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E-commerce as a Consequence of Innovation and the Cause of New Innovations for SMEs: the Perspectives of Latvia and Lithuania

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Abstract

The emergence of new technologies and the expansion of digitalisation have created an opportunity for e-commerce to develop. A supplier and a buyer of goods and services meet in the e-environment and solve their problem without direct contact, which is mutually beneficial. Accordingly, when it comes to globalisation, e-commerce, as a system, becomes an important topic of research in general, and, in particular, it is vital for small and medium enterprises (SMEs), since most enterprises in the European Union (EU) are SMEs. Latvia and Lithuania are EU Member States, and SMEs are dominant in these two Baltic States. The aim of the research is to identify and compare the opinions of producers/sellers and buyers on the positive contribution of e-commerce to date and the problems caused by e-commerce for both sides. The research employed data from Eurostat, OECD and the Central Statistical Bureau of Latvia as well as the authors' own data from a survey (e-commerce users: suppliers (n=112) and buyers (n=138) of goods and services) conducted in Latvia and Lithuania. An analysis of the statistical data reveals the current objective position of e-commerce in both countries. The proportion of small and medium enterprises involved in this process is increasing. At the same time, the processing of the results of the e-commerce survey enables the authors to see a subjective view of this process, which includes both positive and negative features of both the buyers and the sellers. Identifying problems and comparing the situations in the two neighbouring countries opens the way to find e-commerce development directions and reduce the problems not only economically but also geographically and ethnically, as the objective data on e-commerce are not identical for Latvia and Lithuania, even though the data are positive and only slightly different.

Keywords: e-commerce, SMEs, innovation, motivation

JEL: M37, 014

Introduction

Europe 2020 is the European Union's strategy for smart, sustainable and inclusive growth. Smart growth refers to an economy based on knowledge and innovation as drivers of future growth. The flagship initiative for smart growth, called "A Digital Agenda for Europe", prescribes the ultra-fast creation of information and communication technology systems, which also takes into consideration the growing effect of the European Digital Single Market (EC 2010). Even though the digital economy is growing faster than the economy as a whole (EC 2014), the expected European Digital Single Market is not developing sufficiently fast. The Digital Economy and Society Index (DESI) was designed to assess the digitalisation process, and since 2004, it has measured the progress of the EU Member States towards a digital economy and society, yet some changes have occurred in the digitalisation process (EC 2018a). On 10 May 2017, the European Commission published a mid-term review of the Digital Single Market Strategy. It presents and evaluates the progress in implementing the Strategy since

2015 and highlights where further actions are needed (data economy, cybersecurity and online platforms) (EC 2017). However, according to the European Ecommerce Association (EMOTA), Internet use and online shopping differ strongly across the EU Member States (European Ecommerce Report 2018).

E-commerce as a phenomenon attracts the attention of policy-makers and prompts activity in research on the e-environment, e-skills and, of course, the effects of e-commerce on the social and economic activity of individuals. Research has revealed that business patterns transform under digitalisation (Schallmo et al. 2017; Byungjoon and Moonkyoung 2019), or the transformation occurs in a particular segment of the economy, e.g. agriculture (GFA 2018). Research has found that e-commerce has expanded in the key EU Member States (Raisová and Ćurpová 2014). At the same time, a number of authors have pointed to the unbalanced development of innovation both among countries and within some countries (Raisová and Ćurpová 2014; Pytkowska and Korynski 2017). A significant focus in the research is placed on analysing the effects of technologies, and digitalisation in particular, on the working world. The term "Industry 4.0" has led to the term "labour 4.0" (Grass and Weber 2017). One of its features is the expanding scope of work on digital or online platforms (Waas et al. 2018). The challenges of working on online platforms were extensively discussed at the Trade Union Forum (TUAC 2017). The International Labour Organisation (ILO) has done extensive research into digital labour platforms and the future of work, which require from individuals another level of thinking, knowledge and skills (Berg et al. 2018). Work on digital or online platforms explicitly indicates the e-commerce system in an economy.

Small and medium enterprises (SMEs) in the EU constitute most of the total number of enterprises, and they are dominant in Latvia and Lithuania (Eurostat 2018). Therefore, an analysis of the factors that promote or hinder SMEs is crucial from the perspective of opportunities for their economic development. As e-commerce expands, the authors have set the aim of identifying and then comparing the opinions of manufacturers and consumers on their involvement in this system in the two small Baltic States. In particular, the authors aim to explore the positive contribution that e-commerce has made to date and, at the same time, to identify the problems posed by the established e-commerce system and which arise from economic cooperation between both sides. A specific research task was also to make a cross-country comparison to look for positive experiences in the functioning of the e-commerce system in either country.

The research employed data from Eurostat, the OECD and the Central Statistical Bureau of Latvia, as well as the authors' own data from a survey (e-commerce users of goods and services: suppliers (n=112: 95 in Latvia and 17 in Lithuania) and buyers (n=138: 61 in Latvia and 77 in Lithuania)) conducted in Latvia and Lithuania. The survey was carried out in 2018. Despite the fact that the sample groups were not representative (did not reflect the views of the entire population groups as entrepreneurs and consumers), the obtained data and results of this analysis provided an insight into supply and the demand in e-commerce, stressing the problems to be tackled.

Results and discussion

Latvia and Lithuania have been EU Member States since 2004. One of the goals of their accession to the EU was to achieve at least the average social development level of the EU. It could be achieved only by successful economic growth, including digitalisation. The performance of the economy in relation to digitalisation is measured by the DESI index, which shows the progress of the EU Member States towards the digital economy and society. The index shows the situations in all the EU Member States, which gives an opportunity to compare individual Member States and benchmark them against the EU average (EC 2017b, p. 5).

