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## Shadow Economy Worsens Income distribution

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**Abstract:**

*Shadow economy has many repercussions affecting most sectors of the economy. Our research question is how shadow economy affects income distribution. The contribution of the present paper is that if is found that shadow economy worsens income distribution.*

*Our sample includes the following countries Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden and UK. It becomes evident that, international accounting standards and international standards of auditing should be adopted by EU members to eliminate shadow economy, and thus promote not only economic growth but also political stability.*

*The structure of this paper has as follows. Literature review will be presented in sector 1. In sector 2 the econometric model will be analyzed and finally conclusions will be discussed in sector 3.*

**Keywords:** *shadow economy; tax evasion; economic growth; income distribution; panel data analysis*

**JEL classifications:** *E26; E25; O17; C33*

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## 1. Introduction

The main reason of shadow economy is tax evasion. An extensive literature is found in (Schneider and Enste, 2000). Shadow economy, which is a world-wide problem, has many forms. One of them and very common is earning management, that is used by companies to pay less taxes (Guenther, 1994).

This is done mainly by large companies<sup>4</sup>. Earnings management has been examined by many economists: DeAngelo (1986), Jones (1991), Cahan (1992) and showed a considerable increase during the period 1997-2002 (Cohen *et al.*, 2004). The rapid technological progress as well as the fast change in capital markets are two important reasons that made accounting system very complicated. According to Allingham and Sandmo (1972) and Srinivasan (1973) the international auditing standards are one important determinant factor to reduce tax evasion. Consequently, auditing is required to guarantee that company's income statements become trustworthy. Further, Kerr (2015) asserts that countries, where companies have greater levels of transparency, experience lower levels of tax avoidance. Further, an increased transparency gives better, trustworthy and reliable information to the would-be investors. Hence, international investments will be increased ending up with economic growth (Georgiou, 2013a; Thalassinou *et al.*, 2012a; 2012b).

## 2. Shadow Economy's Impacts

### 2.1 Trying to restrict shadow economy is difficult

According to (Hanlon *et al.*, 2008) the increase in book-tax conformity resulted in a decrease in the informativeness of the firms' accounting earnings. To our knowledge this is a unique result in that it is a case of a tax law change that has an adverse consequence on the informativeness of accounting earnings. Besides, based on (Georgiou, 2013b) restricting shadow economy has some costly side effects.

### 2.2 Shadow economy's impact on Share Prices

According to Weber (2006) analysts' systematic errors proxy for similar errors made by investors concerning book-tax differences for future earnings lead to mispricing. According to (Kim *et al.*, 2011) Using a large sample of U.S. firms for the period 1995–2008, we provide strong and robust evidence that corporate tax avoidance is positively associated with firm-specific stock price crash risk. According to Georgiou (2013) shadow economy pushes up share prices. There are countries where there are firms not listed in the stock market, in which tax evasion takes place. In

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*4 It is made mainly by large companies that have well organized accounting department. Hence, large companies (compared to the small and medium firms) are in a position to show a better picture in order to attract investors in the future. Hence, there is a distortion in market competition.*

these countries the method of earnings management happens many times. Further, earnings management takes place in order to show that the company has met its targets so as to increase its share price (Bartov *et al.*, 2002). It should be also noted that firms aim to remain competitive and to meet their obligations to third parties (Cormier and Magnan, 1996) to avoid bankruptcy. Hence, they sometimes hide various costs, to avoid an increase in the interest rates of their loans<sup>5</sup>.

### **2.3 Shadow economy impact on Inflation and Taxation**

According to (Mazhar and Méon, 2012) in a sample of developed and developing countries during the period 1999-2007, a positive relation is found between inflation and the size of the shadow economy. Further, tax burden tends to increase shadow economy (Schneider, 2012).

### **2.4 Shadow economy impact on Competition**

According to the study of (Armbrecht and Carlback, 2011) after making a survey of 535 restaurants in Sweden it is found that it is very difficult not only to survive as a law-abiding firm, but also that the unfair competition (due to shadow economy) affects the whole sector's progress and development. In other words, shadow economy is an obstacle to the competition. Firms in a globalized environment resorted to earnings management in order to attract would-be investors<sup>6</sup> (Vanasco, 1998).

### **2.5 Corruption and shadow economy**

According to (Dreher and Schneider, 2010) there is not any significant relationship between corruption and the size of the shadow economy. However, in low income countries corruption and the shadow economy are complements and there is no protection of investors Wang (2014).

