paper (No. 0004), *Department of Economics, Johannes Kepler University of Linz.*

Frey, B.S. and Torgler, B., (2007). Tax morale and conditional cooperation. *Journal of Comparative Economics*, 35(1), pp.136-159.

Frey, B. and Weck-Hanneman, H. (1984), The Hidden Economy as 'Unobserved Variable', *European Economic Review*, Vol. 26, pp. 33–53.

Frey, B., (1989). How large (or small) should the underground economy be? In E.L. Feige (Ed.), The underground economy: Tax evasion and information distortion, 111-129. Cambridge: Cambridge University

Frey, B., and Weck, H. (1983a). Estimating the Shadow Economy: A 'Naive' Approach. *Oxford Economic Papers*, 34:23-44.

Frey, B., and Weck, H. (1983b). Bureaucracy and the Shadow Economy: A Macro-Approach. In: *Anatomy of Government Deficiencies*, ed. by Horst Hanusch, pp. 89–109, *Springer*.

Friedman, E., Johnson, S., Kaufmann, D., and Zoido-Lobaton, P. (2000). Dodging the Grabbing Hand: The Determinants of Unofficial Activity in 69 Countries. *Journal of Public Economics,* 76(3):459-493.

Galli, R., and Kucera, D. (2003). Informal employment in Latin America: Movements over business cycles and the effects of worker rights*. International Institute for Labour Studies*.

Garcia, G. (1978). The Currency Ratio and the Subterranean Economy. *Financial Analysts Journal*, 69(1):64-66.

Garvanlieva, V., Andonov, V. and Nikolov, M., (2012). Shadow Economy of Macedonia. *CEA Journal of Economics*, *7*(2).

Geertz, C., 1978. The bazaar economy: Information and search in peasant marketing. *The American Economic Review*, 68(2), pp.28-32.

Gerxhani, K. (2004a). Tax evasion in transition: Outcome of an institutional clash? Testing Feige's conjecture in Albania, *European Economic Review* 48 (4): 729-745

Gerxhani, K. (2004b). The informal sector in developed and less developed countries: a literature survey. *Public choice*, *120*(3-4), pp.267-300.

Geshkov, M., (2014). The Effect of the World Economic Crisis on the Countries of the Balkan Region. *Economic Alternatives*, (1), pp.108-125.

Gibson, B. and Kelley, B., (1994). A classical theory of the informal sector. *The Manchester School*, *62*(1), pp.81-96.

Giles, David, E.A. (1997a). Causality between the Measured and Underground Economies in New Zealand. *Applied Economics Letters*, 4(1):63-67. http://ideas.repec.org/a/taf/apeclt/v4y1997i1p63-67.html

Giles, David, E.A. (1997b). Testing for Asymmetry in the Measured and Underground Business Cycles in New Zealand. *The Economic Record*, 73(222):225-32.

Giles, David, E.A. (1999a). Measuring the Hidden Economy: Implications for Econometric Modelling. *The Economic Journal*, 109(456): 370–380.

Giles, David, E.A. (1999b): Modelling the Hidden Economy in the Tax-Gap in New Zealand. *Empirical Economics 24*(4): 621–640.

Giles, David, E.A. (1999c). The Rise and Fall of the New Zealand Underground Economy: Are the Reasons Symmetric? *Applied Economic Letters* 6: 185–189.

Giles, David, E.A., Tedds, Lindsay, M. and Werkneh, Gugsa (2002): The Canadian underground and measured economies, *Applied Economics*, 34/4, pp.2347-2352.

Gillman, M. and Cziráky, D., (2004). Inflation and endogenous growth in underground economies (No. 050). *The Vienna Institute for International Economic Studies*.

Glenny, M., (2000). The Balkans, 1804-1999: Nationalism, war and the great powers. *Granta Books*.

Goldberger, A. S. (1972), Structural Equation Methods in the Social Sciences, *Econometrica*, 40, pp. 979-1001.

Goldstein, Itay and Razin, Assaf, (2015). Three Branches of Theories of Financial Crises, *Foundations and Trends(R) in Finance, Now publishers*, vol. 10(2), pages 113-180, 30

Greener, S. (2008). Business research methods. BookBoon. Available from www.bookboon.com/en

Gujarati, D.N., 2009. Basic econometrics. 5th Edition. *Tata McGraw-Hill Education*. ISBN 10: 0071276254

Gupta, S., Davoodi, H. and Alonso-Terme, R., (2002). Does corruption affect income inequality and poverty? *Economics of governance*, 3(1), pp.23-45.

Hadri, K., (2000). Testing for stationarity in heterogeneous panel data. *The Econometrics Journal*, 3(2), pp.148-161.

Hair Jr, J. F., Hult, G. T. M., Ringle, C., and Sarstedt, M. (2016). A primer on partial least squares structural equation modelling (PLS-SEM). *Sage Publications.*

Hall, B. and Mairesse, J., (2002). Testing for unit roots in panel data: an exploration using real and simulated data. Identification and Inference for Econometric Models. *Essays in Honour of Thomas Rothenberg*, pp.451-475.

Harding, P., and Jenkins, R. (1989). The myth of the hidden economy: towards a new understanding of the informal economic activity. *Open University Press.*

Harris, R.D. and Tzavalis, E., (1999). Inference for unit roots in dynamic panels where the time dimension is fixed. *Journal of Econometrics*, 91(2), pp.201-226.

Hart, Heith. (1970). "Small Scale Entrepreneurs in Ghana and Development Planning". *Journal of Development Studies* 6, pp. 104-120.

Hart, Heith. (1973). "Informal Income Opportunities and Urban Employment in Ghana". *Journal of Modern African Studies* 11, pp. 61-89.

Hart, K., (2008a). Informal Economy, *The New Palgrave Dictionary of Economics*. Eds. Steven N. Durlauf and Lawrence E. Blume.

Hart, K., (2008b). Between bureaucracy and the people: a political history of informality (No. 2008: 27). DIIS Working paper.

Hassan, Mai and Schneider, Friedrich, (2016a) Size and development of the shadow economies of 157 worldwide countries: Updated and new measures from 1999 to 2013. *Journal of Global Economics*, *4*(218), p.2.

Hassan, Mai and Schneider, Friedrich, (2016b) Modelling the Egyptian Shadow Economy: A MIMIC model and A Currency Demand approach. *Journal of Economics and Political Economy*, *3*(2), p.309.

Hauser, R.M. and Goldberger, A.S., (1971). The treatment of unobservable variables in path analysis. *Sociological methodology*, 3, pp.81-117.

Helberger, C., and Knepel, H. (1988). How Big is the Shadow Economy? A Re-analysis of the Unobserved-variable Approach of B.S. Frey and H. Weck-Hannemann. *European Economic Review*, 32(4):965-976.

Hernandez, M.A., 2009. Estimating the Size of the Hidden Economy in Peru: A Currency Demand Approach. *Revista de Ciencias Empresariales Y Economia*, (8), pp. 85-104.

Herwartz, H., Schneider, F., and Tafenau, E. (2009). One share fits it all? Regional variation in the shadow economy in the EU regions. *Discussion paper, Universities of Linz and Kiel.*

Heintz, J. and Pollin, R., (2003). Informalisation, economic growth and the challenge of creating viable labour standards in developing countries. *PERI Working Paper* No. 60. Available at SSRN: https://ssrn.com/abstract=427683 or http://dx.doi.org/10.2139/ssrn.427683

Hindriks, J., Keen, M., and Muthoo, A. (1999). Corruption, Extortion and Evasion. *Journal of Public Economics,* 74(3):395-430. http://ideas.repec.org/a/eee/pubeco/v74y1999i3p395-430.html

Hirschheim, R., (1985). Information systems epistemology: An historical perspective. *Research methods in information systems,* pp.13-35.

Hoang, N.T. and McNown, R.F., (2006). Panel data unit roots tests using various estimation methods. *University of Colorado Bulletin*, 6, pp.33-66.

Hoelter, J.W., (1983). The analysis of covariance structures: Goodness-of-fit indices. Sociological Methods & Research, 11(3), pp.325-344.

Horn, A., (2011). Who's out there? A profile of informal traders in four South African city central business districts. *Town and Regional Planning*, *59*, pp.1-6.

Hsiao, C., (2003). Analysis of panel data, second. *Cambridge University Press*.

Kose, MA, ES Prasad and ME Terrones (2003), Financial Integration and Macroeconomic Volatility, *IMF Staff Papers*, 50, pp.119-142.

Hu, L.T. and Bentler, P.M., (1998). Fit indices in covariance structure modelling: Sensitivity to under parameterised model misspecification. *Psychological Methods*, 3(4), p.424.

Hu, L.T. and Bentler, P.M., (1999). Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modelling: a multidisciplinary journal*, 6(1), pp.1-55.

Ihrig, J., and Moe, K. S. (2004). Lurking in the shadows: the informal sector and government policy. *Journal of Development Economics*, 73(2), 541-557.

Im, K.S., Pesaran, M.H. and Shin, Y., (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics*, 115(1), pp.53-74.

International Labour Organisation (1972). Employment, income and equality: A strategy for increasing productivity in Kenya. Geneva: *ILO*.

Isachsen, A.J., and Strom, S. (1985). The Size and Growth of the Hidden Economy in Norway. *Review of Income and Wealth*, 31(1):21-38. http://ideas.repec.org/a/bla/revinw/v31y1985i1p21-38.html

Ishengoma, E., and Kappel, R. (2006). Formalisation of informal enterprises: economic growth and poverty. Eschborn: *Economic Reform and Private Sector Development Section*, GTZ.

Johnson, S., D. Kaufmann and A. Shleifer, (1997), "The Unofficial Economy in Transition," *Brookings Papers on Economic Activity*, Fall, Washington D.C. Johnson, S.

Johnson, S., Kaufmann, D., and Zoido-Lobaton, P. (1998). Regulatory Discretion and the Unofficial Economy. *American Economic Review*, 88(2):387-92.

Johnson, S., Kaufmann, D., McMillan, J., and Woodruff, C. (2000). Why do firms hide? Bribes and unofficial activity after communism. *Journal of Public Economics*, 76(3), 495-520.

Jöreskog, K. (1970). A general method for estimating a linear structural equation system. *ETS Research Bulletin Series*, *1970*(2), i-41.

Jöreskog, K., and A.S. Goldberger (1975), "Estimation of a model with multiple indicators and multiple causes of a single latent variable", *Journal of the American Statistical Association*, 70, pp. 631-639.

Jütting, J. and J. de Laiglesia (2009), Is Informal Normal? Towards More and Better Jobs in Developing Countries, *OECD Publishing*, Paris.

Kaplan, D., (2008). Structural equation modelling: Foundations and extensions. Advanced Quantitative Techniques in the Social Sciences series. *Sage Publications.* Volume 10.

Kaufmann, D., and Kaliberda, A. (1996). Integrating the Unofficial Economy into the Dynamics of Post Socialist Economies: A framework of Analyses and Evidence. In: *Economic Transition in Russia and the New States of Eurasia*, ed. by B. Kaminski, M.E. Sharpe, pp.81-120. London.

Kanbur, Ravi, (2009). Conceptualising Informality: Regulation and Enforcement. *IZA Discussion Paper* No. 4186. Available at SSRN: https://ssrn.com/abstract=1412264

Kazemier, B. (2003). The Underground Economy: A Survey of Methods and Estimates. Statistics Netherlands, Voorburg, Netherlands, *IZA Discussion Paper*.

Kazemier, B. (2005). Monitoring the Underground Labour Market: What Surveys Can Do. Statistics Netherlands, Voorburg, Netherlands, *IZA Discussion Paper*.

Keefer, P. and Knack, S., (1997). Why don't poor countries catch up? A cross-national test of an institutional explanation. *Economic Inquiry*, 35(3), pp.590-602.

Kenny, D.A., (2015). Measuring model fit. Available at: http://davidakenny.net/cm/fit.htm (Last accessed 10.06.2017)

Kindleberger, C. P., and Aliber, R. Z. (2005). Manias, panics, and crashes: A History of Financial Crises, Seventh Edition. *Palgrave Macmillan UK*, DOI: 10.1007/978-1-137-52574-1

Kirchler, E., Maciejovsky, B., and Schneider, F. (2003). Everyday Representations of Tax Avoidance, Tax Evasion, and Tax Flight: Do Legal Differences Matter? *Journal of Economic Psychology*, 24(4):535-553.

Kline, R.B., (2015). Principles and practice of structural equation modelling. *Guilford Press publications*. ISBN: 9781462523344

Klarić, V., 2011. Estimating the size of non-observed economy in Croatia using the MIMIC approach. *Financial theory and practice*, 35(1), pp.59-90.

Klovland, J.T. (1984). Tax Evasion and the Demand for Currency in Norway and Sweden. Is There a Hidden Relationship? *Scandinavian Journal of Economics*, 86(4):423-39.

Kobrak, C., and Wilkins, M. (2011). The '2008 Crisis' in an economic history perspective: Looking at the twentieth century. *Business History*, 53(2), 175-192.

Kostovicova, D. and Bojicic-Dzelilovic, V. (2006). Europeanizing the Balkans: rethinking the post-communist and post-conflict transition. *Ethnopolitics*, 5(3), pp.223-241.

Krstić, B., and Stanišić, T. (2013). The influence of knowledge economy development on the competitiveness of south-eastern Europe countries. *Industrija*, 41(2), 151-167.

Krstić, G. and Sanfey, P., (2011). Earnings inequality and the informal economy. *Economics of transition*, *19*(1), pp.179-199.

Kuznets, S., (1955). Economic growth and income inequality. *The American economic review*, 45(1), pp.1-28.

La Porta, R. and Shleifer, A., (2014). Informality and development. *The Journal of Economic Perspectives*, *28*(3), pp.109-126.

Lackó, M. (1996). Hidden economy in East-European countries in international comparison. *International Institute for Applied Systems Analysis* (IIASA), Luxemburg.

Lackó, M. (1998). The hidden economies of Visegrad countries in international comparison: A household electricity approach, In: Halpern, L. and Wyplosz, Ch. (eds.), Hungary: Towards a market economy, Cambridge (Mass.): *Cambridge University Press,* p.128-152.

Lacko, M. (1999a) Electricity Intensity and the Unrecorded Economy in Post-Socialist Countries in Feige and Ott (eds.) Underground Economies in Transition, *Ashgate, Brookfield,* USA 141-165.

Lackó, M. (1999b). Do power consumption data tell the story? Electricity intensity and hidden economy in post-socialist countries. *Institute of Economics*, Hungarian Academy of Sciences.

Lackó, M. (2000). Hidden Economy - an Unknown Quantity? Comparative Analysis of Hidden Economies in Transition Countries, 1989-95. The Economics of Transition, 8(1):117-149. http://ideas.repec.org/a/bla/etrans/v8y2000i1p117-149.html

Levin, A., Lin, C.F. and Chu, C.S.J., (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of econometrics*, 108(1), pp.1-24.

Levy, S. (2007). Can social programs reduce productivity and growth? A hypothesis for Mexico. In *Global Development Network Conference.* January (Vol. 12).

Levy, S. (2010). Good intentions, bad outcomes: Social policy, informality, and economic growth in Mexico. *Brookings Institution Press.* E-ISBN-13: 9780815701637

Lewis, A. (1979). An empirical assessment of tax mentality. *Public Finance*, *34*(2), 245-57.

Lippert, O., and Walker, M. (1997). The Underground Economy: Global Evidence of its Size and Impact*.* Vancouver, B.C.: *The Frazer Institute.*

Llorca, M., and Redžepagić, S. (2009). Impacts of Global Recession in Western Balkan Countries a Comparison with the EU New Member States. *Institute of Economic Sciences Book Chapters*, 1, 9-16.

Loayza, N.V. (1996). The Economics of the Informal Sector: a Simple Model and Some Empirical Evidence from Latin America. *Carnegie-Rochester Conference Series on Public Policy*, 45(1):129-162. http://ideas.repec.org/a/eee/crcspp/v45y1996ip129-162.html

Loayza, N.V, and Rigolini, J. (2006). Informality trends and cycles. *World Bank Policy Research* Working Paper, (4078).

Losby, J. L., Else, J. F., Kingslow, M. E., Edgcomb, E. L., Malm, E. T., and Kao, V. (2002). Informal economy literature review. *ISED Consulting and Research.*

Loukanova, P. & Tzanov, V. (2017). Bulgaria: Recent development in employment and social affairs. European Parliament, EMPL Committee, available at: http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/607358/IPOL_IDA(2017)607358_EN.pdf (last accessed on 22.12.2017)

MacCallum, R. C., Browne, M. W., and Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modelling. *Psychological Methods*, 1, 130-149.

Macias, J. B., and Cazzavillan, G. (2009). The dynamics of parallel economies. Measuring the informal sector in Mexico. *Research in Economics*, 63(3), 189-199.

Macias, J. B., and Cazzavillan, G. (2010). Modelling the informal economy in Mexico. A structural equation approach. *The Journal of Developing Areas*, *44*(1), pp.345-365.

Madžarević-Šujster, S., 2002. An estimate of tax evasion in Croatia. Institute of Public Finance, Croatia, Occasional Paper, No.13. *Financijska teorija i praksa,* 26(1), 2002, pp.117-145. Available at http://www.ijf.hr/financijska_praksa/PDF-2002/madzarevic-sujster.pdf.

Maddala, G.S. and Wu, S., (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and statistics*, 61(S1), pp.631-652.

Manolas, G., Rontos, K., Sfakianakis, G., and Vavouras, I. (2013). The determinants of the shadow economy: the case of Greece. *International Journal of Criminology and Sociological Theory*, 6(1).

Marcelli, E. (2004). Unauthorized Mexican Immigration, Day Labour and other Lower-wage Informal Employment in California. *Regional Studies*, 38(1):1-13.

Massenot, B. and Straub, S., (2011). Informal sector and economic growth: the supply of credit channel. *TSE Working Paper*, 11. Available from http://publications.ut-capitole.fr/3608/1/massenot_straub.pdf (Last accessed 16.04.2017)

Marsh HW, Wen Z, Hau KT (2004). Structural equation models of latent interactions: Evaluation of alternative estimation strategies and indicator construction. *Psychological Methods*. 2004;9(3):275–300

Medina, L. and Schneider, F., (2017). Shadow Economies around the World: New Results for 158 Countries over 1991-2015. Available from http://www.econ.jku.at/members/Schneider/files/publications/2017/JointPaper_LeandroMedina_158countries.pdf (last accessed on 20.12.2017)

Mehmetaj, J., (2014). The impact of the political culture in political system and the rule of law: Albania Case. *European Scientific Journal,* ESJ, 10(10).

Mehrotra, S. (2009). The impact of the economic crisis on the informal sector and poverty in East Asia. *Global Social Policy*, *9*(1 suppl), pp. 101-118.

Mirus, R. and Smith, R.S., (1997). Self-employment, tax evasion, and the underground economy: Micro-based estimates for Canada. *International Tax Program, Harvard Law School.*

Micevska, Maja (2004), Unemployment and Labour Market Rigidities in Southeast Europe, *The Balkan Observatory*, Working Papers 049, June 2004.

Milanovic, B., (1999). Explaining the increase in inequality during transition. *Economics of transition*, 7(2), pp.299-341.

Milosevic, M. and Muk, S. (2016). Back to Basics: Re-affirming the rule of law in the Western Balkan. *Institute Alternativa*, December 2016

Misati, R.N., 2010. The role of the informal sector in investment in Sub-Saharan Africa. *International Entrepreneurship And Management Journal*, 6(2), pp.221-230.

Müftüler-Bac, M., (1998). The never-ending story: Turkey and the European Union. *Middle Eastern Studies*, 34(4), pp.240-258.

Müftüler-Baç, M., (2011). Turkish foreign policy, its domestic determinants and the role of the European Union. *South European Society and Politics*, 16(2), pp.279-291.

Murphy, R. (2012), Closing the European Tax Gap: a report for Group of the Progressive Alliance of Socialists and Democrats in the European Parliament. *Downham Market: Tax Research LLP.*

Nardelli, A., Dzidic, D. and Jukic, E., (2014). Bosnia and Herzegovina: the world's most complicated system of government? The Guardian, Wednesday 8th Oct 2014, available at: https://www.theguardian.com/news/datablog/2014/oct/08/bosnia-herzegovina-elections-the-worlds-most-complicated-system-of-government (last accessed on 22.12.2017)

Naylor, R. T. (2002). Wages of Crime: Black Markets. *Illegal Finance and the Underground Economy*.

Neck, R., Schneider, F. and Hofreither, M.F., 1989. The consequences of progressive income taxation for the shadow economy: some theoretical considerations. In *The political economy of progressive taxation* (pp. 149-176). Springer, Berlin, Heidelberg.

Nikopour, H., Shah Habibullah, M. and Schneider, F., (2008). The shadow economy Kuznets's curve panel data analysis. Available at: https://mpra.ub.uni-muenchen.de/12956 (last accessed: 13.07.2017)

Nchor, D. and Adamec, V., 2015. Unofficial Economy Estimation by the MIMIC Model: The Case of Kenya, Namibia, Ghana and Nigeria. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 63, p.222.

Nhavira, J.D.G., 2016. Measuring the Shadow Economy In Tanzania. *The Science Probe, Vol. 4 No. 1 (May 2016)* Page No-4 1-53.

Novkovska, B. (2008). Measuring non-standard and informal employment in the Republic of Macedonia. In *workshop Measurement Informal Employment in Developed Countries WIEGO, Kennedy School of Government, Harvard University* (Vol. 31).

Nastav, B. and Bojnec, Š., (2005), November. Shadow economy in Slovenia. In Proceedings of the 6th International Conference of the Faculty of Management. Available from http://www.fm.upr.si/zalozba/isbn/961-6573-03-9/nastav.pdf (Last accessed: 30.11.2017)

OECD (2009). Is informal normal? Towards more and better jobs in developing countries (pp. 17-26). Paris, *OECD Publications,* ISBN: 978-92-64-05923-8

OECD, (2002), Measuring the Non-Observed Economy: A Handbook. *OECD Publications Service*, Paris, France.

Olters, J. P. (2003). Albania's informal economy: an impediment to economic development. *International Monetary Fund*.

Oviedo, A. M., Thomas, M. R., and Karakurum-zdemir, K. (2009). Economic Informality: Causes, Costs, and Policies A Literature Survey (Vol. 167). World Bank Publications.

Parlevliet, J., J. Jütting and T. Xenogiani (2008), Informal Employment: Can We Tame the Beast? *OECD Development Centre Policy Insights*, No. 56, OECD Publishing, Paris.

Pedersen, S. (2003). The Shadow Economy in Germany, Great Britain and Scandinavia: A Measurement Based on Questionnaire Service. *The Rockwell Foundation Research Unit*, Copenhagen, Study 10.

Penev, Slvaica (2012), Economic and European perspectives of western Balkan countries, Westminster Foundation for Democracy (WFD), ISBN 978-86-89465-00-6

Perry, G. (2007). *Informality: Exit and exclusion*. World Bank Publications.

Pichler, F. and Wallace, C., (2007). Patterns of formal and informal social capital in Europe. *European sociological review*, *23*(4), pp.423-435.

Pickhardt, M., and Sardà-Pons, J. (2006). Size and Scope of the Underground Economy in Germany. *Applied Economics*, 38(14):1707-1713.
http://ideas.repec.org/a/taf/applec/v38y2006i14p1707-1713.html

Pigott, T. D. (2001). A review of methods for missing data. *Educational research and evaluation*, *7*(4), 353-383.

Pommerehne, W. W., and Schneider, F. (1985). The decline of productivity growth and the rise of the shadow economy in the US (Vol. 9). *CESifo Working Paper 85.*

Portes, A. and Haller, W., (2010). The Informal Economy. *The handbook of economic sociology*, pp.403.

Portes, A., Castells, M., and Benton, L. (1989). World underneath: The origins, dynamics, and effects of the informal economy. The informal economy: Studies in advanced and less developed countries. *Johns Hopkins University Press*, Baltimore.

Pouvelle, M.C. and Mitra, M.P., (2012). Productivity Growth and Structural Reform in Bulgaria: Restarting the Convergence Engine (No. 12-131). *International Monetary Fund.*

Rankin, J., (2015). IMF steps up Greek Bailout Criticism over Debt Relief Package'. The Guardian

Rauch, J. E. (1991). Modelling the informal sector formally. *Journal of Development Economics*, *35*(1), 33-47.