Positions of Latvia and Lithuania within the EU with regard to e-commerce

At present, Denmark, Sweden, Finland and the Netherlands have the most advanced digital economies and societies in the EU, followed by Luxembourg, Ireland, the UK, Belgium and Estonia. Romania, Greece and Italy have the lowest scores on the DESI. In 2018, the DESI scores ranged from 71.7 (Denmark) to 37.5 (Romania) (EC 2018b); the median was 54.6, and the mode was in the range of 50.8–60.7. The positions of all the Baltic States (Estonia – 59, Latvia – 56.6, Lithuania – 50.8) were within the range of the mode. An analysis of the DESI components associated with or directly related to e-commerce reveals that the situation is less favourable. As shown in Tables 1 and 2, Estonia has succeeded in reaching EU averages, while Lithuania reached some of them. Latvia, unfortunately, lagged behind considerably in terms of EU averages pertaining to e-commerce.

Table 1. Use of Internet services for shopping (value indicator), 2014–2018

3c2 – Shopping	Estonia	Latvia	Lithuania	EU–28	Denmark	Sweden	Finland
2014	57.0	44.0	36.0	**63.0**	81.0	80.0	73.0
2018	65.0	55.0	49.0	**68.0**	82.0	84.0	75.0
Change	+ 8.0	+ 11.0	+ 13.0	**+ 5.0**	+ 1.0	+ 4.0	+ 2.0

Source: authors' calculations based on the Digital Economy and Society Index (DESI) for 2018.

Of course, the numbers of users of Internet shopping services have increased in all the three Baltic States at a higher rate than on average in the EU, which confirms significant progress in this area. Nevertheless, much has to be done to reach the EU average, and the level of the Nordic countries in particular, as the Baltic States are included in this country group for the assessment of digitalisation performance. It is confirmed by the indicator values for Internet services for shopping in Denmark, Sweden and Finland.

Table 2. Linear and horizontal comparison of integration in e-commerce (indicator value), 2014–2018

4b1 – SMEs selling online	Estonia	Latvia	Lithuania	EU–28	Denmark	Sweden	Finland
2014	12.0	6.9	18.0	**15.0**	26.0	24.0	14.0
2018	15.4	10.6	21.9	**17.2**	27.8	28.5	19.6
Change	+ 3.4	+ 3.7	+3.9	**+ 2.2**	+ 1.8	+ 4.5	+ 5.6
4b2 – E-commerce turnover	**Estonia**	**Latvia**	**Lithuania**	**EU–28**	**Denmark**	**Sweden**	**Finland**
2014	13.0	7.6	7.4	**8.8**	14.0	14.0	…
2018	11.4	8.6	11.8	**10.3**	14.5	15.0	…
Change	–1.6	+ 1.0	+ 4.4	**+ 1.5**	+ 0.5	+ 1.0	…
4b3 – Selling online cross-border	**Estonia**	**Latvia**	**Lithuania**	**EU–28**	**Denmark**	**Sweden**	**Finland**
2014	5.5	4.1	11.0	**6.5**	9.9	7.7	4.8
2018	8.3	4.7	12.4	**8.4**	9.2	9.7	5.9
Change	+2.8	+ 0.6	+ 1.4	**+ 1.9**	–0.7	+ 2.0	+ 1.1

Source: authors' calculations based on the EC (2019) Countries' Performance in Digitisation.

SMEs represent 99% of all businesses in the EU and are the most important sources of employment (EC 2018a). For this reason, promoting innovative economic activities is a priority, while one of the kinds of innovative activity this century is the expansion of e-commerce among SMEs. The authors' calculations showed that performance in digitisation has improved in the EU Member States. The number of micro-, small and medium enterprises, which represent SMEs, who were engaged in e-commerce had increased, as had net turnover and cross-border online selling. Linear e-commerce growth was observed both in the EU as a whole and in any Member State. However, individual Member States could be divided by development level into categories, beginning with innovation leaders, strong innovators and moderate innovators, through to modest innovators. Since the European Ecommerce Association includes Denmark, Sweden and Finland (innovation leaders) and all the three Baltic States – Estonia, Latvia and Lithuania (moderate innovators) – in the group of Nordic countries, the authors selected the previously-mentioned countries for analytical comparison (Table 2). Each country analysed had some differences regarding the research problem. The growth rates for SME online selling and cross-border online selling differed. In 2014, among the innovation leaders, only Denmark dominated, while in 2018, Sweden outpaced Denmark. Among the Baltic States, Lithuania performed the best in SME e-commerce. However, the most important conclusion is that e-commerce is expanding in all the economic activities of SMEs in all the Baltic States, slowly approaching the level of Nordic leaders with regard to this innovative activity. A logical question arises – what contributes to and hinders the expansion of e-commerce in the economic activities of SMEs the most. The second part of the research focuses on answering the question.

The e-commerce system as a supply and demand interaction

E-commerce as a system

A system is an arrangement or collection of objects that operate together for a common purpose. The objects may represent machines, humans, as well as physical and biological entities. E-commerce, in essence, is a system comprised of at least three elements: a supplier of a good/service, the good or service itself and the buyer of the good/service. This system effectively functions only when the supplier and the buyer interact and the wishes of both parties more or less coincide, which manifests itself in a successful offer of goods/services and the active demand for the goods/services.

Most scientists see this system as a set of system components, one of which is the technological-economic component. It includes the availability of the Internet, the financial capacity to purchase necessary hardware, the availability of ICT specialists and the digital skills of the personnel. Other components are socio-economic, and they include the skills of the population to use the Internet, their interest in e-shopping to reduce the cost of a good/service, the opportunity to compare a good/service and the gains from various shopping sites. The uniting element of the two sides, or the third component, is a good or service, whose creators want to sell it in as large quantities as possible and earn the highest profit, while the buyers want to get the cheapest good/service and, at the same time, of the highest quality (see, e.g., Schallmo et al. 2017; Schill et al. 2019; Verhoef 2012). Of course, some researchers give broader and more complex characteristics of the e-commerce system, dividing it into two subsystems – the production ecosystem and the consumption ecosystem, which are mutually interdependent (Subramaniam et al. 2019). Such a system model involves machines, humans, as well as physical and biological entities. However, the expansion of a digital contact network, an increase in the number of related specialists and users and, consequently, the growth of e-commerce on a global scale explicitly contribute to achieving the goal. Since our research on e-commerce as a system is based on a sociological survey, an analysis of the survey results allowed us to construct a human-focused model for the e-commerce system.

