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***ASSOCIAÇÃO DE POLITÉCNICOS DO NORTE* (APNOR)**

INSTITUTO POLITÉCNICO DE BRAGANÇA

NATIONAL, REGIONAL OR INDUSTRIAL EXPLANATION FOR BUSINESS DEMOGRAPHY IN THE EUROPEAN UNION SINCE 2010 UNTIL 2014 – A *SHIFT-SHARE* APPLICATION

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Final Dissertation submitted to *Instituto Politécnico de Bragança*

to obtain the Master Degree in Management, Specialisation in Business Management

Supervisors:

Alcina Maria de Almeida Rodrigues Nunes

Tatiana Khvatova

***Bragança*, July, 2017.**

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Abstract

Among the main concepts of business demography there are the concepts of business births (creation) and deaths (closure), whose importance for the business cycle is well recognized in the specialised literature. Indeed, firms' entry and exit are critical for the continued dynamism of modern economies (Cavallari, 2015; Klapper & Richmond, 2011). Traditionally, creation and closure of new firms and its variations across regions have been associated with regional factors. Still, a region can have an aggregate rate of activity that differs from that of the nation because it has a different mix of industries and/or because it enjoys comparatively more favourable local conditions for that activity (Fotopoulos & Spence, 2001). Thus, business demography in a given spatial area and during a particular time period may be driven by the business cycle, industrial composition, as well as regional advantage (Cheng, 2011). With the previous framework in mind, the research work is dedicated to analyse each of the three factors that may have driven business demography in European Union countries between 2010 and 2014 (a 5 year period), and to find out which of them has/have been the most important one(s). For this purpose, a *shift-share* decomposition *analysis* of business creation and business closure will be applied. The impact of the macroeconomic framework, the industrial composition, and the regional influence was computed to identify the share of impact of each component. The results of the study proved that regional component had the highest influence on both firms' births and deaths during the studied period of time for almost all countries included in the analysis. Only for few countries and in specific industries the most influential factor was the industrial composition of the economic activity, and even for less the national macroeconomic path. Since the applied methodology is just exploratory and not explanatory, the results allow only generating ideas and hypotheses that may be important in order to uncover the relations between firms' births and deaths and regional characteristics, industrial mix, and national economy growth.

Keywords: business demography, firm births, firm deaths, shift-share analysis, European Union

Resumo

Entre os principais conceitos de demografia empresarial encontram-se os conceitos de nascimento (criação) e morte (encerramento) de empresas, cuja importância para o ciclo económico é reconhecida na literatura especializada. De facto, a entrada e a saída de empresas nos mercados constituem-se como fatores críticos para o dinamismo contínuo das economias modernas (Cavallari, 2015; Klapper & Richmond, 2011). Tradicionalmente, a criação e encerramento de novas empresas e respetivas variações têm sido associadas a fatores regionais. Ainda assim, uma região pode apresentar uma taxa agregada de atividade que difere daquela da economia porque possui uma combinação diferente de indústrias/atividades e/ou porque goza de condições locais comparativamente mais favoráveis para o exercício de uma determinada atividade (Fotopoulos & Spence, 2001). Assim, a demografia empresarial num determinado espaço e durante um determinado período de tempo pode ser impulsionada pelo ciclo económico, composição industrial e vantagem regional (Cheng, 2011). Face ao exposto, o trabalho de investigação dedica-se a analisar cada um dos três fatores acima mencionados que podem impulsionar a demografia empresarial nos países da União Europeia entre 2010 e 2014 (um período de 5 anos) e descobrir qual/quais deles foi/foram o(s) mais importante(s). Para o efeito, será aplicada uma análise estatística shift-share que decompõe os valores observados para a criação e encerramento de empresas em três componentes. O impacto da conjuntura macroeconómica, da composição industrial e da influência regional será calculado para identificar a parcela de impacto de cada componente. Os resultados do estudo provam que a componente regional possui maior influência tanto nos nascimentos como nas mortes das empresas durante o período de tempo estudado para quase todos os países incluídos na análise. Apenas para um conjunto reduzido de países, e para um conjunto de indústrias específicas, o fator mais importante foi a composição industrial da atividade económica. O mesmo se verifica para a tendência macroeconómica observada na União Europeia durante o período. Uma vez que a metodologia aplicada é apenas exploratória e não explicativa, os resultados permitem apenas gerar ideias e hipóteses que podem ser importantes para descobrir qual a relação existente entre os nascimentos e mortes das empresas, as características regionais de cada economia, a combinação industrial prevalecente e o crescimento do bloco económico europeu.

Palavras-chave: demografia empresarial, nascimento de empresas, morte de empresas, análise shift-share, União Europeia

Реферат

Основными понятиями в бизнес-демографии являются открытие (рождение) и закрытие (смерть) бизнеса. Важность этих процессов для экономического цикла общепризнана в специализированной литературе. Традиционно, процессы открытия и закрытия фирм, а также их разнообразие по регионам, связывались с региональными факторами. Тем не менее, регион может отличаться по совокупному уровню деятельности от страны в целом в связи с тем, что он располагает определенным набором отраслей промышленности и/или потому, что условия в регионе более предпочтительны для отдельной отрасли промышленности. Таким образом, бизнес-демография в данной отдельной области (регионе) в течение определенного временного периода может быть обусловлена экономическим циклом, набором отраслей промышленности или региональными преимуществами. Данная исследовательская работа посвящена анализу каждого из этих трёх факторов, повлиявших на бизнес-демографию в странах Европейского Союза в период с 2010 по 2014 годы (5 лет). Основная задача состоит в том, чтобы выяснить, какие из этих факторов имели наибольшее влияние на процессы открытия и закрытия фирм. Для достижения поставленной цели был применен анализ структурных сдвигов и региональной конкурентоспособности (*shift-share* анализ). Результаты исследования подтверждают тот факт, что региональный фактор имел наибольшее влияние на процессы как открытия, так и закрытия фирм практически для всех анализируемых стран в течение исследуемого периода времени. Только для небольшого количества стран в определенных отраслях промышленности наиболее важным фактором являлась промышленная составляющая, в то время как национальный фактор играл важнейшую роль в процессах открытия и закрытия фирм лишь в очень редких случаях. Поскольку используемая методология не ставит своей задачей объяснить причины отдельных событий, полученные результаты позволяют лишь выдвигать идеи и гипотезы, которые, тем не менее, могут быть важны в попытке выявить связи между открытием/закрытием бизнеса и характеристиками региона, набором отраслей промышленности и ростом национальной экономики.

Ключевые слова: бизнес-демография, формирование бизнеса, закрытие бизнеса, Европейский Союз, анализ структурных сдвигов и региональной конкурентоспособности (shift-share анализ)

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Abbreviations and/or Acronyms

AUT – Austria
BEL – Belgium
BGR – Bulgaria
CYP – Cyprus
CZE – Czech Republic
DEU – Germany
EIP – Entrepreneurship Indicators Programme
ESP – Spain
EST – Estonia
Eurostat – European Statistics
FIN – Finland
FRA – France
GBR – United Kingdom
HUN – Hungary
IM – Industrial mix component
IRL – Ireland
ITA – Italy
LVA – Latvia
LTU – Lithuania
LUX – Luxemburg
NLD – Netherlands
NS – National share component
OECD – Organisation for Economic Cooperation and Development
POL – Poland
PORDATA – Portugal Database
PRT – Portugal
ROU – Romania
RS – Regional shift component
SVK – Slovakia
SVN – Slovenia
SWE – Sweden
TS – Total shift component

Table of Contents

List of Figures ix

List of Tables xi

Introduction 1

1. Business demography: literature review on the concept 4

1.1. Firm demography: definitions and applications 4

1.2. Business creation: premises and conditions 5

1.3. Business closure: premises and conditions 8

1.4. National, regional and industrial analysis of firm creation and closure 10

2. Research methodology: shift-share analysis 12

2.1. Objective of the study 12

2.2. Variables and databases 12

2.3. Shift-share analysis methodology 14

3. Presentation and analysis of the shift-share empirical results 17

3.1. Descriptive characterisation of the data 17

3.2. Shift-share results and analysis 23

3.2.1. Firms' births 23

3.2.2. Firms' deaths 36

Conclusions, limitations and future research lines 47

References 50

Appendix A1. Shift-share decomposition of the growth rate in firms' births between 2010 and 2014, by country 56

Appendix A2. Shift-share decomposition of the growth rate in firms' deaths between 2010 and 2014, by country 61

List of Figures

Figure 1. Shift-share decomposition compared with the real growth rate of firms' births for all sectors of activity, between 2010 and 2014, by country 26

Figure 2. Shift-share decomposition compared with the real growth rate of firms' births for the manufacturing sector, between 2010 and 2014, by country 27

Figure 3. Shift-share decomposition compared with the real growth rate of firms' births for the construction sector, between 2010 and 2014, by country 28

Figure 4. Shift-share decomposition compared with the real growth rate of firms' births for the services sector, between 2010 and 2014, by country 29

Figure 5. Shift-share decomposition of the growth rate in firms' births between 2010 and 2014, in Austria 31

Figure 6. Shift-share decomposition of the growth rate in firms' births between 2010 and 2014, in Romania 31

Figure 7. Shift-share decomposition of the growth rate in firms' births between 2010 and 2014, in Cyprus 32

Figure 8. Shift-share decomposition of the growth rate in firms' births between 2010 and 2014, in the Netherlands 33

Figure 9. Shift-share decomposition of the growth rate in firms' births between 2010 and 2014, in Estonia 34

Figure 10. Shift-share decomposition of the growth rate in firms' births between 2010 and 2014, in Portugal 35

Figure 11. Shift-share results by component in total compared with the real growth rate of firms' deaths between 2010 and 2014, by country 38

Figure 12. Shift-share results by component for the manufacturing sector compared with the real growth rate of firms' deaths between 2010 and 2014, by country 39

Figure 13. Shift-share results by component for the construction sector compared with the real growth rate of firms' deaths between 2010 and 2014, by country 40

Figure 14. Shift-share results by component for the services sector compared with the real growth rate of firms' deaths between 2010 and 2014, by country 41

Figure 15. Shift-share decomposition of the growth rate in firms' deaths between 2010 and 2014, in Lithuania 43

Figure 16. Shift-share decomposition of the growth rate in firms' deaths between 2010 and 2014, in Bulgaria 43

Figure 17. Shift-share decomposition of the growth rate in firms' deaths between 2010 and 2014, in Ireland 44

Figure 18. Shift-share decomposition of the growth rate in firms' deaths between 2010 and 2014, in France 45

Figure 19. Shift-share decomposition of the growth rate in firms' deaths between 2010 and 2014, in Portugal 46

List of Tables

Table 1.Types of business exit 9

Table 2. Number and percentage variation of the number of firms' births by sector of activity and by European Union country, between 2010 and 2014 18

Table 3. Number and percentage variation of the number of firms' deaths by sector of activity and by European Union country, between 2010 and 2014 21

Table 4. Growth rate of firms' births regarding the national, industrial and regional shift-share components and real growth rates, by country and activity 24

Table 5. Growth rate of firms' deaths regarding the national, industrial and regional shift-share analysis components and real growth rates, by country and activity 36

Introduction

Business demography is one of many possible applications of the whole demography concept. It studies births and deaths and evolution of firms as three key events that determine the population (Schrör, 2008; Van Dijk & Pellenbarg, 1999), as well as firms' age, change in size, growth and decline, mergers and spin-offs (Van Wissen, 2002; Van Dijk & Pellenbarg, 1999) that also can be viewed as important events in firm demography. However, the main concepts of business demography are still business creation (births) and closure (deaths).

New business formation, which is a creation of a new company as a combination of production factors, as agreed by many researches in the field of entrepreneurship and business demography, plays an important role in the process of economic development. It leads to changes in market structure and competition environment, it as well may result in shifting of national competitive advantage, and industrial restructuring (Cheng, 2011). New firms provide new ideas and innovation to an economy which in a large extent contribute to a long term economic growth (Baptista, Escária & Madruga, 2008). Business closure or the end of firm's activity, despite being usually referred to as negative event, has the main goal of resources reallocation (Havila & Medlin, 2012) and can be beneficial on both macroeconomic level, providing business opportunities for new and more efficient businesses, as well as on microeconomic level, ensuring personal development (Schutjens & Stam, 2006). The importance of firm creation and closure for the business cycle is well recognized (Cavallari, 2015). Firm entry and exit is critical for the continued dynamism of modern economies (Klapper & Richmond, 2011). According to Schumpeter (1954) industries evolve through a process of 'creative destruction' where new firms can threaten the survival of existing ones.

Traditionally, only regional factors are considered when speaking about creation and closure of new firms and its variations across regions (Cheng, 2011). Still, a region can differ from a nation in terms of aggregate rate of activity because it has a different mix of industries and/or because it enjoys

comparatively more favorable local conditions for that activity (Fotopoulos & Spence, 2001). Therefore, not only regional advantage, but business cycle and industrial composition as well may drive business demography in a given spatial area and time period (Cheng, 2011).

Having in attention the importance of the concepts previously explained and their business context, the main research objective is to analyze factors such as macroeconomic environment (business cycle), industrial composition and regional advantage that have driven business demography, in particular business creation and closure, in European Union countries in a period between 2010 and 2014 – the recent five years period for which published comparable statistical information exists for three different dimensions: national, regional and sectorial - and to understand which of them has/have been the most important one(s) regarding the establishment of new firms and the death of others.

To reach the objective proposed, the study analyses two variables – firms' births and firms' deaths – using quantitative statistical data on the annual number of births and deaths of enterprises, which is publicly available on PORDATA, in three main economic sectors of activity – manufacturing, construction and services – in 24 countries of the European Union: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

The study results will be obtained by applying the statistical method of shift-share decomposition analysis – quick, simple and inexpensive (this is considered pivotal) research tool for investigating structural changes that occur in regional space during a given period of time (Sobczak, 2012). Traditional shift-share analysis decomposes economic changes in a region into three additive components: national share (business cycle), industrial mix (industrial composition), and regional shift (regional advantage) (Stimson, Stough & Roberts, 2006). The three components sum to the total shift, which is, specifically for this research, the actual growth or decrease in firms' demography if analysing firms' births or deaths, respectively. This methodology is not explanatory, thus, it does not give the answers to what are the exact reasons of occurrence of certain events in business demography, but is an important exploratory statistical method. In the case of this research work, it allows identifying key aspects that require special attention as well as generating ideas and hypothesis to uncover the relations between firms' births and/or deaths and regional characteristics, industrial mix and national economy growth. Moreover, allows to understand the subject of business demography by European Union economy, the regions in a major economic space, and over time.

Despite the existence of a large number of literature in the field of firms' formation and deaths, there are scarce amount of sources considering national, industry-specific, and regional factors influencing these events in the firm's life cycle. Although there are few studies using shift-share methodology for investigating the impact of these factors on firms' creation, it is hard to find any research making this

kind of analysis in terms of firms' closure. Thus, this research work is of significant value in this field of knowledge and provides substantial contribution to the future research on the topic.

The research work consists of three parts. The first part represents the initial theoretical research on the concept of firms' demography in general, and on business creation and closure as a significant part of this concept in particular, with the emphasis on the European Union. It as well provides a theoretical framework for factors that can influence new firms' formation and firms' closure such as macroeconomic fluctuations (business cycle), industrial structures (industrial composition), and regional characteristics (regional advantage). The second part presents the objectives of the study, variables and data under analysis as well as methodology applied. The third part consists of results of analysis that are expected to provide necessary information to fulfil the objective of study which is to understand which factors – national, industrial or regional – are the most important regarding the establishment of new firms and the death of others.

1. Business demography: literature review on the concept

1.1. Firm demography: definitions and applications

The term demography derives from two ancient Greek words: *demos*, that means people, and *grapheria*, that means description or measurement (Markowicz, 2014). Demography is, therefore, a statistical study of populations. Although, traditionally, it is concerned with populations of humans in a wider sense it can be considered as a study dealing with demographic processes (inflow, outflow, ageing or internal change) of any population (Van Wissen, 2002). Thereby, demography of firms is one of the many possible applications of the demography concept.

Literature provides many variants of demography of firms such as organizational demography, business demography, corporate demography or firmography (Carroll & Hannan, 2000; Garcia-Posada & Mora-Sanguinetti, 2015; Van Dijk & Pellenbarg, 2000; Wiersema & Bird, 1993), which, in general, can be considered the same. In this research work the expression “firm demography” will be used for greater convenience.

Firm demography is a new and developing scientific discipline (Markowicz, 2014). It is a multidisciplinary research field that includes economics, sociology and economic geography (Van Wissen, 2002). It studies births and deaths and evolution of firms as three key events that determine the population (Schrör, 2008; Van Dijk & Pellenbarg, 1999). Firms’ age, change in size, firms’ growth and decline, mergers, and spin-offs (Van Dijk & Pellenbarg, 1999; Van Wissen, 2002) can be viewed also as important events in its demography.

Indeed, a population can be described by a set of essential characteristics. In the case of firm demography, these characteristics are age, cohort, calendar time, size and location (Van Wissen, 2002). Regarding age, it is important to understand that like as every population, firms also go through a life cycle that usually includes four stages: introduction (start-up/birth), growth, maturity and decline (death) (Zygmunt & Walkowiak, 2007). A strong cohort effect is also relevant for organizations due to

the fact that firms are shaped to a large degree by the circumstances existing at the time of their founding. Moreover, economic, political or natural events have a strong effect on firm behaviour and overall performance. Therefore, the economic cycle (the calendar time) is one important factor to consider - it is easier to start a firm, acquire new customers and survive in a growing market rather than in declining one. Size is also an important indicator of firm demography, as it is the major form of heterogeneity in firms' performance and there are important interactions between a firm's size and age. First of all, they are highly positively related since the older the firm is, the larger in size it tends to be. Secondly, there is a negative relation between firm growth (change in size) and age since the growth rate is lower for older firms rather than for younger ones. Third, this interaction is quite complex in regards to firm mortality; numerous studies have shown that for smaller firms the risk of mortality increases with age. Finally, the firm's environment (its location) has a major impact on its behaviour and performance. Firms can operate at local, regional, national or international levels and in all these locations exists a competitive environment and they have to deal with many stakeholders (customers, workers, suppliers, competitors, government) (Van Wissen, 2002).

In the particular case of this research, the focus of analysis will be placed on the concepts of business creation (birth) and closure (death). Such concepts will be discussed in more detail in following sections.

The business demography is a new and developing scientific discipline that is proving its importance. According to Eurostat (2017a), firm demography delivers key information for policy decision-making and for monitoring the progress of different programs and measures that support business activity, namely entrepreneurship policies. The obtained data can be used to analyse the dynamics and innovation of different markets. For instance, in terms of the propensity to start a new business or the contribution of newly-born enterprises to the creation of jobs. Simultaneously, being a relatively new field of scientific research, there are still many problems that need to be considered and solved regarding the structure of firms demography and methodology of data collection and analysis. Nevertheless, firm demography provides data that can contribute to better understanding processes within population of firms and future consequences of certain events on a local, regional, and (inter)national scale.

1.2. Business creation: premises and conditions

According to Eurostat (2017b), enterprise birth is the creation of a combination of production factors with the restriction that no other enterprises are involved in the event. So, births do not include entries into the population due to mergers, break-ups, split-off or restructuring of a set of enterprises. It does not include, also, entries into a sub-population resulting only from a change of activity.

In general, nowadays, new firms that enter into an economy are both numerous and small (Geurts & Van Biesebroeck, 2016). They face low survival rates, but those that survive grow and create new jobs

(Klapper & Richmond, 2011). Small firms also ensure the competitiveness of the economy as they create a competitive environment and give the economy the flexibility, mobility and ability to perform rapid changes (Krekova, Shevchenko, Shchinova, Zelinskaya & Akhmadeev, 2016). Indeed, new firms are the platform for introducing new ideas and innovation to an economy. These are considered as keystone elements for long term economic growth (Baptista et al., 2008). New firms that survive in the competitive environment displace incumbent firms that do not present new ideas and do not innovate (Klapper & Richmond, 2011). That is why the effect of new businesses creation on economic development is sometimes called “creative destruction” (Changoluisa & Fritsch, 2014), following the idea introduced by the seminal work of Schumpeter (1954).

New firm formation is closely related to the term ‘entrepreneurship’ (Cheng, 2011). According to a business dictionary (Business Dictionary, 2017), entrepreneurship, means “the capacity and willingness to develop, organise and manage a business venture along with any of its risks in order to make a profit”. In most studies entrepreneurship is defined as “the start-up of a new business firm or organization having its own legal and/or societal identity” (Woodside, Mir & Coduras, 2016, p.137) being the entrepreneurial energy an essential condition for the formation of a new firm (Santarelli, 2006). Entrepreneurship is a key determinant to economic growth, job creation, and greater prosperity. It provides social and economic benefits such as new products and services that increase market choices (Bradley & Klein, 2016). As a field of study and as a national policy, entrepreneurship have great importance for increasing quality of life and advancing national wellbeing (Woodside et al., 2016).

New firm creation is a context-dependent, economic, and social process (Porfirio, Carrilho & Mónico, 2016). There are certain circumstances influencing an individual’s decision to become an entrepreneur. First of all, individuals decide to become self-employed and to set up own business if potential earnings from business ownership is higher than the potential income from wage and salary (Fairlie, 2013). Key characteristics of potential entrepreneur are: (i) opportunity identification; and (ii) entrepreneurial intentions (Devece, Peris-Ortiz & Rueda-Armengot, 2016). According to Burrows (2015) there are five sets of factors that affect individual’s decision to form a new business. First, a displacement event (redundancy, job dissatisfaction, discovering market opportunity, for example) occurred to an individual. Second, the willingness and ability to act appropriately by setting up a company. Third, individual must consider establishment of a new firm as both credible and feasible action. Fourth, resources such as finance, land/premises and labour must be locally available. Finally, general and specific knowledge on business, technology, equipment, and markets should be obtainable in the region. Individual characteristics as gender, age, level of education, job preferences, risk tolerance, expectations, life experience, knowledge, and embeddedness through social networking also have an impact on decision-making in terms of setting up a business (Porfirio et al., 2016; Sahasranamam & Sud, 2016; Santarelli, 2006). Another important aspect to be considered is motivation. This affects the way the entrepreneur runs a business as well as its overall performance. In terms of motivation, there are two types of entrepreneurship: opportunity- (‘pull’) and necessity- (‘push’) based (Devece et al.,

2016). Previously, entrepreneurship research has been focused only on examining the opportunity seeking behaviour. However, nowadays, the transformative nature of entrepreneurship (helping the poor get out of poverty) has been recognized which led to a new stream of research (Sahasranamam & Sud, 2016). Opportunity entrepreneurs are attracted by a promising idea and act appropriately to pursue an opportunity, while necessity entrepreneurs are forced into self-employment by external factors when they see no better alternative of earning money (Deli, 2011). According to Zali, Faghih, Ghotbi & Rajaie (2013) a business which has been set up to exploit a market opportunity is more likely to have a greater propensity to grow than a business for which the main drivers are push factors (e.g. unemployment or job dissatisfaction).

Traditionally, business creation and its variations across regions have been associated with regional factors, although it also can be influenced by macroeconomic fluctuations, industrial structures, and regional characteristics (Cheng, 2011).

Devece et al. (2016) point out that the macroeconomic environment and economic crises are important push factors to start a new business due to the lack or absence of viable alternatives. Nofsinger and Reca (2014) argue that government efficiency and the legal system are positively related with firm birth rates[1]. Francis, Hasan and Wang (2008) support that new firms are generally small and they, in most cases, heavily depend on the credit provided by the banking system for their start, survival and continuous growth. Finally, Burrows (2015), relying on the work of many authors, states that entrepreneurial culture[2] – the social context in which entrepreneurial behaviour is encouraged – has an influence on new firm formation.

Authors like Piacentino, Bono, Cracolici and Giuliani (2017) demonstrate that new business formation (and its determinants) show a significant dependence on place or region where the new firm is located. In addition, according to Fotopoulos (2014), there are six primary processes that affect business creation on a regional level: (1) local demand, since at the time of formation (and for at least first period of operation) many new firms tend to serve local markets; (2) urbanization/agglomeration because large cities are still very attractive for people who want to start business[3]; (3) unemployment, although it has ambiguous effect on new firm formation[4]; (4) personal household wealth since, according to

[1] Business policies that impose burdens on large companies stimulate formation of new small businesses but at the same time can lead to failure of existing firms, increasing firm deaths rates.

[2] Entrepreneurial culture includes both the attitude to risk-taking and orientation of political, educational and financial institutions towards entrepreneurship.

[3] Firms at the beginning prefer to be located in more highly urbanized areas (Piacentino et al., 2017) due to the easier access to important resources such as knowledge and highly qualified labour (Knoben, Ponds & van Oort, 2011). Thus, population density and urbanization have significant positive effect on new firm formation activity. Nevertheless, there are as well several downsides, such as possible raise in land and labour cost due to increased competition for these resources that can lead to decreasing in start-up rates (Knoben et al., 2011)

[4] On one hand, unemployment can increase the supply of potential entrepreneurs as people are pushed to start their own business. More to this, person that starts a new firm employ not only himself, but as well provide job to others (Armington & Acs, 2002). On the other hand, an increasing level of unemployment highlights less favourable market conditions in a region that discourage formation of new businesses. Nevertheless, labour market conditions are a key determinant of business creation (Fairlie, 2013).

Fairlie (2013), personal wealth may be used both as financial capital for business start and as collateral for business liabilities and guarantees in case a person decides to use bank loans; (5) small firm presence because individuals working in small firms have a wide range of task experience, they are familiar with the entire spectrum of operational processes and have greater familiarity with market conditions increasing their probabilities to be entrepreneurs (Burrows, 2015); and (6) public regional policy which can affect business creation in different ways (creating barriers for entry or on the contrary making the process simpler)[5].