Reinhart, C. M., and Rogoff, K. S. (2009). This time is different: eight centuries of financial folly. *Princeton University Press*. ISBN: 9780691152646

Reinhart, C.M. and Rogoff, K.S., (2013). Banking crises: an equal opportunity menace. *Journal of Banking and Finance*, 37(11), pp.4557-4573.

Reinartz, W., Haenlein, M. & Henseler, J. (2009). An empirical comparison of the efficacy of covariance-based and variance-based SEM. *International Journal of Research in Marketing*, 26, pp. 332-344.

Reka, B., (2011). Ten Years from the Ohrid Framework Agreement: Is Macedonia Functioning as a Multi-ethnic State? *South East European University.*

Ritsatos, Titos (2014) "Tax evasion and compliance; from the neoclassical paradigm to behavioural economics, a review", *Journal of Accounting & Organizational Change*, 10 (2), pp.244-262, https://doi.org/10.1108/JAOC-07-2012-0059

Rogoff, K. (1998). Blessing or Curse? Foreign and Underground Demand for Euro Notes. *Economic Policy,* 13(26):261-303. http://ideas.repec.org/a/bla/ecpoli/v13y1998i26p261-303.html

Rosas, G., Corbanese, V., O'Higgins, N., Roland, D., and Tanovic, L. (2009). Employment Policy Review: Bosnia and Herzegovina. *Council of Europe.*

Sadiku, M., Sadiku, L. and Berisha, N., (2014). The Financial Crisis in Greece and Its Impacts on Western Balkan Countries. In *Economic Crisis in Europe and the Balkans* (pp. 27-38). Springer International Publishing.

Saraç, M., and Başar, R. (2014). The Effect of Informal Economy on the European Debt Crisis. Available at: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.864.1189&rep=rep1&type=pdf (Last accessed on 07.11.2017)

Satorra, A., & Bentler, P. M. (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. von Eye & C. C. Clogg (Eds.), Latent variables analysis: Applications for developmental research (pp. 399-419). *Thousand Oaks, CA: Sage Publications.*

Saunders, M., Lewis, P. and Thornhill, A. (2012), Research methods for business students, *Financial Times/ Prentice Hall;* 6 edition, ISBN-13: 978-0273750758

Schautzer, A., (2005). Albania: Country Profile and Recent Economic Developments1. *Focus*, 1, p.05.

Schneider, F. (1986). Estimating the Size of the Danish Shadow Economy Using the Currency Demand Approach: An Attempt. *Scandinavian Journal of Economics*, 88(4):643-68. http://ideas.repec.org/a/bla/scandj/v88y1986i4p643-68.html

Schneider, F., (1994a). Can the Shadow Economy be Reduced through Major Tax Reforms? An Empirical Investigation for Austria. Supplement to *Public Finance/ Finances Publiques*, 49:137-152.

Schneider, F., (1994b). Measuring the size and development of the shadow economy. Can the causes be found, and the obstacles overcome? In *Essays on economic psychology* (pp. 193-212). Springer Berlin Heidelberg.

Schneider, F., (1997) The shadow economies of Western Europe, *Journal of the Institute of Economic Affairs*, 17/3, pp. 42-48.

Schneider, F., (1998). Further empirical results of the size of the shadow economy of 17 OECD-countries over time. In *Paper to be presented at the 54. Congress of the IIPF Cordova, Argentina and discussion paper,* Department of Economics, University of Linz, Linz, Austria.

Schneider, F., (2000). The increase of the size of the shadow economy of 18 OECD countries: some preliminary explanations. *CESifo Working Paper Series* No. 306

Schneider, F., (2002), Size and measurement of the informal economy in 110 countries around the world, Rapid Response Unit, The World Bank, Washington, DC.

Schneider, F., (2003a). The Shadow Economy. In: *Encyclopaedia of Public Choice*, ed. by C.K. Rowley and F. Schneider, Dordrecht: Kluwer Academic Publishers.

Schneider, F., (2003b). The size and development of the shadow economies and shadow economy labour force of 22 transition and 21 OECD countries: what do we really know? *The Informal Economy in the EU Access Countries: Size, Scope, Trends and Challenges to the Process of EU Enlargement, Centre for Study of Democracy*, pp.23-61.

Schneider, F., (2005) Shadow Economies around the World: What do we really know? *European Journal of Political Economy*, 21/3, pp. 598-642.

Schneider, F., (2006). Shadow Economies and Corruption all over the World: What do we really know? *CESifo Working Paper Series* No. 1806. Available at SSRN: https://ssrn.com/abstract=938369

Schneider, F., (2007a). Shadow Economies and Corruption All Over the World: What Do We Really Know? *Economics: The Open-Access, Open-Assessment E-Journal*, Vol. 1, Issue 5, pp. 1-29, 2007. Available at SSRN: https://ssrn.com/abstract=1719953 or http://dx.doi.org/10.5018/economics-ejournal.ja.2007-5

Schneider, F., (2010). The influence of public institutions on the shadow economy: An empirical investigation for OECD countries. *Review of Law and Economics,* 6(3), pp.441-468.

Schneider, F., (2013). *The Shadow Economy in Europe, 2013*, ATKearney, available on http://www.protisiviekonomiji.si/fileadmin/dokumenti/si/projekti/2013/siva_ekonomija/The_Shadow_Economy_in_Europe_2013.pdf, (accessed on 11.12.2016).

Schneider, F., (2014). The shadow economy and shadow labour force: a survey of recent developments. *IZA Discussion Paper* No. 8278

Schneider, F., (2015). Size and Development of the Shadow Economy of 31 European and 5 Other OECD Countries from 2003 to 2014: Different Developments? *Journal of Self-Governance and Management Economics,* 3(4).

Schneider, F., and Bajada, C. (2003). The Size and Development of the Shadow Economies in the Asia-Pacific. *Department of Economics, Johannes Kepler University Linz, Austria, Economics working papers* 2003-01. http://ideas.repec.org/p/jku/econwp/2003_01.html

Schneider, F., and Buehn, A. (2003). Shadow Economies and Corruption All Over the World: Revised Estimates for 120 Countries. Version 2—October 27, 2009. *Economics, The Open-Access, Open-Assessment e-Journal.* Vol. 1, 2007-9, July 24, 2007, Available at: http://www.economics-ejournal.org/economics/journalarticles/2007-9 (last accessed on 22.12.2018).

Schneider, F., and Dell'Anno, R. (2003). The Shadow Economy of Italy and other OECD Countries: What do we know? *Journal of public finance and public choice*, 21(2), 97-120.

Schneider, F., and Enste, D. (2000). Shadow Economies: Size, causes, and consequences, *The Journal of Economic Literature*, 38/1, pp. 77-114.

Schneider, F., and Enste, D. (2002). The Shadow Economy: Theoretical Approaches, Empirical Studies, and Political Implications, Cambridge (UK): *Cambridge University Press.*

Schneider, F., and Enste, D. (2013). The shadow economy: An international survey. Second Edition. *Cambridge University Press.*

Schneider, F., and Hametner, B. (2014). The shadow economy in Colombia: size and effects on economic growth. *Peace Economics, Peace Science and Public Policy*, *20*(2), pp.293-325.

Schneider, F., and Neck, R. (1993). The development of the shadow economy under changing tax systems and structures: some theoretical and empirical results for Austria. *Public Finance Analysis*, 344-369.

Schneider, F., and Savasan, F. (2007). DYMIMIC estimates of the size of shadow economies of Turkey and of her neighbouring countries. *International Research Journal of Finance and Economics*, 9(5), 126-143.

Schneider, F. and Buehn, A., (2016). Estimating the size of the shadow economy: Methods, problems and open questions. *IZA Discussion Paper* No. 9820 (Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2750303, accessed 12.08.2017)

Schneider, F., Andreas Buehn, Claudio E. Montenegro (2010), New Estimates for the Shadow Economies all over the World, *International Economic Journal*, Vol. 24, No. 4, 443–461, December 2010,

Schneider, F., Chaudhuri, K., and Chatterjee, S. (2003). The Size and Development of the Indian Shadow Economy and a Comparison with other 18 Asian Countries: An Empirical Investigation. *Department of Economics, Johannes Kepler University Linz, Austria, Economics working papers* 2003-02. http://ideas.repec.org/p/jku/econwp/2003_02.html

Schneider, F., Hofreither, M.F., and Neck, R. (1989). The Consequences of a Changing Shadow Economy for the Official Economy: Some Empirical Results for Austria. In: *Boes, D. and B. Felderer (eds.), The Political Economy of Progressive Taxation,* pp. 181–211, Heidelberg: Springer Publishing Company.

Schneider, F., Krstić, G., Arandarenko, M., Arsić, M., Radulović, B., Ranđelović, S. and Janković, I., (2013). The shadow economy in Serbia: new findings and recommendations. *Foundation for Advancement of Economics and USAID Study, Belgrade*.

Shaikh, A. (1978). An introduction to the history of crisis theories. *US capitalism in crisis,* pp.219-241.

Sharma, S., Mukherjee, S., Kumar, A. and Dillon, W.R., (2005). A simulation study to investigate the use of cut-off values for assessing model fit in covariance structure models. *Journal of Business Research,* 58(7), pp.935-943.

Smithies, E. (1984). The black economy in England since 1914. *Dublin: Gill and Macmillan*.

Smith, P. M. (1994). Assessing the Size of the Underground Economy: The Statistics Canada Perspectives*. Canadian Economic Observer*, Catalogue and dash; at 3.18.

Smith, R.S., (2002). The underground economy: guidance for policymakers. *Canadian tax journal*, *50*(5), pp.1655-1661.

Stamatović, M., and Zakić, N. (2010). Effects of the global economic crisis on small and medium enterprises in Serbia. *Serbian Journal of Management,* 5(1), pp. 151-162.

STATA, (2017), STATA 14 User Manual, available from https://www.stata.com/manuals14/semintro8.pdf140, last accessed 13.12.2017

Štiks, I. and Horvat, S., (2014). The new Balkan revolts. From protests to plenums, and beyond. Unbribable Bosnia and Herzegovina: *The Fight for the Commons,* pp.83-88.

Swain, A.J., (1975). A class of factor analysis estimation procedures with common asymptotic sampling properties. *Psychometrika*, 40(3), pp.315-335.

Tahmasebi, Mostafa (2015). *The estimate of the underground economy: the contributions of the fuzzy modelling.* Economies and finances. Université Grenoble Alpes. Available online at: https://tel.archives-ouvertes.fr/tel-01419582/document (last accessed on 22.12.2018)

Tanzi, Vito, (1982). A Second (and more Sceptical) Look at the Underground Economy in the United States. In: *The Underground Economy in the United States and Abroad*, ed. by Tanzi, V. (ed.). Lexington (Mass.): Lexington, chap. A Second (and more Sceptical) Look at the Underground Economy in the United States, pp. 38-56.

Tanzi, Vito, (1983). The Underground Economy in the United States: Annual Estimates, 1930–1980. *IMF-Staff Papers*, 30(2):283-305.

Tanzi, Vito, (1980). The Underground Economy in the United States: Estimates and Implications. *Banca Nazionale del Lavoro*, pp.427-453

[140] Also available from https://www.stata.com/bookstore/structural-equation-modeling-reference-manual/ , last accessed on 13.12.2017

Tanzi, Vito, (1999): Uses and abuses of estimates of the underground economy, *The Economic Journal* 109/456, pp.338-340.

Tanzi, Vito, and Tsibouris, G. (2000) Fiscal reform over ten years of transition, *International Monetary Fund,* W.P. WP/00/113, Washington

Teobaldelli, D. (2011). Federalism and the shadow economy. *Public Choice*, *146*(3-4), 269-289.

Teobaldelli, D., and Schneider, F. (2012). Beyond the veil of ignorance: The influence of direct democracy on the shadow economy. *CESifo Working Paper MO3749,* University of Munich, Munich.

Teqja, E., (2008). Western Balkans: Between the Fulfillment Of Criteria And The Diversity Of Problems. The Long Way of Albania. *Communities*, *4*.

Thomas, J., (1992). Informal Economic Activity. In: *LSE, Handbooks in Economics*, London: Harvester Wheatsheaf.

Thomas, J., (1999). Quantifying the black economy: measurement without theory yet again? *The Economic Journal*, *109*(456), pp.381-389.

Torgler, B. and Schneider, F. (2005). Attitudes Towards Paying Taxes in Austria: An Empirical Analysis. *Empirica*, 32(2):231-250. http://ideas.repec.org/a/kap/empiri/v32y2005i2p231-250.html

Torgler, B. and Schneider, F., (2007). Shadow economy, tax morale, governance and institutional quality: a panel analysis. *IZA Discussion Papers*, IZA DP No. 2563

Tzavalis, E., (2002). Structural breaks and unit root tests for short panels. Queen Mary University of London, unpublished. Available at: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.202.9982&rep=rep1&type=pdf (Last accessed: 09.10.2017)

Verbic, M., Srakar, A., Majcen, B. and Cok, M., (2016). Slovenian public finances through the financial crisis. *Teorija in praksa,* 53(1), p.203.

Vuletin, G. J. (2008). Measuring the informal economy in Latin America and the Caribbean (No. 8-102). *International Monetary Fund*. ISBN/ISSN: 9781451869637/1018-5941

Vo, D.H. and Ly, T.H., (2014). Measuring the shadow economy in the ASEAN nations: The MIMIC approach. *International Journal of Economics and Finance*, 6(10), p.139.

Wallace, C., Haerpfer, C., and Latcheva, R. (2004), The Informal Economy in East-Central Europe 1991-1998, (64), *Sociological Series*. Available at: http://nbn-resolving.de/urn:nbn:de:0168-ssoar-220648 (last accessed: 02.06.2016)

Watson, M. W., and Engle, R. F. (1983). Alternative algorithms for the estimation of dynamic factor, mimic and varying coefficient regression models. *Journal of Econometrics,* 23(3), 385-400.

Williams, C.C. and Windebank, J., (1995). Black market work in the European Community: Peripheral work for peripheral localities? *International Journal of Urban and Regional Research,* 19(1), pp.23-39.

Williams, C. C., Dzhekova, R., Baric, M., Franic, J., and Mishkov, L. (2014). Assessing the cross-national transferability of policy measures for tackling undeclared work. Available at SSRN 2501688.

Williams, C., and Martinez, A. (2014). Is the informal economy an incubator for new enterprise creation? A gender perspective. *International Journal of Entrepreneurial Behaviour and Research*, 20(1), 4-19.

Williams, C.C. (2005). The undeclared sector, self-employment and public policy. International *Journal of Entrepreneurial Behaviour and Research*, 11(4), pp.244-257.

Williams, C.C. (2014). Out of the shadows: a classification of economies by the size and character of their informal sector. *Work, employment and society*, *28*(5), pp.735-753.

Williams, C.C. and Lansky, M.A., (2013). Informal employment in developed and developing economies: Perspectives and policy responses. *International Labour Review*, *152*(3-4), pp.355-380.

Williams, C.C. and Renooy, P., (2008). Measures to tackle undeclared work in the European Union. *Eurofound*.

Wincoop, Van. E. (2011). International contagion through leveraged financial institutions (No. w17686). *National Bureau of Economic Research.*

Wolf, E.J., Harrington, K.M., Clark, S.L. and Miller, M.W., 2013. Sample size requirements for structural equation models: An evaluation of power, bias, and solution propriety. *Educational and psychological measurement*, 73(6), pp.913-934.

Wooldridge, Jeffrey, M. (2009). Introductory Econometrics: A modern approach. *South-Western Cengage Learning*. 5th Edition, ISBN-13: 978-1-111-53104-1

Wooldridge, J.M., 2001. Applications of generalized method of moments estimation. *The Journal of Economic Perspectives*, 15(4), pp.87-100.

Yin, J. and Jiangsu, Z., 2009. Econometric model of underground economy scale estimation. *International Journal of Nonlinear Science*, 7(1), pp.125-128.

Zilberfarb, B.-Z. (1986). Estimates of the Underground Economy in the United States, 1930–80. *IMF-Staff Papers*, 33(4):790-798.

Zupcevic, M. and Causevic, F., (2009). Case Study: Bosnia and Herzegovina. *Philip Oxhorn Part 1: Case Studies,* p.10. (Also available online from http://siteresources.worldbank.org/INTCONFLICT/Resources/BosniaFinal.pdf, Last accessed: 23.10.2017)

Appendix

Note: Appendixes have been organised following the order of the chapters and the order of sections and subsections used within the chapters of this thesis.

Appendix 2.2. 1 - Advantages and Disadvantages of the informal economy from three main perspectives

	Advantages	**Disadvantages**
Economic	• Informal sector activities may help in maintaining the competitiveness and flexibility of production; • Harding and Jenkins (1989) suggest that the informal sector activities/enterprises may bring growth if supported and encouraged • this sector puts downward pressure on wages in the formal labour market • it offers lower prices for goods and services; • it generates substantial personal income • the informal sector is characterised by very low costs of labour • the low labour costs combined with the advantage of not bearing any bureaucratic cost are thought to contribute to higher productivity of capital in this sector • the evidence from some transition countries indicates that the particularly large decline of the official GDP that these countries experienced (especially in the beginning) was alleviated through the rapid growth of the informal sector	• Contrary to Harding and Jenkins (1989), la Portes et al. (1989) claim that despite various advantages, no development strategy and growth is expected from the informal sector; • The informal sector causes distortions in some main economic indicators such as the unemployment rate16, inflation rate17 and growth rate. • The operation of informal sector activities (tax evasion) causes financial losses in the State revenues and, ceteris paribus, generates budget deficits; • therefore, it will cause a further increase in the tax rates; • its existence induces an unfair competition for those involved in the national and international formal sector19; • if the informal sector is quite widespread in a country, it may increase the technological gap between this country and the other industrialised ones; • work in the informal sector is often characterised by low productivity and low incomes; • According to Frey (1989), the informal sector is negatively related to the provision of public goods due to the falling State revenues.

Social	• informal sector activities provide families with employment, enables them to meet their basic needs, and increase their well-being; • it offers freedom and opportunities for initiative and creativity • It is a better alternative, even though poorly paid and unprotected, than being dependent on state benefits, or starving.	• Participants of the informal sector are worse off than those of the formal sector regarding their working conditions and because of the exclusion from any social benefit and security; • citizens will be provided with false information due to the incorrect measurement of GNP; • Participants in the informal sector have an unfair advantage (no taxes or social security contributions) compared to participants in the formal sector.
Political	• The existence of the informal sector can be used as a safety valve for public dissatisfaction and social tensions; • Informal sector activities are often tolerated or even encouraged to promote political patronage.	• Due to the fact that informal economic activities are often not included in measuring the GNP, the available statistics will provide a misleading view of the state of the economy to policy-makers; • Their operation will increase corruption and political lobbying with negative consequences.

Appendix 3.4. 1 - Software and Data

Software

STATA will be the main software to be used in this study; however, MS Excel will also be employed for transforming raw data into panel data. eViews was used for Unit Root tests in panel data.

Data sources

The following resources for collecting data have been used:

- The Statistics webpage of the European Central Bank: http://www.ecb.int/stats/html/index.en.html
- Eurostat which contains the economic data of all the members of the European Community: http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/
- The European Central Bank data: http://sdw.ecb.europa.eu/
- The World Bank, Data

    - Data: http://data.worldbank.org/ and http://econ.worldbank.org/
    - World Development Indicators
    - International Comparison Programme database
    - Worldwide Governance Indicators
    - National Accounts Data
    - World Bank Policy Research Working Papers
- The International Monetary Fund, Data and Statistics http://www.imf.org/external/data.htm
- The European Bank for Reconstruction and Development http://www.ebrd.com/pages/research/economics.shtml
- Heritage Foundation, Index of Economic Freedom: http://www.heritage.org/index/
- National Statistics offices and Central Banks of the Balkan countries part of this study
    - National Bank of Albania: https://bankofalbania.org/web/Statistics_Entry_230_2.php
    - National Bank of Bulgaria: http://www.bnb.bg/Statistics/index.htm
    - National Bank of Croatia: http://hnbnetra.hnb.hr/statistika/estatistika.htm
    - National Bank of FYR Macedonia: http://nbrm.mk/default-en.asp?ItemID=C1F5F4BCC020BE44A9C3824FA3046096
    - National Bank of Bosnia and Herzegovina: http://www.cbbh.ba/index.php?id=29&lang=en
    - National Bank of Greece: www.bankofgreece.gr/Pages/en/Statistics/default.aspx
    - National Bank of Turkey: http://www.tcmb.gov.tr/wps/wcm/connect/TCMB+EN/TCMB+EN/Main+Menu/STATISTICS
    - National Bank of Montenegro: http://www.cb-mn.org/eng/index.php?mn1=statistics
    - National Bank of Kosovo: http://bqk-kos.org/index.php?m=t&id=47
    - National Bank of Serbia: http://www.nbs.rs/internet/english/80/index.html
    - National Bank of Romania: http://www.bnro.ro/Statistics-3229.aspx
- OECD Data: https://data.oecd.org/
    - National Accounts Data Files

    - Governance Indicators
    - Employment Outlook
- International Labour Organisation database: http://www.ilo.org/global/statistics-and-databases/lang--en/index.htm

Appendix 3.5. 1 - Table with previous research and methodologies applied

The table below shows selected literature which has estimated the size and development of the informal economy empirically in various countries using Direct, Indirect or Model approaches. These studies are from the year 2000 onwards only. Earlier literature has been referred to and discussed in the literature review chapter. From the table below, it is evident that the three most used methods are the MIMIC, CDA and the Physical Input method (which is also known as the electricity consumption method).