Positive and problematic aspects of e-commerce from the perspective of suppliers

Any human action is determined by a motivation that is oriented towards achieving certain goals. Representatives (owners or employees) of small and large SMEs were involved in the survey as e-commerce suppliers of goods/services. Summarising the opinions of the SMEs surveyed, the authors gained an insight into their motives for doing e-commerce, the economic contribution of e-commerce as well as the problems arising from this economic activity.

Table 3. Motives of suppliers of goods/services for doing e-commerce

For what purposes does your enterprise use the Internet environment? (several answers possible)	Latvia	Lithuania
Advertising	11.6	88.2
Selling goods or services	81.1	76.5
Communication with customers	74.7	82.4

Source: own elaboration.

Both Latvian and Lithuanian SMEs quite equally rated the use of e-commerce for selling goods/services and communicating with customers (Table 3). At the same time, the views on the role of the Internet in advertising goods/services were very different. The Lithuanian respondents considered the use of the Internet to be important for all the three purposes, yet they slightly preferred advertising goods/services to the other options. The Latvian respondents preferred to use the Internet for selling their goods/services. They placed communication with the buyers of their goods/services in second place and assigned a minimum role to advertising their goods/services. It is likely that this factor, in particular, contributed to the better performance of the Lithuanian respondents in e-commerce, as mentioned above (Table 2).

Table 4. Effects of the use of the e-environment on the economic performance of businesses

To what extent does e-environment use improve the economic performance of a business?	Latvia	Lithuania
Meaningfully	63.1	35.3
Partly	29.5	52.9
Makes a minor contribution	7.4	11.8

Source: own elaboration.

The surveyed suppliers of goods/services positively viewed the engagement of SMEs in e-commerce, pointing out that the use of the e-environment enhanced the economic performance of business. This opinion was supported by both the Latvian and Lithuanian respondents (Table 4). However, the respondents' opinions on the economic contribution of e-commerce differed between the countries significantly. Almost two-thirds of the Latvian respondents considered the economic contribution of e-commerce to be very significant, while only a third of the Lithuanian respondents had the same opinion. The opinion of the Latvian suppliers of goods/services could be explained by the fact that among the Baltic States, the strongest increase in online selling was reported in Latvia (+16 percentage points in Latvia, +7 percentage points in Lithuania and +9.5 percentage points in Estonia), and this fact created this positive opinion, even though the increase in e-commerce turnover was larger in Lithuania than in Latvia (Table 2).

Like any economic activity, e-commerce provides gains as well as creates problems for suppliers of goods/services. Identifying the most important problems makes it possible to find solutions to the problems (Table 5).

Table 5. E-commerce issues in the view of the product/service vendor

If entrepreneurs do not actively use e-commerce sufficiently, what are the reasons for this? (several answers possible)	Latvia	Lithuania
Too expensive	16.8	0
No effective method	27.4	17.6
No understanding of e-commerce	23.2	41.2
No specialists engaged in it	36.8	35.3
Other reasons	0	5.9

Source: own elaboration.

The Latvian and Lithuanian respondents' opinions on the key problems that hinder this kind of economic activity were similar but also quite different. The respondents shared the opinion that there was a lack of IT specialists able to digitalise the sale of goods/services and effectively manage e-commerce activities. This problem could be caused by an insufficient number of IT specialists in these countries, and there is a need to contribute to education in this particular field. The problem could also be due to the financial capacity of SMEs – they were not able to provide adequate remuneration to IT specialists or cover the cost of training courses for their employees who were ready to build up their knowledge of and skills in business digitalisation. The respondents also pointed to the lack of understanding of e-commerce as such among the general public. This problem was particularly stressed by the Lithuanian respondents, who prioritised it in their country.

Positive and problematic aspects of e-commerce from the perspective of buyers

Buyers of goods/services use e-commerce to achieve certain goals, i.e. the acquisition of goods or services they are interested in.

Table 6. The most popular products bought online (% of total respondents)

If you buy online, what are you buying the most?	Latvia	Lithuania
Tickets for public events and entertainment	43.5	56.5
Insurance	43.3	56.7
Consumer electronics (TV, washing machine, etc.)	31.6	68.4
Clothing and accessories	39.6	60.4
Mobile phones, tablets and gadgets	25.8	74.2

Source: own elaboration.

The survey results revealed that there were two distinct differences in buyer behaviour between the countries (Table 6). First, the proportion of buyers who purchased both goods and services, regardless of the kinds of products they bought, was higher in Lithuania than in Latvia; second, the overall demand for online shopping was considerably higher in Lithuania than in Latvia. In Latvia, most respondents pur-

chased tickets for public events and entertainment, while in Lithuania, most respondents bought mobile phones, tablets and gadgets. Applying a ranking method revealed that the smallest difference in demand for online shopping between both countries was observed for tickets for public events and entertainment (13 percentage points), whereas the largest difference (48.4 percentage points) was found for mobile phones, tablets and gadgets. An analysis of the top two products bought online revealed that in Latvia, buyers preferred purchasing services, whereas in Lithuania, they preferred buying goods. Identifying the effect of this difference on e-commerce turnover is the next specific tasks of the present research.

According to the Latvian and Lithuanian respondents, the availability of information on the Internet was the key reason for shopping online. More than half of the respondents in both countries pointed out that e-commerce provided lower prices on goods/services than conventional commerce did. The difference in percentage between the countries was only a few points. There were very different opinions on whether the available Internet information on goods and services was sufficient. The Lithuanian respondents more positively rated the available Internet information on goods/services (21.9 percentage points higher than the Latvian respondents). It is likely that the reason was the low role assigned by Latvian suppliers to advertising goods/services (Table 7).

Table 7. Consumer benefits from online shopping

Problems of online shoppers in the digitalised market	Latvia	Lithuania
Inability to find the good/service what you were looking for	18.0	31.2
Lack of information about the good/service, delivery, payment options etc.	41.0	32.5
Delivery is too long	42.6	36.4

Source: own elaboration.