An additional factor influencing firm formation is the industrial restructuring that, nowadays, is associated with either shift from manufacturing to services or a shift to higher level of technology, or a reduction in both firm and plant size. Shift to services may increase firm birth rate, while domination of large firms in the region may result in decrease on new firm formation (Armington & Acs, 2002). As was mentioned above, knowledge is one of the key factors of new firm formation. Knowledge is acquired by incumbent firms and research organizations, such as universities, and spilled over, generating entrepreneurial opportunities for new startups (Cheng & Li, 2012). Knowledge spillovers contribute to the economic growth through entrepreneurship (Knoben et al., 2011). Another deriving finding is that regions with more knowledge generating organizations and capacity have higher rates of entrepreneurship (Knoben et al., 2011).

It is observed in many cases that births of new firms are caused by deaths of the existing ones. The death of firms allows the replacement and release of resources that can be used in more productive ways (Brown, Lambert & Florax, 2013). Due to this fact, the phenomenon of business death will be examined in the following section.

1.3. Business closure: premises and conditions

The term ‘business closure’ is applied to define the end of an activity. However, the term has several synonymous in the literature as ‘enterprise death’, ‘firm death’, ‘firm closure’, ‘firm exit’ or ‘business exit’.

Eurostat (2017b) provides the following definition of an enterprise death: “a death amounts to the dissolution of a combination of production factors with the restriction that no other enterprises are involved in the event. Deaths do not include exits from the population due to mergers, take-overs, break-ups or restructuring of a set of enterprises. It does not include exits from a sub-population resulting only from a change of activity. An enterprise is included in the count of deaths only if it is not reactivated within two years. Equally, a reactivation within two years is not counted as a birth”.

On a firm-level, exit behaviour is specific to the firm and driven by an intra-firm process such as productivity development. At the same time, it is exogenous to the firm and specific to the economy

[5] For this reason policies for new business formation should be wisely planned (Piacentino et al., 2017).

(Schröder & Sørensen, 2012). The main goal of business closure is the reallocation of resources (Havila & Medlin, 2012). Table 1 presents the types of business exits.

Table 1.Types of business exit

Business survival	***Entrepreneurial continuation***		***Business continuation***	
	Entrepreneurial exit (e.g. initial public offering, merger/acquisition)		Harvest sale	
			Distress sale	
Business death	Voluntary death	'Relatively unviable'	Liquidation	Harvest
				Distress
	Involuntary death	'Absolutely unviable'	Bankruptcy	

Source: Coad, 2014, p. 723

Entrepreneurial exit, when business continues operations under new management or with new investors should not be considered as business death[6]. According to Coad (2014), business exits can be successful or unsuccessful depend on whether the decision was made voluntary (when business is 'relatively unviable' due to existence of better outside opportunities or personal reasons) or involuntary (when business is 'absolutely unviable' and the entrepreneur is forced into closure by banks or other creditors). Voluntarily business closure is usually made out of anticipation of failure and refers to either a 'harvest' liquidation of a profitable business or a 'distress' liquidation of a firm under financial or economic distress; at the same time, involuntary business closure always relates to bankruptcy. In a perfect world economically distressed companies should exit through liquidation with opportunity to pay off all creditors in full and rearrange resources for more productive use; however, if sales proceeds cannot cover all firm's liabilities, it exits through court procedures that in most of the cases result in bankruptcy. The probability of going bankrupt rather than follow voluntary liquidation process is higher for older and larger companies (Balcaen, Manigart, Buyze & Ooghe, 2012).

According to Geurts and Van Biesebroeck (2016), exit rates are declining with age and size. The main determinant of firm exit is size. Small firms have much higher exit rates than large ones (Klapper & Richmond, 2011)[7]. Young and mature firms have different reasons and procedures of exit. The business dynamic pattern shows that young firms may either survive with very rapid net growth or exit quickly for several reasons such as: (i) inability to reach a given level of productivity that will allow them to cover costs of entry in a short period of time; (ii) failure to get access to finance resources; (iii) lack of knowledge, among others (Balcaen et al., 2012). Apart from economic difficulties, there is also a

[6] As follows from the definition of 'business death' given by Eurostat, presented above.

[7] For instance, Cavan (2016) highlights the reasons for business closure in retail industry where firms are basically small in size. Retail stores close due to underperformance, trade area alignments, retailer bankruptcy, or opportunity realization.

variety of noneconomic reasons such as ageing or health issues of managers (owners) (Harada, 2007). Although mature firms have reached high level of productivity, have learned from the past experience and have built up a resource base, they exit because of worsen competitive position on the market (Balcaen et al., 2012).

Wasileski, Rodríguez and Diaz (2011) point out that one of the reasons for business closure that should be taken into account are natural disasters such as earthquakes, tornado, tsunami, etc. The impact is twofold: physical damage to business infrastructure (e.g. building, equipment) and lifeline disruption (damage of services such as communication, electricity, transportation etc.). The determinants of business vulnerability to natural disasters that can lead to business closure are the type of business sector, size of a business, financial condition, and preparedness behaviour.

It is important to note, that business closure involves and affects company-internal (e.g. employees) and company-external (e.g. suppliers or customers) parties. Thus, earlier experiences of ending, understanding of different types of commitment and the interdependence between them are important to foresee issues in a closure and handle with it in a proper way (Havila & Medlin, 2012).

Although business closure is usually referred to as negative event, it can be beneficial on both macroeconomic level, providing business opportunities for new and more efficient businesses, as well as on microeconomic level, ensuring personal development (Schutjens & Stam, 2006).

1.4. National, regional and industrial analysis of firm creation and closure

The importance of firm creation and closure for the business cycle is well recognized (Cavallari, 2015). Klapper and Richmond (2011), for example, refer that firms' entry and exit are critical for the continued dynamism of modern economies. According to Schumpeter (1954), industries evolve through a process of 'creative destruction' where new firms can threaten the existence of existing ones.

As abovementioned, start-ups are affected by both macroeconomic fluctuations and industry-specific characteristics (Klapper & Richmond, 2011) as well as by characteristics of regions in which they operate. Several studies show that the more diverse is the industrial base in the region, the higher is the rate of new firm formation in that region. Such an observation can be explained by the idea that a high degree of diversification provides a higher variety of available skills and experiences which can enhance entrepreneurial choice and opportunity (Fotopoulos, 2014).

Indeed, Klapper and Richmond (2011), relying on the works of other authors, point out that large macroeconomic disturbances affect the firm performance: macroeconomic development enhance start-up activity, but new-firm start-ups are also promoted by a low cost of capital as well as high unemployment rates. Later on, Cavallari (2015) argued that firm entry and exit depend on the business cycle. Her findings based on US data, state that entry and exit of firms are more volatile than output, they are negatively correlated with each other and both move in the same direction as output. More

recently, Bradley and Klein (2016) state that country-level characteristics even if appear stable over time, depend on constant changes in political and legal conditions, social and cultural norms that affect entrepreneurial activity.

According to Cheng (2011), new firm formation varies significantly in different industrial sectors and across regions with various industrial specializations. Thus, industry-specific characteristics are one of the sources of firm births. New firm formation varies between industries due to different patterns in demand changes, different innovations and different levels of barriers to entry (Fotopoulos, 2014). Most studies confirm that the majority of new firm founders establish businesses in the industry in which they already worked and have experience. However, industries differ at their ease of entry, which makes it logical to assume that industries with high barriers to entry will have lower new firm formation rates (Burrows, 2015).

Grek, Karlsson and Klaesson (2011) found that firms' deaths negatively relate to employment rate and level of education: the higher se last rates are the lower is firm's exit rate in all sectors of economy. Moreover, they state that there is a significant positive impact of small firms presence on firms' deaths in all sectors: the higher the share of small firms the higher is the exit rate of firms. Varum and Rocha (2012) studied the effect of crises on firms' exit and concluded that recession serves as a catalyst of firms' exit and has more impact on it than crisis itself. They also found that there is a moderating effect of the firm size: large firms have a greater increase in exit hazard than smaller ones during recession as well as in crisis due to the fact that large size may be the reason for inertia and inability to adapt fast to a changing environment. Carree, Verheul and Santarelli (2011) consider a 'domino effect' in connected industries, when high level of exits in one sector will lead to the same results in others; this effect is industry-specific and typical, for example, for services.

Despite the existence of a large number of literature in the field of firm formation and deaths, there are scarce amount of sources considering national, industry-specific and regional impacts on these events and in the firm's life cycle. This continues to remain an area for future research and investigations and the subject of this particular research work.

2. Research methodology: shift-share analysis

2.1. Objective of the study

The main research objective is to calculate and analyse the impact of factors such as business cycle, industrial composition and regional advantage that may drive business demography, in particular business creation and closure, in the European Union countries in a recent period of five years between 2010 and 2014[8] which was characterised by a general financial, economic and political instability. The main idea is to understand which of these factors has/have been the most important one(s) regarding their impact on the establishment of new firms and the death of others.

2.2. Variables and databases

In the analysis two variables were used: firm birth and firm death.

According with the definition of Eurostat (Eurostat, 2017b), used in the Entrepreneurship Indicators Programme (EIP), a firm birth is 'the creation of a combination of production factors with the restriction that no other enterprises are involved in the event. Births do not include entries into the population due to mergers, break-ups, split-off or restructuring of a set of enterprises. It does not include, also, entries into a sub-population resulting only from a change of activity'.

Firm death is 'the dissolution of a combination of production factors with the restriction that no other enterprises are involved in the event. Deaths do not include exits from the population due to mergers, take-overs, break-ups or restructuring of a set of enterprises. It does not include exits from a sub-population resulting only from a change of activity. An enterprise is included in the count of deaths only if it is not reactivated within two years. Equally, a reactivation within two years is not counted as a birth' (Eurostat, 2017b).

[8] Most recent data, by national, regional and industrial desegregation, are not available until the moment.

Quantitative statistical information on numbers of births and deaths of enterprises is publicly available on PORDATA[9] (PORDATA, 2017). In this research the information will be analysed regarding new firms' formation and firms' closure in three main economic sectors of activity – manufacturing, construction and services – in 24 countries of the European Union.

According, with the metadata from Eurostat, an activity takes place when resources such as equipment, labour, manufacturing techniques, information networks or products are combined, leading to the creation of specific goods or services. So, according with the statistical definition, an activity is characterized by an input of products (goods and services), a production process and an output of products. Therefore, an industry consists of a group of local kind-of-activity units engaged in the same, or similar, kind-of-activity (PORDATA, 2017).

According to Eurostat (Eurostat, 2017d), manufacturing includes "both cottage industries (crafts) and large-scale industrial production of: food, drinks and tobacco; textiles; leather and leather goods; paper and paper products, including printing and publishing; timber and wooden furniture; chemicals; artificial fibres; rubber and plastics; non-metallic mineral products; metal products. Excluded from manufacturing are mining and extraction; building and civil engineering; energy and water". Construction is "a structure connected with the ground which is made of construction materials and components and/or for which construction work is carried out. In this respect, the preparation of soil, planting or sowing, etc. for agricultural purposes are not regarded as constructions" (Eurostat, 2017c). Finally, services are "activities performed by an enterprise for another enterprise and/or the public administration. They include: technical services (engineering, architecture and technical studies); computer services (software design and database management); other professional services (legal, accounting, consultancy and management services)" (Eurostat, 2017e). In this particular research data for services includes wholesale and retail trade; transport and storage; accommodation, catering and similar; real estate activities; consulting, scientific and technical activities; administrative and support services activities.

The European Union countries considered in the analysis are: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom, - for which data is obtainable for the investigated period of time which is since 2010 till 2014. Croatia, Denmark, Greece and Malta were excluded from the analysis due to absence of required

[9] Pordata is a database of contemporary Portugal created in 2009 and organized and developed by the Francisco Manuel dos Santos Foundation. Its objectives are the collection, compilation, systematization and dissemination of data on multiple areas of society, for Portugal and its municipalities, and for the European countries. The reported statistics derive from official and certified sources, with data production skills in the respective areas. The Foundation's endeavour consists in collecting and organizing the data available, making it as clear and accessible as possible. Also, the important work of contextualized information, the so-called "metadata", as an inextricable part of the data, enables its adequate interpretation (PORDATA, 2017). In the case of business demography the PORDATA's sources of information are the Eurostat, the OECD and the National Entities responsible for EIP.

information. In case of firm deaths, for Belgium, Cyprus and Poland there is no information available for 2014 which is why for these countries the analysis was made for the time period since 2010 till 2013.

It is important to notice that for some countries data consist of approximate figures as it is hard to collect the exact information on amount of born and dead firms. Moreover, for *Services* as they contain several sub-sectors (wholesale and retail trade; transport and storage; accommodation, catering and similar; real estate activities; consulting, scientific and technical activities; administrative and support services activities) in each country final figures were obtained by simply adding the data available for all sub-sectors. Data for European Union[10] was as well acquired by summing up numbers for each country included in the analysis.

2.3. Shift-share analysis methodology

Shift-share analysis was introduces in 1960 by Dunn (Davis & Rodriguez, 2014; Dunn, 1960). It is the research technique for investigating structural changes that occur in regional space during given period of time (Sobczak, 2012). Thus, shift-share analysis organize data using three dimensions such as geography, sectors of activity, and time (Artige & van Neuss, 2014). This is a quick and inexpensive tool widely used for analysis of competitiveness of region's various industries relative to a nation's general level of economic development; it can help evaluate the performance and composition of local economy (Dogru & Sirakaya-Turk, 2017).

Shift-share analysis is used to explain economic change (growth or decline) as combination of three factors that influence it: national – 'share component', sectoral (industrial) and regional (local) – 'shift components'. It presents a dynamic picture of the contribution of each factor to the local growth: the driving effect of national growth, specific mix of industries and its growth rate compared to national average, and relative competitive advantage/disadvantage of the regional industries (Goschin, 2014). Shift-share analysis is widely used by planners, geographers and regional scientists in political economy, retail analysis, migration analysis, regional growth analysis etc. (Knudsen, 2000).

There is a vast body of research literature using shift-share analysis in different areas of study. For example, analysis of trade and industries' competitiveness is made in works of Alias, Radam, Fen, Yacob and Alam (2014), Chen and Xu (2014), Cheptea, Fontagné and Zignago (2014), Dogru and Sirakaya-Turk (2017), and many others. Employment change and workforce structure are analyzed by Artige and Neuss (2014), Cirillo and Guarascio (2015), Esteban (2000), Herath, Schaeffer and Gebremedhin (2013), Sobczak (2012). Labour productivity is examined by Polyzos, Tsiotas and Sdrolias (2013). Goschin (2014) analyses a regional growth by the means of shift-share analysis. Firm demography, which is the main focus of this paper, is analyzed in works of Armington and Acs (2002), Cheng (2011) and Fotopoulos and Spence (2001).

[10] Note that although in this analysis the designation of European Union is used for the set of countries, that set of countries do not include all the 28 actual European Union countries but just the 24 ones with available information, as explained in the text.

The essential idea of the shift-share analysis is to find out the extent to which the difference in growth between each region and the national average is due to the region performing uniformly better than average on all industries or to the fact that the region happens to be specialized in fast growing sectors (Esteban, 2000).

According to Cheng (2011) and Stimson et al., 2006 traditional shift-share analysis decomposes economic changes in a region into three additive components: national share (business cycle), industrial mix (industrial composition), and regional shift (regional advantage). The three components sum to the total shift, which is, specifically for this research, the actual growth (or decrease) in firms formation and closure.

$$TS = NS + IM + RS \quad [1]$$

Using the mathematical formulations presented in the work of Cheng (2011), he formulas for each component will be represented and explained below.

The *national share component (NS)* measures the regional change in an analysed variable, in this case the absolute and relative change in the number of firm's births and deaths, that could have occurred if regional change was at the same rate as the national economy.

$$NS = \sum_i E_{irt} * g_n \quad [2]$$

$$g_n = (E_{nt^*} - E_{nt})/E_{nt} \quad [3]$$

where E_{irt} is the number of (born and dead) firms in sector *i* of region *r* at the beginning of a time interval *t* (in this case, the year 2010), g_n is the overall national rate of firm growth in the time interval from *t* to *t** (*t** being the end of the time interval, that, in this work, is the year 2014), and E_{nt^*} and E_{nt} are respectively the number of establishments in the nation at time *t** (2014) and *t* (2010). In this particular research data about firm births and deaths in the European Union as a whole (or, in this case, 24 countries with available information) is used for calculations of national share in the analysis.

The *industry mix component (IM)* measures proportional shift due to a difference in industry growth between the region considered (each one of the European Union countries selected) and the national economy (the European Union as a whole), and is represented by the following formulas:

$$IM = \sum_i E_{irt} \, (g_{in} - g_n) \quad [4]$$

$$g_{in} = (E_{int^*} - E_{int})/E_{int} \quad [5]$$

where g_{in} is the national rate of firms growth (in terms of their births and deaths) in industry *i* during the same time interval from *t* to *t** (from 2010 to 2014), and E_{int^*} and E_{int} are respectively the number of establishments in sector *i* in the nation at time *t** and *t*. In this research, industry mix component incudes data for 3 main sectors of economy such as *Manufacturing*, *Construction* and *Services*.

The *regional shift component (RS)* measures the differential shift due to differences in rates of growth of the same industry between the region and the national economy as a result of various factors (national resources, other comparative advantages or disadvantages, leadership and entrepreneurial ability, the effects of regional policy, among others). The formulas for this component are presented below:

$$RS = \sum_i E_{irt} \, (g_{ir} - g_{in}) \quad [6]$$

$$g_{ir} = (E_{irt^*} - E_{irt})/E_{irt} \quad [7]$$

where g_{ir} is the rate of firm growth in the same time interval from t to t^* in industry i in region r, and E_{irt^*} and E_{irt} are respectively the number of firms in sector i in region r at time t^* and t. Countries of the European Union are considered as regions in this research. There are in total 24 countries such as Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and United Kingdom.

The main benefit of using the shift-share analysis is its simplicity since there is no need for primary data collection which is costly and time-consuming (Shi & Yang, 2008). By the means of shift-share analysis it is possible to easily identify within the region the problematic industries that can require future attention (Maťátková & Stejskal, 2012). Moreover, it allows to assess a country's international competitive position and its fluctuations over time (Alias et al., 2014).

Shift-share analysis is a quick and inexpensive tool that plays a significant role in the geographic and regional issues analysis (Knudsen, 2000) as is demonstrated in the present work.

3. Presentation and analysis of the shift-share empirical results

3.1. Descriptive characterisation of the data

As explained in the previous section, in this work the shift-share decomposition of two business demography variables in three components – national industrial and regional - between two moments in time (2010 and 2014) for 24 European Union countries is calculated and analysed. These variables are the absolute number of firms that were created and closed in these two moments in time, and the intention is to verify which component(s) had/have a major impact on the real variations observed. The two next tables present those absolute values for each one of the countries and for the European Union (consisting of the 24 countries for which the information is available as explained before), in 2010 and 2014. The tables also present the percentage variation of the number of firms between the two years. The values are presented for the total of the economic activity and by the three main sectors of activity considered: manufacturing, construction and services.

In particular, Table 2 presents the absolute number of firms' births in 2010 and 2014 and the percentage variation[11] of those numbers between 2010 and 2014. Table 3 presents the absolute number of firms' deaths in 2010 and 2014 and the percentage change of the values between 2010 and 2014.

[11] Percentage variation of firm births (deaths) is the difference, in percent, between numbers of born (closed) firms in 2010 and in 2014. It is calculated using the following formula: $\frac{N_{t+n}-N_t}{N_t} \times 100$, where N_t is the number of births (deaths) in 2010, and N_{t+1} is the number of births (deaths) in 2014. A positive value indicates the number of firms created (closed) grew in 2014 relatively to 2010 and a negative value indicates the number of firms created (closed) decreased in 2014 relatively to 2010.

Table 2. Number and percentage variation of the number of firms' births by sector of activity and by European Union country, between 2010 and 2014

Sectors of activity		Total		Manufacturing		Construction		Services	
Countries	Years	Number	% variation (2010-2014)	Number	% variation (2010-2014)	Number	% variation (2010-2014)	Number	% variation (2010-2014)
European Union	2010	2 410 104	8,6	118 695	17,5	294 914	4,2	1 388 181	8,1
	2014	2 616 509		139 511		307 395		1 500 680	
Austria	2010	48 529	-5,5	1 535	7,0	3 341	-0,5	25 665	-13,0
	2014	45 865		1 643		3 325		22 321	
Belgium	2010	30 814	-6,1	1 267	-13,0	4 853	-6,1	19 558	-7,5
	2014	28 945		1 102		4 556		18 083	
Bulgaria	2010	42 120	6,9	2 239	18,9	2 018	37,1	30 433	4,2
	2014	45 047		2 662		2 766		31 719	
Cyprus	2010	2 642	67,4	103	45,6	273	31,5	1 430	73,7
	2014	4 422		150		359		2 484	
Czech Republic	2010	122 887	-16,6	14 653	13,7	16 423	-15,9	51 077	-15,1
	2014	102 513		16 657		13 817		43 364	
Estonia	2010	9 115	14,0	664	11,3	771	40,6	5 696	4,3
	2014	10 388		739		1 084		5 939	
Finland	2010	35 344	-19,9	1 439	-6,0	4 276	-20,3	20 304	-25,7
	2014	28 295		1 353		3 409		15 081	
France	2010	476 480	-8,0	18 748	12,5	70 439	-13,3	251 095	-9,2
	2014	438 253		21 089		61 048		227 943	
Germany	2010	308 728	-17,7	12 255	-23,4	28 660	-12,5	183 563	-20,8
	2014	254 007		9 384		25 076		145 329	
Hungary	2010	66 864	-2,2	3 232	3,9	6 156	-4,8	37 383	-6,9
	2014	65 380		3 358		5 859		34 819	
Ireland	2010	9 837	46,3	590	68,8	1 818	93,9	7 429	32,9
	2014	14 393		996		3 526		9 871	
Italy	2010	298 940	9,0	20 322	-7,8	50 255	-22,4	177 872	11,1
	2014	325 959		18 742		38 977		197 637	
Latvia	2010	18 322	9,4	1 152	15,2	1 352	45,6	9 931	6,6
	2014	20 045		1 327		1 969		10 586	
Lithuania	2010	30 142	78,5	2 344	58,4	3 933	145,0	18 236	45,3
	2014	53 797		3 712		9 634		26 491	
Luxemburg	2010	2 980	16,7	44	-31,8	288	13,5	1 995	18,9
	2014	3 477		30		327		2 373	
Netherlands	2010	149 109	1,2	3 890	11,9	12 284	1,1	73 126	9,4
	2014	150 879		4 353		12 423		79 985	
Poland	2010	245 323	-7,8	27 405	-10,4	48 605	-10,1	169 313	-6,7
	2014	226 204		24 552		43 698		157 954	
Portugal	2010	134 340	10,5	4 557	43,8	8 725	-2,9	87 050	12,3
	2014	148 504		6 555		8 468		97 788	
Romania	2010	41 745	89,1	3 317	70,6	4 559	66,9	28 991	75,3
	2014	78 922		5 659		7 609		50 822	
Slovakia	2010	53 077	79,4	5 784	128,8	9 736	109,1	30 892	49,4
	2014	95 242		13 234		20 358		46 139	
Slovenia	2010	15 325	19,9	1 030	50,4	2 217	-9,5	8 118	22,7
	2014	18 379		1 549		2 007		9 959	
Spain	2010	285 736	21,7	10 510	16,1	37 010	17,1	179 611	19,2
	2014	347 605		12 198		43 334		214 028	
Sweden	2010	50 214	-8,0	2 684	4,7	7 956	-8,1	33 869	6,5
	2014	46 183		2 811		7 311		36 061	
United Kingdom	2010	236 865	48,0	9 610	45,8	27 345	49,9	146 155	49,0
	2014	350 585		14 015		40 990		217 790	

Source: Own elaboration

The observation of Table 2 allows to verify that, for the majority of the countries in study, the number of firms' births increased from 2010 to 2014. Indeed, in 2014, in the majority of the countries, the number of new firms created was bigger than the number of new firms created in 2010. This result can be stressed by the percentage change of the number of firms created in the period for all the 24 European Union countries considered – the total number of firms created, considering the European Union economic block, increased by 8,6% if sectors of activity are not taken into account. Manufacturing is the sector of activity where the major increase was observed, followed by the services sector and, only after, by the construction sector of activity. The number of firms created in manufacturing increased between 2010 and 2014 by 17,5%. In services the number of firms created increased by 8,1% while in the construction sector this number increased by 4,2%.

It is important to note that, if sectors of activity are not taken into account, countries like Cyprus, Lithuania, Slovakia, and Romania have the highest rate of firm births with remarkable increase of 67,4%, 78,5%, 79,4%, and 89,1% respectively. These countries were among the last to access the European Union; Cyprus, Lithuania and Slovakia in 2004, while Romania in 2007. Since it is known that after accession to European Union the countries are eligible to receive specific European Union funds, namely the ones direct to help national economies development, promote business development and enhance entrepreneurship, one of the main causes for such good performance relating business creation could be the rise in incoming funds from European Union that boosted business creation in this particular countries. However, this might not be the only reason [12]. Ireland and the United Kingdom, as well, had considerably high firm birth rates (almost 50% of growth in the number of new firms created). For Bulgaria, Estonia, Italy, Latvia, Luxemburg, Netherlands, Portugal, Slovenia and Spain the rise in firm birth rates was similar to that of the European Union (as a whole) with fluctuations within 10% from the figure representing the European Union. At the same time, Austria, Belgium, France, Hungary, Poland, and Sweden are the countries with a relatively small decrease of the firm's birth rates - it is observed a decrease of around 8% in the number of new firms created in 2014 compared to 2010. For Czech Republic, Finland and Germany the decline was more substantial - within a range from -16% to -20%. These countries should be referred as the ones with problems in business creation which should be thoroughly examined and dealt with for future improvement.

When sectors of activity are taken into consideration, several important issues arise and should be remarked.