### **2.6 Developed Economies vs Rest of the World**

According to (Fleming *et al.*, 2000; Schneider and Enste, 2000) shadow economy is larger in transition and developing countries Wang (2014). Particularly, within EU southern EU States have higher levels of shadow economy<sup>7</sup>.

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<sup>5</sup> *This lack of transparency distorts fair competition and is an obstacle for economic growth (Georgiou, 2013a).*

<sup>6</sup> *This lack of transparency distorts fair competition and is an obstacle for economic growth (Georgiou, 2013a).*

<sup>7</sup> *See, for example, Contini, B. "The Second Economy of Italy", in Vito Tanzi, ed., The Underground Economy in the United States and Abroad (Lexington, MA: D.C. Heath and Company, 1982) pp.199-208.*

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## **2.7 The role of institutions, Democracy and State governance to fight shadow economy**

An improvement in the institutional quality reduce shadow economy and corruption (Dreher *et al.*, 2009; Torgler and Schneider, 2007). Similarly, according to Torgler *et al.*, (2010) local autonomy and federal system tend to reduce shadow economy. Further, direct democracy and democratic institutions cause a decrease of the size of shadow economy (Teobaldelli and Schneider, 2012). Besides, world history has shown that countries, having robust accounting systems and high levels of transparency, enjoy economic growth and political stability (Georgiou *et al.*, 2015; Bekiaris *et al.*, 2011).

## **2.8 Shadow economy on entrepreneurship**

According to (Estrin and Mickiewicz, 2012) shadow economy hinders entrepreneurial entry. Further, shadow economy is an obstacle to entrepreneurial activity (Georgiou, 2013a).

## **2.9 Shadow Economy on Unemployment**

According to the work of Boeri and Garibaldi, (2002) an effort by the official state to reduce shadow economy will increase unemployment. This finding agrees with the study of Georgiou, (2013b) indicating that shadow economy is hard to fight without any cost of side effects.

## **2.10 Shadow Economy's Impact on Income Distribution**

Since, tax avoidance reduces the total tax revenues, then “*tax burden*” on “*honest*” tax payers are expected to go up<sup>8</sup> in order to cover the tax revenue generated gap. Consequently, this tax burden will be at the cost of income distribution (Georgiou, 2013c; Alm, 2014). In other words, only “*honest*” tax payers will pay this increased tax burden, which will cause a further reduction in their disposable income and finally income distribution will be worse than before.

## **2.11 Conclusions of this section**

After the afore mentioned it becomes clear that shadow economy can affect economy in various ways and in many sectors. Tax evasion causes lower tax revenues and ultimately the higher effective tax rate (to cover the tax revenue gap) falls on the shoulders of honest tax payers. Hence, it is expected a priori that shadow economy will affect income distribution. Our research question is then “how shadow economy affects income distribution”.

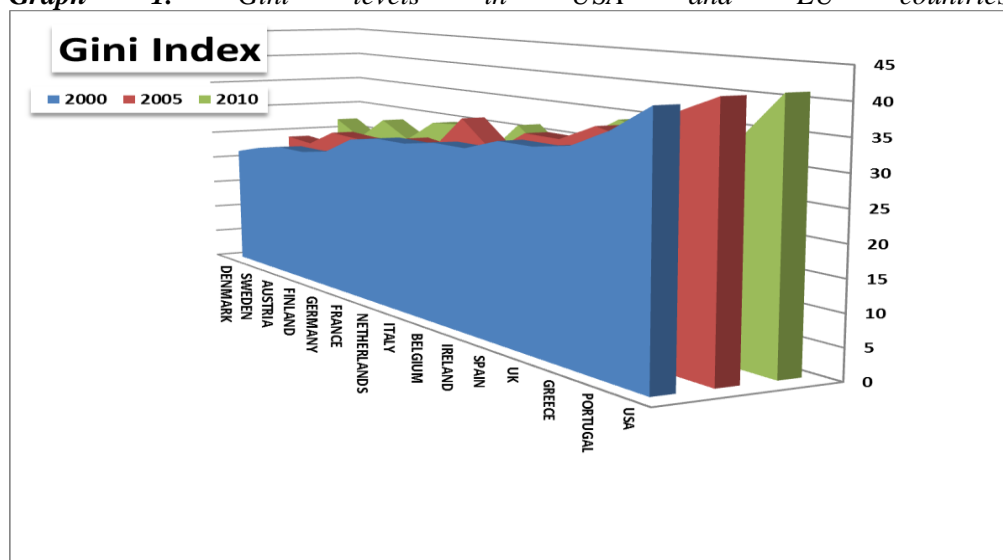
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<sup>8</sup> In other words, effective tax rate will increase in order to compensate for the reduction of tax revenues, which is created by tax evasion.