Authors	**Method**	**Data**	**Variables used**	**Countries**
Schneider (2000)	CDA	Panel Data	Currency demand per capita, ratio of cash holdings to checkable deposits, real GDP per capita, interest rates, exchange rates, net tax rate on income, net tax rate on consumption, total tax revenues in percentage of GDP, unemployment rate, real expenditures for public employees as percentage of GDP	OECD countries
Schneider and Enste (2000)	Physical Input Method, CDA, MIMIC	Panel Data	**Causes:** taxation burden, regulation burden, per capita household electricity consumption, per capita real consumption of households, the real price of consumption of 1 kwh of residential electricity in US dollars, the relative frequency of months with the need to heat houses in country, the ratio of energy sources other than electricity to all energy sources in household energy consumption; the per capita output of the hidden economy; the ratio of the sum of paid personal	Various countries

			income, corporate profit, and taxes on goods and services to GDP; ratio of public social welfare expenditures to GDP; and is the sum of the numbers of dependants over 14 years and of inactive earners, both per 100 active earners. **Indicators:** Monetary aggregates, GDP per capita, GDP growth, Labour force	
Ogunc and Yilmaz (2000)	National Accounts discrepancies method Employment method CDA	Time series	GDP by expenditure approach, GDP by production approach Labour force, employment, population, ratio of labour force relative to population, employment to population ratio Currency ratio, currency in circulation, Total deposits, GNP, income velocity of money	Turkey
Kyle et al. (2001)	Electricity consumption approach	Time series	Total electricity consumption for a year, GDP	Bulgaria
Schneider (2002)	CDA MIMIC	Panel Data	**Causes:** Business regulations, unemployment rate, transfers and subsidies, government consumption, fiscal freedom, government effectiveness, the rule of law, Freedom from corruption **Indicators:** Labour Force participation rate, GDP growth, Ratio of M0 to M1, Real GDP per capita	OECD and Transition countries
Dell'Anno (2003)	MIMIC	Time series	**Causes:** Government employment relative to the labour force, Tax burden, Subsidies relative to the GDP, Social benefits paid by the government as a ratio to GDP, self-employment as a ratio of GDP, Unemployment rate	Italy

			Indicators: Index of Real GDP, Labour force participation ratio	
Schneider (2004)	MIMIC	Panel data	**Causes:** direct and indirect taxation, burden of state regulation, unemployment rate, GDP per capita **Indicators:** Employment rate, GDP growth, change of currency per capita	10 East European countries
Krakowski (2005)	Various Direct and Indirect approaches	Time Series Panel Data	GDP per capita, Tax indicators, Cost of starting a business, Socio-cultural indicators, Governance indicators, Labour regulation indicators.	109 worldwide countries, South American countries
Chaudhuri et al. (2006)	MIMIC	Time series	**Causes:** Tax burden in the form or direct and indirect taxes, social security contributions, proxy for regulation burden, governance indicators, unemployment rate **Indicators:** Currency ratio, GDP growth rate, labour force participation ratio	India
Nastav and Bojnec (2005)	Discrepancy between the Official and Actual Labour Force	Time series	Employment rate from official records, employment rate from the Labour Force Survey, Unemployment rate from the Labour Force Survey, Unemployment rate from official records.	Slovenia
Dell'Anno and Schneider (2006)	MIMIC	Panel Data	**Causes:** Size of the government, share of direct taxation, Fiscal freedom, business freedom, unemployment, government effectiveness, sub-national government employment **Indicators:** Currency in circulation, GDP per capita, labour force participation ratio	Various countries
Schneider (2007a)	MIMIC	Panel Data	**Causes:** Direct taxation, indirect taxation, regulation burden index, unemployment quota, quality of institutions, tax morality, average working time per week	96 developing countries, 25 central and east European countries, 25 highly

			Indicators: GDP per capita, Employment rate, annual rate of GDP, change of local currency per capita,	developed OECD countries
Schneider (2007a)	MIMIC	Panel data	**Causes:** Direct taxation, indirect taxation, regulation burden index, unemployment quota, quality of institutions, tax morality, average working time per week **Indicators:** GDP per capita, Employment rate, annual rate of GDP, change of local currency per capita,	Middle and South American countries
Dell'Anno (2007)	MIMIC	Time Series	**Causes:** Government employment relative to the labour force, Tax burden, Subsidies relative to the GDP, Social benefits paid by the government as a ratio to GDP, self-employment as a ratio of GDP, Unemployment rate **Indicators:** Index of Real GDP, Labour force participation ratio	Portugal
Schneider and Savasan (2007)	MIMIC	Panel Data	**Causes:** Share of direct and indirect taxes, share of social security payments, customs duties, burden of state regulation, employment in state institutions relative to the overall employment, unemployment rate, GDP per capita **Indicators:** Employment rate, annual rate of GDP, changes in the local currency per capita	Turkey and seven neighbouring countries
Schneider (2007c)	MIMIC	Panel Data	**Causes:** share of direct and indirect taxation, share of social security contributions, stage regulation burden, quality of state institutions, tax morale, GDP per capita, unemployment rate	145 countries worldwide

			Indicators: Employment rate, average working time per week, Annual rate of GDP, change of local currency per capita	
Dell'Anno et al. (2007)	MIMIC	Time series	**Causes:** Tax burden in the form or direct and indirect taxes, social security contributions, proxy for regulation burden, self-employment rate, unemployment rate **Indicators:** Currency ratio, GDP growth rate, labour force participation ratio	France, Spain and Greece
Alanon and Antonio (2007)	MIMIC	Time series	**Causes:** tax burden, the degree of regulation, unit labour costs, Unemployment rate, Ease of doing business. **Indicators**: GDP per capita, Currency in Circulation, Labour Force participation ratio.	Spain
Ahmed and Hussain (2008)	CDA	Time series	Currency ratio in circulation to money supply M2, overall tax to GDP ratio, average rate of return on deposits, a tax reform dummy	Pakistan
Vuletin (2008)	MIMIC	Panel Data	**Causes:** Labour rigidity index, Tax burden, Importance of agriculture, inflation, Strength of enforcement system **Indicators:** Workers contribution to social security, degree of unionisation, gross enrolment ratio for secondary school	South America and Caribbean countries
Dell'Anno and Schneider (2008)	MIMIC	Panel Data	**Causes:** Size of the government, share of direct taxation, Fiscal freedom, business freedom, unemployment, government effectiveness, sub-national government employment **Indicators:** Currency in circulation, GDP per capita, labour force participation ratio	151 countries worldwide

Buehn and Schneider (2009)	MIMIC	Panel Data	**Causes:** Business regulations, unemployment rate, transfers and subsidies, government consumption, fiscal freedom, government effectiveness, the rule of law, bureaucracy costs, Freedom from corruption, school enrolment **Indicators:** Labour Force participation rate, GDP growth, Ratio of M0 to M1, Real GDP per capita, Bribes, Judicial independence	51 worldwide countries
Ahumada et al. (2004)	CDA	Time series Panel Data	Real level of cash holdings, deposit and real interest rates, Real GDP	Various countries
Schneider (2009)	MIMIC	Panel Data	**Causes:** Direct and Indirect taxation, state regulation burden, GDP per capita, unemployment rate **Indicators:** GDP growth, employment to population ratio, change in currency in circulation per capita	25 central and eastern European countries
Hernandez (2009)	CDA	Time series	Interest rates, inflation rate, Real GDP, Currency in circulation relative to M2, tax rate	Peru
Yin and Jiangsu (2009)	CDA	Time series	Currency in circulation, Money supply M2, tax rate, deposit annual average interest rate, national per capita net income, national per capita consumption level	China
Schneider, Buehn and Montenegro (2010)	MIMIC	Panel Data	**Causes:** Size of government, total tax burden, direct taxation, indirect taxation, fiscal freedom index, business freedom index, economic freedom index, unemployment rate, GDP per capita, regulatory quality, government effectiveness, openness, inflation rate **Indicators:** GDP per capita growth rate, GDP per capita, Labour force participation ratio, growth rate of labour force, currency	Various specifications for 98 developing countries, 88 developing countries, 21 transition countries, 25 high-income OECD countries, 151

				countries worldwide, 120 countries.
Andrei et al. (2010)	CDA	Time series	Cash outside the banking system, total government expenses, Real GDP, short-term interest rate, inflation rate as per CPI, taxes on products	Romania
Feld and Schneider (2010)	MIMIC	Panel Data	**Causes:** Share of direct and indirect taxation, tax morale, state regulation burden, governance indicators, unemployment rate **Indicators:** Currency ratio to M2, GDP per capita growth rate, labour force participation ratio, employment ratio	OECD countries
Klaric (2011)	MIMIC	Time series	**Causes:** Unemployment Rate, Direct taxes, Indirect taxes, Social security contributions **Indicators:** GDP growth, M1	Croatia
Abdih and Medina (2013)	MIMIC	Panel Data	**Causes:** Tax burden, labour rigidity index, institutional quality, regulatory burden in financial and product markets, control of corruption, the rule of law, government effectiveness, **Indicators:** Self-employment, M0 over M1, GDP per capita	The Caucasus and Central Asian countries
Buehn and Schneider (2012)	MIMIC	Panel Data	**Causes:** Size of the government, share of direct taxation, Fiscal freedom, business freedom, unemployment, government effectiveness, sub-national government employment **Indicators:** Currency in circulation, GDP per capita, labour force participation ratio	Various specifications for 88 developing countries, 21 transition countries, 25 high-income OECD countries, 151 countries worldwide, 120 countries

Garvanlieva et al. (2012)	Electricity consumption method	Time series	Annual growth rate of GDP, annual growth rate of electric power consumption, output elasticity of electricity consumption	FYR Macedonia
Arby et al. (2012)	CDA	Time series	Tax to GDP ratio, currency in circulation to M2 ratio, financial development indicator, market interest rate, level of higher education	Pakistan
Arby et al. (2012)	Electricity Consumption Approach	Time series	Electricity consumption, GDP growth, Real GDP	Pakistan
Arby et al. (2012)	MIMIC	Time series	**Causes:** Tax to GDP ratio, M2 to GDP ratio, regime durability **Indicators:** currency in circulation as a ratio to M2, electricity consumption	Pakistan
Boka and Torluccio (2013)	National Accounts discrepancies method	Time series	GDP by expenditure approach, GDP by production approach	Albania
Boka and Torluccio (2013)	Physical Input method	Time series	GDP growth rate, Electricity consumption changes	Albania
Gunes et al. (2013)	Monetary approach The Discrepancy between National Expenditure and Income Statistics	Time series	Expenditure of durable and non-durable goods, aggregate demand, total expenditures	Turkey
Barbosa et al. (2013)	MIMIC	Time series	**Causes:** Government employment relative to the labour force, tax burden as percentage of GDP, subsidies as percentage to GDP, social benefits paid by the government relative to GDP, self-	Portugal

			employment as percentage of labour force, unemployment rate **Indicators:** Index of real GDP, Labour force participation ratio	
Schneider (2013)	CDA	Time series	Currency demand per capita, ratio of cash holdings to checkable deposits, real GDP per capita, interest rates, exchange rates, net tax rate on income, net tax rate on consumption, total tax revenues in percentage of GDP, unemployment rate, real expenditures for public employees as percentage of GDP, new laws enforced per year	Colombia
Schneider and Hemetner (2013)	CDA	Time series	Currency demand per capita, ratio of cash holdings to checkable deposits, real GDP per capita, interest rates, exchange rates, net tax rate on income, net tax rate on consumption, total tax revenues in percentage of GDP, unemployment rate, real expenditures for public employees as percentage of GDP, new laws enforced per year	Colombia
Schneider et al. (2013)	MIMIC	Panel Data	**Causes:** Direct and indirect taxation, marginal income tax burden, effective income tax rate, regulatory effectiveness index, the rule of law index, corruption index, self-employment, unemployment rate **Indicators:** Cash per capita growth rate, employment rate, GDP per capita	Serbia and ten other countries
Alm and Embaye (2013)	CDA	Panel Data	Currency ratio to M2, Tax rate, enforcement variable (the rule of law, regulatory quality and government effectiveness), Per capita Income, inflation rate, interest rate, degree of urbanisation	111 countries worldwide

Alexandru (2013)	Simple Currency Ratio Method	Time series	Actual currency stock, demand on deposits in observed and unobserved sector, observed income, ratio of currency to demand deposits on observed and unobserved sectors, income velocity in observed and unobserved sectors	Romania
Vo and Ly (2014)	MIMIC	Panel Data	**Causes:** Tax Rate, Fiscal freedom index, business freedom index, labour freedom index, government spending index, unemployment rate **Indicators:** Ratio of M0 to M1, Labour market index, Tax revenue, GDP per capita	South East Asian countries
Trebicka (2014)	MIMIC	Time series	**Causes:** Government employment relative to the labour force, Tax burden, Subsidies relative to the GDP, Social benefits paid by the government as a ratio to GDP, self-employment as a ratio of GDP, Unemployment rate **Indicators:** Index of Real GDP, Labour force participation ratio	Albania
Asiedu and Stengos (2014)	CDA	Time series	Ratio of currency in circulation to M2, Weighted average tax rate, proportion of wages and salaries to national income, average rate of return on deposits, income per capita	Ghana
Gamal and Dahalan (2015)	CDA	Time series	Ratio of currency in circulation to M2, indirect and direct tax rate, proportion of wages and salaries to national income, average rate of return on deposits, income per capita, real interest rate	UAE, Saudi Arabia
Nchor and Adamec (2015)	MIMIC	Time series	**Causes:** Size of the government, share of direct taxation, business regulation, total tax rate, unemployment rate, GDP per capita, quality of public administration	Kenya, Namibia, Ghana and Nigeria

			Indicators: Cash held by the public, GDP per capita growth rate, labour force participation ratio	
Elshamy (2015)	MIMIC	Time series	**Causes:** average of corporate and personal marginal income tax rate, importance of agriculture sector to GDP, inflation rate **Indicators:** gross enrolment ratio for secondary school, labour force contribution to social security system	Egypt
Schneider (2015)	MIMIC	Panel Data	**Causes:** Business regulations, unemployment rate, transfers and subsidies, government consumption **Indicators:** GDP growth, labour force participation ratio, Ratio of M0 to M1	OECD countries
Osmani (2015)	Survey Method	Questionnaires Panel Data	**Causes:** Direct and Indirect taxation rate, results from the survey, **Indicators:** unclear from his methodology	5 South East European countries
Hassan and Schneider (2016a)	MIMIC	Panel Data	**Causes:** Tax burden, regulation burden, Unemployment rate, self-employment rate, economic freedom index, business freedom index **Indicators:** GDP growth, currency in circulation, labour force participation ratio	157 countries worldwide
Hassan and Schneider (2016b)	MIMIC	Time Series	**Causes:** Tax burden, Institutional quality, Agriculture dominance, unemployment, self-employment **Indicators:** real GDP, total employment, money in circulation	Egypt
Hassan and Schneider (2016b)	CDA	Time Series	Tax burden, interest rates, public employment, real currency outside bank, real income, self-employment	Egypt

Schneider and Buehn (2016)	MIMIC	Panel Data	**Causes:** Direct taxation, indirect taxation, regulation burden index, unemployment quota, quality of institutions, tax morality, **Indicators:** GDP per capita, Employment rate, annual rate of GDP, change of local currency per capita	Various countries, OECD countries
Nhavira (2016)	CDA	Time series	Currency holdings ratio, Real GDP per capita growth rate, Government expenditure as percentage of GDP, Real interest rate, Deposit interest rate, ratio of M1 to M2	Tanzania
Gamal and Dahalan (2016)	CDA	Time series	Ratio of currency in circulation to M2, indirect and direct tax rate, proportion of wages and salaries to national income, average rate of return on deposits, income per capita, real interest rate	UAE, Saudi Arabia
Bitzenis et al. (2016).	MIMIC	Panel Data	**Causes:** Personal Income Tax, Payroll Taxes, Indirect Taxes, Tax morale, Unemployment Rate, Business Freedom Index, Self-employment rate, the rule of law index, GDP growth, education **Indicators:** GDP per capita, Currency in circulation, Labour force participation ratio	Various European countries and non-European countries Total of 36 countries
Medina and Schneider (2017) (working paper)	MIMIC	Panel Data	**Causes:** Tax burden, Regulatory Burden, Self-employment rate, unemployment rate, economic freedom index, business freedom index **Indicators:** GDP growth, currency in circulation, Labour force participation rate.	158 countries worldwide
Aydin (2017, p.19)	MIMIC	Panel Data	**Causes:** Size of government, total tax rate, business regulation, GDP per capita, unemployment rate, and quality of public administration **Indicators:** Labour force participation rate, GDP per capita growth rate, Cash rate held by the public	Seven Transition countries

Appendix 5.2. 1 – Introducing Research philosophies

Research philosophy is a belief about the way in which data about a phenomenon should be gathered, analysed and then used. The purpose of science, then, is the process of transforming things believed into things known: doxa to episteme (Bryman & Bell, 2007). There are known to be three major ways of thinking about research philosophy: epistemology, ontology, and axiology (Bryman & Bell, 2007; Saunders et al., 2012). Epistemology is mainly concerned with what constitutes acceptable knowledge in a field of study. Under epistemology, there are two major research philosophies - the positivist (sometimes called scientific) and interpretivist (also known as anti-positivist), (Bryman & Bell 2007; Greener, 2008; Saunders et al., 2012). Sometimes, research takes a middle approach known as pragmatism where both philosophy perspectives are considered. Positivists believe that reality is stable and can be observed and described from an objective viewpoint, i.e. without interfering with the phenomena being studied. This philosophy of research usually involves empirical testing. An interpretivist researcher, on the other hand, aims to see the world through the eyes of the people being studied, allowing them multiple perspectives of reality rather than one reality of positivism (Greener, 2008).

Ontology, on the other hand, is concerned with the nature of reality. This raises questions of the assumptions that the researchers have about the way the world operates. The first aspect of ontology is objectivism, which tries to portray the position that social entities exist in reality external to social actors concerned with their existence, while the second aspect is subjectivism which states that social phenomena are created from the perceptions and consequent actions of those social actors concerned with their existence (Bryman & Bell 2007; Greener, 2008; Saunders et al., 2012). The ontology of a positivist philosophy is objectivism,

while the ontology of the interpretivist philosophy is subjectivism. The pragmatist philosophy considers research both from an objective and subjective perspective.

Finally, the axiology is a branch of philosophy that studies judgments about value. The axiology of positivist philosophy in research is value-free, unaffected by the researcher's values to the research. The interpretivist philosophy, on the other hand, can be biased as it is based on the values and perceptions one gives to the research and the results produced (Greener, 2008). Therefore, this will entail ethical issues being considered when undertaking this kind of research since results are interpreted and affected by personal values.

The relationship between the research philosophy chosen and the research approach can be explained regarding deductive and inductive approaches. The deductive approach begins the research by looking at the theory, highlighting the main hypothesis relating to the theory, and then proceeding to empirically test the theory using a quantitative research strategy (Greener, 2008). The inductive approach, on the other hand, starts by looking at the focus of the research, and thorough investigations by various research methods aim to generate theory from the research. The deductive approach is mainly used by the positivist philosophy, while the inductive research is used by the interpretivist philosophy (Bryman & Bell 2007; Saunders et al., 2012).

Appendix 5.4. 1 – Countries part of this research

The following countries will be part of this research: Albania, FYR Macedonia, Serbia, Croatia, Slovenia, Romania, Turkey, Greece, Bosnia and Herzegovina, and Bulgaria

Countries entirely within the Balkan Peninsula:

- Albania: 27,390^{km2} (>99% of total land)
- Bulgaria: 108,400^{km2} (>99%)
- Bosnia and Herzegovina: 51,180^{km2} (>99%)
- Macedonia: 25,430^{km2} (>99%)

Countries mostly or partially Balkan states:

- Croatia (south mainland): 30,000^{km2} (54%)
- Greece (mainland): 104,470^{km2}(80%)
- Serbia (south part excl. Vojvodina and North Belgrade): 55,000^{km2} (69%)
- Slovenia (southwest part): 10,000^{km2} (50%)
- Romania (Dobruja 's mainland): 12,000^{km2} (5%)
- Turkey (European part): 23,000^{km2} (3%)Map of countries part of this research

Map of the region:

The Balkan states according to Encyclopaedia Britannica

- The Balkan Peninsula by the Danube–Sava–Soča border
- Political communities which are usually included in the Balkans
- Political communities which are usually not included in the Balkans

Appendix 6.3. 1 - Descriptive Statistics for each country separately

	Variable	Obs	Mean	Std. Dev.	Min	Max
ALBANIA	bfindex	19	66.0	8.7	54.3	81.0
	monefreeindex	19	74.7	11.6	42.6	86.0
	urban	19	47.1	5.6	39.5	56.4
	govspend	19	70.7	6.3	51.0	76.0
	goveffec	19	-0.5	0.2	-0.8	-0.1
	govintegrity	19	21.4	9.5	10.0	34.0
	agricultvat	19	24.2	4.9	19.4	37.5
	unempilo	19	14.5	2.4	12.4	22.7
	cofc	19	-0.8	0.2	-1.1	-0.5
	finfreeindex	19	54.2	17.1	30.0	70.0
	ruleoflaw	19	-0.8	0.3	-1.2	-0.4
	taxrev	19	21.3	3.3	12.8	24.5
	infgdpdef	19	5.6	9.1	0.2	41.3
	empratio	19	50.3	2.9	46.3	54.5
	gdppercap	19	6627.3	2872.0	2837.4	11307.6
	electric	19	1698.3	847.5	680.7	4569.6
	lfpr	19	65.1	2.1	62.6	68.2
	m2growth	19	13.9	10.0	2.3	43.8
OSNIA AND HERZEGOVINA	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	bfindex	19	50.8	10.3	40.0	73.3
	monefreeindex	19	67.3	27.4	0.0	86.1
	urban	19	39.3	0.1	39.2	39.6
	govspend	19	25.0	15.9	0.0	52.0
	goveffec	19	-0.8	0.2	-1.3	-0.4
	govintegrity	19	24.7	12.5	10.0	52.8
	agricultvat	19	11.6	5.1	7.2	25.2
	unempilo	19	26.9	1.9	23.9	31.8
	cofc	19	-0.3	0.1	-0.5	-0.2
	finfreeindex	19	48.9	19.4	10.0	70.0
	ruleoflaw	19	-0.5	0.2	-0.7	-0.2
	taxrev	19	21.5	1.9	19.0	25.5
	infgdpdef	19	3.8	8.5	-17.1	28.8
	empratio	19	32.9	1.2	29.6	34.7
	gdppercap	19	6685.7	2587.7	2332.7	10472.7
	electric	19	2417.5	698.4	1112.7	3784.7
	lfpr	19	52.5	1.3	50.9	54.5
	m2growth	19	17.2	16.9	2.1	77.8
BULGARIA	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	bfindex	19	63.5	9.4	55.0	77.8
	monefreeindex	19	58.8	28.7	0.0	83.1
	urban	19	70.6	1.8	68.0	73.6
	govspend	19	53.5	9.3	30.6	67.3
	goveffec	19	0.0	0.2	-0.3	0.2
	govintegrity	19	35.5	4.3	29.0	41.0
	agricultvat	19	9.5	4.8	4.8	22.6
	unempilo	19	12.1	3.7	5.6	19.9
	cofc	19	-0.2	0.2	-0.8	0.1
	finfreeindex	19	57.4	7.3	50.0	70.0
	ruleoflaw	19	-0.2	0.1	-0.5	-0.1

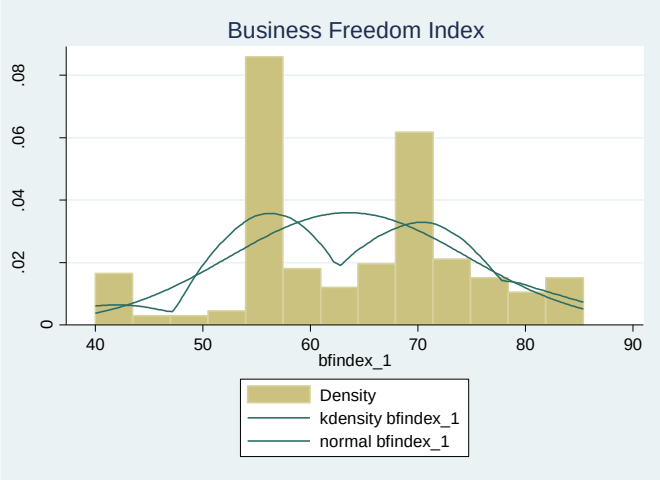
	taxrev	19	18.8	2.1	16.0	22.1
	infgdpdef	19	61.4	218.5	-0.7	958.7
	empratio	19	46.0	2.9	41.3	52.0
	gdppercap	19	10826.1	4286.5	5624.8	17406.1
	electric	19	4190.7	413.8	3539.3	4863.7
	lfpr	19	65.0	2.3	61.3	68.4
	m2growth	19	39.1	80.1	1.1	351.5
CROATIA	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	bfindex	19	57.5	3.7	54.2	65.2
	monefreeindex	19	68.6	24.7	0.0	81.4
	urban	19	56.6	1.1	55.0	58.7
	govspend	19	36.9	10.4	22.9	50.5
	goveffec	19	0.4	0.2	0.1	0.7
	govintegrity	19	40.0	6.7	27.0	50.0
	agricultvat	19	5.5	0.9	4.3	7.0
	unempilo	19	13.1	3.2	8.4	20.5
	cofc	19	-0.1	0.3	-0.8	0.3
	finfreeindex	19	57.4	7.3	50.0	70.0
	ruleoflaw	19	0.0	0.2	-0.6	0.3
	taxrev	19	20.6	1.7	18.5	25.0
	infgdpdef	19	3.6	2.1	0.0	8.3
	empratio	19	46.0	2.3	42.2	49.5
	gdppercap	19	15490.8	4774.2	8795.5	22002.5
	electric	19	3303.9	490.5	2438.8	3900.6
	lfpr	19	64.4	0.6	63.4	65.4
	m2growth	19	13.6	16.7	-14.6	49.2
GREECE	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	bfindex	19	72.4	3.3	69.7	78.7
	monefreeindex	19	76.1	3.5	67.9	80.6
	urban	19	74.6	1.8	72.2	77.7
	govspend	19	46.4	13.0	16.2	57.8
	goveffec	19	0.6	0.1	0.3	0.8
	govintegrity	19	43.7	5.9	33.2	54.0
	agricultvat	19	4.8	1.4	3.1	7.3
	unempilo	19	12.9	6.1	7.7	27.2
	cofc	19	0.3	0.4	-0.3	1.1
	finfreeindex	19	45.8	10.7	30.0	60.0
	ruleoflaw	19	0.7	0.2	0.3	1.0
	taxrev	19	10.4	11.0	0.2	24.5
	infgdpdef	19	2.7	2.5	-2.4	7.6
	empratio	19	46.0	3.2	38.7	49.3
	gdppercap	19	24160.9	4603.2	16130.1	30856.0
	electric	19	4951.0	622.3	3832.7	5805.2
	lfpr	19	65.9	2.2	61.9	68.3
	m2growth	19	6.7	9.0	-13.5	18.2
MACEDONIA, FYR	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	bfindex	19	63.8	8.9	54.4	81.0
	monefreeindex	19	82.4	4.4	77.2	90.7
	urban	19	57.8	0.8	57.0	59.4
	govspend	19	61.5	8.9	48.1	85.7
	goveffec	19	-0.3	0.3	-0.8	0.2
	govintegrity	19	41.1	14.9	23.0	76.8