Considering manufacturing, for almost all countries there was an increase in the number of firm births. Surprisingly, Slovakia had a dramatic growth of the firm birth rate equal to roughly 130%. High rates of

[12] The economic, political and social explanation of the changes observed is not the main objective of the present research so further explanations of these dynamics could be done in related future works after explaining if such a change was caused by an European trend, the country's regional features or the industrial mix observed, as intends the present work.

firm births in manufacturing are also a characteristic of Cyprus, Ireland, Lithuania, Portugal, Romania, Slovenia, and the United Kingdom; the values are within the range from 45% to 71%. Simultaneously, countries like Belgium, Finland, Germany, Italy, Luxemburg, and Poland had a decrease in the number of newly born firms. Moreover, for Germany and Luxemburg the decline was more significant, -23,4% and -31,8% respectively. Other countries more or less followed the trend of the European Union, for which the firm birth rate in manufacturing was equal 17,5%.

In construction, for half of the countries there was an increase in the number of newly created firms, while for the other half the decline was observed. Ireland, Slovakia, and Lithuania had the highest growth rates of firm births: the countries present growth rates equal to 93,9%, 109,1%, and 145% respectively. A substantial rise within the range from 45% to 67% could be also observed in Latvia, Romania, and the United Kingdom. In Bulgaria, Cyprus and Estonia there was a significant increase as well, 37,1%, 31,5% and 40,6% respectively. Countries like Czech Republic, Finland and Italy had the highest decline rates within the range from -15% to -23%. Austria, Belgium, France, Germany, Hungary, Poland, Portugal, Slovenia, and Sweden have a negative firm birth rate and could be considered as problematic in terms of business creation in the construction sector of activity, during the period in analysis.

The services sector of activity, from the business creation point of view, was developing during the analyzed period of time – for almost all countries as well as the European Union as a whole there was an increase in the number of newly born firms in 2014 compared with the year of 2010. Cyprus and Romania had the highest growth rates among others - 73,7% and 75,3%, respectively A significant increase within the range from 32% to 50% could be also observed for Ireland, Lithuania, Slovakia, and the United Kingdom. Luxemburg, Spain and Slovenia had a considerable rise in firm births (in 2014 comparing with 2010) as well - 18,9%, 19,2%, and 22,7% correspondingly. At the same time, Austria, Belgium, Czech Republic, Finland, France, Germany, Hungary, and Poland had a decline in the number of born firms in the sector of services. Furthermore, for Finland and Germany the decrease was more significant than for others. In the services sector, the figures observed for the rest of the countries such as Bulgaria, Estonia, Italy, Latvia, the Netherlands, Portugal, and Sweden are approximately the same as for the European Union as a whole, for which it is equal to an increase of 8,2%, with just slight differences.

As referred above, Table 3 presents the absolute number of firm’s deaths in 2010 and 2014 and the percentage change of the values between 2010 and 2014. The analysis will be made as it was made for the variable that measures the number and percentage change of new firms created in 2014 when compared with the value observed five years before.

Table 3. Number and percentage variation of the number of firms' deaths by sector of activity and by European Union country, between 2010 and 2014

Sectors of activity		Total		Manufacturing		Construction		Services	
Countries	Years	Number	% variation (2010-2014)	Number	% variation (2010-2014)	Number	% variation (2010-2014)	Number	% variation (2010-2014)
European Union	2010	2 201 709	3,6	158 946	-11,3	360 497	-15,3	1 471 679	-6,2
	2014	2 280 166		140 990		305 370		1 381 146	
Austria	2010	35 738	10,1	1 546	-16,4	2 753	4,7	22 377	-2,1
	2014	39 341		1 293		2 883		21 898	
Belgium	2010	19 672	16,9	1 020	-2,5	2 902	8,4	12 946	11,4
	2013	22 995		995		3 147		14 424	
Bulgaria	2010	28 865	84,5	2 274	40,5	2 068	35,9	20 565	83,1
	2014	53 258		3 196		2 810		37 645	
Cyprus	2010	4 300	14,7	310	22,3	846	10,2	2 365	12,4
	2013	4 931		379		932		2 658	
Czech Republic	2010	95 763	24,5	11 322	32,6	14 301	38,7	55 658	17,1
	2014	119 235		15 014		19 829		65 173	
Estonia	2010	8 352	-2,7	624	-9,1	1 165	-13,5	4 793	1,0
	2014	8 125		567		1 008		4 840	
Finland	2010	29 887	-39,7	1 848	-36,9	3 767	-46,7	16 952	-37,9
	2014	18 010		1 167		2 006		10 521	
France	2010	239 791	0,7	13 090	-10,9	40 625	-13,1	135 839	-4,5
	2014	241 393		11 661		35 316		129 697	
Germany	2010	302 159	-12,5	14 208	-13,2	26 937	1,6	186 453	-16,2
	2014	264 477		12 335		27 355		156 203	
Hungary	2010	72 443	-11,7	4 222	-12,1	8 509	-30,4	40 040	-7,7
	2014	63 984		3 713		5 923		36 955	
Ireland	2010	14 739	-67,3	854	-65,3	4 508	-83,4	9 377	-59,7
	2014	4 823		296		747		3 780	
Italy	2010	289 672	28,5	23 558	13,2	51 368	21,0	170 143	30,9
	2014	372 288		26 678		62 139		222 768	
Latvia	2010	12 871	-45,9	654	-21,1	1 081	-55,4	6 589	-32,5
	2014	6 968		516		482		4 448	
Lithuania	2010	23 399	495,4	1 989	432,8	3 343	531,0	14 483	387,8
	2014	139 315		10 598		21 096		70 651	
Luxemburg	2010	2 262	15,7	47	-8,5	204	30,4	1 618	11,6
	2014	2 617		43		266		1 806	
Netherlands	2010	88 943	5,0	3 061	-0,9	10 977	-17,3	48 934	5,1
	2014	93 356		3 032		9 082		51 432	
Poland	2010	189 521	25,1	21 159	26,0	38 531	28,5	129 831	24,0
	2013	237 137		26 664		49 497		160 976	
Portugal	2010	173 440	-7,8	7 621	-15,1	15 915	-31,7	108 618	-6,9
	2014	159 950		6 469		10 875		101 108	
Romania	2010	100 259	-31,0	7 570	-22,9	10 038	-21,0	65 482	-29,6
	2014	69 143		5 838		7 932		46 092	
Slovakia	2010	28 907	52,6	3 505	78,2	4 567	114,1	17 422	29,2
	2014	44 126		6 246		9 778		22 505	
Slovenia	2010	12 060	-7,7	1 143	-19,2	2 676	-35,7	6 015	-0,3
	2014	11 131		923		1 722		5 996	
Spain	2010	318 300	-12,9	16 573	-20,5	60 979	-32,9	190 956	-8,0
	2014	277 327		13 180		40 890		175 732	
Sweden	2010	40 112	-1,8	2 950	-4,8	5 206	16,2	27 856	9,6
	2014	39 384		2 807		6 049		30 528	
United Kingdom	2010	248 595	0,5	13 265	-7,0	39 095	-18,9	146 895	4,3
	2014	249 920		12 340		31 715		153 150	

Source: Own elaboration

As it may be observed in Table 3, the number of firm's deaths increased during the analysed period of time for slightly more than a half of countries. This seems to reflect the overall economic and financial situation in the European Union in that period of time – the number of firms that closed in 2014 increased by 3,6% when compared with the number of firms that closed in 2010, if sectors of activity are not considered. Nonetheless, even though there was an increase in the total number of firm's closures for the European Union (as a whole) in each sector of activity, taken individually, there was a decline in the number of firm deaths. This is, less firms close in 2014 when compared with the number observed in 2010. In percentage, the closure of firms decreased by the amount of -6,2%, -11,3%, and -15,3% for services, manufacturing and construction respectively. This opposite results show the importance of the current research work – if, by sector of activity (in European Union in general) there were less firms exiting the market it should exist one other reason for observing an increase number of deaths as a whole. A regional impact explanation that overcomes the industrial mix observed for European Union must take place. The growth observed in each country for each sector of activity was probably more important than the growth observed by industry in the full economic block.

The shift-share analysis proposed will allow to withdraw conclusions but, for now, a description of the observed values will be made. The table depicts, for example, interesting results for Lithuania: there is an enormous increase in the number of closed firms in total (495,4%) as well as in each individual industry, with the highest growth being equal to 531% in construction[13]. Other facts can also be noted. For instance, if sectors of activity are not considered, Bulgaria has very high level of firm deaths, followed by Slovakia, Italy, and Czech Republic. For countries such as Estonia, Finland, Germany, Hungary, Ireland, Latvia, Portugal, Romania, Slovenia, Spain and Sweden there was a decline in the number of closed firms which means that, compared to 2010, in 2014 less amount of businesses, new and existing ones, were closed.

In manufacturing, for the majority of countries the number of firm's deaths decreased almost in equal proportion with the decline observed in the European Union in general, except for Finland and Ireland – these countries had a significant drop, -39,6% and -65,3% respectively. Bulgaria, Czech Republic and Slovakia, on the other hand, had a relatively high firm death rate, comparing to other countries for which this indicator was also positive. Considering construction, for half of the countries there was an increase in the number of closed firms, while for the other half a decline in the variable was observed. The highest increase, apart from Lithuania, could be observed in Slovakia, followed by Czech Republic, Bulgaria, Luxemburg and Poland. In contrast, for Finland, Ireland and Latvia there was a substantial decrease in the number of closed enterprises. In services, the number of closed firms increased in one half of countries while for the other half there was a decline in the growth rate of firms' deaths. Bulgaria attracts attention having the second highest firm's deaths rate after Lithuania. For

[13] One of the possible explanations for this result could be the instability of the economy and the incapability of firms, new and established ones, to fit into a changing economic and financial environment as it was observed between 2010 and 2014.

Poland and Slovakia the number is also relatively high comparing to other countries. The biggest decline could be seen in Ireland, followed by Finland, Latvia and Romania.

3.2. Shift-share results and analysis

In the present section, the results of the shift-share methodology are divided in two sub-sections. The first one is for firms' births and the second one is for firms' deaths. For a better analysis and representation of the shift-share results, they will be presented not in absolute number but in percentage. Thus, the growth rate of the number of firm births and deaths from the initial moment (2010) until the final moment (2014) of the analysis will be presented. As the European Union countries are very different in terms of their dimension and, consequently, in terms of the number of existent active firms (both for newly created firms and the ones that close), an analysis based on absolute numbers would bias the results. Therefore, the option is the analysis to be made in relative values in order to base all the analysis in normalised values independent on the dimension of each country.

3.2.1. Firms' births

As explained in the methodology sub-section, the shift-share analysis divides the evolution of a variable over a period of time by three components: national, industrial and regional. As a result, after the application of the methodology to the number of firms created in 2010 and 2014, is possible to present Table 4.

Table 4 depicts the growth rate of firms created in the whole European Union independently of the countries that compose the economic block or the types of activity considered (national component). It is also possible to observe, independently from country (region), the growth rates of firms created in three main economic sectors of activity – manufacturing, construction and services - which represents the industrial component of the shift-share analysis. Finally, the regional component is reflected in the growth rates of firms created in each country (region) in total as well as in each individual sector of activity performed in that region. The real growth rates observed in each country for the analysed period of time for the entire country's activity and for each sector of activity are also presented in the table. Total real growth rate (column 10 in the table) is calculated by summation of total regional component (column 6), total industrial component[14] (column 2) and national component (column 1)[15]. The same calculations are made for each individual industry, e.g. the real growth rate for manufacturing (column 5) is equal to the value compute for the manufacturing regional component

[14] Total industrial component is equal to zero since this component indicates the influence of each individual industry on the variable under analysis and not the impact of all existing industries. Industrial component of each individual industry is the same for every country under analysis because it represents changes in specific industry without taking into consideration a country (region).

[15] National component is always the same because it does not depend on the sector of activity or region.

(column 1) plus the value compute for the manufacturing industrial component plus the value compute for the national component[16][17].

Table 4. Growth rate of firms' births regarding the national, industrial and regional shift-share components and real growth rates, by country and activity

European Union	National Component (%)							
	(1)							
	8,6							
	Industrial Component (%)							
	(2)							
Manufacturing	9,0							
Construction	-4,3							
Services	-0,5							
Total	0,0							
	Regional Component (%)				Real growth rates (%)			
	Manufacturing	Construction	Services	Total	Manufacturing	Construction	Services	Total
	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
AUT - Austria	-10,5	-4,7	-21,1	-14,1	7,0	-0,5	-13,0	-5,5
BEL - Belgium	-30,6	-10,4	-15,6	-14,6	-13,0	-6,1	-7,5	-6,1
BGR - Bulgaria	1,4	32,8	-3,9	-1,6	18,9	37,1	4,2	6,9
CYP - Cyprus	28,1	27,3	65,6	58,8	45,6	31,5	73,7	67,4
CZE - Czech Republic	-3,9	-20,1	-23,2	-25,1	13,7	-15,9	-15,1	-16,6
EST - Estonia	-6,2	36,4	-3,8	5,4	11,3	40,6	4,3	14,0
FIN - Finland	-23,5	-24,5	-33,8	-28,5	-6,0	-20,3	-25,7	-19,9
FRA - France	-5,1	-17,6	-17,3	-16,6	12,5	-13,3	-9,2	-8,0
DEU - Germany	-41,0	-16,7	-28,9	-26,3	-23,4	-12,5	-20,8	-17,7
HUN - Hungary	-13,6	-9,1	-15,0	-10,8	3,9	-4,8	-6,9	-2,2
IRL - Ireland	51,3	89,7	24,8	37,8	68,8	93,9	32,9	46,3
ITA - Italy	-25,3	-26,7	3,0	0,5	-7,8	-22,4	11,1	9,0
LVA - Latvia	-2,3	41,4	-1,5	0,8	15,2	45,6	6,6	9,4
LTU - Lithuania	40,8	140,7	37,2	69,9	58,4	145,0	45,3	78,5
LUX - Luxemburg	-49,4	9,3	10,8	8,1	-31,8	13,5	18,9	16,7
NLD - Netherlands	-5,6	-3,1	1,3	-7,4	11,9	1,1	9,4	1,2
POL - Poland	-27,9	-14,3	-14,8	-16,4	-10,4	-10,1	-6,7	-7,8
PRT - Portugal	26,3	-7,2	4,2	2,0	43,8	-2,9	12,3	10,5
ROU - Romania	53,1	62,7	67,2	80,5	70,6	66,9	75,3	89,1
SVK - Slovakia	111,3	104,9	41,3	70,9	128,8	109,1	49,4	79,4
SVN - Slovenia	32,9	-13,7	14,6	11,4	50,4	-9,5	22,7	19,9
ESP - Spain	-1,5	12,9	11,1	13,1	16,1	17,1	19,2	21,7
SWE - Sweden	-12,8	-12,3	-1,6	-16,6	4,7	-8,1	6,5	-8,0
GBR - United Kingdom	28,3	45,7	40,9	39,4	45,8	49,9	49,0	48,0

Source: Own elaboration

In the whole European Union countries considered, the number of new firms created grew by 8,6% between 2010 and 2014. This number had already been seen in the section of descriptive statistics and matches the value found for the shift-share national component, as expected. Note that this value

[16] For instance, for Portugal the real growth rate for the creation of new firms between 2010 and 2014 in the manufacturing sector of activity is 43,8%. According with the shift-share decomposition this value is also the result of the following formula: 26,3 (regional component) + 9 (industrial component) + 8,6 (national component).

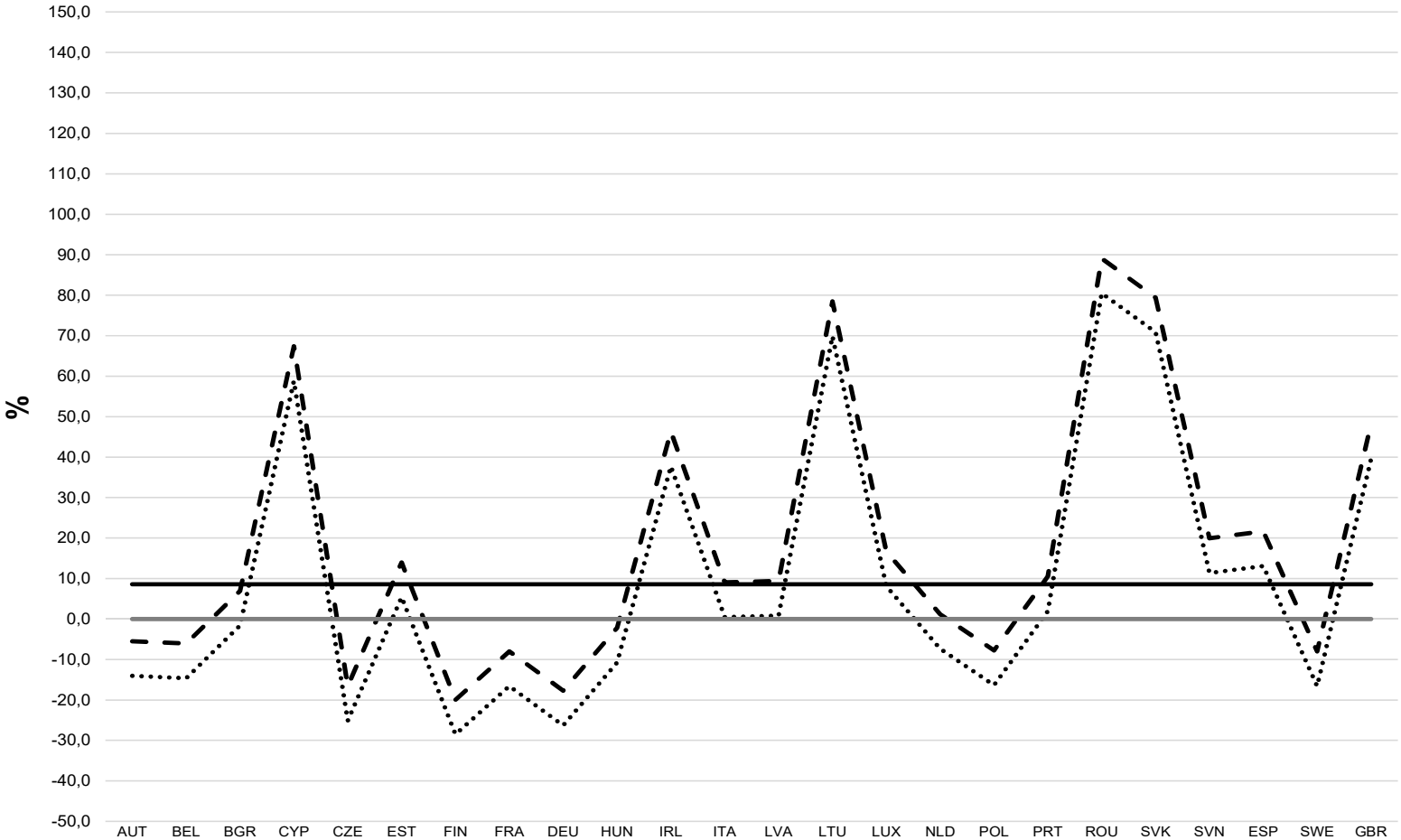
[17] Note that for convenience of data representation all numbers in the table are represented with one decimal place (although all calculations are made with 14 decimal places).

does not depend neither on the countries comprised in the economic block nor on the sector of activity in which firms where created.

If the sector of activity is considered (the industrial component), for all the 24 countries in the European Union, is possible to observe that manufacturing was the sector of activity that drove the creation of firms in the European Union – the number of firms created in the manufacturing sector increased by 9% between 2010 and 2014. By opposition, the other two sectors of activity decreased during these years by 0,5% and 4,3% for services and construction, respectively, lowering the European Union total growth rate for firm's births.

The regional component shows the most relevant and interesting results. This component played the most important role in new firm's formation in almost all of 24 countries except few exceptions. The first observation is that among the 24 countries, there would be very distinct patterns of growth regarding the creation of new firms due to regional specification. Slightly more than half of the countries present positive growth rates for the total of the economic activity. But, while some present small positive changes, driven by this regional component, others present very high growth rates in the number of firms created. There are also countries that follow an opposite regional pattern of growth if compared to the European Union as a whole. In these cases, the countries that presented negative regional growth rates for the all economy present relatively high decreases in such rates, indicating a high relevance of regional features to explain the real evolution of growth. These diverse growth rates are also observed by sectors of activity, with examples of countries for which the regional component follows the rates presented for the industrial component while for others regional component differs widely for the specific sectors of activity due to regional specifications.

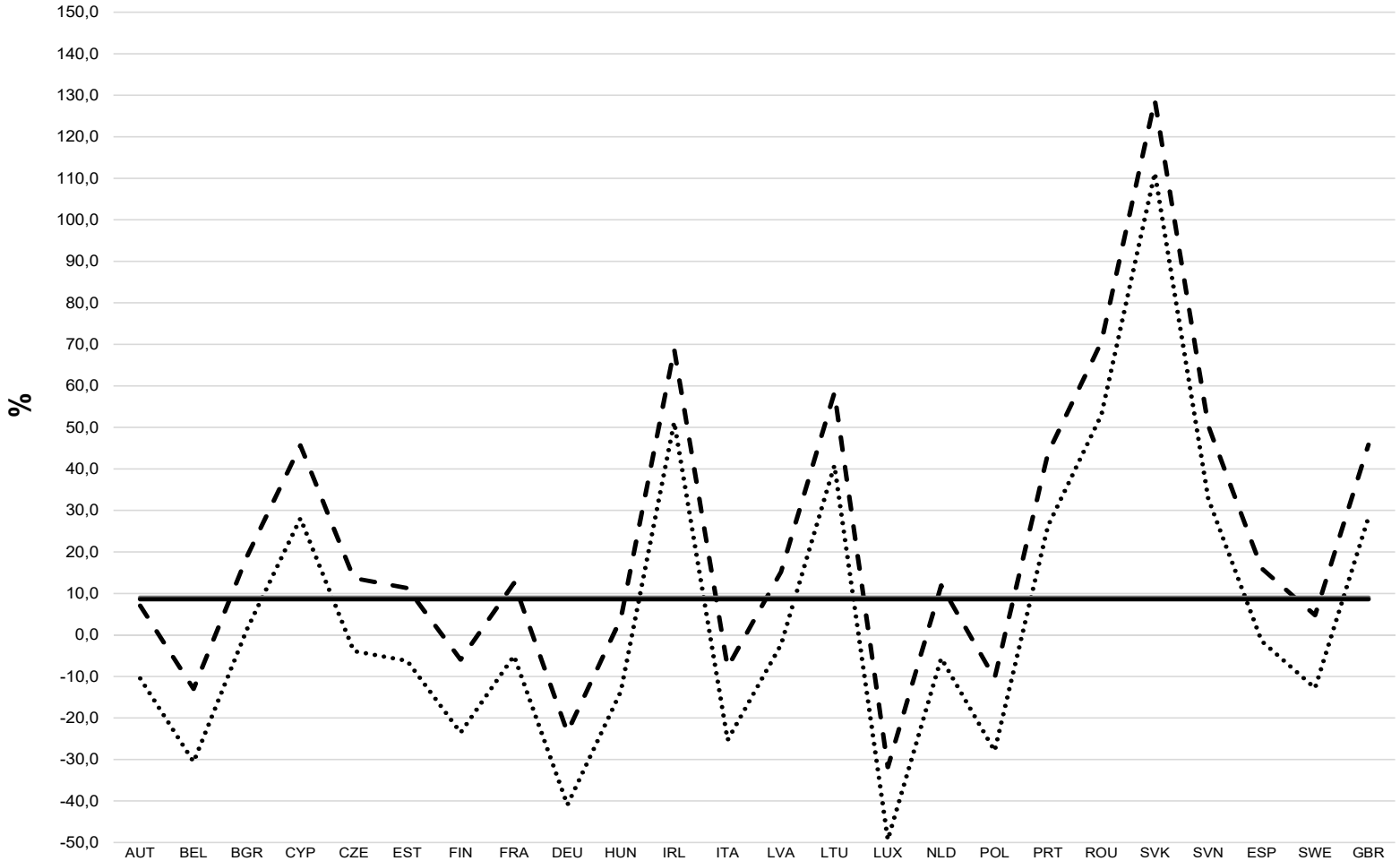
The visualization of the impact of each component (national, industrial and regional) compared with the real growth rate in firms' births, by country, helps to understand the significance of its impact in the evolution of the number of new firms created. Thus, Figures 1, 2, 3, and 4 are presented below. Figure 1 represents the results of the shift-share decomposition for the total number of firms (independently of the sector of activity) that would be created for each component and the real growth rate of firms' births between 2010 and 2014 in every country. Figures 2, 3 and 4 present the same results but having in consideration a particular sector of activity. So, Figure 2 presents the decomposition of the shift-share components and the real growth rate for firm´s births in manufacturing, Figure 3 the decomposition of the shift-share components and the real growth rate for firm´s births in construction and the services are represented in Figure 4. In the Figures, the 24 analysed countries are presented and identified by the acronyms used by Eurostat.