### 3. Income Distribution Estimation

Gini statistic is worldwide known as an indicator of income distribution<sup>9</sup>. Following the definition of OECD<sup>10</sup> index GINI<sup>11</sup> measures the degree of income distribution (and in some cases the consumption expenditure) among individuals or households. Its value ranges from 0 to 1 (or as a percentage from 0 to 100). When its value equals to 0, then this is the ideal situation in which income distribution is completely equal among individuals. On the contrary, the value 1 indicates the extreme case in which income distribution is totally unequal. Consequently, the higher the value of Gini the worse income distribution is. However, there are intermediate cases. In fact, according to Luebker (2010) an index Gini around 0,20 indicates a low level of unequal income distribution. Values around 0,25 show a moderate level of unequal income distribution, while values around 0,35 indicate a highly unequal distribution of income and finally for values beyond 0,50 then there is an extremely unequal income. In the graph 1 one can see the different levels of income distribution inequality between USA and many countries of EU.

**Graph 1.** Gini levels in USA and EU countries



*Source: Eurostat, OECD*

One can observe in the graph 1 that income distribution in the USA is during period 2000-2010 worse than many European countries. More specifically, between the selected European countries the worst income distribution appears in Portugal, and the remaining countries have better income distribution improving according to the

<sup>9</sup> To be comprehensive, there are many ways to estimate income distribution (Stewart et al., 2005). However, Gini index is the one world-wide used.

<sup>10</sup> <http://stats.oecd.org/glossary/detail.asp?ID=4842>

<sup>11</sup> It took the name after the famous Italian Statistician Corrado Gini (1884-1965).

following order: Greece, UK, Spain, Ireland, Belgium, Italy, Netherlands, France, Germany, Finland, Austria, Sweden and Denmark.

It should be noted that recent world economic crisis had as a repercussion the worsening of income distribution (Özlem Onaran, 2009). Besides, the German policy concerning the budgetary discipline was strongly criticized by IMF (Schrörsand Pache, 2009). It is well known that the various austerity measures resulted in a consumption decline<sup>12</sup>. Furthermore, firms faced losses<sup>13</sup> and unemployment has risen. Hence, austerity measures worsened income distribution (Theodoropoulou and Watt, 2011; Georgiou, 2012).

#### 4. Income distribution determinants

However, it should be mentioned that shadow economy is not the only income distribution determinant. In fact, entrepreneurship, by creating jobs, tends to reduce income inequality (Georgiou, 2009), because entrepreneurship reduces unemployment<sup>14</sup>. Further, education spending improves income distribution, for educated people find jobs easily (Georgiou, 2010b)<sup>15</sup>. Besides, globalization can improve income distribution (IMF, 2007); (Georgiou, 2010)<sup>16</sup>. Inflation is also a serious factor that worsens income distribution (Jäntti and Jerkins, 2001; Georgiou, 2010a; Oberdabernig, 2013). Furthermore, economic crisis and the imposed austerity measures tend to worsen income distribution (Georgiou, 2012c; Theodoropoulou and Watt, 2011; Özlem Onaran, 2009). One should not forget the contribution of the trade unions towards the improvement of income distribution (Checchi and Garcia-Peñalosa, 2005; Georgiou, 2012a)<sup>17</sup>. Finally, it is claimed that decentralization (Georgiou, 2012b) as well as Federal system and political stability (Georgiou, 2015) help to improve income distribution.

#### 5. Our Research Hypothesis

Based on the afore-mentioned our research hypothesis is: Ho: “*Shadow economy has no impact on income distribution*”

##### 5.1 Data

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<sup>12</sup> Mainly in Greece (Georgiou et al., 2015).

<sup>13</sup> This can be explained by the consumption-led growth theory (Saito, 2007).

<sup>14</sup> In fact a reduction in unemployment improves income distribution (Jäntti and Jerkins, 2001).

<sup>15</sup> Again in this case unemployment is reduced.