It is not only suppliers of goods/serviced that face problems in e-commerce. E-commerce creates problems for buyers, as well. The most negative aspects, according to the respondents of both countries, were too long delivery time and insufficient information about the good/service available on the Internet (Table 8). The Latvian respondents had a more negative opinion than the Lithuanian respondents. The latter stressed the wish to have a broader assortment of goods/services available on the Internet, which meant that a more diverse spectrum of SMEs would have to engage in e-commerce. This kind of wish was less pronounced in Latvia.

In economic theory, perfect markets have been associated with possessing perfect information, that is to say, a situation in which all consumers and producers have perfect knowledge of the price, utility, quality and production methods of products. A perfect market is an ideal. Real markets do not normally display perfect market conditions; they range from those that are closer to the ideal to farther away (Improving... 2016). The survey revealed that e-commerce in Lithuania, and especially in Latvia, was on its way to becoming a perfect e-market.

Table 8. Problems of online shoppers in the digitalised market

Consumer benefits from online shopping	Latvia	Lithuania
To access different offers more easily	50.8	72.7
Information is always available on the Internet	67.2	68.8
Cheaper than in a traditional store	50.8	53.2

Source: own elaboration.

Opportunities to improve the interaction between suppliers and buyers

The desirable result of the interaction between suppliers and buyers is the effective functioning of e-commerce as a system. Applying the paradigmatic method and analogical comparison allowed us to assess the interaction between suppliers and buyers (Table 9).

Table 9. Comparison of positive and problematic aspects from the perspectives of suppliers and buyers

Suppliers	Buyers
Positive aspects E-commerce gives an opportunity to communicate with consumers and increase net turnover	**Positive aspects** Access to the desired good/service from home
Problematic aspects Lack of specialists: prepared by education institutions enterprise personnel with necessary skills	**Problematic aspects** Information about the good/service is available on the Internet, yet it is either insufficient in content or not specific (SMEs currently do not offer some goods/services via e-commerce)

Source: own elaboration.

Digital infrastructure for communication is the foundation for a dynamic business ecosystem and is of great importance for SMEs. The practical application of the infrastructure both in the technical and content aspects opens the way for distance marketing not only in the domestic market but also in the single EU market and the global market (OECD 2019). Research has found that as the demand for goods/services grows, consumers increasingly want a wider assortment of goods/services and also change in the assortment (Lee et al. 2019, pp. 264–275). In view of the growing number of e-commerce users, the structuring of buyers who differ in terms of interests and financial capacity is increasingly being observed (Schill et al. 2019, pp. 317–327).

The comparison of problematic aspects in e-commerce from the perspectives of Latvian and Lithuanian respondents (suppliers and buyers) has focused on the interaction of the e-marketing parties through communication. Accordingly, the conclusion drawn by the research is sufficiently important to seek solutions to enhance the interaction of suppliers and buyers. One of the options, of course, is the enhancement

of the education system, so that young individuals entering the labour market have sufficient IT skills. This would contribute to the expansion of e-commerce among SMEs, micro-enterprises in particular. The second option pertains to improving the professionalism of current enterprise personnel – including their marketing and advertising skills. This, in turn, would allow them to meet the expectations of various social groups, as their wishes are not homogeneous. In both cases, new, innovative solutions should be sought to achieve positive change (Westlund et al. 2013). Implementing both options would provide more opportunities for cross-border e-commerce, as Latvia and Lithuania are countries with small domestic markets.

Commerce is a traditional phenomenon that has existed for millennia. The 21st century has brought a new kind of commerce – e-commerce that, combining the traditional and the modern, requires new skills from both suppliers and buyers in order that both parties achieve the desired result through mutual communication. For this reason, a comparison and assessment of the opinions of suppliers and buyers of goods/services was important.

Conclusions

1. Integration in e-commerce in Latvia and Lithuania has expanded in recent years, approaching the EU averages. Lithuania has even exceeded some EU averages. Reaching the levels of Denmark, Sweden and Finland, which are leaders in the group of Nordic countries, requires much effort, and both quantitative and qualitative changes need to be achieved. This indicates that solutions could be found to improve e-commerce as a system in the countries examined.
2. In the opinion of the manufacturers involved in the e-commerce system, the biggest problem is the lack of adequately trained specialists who are not only familiar with the use of technologies but who also have communication skills with consumers and creative ideas for high-quality advertising of goods or services. Additionally, they should speak a foreign language required for the expansion of cross-border trade in addition to the official language of the country they are doing business in. Accordingly, one of the ways to improve the e-commerce system is to expand the preparation of qualified specialists who have a broad socio-technological knowledge to perform their tasks.
3. Consumers who shop online, i.e. those who participate in an e-commerce system as shoppers, identify two major problems. First, there is a lack of information about the product/service itself that is supplied by the manufacturer/service provider. This is particularly true regarding certain types of product/service (concert tickets, mobile phones, clothing or food). Second, the buyer wants to get information not only on the amount to be paid but also on the possible payment method. The results of the survey clearly indicated the need to improve the amount and quality of information that the manufacturer/service provider makes avail-

able online, which pointed to another, very important development path for this e-commerce system.

4. The research results revealed that Latvia lagged behind the other countries. The Lithuanian respondents (both suppliers and buyers) viewed e-commerce more positively than the Latvian respondents did. Compared with the Lithuanian respondents, the Latvian respondents (both suppliers and buyers) identified more problems in e-commerce. However, the problems in the e-commerce system were identified by the respondents in both countries, which confirmed the need to improve the interaction between suppliers and buyers of goods/services within e-commerce as a system. The interaction represents the amount and, most importantly, the quality of information available online. Increasing the amount of information and, above all, improving the quality is a priority for suppliers of goods/services.