	AUT	BEL	BGR	CYP	CZE	EST	FIN	FRA	DEU	HUN	IRL	ITA	LVA	LTU	LUX	NLD	POL	PRT	ROU	SVK	SVN	ESP	SWE	GBR
TOTAL - real	-5,5	-6,1	6,9	67,4	-16,6	14,0	-19,9	-8,0	-17,7	-2,2	46,3	9,0	9,4	78,5	16,7	1,2	-7,8	10,5	89,1	79,4	19,9	21,7	-8,0	48,0
TOTAL - regional	-14,1	-14,6	-1,6	58,8	-25,1	5,4	-28,5	-16,6	-26,3	-10,8	37,8	0,5	0,8	69,9	8,1	-7,4	-16,4	2,0	80,5	70,9	11,4	13,1	-16,6	39,4
TOTAL - industrial	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
European Union - national	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6

Figure 1. Shift-share decomposition compared with the real growth rate of firms' births for all sectors of activity, between 2010 and 2014, by country

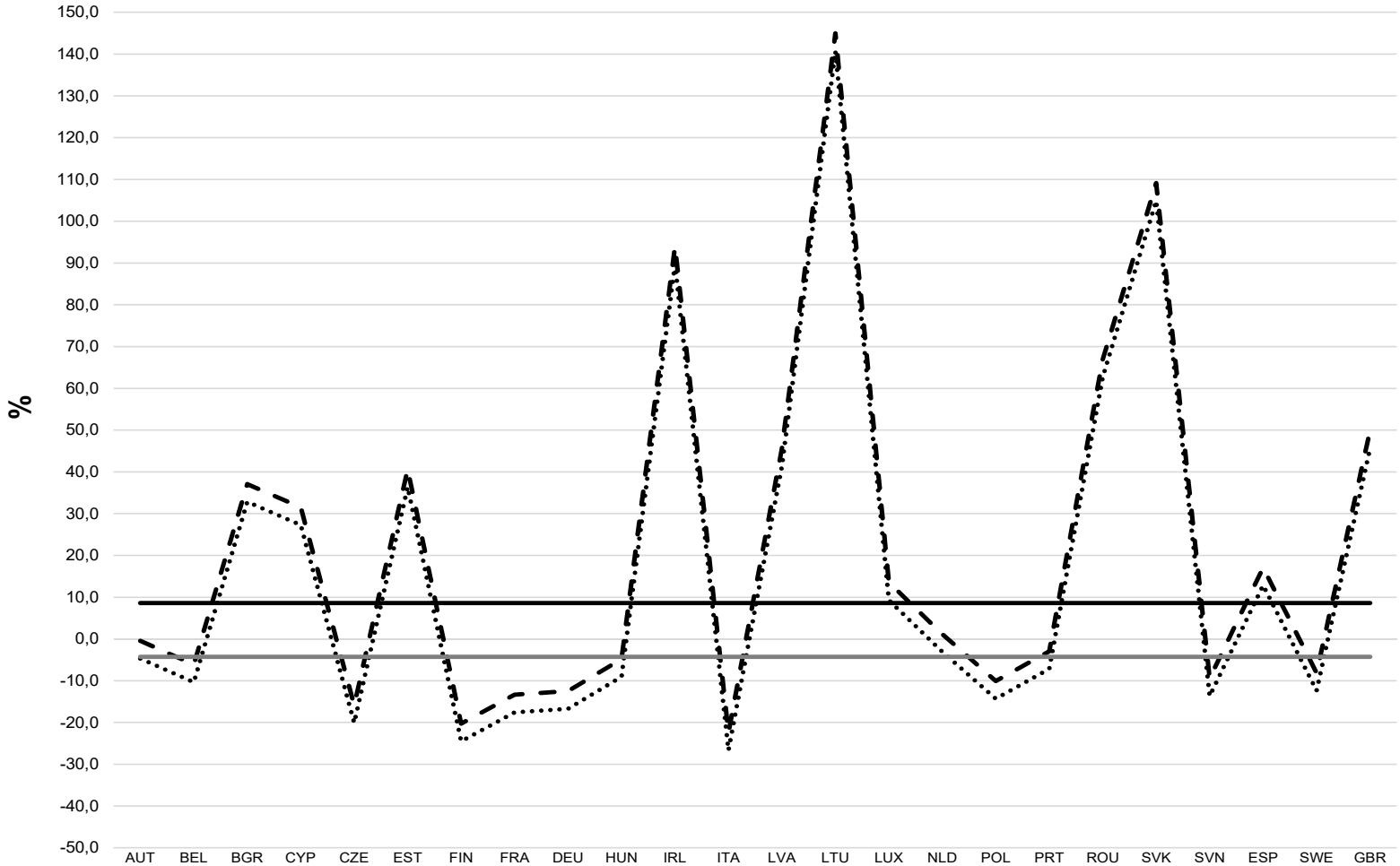
Source: Own elaboration



	AUT	BEL	BGR	CYP	CZE	EST	FIN	FRA	DEU	HUN	IRL	ITA	LVA	LTU	LUX	NLD	POL	PRT	ROU	SVK	SVN	ESP	SWE	GBR
Manufacturing - real	7,0	-13,0	18,9	45,6	13,7	11,3	-6,0	12,5	-23,4	3,9	68,8	-7,8	15,2	58,4	-31,8	11,9	-10,4	43,8	70,6	128,8	50,4	16,1	4,7	45,8
Manufacturing - regional	-10,5	-30,6	1,4	28,1	-3,9	-6,2	-23,5	-5,1	-41,0	-13,6	51,3	-25,3	-2,3	40,8	-49,4	-5,6	-27,9	26,3	53,1	111,3	32,9	-1,5	-12,8	28,3
Manufacturing - industrial	9,0	9,0	9,0	9,0	9,0	9,0	9,0	9,0	9,0	9,0	9,0	9,0	9,0	9,0	9,0	9,0	9,0	9,0	9,0	9,0	9,0	9,0	9,0	9,0
European Union - national	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6

Figure 2. Shift-share decomposition compared with the real growth rate of firms' births for the manufacturing sector, between 2010 and 2014, by country

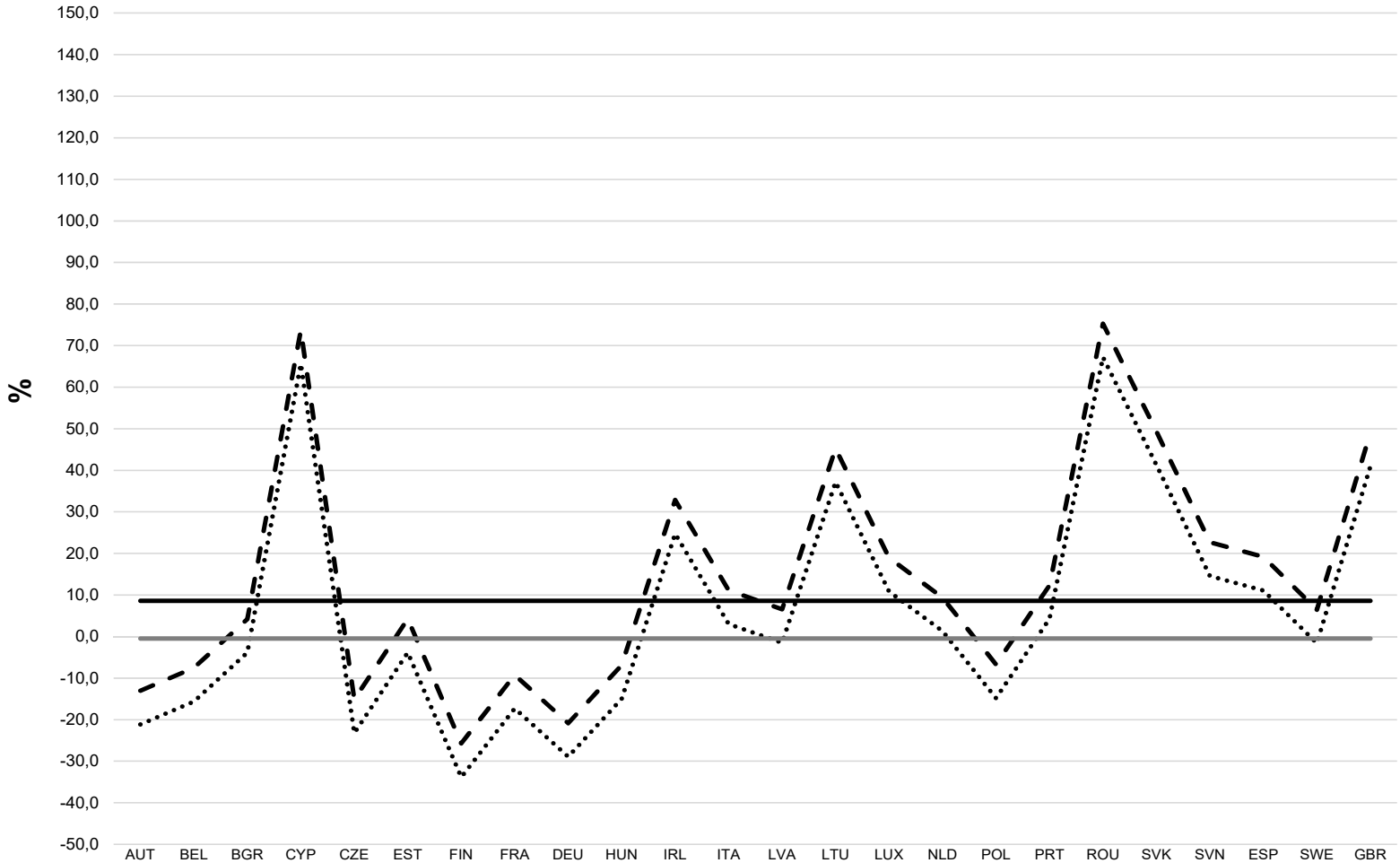
Source: Own elaboration



	AUT	BEL	BGR	CYP	CZE	EST	FIN	FRA	DEU	HUN	IRL	ITA	LVA	LTU	LUX	NLD	POL	PRT	ROU	SVK	SVN	ESP	SWE	GBR
Construction - real	-0,5	-6,1	37,1	31,5	-15,9	40,6	-20,3	-13,3	-12,5	-4,8	93,9	-22,4	45,6	145,0	13,5	1,1	-10,1	-2,9	66,9	109,1	-9,5	17,1	-8,1	49,9
Construction - regional	-4,7	-10,4	32,8	27,3	-20,1	36,4	-24,5	-17,6	-16,7	-9,1	89,7	-26,7	41,4	140,7	9,3	-3,1	-14,3	-7,2	62,7	104,9	-13,7	12,9	-12,3	45,7
Construction - industrial	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3	-4,3
European Union - national	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6

Figure 3. Shift-share decomposition compared with the real growth rate of firms' births for the construction sector, between 2010 and 2014, by country

Source: Own elaboration



	AUT	BEL	BGR	CYP	CZE	EST	FIN	FRA	DEU	HUN	IRL	ITA	LVA	LTU	LUX	NLD	POL	PRT	ROU	SVK	SVN	ESP	SWE	GBR
Services - real	-13,0	-7,5	4,2	73,7	-15,1	4,3	-25,7	-9,2	-20,8	-6,9	32,9	11,1	6,6	45,3	18,9	9,4	-6,7	12,3	75,3	49,4	22,7	19,2	6,5	49,0
Services - regional	-21,1	-15,6	-3,9	65,6	-23,2	-3,8	-33,8	-17,3	-28,9	-15,0	24,8	3,0	-1,5	37,2	10,8	1,3	-14,8	4,2	67,2	41,3	14,6	11,1	-1,6	40,9
Services - industrial	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5	-0,5
European Union - national	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6	8,6

Figure 4. Shift-share decomposition compared with the real growth rate of firms' births for the services sector, between 2010 and 2014, by country

Source: Own elaboration

For all activities (Figure 1) is important to notice that the real growth in the firms created in 2014, compared with 2010, followed very closely the regional component of the shift-share analysis, which demonstrates the importance of the regional characteristics in the real evolution observed in the number of firms created. This is even more evident for the construction sector (Figure 3), where the real growth observed almost matches what had happened if the country had been only affected by its regional features. The manufacturing sector (Figure 2) is the one where the differences between the regional component and the real growth rate of new firms are more distant even if the regional component is the one with more impact on the effective growth in the rate of firm's births. The sector of services (Figure 4) is the sector where the effective growth rate is more similar among the three components even if the regional impact continues to be the most important one for the generality of the countries.

Several countries present obvious peaks in terms of new firms' creation in 2014 (by comparison with 2010). Those countries are, for example, Cyprus, Ireland, Lithuania, Romania, and Slovakia.

To illustrate how the analysis of graphs can be done, the example of Austria will be used. Austria is one of the countries where the regional component drove the real growth rate in the number of firms created. If Austria had followed the same pattern of evolution as the whole European Union, it should had been created 8,6% more firms in 2014 compared with 2010. However, in Austria the number of new firms born in 2014 was reduced by 5,5%. This was mainly due to the strong importance of the services sector in this country. The number of firms created in the services sector in 2014 was lower than this number in the sector 5 years earlier. Although this was the tendency for all the European Union in the services sector – there was a decrease of 0,5% in this sector – in Austria the decline was even more drastic, equal to -21%. At the same time, the manufacturing, that presented a positive evolution in the whole European Union, showed the opposite sign due to the regional features of the country. The impact of the regional characteristics on the different sectors performance explains the reduction of firms' births in Austria between 2010 and 2014.

For a better representation of the shift-share results for Austria in terms of each individual industry, the Figure 5 is presented below. In the below Figure is possible to observe, with more detail, the shift-share decomposition of the firm's growth rate by sector of activity.

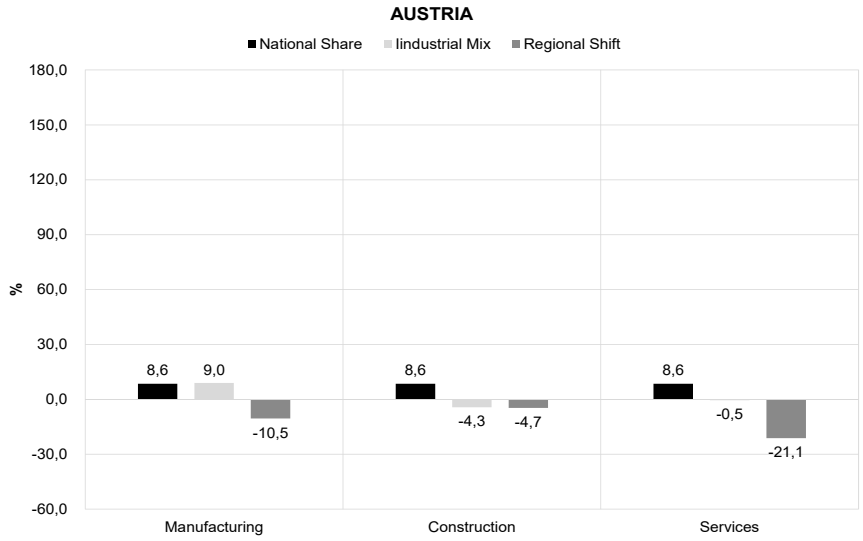


Figure 5. Shift-share decomposition of the growth rate in firms' births between 2010 and 2014, in Austria

Source: Own elaboration

The regional component, as well, has a major impact on Romania, which can be observed from Figure 6 that presents the results of the shift-share decomposition for firms' births in Romania, by sector of activity.

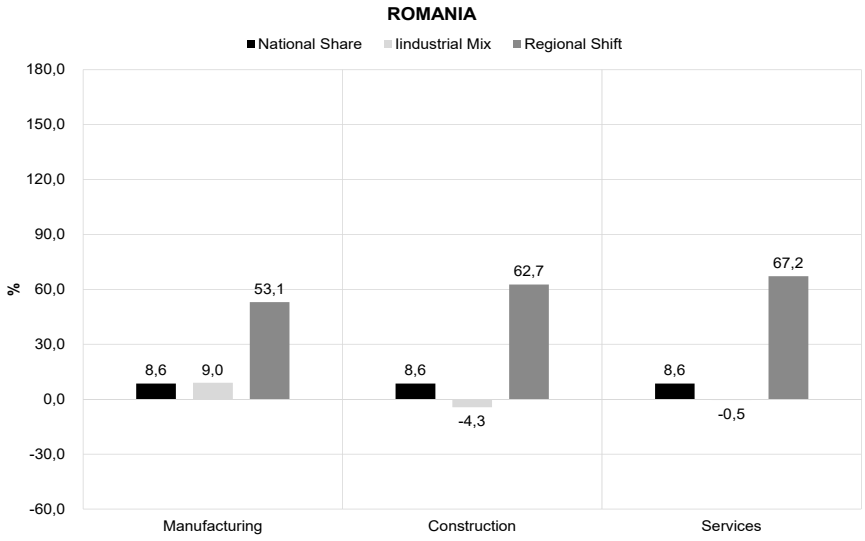


Figure 6. Shift-share decomposition of the growth rate in firms' births between 2010 and 2014, in Romania

Source: Own elaboration

The above figure shows that regional component in each sector of activity played a major role in the change of the number of created firms between 2010 and 2014. Romania had the highest positive real growth rate among other countries. In Romania the results of the shift-share decomposition show that if Romania had followed the regional trend the number of firms created should had grown 89,1% - which is 10 times more than number of firms that should have been created if country had followed the same evolution pattern as the whole European Union. In Romania, all sectors of activity were growing in terms of new firms' formation, however, the biggest growth can be observed in the services sector followed by the construction sector, despite the fact that, in general, these industries were in a decline during the period of time under study. Thus, the overall increase in formation of new businesses in Romania could be explained by regional characteristics of this country as well as by a regional advantage for different sectors of activity. The same evolution pattern due to regional component and especially growth in services could be seen for Cyprus, which as well shows a significant increase in real growth rate compared to other countries (Figure 7).

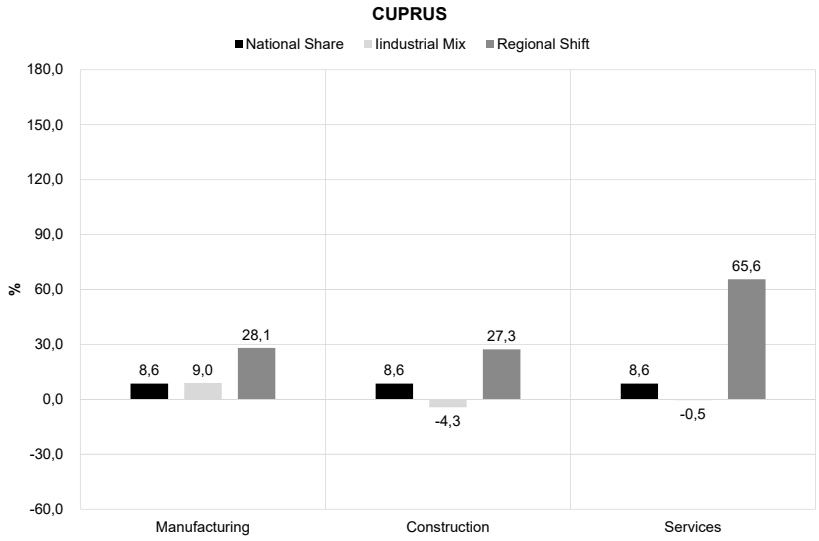


Figure 7. Shift-share decomposition of the growth rate in firms' births between 2010 and 2014, in Cyprus

Source: Own elaboration

In the case of the Netherlands, despite the negative sign of changes due to regional component - in total and for most industries except for services (for which there was only minor positive change that could be considered insignificant) - the real growth rate shows an increase by 1,2%, in total, as well as for each individual sector of activity. It can be concluded, thus, that for the Netherlands the positive change in national component (which considers the European Union as a whole) drove the real growth rate in the number of firms created. In other words, because there was an increase in the number of

newly born firms in the European Union in general (without taking into consideration sectors of activity or countries separately), the real growth rate for the Netherlands rose as well in spite of general decrease in the region. Figure 8 depicts the results of the shift-share decomposition for firms' births in the Netherlands, by sector of activity. It can be observed from the figure that for the Netherlands the national component played an important role in enhancing the real growth rate of new firm formation.

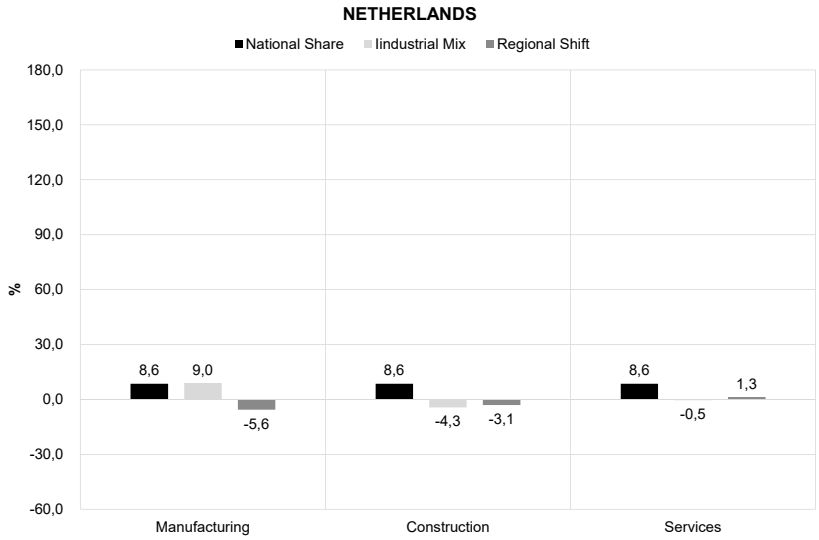


Figure 8. Shift-share decomposition of the growth rate in firms' births between 2010 and 2014, in the Netherlands

Source: Own elaboration

Estonia represents also an interesting case. Though there is a big increase in the number of firms created in the country's construction sector, in total there is only a minor rise in the regional component, partly because other sectors of activity were decreasing the number of new firms in the region between 2010 and 2014. However, due to the impact of the European Union, the real growth rate increased significantly in total, by 14%. If individual sectors of activity are considered (Figure 9), the real growth rate for manufacturing increases by 11,3% due to combined influence of national and industrial components, since manufacturing sector in general was growing by 9%. For construction, even though in general this sector was declining, an increase of this sector of activity in Estonia resulted in an increase of real growth rate for construction in the country despite the negative influence of the industrial component. Thus, in the construction sector in Estonia, the regional component had a major impact on new firms' formation.

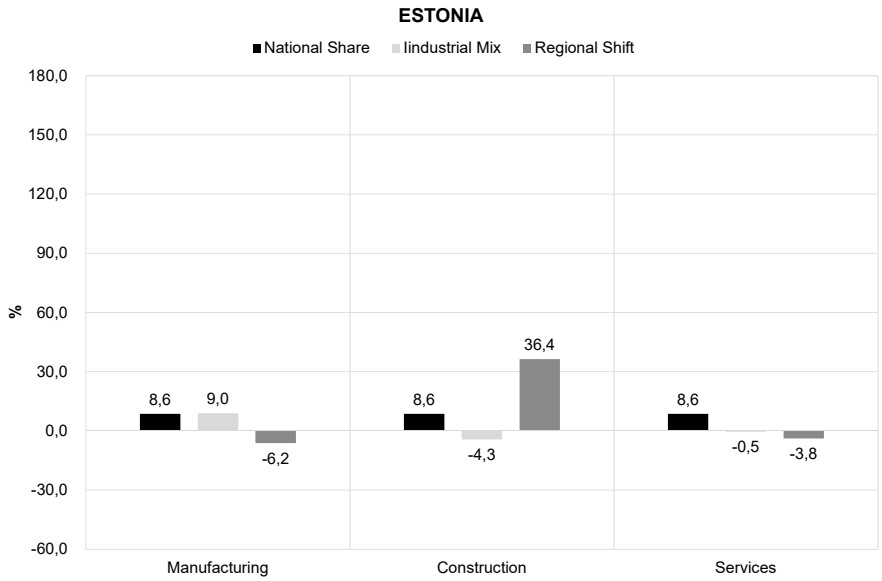


Figure 9. Shift-share decomposition of the growth rate in firms' births between 2010 and 2014, in Estonia

Source: Own elaboration

Portugal is one of the few countries where national component drove the total real growth rate in the number of firms created. If it was taken separately from the European Union, the number of newly born firms in Portugal would have increased by 2%. However, since for the European Union this number increased more significantly, by 8,6%, and the overall situation in the European Union had a major impact on processes that were going on in Portugal, the total real growth rate in the country increased by 10,5%. The situation is different if individual sectors of activity are taken into account, as can be observed from Figure 10.

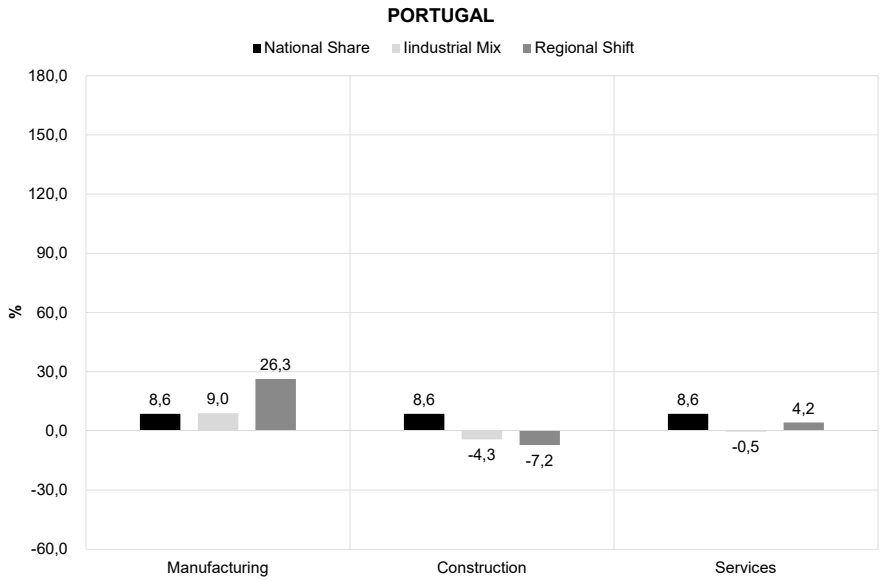


Figure 10. Shift-share decomposition of the growth rate in firms' births between 2010 and 2014, in Portugal

Source: Own elaboration

In manufacturing, despite the fact that the industry was growing in general, regional component had more influence on new firms' formation in this sector. As a result, instead of an increase only by 17,6% (considering mutual impact of national and industrial components), the real growth rate of the number of firms created in manufacturing in Portugal rose by 43,8%. For construction, the combined influence of industrial and regional components outweighed that of national component decreasing real growth rate in construction to the level equal to -2,9%. In services, although the industry in general was declining, the mutual effect of national and regional components drove the real growth rate in Portugal to a rise equal to 12,3%.