<sup>16</sup> According to (Atif et al., 2012) the impact of globalisation on income distribution differs among countries.

<sup>17</sup> It should be mentioned that trade unions are also responsible for the creation of “wage rigidities” (Toichiro Asada et al., 2003), that might cause unemployment. This topic however goes beyond the limits of the present paper.

Variable (**Gini**) is taken from Eurostat. Shadow Economy data (**sh\_ec**) as a percentage of *official* GDP<sup>18</sup> are taken from (Schneider et al., 2010; Schneider, 2013). The period covered is 2000-2013 annually, and our data refer to Austria (2000-2013), Belgium (2000-2013), Cyprus (2004-2013), Denmark (2000-2013), Finland (2000-2013), France (2003-2013), Germany (2000-2013), Greece (2000-2013), Ireland (2000-2012), Italy (2000-2013), Netherlands (2000-2013), Portugal (2000-2013), Spain (2000-2013), Sweden (2000-2013) and UK (2000-2013).

## 5.2 The Regression

The econometric model is shown by equation (1).

$$Gini_{it} = c_0 + c_1 sh\_ec_{it} + error_{it} \quad (1)$$

This model is estimated by Panel EGLS (Cross section weights)<sup>19</sup>, at a significance level  $\alpha = 0,01$ .

## 5.3 Results

*Table 1. Regression Results in Brief*

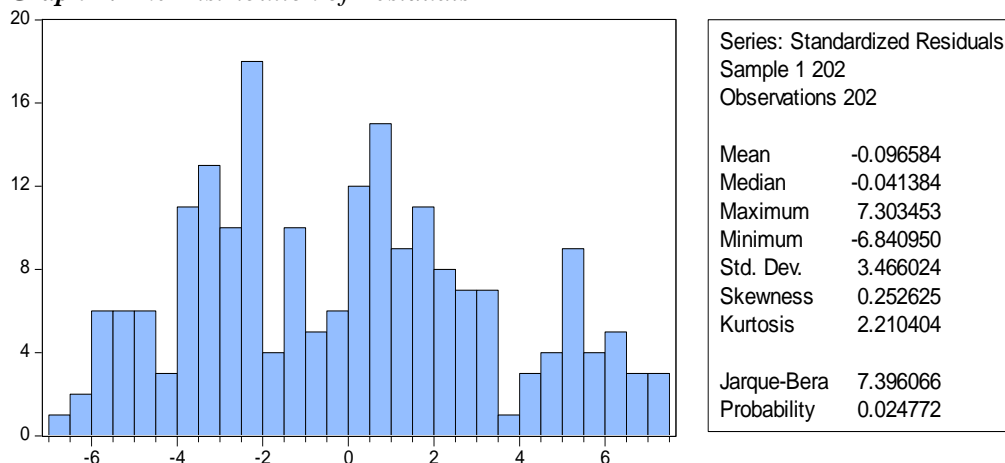
Variable	Coefficient	P-value
Constant	24,870	0,0000
sh_ec	0,266	0,0021
R <sup>2</sup>	0,160	...
Adjusted R <sup>2</sup>	0,156	...
S.E. of regression	3,476	...
<i>F-statistic</i>	38,217	0,0000
Durbin-Watson stat	1,970	...

## 5.4 Comments

With a sample size equal to 202, (*at 1%*)  $d_U = 1,6850 < DW = 1,970029$ . Hence, there is no serial correlation in this model. All coefficients (including the constant term) are statistically significant, and positive, for all  $p\text{-values} < \alpha$ . Finally,  $p\text{-value}$  of (*F statistic*)  $< \alpha$ . This indicates that the vector of explanatory variable *does* explain the variations of the vector of dependent variable (Pindyck and Rubinfeld, 1998). The determination coefficient indicates that 16% of the variations in income distribution are explained by the present model.

<sup>18</sup> Without allowing for the shadow economy part.

<sup>19</sup> For a detailed econometric analysis see (Halkos and Georgiou, 2005).

**Graph 2. The Distribution of Residuals**

Jarque-Bera (*JB*) statistic is estimated by the following equation (2):

$$JB = n * \left[ \frac{S^2}{6} + \frac{(K - 3)^2}{24} \right] \quad (2)$$

where: *S* (*skewness*), *K* (*kurtosis*) and *n* (*the sample size*). *JB* statistic follows a *chi-square* distribution<sup>20</sup>, and the null hypothesis *Ho* is: “*the residuals of the regression are normally distributed*” (Vogelvang, 2005).