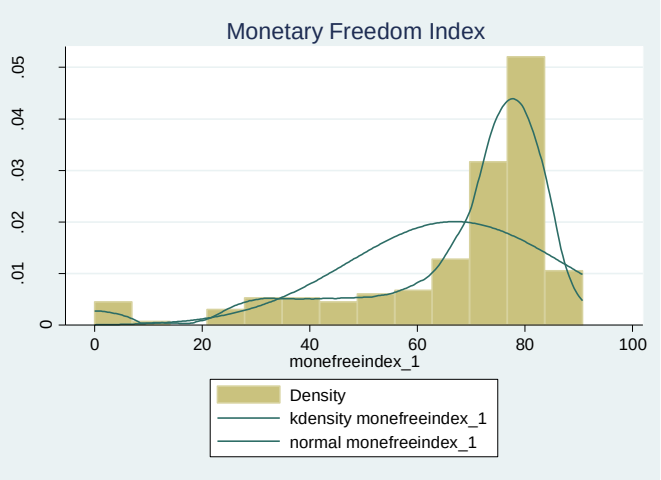
	agricultvat	19	12.0	1.1	10.3	13.4
	unempilo	19	33.2	2.7	27.9	37.3
	cofc	19	-0.4	0.3	-1.0	0.1
	finfreeindex	19	67.4	6.9	60.0	78.6
	ruleoflaw	19	-0.4	0.2	-0.7	0.0
	taxrev	19	20.6	4.4	16.4	35.8
	infgdpdef	19	3.3	3.1	-0.2	13.8
	empratio	19	36.2	2.0	32.4	39.9
	gdppercap	19	8490.1	2873.4	4907.0	13477.0
	electric	19	3314.2	350.0	2783.1	3895.2
	lfpr	19	62.1	1.7	59.1	64.6
	m2growth	19	16.5	16.0	-8.1	67.9
ROMANIA	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	bfindex	19	63.4	9.1	55.0	74.9
	monefreeindex	19	57.1	18.9	11.9	77.1
	urban	19	53.5	0.5	52.8	54.4
	govspend	19	65.4	6.3	55.1	79.7
	goveffec	19	-0.3	0.2	-0.6	0.0
	govintegrity	19	33.2	5.6	26.0	50.0
	agricultvat	19	10.5	4.6	5.3	18.7
	unempilo	19	6.8	0.7	5.5	8.1
	cofc	19	-0.3	0.2	-0.7	-0.1
	finfreeindex	19	48.4	6.9	30.0	60.0
	ruleoflaw	19	-0.1	0.1	-0.3	0.2
	taxrev	19	17.2	0.7	15.9	18.0
	infgdpdef	19	26.1	31.2	1.7	135.4
	empratio	19	55.0	4.2	51.1	62.7
	gdppercap	19	11647.1	5622.5	5576.1	20797.0
	electric	19	2409.2	392.6	1935.6	3755.5
	lfpr	19	65.9	3.3	62.4	71.8
	m2growth	19	31.0	28.0	2.8	113.4
SERBIA	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	bfindex	19	52.6	7.7	40.0	65.7
	monefreeindex	19	56.6	10.1	34.2	68.0
	urban	19	54.2	1.1	52.1	55.5
	govspend	19	61.0	15.7	38.6	89.2
	goveffec	19	-0.4	0.4	-0.9	0.1
	govintegrity	19	22.7	9.4	10.0	35.0
	agricultvat	19	14.0	4.7	9.0	21.3
	unempilo	19	17.2	4.0	12.6	23.9
	cofc	19	-0.6	0.4	-1.1	-0.2
	finfreeindex	19	38.9	9.1	30.0	50.0
	ruleoflaw	19	-0.8	0.4	-1.3	-0.2
	taxrev	19	18.3	3.9	7.0	22.8
	infgdpdef	19	23.8	27.9	2.7	89.2
	empratio	19	44.7	2.9	39.8	47.8
	gdppercap	19	9150.5	3221.8	5087.5	13806.0
	electric	19	4290.8	203.3	3921.9	4797.3
	lfpr	19	62.6	1.2	60.5	64.2
	m2growth	19	35.4	36.7	4.6	160.8
SLOVENIA	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	bfindex	19	78.7	6.6	70.0	85.4

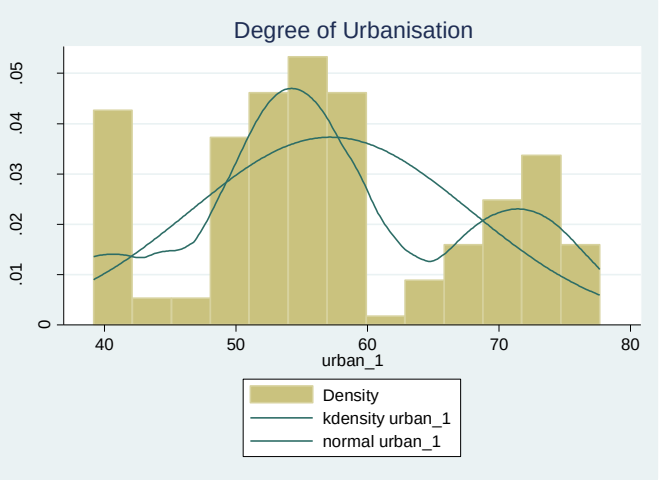
	monefreeindex	19	75.4	6.1	60.5	81.7
	urban	19	50.4	0.4	49.7	50.8
	govspend	19	37.2	7.2	22.3	47.1
	goveffec	19	0.9	0.1	0.7	1.2
	govintegrity	19	57.1	8.8	30.0	67.0
	agricultvat	19	2.7	0.7	1.9	4.1
	unempilo	19	6.9	1.5	4.4	10.2
	cofc	19	0.9	0.2	0.7	1.3
	finfreeindex	19	54.2	8.4	50.0	70.0
	ruleoflaw	19	1.0	0.1	0.9	1.2
	taxrev	19	19.2	1.6	16.4	21.6
	infgdpdef	19	4.3	3.4	-1.0	11.4
	empratio	19	54.4	1.5	51.8	56.9
	gdppercap	19	23387.2	5580.6	14272.7	31022.2
	electric	19	6326.7	623.1	5365.5	7137.8
	lfpr	19	69.6	1.8	67.0	71.9
	m2growth	19	17.5	13.7	-1.2	35.6
TURKEY	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	bfindex	19	66.7	7.3	55.0	85.0
	monefreeindex	19	53.2	18.1	28.9	73.3
	urban	19	67.8	3.3	62.7	72.9
	govspend	19	65.8	11.1	45.0	83.6
	goveffec	19	0.1	0.2	-0.3	0.4
	govintegrity	19	36.4	8.0	10.0	46.0
	agricultvat	19	10.7	2.5	8.0	17.4
	unempilo	19	9.4	2.0	6.5	14.0
	cofc	19	-0.2	0.3	-0.7	0.2
	finfreeindex	19	55.8	10.7	30.0	70.0
	ruleoflaw	19	0.0	0.1	-0.2	0.2
	taxrev	19	18.0	2.1	15.0	21.4
	infgdpdef	19	31.7	36.1	5.3	138.0
	empratio	19	44.1	2.8	40.9	49.5
	gdppercap	19	12769.1	4153.9	8014.5	19653.6
	electric	19	2069.7	508.4	1327.7	2902.6
	lfpr	19	52.0	2.1	49.2	55.7
	m2growth	19	41.4	36.7	10.4	116.5

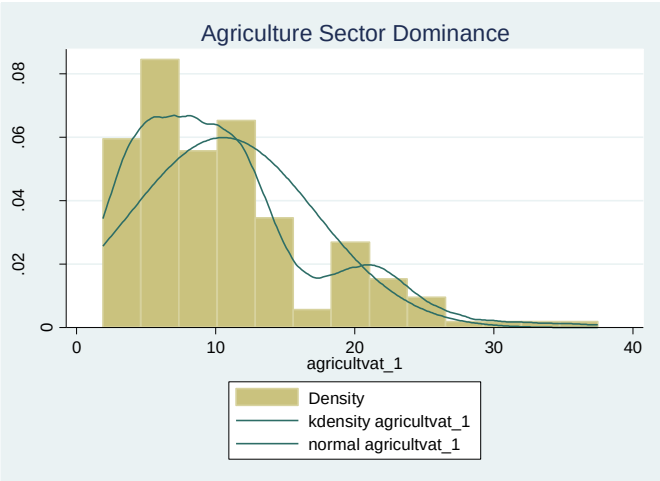
Appendix 6.3. 2 - Histograms for all the variables

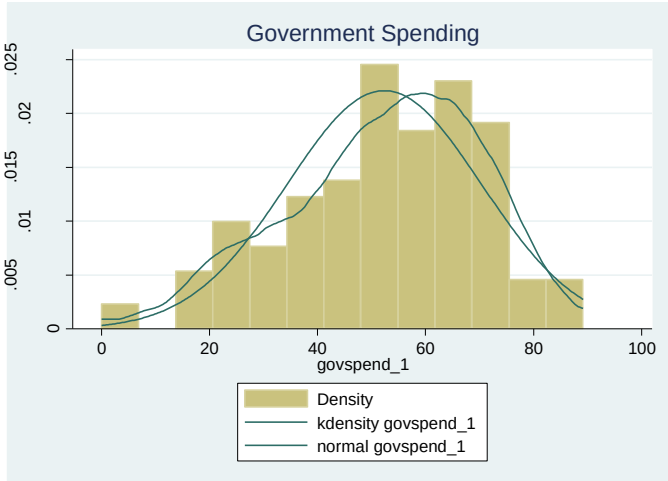
Histograms for each of the variables used have been presented below which summarize the data graphically for the density from a normal and kernel distribution perspective.

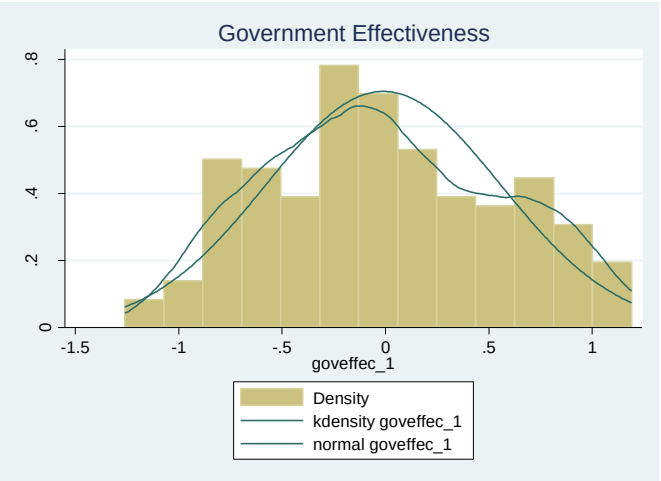


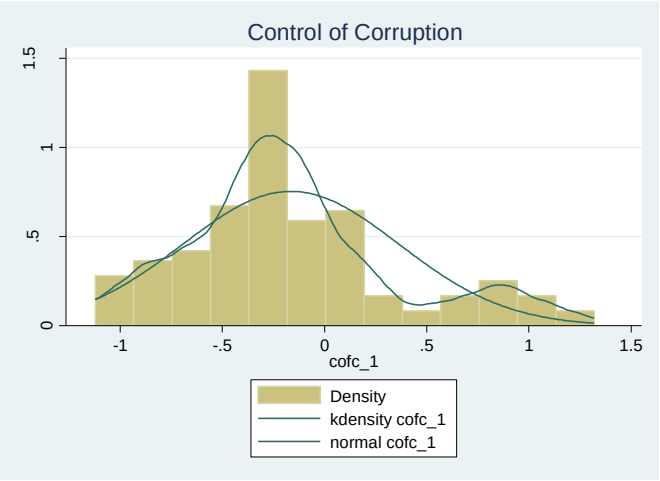


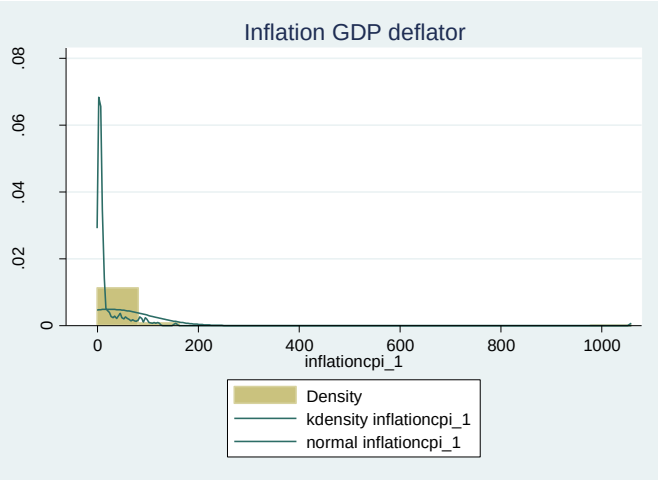


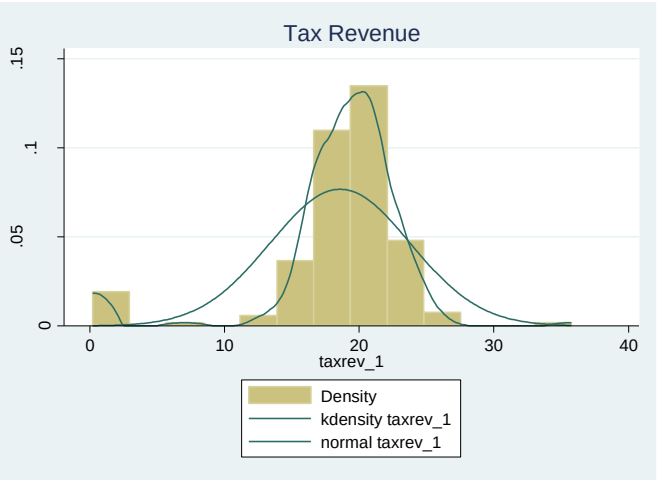


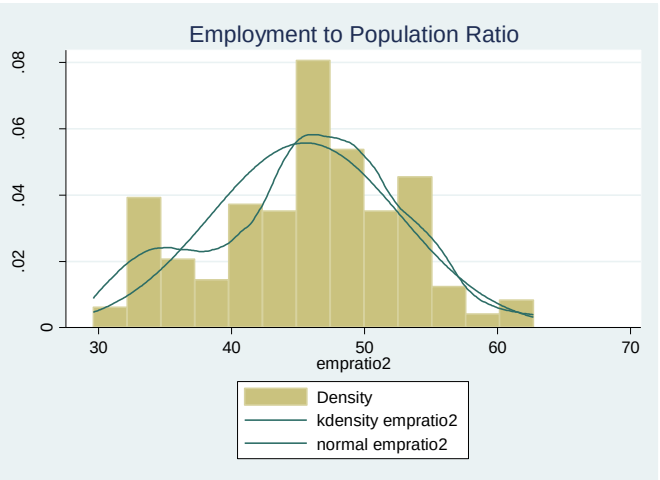


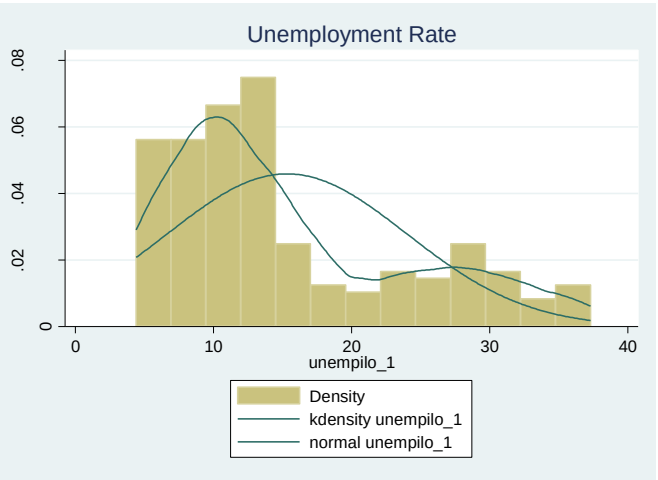


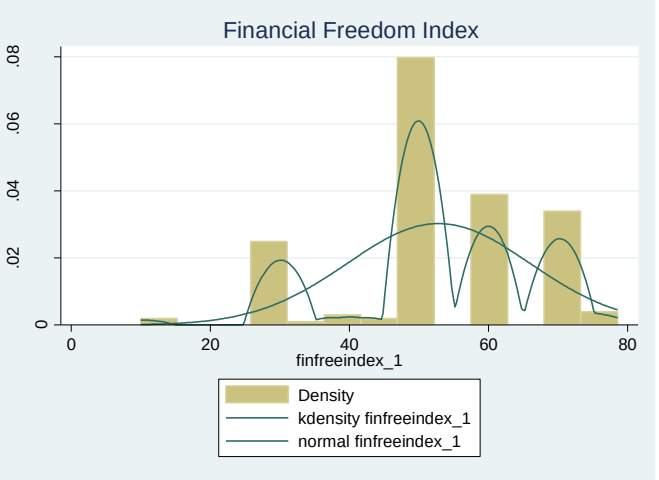

Control of Corruption
0
.5
1
1.5
-1
-.5
0
.5
1
1.5
cofc_1
Density
kdensity cofc_1
normal cofc_1

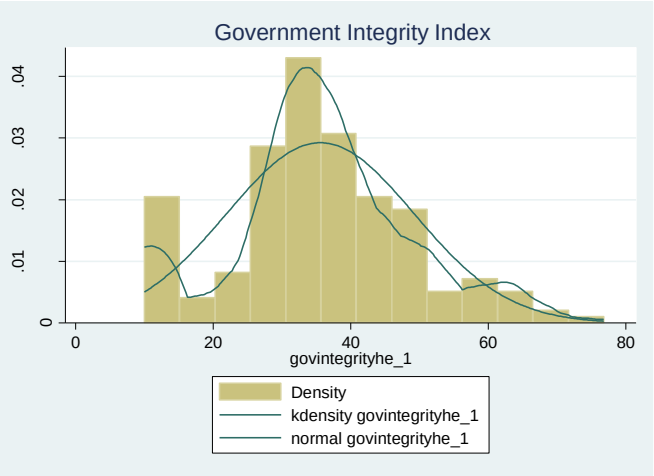

Inflation GDP deflator
0
.02
.04
.06
.08
0
200
400
600
800
1000
inflationcpi_1
Density
kdensity inflationcpi_1
normal inflationcpi_1

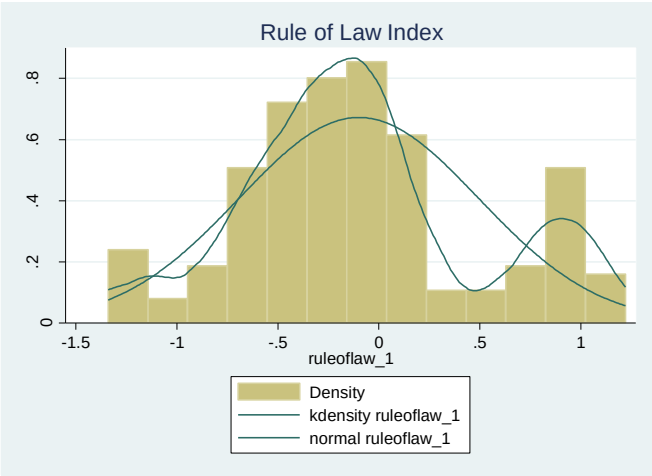

Tax Revenue
0
.05
.1
.15
0
10
20
30
40
taxrev_1
Density
kdensity taxrev_1
normal taxrev_1

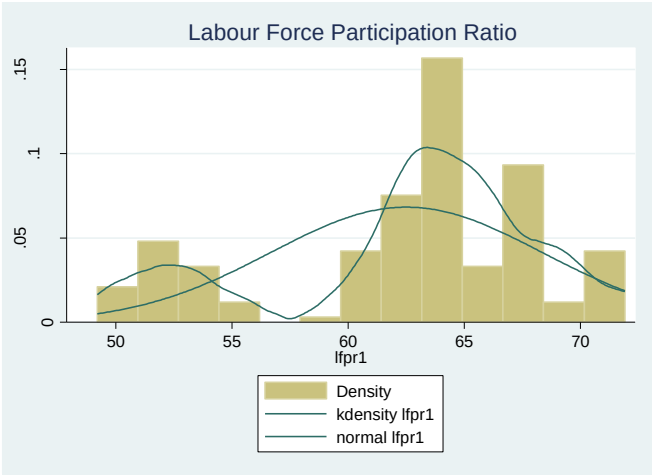

Employment to Population Ratio
0
.02
.04
.06
.08
30
40
50
60
70
empratio2
Density
kdensity empratio2
normal empratio2

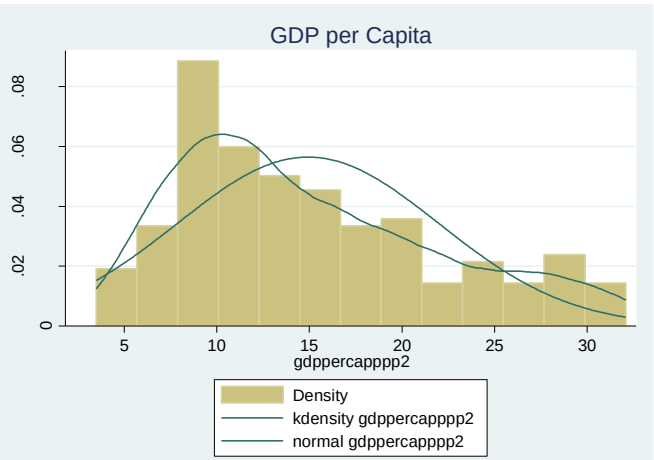

Unemployment Rate
0
.02
.04
.06
.08
0
10
20
30
40
unempilo_1
Density
kdensity unempilo_1
normal unempilo_1

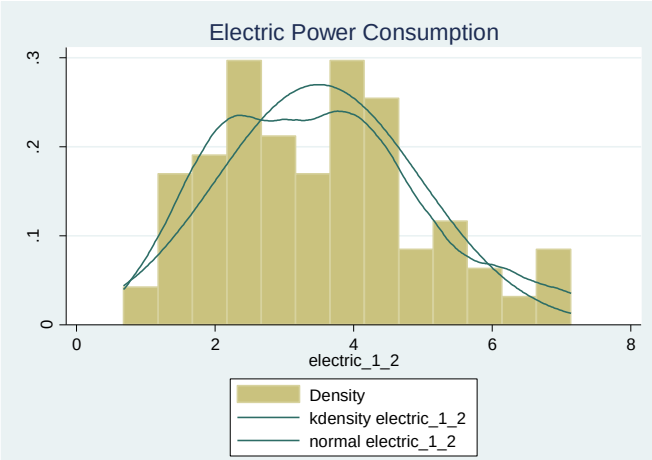

Financial Freedom Index
0
.02
.04
.06
.08
0
20
40
60
80
finfreeindex_1
Density
kdensity finfreeindex_1
normal finfreeindex_1