Note that, above, there are mentioned only few examples of different country's evolutions observed. At least one example was mentioned and a similar analysis, based on the information from Table 4, Figures 1 to 4 and Appendix A1, can be made for any country presented in the study.

3.2.2. Firms' deaths

This section contains the results of shift-share analysis for firms' deaths.

Table 5 represents the information concerning the growth rate of firms closed in the whole European Union independently of the countries that compose the economic block or the types of activity considered (national component). The growth rates of firms closed in three main economic sectors of activity – manufacturing, construction and services - independently from country (region), as well, could be observed. This represents the industrial component of the shift-share analysis. Finally, the regional component is reflected in the growth rates of firms closed in each country (region) in total as well as in each individual sector of activity performed in that region. Note that all calculations were made following the same principles and formulas as for firms' births and explained in the previous section.

Table 5. Growth rate of firms' deaths regarding the national, industrial and regional shift-share analysis components and real growth rates, by country and activity

European Union	National Component (%)							
	(1)							
	3,6							
	Industrial Component (%)							
	(2)							
Manufacturing	-14,9							
Construction	-18,9							
Services	-9,7							
Total	0,0							
	Regional Component (%)				Real growth rates (%)			
	Manufacturing	Construction	Services	Total	Manufacturing	Construction	Services	Total
	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
AUT - Austria	-5,1	20,0	4,0	6,5	-16,4	4,7	-2,1	10,1
BEL - Belgium	8,8	23,7	17,6	13,3	-2,5	8,4	11,4	16,9
BGR - Bulgaria	51,8	51,2	89,2	80,9	40,5	35,9	83,1	84,5
CYP - Cyprus	33,6	25,5	18,5	11,1	22,3	10,2	12,4	14,7
CZE - Czech Republic	43,9	53,9	23,2	20,9	32,6	38,7	17,1	24,5
EST - Estonia	2,2	1,8	7,1	-6,3	-9,1	-13,5	1,0	-2,7
FIN - Finland	-25,6	-31,5	-31,8	-43,3	-36,9	-46,7	-37,9	-39,7
FRA - France	0,4	2,2	1,6	-2,9	-10,9	-13,1	-4,5	0,7
DEU - Germany	-1,9	16,8	-10,1	-16,0	-13,2	1,6	-16,2	-12,5
HUN - Hungary	-0,8	-15,1	-1,6	-15,2	-12,1	-30,4	-7,7	-11,7
IRL - Ireland	-54,0	-68,1	-53,5	-70,8	-65,3	-83,4	-59,7	-67,3
ITA - Italy	24,5	36,3	37,1	25,0	13,2	21,0	30,9	28,5
LVA - Latvia	-9,8	-40,1	-26,3	-49,4	-21,1	-55,4	-32,5	-45,9
LTU - Lithuania	444,1	546,3	394,0	491,8	432,8	531,0	387,8	495,4
LUX - Luxemburg	2,8	45,7	17,8	12,1	-8,5	30,4	11,6	15,7
NLD - Netherlands	10,3	-2,0	11,3	1,4	-0,9	-17,3	5,1	5,0
POL - Poland	37,3	43,8	30,1	21,6	26,0	28,5	24,0	25,1
PRT - Portugal	-3,8	-16,4	-0,8	-11,3	-15,1	-31,7	-6,9	-7,8
ROU - Romania	-11,6	-5,7	-23,5	-34,6	-22,9	-21,0	-29,6	-31,0
SVK - Slovakia	89,5	129,4	35,3	49,1	78,2	114,1	29,2	52,6
SVN - Slovenia	-8,0	-20,4	5,8	-11,3	-19,2	-35,7	-0,3	-7,7
ESP - Spain	-9,2	-17,7	-1,8	-16,4	-20,5	-32,9	-8,0	-12,9
SWE - Sweden	6,4	31,5	15,7	-5,4	-4,8	16,2	9,6	-1,8
GBR - United Kingdom	4,3	-3,6	10,4	-3,0	-7,0	-18,9	4,3	0,5

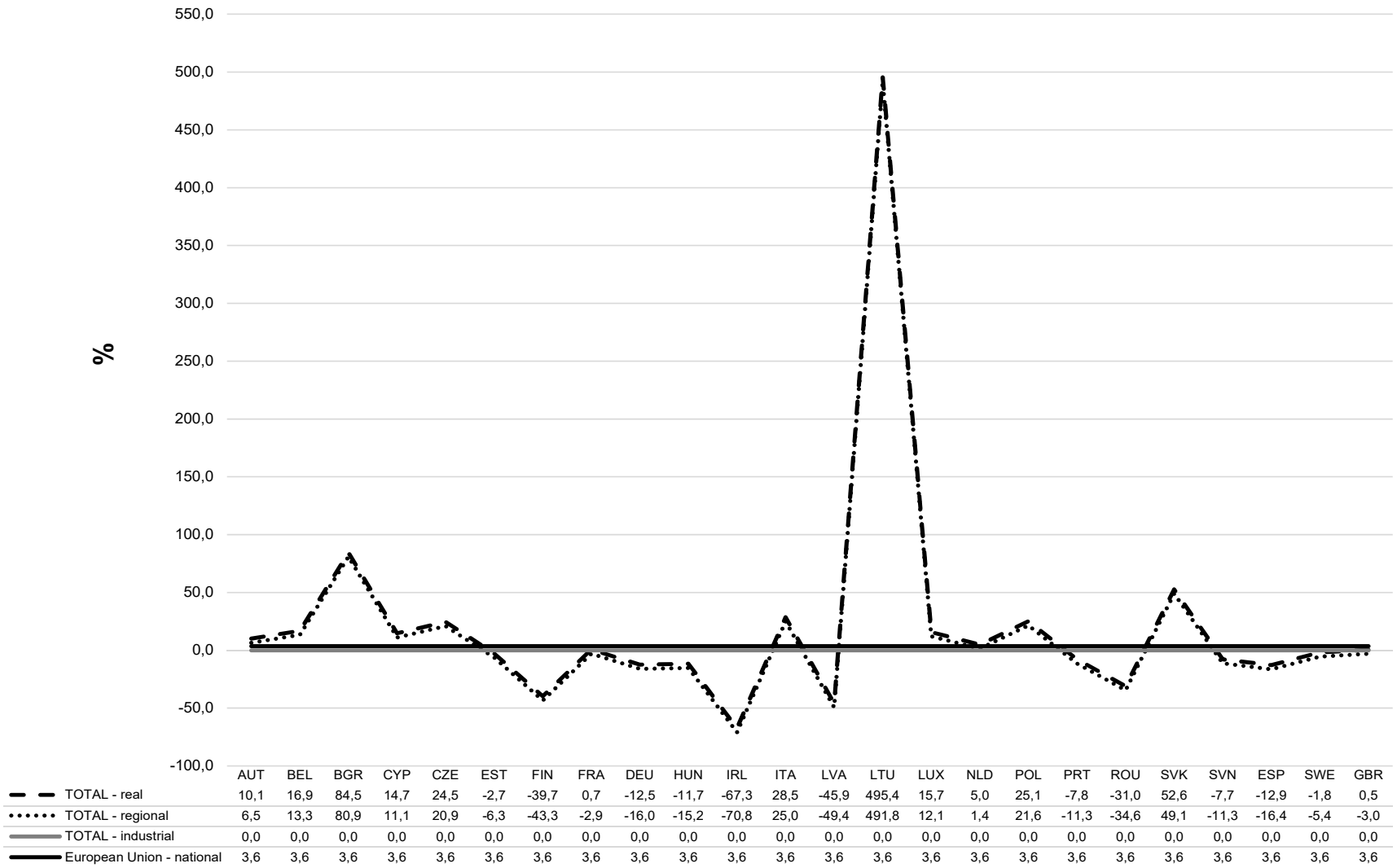
Source: Own elaboration

As could be seen from the table, the number of firms closed in the whole European Union between 2010 and 2014 increased by 3,6% (as in case of firms' births, for firms' deaths value of shift-share national component matches the value showed in the descriptive statistics, as expected). Note that this value does not depend neither on the countries comprised in the economic block nor on the sector of activity in which firms where created.

Despite the fact that for the whole European Union there was a rise in the number of firms closed, if each sector of activity were taken individually (industrial component), for every sector that was analysed there was a decline in this value. This means that in three main sectors of activity the number of firms closed in 2014 was less than that of 2010. The highest drop is seen in construction – the number of firms closed decreased by 18,9% - followed by manufacturing and services, for which the decrease was equal to 14,9% and 9,7%, respectively.

Similar to the case of firms' births, the regional component had a major impact on closure of firms in almost all 24 countries except for few. Almost half of all countries presented positive growth rates in total mainly due to their regional specifications. Some countries, however, presented small positive changes while for others there was a substantial increase in the number of closed firms. There are also countries for which there was a decrease in the number of firms' closures; moreover, for some of them there was a minor decline, while for others the growth rates dropped significantly. This highlights the fact that regional characteristics were of high relevance for the evolution of real growth rates in analysed countries. Very distinct patterns of growth are also observed if each sector of activity presented in every region is taken into consideration. There are countries for which the regional component followed the growth rates of industrial component (either in one specific industry or in two, or in all of them) as well as those countries for which regional component was noticeably different for the specific sectors of activity due to specifications of region.

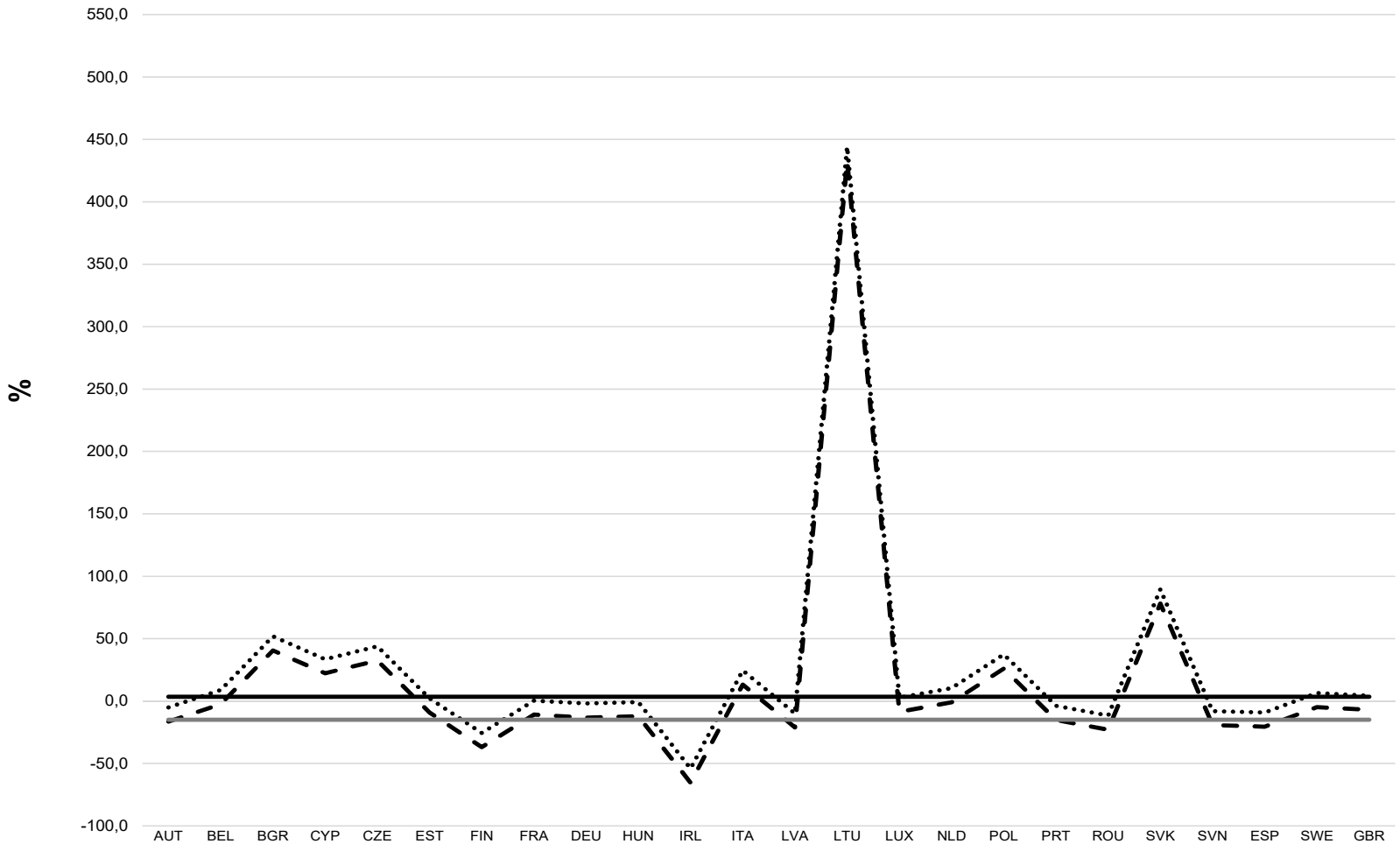
The visualization of the impact of each component is presented in the Figures 11, 12, 13, and 14. Figure 14 presents the results of the shift-share decomposition in total for each component compared with the real growth rate of firms' deaths between 2010 and 2014 in total in every country. Figures 6, 7 and 8 reflect manufacturing, construction and the services sectors, respectively, comparing regional component with the national component and the industrial one as well as with the real growth rate of firms' deaths between 2010 and 2014 in each individual sector of activity in every country.



	AUT	BEL	BGR	CYP	CZE	EST	FIN	FRA	DEU	HUN	IRL	ITA	LVA	LTU	LUX	NLD	POL	PRT	ROU	SVK	SVN	ESP	SWE	GBR
TOTAL - real	10,1	16,9	84,5	14,7	24,5	-2,7	-39,7	0,7	-12,5	-11,7	-67,3	28,5	-45,9	495,4	15,7	5,0	25,1	-7,8	-31,0	52,6	-7,7	-12,9	-1,8	0,5
TOTAL - regional	6,5	13,3	80,9	11,1	20,9	-6,3	-43,3	-2,9	-16,0	-15,2	-70,8	25,0	-49,4	491,8	12,1	1,4	21,6	-11,3	-34,6	49,1	-11,3	-16,4	-5,4	-3,0
TOTAL - industrial	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
European Union - national	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6

Figure 11. Shift-share results by component in total compared with the real growth rate of firms' deaths between 2010 and 2014, by country

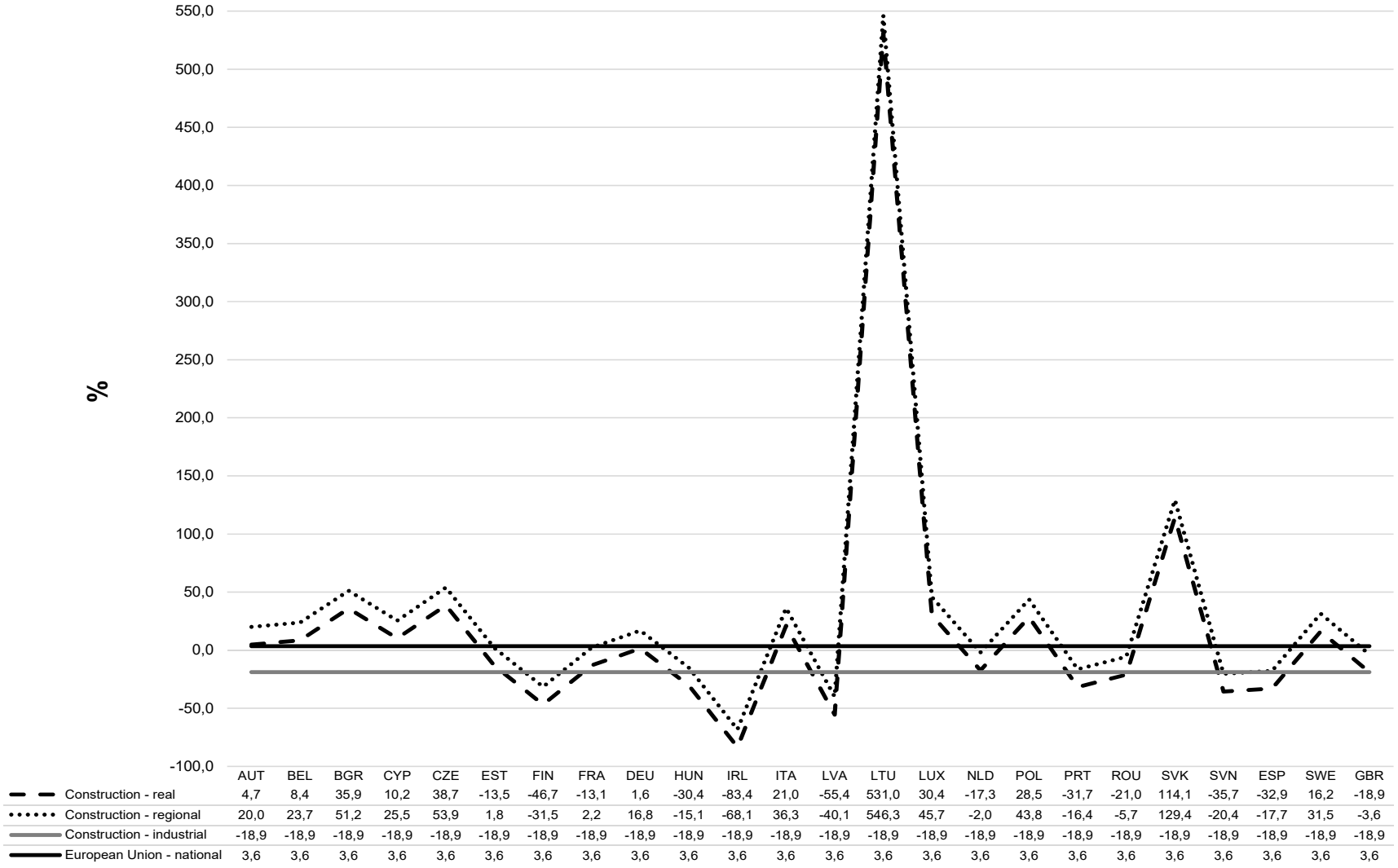
Source: Own elaboration



	AUT	BEL	BGR	CYP	CZE	EST	FIN	FRA	DEU	HUN	IRL	ITA	LVA	LTU	LUX	NLD	POL	PRT	ROU	SVK	SVN	ESP	SWE	GBR
Manufacturing - real	-16,4	-2,5	40,5	22,3	32,6	-9,1	-36,9	-10,9	-13,2	-12,1	-65,3	13,2	-21,1	432,8	-8,5	-0,9	26,0	-15,1	-22,9	78,2	-19,2	-20,5	-4,8	-7,0
Manufacturing - regional	-5,1	8,8	51,8	33,6	43,9	2,2	-25,6	0,4	-1,9	-0,8	-54,0	24,5	-9,8	444,1	2,8	10,3	37,3	-3,8	-11,6	89,5	-8,0	-9,2	6,4	4,3
Manufacturing - industrial	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9	-14,9
European Union - national	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6

Figure 12. Shift-share results by component for the manufacturing sector compared with the real growth rate of firms' deaths between 2010 and 2014, by country

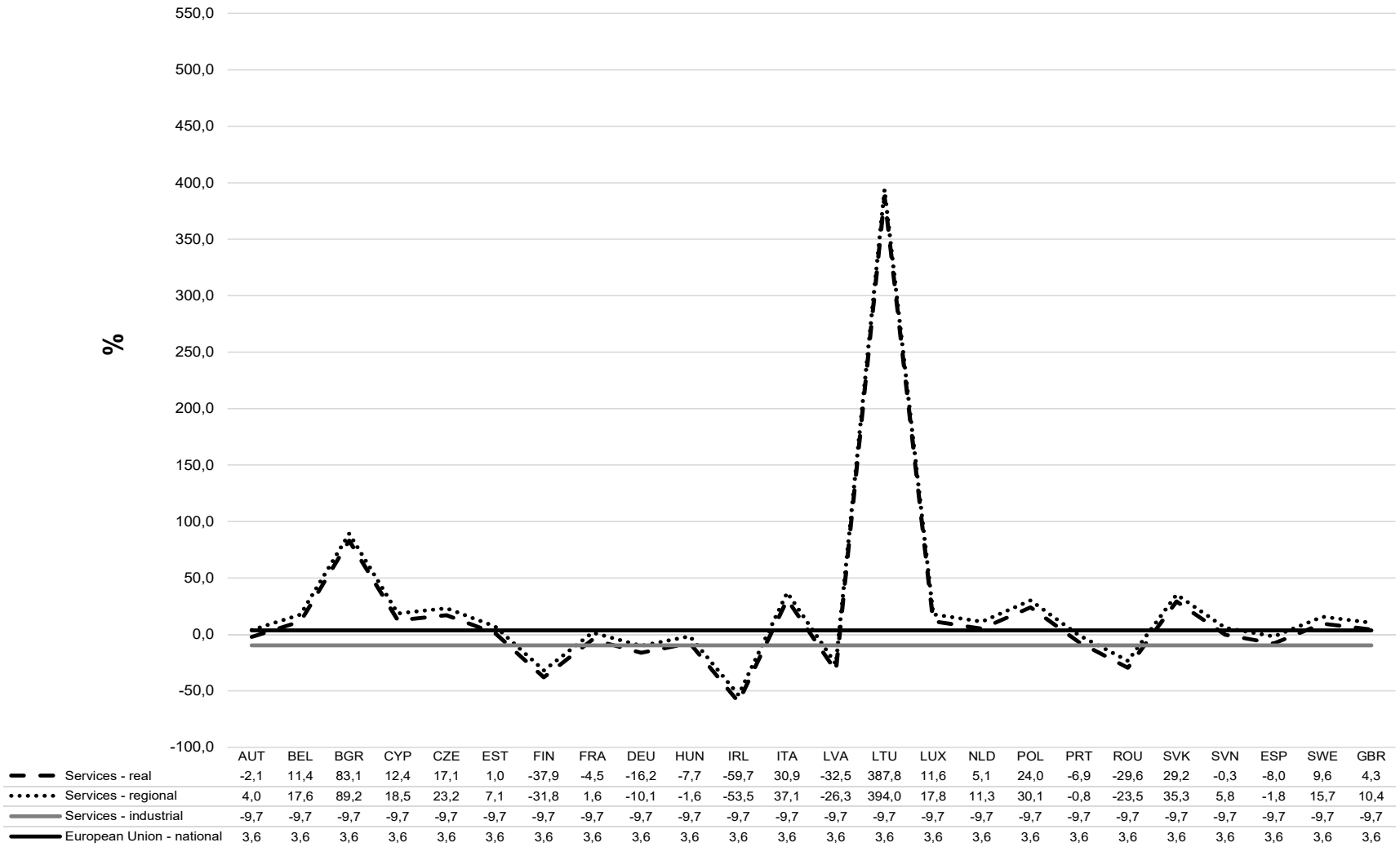
Source: Own elaboration



	AUT	BEL	BGR	CYP	CZE	EST	FIN	FRA	DEU	HUN	IRL	ITA	LVA	LTU	LUX	NLD	POL	PRT	ROU	SVK	SVN	ESP	SWE	GBR
Construction - real	4,7	8,4	35,9	10,2	38,7	-13,5	-46,7	-13,1	1,6	-30,4	-83,4	21,0	-55,4	531,0	30,4	-17,3	28,5	-31,7	-21,0	114,1	-35,7	-32,9	16,2	-18,9
Construction - regional	20,0	23,7	51,2	25,5	53,9	1,8	-31,5	2,2	16,8	-15,1	-68,1	36,3	-40,1	546,3	45,7	-2,0	43,8	-16,4	-5,7	129,4	-20,4	-17,7	31,5	-3,6
Construction - industrial	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9	-18,9
European Union - national	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6

Figure 13. Shift-share results by component for the construction sector compared with the real growth rate of firms' deaths between 2010 and 2014, by country

Source: Own elaboration



	AUT	BEL	BGR	CYP	CZE	EST	FIN	FRA	DEU	HUN	IRL	ITA	LVA	LTU	LUX	NLD	POL	PRT	ROU	SVK	SVN	ESP	SWE	GBR
Services - real	-2,1	11,4	83,1	12,4	17,1	1,0	-37,9	-4,5	-16,2	-7,7	-59,7	30,9	-32,5	387,8	11,6	5,1	24,0	-6,9	-29,6	29,2	-0,3	-8,0	9,6	4,3
Services - regional	4,0	17,6	89,2	18,5	23,2	7,1	-31,8	1,6	-10,1	-1,6	-53,5	37,1	-26,3	394,0	17,8	11,3	30,1	-0,8	-23,5	35,3	5,8	-1,8	15,7	10,4
Services - industrial	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7	-9,7
European Union - national	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6

Figure 14. Shift-share results by component for the services sector compared with the real growth rate of firms' deaths between 2010 and 2014, by country

Source: Own elaboration

It is important to notice that for all activities (Figure 11) the real growth of the number of closed firms in 2014, compared with 2010, very closely followed the regional component of the shift-share analysis, as in the case of firms' births. It thus can be concluded that the regional characteristics were very important in the evolution of real growth rates of closed firms during an investigated period. Despite the fact that in every industry the regional component had major influence on the number of firms' deaths, in manufacturing (Figure 12) and construction (Figure 13) the difference between regional component and real growth rate is bigger, while in services (Figure 14) the two lines almost match each other, which indicates the fact that in services the regional impact on closure of firms was the highest.

There are obvious peaks in terms of firms' closure in 2014 (by comparison with 2010) that can be observed in several countries, for example Bulgaria, Finland, Ireland, Slovakia, and Lithuania.