### 5.5 Robustness of the Model

The following tests aim to check if our model is robust.

**Table 2. Unit Root Test<sup>21</sup> for [*gini*]**

Method	Statistic	P-value
Im, Pesaran and Shin W-stat	-4,333	0,0000
ADF - Fisher <i>Chi-square</i>	67,433	0,0000
PP - Fisher <i>Chi-square</i>	169,814	0,0000

### 5.6 Comments

Variable **gini** is stationary<sup>22</sup> since all *p-values* <  $\alpha$ .

<sup>20</sup> See (Pindyck and Rubinfeld, 1998).

<sup>21</sup> A similar unit root test can be found in (Georgiou et al.,2015)

<sup>22</sup> All variables must be stationary in order to be able to estimate the regression.



**Table 3.** Unit Root Test for [sh\_ec]

Method	Statistic	P-value
Im, Pesaran and Shin W-stat	-3,040	0,0012
ADF - Fisher <i>Chi-square</i>	53,986	0,0022
PP - Fisher <i>Chi-square</i>	176,691	0,0000

Variable sh\_ec is stationary<sup>23</sup> since all p-values <  $\alpha$ .

**Table 4.** Diagnostic Tests of Model Robustness<sup>24</sup>

TESTS	Model	Critical values ( $\alpha = 0,01$ )
Heteroskedasticity (*)	0,000	11,350
RESET (**)	0,014	6,340
Normality (***)	7,397	9,210

**Notes:**

(\*) Regression of the log of squared residuals on  $X$  (a Harvey test)

(\*\*) Regression of residuals on  $\hat{Y}^2$

(\*\*\*) Normality test (Jarque Bera) (see Vogelvang, 2005)

The robustness tests (see Table 4) are made in order to check whether the basic assumptions for the construction of the above model are met. To begin with, the assumption of homoskedasticity is fulfilled since, according to the above *Harvey test*, the statistic is less than the critical value 11,350. Besides, the specification of this model is correct, since the RESET statistic is less than the critical value 6,340. Further, the distribution of the regression residuals in this model is normal, since Jarque Bera statistic is less than the critical value 9,210. Finally, there is no serial correlation, since at  $\alpha = 1\%$ ,  $d_U = 1,6850 < DW = 1,970$ . Needless to mention that all variables [Gini] and [sh\_ec] are stationary, since Im, Pesaran and Shin W-stat, ADF - Fisher *Chi-square*, and PP - Fisher *Chi-square* have all p-values <  $\alpha$ . Consequently, the afore-mentioned model is robust.

## 6. Concluding

### 6.1 Findings and discussion

According to this model at a level of significance 1% the afore mentioned *research hypothesis* is not accepted. More specifically, shadow economy, which is created by tax evaders, has a positive impact on Gini coefficient. In economic jargon this means that as shadow economy grows then income distribution worsens. This finding is in agreement with Georgiou (2013c), where a different econometric model was used.

<sup>23</sup> All variables must be stationary in order to be able to estimate the regression.

<sup>24</sup> These robustness tests are based on Halkos (2003).

This impact on Gini is not fair, and in the long run it might be unfortunately a “*motive*” for the today’s “*legal and honest taxpayers*” to turn into “*tax evaders*” in the future. If this takes place, then the size of shadow economy will increase even further, and the created lack of transparency will hinder entrepreneurs to invest and create economic growth. Thus, shadow economy will be an obstacle to economic growth.

Apart from that consequence, according to this model income distribution will worsen even further, thus poverty will tend to increase. This situation will create some social problems in the long run. According to the empirical analysis of Georgiou (2014) a poverty increase in EU will cause a decrease in confidence on the Institutions of the EU and the general *entity* of EU. Policy makers should take this seriously.

Consequently, international accounting standards and international standards of auditing should be adopted by EU members in order to eliminate tax avoidance, which is a great segment of shadow economy, and thus promote not only economic growth but also political stability.

## 6.2 Further research

This model refers on the impact of total shadow economy on income distribution. The afore mentioned model could be enhanced by taking into account additional income distribution determinant factors, such as: entrepreneurship (Georgiou, 2009), education spending (Georgiou, 2010b), austerity measures (Georgiou, 2012c); (Theodoropoulou and Watt, 2011); (Özlem Onaran, 2009) and finally economic crisis, which hits mainly southern EU.

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