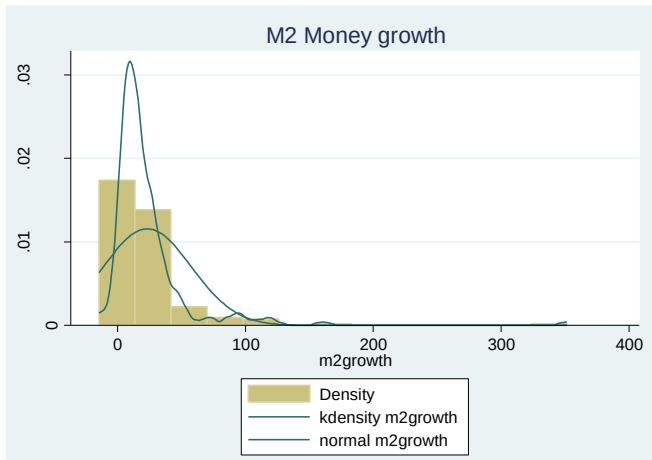

Government Integrity Index
0
.01
.02
.03
.04
0
20
40
60
80
govintegrityhe_1
Density
kdensity govintegrityhe_1
normal govintegrityhe_1

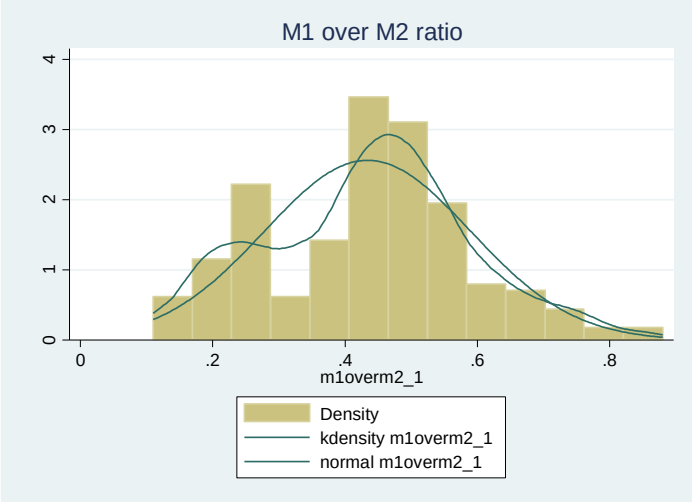

Rule of Law Index
0
.2
.4
.6
.8
-1.5
-1
-.5
0
.5
1
ruleoflaw_1
Density
kdensity ruleoflaw_1
normal ruleoflaw_1


Labour Force Participation Ratio
0
.05
.1
.15
50
55
60
65
70
lfpr1
Density
kdensity lfpr1
normal lfpr1


GDP per Capita
0
.02
.04
.06
.08
5
10
15
20
25
30
gdppercapppp2
Density
kdensity gdppercapppp2
normal gdppercapppp2


Electric Power Consumption
0
.1
.2
.3
0
2
4
6
8
electric_1_2
Density
kdensity electric_1_2
normal electric_1_2


M2 Money growth
0
.01
.02
.03
0
100
200
300
400
m2growth
Density
kdensity m2growth
normal m2growth



Appendix 6.3. 3 - Correlation Matrix

	bfindex	monefreeindex	urban	agricultvat	govspend	goveffec	cofc	govintegrity	infgdpdef
bfindex	1.00000								
monefreeindex	0.30670	1.00000							
urban	0.30220	-0.00780	1.00000						
agricultvat	-0.28790	-0.30400	-0.37140	1.00000					
govspend	0.08620	-0.08100	0.21370	0.39440	1.00000				
goveffec	0.54430	0.27030	0.48910	-0.73030	-0.18280	1.00000			
cofc	0.46170	0.25810	0.20600	-0.71240	-0.34130	0.83670	1.00000		
govintegrity	0.58000	0.28430	0.31830	-0.61300	-0.18650	0.66220	0.61670	1.00000	
infgdpdef	-0.09290	-0.25200	0.07890	0.21320	0.01310	-0.10820	-0.13340	-0.09880	1.00000
taxrev	-0.13250	0.04330	-0.33410	0.12190	-0.08450	-0.28550	-0.28250	-0.12150	-0.06780
empratio	0.38190	-0.15390	0.07400	-0.01220	0.28230	0.35690	0.24060	0.18570	0.08170
finfreeindex	0.22760	0.37810	0.13280	-0.19650	0.00860	0.14670	0.05040	0.33170	-0.04610
unempilo	-0.33670	0.20800	-0.26090	0.20670	-0.17870	-0.46710	-0.35160	-0.20560	-0.09140

ruleoflaw	0.58000	0.22370	0.38150	-0.76050	-0.31420	0.88040	0.90440	0.73620	-0.09900
gdppercap	0.58310	0.29680	0.45810	-0.77530	-0.22920	0.89760	0.78670	0.65220	-0.12870
electric	0.40660	0.27980	0.29110	-0.64410	-0.28060	0.69450	0.66360	0.54330	-0.04360
m2growth	-0.19830	-0.45660	0.01850	0.29070	0.08480	-0.21450	-0.21600	-0.21810	0.83050
lfpr	0.38880	0.14310	0.10470	-0.14670	0.06620	0.41070	0.25770	0.28660	0.00630
m1overm2	-0.10380	0.20130	-0.12170	0.09070	0.03680	-0.11760	-0.05590	-0.16750	-0.01690
	taxrev	empratio	finfreeindex	unempilo	ruleoflaw	gdppercap	electric	m2growth	lfpr
taxrev	1.00000								
empratio	-0.17610	1.00000							
finfreeindex	0.27470	-0.16450	1.00000						
unempilo	0.25800	-0.85460	0.18130	1.00000					
ruleoflaw	-0.31750	0.31260	0.13750	-0.42850	1.00000				
gdppercap	-0.32090	0.38760	0.02990	-0.50330	0.89290	1.00000			
electric	-0.16940	0.20910	0.00710	-0.19530	0.64180	0.71230	1.00000		
m2growth	-0.04790	0.12510	-0.09330	-0.12840	-0.19500	-0.24420	-0.14320	1.00000	
lfpr	-0.08520	0.69430	-0.01750	-0.35390	0.30980	0.42180	0.53370	-0.06400	1.00000
m1overm2	-0.05960	-0.14030	-0.12640	0.29670	-0.15450	-0.04690	0.35510	-0.09830	0.23180

Appendix 6.3. 4 - Panel Unit root tests

	Im-Pesaran-Shin unit-root test			Im-Pesaran-Shin unit-root test		
	Ho: All panels contain unit roots			Ho: All panels contain unit roots		
	Ha: Some panels are stationary			Ha: Some panels are stationary		
	AR parameter: Panel-specific			AR parameter: Panel-specific		
	Panel means: Included sequentially			Panel means: Included sequentially		
	Time trend: Not included			Time trend: Included		
	ADF regressions: No lags included			Number of panels = 10		
	Number of panels = 10			Number of periods = 19		
	Number of periods = 19			Asymptotics: T,N -> Infinity		
	Asymptotics: T,N -> Infinity					
	Fixed-N exact critical values			Fixed-N exact critical values		
	1%	5%	10%	1%	5%	10%
	-2.21	-1.99	-1.89	-2.84	-2.63	-2.52
		Statistic	**p-value**		**Statistic**	**p-value**
unempilo	t-bar	-1.554		t-bar	-1.863	
	t-tilde-bar	-1.327		t-tilde-bar	-1.637	
	Z-t-tilde-bar	0.243	0.596	Z-t-tilde-bar	-1.036	0.150
agricult	t-bar	-2.655		t-bar	-2.495	
	t-tilde-bar	-2.027		t-tilde-bar	-1.913	
	Z-t-tilde-bar	-2.649	0.004	Z-t-tilde-bar	-2.177	0.015
bfindex	t-bar	-1.490		t-bar	-2.349	
	t-tilde-bar	-1.373		t-tilde-bar	-1.936	
	Z-t-tilde-bar	0.054	0.521	Z-t-tilde-bar	-2.273	0.012
urban	t-bar	3.433		t-bar	-0.246	
	t-tilde-bar	1.067		t-tilde-bar	-0.678	
	Z-t-tilde-bar	10.129	1.000	Z-t-tilde-bar	2.921	0.998
goveffec	t-bar	-1.104		t-bar	-2.630	
	t-tilde-bar	-1.064		t-tilde-bar	-2.239	
	Z-t-tilde-bar	1.329	0.908	Z-t-tilde-bar	-3.524	0.000
govspend	t-bar	-2.275		t-bar	-2.702	
	t-tilde-bar	-1.824		t-tilde-bar	-2.185	
	Z-t-tilde-bar	-1.808	0.035	Z-t-tilde-bar	-3.300	0.001
govintegrity	t-bar	-2.684		t-bar	-3.383	
	t-tilde-bar	-2.068		t-tilde-bar	-2.357	
	Z-t-tilde-bar	-2.817	0.002	Z-t-tilde-bar	-4.011	0.000
ruleoflaw	t-bar	-1.090		t-bar	-2.562	
	t-tilde-bar	-0.992		t-tilde-bar	-2.035	
	Z-t-tilde-bar	1.625	0.948	Z-t-tilde-bar	-2.681	0.004
gdppercapppp	t-bar	-1.074		t-bar	-1.487	
	t-tilde-bar	-0.892		t-tilde-bar	-1.330	
	Z-t-tilde-bar	2.039	0.979	Z-t-tilde-bar	0.229	0.590

electric	t-bar	-0.725		t-bar	-0.812	
	t-tilde-bar	-0.697		t-tilde-bar	-0.818	
	Z-t-tilde-bar	2.845	0.998	Z-t-tilde-bar	2.346	0.991
lfpr	t-bar	-1.188		t-bar	-1.472	
	t-tilde-bar	-1.142		t-tilde-bar	-1.346	
	Z-t-tilde-bar	1.006	0.843	Z-t-tilde-bar	0.163	0.565
infgdpdef	t-bar	-4.233		t-bar	-5.000	
	t-tilde-bar	-2.362		t-tilde-bar	-2.827	
	Z-t-tilde-bar	-4.032	0.000	Z-t-tilde-bar	-5.949	0.000
m2growth	t-bar	-2.835		t-bar	-3.691	
	t-tilde-bar	-2.262		t-tilde-bar	-2.708	
	Z-t-tilde-bar	-3.619	0.000	Z-t-tilde-bar	-5.461	0.000
monefreeindex	t-bar	-2.210		t-bar	-2.221	
	t-tilde-bar	-1.885		t-tilde-bar	-1.860	
	Z-t-tilde-bar	-2.061	0.020	Z-t-tilde-bar	-1.959	0.025
finfreeindex	t-bar	-1.507		t-bar	-2.080	
	t-tilde-bar	-1.407		t-tilde-bar	-1.899	
	Z-t-tilde-bar	-0.089	0.464	Z-t-tilde-bar	-2.118	0.017
cofc	t-bar	-1.649		t-bar	-2.570	
	t-tilde-bar	-1.465		t-tilde-bar	-2.093	
	Z-t-tilde-bar	-0.329	0.371	Z-t-tilde-bar	-2.921	0.002
empratio	t-bar	-1.152		t-bar	-1.682	
	t-tilde-bar	-1.077		t-tilde-bar	-1.449	
	Z-t-tilde-bar	1.273	0.899	Z-t-tilde-bar	-0.260	0.397
taxrev	t-bar	-1.297		t-bar	-1.333	
	t-tilde-bar	-1.132		t-tilde-bar	-1.335	
	Z-t-tilde-bar	1.049	0.853	Z-t-tilde-bar	0.209	0.583

Based on augmented Dickey-Fuller tests
Ho: All panels contain unit roots
Ha: At least one panel is stationary
AR parameter: Panel-specific
Panel means: Included
Drift term: Not included

Number of panels = 10
Number of periods = 19
Asymptotics: T -> Infinity
ADF regressions: 0 lags

			Time trend		**Without Time Trend**	
			Statistic	**p-value**	**Statistic**	**p-value**
unempilo	Inverse normal	Z	1.326	0.908	-0.220	0.413
	Inverse logit t(54)	L*	1.291	0.899	-0.426	0.336
	Modified inv. chi-squared	Pm	0.032	0.487	1.791	0.037
agricult	Inverse normal	Z	-1.370	0.085	-4.079	0.000
	Inverse logit t(54)	L*	-1.396	0.084	-6.205	0.000
	Modified inv. chi-squared	Pm	2.466	0.007	9.575	0.000
bfindex	Inverse normal	Z	-0.640	0.261	0.211	0.584
	Inverse logit t(54)	L*	-0.877	0.192	0.107	0.542

	Modified inv. chi-squared	Pm	1.181	0.119	-0.101	0.540
urban	Inverse normal	Z	-3.101	0.001	0.510	0.695
	Inverse logit t(39)	L*	-3.643	0.000	-0.996	0.163
	Modified inv. chi-squared	Pm	4.746	0.000	5.169	0.000
goveffec	Inverse normal	Z	-1.872	0.031	1.687	0.954
	Inverse logit t(54)	L*	-1.965	0.027	1.582	0.940
	Modified inv. chi-squared	Pm	2.053	0.020	-1.601	0.945
govspend	Inverse normal	Z	-2.126	0.017	-2.929	0.002
	Inverse logit t(54)	L*	-2.388	0.010	-3.546	0.000
	Modified inv. chi-squared	Pm	3.302	0.001	5.915	0.000
govintegrity	Inverse normal	Z	-4.693	0.000	-4.371	0.000
	Inverse logit t(54)	L*	-6.629	0.000	-5.782	0.000
	Modified inv. chi-squared	Pm	10.597	0.000	9.097	0.000
ruleoflaw	Inverse normal	Z	-1.550	0.061	1.561	0.941
	Inverse logit t(54)	L*	-1.755	0.043	1.575	0.939
	Modified inv. chi-squared	Pm	2.186	0.014	-0.704	0.759
gdppercapppp	Inverse normal	Z	2.804	0.998	1.598	0.945
	Inverse logit t(54)	L*	2.927	0.998	1.196	0.882
	Modified inv. chi-squared	Pm	-1.875	0.970	0.769	0.221
electric	Inverse normal	Z	1.942	0.974	2.759	0.997
	Inverse logit t(44)	L*	2.118	0.980	2.929	0.998
	Modified inv. chi-squared	Pm	-1.553	0.940	-1.890	0.971
lfpr	Inverse normal	Z	2.894	0.998	1.344	0.911
	Inverse logit t(54)	L*	2.944	0.998	1.308	0.902
	Modified inv. chi-squared	Pm	-2.059	0.980	-1.464	0.928
infgdpdef	Inverse normal	Z	-8.267	0.000	-6.699	0.000
	Inverse logit t(54)	L*	-13.420	0.000	-11.633	0.000
	Modified inv. chi-squared	Pm	21.425	0.000	18.703	0.000
m2growth	Inverse normal	Z	-6.086	0.000	-4.982	0.000
	Inverse logit t(54)	L*	-7.545	0.000	-5.877	0.000
	Modified inv. chi-squared	Pm	11.137	0.000	8.318	0.000
monefreeindex	Inverse normal	Z	-0.157	0.438	-2.578	0.005
	Inverse logit t(54)	L*	-0.226	0.411	-2.861	0.003
	Modified inv. chi-squared	Pm	0.560	0.288	3.740	0.000
finfreeindex	Inverse normal	Z	0.477	0.683	0.112	0.545
	Inverse logit t(54)	L*	0.399	0.654	0.144	0.557
	Modified inv. chi-squared	Pm	-0.836	0.798	-0.419	0.662
cofc	Inverse normal	Z	-1.540	0.062	-0.408	0.342
	Inverse logit t(54)	L*	-1.952	0.028	-0.673	0.252
	Modified inv. chi-squared	Pm	2.672	0.004	1.108	0.134
empratio	Inverse normal	Z	2.101	0.982	1.385	0.917
	Inverse logit t(54)	L*	1.847	0.965	1.383	0.914
	Modified inv. chi-squared	Pm	0.112	0.455	-1.002	0.842
taxrev	Inverse normal	Z	-1.556	0.060	0.711	0.761

	Inverse logit t(44)	L*	-1.524	0.067	0.686	0.752
	Modified inv. chi-squared	Pm	0.641	0.261	0.571	0.284

Appendix 6.7. 1 - MIMIC Model Indexes for three chosen specifications

MIMIC Model Index		MIMIC Spec 1	MIMIC Spec 2	MIMIC Spec 3
Country	**Year**	**ῆt**	**ῆt**	**ῆt**
Albania	***1996***	-12.616013	-6.286784	-13.835908
Albania	***1997***	-13.593237	-6.316756	-14.099137
Albania	***1998***	-13.622609	-6.213743	-13.662907
Albania	***1999***	-12.473446	-5.776858	-12.756928
Albania	***2000***	-12.447158	-5.706199	-12.822123
Albania	***2001***	-13.738768	-6.216203	-12.734435
Albania	***2002***	-12.948089	-5.485062	-13.666297
Albania	***2003***	-12.771972	-5.397199	-13.396815
Albania	***2004***	-12.396763	-5.426110	-13.119652
Albania	***2005***	-12.818349	-5.490036	-13.236003
Albania	***2006***	-12.574186	-5.399183	-12.925297
Albania	***2007***	-13.919590	-6.353938	-13.379235
Albania	***2008***	-12.682398	-5.694848	-12.793068
Albania	***2009***	-14.550132	-6.862271	-13.571357
Albania	***2010***	-14.781263	-7.039709	-13.731541
Albania	***2011***	-15.231282	-7.318193	-14.308409
Albania	***2012***	-16.792873	-8.236255	-14.971406
Albania	***2013***	-16.867958	-8.259089	-14.586742
Albania	***2014***	-16.784082	-8.299106	-14.707750
Bosnia and Herzegovina	***1996***	-17.901315	-8.544255	-14.707791
Bosnia and Herzegovina	***1997***	-15.453251	-7.149306	-13.440745
Bosnia and Herzegovina	***1998***	-13.005208	-5.754370	-12.468590
Bosnia and Herzegovina	***1999***	-13.147694	-5.834613	-12.585035
Bosnia and Herzegovina	***2000***	-10.949510	-4.368497	-9.975456
Bosnia and Herzegovina	***2001***	-11.380628	-4.908583	-10.670199
Bosnia and Herzegovina	***2002***	-12.562139	-5.622772	-12.117228
Bosnia and Herzegovina	***2003***	-13.850273	-6.512715	-13.430077
Bosnia and Herzegovina	***2004***	-13.341143	-6.083826	-12.380342
Bosnia and Herzegovina	***2005***	-13.019978	-5.786833	-12.048853
Bosnia and Herzegovina	***2006***	-14.016136	-6.197746	-10.935982
Bosnia and Herzegovina	***2007***	-13.526535	-5.922158	-10.846222
Bosnia and Herzegovina	***2008***	-13.519353	-6.148563	-11.411226
Bosnia and Herzegovina	***2009***	-14.732475	-6.806181	-12.369103
Bosnia and Herzegovina	***2010***	-15.189096	-7.228094	-12.797447
Bosnia and Herzegovina	***2011***	-15.782907	-7.439121	-13.268344
Bosnia and Herzegovina	***2012***	-15.231357	-7.226115	-13.131532

Bosnia and Herzegovina	***2013***	-14.825836	-7.043347	-12.906634
Bosnia and Herzegovina	***2014***	-15.034670	-7.111625	-12.934488
Bulgaria	***1996***	-13.166498	-7.881564	-15.618235
Bulgaria	***1997***	-13.249074	-7.789264	-15.243099
Bulgaria	***1998***	-11.689630	-7.178746	-13.965045
Bulgaria	***1999***	-11.975986	-7.389966	-13.977091
Bulgaria	***2000***	-11.558774	-7.136213	-13.153319
Bulgaria	***2001***	-10.842722	-6.689349	-12.208846
Bulgaria	***2002***	-15.825221	-8.440310	-15.650388
Bulgaria	***2003***	-15.434960	-8.133101	-15.352218
Bulgaria	***2004***	-15.095444	-7.927043	-15.152113
Bulgaria	***2005***	-16.183567	-8.504371	-16.252488
Bulgaria	***2006***	-18.477825	-9.821608	-17.739086
Bulgaria	***2007***	-17.577397	-9.368056	-17.348651
Bulgaria	***2008***	-17.235735	-9.213872	-17.599167
Bulgaria	***2009***	-17.957327	-9.722254	-17.667403
Bulgaria	***2010***	-19.040706	-10.486121	-18.179363
Bulgaria	***2011***	-18.543482	-9.996356	-17.314053
Bulgaria	***2012***	-18.828218	-10.163956	-17.872592
Bulgaria	***2013***	-18.134480	-9.667519	-16.892548
Bulgaria	***2014***	-18.141585	-9.630182	-17.002240
Croatia	***1996***	-14.473217	-7.243183	-15.395089
Croatia	***1997***	-14.037949	-7.154143	-15.132788
Croatia	***1998***	-14.332074	-7.546973	-15.621668
Croatia	***1999***	-15.280259	-7.925434	-15.942447
Croatia	***2000***	-15.001270	-7.887861	-15.429538
Croatia	***2001***	-15.693291	-8.337423	-15.691713
Croatia	***2002***	-16.590223	-8.849306	-16.914549
Croatia	***2003***	-16.439291	-8.727798	-16.819993
Croatia	***2004***	-17.139521	-9.122149	-17.648595
Croatia	***2005***	-17.083459	-9.019755	-17.554579
Croatia	***2006***	-17.277099	-9.178712	-17.885416
Croatia	***2007***	-16.953986	-9.007455	-17.810368
Croatia	***2008***	-17.420682	-9.281941	-17.974642
Croatia	***2009***	-17.452230	-9.281980	-17.744395
Croatia	***2010***	-16.470400	-8.735818	-16.268772
Croatia	***2011***	-16.985261	-8.934399	-16.120331
Croatia	***2012***	-17.416650	-9.185646	-16.418063
Croatia	***2013***	-17.100773	-9.019967	-15.980270
Croatia	***2014***	-16.921535	-8.999028	-16.093859
Greece	***1996***	-18.147969	-10.331830	-17.809702
Greece	***1997***	-18.033705	-10.242086	-17.555850
Greece	***1998***	-18.237095	-10.390848	-17.749127
Greece	***1999***	-18.173009	-10.231339	-17.524156

Greece	***2000***	-18.353640	-10.262150	-17.694131
Greece	***2001***	-18.623046	-10.341790	-17.814656
Greece	***2002***	-18.728193	-10.392464	-17.977609
Greece	***2003***	-18.997027	-10.573810	-18.418629
Greece	***2004***	-18.865564	-10.539074	-18.294149
Greece	***2005***	-18.725628	-10.402565	-18.193436
Greece	***2006***	-19.285891	-10.703800	-18.598084
Greece	***2007***	-18.702735	-10.333034	-18.384043
Greece	***2008***	-18.567202	-10.216003	-18.191772
Greece	***2009***	-20.657329	-11.474204	-19.591540
Greece	***2010***	-20.639834	-11.477852	-19.552809
Greece	***2011***	-21.170039	-11.737280	-19.621259
Greece	***2012***	-21.672388	-12.268255	-20.004481
Greece	***2013***	-21.425475	-12.137839	-19.312494
Greece	***2014***	-21.784403	-12.271621	-19.804650
Macedonia, FYR	***1996***	-16.938142	-8.375444	-14.241111
Macedonia, FYR	***1997***	-16.377572	-8.069055	-13.648481
Macedonia, FYR	***1998***	-15.817700	-7.763288	-13.367957
Macedonia, FYR	***1999***	-15.189619	-7.365325	-13.082695
Macedonia, FYR	***2000***	-14.561508	-6.967347	-12.666359
Macedonia, FYR	***2001***	-14.108188	-6.722729	-12.577160
Macedonia, FYR	***2002***	-13.654854	-6.478105	-12.193073
Macedonia, FYR	***2003***	-12.564838	-5.720324	-10.328756
Macedonia, FYR	***2004***	-15.380451	-7.583319	-13.205024
Macedonia, FYR	***2005***	-15.394436	-7.453862	-13.205233
Macedonia, FYR	***2006***	-14.682087	-6.930544	-12.468876
Macedonia, FYR	***2007***	-15.769541	-7.535194	-13.241476
Macedonia, FYR	***2008***	-16.248135	-8.031184	-13.617539
Macedonia, FYR	***2009***	-14.921198	-7.251268	-13.051757
Macedonia, FYR	***2010***	-15.414056	-7.683898	-13.203403
Macedonia, FYR	***2011***	-15.819790	-7.782460	-13.505895
Macedonia, FYR	***2012***	-18.301258	-9.181986	-14.504139
Macedonia, FYR	***2013***	-17.903955	-8.997134	-14.407146
Macedonia, FYR	***2014***	-18.029707	-9.152828	-14.593792
Romania	***1996***	-8.363908	-5.103014	-13.122996
Romania	***1997***	-10.291847	-5.453558	-14.457501
Romania	***1998***	-11.283833	-5.637914	-14.829351
Romania	***1999***	-9.428967	-5.251671	-13.831422
Romania	***2000***	-10.437895	-5.604971	-14.267696
Romania	***2001***	-9.664635	-5.021861	-13.029151
Romania	***2002***	-11.505016	-6.106234	-13.889169
Romania	***2003***	-11.562749	-6.016211	-13.770275
Romania	***2004***	-11.275425	-5.670859	-12.981684
Romania	***2005***	-12.027773	-5.967714	-13.386350