However, Lithuania represents the most interesting case. If it followed the evolution pattern of the whole European Union, the number of closed firms was supposed to rise by 3,6% between 2010 and 2014. However, as can be observed from the table and the graphs, in the case of Lithuania there was in immense increase in the number of closed firms – in total it grew by 495,4% due to huge importance of regional component and its impact on firms' closure. Regional component had a major impact not only on total growth rates, but as well considering each individual industry presented in country – there was an enormous increase despite the fact that all industries were declining in terms of firms' closure during this period of time (Figure 15). The highest rise is seen in construction – 546,3% - followed by manufacturing and services, for which the numbers are 444,1% and 394%, respectively. If compare these figures with the results of shift-share analysis for firms' births in Lithuania, it can be observed, that for both events there is a significant rise in the number of both firms' births and deaths, although for deaths the value in total is 6 times bigger. One of the possible reasons for that is so-called 'revolving door' effect. This phenomena has been studied in works of many authors such as Calá, Arauzo-Carod and Manjón-Antolín (2015), Brixy (2014), Carree, Verheul and Santarelli (2011), Santarelli and Vivarelli (2007). The 'revolving door' effect should be distinguished from Schumpeterian 'creative destruction' since the last one refers to the model where new firms compete with existing ones and force them to exit the market while the first one represent situation in which firms close shortly after their foundation (Brixy, 2014). Revolving door firms continuously enter and exit market and have low survival likelihood (Carree et al., 2011). Thus, probably in Lithuania, the revolving door effect, among other reasons, played an important role in business demography during 2010-2014 causing dramatic increase of growth rates of firms' births and deaths.

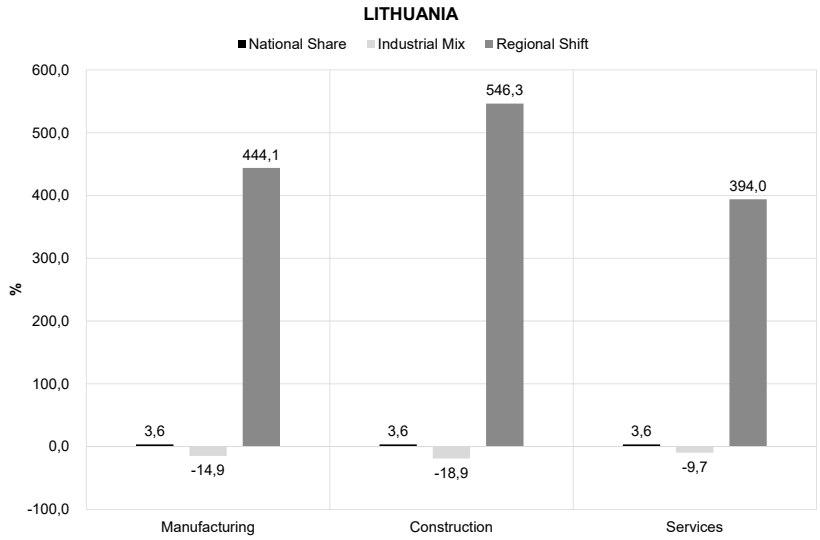


Figure 15. Shift-share decomposition of the growth rate in firms' deaths between 2010 and 2014, in Lithuania

Source: Own elaboration

Bulgaria is also one of the countries where regional component drove the growth rate of firms' deaths during investigated period of time. As it can be seen from the Table 5 and Figure 11, the real growth rate of closed firms increased by 84,5% of which 80,9% accounted for regional component. Figure 16 represents the results of shift-share analysis for firms' deaths in Bulgaria considering three main sectors of activities performed in the region.

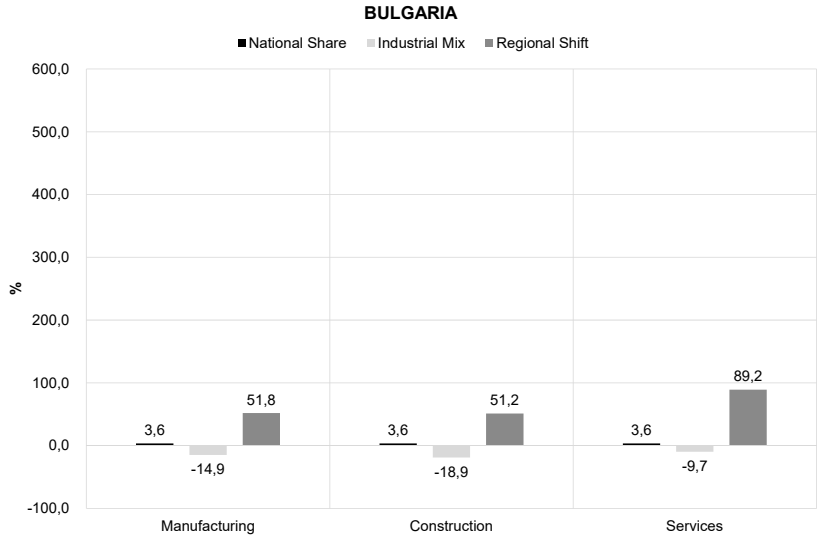


Figure 16. Shift-share decomposition of the growth rate in firms' deaths between 2010 and 2014, in Bulgaria

Source: Own elaboration

It is clearly seen that in each individual industry in Bulgaria the impact of regional component on their evolution patterns is major, especially in services sector. Despite the fact that for all industries in the European Union numbers of closed firms were declining, the significant rise in these numbers due to regional component increased the real growth rates in each sector of activity in Bulgaria, eliminating the effect of industrial component on firms' closures in this country.

In the case of Ireland there was also a significant impact of regional component on closure of firms. However, this impact was negative: instead of having an increase by 3,6% in the number of closed firms, following the whole European Union evolution pattern, in Ireland there was a decline in the real growth rate by 67,3% due to regional component. As can be seen from the Figure 17, which depicts the results of shift-share analysis for all sectors of activity presented in country, in each individual sector there was as well a decrease in the number of firms' deaths due to combined negative effect of industrial and regional components, with greater influence of the last one, that lead to a drop in the real growth rates of this number for every industry. The highest decline rate for Ireland was in the construction sector followed by manufacturing and services. The same is observed for all industries despite regions. Thus, it can be said that Ireland followed the trend of industries' evolution pattern but with greater impact of regional component on firms' closure.

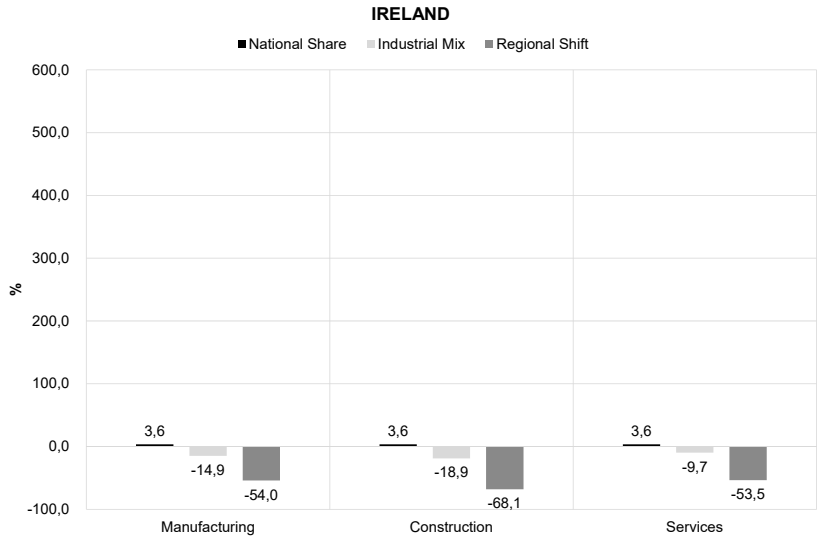


Figure 17. Shift-share decomposition of the growth rate in firms' deaths between 2010 and 2014, in Ireland

Source: Own elaboration

France is one of few countries for which the regional component was the least important one. If it followed the tendency of the region the number of closed firms in total would have decreased by 2,9%, but due to the influence of the whole European Union the real growth rate of number of firms' deaths

increased by 0,7%. However, if each individual sector of activity is taken into consideration, for all of them the industrial component had the most impact, as can be observed from Figure 18.

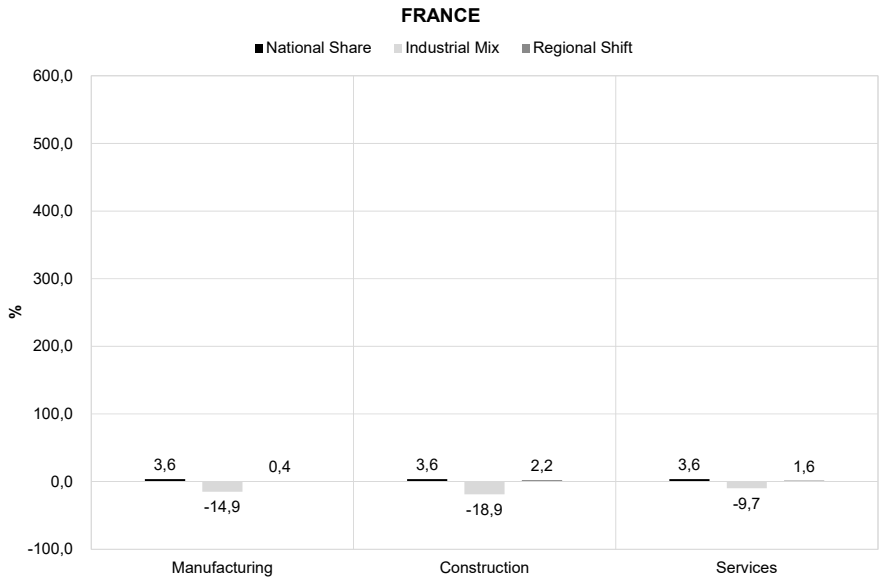


Figure 18. Shift-share decomposition of the growth rate in firms' deaths between 2010 and 2014, in France

Source: Own elaboration

Despite the positive change in national and regional components for each industry, their influence on the real growth rate was not sufficient. Thereby, in France every sector of activity declined in terms of firms' deaths due to the evolution trend existed in each of these industries if regions are not considered.

Portugal presents ambiguous results. On one hand, in total for whole country the regional component had major impact on the real growth rate of number of closed firms, lowering it to the value of -7,8% despite positive change in the European Union as a whole. On the other hand, if sectors of activity are considered, the importance of industrial component is noticeable. Figure 19 shows such ambiguous results.

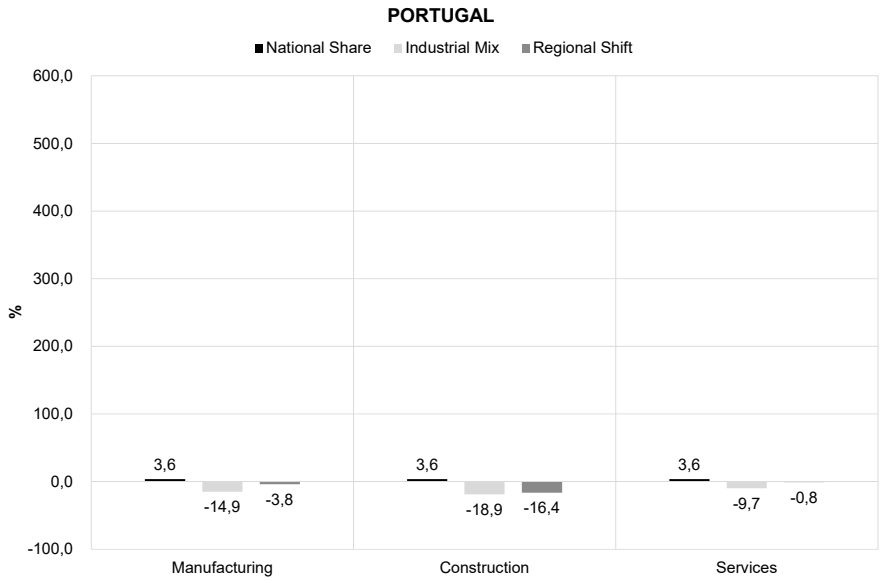


Figure 19. Shift-share decomposition of the growth rate in firms' deaths between 2010 and 2014, in Portugal

Source: Own elaboration

It can be observed in the figure above that in the case of the construction sector, for which there was the highest decline in the number of closed firms, there was a mutual impact of industrial and regional components with more significant influence of the first one. The two other sectors, as well, experienced the effect of industrial component on the real growth rates and followed the evolution pattern of industries despite positive change in the national component, which influence on the industries' performance in the case of Portugal was not sufficient.

As in the case of firms' births, for firms' deaths there are only few cases explained above; similar analysis, based on the information from Table 5, Figures 11-14, and Appendix A2 can be made for any country presented in the study.

Note, that the reasons for the evidence presented before are not explained by the shift-share analysis but should be looked for on the macroeconomic, social, political and legal framework that drove this specific period in each specific country, and is not object of detailed study in this research work.

Conclusions, limitations and future research lines

The main objective of this research was to analyse factors – business cycle, industrial composition and regional advantage – that influenced business demography, in particular business creation and closure, in the European Union countries in a five years period; moreover, the work tried to provide an understanding of which factors has/have been the most important one(s) regarding the new firms' formation and firms' closure.

In order to offer a theoretical scientific framework for the issue in question, literature review on the topic of business demography, in general, and business creation and closure, in particular, was provided along with the explanation of factors under analysis and their impact on these processes. The idea was to give the most updated literature context on the subject presenting the discussion that is being done by the academics and a theoretical background that may be important for policy makers, in general, and business managers, in particular, for implementing effective policy measures and business strategies.

To reach the objective proposed, two variables – firm birth and firm death – were analysed using quantitative statistical data on the number of births and deaths of enterprises, which are produced by the Eurostat's Entrepreneurship Indicators Programme and are publicly available, in three main economic sectors of activity – manufacturing, construction and services – in 24 countries of the European Union. The only countries not included in the analysis due to the lack of data were Croatia, Denmark, Greece and Malta. The analysis was conducted applying the shift-share analysis that decomposes economic changes in a region into three additive components: national share (business cycle), industrial mix (industrial composition), and regional shift (regional advantage). The three components sum to the total shift, which is, specifically for this research, the actual growth (or decrease) in firms' births and deaths.

The results of this study show that the regional component drove both business creation and closure in most of the analysed countries. This means that in terms of business demography the evolution pattern of a region (country) is more important than that of an economic block (in this case, the European Union works as the full nation) or a specific industrial activity. However, for some countries such as, for example, Bulgaria, Italy, Portugal for firms' births and France, the Netherlands, the United Kingdom for firms' deaths national component had more influence on overall change than the other ones. Moreover, in the case of firms' births the number of such countries is twice bigger than that of firms' deaths. If each individual sector of activity is taken into consideration, there are as well countries for which industrial mix component drove business demography in an investigated period of time. Furthermore, for firms' births the industrial component seemed to have the highest impact on the number of created firms only in few countries such as Bulgaria, France, and Latvia and only in manufacturing sector. For other sectors there was a major influence of either national or, in most cases, regional components. At

the same time, for firms' deaths for most countries in which the impact of industrial component was bigger than that of others, for example, Estonia, France, and Hungary the main influence can be observed in the manufacturing sector followed by the construction sector as these were the two most decreasing sectors in terms of firms' deaths between 2010 and 2014.

In some countries, as for example Lithuania, if numbers of created and closed births are compared, there is a substantial increase in the real growth rate for both variables; one of possible reasons for occurrence of such situation may be 'revolving door' effect, the influence of which on the economy should be studied separately.

As any other research, the work suffers from some limitations. First of all, in this research was used the traditional shift-share analysis model which has certain criticism points: (i) it is not possible to use this method for predictions or forecasting (Cheng, 2011); (ii) it has temporal, spatial and industrial aggregation as well as uncertain theoretical content (Stimson et al., 2006); (iii) the analysis is static and considers change simply between initial and final period not taking into account variations at intermediate points within the initial period (Davis & Rodriguez, 2014). However, these points can be dealt with since there are several extensive models such as dynamic shift-share, ANOVA -based shift-share or information-theoretic shift-share (Knudsen, 2000), for instance, that allow to overcome the abovementioned critics. These models as the modifications of traditional shift-share analysis have been developed to overcome the main limitations of the traditional method (Shi & Yang, 2008) and could be applied in future research going further than the present first step in the analysis.

Second of all, the methodology is not explanatory but just exploratory. It only analyses numbers and provides decomposition of those numbers into three additional components in order to understand the impact of each component on an investigated subjects - which in the case of this research are firms' births and deaths. However, it is important to notice that being exploratory the analysis allows identifying aspects that require special attention as well as generating ideas and hypothesis to uncover the relations between firms' births and deaths and regional characteristics, industrial mix and national economy growth, and to understand the subject of business demography by economy and over time.

Third, it was not possible to obtain data for Croatia, Denmark, Greece, and Malta due to its absence, thus these countries were excluded from the analysis, and because of that only 24 countries (out of 28) of the European Union were analysed. As it is hard to collect the exact information on amount of born and dead firms in the whole European Union (or 24 countries in the case of this research) and in each individual sector of activity, in some cases data consist of approximate figures or has been obtained by simple summation.

If these limitations may undermine the results and restrict the discussion it is believed that in future works they can be overcome. For example, one of the extended versions of methodology can be used for future analysis since in this paper the traditional shift-share analysis model was chosen due to its simplicity and reasonably accurate results. Other dimensions for future research include analysis of

reasons that led to such results in each country taken separately by investigating macroeconomic, social, political and legal framework that drove this specific period in each specific country. Future works may as well be focused on the difference between numbers of firms' births and deaths and the concept of 'revolving door' effect in order to understand to what extend this effect has influence on regional economies.

Regardless of all above mentioned limitations, this work is valuable, because it is one of the few ones existing in the field of business demography that uses shift-share analysis to examine national, industry-specific and regional factors that influence firms' formation and deaths. Moreover, no other work studies almost all countries of the European Union at once; and in terms of firms' deaths there is no such study yet presented. Thus, this research work is of significant importance in this field of knowledge and the results can be used by other researchers in future studies on the topic as well as by policy makers and business managers and all concerned business stakeholders that have power to change the environment relying on the findings of this study. This work is also a good start-up for more advanced studies on the topic.

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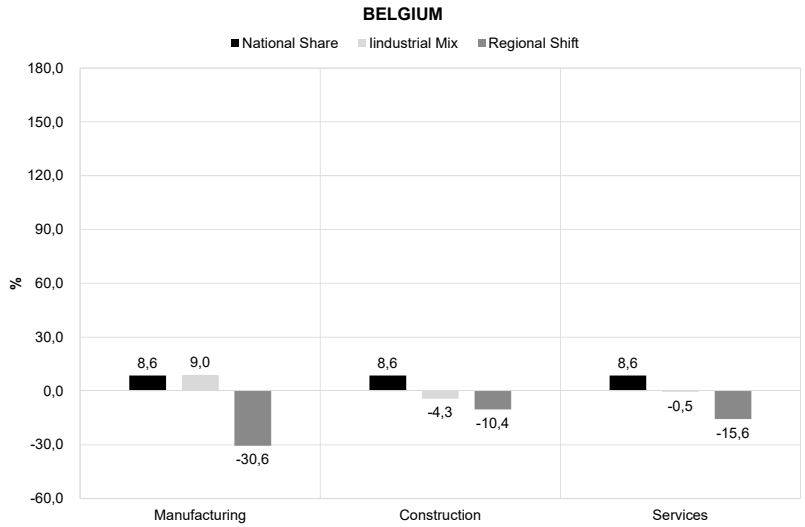
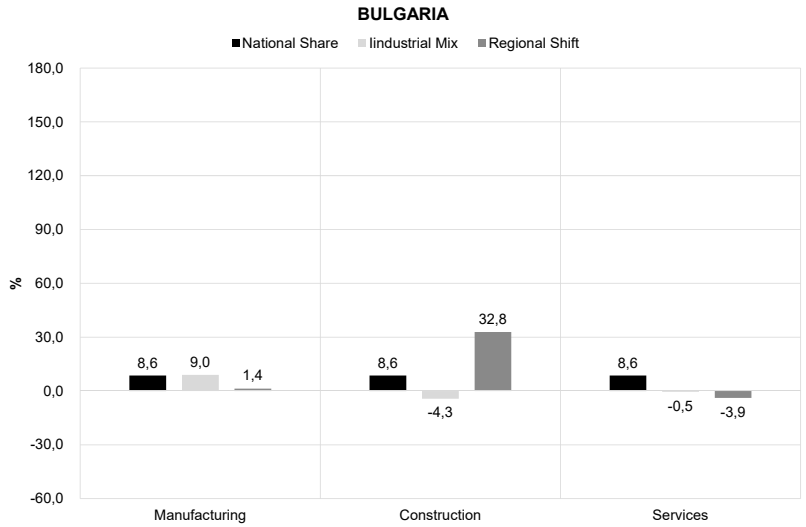
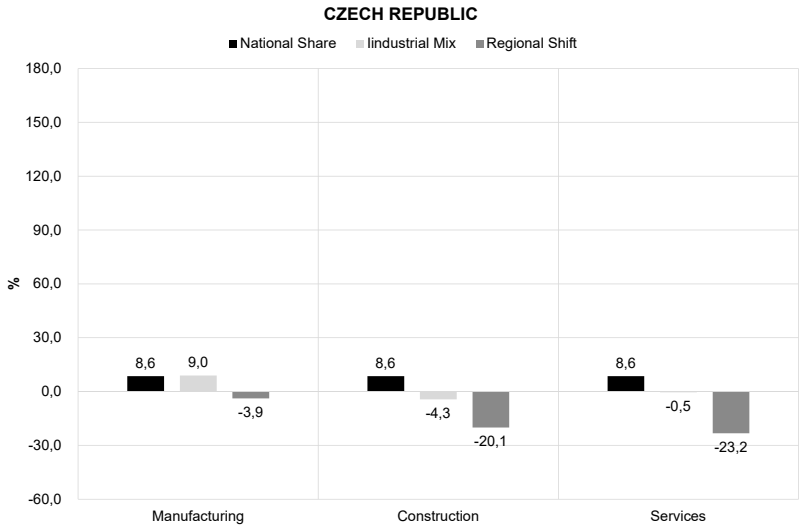
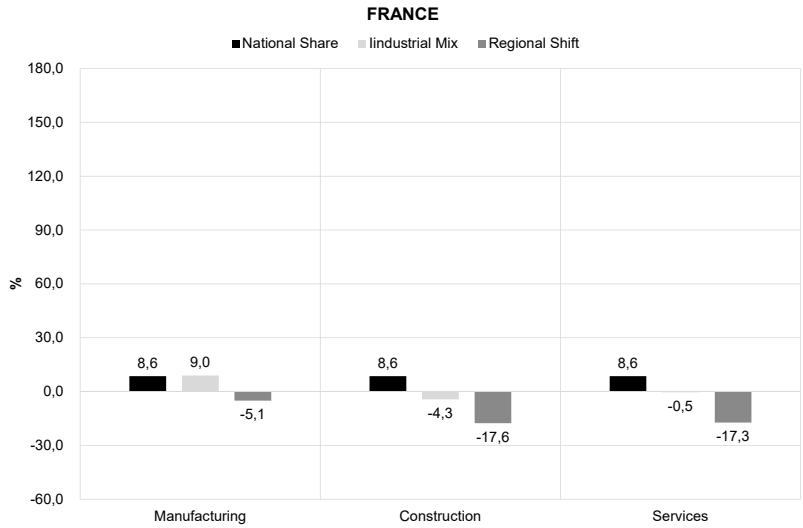
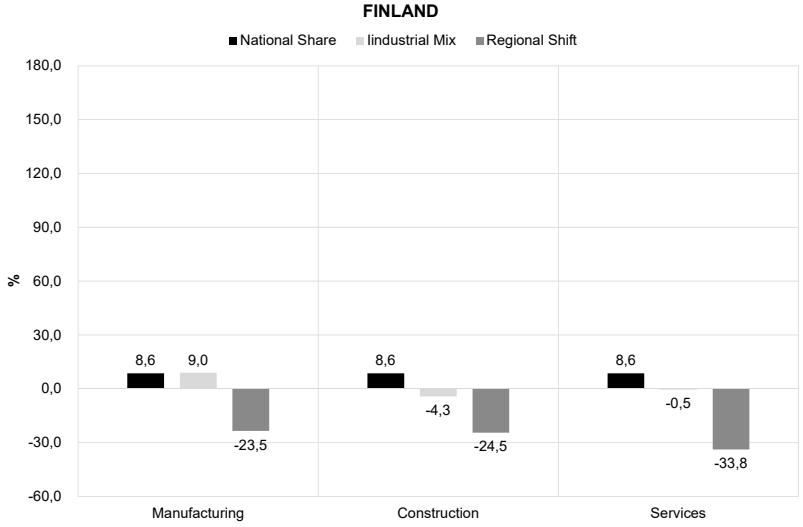
Appendix A1. Shift-share decomposition of the growth rate in firms' births between 2010 and 2014, by country