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Streszczenie

Handel elektroniczny jako konsekwencja innowacji i przyczyna nowych innowacji dla MŚP: perspektywy Łotwy i Litwy

Pojawienie się nowych technologii i rozwój cyfryzacji stworzyły okazję dla rozwoju handlu elektronicznego. Dostawca i nabywca towarów i usług spotykają się w środowisku elektronicznym i rozwiązują swoje problemy bez bezpośredniego kontaktu, przynosząc wzajemne korzyści. W UE i w krajach badanych przez niniejsze badanie MŚP stanowią większość ogółu przedsiębiorstw. W związku z tym handel elektroniczny (e-handel) jako system, w świetle globalizacji, staje się ważnym priorytetem badawczym, a ocena tego z perspektywy dostawców i nabywców jest szczególnym zadaniem niniejszego badania. W niniejszym badaniu wykorzystano dane Eurostatu, OECD i Centralnego Biura Statystycznego Łotwy, a także dane autorów z ankiety (użytkownicy handlu elektronicznego: dostawcy (n = 112) i nabywcy (n = 138) towarów i usług) przeprowadzenego na Łotwie i Litwie. Analiza danych pozwoliła stwierdzić, że pozytywne i negatywne perspektywy badanego zjawiska zostały podane zarówno przez dostawców, jak i nabywców. Z tego powodu istnieje potrzeba zmotywowania społeczeństwa jako całości i struktur zarządzania na wszystkich szczeblach, aby uzgodnić nowoczesność z tradycyjną, co jest spowodowane ekspansją handlu elektronicznego.

Słowa kluczowe: handel elektroniczny, MŚP, innowacje, motywacja

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Internal and External Sources of Knowledge in Manufacturing and Service Enterprises A Comparative Analysis of European Union Countries

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Abstract

Along with the development of economies based on knowledge, the importance of knowledge input in production processes has been increasing. Enterprises may acquire knowledge input by developing their internal knowledge base and/or purchasing knowledge from external entities. Their internal knowledge base may be developed mainly by employing highly qualified specialists and their own research. The aim of the paper is to examine the importance of all these knowledge sources in manufacturing and services enterprises, as well as to compare their changing role with productivity performance in EU countries. It is based on data from the World Input-Output Database, Eurostat, OECD and EU KLEMS. Thanks to the availability of relevant data, the analysed period covers the years 1995–2018. The study demonstrates that knowledge base, developed through both internal and external sources, played a significantly more important role in the EU-15 than in the EU-12, with a tendency to decrease these disparities (most visible with respect to KIBS input). The growing importance of an external knowledge base was more visible and stable in the EU-12 countries. R&D expenditures were an exception. The recent financial crisis heavily affected only external R&D expenditures.

Keywords: knowledge, R&D, services, manufacturing, EU

JEL: O14, O47

Introduction

In today's knowledge-based economies operating in a competitive global landscape, knowledge is an essential asset, a key for firms' profitability and survival, to a greater extent than traditional production factors (Nonaka 1994; Dean and Kretschmer 2007). Thus, the ability to create and apply new knowledge is considered to be one of the primary sources of competitive advantage (Nonaka 1991; Mu et al. 2008).

Firms need to acquire new knowledge from numerous internal and external sources in order to constantly generate innovations and maintain their competitive edge (Cotic Svetina and Prodan 2008; Santamaria et al. 2009; Basit and Medase 2019). Moreover, the development of knowledge-based economies, the information and communications technology (ICT) revolution, and increased competition made it necessary to reorganise production processes in order to increase their efficiency (Jones and Kierzkowski 1990; Baldwin 2014). As a result, the growing demand for business services (in particular those related to new technologies and knowledge, which are called "knowledge-intensive business services" – KIBS) occurred, as well as the tendency to outsource business services. In the light of this phenomenon, the growing importance of knowledge input acquired from external sources should be expected.

The aim of the paper is to examine the changing role of the internal knowledge base and the acquisition of knowledge from external sources in manufacturing and service enterprises. I proposed three indicators to measure the importance of an internal knowledge base, and two indicators to measure knowledge acquired from external sources. Finally, the average annual growth rates of all indicators are compared with average annual productivity growth in the manufacturing and services sector, measured by total factor productivity (TFP), as the production of new knowledge together with the transmission of the existing knowledge are important drivers of productivity performance (Bostian et al. 2020). To take into account the impact of the recent financial crisis, the analysed period is divided into three sub-periods: 1995–2007, 2008–2010 and 2011–2018/19 (these sub-periods cover different years with respect to different indexes depending on the period for which the relevant data is available). To compare the results for the 'old' and 'new' EU member states, the weighted averages for the EU-15 and the EU-12 are calculated (with weights assigned based on each country's share in the EU-15's and EU-12's output respectively).

The paper is organised as follows. Section 2 reviews the related studies. Section 3 describes the methodology and data source. Section 4 presents and discusses the empirical results. Section 5 concludes.

Literature review

High-skilled, professional employees represent the most important internal source of knowledge (Divanna and Rogers 2005; Gabcanova 2011). Based on their internal knowledge base, firms acquire knowledge through in-house R&D activities and by learning from continuous improvements in business processes. Firms may also develop their knowledge base through education and training.

If firms do not have an appropriate knowledge base inside the firm, they can acquire it externally by cooperating with customers and suppliers, as well as other firms. Among the external sources of knowledge, inter-firm collaboration has received the most widespread research attention, as a consequence of the dynamic development of outsourcing and the offshoring of business services since the 1980s. Nowadays, in order to bring new products, processes and services to the market, firms must mobilise a broad set of skills, which are often beyond their internal capabilities and which include not only technical skills but also market analysis, logistics, and behavioural sciences. Outsourcing and cooperating with other firms enable enterprises to specialise and enhance their competitive advantage (Abramovsky et al. 2004), using their internal knowledge resources optimally and combining them with their partners' specific competencies. In recent years, the range of business services that have been subject to these processes has extended from simple, routine, and standardised tasks to KIBS, such as IT applications, finance and accounting, engineering, R&D, and human resources (Massini and Miozo 2010; Berchicci 2013; Garavelli et al. 2013).