Romania	***2006***	-15.367232	-7.817724	-15.029902
Romania	***2007***	-15.175156	-7.582580	-14.901625
Romania	***2008***	-15.656795	-7.792393	-15.170140
Romania	***2009***	-15.873227	-7.828017	-15.188906
Romania	***2010***	-16.154343	-8.138998	-15.871166
Romania	***2011***	-16.267471	-8.176726	-15.945463
Romania	***2012***	-16.206653	-8.149079	-16.177351
Romania	***2013***	-15.959663	-8.056837	-15.854398
Romania	***2014***	-16.486760	-8.346055	-16.342798
Serbia	***1996***	-13.697698	-6.485496	-13.477155
Serbia	***1997***	-12.726067	-6.011377	-12.911601
Serbia	***1998***	-11.754428	-5.537257	-12.411571
Serbia	***1999***	-10.754969	-5.036400	-11.866566
Serbia	***2000***	-9.755525	-4.535552	-11.436242
Serbia	***2001***	-9.843316	-4.663853	-11.548146
Serbia	***2002***	-9.929615	-4.790898	-11.576973
Serbia	***2003***	-10.010203	-4.970287	-11.582775
Serbia	***2004***	-10.097875	-5.078236	-11.416650
Serbia	***2005***	-10.185664	-5.205734	-11.331955
Serbia	***2006***	-10.271963	-5.331901	-11.459075
Serbia	***2007***	-11.547088	-5.958598	-12.670049
Serbia	***2008***	-12.846268	-6.631946	-13.984855
Serbia	***2009***	-14.240804	-7.389431	-14.545818
Serbia	***2010***	-14.906210	-7.834236	-14.687821
Serbia	***2011***	-14.963667	-7.817754	-14.380332
Serbia	***2012***	-14.899755	-7.732115	-14.436503
Serbia	***2013***	-15.216186	-7.992077	-14.689839
Serbia	***2014***	-15.460259	-8.177076	-14.992072
Slovenia	***1996***	-17.171554	-9.771457	-18.109599
Slovenia	***1997***	-17.288159	-9.722613	-18.209260
Slovenia	***1998***	-17.504849	-9.711243	-18.331924
Slovenia	***1999***	-17.515753	-9.588155	-18.049337
Slovenia	***2000***	-17.774070	-9.669741	-18.233688
Slovenia	***2001***	-19.551246	-10.612560	-18.678254
Slovenia	***2002***	-19.844586	-10.875329	-19.007713
Slovenia	***2003***	-20.408968	-11.166563	-19.250541
Slovenia	***2004***	-20.367034	-11.119845	-19.608562
Slovenia	***2005***	-20.143126	-10.877221	-19.247728
Slovenia	***2006***	-18.936646	-10.163750	-18.870792
Slovenia	***2007***	-19.243786	-10.465498	-19.811253
Slovenia	***2008***	-19.510113	-10.658808	-19.931330
Slovenia	***2009***	-20.651689	-11.315914	-20.007622
Slovenia	***2010***	-19.655370	-10.690584	-18.958636
Slovenia	***2011***	-20.329064	-10.985299	-19.229864

Slovenia	***2012***	-20.946784	-11.394920	-20.055768
Slovenia	***2013***	-21.218270	-11.544536	-20.267868
Slovenia	***2014***	-21.813073	-11.913105	-20.552559
Turkey	***1996***	-15.752618	-9.324670	-15.800163
Turkey	***1997***	-13.154387	-7.717252	-14.196323
Turkey	***1998***	-12.788588	-7.353839	-13.704251
Turkey	***1999***	-13.700642	-8.026090	-14.653517
Turkey	***2000***	-12.159303	-7.077512	-12.499746
Turkey	***2001***	-13.194480	-7.593628	-13.298903
Turkey	***2002***	-12.239591	-6.991160	-13.427306
Turkey	***2003***	-13.346658	-7.756005	-14.411839
Turkey	***2004***	-12.838948	-7.338882	-13.500711
Turkey	***2005***	-13.715347	-7.740215	-14.163038
Turkey	***2006***	-15.449630	-8.403761	-14.348422
Turkey	***2007***	-16.489642	-8.970269	-15.185865
Turkey	***2008***	-16.296987	-8.807575	-14.882445
Turkey	***2009***	-15.618803	-8.341797	-13.818119
Turkey	***2010***	-15.475022	-8.300538	-14.110344
Turkey	***2011***	-15.678490	-8.378922	-14.543827
Turkey	***2012***	-17.118536	-9.417786	-16.483279
Turkey	***2013***	-16.988281	-9.267306	-16.177138
Turkey	***2014***	-16.907236	-9.232836	-16.176858

Appendix 6.8. 1 - Size of the informal economy in ten Balkan countries using MIMIC Spec 1, 2 and 3 (in % of GDP)

MIMIC Spec 1										
Year/Country	**Albania**	**B and H**	**Bulgaria**	**Croatia**	**Greece**	**FYRoM**	**Romania**	**Serbia**	**Slovenia**	**Turkey**
1996	35.3	25.2	33.9	35.7	28.5	35.0	38.7	26.1	27.8	28.4
1997	32.8	29.2	33.7	36.8	28.7	36.2	31.4	28.1	27.7	34.1
1998	32.7	34.7	38.2	36.0	28.4	37.5	28.7	30.4	27.3	35.0
1999	35.7	34.3	37.3	33.8	28.5	39.0	34.3	33.2	27.3	32.7
2000	35.8	41.2	38.6	34.4	28.2	40.7	31.0	36.6	26.9	36.8
2001	32.4	39.6	41.2	32.9	27.8	42.0	33.5	36.3	24.5	34.0
2002	34.4	35.9	28.2	31.1	27.7	43.4	28.1	36.0	24.1	36.6
2003	34.9	32.6	28.9	31.4	27.3	47.1	28.0	35.7	23.4	33.6
2004	35.9	33.8	29.6	30.1	27.5	38.5	28.7	35.4	23.5	34.9
2005	34.7	34.6	27.6	30.2	27.7	38.5	26.9	35.1	23.7	32.7
2006	35.4	32.2	24.2	29.9	26.9	40.3	21.0	34.8	25.3	29.0
2007	32.0	33.3	25.4	30.5	27.7	37.6	21.3	30.9	24.8	27.2
2008	35.1	33.4	25.9	29.6	27.9	36.5	20.7	27.8	24.5	27.5
2009	30.6	30.6	24.9	29.6	25.1	39.7	20.4	25.1	23.2	28.7
2010	30.1	29.7	23.5	31.4	25.1	38.4	20.0	24.0	24.3	29.0
2011	29.2	28.6	24.1	30.4	24.5	37.4	19.9	23.9	23.5	28.6
2012	26.5	29.6	23.7	29.7	23.9	32.4	20.0	24.0	22.8	26.2
2013	26.4	30.4	24.6	30.2	24.2	33.1	20.3	23.5	22.5	26.4
2014	26.5	30.0	24.6	30.5	23.8	32.9	19.6	23.1	21.9	26.5
Average	32.4	32.6	29.4	31.8	26.8	38.2	25.9	30.0	24.7	30.9
Three-year Average	26.5	30.0	24.3	30.1	23.9	32.8	19.9	23.5	22.4	26.3
Five-year Average	27.8	29.7	24.1	30.4	24.3	34.8	19.9	23.7	23.0	27.3
Min	26.4	25.2	23.5	29.6	23.8	32.4	19.6	23.1	21.9	26.2
Max	35.9	41.2	41.2	36.8	28.7	47.1	38.7	36.6	27.8	36.8
S.D	3.3	3.8	5.9	2.4	1.7	3.7	6.0	5.2	1.9	3.7

MIMIC Spec 2										
Year/Country	**Albania**	**B and H**	**Bulgaria**	**Croatia**	**Greece**	**FYRoM**	**Romania**	**Serbia**	**Slovenia**	**Turkey**
1996	32.8	23.4	35.0	37.0	28.2	34.3	35.3	25.8	26.8	28.1
1997	32.6	28.0	35.4	37.4	28.5	35.6	33.0	27.8	26.9	34.0
1998	33.2	34.8	38.4	35.5	28.1	37.0	32.0	30.2	27.0	35.7
1999	35.7	34.3	37.3	33.8	28.5	39.0	34.3	33.2	27.3	32.7
2000	36.1	45.8	38.6	34.0	28.4	41.2	32.1	36.9	27.1	37.1
2001	33.2	40.8	41.2	32.1	28.2	42.7	35.9	35.9	24.7	34.6
2002	37.6	35.6	32.7	30.3	28.1	44.3	29.5	34.9	24.1	37.5
2003	38.2	30.7	33.9	30.7	27.6	50.2	29.9	33.6	23.4	33.8
2004	38.0	32.9	34.8	29.4	27.7	37.9	31.8	32.9	23.5	35.8
2005	37.6	34.6	32.4	29.7	28.0	38.5	30.2	32.1	24.1	33.9
2006	38.2	32.3	28.1	29.2	27.2	41.4	23.0	31.4	25.8	31.2
2007	32.5	33.8	29.4	29.7	28.2	38.1	23.8	28.1	25.0	29.3
2008	36.2	32.5	29.9	28.9	28.5	35.8	23.1	25.2	24.6	29.8
2009	30.1	29.4	28.4	28.9	25.4	39.6	23.0	22.6	23.1	31.5
2010	29.3	27.7	26.3	30.7	25.4	37.4	22.1	21.3	24.5	31.6
2011	28.2	26.9	27.6	30.0	24.8	36.9	22.0	21.4	23.8	31.3
2012	25.0	27.7	27.1	29.2	23.8	31.3	22.1	21.6	23.0	27.9
2013	25.0	28.4	28.5	29.7	24.0	31.9	22.4	20.9	22.7	28.3
2014	24.9	28.1	28.6	29.8	23.8	31.4	21.6	20.4	22.0	28.4
Average	32.9	32.0	32.3	31.4	27.0	38.1	27.7	28.2	24.7	32.2
Three-year Average	25.0	28.1	28.1	29.5	23.9	31.5	22.0	21.0	22.5	28.2
Five-year Average	26.5	27.8	27.6	29.9	24.4	33.8	22.0	21.1	23.2	29.5
Min	24.9	23.4	26.3	28.9	23.8	31.3	21.6	20.4	22.0	27.9
Max	38.2	45.8	41.2	37.4	28.5	50.2	35.9	36.9	27.3	37.5
S.D	4.6	5.2	4.5	2.8	1.8	4.7	5.3	5.7	1.7	3.1

MIMIC Spec 3										
Year/Country	**Albania**	**B and H**	**Bulgaria**	**Croatia**	**Greece**	**FYRoM**	**Romania**	**Serbia**	**Slovenia**	**Turkey**
1996	32.9	29.3	33.4	35.0	28.0	35.8	36.2	29.2	27.2	30.3
1997	32.3	32.1	34.2	35.6	28.4	37.4	32.8	30.5	27.1	33.8
1998	33.3	34.6	37.3	34.5	28.1	38.2	32.0	31.7	26.9	35.0
1999	35.7	34.3	37.3	33.8	28.5	39.0	34.3	33.2	27.3	32.7
2000	35.5	43.3	39.6	34.9	28.2	40.3	33.3	34.4	27.0	38.3
2001	35.8	40.5	42.7	34.3	28.0	40.6	36.4	34.1	26.4	36.0
2002	33.3	35.6	33.3	31.9	27.8	41.8	34.2	34.0	25.9	35.7
2003	34.0	32.1	34.0	32.0	27.1	49.4	34.5	34.0	25.6	33.2
2004	34.7	34.9	34.4	30.5	27.3	38.6	36.5	34.5	25.1	35.5
2005	34.4	35.8	32.1	30.7	27.5	38.6	35.4	34.8	25.6	33.8
2006	35.2	39.5	29.4	30.1	26.9	40.9	31.6	34.4	26.1	33.4
2007	34.0	39.8	30.1	30.3	27.2	38.5	31.8	31.1	24.9	31.6
2008	35.6	37.8	29.6	30.0	27.5	37.5	31.3	28.2	24.7	32.2
2009	33.6	34.9	29.5	30.4	25.5	39.1	31.2	27.1	24.6	34.7
2010	33.2	33.7	28.7	33.1	25.5	38.6	29.9	26.8	26.0	34.0
2011	31.8	32.5	30.1	33.4	25.5	37.8	29.8	27.4	25.6	32.9
2012	30.4	32.9	29.2	32.8	25.0	35.2	29.3	27.3	24.6	29.1
2013	31.2	33.4	30.9	33.7	25.9	35.4	29.9	26.8	24.3	29.6
2014	31.0	33.4	30.7	33.5	25.2	35.0	29.0	26.3	24.0	29.6
Average	33.6	35.3	33.0	32.7	27.0	38.8	32.6	30.8	25.7	33.2
Three-year Average	30.9	33.2	30.2	33.3	25.3	35.2	29.4	26.8	24.3	29.4
Five-year Average	31.5	33.2	29.9	33.3	25.4	36.4	29.6	26.9	24.9	31.0
Min	30.4	29.3	28.7	30.0	25.0	35.0	29.0	26.3	24.0	29.1
Max	35.8	43.3	42.7	35.6	28.5	49.4	36.5	34.8	27.3	38.3
S.D	1.7	3.5	3.9	1.9	1.2	3.2	2.5	3.3	1.1	2.4

Appendix 6.8. 2 - Map of Balkan countries in Europe and the level of the informal economy.

Appendix 6.8. 3 - Comparing the Size of the informal economy from MIMIC Spec 1, 2 and 3 (in % of GDP)

Country	Year	MIMIC Spec 1	MIMIC Spec 2	MIMIC Spec 3	Average	St.Dev.	Var.
Albania	1996	35.3	32.8	32.9	33.7	1.4	2.0
Albania	1997	32.8	32.6	32.3	32.6	0.3	0.1
Albania	1998	32.7	33.2	33.3	33.1	0.3	0.1
Albania	1999	35.7	35.7	35.7	35.7	0.0	0.0
Albania	2000	35.8	36.1	35.5	35.8	0.3	0.1
Albania	2001	32.4	33.2	35.8	33.8	1.8	3.2
Albania	2002	34.4	37.6	33.3	35.1	2.2	5.0
Albania	2003	34.9	38.2	34	35.7	2.2	4.9
Albania	2004	35.9	38	34.7	36.2	1.7	2.8
Albania	2005	34.7	37.6	34.4	35.6	1.8	3.1
Albania	2006	35.4	38.2	35.2	36.3	1.7	2.8
Albania	2007	32	32.5	34	32.8	1.0	1.1
Albania	2008	35.1	36.2	35.6	35.6	0.6	0.3
Albania	2009	30.6	30.1	33.6	31.4	1.9	3.6
Albania	2010	30.1	29.3	33.2	30.9	2.1	4.2
Albania	2011	29.2	28.2	31.8	29.7	1.9	3.5
Albania	2012	26.5	25	30.4	27.3	2.8	7.8
Albania	2013	26.4	25	31.2	27.5	3.3	10.6
Albania	2014	26.5	24.9	31	27.5	3.2	10.0
B and H[141]	1996	25.2	23.4	29.3	26	3.0	9.1
B and H	1997	29.2	28	32.1	29.8	2.1	4.4
B and H	1998	34.7	34.8	34.6	34.7	0.1	0.0
B and H	1999	34.3	34.3	34.3	34.3	0.0	0.0
B and H	2000	41.2	45.8	43.3	43.4	2.3	5.3
B and H	2001	39.6	40.8	40.5	40.3	0.6	0.4
B and H	2002	35.9	35.6	35.6	35.7	0.2	0.0
B and H	2003	32.6	30.7	32.1	31.8	1.0	1.0
B and H	2004	33.8	32.9	34.9	33.9	1.0	1.0
B and H	2005	34.6	34.6	35.8	35	0.7	0.5
B and H	2006	32.2	32.3	39.5	34.7	4.2	17.5
B and H	2007	33.3	33.8	39.8	35.6	3.6	13.1
B and H	2008	33.4	32.5	37.8	34.6	2.8	8.0
B and H	2009	30.6	29.4	34.9	31.6	2.9	8.4
B and H	2010	29.7	27.7	33.7	30.4	3.1	9.3
B and H	2011	28.6	26.9	32.5	29.3	2.9	8.2
B and H	2012	29.6	27.7	32.9	30.1	2.6	6.9
B and H	2013	30.4	28.4	33.4	30.7	2.5	6.3
B and H	2014	30	28.1	33.4	30.5	2.7	7.2
Bulgaria	1996	33.9	35	33.4	34.1	0.8	0.7
Bulgaria	1997	33.7	35.4	34.2	34.4	0.9	0.8
Bulgaria	1998	38.2	38.4	37.3	38	0.6	0.3
Bulgaria	1999	37.3	37.3	37.3	37.3	0.0	0.0
Bulgaria	2000	38.6	38.6	39.6	38.9	0.6	0.3
Bulgaria	2001	41.2	41.2	42.7	41.7	0.9	0.8

[141] B and H = Bosnia and Herzegovina

Bulgaria	2002	28.2	32.7	33.3	31.4	2.8	7.8
Bulgaria	2003	28.9	33.9	34	32.3	2.9	8.5
Bulgaria	2004	29.6	34.8	34.4	32.9	2.9	8.4
Bulgaria	2005	27.6	32.4	32.1	30.7	2.7	7.2
Bulgaria	2006	24.2	28.1	29.4	27.2	2.7	7.3
Bulgaria	2007	25.4	29.4	30.1	28.3	2.5	6.4
Bulgaria	2008	25.9	29.9	29.6	28.5	2.2	5.0
Bulgaria	2009	24.9	28.4	29.5	27.6	2.4	5.8
Bulgaria	2010	23.5	26.3	28.7	26.2	2.6	6.8
Bulgaria	2011	24.1	27.6	30.1	27.3	3.0	9.1
Bulgaria	2012	23.7	27.1	29.2	26.7	2.8	7.7
Bulgaria	2013	24.6	28.5	30.9	28	3.2	10.1
Bulgaria	2014	24.6	28.6	30.7	28	3.1	9.6
Croatia	1996	35.7	37	35	35.9	1.0	1.0
Croatia	1997	36.8	37.4	35.6	36.6	0.9	0.8
Croatia	1998	36	35.5	34.5	35.3	0.8	0.6
Croatia	1999	33.8	33.8	33.8	33.8	0.0	0.0
Croatia	2000	34.4	34	34.9	34.4	0.5	0.2
Croatia	2001	32.9	32.1	34.3	33.1	1.1	1.2
Croatia	2002	31.1	30.3	31.9	31.1	0.8	0.6
Croatia	2003	31.4	30.7	32	31.4	0.7	0.4
Croatia	2004	30.1	29.4	30.5	30	0.6	0.3
Croatia	2005	30.2	29.7	30.7	30.2	0.5	0.3
Croatia	2006	29.9	29.2	30.1	29.7	0.5	0.2
Croatia	2007	30.5	29.7	30.3	30.2	0.4	0.2
Croatia	2008	29.6	28.9	30	29.5	0.6	0.3
Croatia	2009	29.6	28.9	30.4	29.6	0.8	0.6
Croatia	2010	31.4	30.7	33.1	31.7	1.2	1.5
Croatia	2011	30.4	30	33.4	31.3	1.9	3.5
Croatia	2012	29.7	29.2	32.8	30.6	2.0	3.8
Croatia	2013	30.2	29.7	33.7	31.2	2.2	4.8
Croatia	2014	30.5	29.8	33.5	31.3	2.0	3.9
Greece	1996	28.5	28.2	28	28.2	0.3	0.1
Greece	1997	28.7	28.5	28.4	28.5	0.2	0.0
Greece	1998	28.4	28.1	28.1	28.2	0.2	0.0
Greece	1999	28.5	28.5	28.5	28.5	0.0	0.0
Greece	2000	28.2	28.4	28.2	28.3	0.1	0.0
Greece	2001	27.8	28.2	28	28	0.2	0.0
Greece	2002	27.7	28.1	27.8	27.9	0.2	0.0
Greece	2003	27.3	27.6	27.1	27.3	0.3	0.1
Greece	2004	27.5	27.7	27.3	27.5	0.2	0.0
Greece	2005	27.7	28	27.5	27.7	0.3	0.1
Greece	2006	26.9	27.2	26.9	27	0.2	0.0
Greece	2007	27.7	28.2	27.2	27.7	0.5	0.3
Greece	2008	27.9	28.5	27.5	28	0.5	0.3
Greece	2009	25.1	25.4	25.5	25.3	0.2	0.0
Greece	2010	25.1	25.4	25.5	25.3	0.2	0.0
Greece	2011	24.5	24.8	25.5	24.9	0.5	0.3
Greece	2012	23.9	23.8	25	24.2	0.7	0.4
Greece	2013	24.2	24	25.9	24.7	1.0	1.1

Greece	2014	23.8	23.8	25.2	24.3	0.8	0.7
Macedonia, FYR	1996	35	34.3	35.8	35	0.8	0.6
Macedonia, FYR	1997	36.2	35.6	37.4	36.4	0.9	0.8
Macedonia, FYR	1998	37.5	37	38.2	37.6	0.6	0.4
Macedonia, FYR	1999	39	39	39	39	0.0	0.0
Macedonia, FYR	2000	40.7	41.2	40.3	40.7	0.5	0.2
Macedonia, FYR	2001	42	42.7	40.6	41.8	1.1	1.1
Macedonia, FYR	2002	43.4	44.3	41.8	43.2	1.3	1.6
Macedonia, FYR	2003	47.1	50.2	49.4	48.9	1.6	2.6
Macedonia, FYR	2004	38.5	37.9	38.6	38.3	0.4	0.1
Macedonia, FYR	2005	38.5	38.5	38.6	38.5	0.1	0.0
Macedonia, FYR	2006	40.3	41.4	40.9	40.9	0.6	0.3
Macedonia, FYR	2007	37.6	38.1	38.5	38.1	0.5	0.2
Macedonia, FYR	2008	36.5	35.8	37.5	36.6	0.9	0.7
Macedonia, FYR	2009	39.7	39.6	39.1	39.5	0.3	0.1
Macedonia, FYR	2010	38.4	37.4	38.6	38.1	0.6	0.4
Macedonia, FYR	2011	37.4	36.9	37.8	37.4	0.5	0.2
Macedonia, FYR	2012	32.4	31.3	35.2	33	2.0	4.0
Macedonia, FYR	2013	33.1	31.9	35.4	33.5	1.8	3.2
Macedonia, FYR	2014	32.9	31.4	35	33.1	1.8	3.3
Romania	1996	38.7	35.3	36.2	36.7	1.8	3.1
Romania	1997	31.4	33	32.8	32.4	0.9	0.8
Romania	1998	28.7	32	32	30.9	1.9	3.6
Romania	1999	34.3	34.3	34.3	34.3	0.0	0.0
Romania	2000	31	32.1	33.3	32.1	1.2	1.3
Romania	2001	33.5	35.9	36.4	35.3	1.6	2.4
Romania	2002	28.1	29.5	34.2	30.6	3.2	10.2
Romania	2003	28	29.9	34.5	30.8	3.3	11.2
Romania	2004	28.7	31.8	36.5	32.3	3.9	15.4
Romania	2005	26.9	30.2	35.4	30.8	4.3	18.4
Romania	2006	21	23	31.6	25.2	5.6	31.7
Romania	2007	21.3	23.8	31.8	25.6	5.5	30.1
Romania	2008	20.7	23.1	31.3	25	5.6	30.9
Romania	2009	20.4	23	31.2	24.9	5.6	31.8
Romania	2010	20	22.1	29.9	24	5.2	27.2
Romania	2011	19.9	22	29.8	23.9	5.2	27.2
Romania	2012	20	22.1	29.3	23.8	4.9	23.8
Romania	2013	20.3	22.4	29.9	24.2	5.0	25.5
Romania	2014	19.6	21.6	29	23.4	5.0	24.5
Serbia	1996	26.1	25.8	29.2	27	1.9	3.5
Serbia	1997	28.1	27.8	30.5	28.8	1.5	2.2
Serbia	1998	30.4	30.2	31.7	30.8	0.8	0.7
Serbia	1999	33.2	33.2	33.2	33.2	0.0	0.0
Serbia	2000	36.6	36.9	34.4	36	1.4	1.9
Serbia	2001	36.3	35.9	34.1	35.4	1.2	1.4
Serbia	2002	36	34.9	34	35	1.0	1.0
Serbia	2003	35.7	33.6	34	34.4	1.1	1.2
Serbia	2004	35.4	32.9	34.5	34.3	1.3	1.6
Serbia	2005	35.1	32.1	34.8	34	1.7	2.7
Serbia	2006	34.8	31.4	34.4	33.5	1.9	3.5