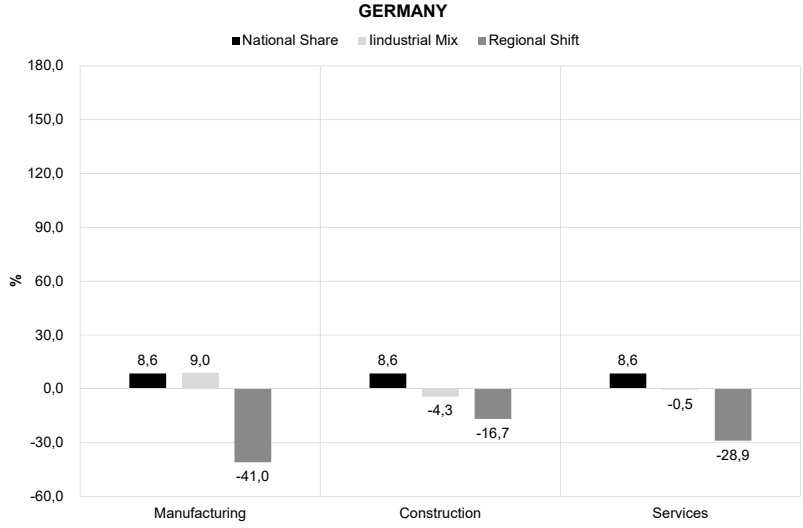


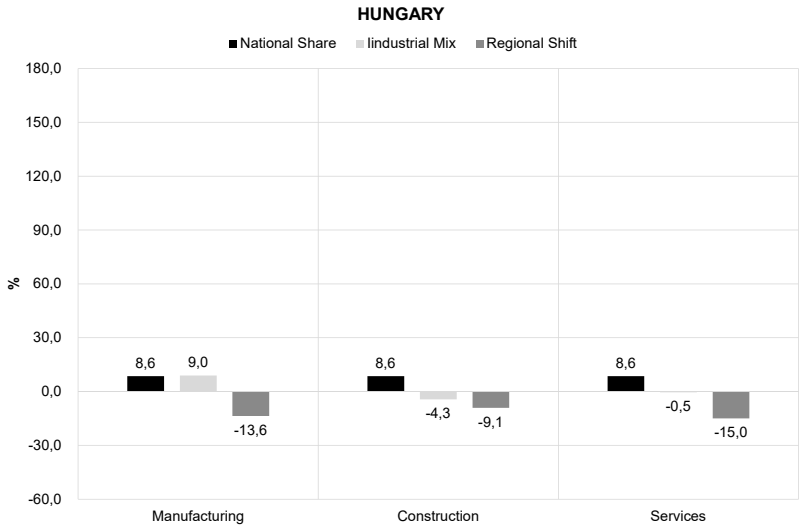


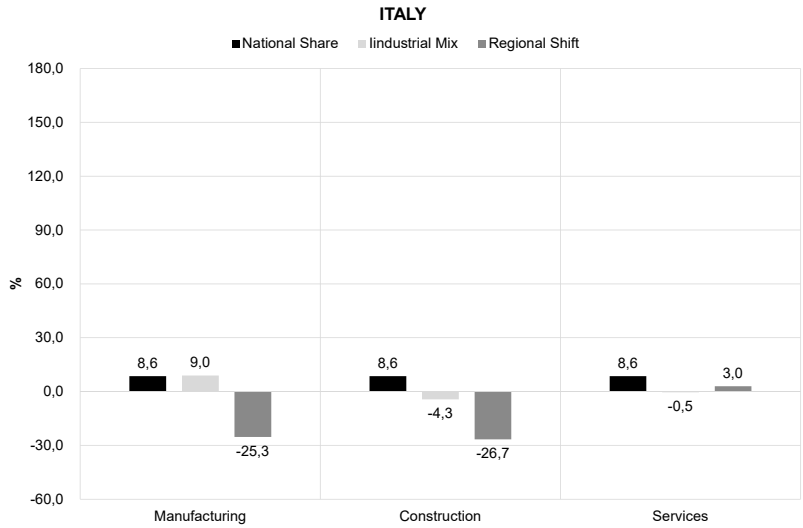

CZECH REPUBLIC
National Share
Iindustrial Mix
Regional Shift
180,0
150,0
120,0
90,0
60,0
30,0
0,0
-30,0
-60,0
%
8,6
9,0
-3,9
8,6
-4,3
-20,1
8,6
-0,5
-23,2
Manufacturing
Construction
Services

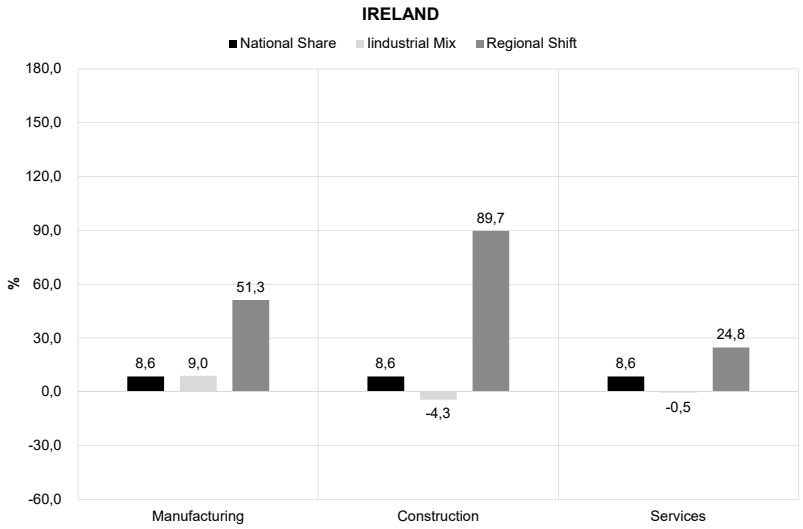

FRANCE
National Share
Iindustrial Mix
Regional Shift
180,0
150,0
120,0
90,0
60,0
30,0
0,0
-30,0
-60,0
%
8,6
9,0
-5,1
8,6
-4,3
-17,6
8,6
-0,5
-17,3
Manufacturing
Construction
Services

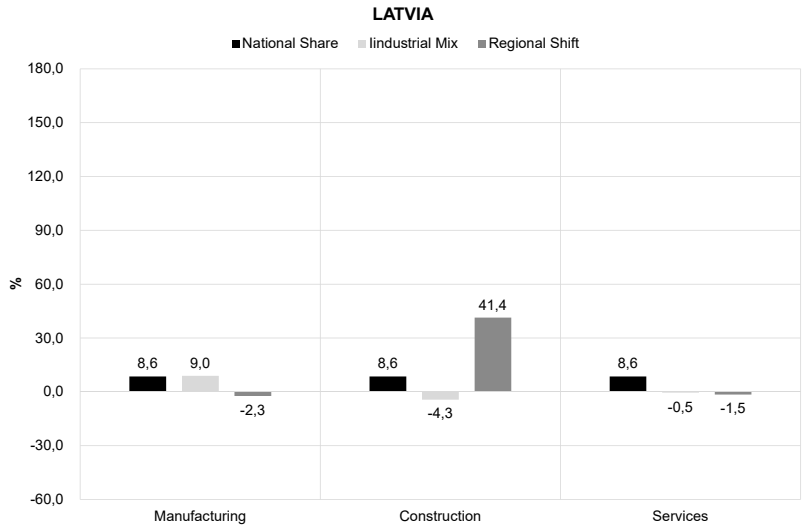

FINLAND
National Share
Iindustrial Mix
Regional Shift
180,0
150,0
120,0
90,0
60,0
30,0
0,0
-30,0
-60,0
%
8,6
9,0
-23,5
8,6
-4,3
-24,5
8,6
-0,5
-33,8
Manufacturing
Construction
Services

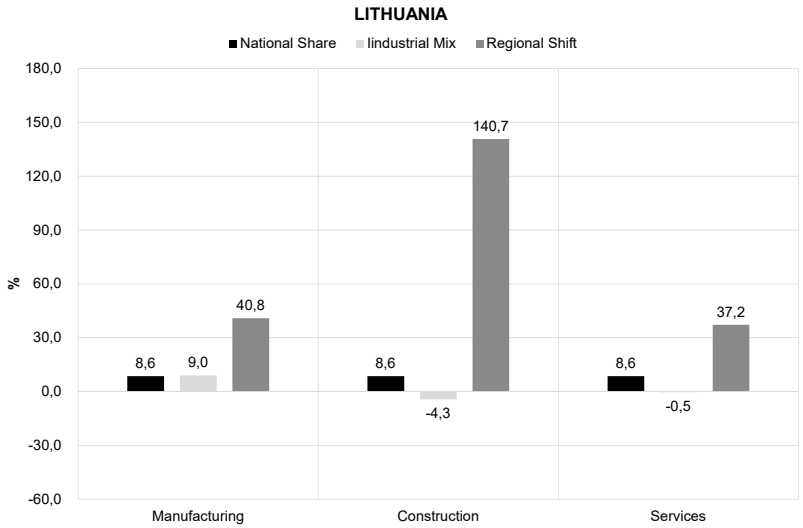

GERMANY
National Share
Iindustrial Mix
Regional Shift
180,0
150,0
120,0
90,0
60,0
30,0
0,0
-30,0
-60,0
%
8,6
9,0
-41,0
8,6
-4,3
-16,7
8,6
-0,5
-28,9
Manufacturing
Construction
Services

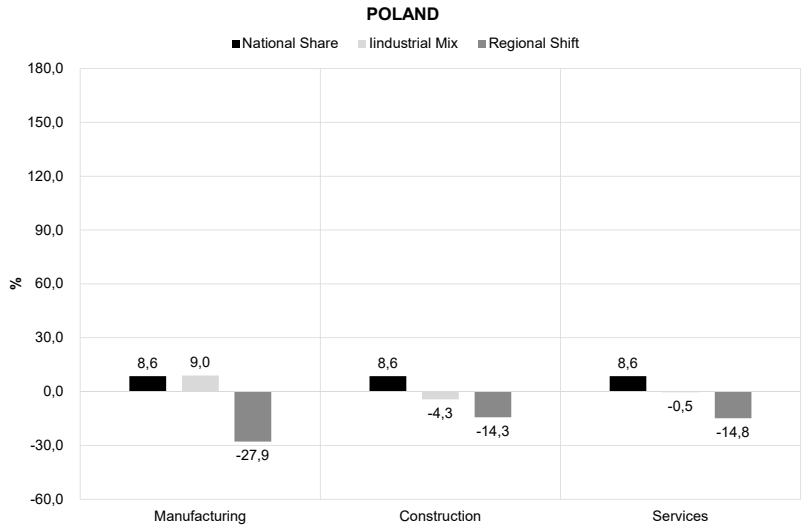

HUNGARY
National Share
Iindustrial Mix
Regional Shift
180,0
150,0
120,0
90,0
60,0
30,0
0,0
-30,0
-60,0
%
8,6
9,0
-13,6
8,6
-4,3
-9,1
8,6
-0,5
-15,0
Manufacturing
Construction
Services

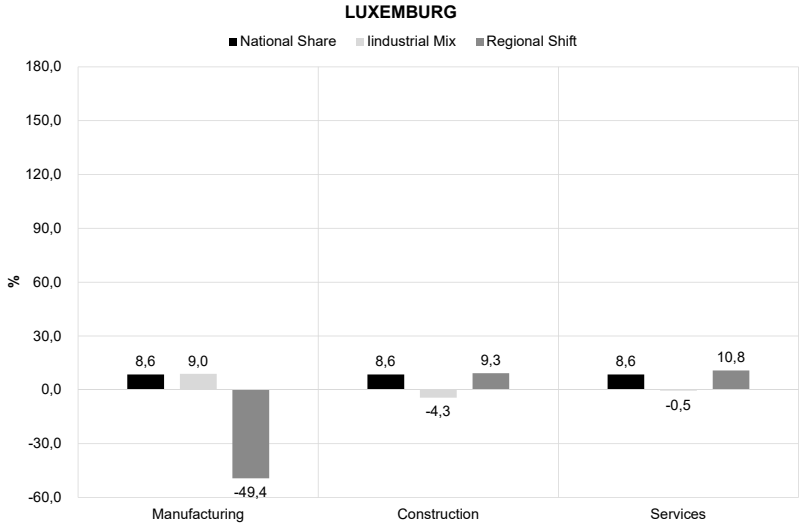

ITALY
National Share
Iindustrial Mix
Regional Shift
180,0
150,0
120,0
90,0
60,0
30,0
0,0
-30,0
-60,0
%
8,6
9,0
-25,3
8,6
-4,3
-26,7
8,6
-0,5
3,0
Manufacturing
Construction
Services

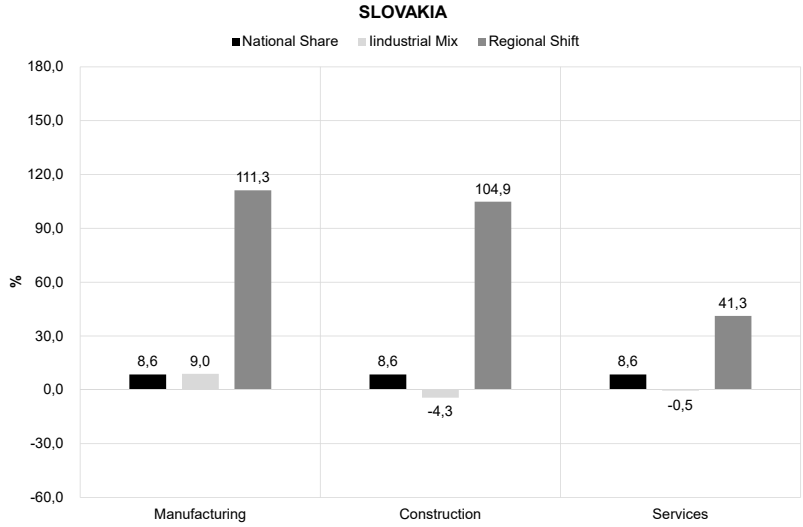

IRELAND
National Share
Iindustrial Mix
Regional Shift
180,0
150,0
120,0
90,0
60,0
30,0
0,0
-30,0
-60,0
%
8,6
9,0
51,3
8,6
-4,3
89,7
8,6
-0,5
24,8
Manufacturing
Construction
Services

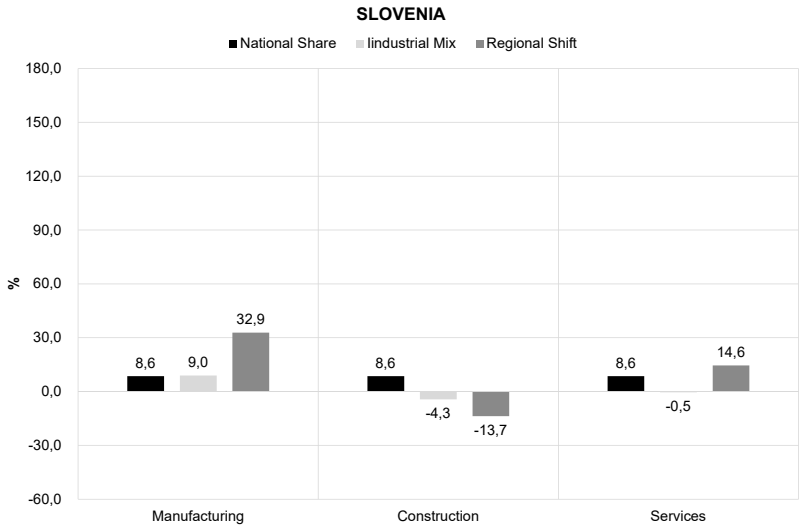

LATVIA
National Share
Iindustrial Mix
Regional Shift
180,0
150,0
120,0
90,0
60,0
30,0
0,0
-30,0
-60,0
%
8,6
9,0
-2,3
8,6
-4,3
41,4
8,6
-0,5
-1,5
Manufacturing
Construction
Services

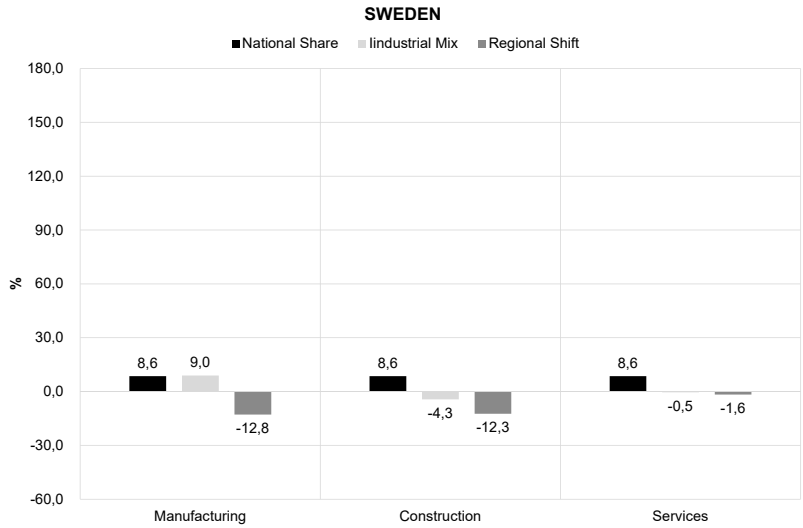

LITHUANIA
National Share
Iindustrial Mix
Regional Shift
180,0
150,0
120,0
90,0
60,0
30,0
0,0
-30,0
-60,0
%
8,6
9,0
40,8
8,6
-4,3
140,7
8,6
-0,5
37,2
Manufacturing
Construction
Services

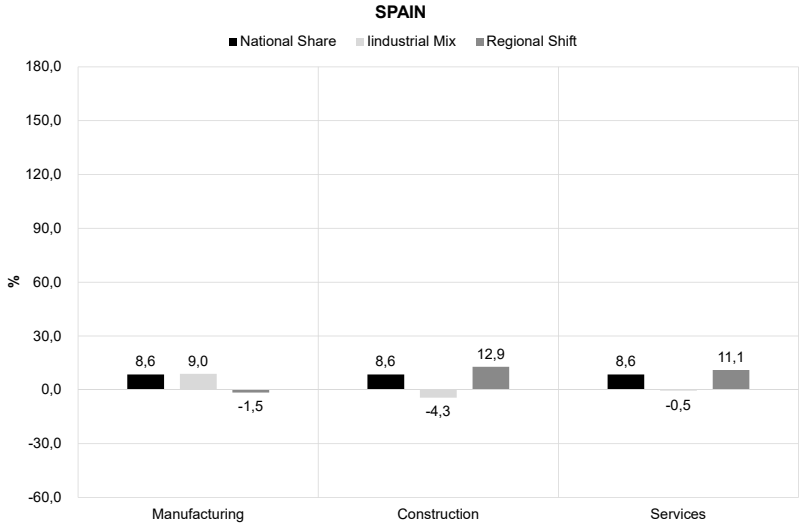

POLAND
National Share
Iindustrial Mix
Regional Shift
180,0
150,0
120,0
90,0
60,0
30,0
0,0
-30,0
-60,0
%
8,6
9,0
-27,9
8,6
-4,3
-14,3
8,6
-0,5
-14,8
Manufacturing
Construction
Services

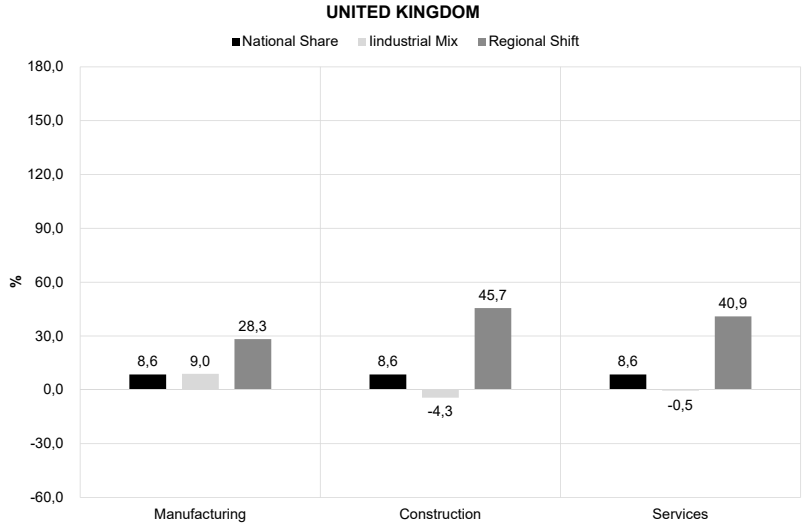

LUXEMBURG
National Share
Iindustrial Mix
Regional Shift
180,0
150,0
120,0
90,0
60,0
30,0
0,0
-30,0
-60,0
%
8,6
9,0
-49,4
8,6
-4,3
9,3
8,6
-0,5
10,8
Manufacturing
Construction
Services


SLOVAKIA
National Share
Iindustrial Mix
Regional Shift
180,0
150,0
120,0
90,0
60,0
30,0
0,0
-30,0
-60,0
%
8,6
9,0
111,3
8,6
-4,3
104,9
8,6
-0,5
41,3
Manufacturing
Construction
Services

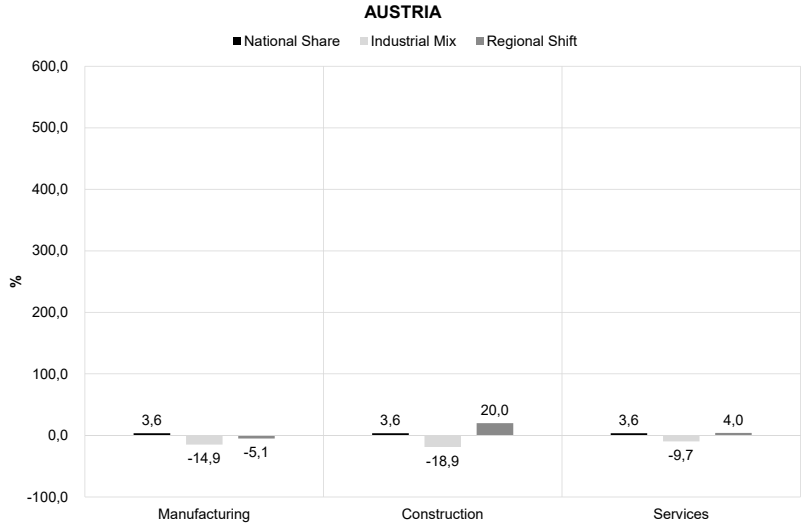

SLOVENIA
National Share
Iindustrial Mix
Regional Shift
180,0
150,0
120,0
90,0
60,0
30,0
0,0
-30,0
-60,0
%
8,6
9,0
32,9
8,6
-4,3
-13,7
8,6
-0,5
14,6
Manufacturing
Construction
Services

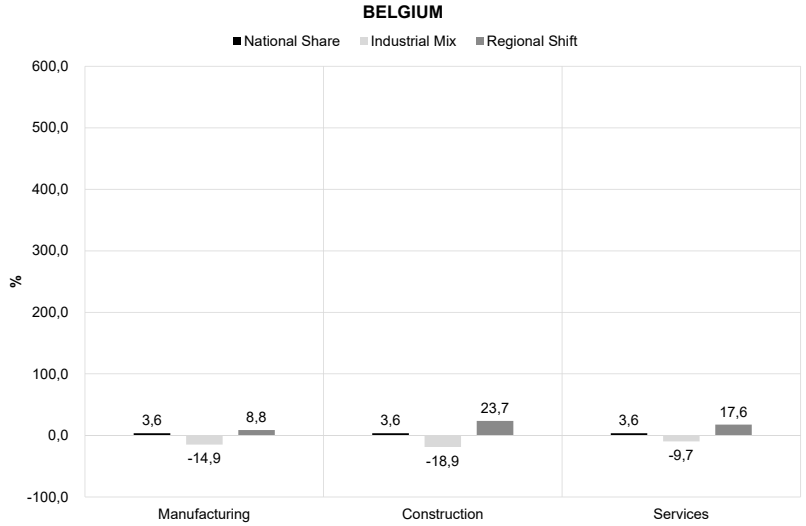

SWEDEN
National Share
Iindustrial Mix
Regional Shift
180,0
150,0
120,0
90,0
60,0
30,0
0,0
-30,0
-60,0
%
8,6
9,0
-12,8
8,6
-4,3
-12,3
8,6
-0,5
-1,6
Manufacturing
Construction
Services

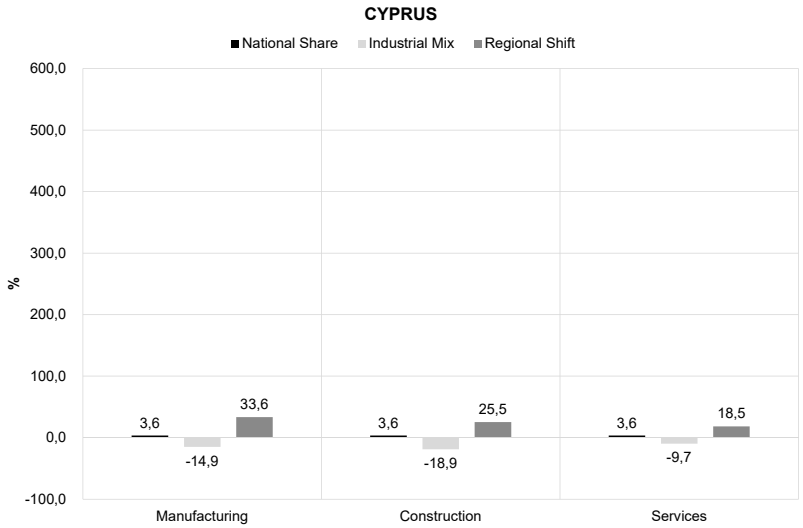

SPAIN
National Share
Iindustrial Mix
Regional Shift
180,0
150,0
120,0
90,0
60,0
30,0
0,0
-30,0
-60,0
%
8,6
9,0
-1,5
8,6
-4,3
12,9
8,6
-0,5
11,1
Manufacturing
Construction
Services

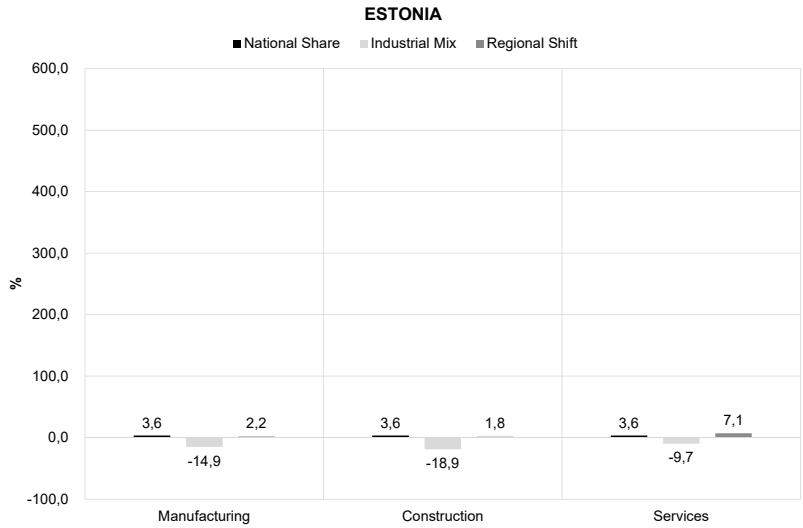

UNITED KINGDOM
National Share
Iindustrial Mix
Regional Shift
180,0
150,0
120,0
90,0
60,0
30,0
0,0
-30,0
-60,0
%
8,6
9,0
28,3
8,6
-4,3
45,7
8,6
-0,5
40,9
Manufacturing
Construction
Services