Firms may acquire knowledge from other private or public firms. In the first case, knowledge input is delivered by firms from the KIBS sector, while in the second case, by universities or public research organisations (Keeble and Wilkinson 2000; Li et al. 2019). KIBS are increasingly recognised as important carriers of new knowledge that is developed in upstream sectors and then diffused into other industries (Schricke et al. 2012), which determines their value added and productivity (Tomlinson 2000; Baker 2007; Wyszkowska-Kuna 2016). KIBS may also be used to translate codified academic knowledge into practical and accessible know-how, to enhance product differentiation, and they may help companies to reduce costs by providing services more cheaply (Di Cagno and Meliciani 2005).

Data and methodology

The study refers to the manufacturing and service sectors, and thus all indicators are calculated for the manufacturing sector (including all manufacturing divisions, i.e., D15-D37 according to NACE Rev. 1.1 and C10-C33 according to NACE Rev. 2) and for the service sector (including the service divisions except public services, i.e., G50-K74 according to NACE Rev. 1.1 and G45-N80 according to NACE Rev. 2).

The first indicator takes the form of the share of hours worked by high-skilled persons engaged in total hours worked (HHS). The values of this indicator are presented in WIOD (2013), but they are available for individual manufacturing and service industries. Thus, it was necessary to calculate it for all manufacturing and service sectors, according to the formula:

$$HHS^{I} = \frac{\sum_{i \in I} HHS_i \cdot HEMP_i}{\sum_{i \in I} HEMP_i} \cdot 100\% \tag{1}$$

where *HEMP* = total hours worked by persons engaged[1]; *I* denotes the group of industries (i.e. *M* – the manufacturing sector and *S* – the service sector); and *i* denotes divisions according to the NACE classification.

The second index (PROFS) shows the share of Professionals in total employment in manufacturing and services (Eurostat 2020). It can be calculated for the period 2008–2019.

The third indicator measures R&D expenditures in manufacturing and services. It is calculated as the ratio of R&D expenditures and gross output (ExR&D/GO – hereinafter called the R&D index) based on data derived from the OECD STAN Database and Eurostat.

The indicator measuring knowledge acquired from other firms takes the form of the share of KIBS input in total intermediate inputs. It is calculated according to the formula:

$$IIKIBS^{I} = \frac{\sum_{i \in I} IIK_i}{\sum_{i \in I} II_i} \cdot 100\% \tag{2}$$

where *II* = all intermediate inputs derived from Use tables; *IIK* = intermediate inputs from KIBS sectors (J62–63 and M69–73); *I* and *i* denote as in formula (1). KIBS are defined as including the following divisions: Computer programming, consultancy and related activities; information service activities (J62–63); Legal and accounting activities; activities of head offices; management consultancy activities (M69–70); Architectural and engineering activities; technical testing and analysis (M71); Scientific research and development (M72); Advertising and market research (M73) (Schnabl and Zenker 2013). This indicator measures the acquisition of knowledge input from external entities, which includes knowledge input acquired from both private and public enterprises. Separately, data on R&D intermediate input (hereinafter denoted as II72), which is a part of IIKIBS, is presented to compare the importance of expenditures on R&D developed internally and purchased from external sources. The index

1 The term 'persons engaged' is wider than the term 'employees' as it also includes self-employed and family workers (O'Mahony and Timmer 2009).

is also calculated as the ratio of R&D intermediate input and gross output – II72/GO (hereinafter called the IIR&D index) based on the formula:

$$IIR\ \&\ D^I = \frac{\sum_{i \in I} II72}{\sum_{i \in I} GO} \cdot 100\% \tag{3}$$

When calculating the last index, one has to face the problems arising from the change in the classification of R&D expenditures in national accounts (since 2009). ESA2010 has expanded the range of intellectual property products (intangible assets) by including R&D. This means that, according to ESA2010, expenditures related to R&D activities are treated as investment expenditures, and not as intermediate consumption (ESA1995). As a result, now both external and internal R&D are recorded together in the gross fixed capital formation account (GFCF), whereas R&D intermediate input includes only expenditures incurred by the division M72 (Scientific research and development – they may be called "pure R&D services"). This means that most external R&D is excluded from the II72 value.

Moreover, according to ESA1995, external R&D (II72) used to be assigned to each division – thus, it was possible to calculate their values in manufacturing and services. Since R&D have been classified in the GFCF account, they refer to the whole economy. Thus, in order to estimate the values of external R&D in manufacturing and services, first I calculated the shares of II72 that were incurred in manufacturing and services, as well as the shares of external R&D in total R&D (external and internal). Such calculations were made for each country in 2007 (the year before the ESA2010 regulations were introduced and before the outbreak of the recent financial crisis). Further, these shares were used to calculate which part of R&D GFCF should be assigned to external R&D, and which part of external R&D should be assigned to the manufacturing and service sectors. Finally, this value was added to II72 ("pure R&D services") in manufacturing and services. Such calculations were made for the period 2009–2016. This ensures index comparability in the whole analysed period. The II72 value calculated using this method was also included in the IIKIBS value.

The values of HHS and IIKIBS are calculated based on data from the WIOD database. It covers the period 1995–2009 (2013 Release), and 2000–2014 (2016 Release). The HHS values are available only in the WIOD 2013 Release. The IIKIBS values can be calculated for both periods. One should note, however, that the WIOD 2013 Release was developed based on NACE Rev. 1.1, while the WIOD 2016 Release is based on NACE Rev. 2. As a result, one can notice some changes in the way some services included in the KIBS category are classified. Moreover, data in the WIOD 2016 Release are more disaggregated than those in the WIOD 2013 Release. These change the definition of KIBS, thus making the results incomparable. Finally, one should note that the definition of KIBS according to the WIOD 2016 Release is more relevant as, to a larger extent, it includes only those services that are knowledge-intensive, and therefore

I used data from the WIOD 2016 Release. Additionally, the ESA Input-Output tables (Eurostat) are used to extend the analysed period till 2016. The data on IIR&D was derived from the same sources.