Serbia	2007	30.9	28.1	31.1	30	1.7	2.8
Serbia	2008	27.8	25.2	28.2	27.1	1.6	2.7
Serbia	2009	25.1	22.6	27.1	24.9	2.3	5.1
Serbia	2010	24	21.3	26.8	24	2.8	7.6
Serbia	2011	23.9	21.4	27.4	24.2	3.0	9.1
Serbia	2012	24	21.6	27.3	24.3	2.9	8.2
Serbia	2013	23.5	20.9	26.8	23.7	3.0	8.7
Serbia	2014	23.1	20.4	26.3	23.3	3.0	8.7
Slovenia	1996	27.8	26.8	27.2	27.3	0.5	0.3
Slovenia	1997	27.7	26.9	27.1	27.2	0.4	0.2
Slovenia	1998	27.3	27	26.9	27.1	0.2	0.0
Slovenia	1999	27.3	27.3	27.3	27.3	0.0	0.0
Slovenia	2000	26.9	27.1	27	27	0.1	0.0
Slovenia	2001	24.5	24.7	26.4	25.2	1.0	1.1
Slovenia	2002	24.1	24.1	25.9	24.7	1.0	1.1
Slovenia	2003	23.4	23.4	25.6	24.1	1.3	1.6
Slovenia	2004	23.5	23.5	25.1	24	0.9	0.9
Slovenia	2005	23.7	24.1	25.6	24.5	1.0	1.0
Slovenia	2006	25.3	25.8	26.1	25.7	0.4	0.2
Slovenia	2007	24.8	25	24.9	24.9	0.1	0.0
Slovenia	2008	24.5	24.6	24.7	24.6	0.1	0.0
Slovenia	2009	23.2	23.1	24.6	23.6	0.8	0.7
Slovenia	2010	24.3	24.5	26	24.9	0.9	0.9
Slovenia	2011	23.5	23.8	25.6	24.3	1.1	1.3
Slovenia	2012	22.8	23	24.6	23.5	1.0	1.0
Slovenia	2013	22.5	22.7	24.3	23.2	1.0	1.0
Slovenia	2014	21.9	22	24	22.6	1.2	1.4
Turkey	1996	28.4	28.1	30.3	28.9	1.2	1.4
Turkey	1997	34.1	34	33.8	34	0.2	0.0
Turkey	1998	35	35.7	35	35.2	0.4	0.2
Turkey	1999	32.7	32.7	32.7	32.7	0.0	0.0
Turkey	2000	36.8	37.1	38.3	37.4	0.8	0.6
Turkey	2001	34	34.6	36	34.9	1.0	1.1
Turkey	2002	36.6	37.5	35.7	36.6	0.9	0.8
Turkey	2003	33.6	33.8	33.2	33.5	0.3	0.1
Turkey	2004	34.9	35.8	35.5	35.4	0.5	0.2
Turkey	2005	32.7	33.9	33.8	33.5	0.7	0.4
Turkey	2006	29	31.2	33.4	31.2	2.2	4.8
Turkey	2007	27.2	29.3	31.6	29.4	2.2	4.8
Turkey	2008	27.5	29.8	32.2	29.8	2.4	5.5
Turkey	2009	28.7	31.5	34.7	31.6	3.0	9.0
Turkey	2010	29	31.6	34	31.5	2.5	6.3
Turkey	2011	28.6	31.3	32.9	30.9	2.2	4.7
Turkey	2012	26.2	27.9	29.1	27.7	1.5	2.1
Turkey	2013	26.4	28.3	29.6	28.1	1.6	2.6
Turkey	2014	26.5	28.4	29.6	28.2	1.6	2.4

Appendix 6.8. 4 - Averages from the three MIMIC Specs

MIMIC Model Specification 1

Year/Country	*Average (%)*	*3 year Average (%)*	*5 year Average (%)*
Albania	32.45	26.48	27.76
Bosnia and Herzegovina	32.57	30.01	29.66
Bulgaria	29.38	24.33	24.11
Croatia	31.81	30.13	30.43
Greece	26.80	23.95	24.28
Macedonia, FYR	38.21	32.77	34.84
Romania	25.91	19.95	19.95
Serbia	29.97	23.51	23.67
Slovenia	24.69	22.43	23.03
Turkey	30.93	26.35	27.31

MIMIC Model Specification 2

Year/Country	*Average (%)*	*3 year Average (%)*	*5 year Average (%)*
Albania	32.86	24.95	26.47
Bosnia and Herzegovina	31.99	28.08	27.77
Bulgaria	32.29	28.09	27.62
Croatia	31.36	29.54	29.86
Greece	26.97	23.85	24.36
Macedonia, FYR	38.14	31.53	33.78
Romania	27.74	22.02	22.04
Serbia	28.23	21.00	21.15
Slovenia	24.69	22.54	23.19
Turkey	32.24	28.20	29.51

MIMIC Model Specification 3

Year/Country	*Average (%)*	*3 year Average (%)*	*5 year Average (%)*
Albania	33.58	30.87	31.52
Bosnia and Herzegovina	35.29	33.23	33.19
Bulgaria	32.97	30.23	29.90
Croatia	32.66	33.34	33.31
Greece	27.00	25.35	25.41
Macedonia, FYR	38.83	35.18	36.40
Romania	32.60	29.43	29.58
Serbia	30.84	26.80	26.92
Slovenia	25.73	24.29	24.89
Turkey	33.23	29.44	31.04

Appendix 6.12. 1 - Mean comparisons with other empirical studies

	Variable	Obs	Mean	Std. Dev.	Min	Max
Albania	*MIMIC Spec 1*	19	32.4	3.3	26.4	35.9
	MIMIC Spec 2	19	32.9	4.6	24.9	38.2
	MIMIC Spec 3	19	33.6	1.7	30.4	35.8
	Schneider, (2007b)	5	34.5	0.7	33.4	35.3
	Schneider, (2009)	7	35.5	1.2	33.4	37.0
	Schneider et al., (2010)	9	34.3	0.9	32.9	35.7
	Buehn & Schneider, (2012)	9	34.3	0.9	32.9	35.7
	Alm and Embaye, (2013)	11	37.8	3.0	30.8	41.9
	Hassan and Schneider, (2016)	15	42.1	6.8	27.8	52.0
	Boka and Torluccio (2013)	18	36.0	4.2	28.2	42.0
Bosnia & Herzegovina	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	MIMIC Spec 1	19	32.6	3.8	25.2	41.2
	MIMIC Spec 2	19	32.0	5.2	23.4	45.8
	MIMIC Spec 3	19	35.3	3.5	29.3	43.3
	Schneider, (2007b)	5	35.5	1.0	34.1	36.7
	Schneider, (2009)	7	37.0	1.7	34.1	39.0
	Schneider et al., (2010)	9	33.6	0.5	32.8	34.3
	Buehn & Schneider, (2012)	9	33.6	0.5	32.8	34.3
	Hassan and Schneider, (2016)	15	34.4	2.2	29.8	37.3
Bulgaria	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	MIMIC Spec 1	19	29.4	5.9	23.5	41.2
	MIMIC Spec 2	19	32.3	4.5	26.3	41.2
	MIMIC Spec 3	19	33.0	3.9	28.7	42.7
	Schneider, (2007b)	5	37.2	0.7	36.5	38.3
	Schneider, (2009)	7	37.0	1.7	34.1	39.0
	Schneider et al., (2010)	9	35.3	1.6	32.7	37.3
	Buehn & Schneider, (2012)	9	35.3	1.6	32.7	37.3
	Schneider et al., (2013)	10	34.0	1.3	32.3	36.2
	Alm and Embaye, (2013)	11	35.7	7.7	31.0	58.1
	Hassan and Schneider, (2016)	15	34.0	3.4	30.5	42.9
	Bitzenis et al. (2016).	9	33.5	1.4	32.1	35.9
Croatia	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	MIMIC Spec 1	19	31.8	2.4	29.6	36.8
	MIMIC Spec 2	19	31.4	2.8	28.9	37.4
	MIMIC Spec 3	19	32.7	1.9	30.0	35.6
	Schneider, (2007b)	5	34.4	0.7	33.4	35.4
	Schneider, (2009)	7	35.7	1.5	33.4	37.3
	Schneider et al., (2010)	9	32.1	1.2	30.4	33.8
	Buehn & Schneider, (2012)	9	32.1	1.2	30.4	33.8
	Alm and Embaye, (2013)	8	31.0	2.2	29.5	36.0

	Hassan and Schneider, (2016)	15	28.9	3.9	23.0	36.7
	Bitzenis et al. (2016).	9	30.7	1.1	29.5	32.3
Greece	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	MIMIC Spec 1	19	26.8	1.7	23.8	28.7
	MIMIC Spec 2	19	27.0	1.8	23.8	28.5
	MIMIC Spec 3	19	27.0	1.2	25.0	28.5
	Schneider, (2007b)	5	27.8	1.0	26.3	28.7
	Schneider et al., (2010)	9	27.5	0.9	26.4	28.7
	Buehn & Schneider, (2012)	9	27.5	0.9	26.4	28.7
	Alm and Embaye, (2013)	11	20.5	2.6	15.7	23.2
	Hassan and Schneider, (2016)	15	32.2	6.1	27.2	45.1
	Bitzenis et al. (2016).	9	26.0	1.6	24.3	28.2
Macedonia, FYR	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	MIMIC Spec 1	19	38.2	3.7	32.4	47.1
	MIMIC Spec 2	19	38.1	4.6	31.3	50.2
	MIMIC Spec 3	19	38.8	3.2	35.0	49.4
	Schneider, (2007b)	5	35.8	1.2	34.1	36.9
	Schneider, (2009)	7	36.9	1.8	34.1	39.0
	Schneider et al., (2010)	9	37.6	1.5	34.9	39.1
	Buehn & Schneider, (2012)	9	37.6	1.5	34.9	39.1
	Hassan and Schneider, (2016)	15	34.3	4.8	29.5	43.3
Romania	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	MIMIC Spec 1	19	25.9	6.0	19.6	38.7
	MIMIC Spec 2	19	27.7	5.3	21.6	35.9
	MIMIC Spec 3	19	32.6	2.5	29.0	36.5
	Schneider, (2007b)	5	35.9	1.1	34.4	37.4
	Schneider, (2009)	7	37.2	1.5	34.4	38.9
	Schneider et al., (2010)	9	32.6	1.5	30.2	34.4
	Buehn & Schneider, (2012)	9	32.6	1.5	30.2	34.4
	Schneider et al., (2013)	10	31.3	1.5	29.5	33.4
	Hassan and Schneider, (2016)	15	32.6	2.3	29.8	36.1
	Bitzenis et al. (2016).	9	30.9	1.6	29.4	33.6
Serbia	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	MIMIC Spec 1	19	30.0	5.2	23.1	36.6
	MIMIC Spec 2	19	28.2	5.7	20.4	36.9
	MIMIC Spec 3	19	30.8	3.3	26.3	34.8
	Schneider, (2007b)	5	37.7	1.0	36.4	39.1
	Schneider, (2009)	7	39.7	2.2	36.4	42.1
	Schneider et al., (2013)	10	31.4	1.1	30.1	33.2
	Hassan and Schneider, (2016)	15	36.2	4.3	29.8	44.3
Slovenia	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	MIMIC Spec 1	19	24.7	1.9	21.9	27.8
	MIMIC Spec 2	19	24.7	1.7	22.0	27.3

	MIMIC Spec 3	19	25.7	1.1	24.0	27.3
	Schneider, (2007b)	5	28.1	0.9	27.1	29.4
	Schneider, (2009)	7	28.0	1.1	26.4	29.4
	Schneider et al., (2010)	9	26.2	0.8	24.7	27.3
	Buehn & Schneider, (2012)	9	26.2	0.8	24.7	27.3
	Schneider et al., (2013)	10	25.4	0.9	24.1	26.6
	Alm and Embaye, (2013)	8	29.0	0.7	27.7	29.7
	Hassan and Schneider, (2016)	15	27.5	1.5	25.2	30.0
	Bitzenis et al. (2016).	9	25.2	1.1	24.0	26.7
Turkey	**Variable**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
	MIMIC Spec 1	19	30.9	3.7	26.2	36.8
	MIMIC Spec 2	19	32.2	3.1	27.9	37.5
	MIMIC Spec 3	19	33.2	2.4	29.1	38.3
	Schneider, (2007b)	5	33.3	0.8	32.1	34.3
	Schneider et al., (2010)	9	31.3	1.4	29.1	32.8
	Buehn & Schneider, (2012)	9	31.3	1.4	29.1	32.8
	Alm and Embaye, (2013)	11	37.0	3.2	29.0	39.9
	Hassan and Schneider, (2016)	15	37.3	4.2	29.5	43.3
	Bitzenis et al. (2016).	9	29.7	1.6	27.7	32.2

Appendix 6.12. 2 - Correlation of estimates between three chosen MIMIC specifications

Correlation between MIMIC Specifications for all countries (obs=190)			
	MIMIC Spec 1	MIMIC Spec 2	MIMIC Spec 3
MIMIC Spec 1	1		
MIMIC Spec 2	0.9483	1	
MIMIC Spec 3	0.8558	0.8831	1
Correlations for Albania between MIMIC Specifications (obs=19)			
	MIMIC Spec 1	MIMIC Spec 2	MIMIC Spec 3
MIMIC Spec 1	1		
MIMIC Spec 2	0.9551	1	
MIMIC Spec 3	0.8218	0.8104	1
Correlations for Bosnia & Herzegovina between MIMIC Specifications (obs=19)			
	MIMIC Spec 1	MIMIC Spec 2	MIMIC Spec 3
MIMIC Spec 1	1		
MIMIC Spec 2	0.9867	1	
MIMIC Spec 3	0.8166	0.8538	1
Correlations for Bulgaria between MIMIC Specifications (obs=19)			
	MIMIC Spec 1	MIMIC Spec 2	MIMIC Spec 3
MIMIC Spec 1	1		
MIMIC Spec 2	0.9731	1	
MIMIC Spec 3	0.9545	0.9624	1

Correlations for Croatia between MIMIC Specifications (obs=19)			
	MIMIC Spec 1	MIMIC Spec 2	MIMIC Spec 3
MIMIC Spec 1	1		
MIMIC Spec 2	0.9903	1	
MIMIC Spec 3	0.7949	0.7936	1
Correlations for Greece between MIMIC Specifications (obs=19)			
	MIMIC Spec 1	MIMIC Spec 2	MIMIC Spec 3
MIMIC Spec 1	1		
MIMIC Spec 2	0.9881	1	
MIMIC Spec 3	0.9711	0.9444	1
Correlations for FYR Macedonia between MIMIC Specifications (obs=19)			
	MIMIC Spec 1	MIMIC Spec 2	MIMIC Spec 3
MIMIC Spec 1	1		
MIMIC Spec 2	0.9951	1	
MIMIC Spec 3	0.9475	0.9644	1
Correlations for Romania between MIMIC Specifications (obs=19)			
	MIMIC Spec 1	MIMIC Spec 2	MIMIC Spec 3
MIMIC Spec 1	1		
MIMIC Spec 2	0.9738	1	
MIMIC Spec 3	0.8374	0.8715	1
Correlations for Serbia between MIMIC Specifications (obs=19)			
	MIMIC Spec 1	MIMIC Spec 2	MIMIC Spec 3
MIMIC Spec 1	1		
MIMIC Spec 2	0.9787	1	
MIMIC Spec 3	0.9828	0.9671	1
Correlations for Slovenia between MIMIC Specifications (obs=19)			
	MIMIC Spec 1	MIMIC Spec 2	MIMIC Spec 3
MIMIC Spec 1	1		
MIMIC Spec 2	0.9836	1	
MIMIC Spec 3	0.8988	0.9009	1
Correlations for Turkey between MIMIC Specifications (obs=19)			
	MIMIC Spec 1	MIMIC Spec 2	MIMIC Spec 3
MIMIC Spec 1	1		
MIMIC Spec 2	0.9688	1	
MIMIC Spec 3	0.8342	0.9095	1

Appendix 6.12. 3 - Correlation of estimates between the MIMIC specifications and other empirical studies

	MIMIC Spec 1	MIMIC Spec 2	MIMIC Spec 3	Schneider, (2007b)	Schneider, (2009)	Schneider et al., (2010)	Buehn & Schneider, (2012)	Alm and Embaye, (2013)	Schneider et al., (2013)	Hassan & Schneider, (2016a)	Bitzenis et al. (2016).
MIMIC Spec 1	1.00										
MIMIC Spec 2	1.00	1.00									
MIMIC Spec 3	1.00	1.00	1.00								
Schneider, (2007b)	0.98	0.99	0.99	1.00							
Schneider, (2009)	1.00	1.00	1.00	0.99	1.00						
Schneider et al., (2010)	0.99	0.99	1.00	1.00	0.99	1.00					
Buehn & Schneider, (2012)	0.99	0.99	1.00	1.00	0.99	1.00	1.00				
Alm and Embaye, (2013)	0.95	0.94	0.93	0.89	0.94	0.89	0.89	1.00			
Schneider et al., (2013)	0.99	0.99	1.00	1.00	0.99	1.00	1.00	0.90	1.00		
Hassan and Schneider, (2016)	0.94	0.94	0.96	0.98	0.95	0.97	0.97	0.81	0.97	1.00	
Bitzenis et al. (2016).	0.99	0.99	1.00	1.00	0.99	1.00	1.00	0.90	1.00	0.97	1.00

Appendix 6.12. 4 - Correlation of estimates from the MIMIC specifications and other variables

	MIMIC Spec 1	MIMIC Spec 2	MIMIC Spec 3
MIMIC Spec 1	1		
MIMIC Spec 2	0.9483	1	
MIMIC Spec 3	0.8558	0.8831	1
Business Freedom Index	-0.612	-0.5761	-0.574
Government Integrity	-0.3808	-0.365	-0.4256
Government Effectiveness	-0.47	-0.4553	-0.6194
Government Spending Index	0.1898	0.2862	0.3384

Unemployment Rate	0.5242	0.4133	0.5528
Employment to Population Rate	-0.4058	-0.3248	-0.4806
Control of Corruption	-0.4829	-0.4892	-0.5852
Size of Agriculture sector	0.4604	0.431	0.4456
Degree of Urbanisation	-0.1867	-0.0805	-0.2258
Labour Force Participation Ratio	-0.2827	-0.268	-0.425
Regulatory Quality	-0.5645	-0.4796	-0.5601
Rule of Law	-0.535	-0.5172	-0.6336
Political Stability Index	-0.462	-0.4455	-0.5169
Monetary Freedom Index	-0.2793	-0.2365	-0.1977
M2 Growth	0.247	0.2577	0.1818
Tax Revenue	0.1301	0.125	0.2135
Level of Exports	-0.3353	-0.3011	-0.2918
Inflation	0.1003	0.1197	0.0702
Electric Power Consumption	-0.4454	-0.4813	-0.6225
GDP per Capita	-0.6046	-0.585	-0.7242
State Fragility Index	0.489	0.4973	0.5344
Political Stability Index	-0.462	-0.4455	-0.5169
Banking Crisis	-0.1739	-0.1793	-0.0997
Institutionalised Democracy	-0.1803	-0.1193	-0.2541
Voice and Accountability	-0.5142	-0.4805	-0.591
Overall Economic Freedom	-0.3807	-0.3172	-0.2527

Appendix 6.12. 5 – Impact of informal economy on the government revenues

		GDP	Tax	Government	Informal	Size of	Lost	Potential Total	Potential Tax
		based on PPP	Revenues	Tax	Economy	Informal	Government	Government	Revenues
Country	Year	(current int. $)	(% of GDP)	Revenues	(% of GDP)	Economy	Revenues	Revenues	(% of GDP)
ALB	1996	9,850,039,915	12.81	1,261,790,113	33.67	3,316,508,439	424,844,731	1,686,634,844	17.12
ALB	1997	8,932,819,723	13.76	1,229,155,994	32.57	2,909,419,384	400,336,107	1,629,492,101	18.24
ALB	1998	10,039,363,360	18.86	1,893,423,930	33.07	3,320,017,463	626,155,294	2,519,579,223	25.10
ALB	1999	11,473,507,534	18.84	2,161,608,819	35.70	4,096,042,190	771,694,349	2,933,303,168	25.57
ALB	2000	12,438,082,811	20.77	2,583,389,800	35.80	4,452,833,646	924,853,548	3,508,243,348	28.21
ALB	2001	13,659,433,660	20.28	2,770,133,146	33.80	4,616,888,577	936,305,003	3,706,438,150	27.13
ALB	2002	14,506,505,449	21.12	3,063,773,951	35.10	5,091,783,413	1,075,384,657	4,139,158,608	28.53
ALB	2003	15,546,952,059	21.45	3,334,821,217	35.70	5,550,261,885	1,190,531,174	4,525,352,391	29.11
ALB	2004	16,723,679,412	22.50	3,762,827,868	36.20	6,053,971,947	1,362,143,688	5,124,971,556	30.65
ALB	2005	17,896,842,537	22.86	4,091,218,204	35.57	6,365,906,890	1,455,246,315	5,546,464,519	30.99
ALB	2006	19,854,814,601	23.55	4,675,808,838	36.27	7,201,341,256	1,695,915,866	6,371,724,704	32.09
ALB	2007	21,650,252,013	23.63	5,115,954,551	32.83	7,107,777,736	1,679,567,879	6,795,522,430	31.39
ALB	2008	24,251,466,868	24.47	5,934,333,943	35.63	8,640,797,645	2,114,403,184	8,048,737,126	33.19
ALB	2009	25,832,022,152	23.68	6,117,022,846	31.43	8,119,004,562	1,922,580,280	8,039,603,126	31.12
ALB	2010	28,100,696,752	23.28	6,541,842,204	30.87	8,674,685,087	2,019,466,688	8,561,308,892	30.47
ALB	2011	29,655,482,843	23.37	6,930,486,340	29.73	8,816,575,049	2,060,433,589	8,990,919,929	30.32
ALB	2012	30,530,519,326	22.57	6,890,738,212	27.30	8,334,831,776	1,881,171,532	8,771,909,744	28.73
ALB	2013	30,643,070,633	22.21	6,805,825,988	27.53	8,436,037,345	1,873,643,894	8,679,469,882	28.32
ALB	2014	32,720,135,193	24.09	7,882,280,568	27.47	8,988,221,137	2,165,262,472	10,047,543,040	30.71
BIH	1996	8,888,899,060	25.48	2,264,713,702	25.97	2,308,447,086	588,146,149	2,852,859,851	32.09
BIH	1997	12,150,205,641	24.86	3,020,055,114	29.77	3,617,116,219	899,070,407	3,919,125,522	32.26
BIH	1998	14,198,068,429	24.23	3,440,759,903	34.70	4,926,729,745	1,193,943,686	4,634,703,589	32.64
BIH	1999	15,799,217,627	23.61	3,730,511,266	34.30	5,419,131,646	1,279,565,364	5,010,076,630	31.71
BIH	2000	17,047,462,281	22.99	3,919,211,578	43.43	7,403,712,869	1,702,113,588	5,621,325,167	32.97
BIH	2001	17,883,753,581	22.37	4,000,238,001	40.30	7,207,152,693	1,612,095,914	5,612,333,915	31.38
BIH	2002	19,310,551,062	21.75	4,199,272,434	35.70	6,893,866,729	1,499,140,259	5,698,412,693	29.51
BIH	2003	20,213,831,698	21.12	4,269,969,808	31.80	6,427,998,480	1,357,850,399	5,627,820,207	27.84
BIH	2004	22,093,035,682	20.50	4,529,514,176	33.87	7,482,911,186	1,534,146,451	6,063,660,627	27.45
BIH	2005	24,402,765,425	19.88	4,851,269,766	35.00	8,540,967,899	1,697,944,418	6,549,214,185	26.84
BIH	2006	27,908,070,415	21.69	6,053,260,473	34.67	9,675,728,013	2,098,665,406	8,151,925,879	29.21
BIH	2007	30,795,338,339	21.40	6,590,202,404	35.63	10,972,379,050	2,348,089,117	8,938,291,521	29.02
BIH	2008	33,876,565,225	20.31	6,880,330,397	34.57	11,711,128,598	2,378,530,218	9,258,860,615	27.33
BIH	2009	33,746,612,805	18.96	6,398,357,788	31.63	10,674,053,630	2,023,800,568	8,422,158,356	24.96
BIH	2010	34,678,810,241	19.70	6,831,725,618	30.37	10,531,954,670	2,074,795,070	8,906,520,688	25.68
BIH	2011	36,495,497,235	20.32	7,415,885,038	29.33	10,704,129,339	2,175,079,082	9,590,964,120	26.28
BIH	2012	37,103,872,110	20.50	7,606,293,783	30.07	11,157,134,343	2,287,212,540	9,893,506,323	26.66