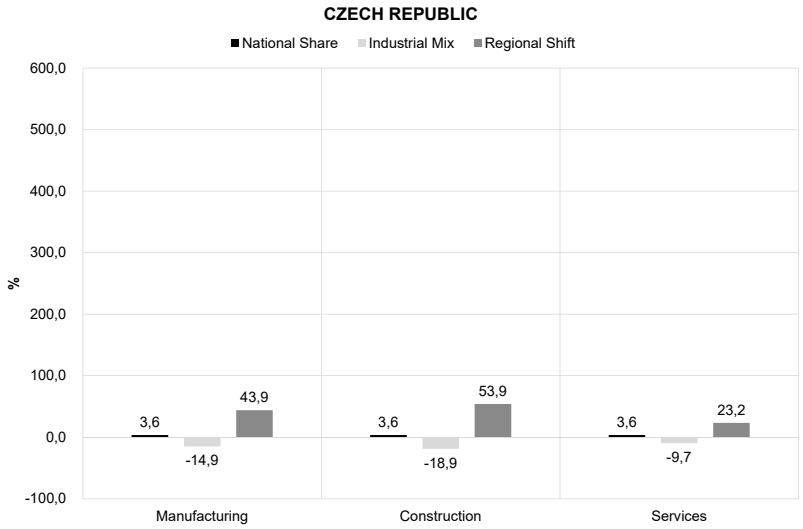
Appendix A2. Shift-share decomposition of the growth rate in firms' deaths between 2010 and 2014, by country

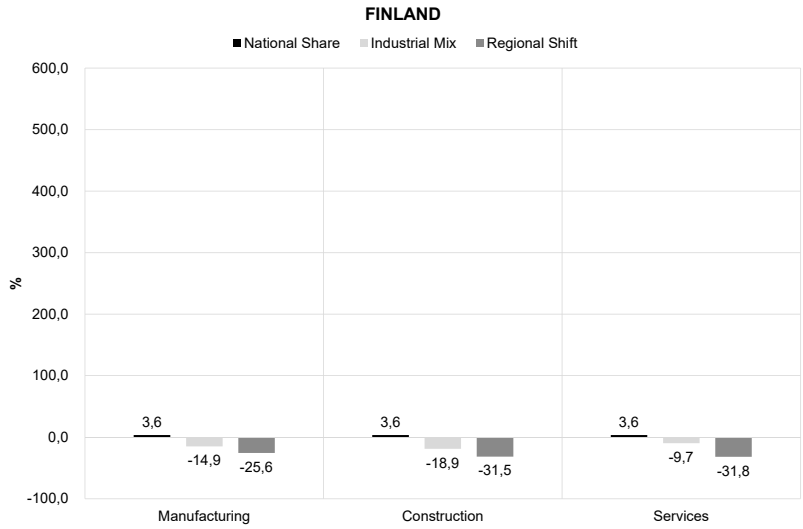


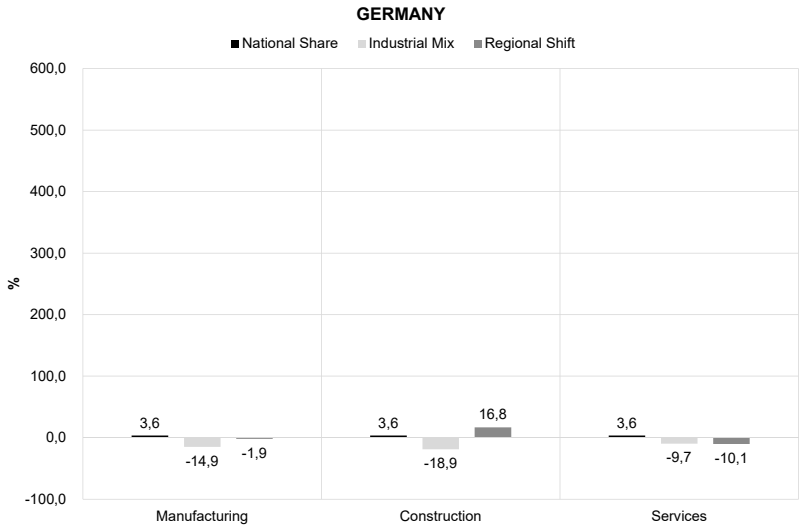


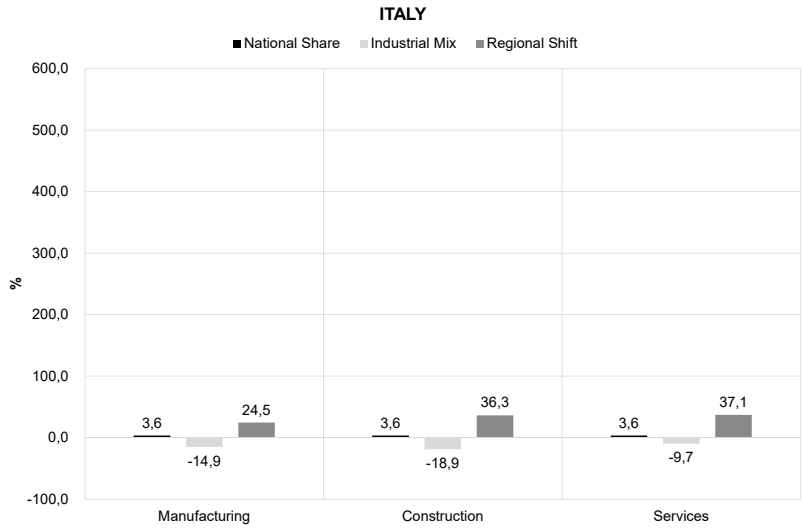

CYPRUS
National Share
Industrial Mix
Regional Shift
600,0
500,0
400,0
300,0
200,0
100,0
0,0
-100,0
%
3,6
-14,9
33,6
3,6
-18,9
25,5
3,6
-9,7
18,5
Manufacturing
Construction
Services

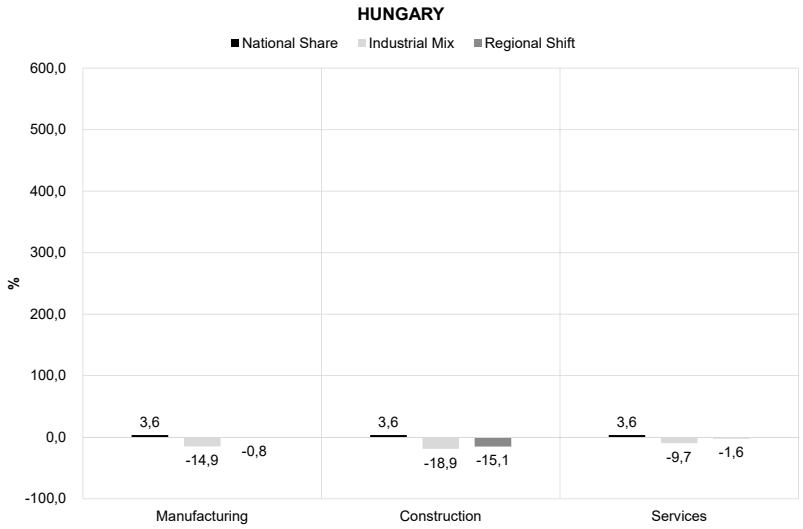

ESTONIA
National Share
Industrial Mix
Regional Shift
600,0
500,0
400,0
300,0
200,0
100,0
0,0
-100,0
%
3,6
-14,9
2,2
3,6
-18,9
1,8
3,6
-9,7
7,1
Manufacturing
Construction
Services

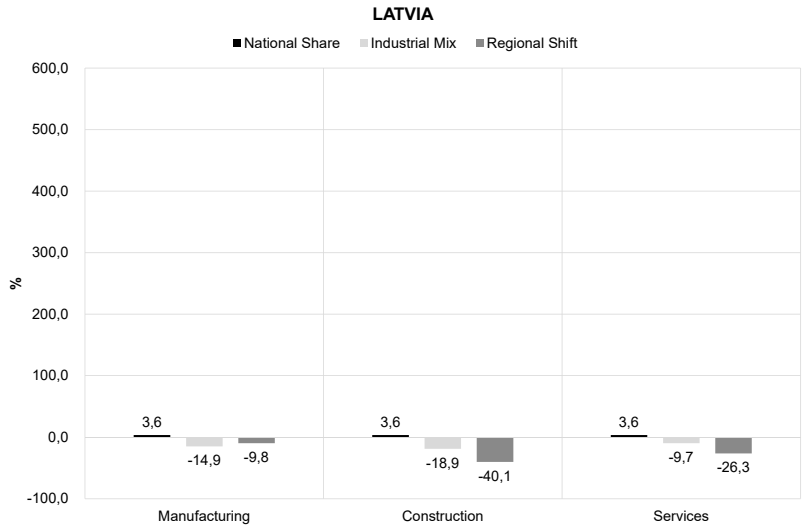

CZECH REPUBLIC
National Share
Industrial Mix
Regional Shift
600,0
500,0
400,0
300,0
200,0
100,0
0,0
-100,0
%
3,6
-14,9
43,9
3,6
-18,9
53,9
3,6
-9,7
23,2
Manufacturing
Construction
Services

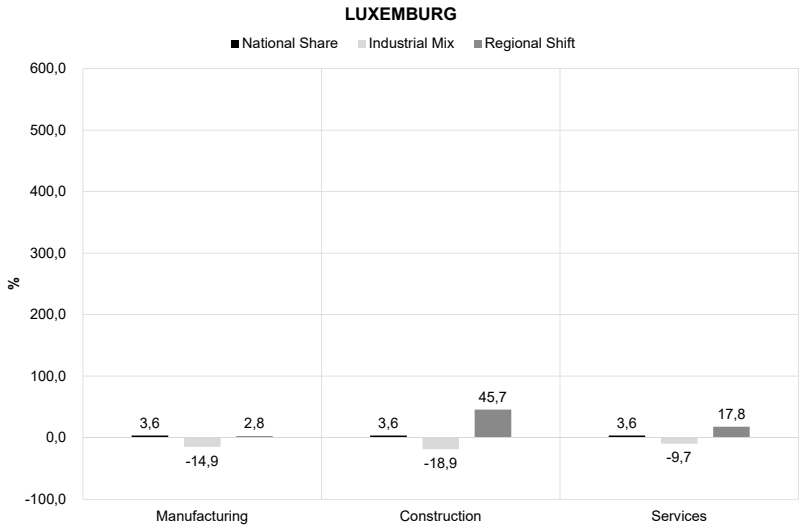

FINLAND
National Share
Industrial Mix
Regional Shift
600,0
500,0
400,0
300,0
200,0
100,0
0,0
-100,0
%
3,6
-14,9
-25,6
3,6
-18,9
-31,5
3,6
-9,7
-31,8
Manufacturing
Construction
Services

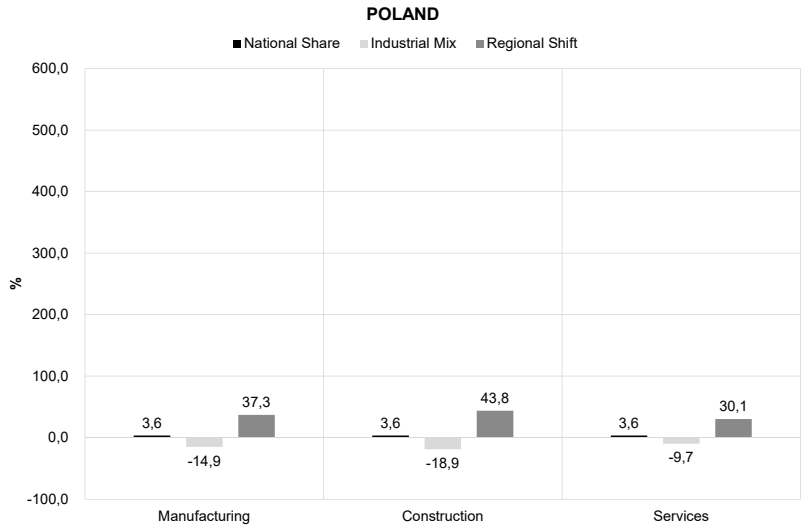

GERMANY
National Share
Industrial Mix
Regional Shift
600,0
500,0
400,0
300,0
200,0
100,0
0,0
-100,0
%
3,6
-14,9
-1,9
3,6
-18,9
16,8
3,6
-9,7
-10,1
Manufacturing
Construction
Services

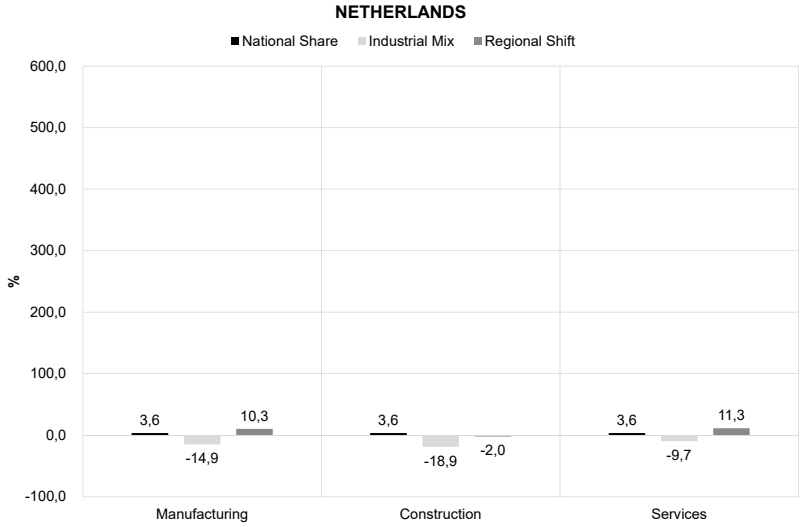

ITALY
National Share
Industrial Mix
Regional Shift
600,0
500,0
400,0
300,0
200,0
100,0
0,0
-100,0
%
3,6
-14,9
24,5
3,6
-18,9
36,3
3,6
-9,7
37,1
Manufacturing
Construction
Services

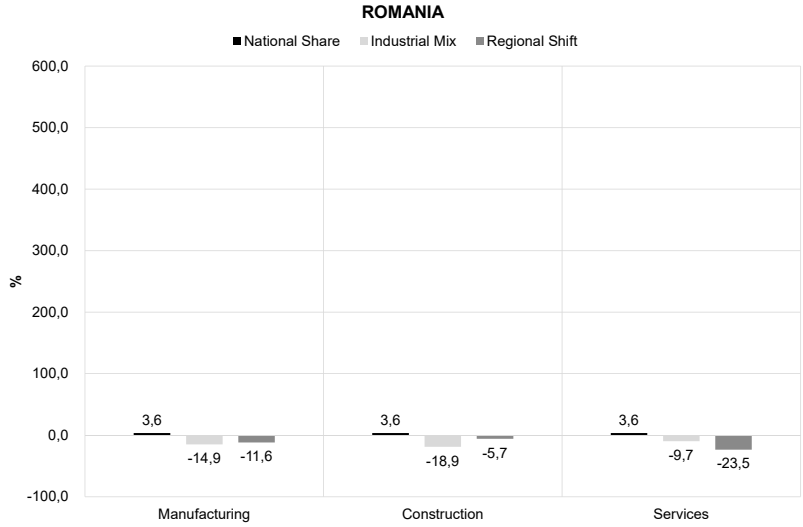

HUNGARY
National Share
Industrial Mix
Regional Shift
600,0
500,0
400,0
300,0
200,0
100,0
0,0
-100,0
%
3,6
-14,9
-0,8
3,6
-18,9
-15,1
3,6
-9,7
-1,6
Manufacturing
Construction
Services

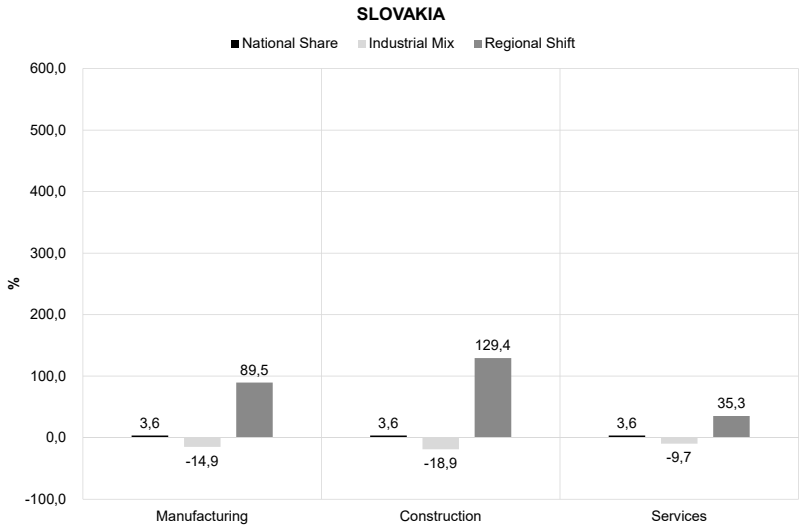

LATVIA
National Share
Industrial Mix
Regional Shift
600,0
500,0
400,0
300,0
200,0
100,0
0,0
-100,0
%
3,6
-14,9
-9,8
3,6
-18,9
-40,1
3,6
-9,7
-26,3
Manufacturing
Construction
Services

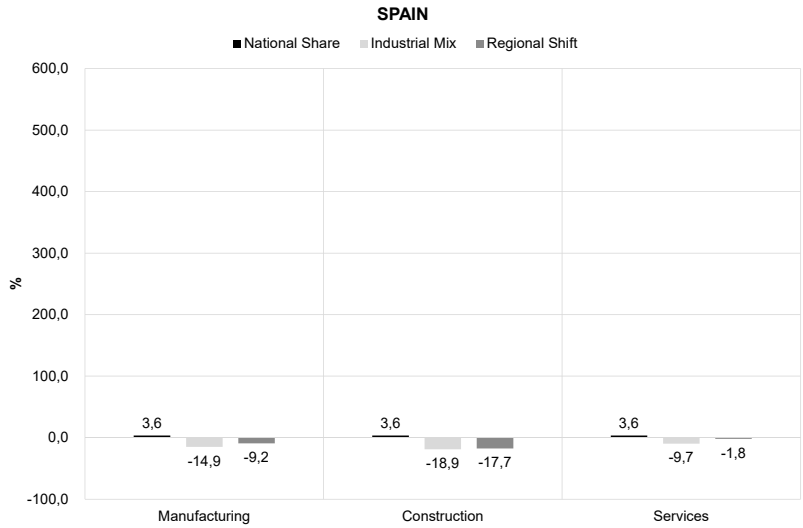

LUXEMBURG
National Share
Industrial Mix
Regional Shift
600,0
500,0
400,0
300,0
200,0
100,0
0,0
-100,0
%
3,6
-14,9
2,8
3,6
-18,9
45,7
3,6
-9,7
17,8
Manufacturing
Construction
Services

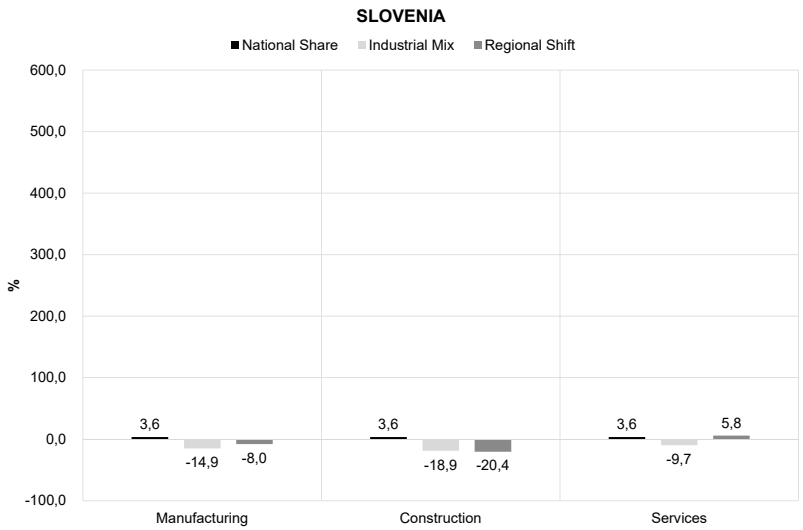

POLAND
National Share
Industrial Mix
Regional Shift
600,0
500,0
400,0
300,0
200,0
100,0
0,0
-100,0
%
3,6
-14,9
37,3
3,6
-18,9
43,8
3,6
-9,7
30,1
Manufacturing
Construction
Services

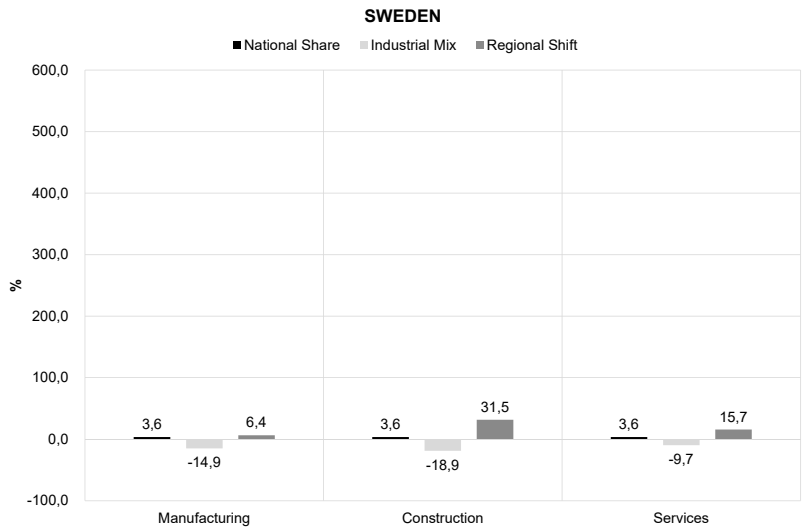

NETHERLANDS
National Share
Industrial Mix
Regional Shift
600,0
500,0
400,0
300,0
200,0
100,0
0,0
-100,0
%
3,6
-14,9
10,3
3,6
-18,9
-2,0
3,6
-9,7
11,3
Manufacturing
Construction
Services

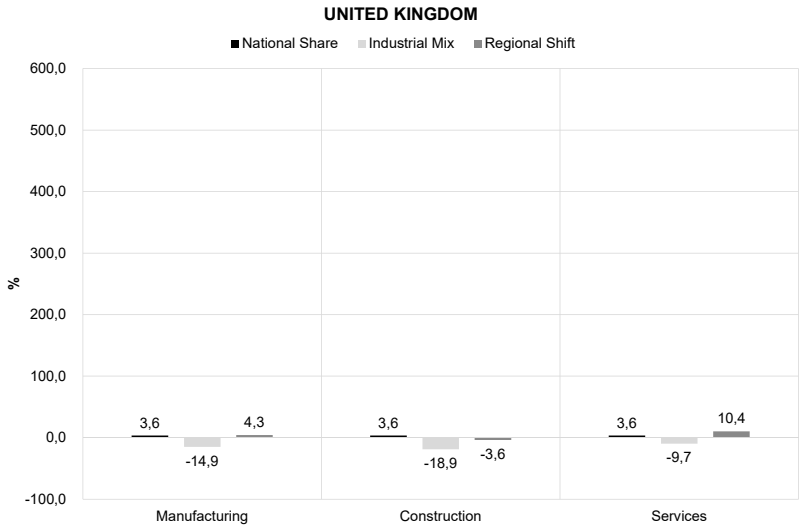

ROMANIA
National Share
Industrial Mix
Regional Shift
600,0
500,0
400,0
300,0
200,0
100,0
0,0
-100,0
%
3,6
-14,9
-11,6
3,6
-18,9
-5,7
3,6
-9,7
-23,5
Manufacturing
Construction
Services


SLOVAKIA
National Share
Industrial Mix
Regional Shift
600,0
500,0
400,0
300,0
200,0
100,0
0,0
-100,0
%
3,6
-14,9
89,5
3,6
-18,9
129,4
3,6
-9,7
35,3
Manufacturing
Construction
Services


SPAIN
National Share
Industrial Mix
Regional Shift
600,0
500,0
400,0
300,0
200,0
100,0
0,0
-100,0
%
3,6
-14,9
-9,2
3,6
-18,9
-17,7
3,6
-9,7
-1,8
Manufacturing
Construction
Services


SLOVENIA
National Share
Industrial Mix
Regional Shift
600,0
500,0
400,0
300,0
200,0
100,0
0,0
-100,0
%
3,6
-14,9
-8,0
3,6
-18,9
-20,4
3,6
-9,7
5,8
Manufacturing
Construction
Services


SWEDEN
National Share
Industrial Mix
Regional Shift
600,0
500,0
400,0
300,0
200,0
100,0
0,0
-100,0
%
3,6
-14,9
6,4
3,6
-18,9
31,5
3,6
-9,7
15,7
Manufacturing
Construction
Services


UNITED KINGDOM
National Share
Industrial Mix
Regional Shift
600,0
500,0
400,0
300,0
200,0
100,0
0,0
-100,0
%
3,6
-14,9
4,3
3,6
-18,9
-3,6
3,6
-9,7
10,4
Manufacturing
Construction
Services