Finally, the growth accounting framework (O'Mahony and Timmer 2009) is used to calculate changes in TFP (value-added based, in 2010 prices) on the basis of data derived from the EU KLEMS database (2017).

Empirical results

In Table 1, the values of the HHS, PROFS and IIKIBS indexes in manufacturing and services in the EU countries are presented. In 2009 their values ranged as follows:

- HHS from 38% (Ireland) to 6% (Portugal, Bulgaria, Malta and Romania) in manufacturing and from 46% (Greece and Ireland) to 14% (Romania) in services,
- PROFS from 23% (Finland) to 3% (Slovakia) in manufacturing and from 27% (Finland and Sweden) to 15% (Slovakia) in services,
- IIKIBS from 14% (Ireland) to 1.5% (Cyprus) in manufacturing and from 28% (Belgium) to 6% (Luxembourg) in services.

The HHS and PROFS indicators increased their values in all EU countries in manufacturing (PROFS except Latvia), and in almost all EU countries in services. The strongest increase in the HHS value took place in Ireland (+23 pp in manufacturing and +21 pp in services), while the lowest was in Cyprus (+1 pp in manufacturing) and in Lithuania (-7.6 pp in services). The PROFS index recorded the highest growth in Finland (+11 pp in manufacturing) and Great Britain (+13 pp in services), while the lowest was in Latvia (-0.2 pp in manufacturing) and Greece (+3.8 pp). KIBS input also increased its share in total intermediate inputs in almost all EU-12 countries and most of the EU-15 countries, though the EU-15 average in manufacturing slightly decreased. The strongest increase in the index value can be noticed in Ireland (+6 pp in manufacturing) and Belgium (+7.3 pp in services).

All three indexes (Table 1) played a more significant role in the EU-15 than in the EU-12. Particularly high disparities are visible in manufacturing, where the EU-15 average values were about twice higher than those for the EU-12, with the highest disparity in the case of IIKIBS. The disparity between the EU-15 and the EU-12 in services was much less significant. In both groups, one can notice some exceptions – Portugal and Italy reached low values among the EU, while in Estonia (HHS), Lithuania and Slovakia (PROFS in services) and Malta (IIKIBS in services) the situation was the reverse. All indexes (except PROFS) recorded stronger increases in the EU-12 than in the EU-15.

The values of all indexes in services were higher than in manufacturing, with the highest disparity in the case of KIBS input. Moreover, this is more visible in the EU-12 than the EU-15 due to the relatively low values of all indexes in manufacturing in the EU-12 in comparison with the EU-15 countries.

Table 1. The values of the HHS, PROFS and KIBS indexes in (%) and their changes (in pp) in the periods covered by the study in manufacturing and services in the EU countries

Country	HHS				PROFS				IIKIBS			
	2009	Change[a]	2009	Change[a]	2019	Change[a]	2019	Change[a]	2016	Change[a]	2016	Change[a]
	M[b]		S[b]		M[b]		S[bc]		M[b]		S[b]	
AUT	15	8	19	8	10	6	18	5	6	–0.1	22	2.6
BEL	15	5	32	13	12	5	22	7	7	2.1	28	7.3
DNK	25	11	27	7	15	7	23	7	4	–0.6	14	1.6
FIN	32	9	41	5	23	11	29	11	12	–2.8	19	4.7
FRA	27	12	39	14	11	0	21	8	10	0.3	20	3.8
GER	24	6	30	9	13	4	17	5	7	–0.5	19	2.0
GBR	27	11	35	13	20	10	25	13	6	0.8	21	1.9
GRC	14	5	46	15	8	3	18	4	5	–1.3	8	0.7
IRL	38	23	46	21	16	5	23	7	14	5.7	13	–8.8
ITA	8	5	27	12	5	2	16	4	8	–0.1	18	–0.8
LUX	23	8	41	19	23	5	–	–	2	–1.1	6	–0.9
NLD	22	11	36	15	17	8	25	10	7	–4.1	21	–0.4
PRT	6	3	15	6	6	4	21	–	3	0.1	18	–0.6
ESP	31	15	42	19	9	4	15	5	4	0.5	13	1.8
SWE	17	8	29	14	12	3	29	7	10	–2.6	18	0.4
BGR	6	3	19	10	5	0	–	–	2	0.5	11	3.6
CYP	17	1	48	–3	8	6	–	–	2	0.2	19	5.7
CZE	9	3	26	9	6	3	19	5	4	1.4	17	3.0
EST	25	4	43	–1	9	4	–	–	4	–0.6	12	2.2
HUN	12	4	24	9	8	2	17	5	3	0.6	16	2.5
LTU	22	7	40	–8	9	2	22	5	2	–0.1	11	0.5
LVA	18	5	33	–1	5	0	–	–	3	0.1	13	2.8
MLT	6	3	18	8	11	5	–	–	5	–2.2	23	1.9
POL	15	8	35	12	9	3	21	8	4	0.0	16	1.0
ROU	6	3	14	4	9	1	17	4	5	2.4	15	6.9
SVK	8	2	26	10	3	0	15	–	3	0.0	17	2.6
SVN	15	6	31	12	11	5	22	9	5	0.7	18	0.9
EU15	22	9	34	13	12	4	20	8	7	–0.2	19	1.5
EU12	12	5	29	9	8	2	19	6	4	0.6	16	2.1

[a] Changes in the following periods: HHS 1995–2009; PROFS 2008–2019; IIKIBS 2000–2016.

[b] M – manufacturing; S – services.

[c] Excluding Accommodation and food service activities; and Real estate activities.

Source: own calculations based on data derived from WIOD 2013, 2016; Eurostat 2020a.