BIH	2013	39,010,595,697	19.78	7,716,295,829	30.73	11,987,956,058	2,371,217,708	10,087,513,537	25.86
BIH	2014	39,980,164,560	19.82	7,924,068,616	30.50	12,193,950,191	2,416,840,928	10,340,909,544	25.87
BGR	1996	47,039,286,253	17.03	8,010,790,449	34.10	16,040,396,612	2,731,679,543	10,742,469,992	22.84
BGR	1997	47,251,686,007	16.63	7,857,955,383	34.43	16,268,755,492	2,705,494,038	10,563,449,421	22.36
BGR	1998	49,600,149,953	16.17	8,020,344,247	37.97	18,833,176,937	3,045,324,711	11,065,668,958	22.31
BGR	1999	47,223,085,883	17.18	8,112,926,155	37.30	17,614,211,034	3,026,121,456	11,139,047,610	23.59
BGR	2000	52,048,554,046	17.55	9,134,521,235	38.93	20,262,502,090	3,556,069,117	12,690,590,352	24.38
BGR	2001	55,697,079,591	16.79	9,351,539,663	41.70	23,225,682,189	3,899,592,040	13,251,131,703	23.79
BGR	2002	60,865,248,219	16.00	9,738,439,715	31.40	19,111,687,941	3,057,870,071	12,796,309,786	21.02
BGR	2003	65,151,458,359	17.88	11,649,080,755	32.27	21,024,375,612	3,759,158,359	15,408,239,114	23.65
BGR	2004	70,820,549,109	20.62	14,603,197,226	32.93	23,321,206,822	4,808,832,847	19,412,030,073	27.41
BGR	2005	78,696,095,092	20.94	16,478,962,312	30.70	24,159,701,193	5,059,041,430	21,538,003,742	27.37
BGR	2006	86,482,983,437	21.78	18,835,993,792	27.23	23,549,316,390	5,129,041,110	23,965,034,902	27.71
BGR	2007	97,319,054,459	21.76	21,176,626,250	28.30	27,541,292,412	5,992,985,229	27,169,611,479	27.92
BGR	2008	107,860,139,054	22.06	23,793,946,675	28.47	30,707,781,589	6,774,136,618	30,568,083,294	28.34
BGR	2009	105,212,811,320	19.71	20,737,445,111	27.60	29,038,735,924	5,723,534,851	26,460,979,962	25.15
BGR	2010	110,659,860,114	18.06	19,985,170,737	26.17	28,959,685,392	5,230,119,182	25,215,289,918	22.79
BGR	2011	115,193,278,719	17.77	20,469,845,628	27.27	31,413,207,107	5,582,126,903	26,051,972,531	22.62
BGR	2012	118,416,202,048	18.50	21,906,997,379	26.67	31,581,601,086	5,842,596,201	27,749,593,580	23.43
BGR	2013	120,940,806,200	19.88	24,047,023,319	28.00	33,863,425,736	6,733,166,529	30,780,189,849	25.45
BGR	2014	125,740,576,129	21.27	26,740,871,104	27.97	35,169,639,143	7,479,421,648	34,220,292,751	27.21
HRV	1996	39,526,778,516	22.65	8,952,815,334	35.90	14,190,113,487	3,214,060,705	12,166,876,039	30.78
HRV	1997	42,828,764,961	21.80	9,336,670,762	36.60	15,675,327,976	3,417,221,499	12,753,892,260	29.78
HRV	1998	44,241,626,863	25.00	11,060,406,716	35.33	15,630,566,771	3,907,641,693	14,968,048,408	33.83
HRV	1999	44,395,695,503	23.04	10,228,768,244	33.80	15,005,745,080	3,457,323,666	13,686,091,910	30.83
HRV	2000	47,564,558,954	22.16	10,540,306,264	34.43	16,376,477,648	3,629,027,447	14,169,333,711	29.79
HRV	2001	50,285,356,716	20.84	10,479,468,340	33.10	16,644,453,073	3,468,704,020	13,948,172,360	27.74
HRV	2002	54,539,852,822	21.35	11,644,258,577	31.10	16,961,894,228	3,621,364,418	15,265,622,995	27.99
HRV	2003	58,260,522,999	20.62	12,013,319,842	31.37	18,276,326,065	3,768,578,435	15,781,898,277	27.09
HRV	2004	62,579,293,389	19.86	12,428,247,667	30.00	18,773,788,017	3,728,474,300	16,156,721,967	25.82
HRV	2005	66,004,826,366	19.78	13,055,754,655	30.20	19,933,457,562	3,942,837,906	16,998,592,561	25.75
HRV	2006	75,189,970,861	19.86	14,932,728,213	29.73	22,353,978,337	4,439,500,098	19,372,228,311	25.76
HRV	2007	83,267,221,867	19.93	16,595,157,318	30.17	25,121,720,837	5,006,758,963	21,601,916,281	25.94
HRV	2008	89,785,126,205	20.01	17,966,003,754	29.50	26,486,612,230	5,299,971,107	23,265,974,861	25.91
HRV	2009	86,237,221,790	19.24	16,592,041,472	29.63	25,552,088,816	4,916,221,888	21,508,263,361	24.94
HRV	2010	84,845,080,572	19.16	16,256,317,438	31.73	26,921,344,065	5,158,129,523	21,414,446,960	25.24
HRV	2011	88,627,632,084	18.47	16,369,523,646	31.27	27,713,860,553	5,118,750,044	21,488,273,690	24.25
HRV	2012	90,186,781,801	19.58	17,658,571,877	30.57	27,570,099,197	5,398,225,423	23,056,797,299	25.57
HRV	2013	92,268,446,101	19.13	17,650,953,739	31.20	28,787,755,184	5,507,097,567	23,158,051,306	25.10
HRV	2014	93,255,069,483	19.29	17,988,902,903	31.27	29,160,860,227	5,625,129,938	23,614,032,841	25.32
GRC	1996	171,120,830,289	18.64	31,890,229,320	28.23	48,307,410,390	9,002,611,737	40,892,841,057	23.90

GRC	1997	182,757,003,454	19.52	35,677,642,605	28.53	52,140,573,085	10,178,831,435	45,856,474,041	25.09
GRC	1998	193,131,757,855	20.53	39,646,245,833	28.20	54,463,155,715	11,180,241,325	50,826,487,158	26.32
GRC	1999	198,711,870,544	21.43	42,590,007,129	28.50	56,632,883,105	12,138,152,032	54,728,159,161	27.54
GRC	2000	210,755,176,396	22.47	47,357,787,871	28.27	59,580,488,367	13,388,046,631	60,745,834,502	28.82
GRC	2001	228,231,416,082	20.94	47,786,575,490	28.00	63,904,796,503	13,380,241,137	61,166,816,628	26.80
GRC	2002	246,559,427,996	21.27	52,435,490,756	27.87	68,716,112,582	14,613,771,274	67,049,262,030	27.19
GRC	2003	260,839,187,353	19.71	51,405,343,776	27.33	71,287,349,904	14,049,080,454	65,454,424,230	25.09
GRC	2004	278,865,832,297	19.13	53,360,224,341	27.50	76,688,103,882	14,674,061,694	68,034,286,035	24.40
GRC	2005	281,028,288,405	20.33	57,123,231,252	27.73	77,929,144,375	15,840,272,026	72,963,503,278	25.96
GRC	2006	314,476,206,162	19.98	62,829,832,442	27.00	84,908,575,664	16,964,054,759	79,793,887,202	25.37
GRC	2007	323,504,148,095	20.24	65,486,435,310	27.70	89,610,649,022	18,139,742,581	83,626,177,891	25.85
GRC	2008	341,817,992,912	20.21	69,093,764,964	27.97	95,606,492,617	19,325,526,060	88,419,291,024	25.87
GRC	2009	337,613,679,843	19.78	66,765,401,496	25.33	85,517,545,104	16,911,676,199	83,677,077,695	24.78
GRC	2010	313,653,326,969	20.21	63,401,888,041	25.33	79,448,387,721	16,059,698,241	79,461,586,282	25.33
GRC	2011	290,296,713,795	22.07	64,079,319,875	24.93	72,370,970,749	15,974,974,445	80,054,294,320	27.58
GRC	2012	279,267,183,855	23.60	65,917,100,822	24.23	67,666,438,648	15,971,713,529	81,888,814,351	29.32
GRC	2013	286,427,292,633	23.74	67,997,323,677	24.70	70,747,541,280	16,795,338,948	84,792,662,625	29.60
GRC	2014	288,147,021,055	24.38	70,254,357,034	24.27	69,933,282,010	17,050,732,452	87,305,089,486	30.30
MKD	1996	9,609,420,521	23.02	2,212,088,604	35.03	3,366,180,008	774,894,638	2,986,983,242	31.08
MKD	1997	9,914,628,240	22.51	2,231,782,817	36.40	3,608,924,679	812,368,945	3,044,151,762	30.70
MKD	1998	10,387,304,852	22.00	2,285,207,068	37.57	3,902,510,433	858,552,295	3,143,759,363	30.27
MKD	1999	10,977,905,353	21.49	2,359,151,860	39.00	4,281,383,088	920,069,226	3,279,221,086	29.87
MKD	2000	12,457,849,682	20.98	2,613,656,863	40.73	5,074,082,175	1,064,542,440	3,678,199,304	29.53
MKD	2001	12,344,255,335	20.47	2,526,869,067	41.77	5,156,195,454	1,055,473,209	3,582,342,276	29.02
MKD	2002	12,919,271,008	19.96	2,578,686,493	43.17	5,577,249,294	1,113,218,959	3,691,905,452	28.58
MKD	2003	13,351,874,808	19.45	2,596,939,650	48.90	6,529,066,781	1,269,903,489	3,866,843,139	28.96
MKD	2004	14,574,499,050	18.94	2,760,410,120	38.33	5,586,405,486	1,058,065,199	3,818,475,319	26.20
MKD	2005	15,987,086,813	18.43	2,945,636,517	38.53	6,159,824,549	1,134,953,750	4,080,590,267	25.52
MKD	2006	17,721,804,605	18.08	3,204,573,971	40.87	7,242,901,542	1,309,709,382	4,514,283,353	25.47
MKD	2007	19,083,218,989	19.07	3,640,091,623	38.07	7,264,981,469	1,385,782,881	5,025,874,504	26.34
MKD	2008	21,537,236,737	18.52	3,989,546,126	36.60	7,882,628,646	1,460,173,882	5,449,720,008	25.30
MKD	2009	22,605,639,278	17.13	3,872,250,673	39.47	8,922,445,823	1,528,377,341	5,400,628,013	23.89
MKD	2010	23,390,230,361	16.87	3,944,924,399	38.13	8,918,694,837	1,504,199,673	5,449,124,072	23.30
MKD	2011	24,064,082,357	17.00	4,090,810,018	37.37	8,992,747,577	1,528,735,704	5,619,545,721	23.35
MKD	2012	24,558,825,220	16.42	4,031,736,483	32.97	8,097,044,675	1,329,263,519	5,361,000,002	21.83
MKD	2013	26,293,430,873	15.67	4,119,906,641	33.47	8,800,411,313	1,378,932,753	5,498,839,394	20.91
MKD	2014	27,973,163,086	16.24	4,541,522,389	33.10	9,259,116,982	1,503,243,911	6,044,766,300	21.61
ROU	1996	130,661,914,104	16.00	20,907,501,988	36.73	47,992,121,050	7,679,325,480	28,586,827,468	21.88
ROU	1997	126,320,875,404	16.91	21,361,711,657	32.40	40,927,963,631	6,921,194,577	28,282,906,234	22.39
ROU	1998	125,502,401,719	17.62	22,109,676,449	30.90	38,780,242,131	6,831,890,023	28,941,566,472	23.06
ROU	1999	126,569,797,535	16.95	21,451,166,294	34.30	43,413,440,555	7,357,750,039	28,808,916,333	22.76

ROU	2000	131,817,966,895	17.87	23,560,904,790	32.13	42,353,112,763	7,570,118,709	31,131,023,499	23.62
ROU	2001	145,815,589,404	16.50	24,062,298,118	35.27	51,429,158,383	8,486,772,546	32,549,070,664	22.32
ROU	2002	156,007,553,674	16.45	25,663,820,082	30.60	47,738,311,424	7,853,128,945	33,516,949,027	21.48
ROU	2003	168,720,335,331	17.16	28,957,074,232	30.80	51,965,863,282	8,918,778,863	37,875,853,095	22.45
ROU	2004	196,017,571,593	17.14	33,591,471,188	32.33	63,372,480,896	10,860,122,635	44,451,593,822	22.68
ROU	2005	207,302,689,152	17.25	35,759,629,670	30.83	63,911,419,065	11,024,693,827	46,784,323,497	22.57
ROU	2006	247,843,784,061	17.73	43,936,944,446	25.20	62,456,633,583	11,072,110,000	55,009,054,446	22.20
ROU	2007	280,721,829,724	17.41	48,859,899,526	25.63	71,949,004,958	12,522,792,249	61,382,691,775	21.87
ROU	2008	334,807,276,941	16.84	56,384,976,384	25.03	83,802,261,418	14,113,159,589	70,498,135,972	21.06
ROU	2009	326,151,619,753	15.40	50,243,537,142	24.87	81,113,907,833	12,495,567,687	62,739,104,829	19.24
ROU	2010	347,851,579,156	16.57	57,645,434,049	24.00	83,484,378,997	13,834,904,172	71,480,338,221	20.55
ROU	2011	364,569,775,773	17.99	65,574,540,363	23.90	87,132,176,410	15,672,315,147	81,246,855,510	22.29
ROU	2012	380,769,349,931	17.88	68,087,460,776	23.80	90,623,105,284	16,204,815,665	84,292,276,441	22.14
ROU	2013	397,225,989,630	17.55	69,725,606,584	24.20	96,128,689,490	16,873,596,793	86,599,203,377	21.80
ROU	2014	414,046,808,587	17.90	74,100,432,820	23.40	96,886,953,209	17,339,501,280	91,439,934,100	22.08
SRB	1996	38,755,576,817	14.22	5,512,011,913	27.03	10,475,632,414	1,489,896,820	7,001,908,733	18.07
SRB	1997	42,251,060,561	15.01	6,339,771,637	28.80	12,168,305,441	1,825,854,231	8,165,625,869	19.33
SRB	1998	43,747,630,945	15.79	6,906,657,236	30.77	13,461,146,042	2,125,178,431	9,031,835,667	20.65
SRB	1999	39,021,947,365	16.57	6,465,936,678	33.20	12,955,286,525	2,146,690,977	8,612,627,656	22.07
SRB	2000	43,006,592,182	17.35	7,462,718,908	35.97	15,469,471,208	2,684,339,991	10,147,058,900	23.59
SRB	2001	46,160,131,108	18.14	8,371,139,776	35.43	16,354,534,451	2,965,894,823	11,337,034,599	24.56
SRB	2002	50,982,943,928	18.92	9,644,698,418	34.97	17,828,735,492	3,372,751,037	13,017,449,454	25.53
SRB	2003	53,840,949,717	19.70	10,606,667,094	34.43	18,537,438,988	3,651,875,481	14,258,542,575	26.48
SRB	2004	60,229,292,344	20.48	12,336,464,804	34.27	20,640,578,486	4,227,706,488	16,564,171,293	27.50
SRB	2005	64,786,639,079	21.27	13,776,878,800	34.00	22,027,457,287	4,684,138,792	18,461,017,592	28.50
SRB	2006	71,267,080,387	22.05	15,712,609,548	33.53	23,895,852,054	5,268,437,982	20,981,047,530	29.44
SRB	2007	77,300,277,201	22.83	17,644,253,596	30.03	23,213,273,244	5,298,569,355	22,942,822,951	29.68
SRB	2008	87,627,895,069	22.41	19,635,441,414	27.07	23,720,871,195	5,315,313,991	24,950,755,405	28.47
SRB	2009	86,691,882,449	21.20	18,378,717,969	24.93	21,612,286,295	4,581,814,390	22,960,532,359	26.49
SRB	2010	88,216,846,518	21.44	18,912,509,953	24.03	21,198,508,218	4,544,676,142	23,457,186,094	26.59
SRB	2011	93,810,865,402	20.20	18,949,251,817	24.23	22,730,372,687	4,591,403,715	23,540,655,532	25.09
SRB	2012	94,365,827,053	19.72	18,610,249,604	24.30	22,930,895,974	4,522,290,654	23,132,540,257	24.51
SRB	2013	98,668,341,471	19.25	18,995,273,130	23.73	23,413,997,431	4,507,578,314	23,502,851,444	23.82
SRB	2014	98,444,967,815	19.25	18,952,270,040	23.27	22,908,144,010	4,410,193,238	23,362,463,278	23.73
SVN	1996	28,383,002,368	20.13	5,713,054,118	27.27	7,740,044,746	1,557,949,858	7,271,003,976	25.62
SVN	1997	30,306,251,616	19.82	6,005,192,329	27.23	8,252,392,315	1,635,213,871	7,640,406,200	25.21
SVN	1998	31,754,417,297	20.52	6,516,433,781	27.07	8,595,920,762	1,763,998,625	8,280,432,406	26.08
SVN	1999	33,844,952,075	20.86	7,059,545,020	27.30	9,239,671,917	1,927,255,790	8,986,800,811	26.55
SVN	2000	35,873,180,670	20.04	7,190,385,094	27.00	9,685,758,781	1,941,403,975	9,131,789,069	25.46
SVN	2001	37,846,698,512	19.95	7,550,521,881	25.20	9,537,368,025	1,902,731,514	9,453,253,395	24.98
SVN	2002	40,498,975,974	20.44	8,277,647,672	24.70	10,003,247,066	2,044,578,975	10,322,226,647	25.49

SVN	2003	42,174,601,093	20.62	8,697,210,488	24.13	10,176,731,244	2,098,636,891	10,795,847,378	25.60
SVN	2004	45,517,750,685	20.60	9,377,142,021	24.03	10,937,915,490	2,253,327,228	11,630,469,248	25.55
SVN	2005	47,901,860,736	21.07	10,091,581,371	24.47	11,721,585,322	2,469,409,962	12,560,991,333	26.22
SVN	2006	51,733,016,594	20.84	10,779,894,289	25.73	13,310,905,170	2,773,666,801	13,553,561,090	26.20
SVN	2007	55,689,655,161	20.03	11,154,392,346	24.90	13,866,724,135	2,777,443,694	13,931,836,041	25.02
SVN	2008	59,879,849,603	19.39	11,613,650,600	24.60	14,730,443,002	2,856,958,048	14,470,608,647	24.17
SVN	2009	56,099,203,174	18.04	10,121,026,923	23.63	13,256,241,710	2,391,598,662	12,512,625,585	22.30
SVN	2010	56,936,222,201	18.11	10,312,760,711	24.93	14,194,200,195	2,570,971,245	12,883,731,956	22.63
SVN	2011	59,131,529,881	17.92	10,594,962,899	24.30	14,368,961,761	2,574,575,984	13,169,538,883	22.27
SVN	2012	59,332,421,600	17.96	10,653,177,540	23.47	13,925,319,350	2,500,300,769	13,153,478,309	22.17
SVN	2013	60,889,413,841	18.01	10,963,827,703	23.17	14,108,077,187	2,540,318,879	13,504,146,582	22.18
SVN	2014	63,967,064,472	18.18	11,628,057,810	22.63	14,475,746,690	2,631,429,482	14,259,487,292	22.29
TUR	1996	476,473,573,525	15.20	72,423,983,176	28.93	137,843,804,821	20,952,258,333	93,376,241,509	19.60
TUR	1997	520,409,370,150	19.05	99,137,985,014	33.97	176,783,063,040	33,677,173,509	132,815,158,523	25.52
TUR	1998	544,189,350,800	15.03	81,791,659,425	35.23	191,717,908,287	28,815,201,616	110,606,861,041	20.33
TUR	1999	532,389,563,026	15.38	81,876,190,898	32.70	174,091,387,110	26,773,514,424	108,649,705,321	20.41
TUR	2000	591,388,539,360	15.73	93,013,589,471	37.40	221,179,313,721	34,787,082,462	127,800,671,933	21.61
TUR	2001	580,324,299,429	16.08	93,298,737,619	34.87	202,359,083,211	32,533,269,808	125,832,007,427	21.68
TUR	2002	592,770,396,160	16.43	97,368,465,273	36.60	216,953,964,995	35,636,858,290	133,005,323,563	22.44
TUR	2003	616,729,512,196	16.78	103,456,375,671	33.53	206,789,405,439	34,688,922,762	138,145,298,433	22.40
TUR	2004	705,551,346,211	17.12	120,818,612,525	35.40	249,765,176,559	42,769,788,834	163,588,401,359	23.19
TUR	2005	777,546,447,173	17.47	135,860,690,715	33.47	260,244,795,869	45,472,573,182	181,333,263,897	23.32
TUR	2006	900,493,098,629	17.82	160,485,880,038	31.20	280,953,846,772	50,071,594,572	210,557,474,609	23.38
TUR	2007	989,102,724,091	18.17	179,729,855,994	29.37	290,499,470,065	52,786,658,706	232,516,514,700	23.51
TUR	2008	1,080,201,656,894	17.70	191,155,987,611	29.83	322,224,154,251	57,021,831,104	248,177,818,715	22.98
TUR	2009	1,054,276,201,165	18.26	192,525,150,715	31.63	333,467,562,428	60,895,705,171	253,420,855,886	24.04
TUR	2010	1,196,158,257,013	19.41	232,118,930,937	31.53	377,148,698,436	73,187,098,924	305,306,029,861	25.52
TUR	2011	1,343,143,703,632	18.74	251,760,011,639	30.93	415,434,347,533	77,869,371,600	329,629,383,239	24.54
TUR	2012	1,389,214,250,835	18.39	255,514,821,168	27.73	385,229,111,757	70,854,259,910	326,369,081,078	23.49
TUR	2013	1,465,678,167,670	18.53	271,617,834,526	28.10	411,855,565,115	76,324,611,502	347,942,446,028	23.74
TUR	2014	1,523,622,436,760	18.07	275,315,857,730	28.17	429,204,440,435	77,556,477,122	352,872,334,852	23.16