Table 2. The values of the IIR&D and R&D indexes (in %) and their changes (in pp) in the periods covered by the study in manufacturing and services in the EU countries

Country	IIR&D				R&D					
	M		S[a]		M			S[a]		
	2016	2000–2016	2016	2000–2016	2017	1995–2017	2000–2017	2017	1995–2017	2000–2017
AUT	0.6	0.0	0.2	0.1	2.7	0.9	0.7	0.9	0.5	0.4
BEL	1.2	0.7	0.2	0.1	2.0	0.5	0.4	0.8	0.5	0.4
DNK	0.5	0.3	0.3	0.2	3.2	–	0.1	0.9	–	–0.3
FIN	3.3	–0.2	0.1	–0.1	2.2	0.5	–0.3	0.8	0.4	0.2
FRA	2.6	–0.4	0.3	–0.1	2.1	–	0.2	0.8	–	0.2
GER	0.7	0.0	0.1	0.0	3.0	0.5	0.4	0.4	0.3	0.2
GBR	0.4	0.1	0.3	0.1	1.9	–	0.3	0.7	–	0.1
GRC	0.0	0.0	0.2	0.0	0.5	0.3	0.3	0.4	0.4	0.4
IRL	4.0	1.6	1.5	0.9	0.6	–0.6	–0.2	0.5	0.4	0.3
ITA	1.3	0.4	0.3	0.1	1.1	0.4	0.4	0.3	0.2	0.1
LUX	0.1	0.0	0.01	0.0	–	0.0	0.0	0.1	–	0.1
NLD	1.9	–1.2	0.3	–0.2	1.5	–	–0.2	0.5	0.3	0.2
PRT	0.3	0.0	0.3	–0.1	0.6	0.5	0.4	0.5	0.4	0.3
ESP	0.8	0.1	0.4	0.0	0.7	0.2	0.1	0.4	0.3	0.2
SWE	1.6	0.1	0.6	0.0	3.2	–	0.2	1.3	–	0.4
BGR	0.1	0.0	0.02	0.0	0.3	–	0.2	0.4	–	0.3
CYP	0.0	0.0	0.04	0.0	0.4	–	0.2	0.1	–	0.1
CZE[b]	0.8	0.3	0.1	0.1	0.7	–	0.1	0.6	–	0.4
EST	0.1	0.0	0.1	0.0	0.4	–	0.0	0.4	–	0.1
HUN	0.4	0.1	0.5	0.0	0.6	0.2	0.3	0.7	0.7	0.6
LTU	0.1	0.0	0.1	0.0	0.2	–	0.1	0.3	–	0.2
LVA	0.1	0.0	0.3	–0.1	0.2	–	0.1	0.1	–	0
MLT	0.0	0.0	0.02	0.0	0.4	–	–0.1	0.2	–	0.1
POL	0.3	0.0	0.2	0.0	0.4	0.1	0.1	0.5	0.4	0.5
ROU	0.2	0.0	0.2	–0.1	0.2	–0.3	–0.1	0.2	0.1	0.2
SVK	0.1	–0.2	0.2	–0.2	0.4	0.1	0.2	0.2	–0.1	–0.1
SVN	0.7	–0.1	0.3	–0.1	1.6	0.9	0.8	0.5	0.4	0.2
EU15	1.2	0.0	0.3	0.03	2.0	–	0.3	0.6	–	0.2
EU12	0.4	0.1	0.2	–0.02	0.5	–	0.1	0.4	–	0.3

[a] Data on services excluding Real estate (Germany), Transportation and storage (Poland), and Publishing, motion picture, video, television programme production; sound recording, programming and broadcasting activities (Ireland) in the years 2015–2017.

[b] Czechia (2000–2007).

Source: own calculations based on data derived from WIOD 2013, 2016; OECD 2020; Eurostat 2020b.

In Table 2, one can find the values of the two indexes used to compare the role of external and internal expenditures on R&D activities. Both indexes reached values below

1% in most EU countries in 2016/17. Higher index values can be noticed in the following countries: of IIR&D in Ireland (both sectors), Belgium, Finland, France, Italy, the Netherlands and Sweden (in manufacturing), and of R&D in most of the EU-15 countries and Slovakia (in manufacturing) and Sweden (in services). The values ranged as follows:

- IIR&D from 4% (Ireland) and 0% (Greece, Cyprus and Malta) in manufacturing and 1.5% (Ireland) to 0.01% (Luxembourg) in services,
- R&D from 3.2% (Denmark and Sweden) to 0.2% (Lithuania and Latvia) in manufacturing and from 1.3% (Sweden) to 0.1% (Cyprus and Latvia) in services.

One can notice that internal R&D expenditures played a more important role than external ones in almost all EU countries with respect to both manufacturing and services. The situation was the reverse only in some of the EU-15 countries (in Ireland in both sectors; in Belgium Finland, France, Italy, the Netherlands, and Sweden in manufacturing; and in Latvia in services).

The values of the IIR&D index increased or stayed at a similar level in most of the EU countries. A downward trend is visible in six countries. The biggest change in the index value took place in Ireland (+1.6 pp in manufacturing and +0.9 pp in services), while the strongest decline was in the Netherlands (-1.2 pp in manufacturing).

Both indexes recorded much higher values in the EU-15 than in the EU-12 – in the case of IIR&D, it was three times higher and in the case of R&D, four times higher. This proves that the R&D disparity between the EU-15 and the EU-12 is much more significant than with respect to the indexes presented in Table 1. This was the case only in manufacturing.

The IIR&D index in manufacturing reached four times higher (EU-15) / twice (EU-12) higher values than in services, and the R&D index in manufacturing recorded three times higher value than in services (EU-15). This proves that R&D expenditures in manufacturing played a much more important role than in services.

The average annual growth rates of all indexes in the following sub-periods are presented in Table 3. The HHS index increased its value in almost all EU countries through both periods. During the pre-crisis period, the index value declined only in Lithuania and Latvia (in services). What is worth mentioning is that the growth rates during the crisis period were usually significantly higher than during the pre-crisis period (in the EU-12 three/four times higher). The situation was similar regarding the PROFS index, i.e., an upward trend prevailed. During the post-crisis period, the index value declined only in Bulgaria and Latvia (in manufacturing). The index growth rates in the EU-12 were usually higher than in the EU-15, and they usually reached similar values in both periods (except manufacturing in the EU-12 where it increased from 0 to 4 pp).

As far as the IIKIBS index is concerned, an upward trend prevailed through all periods only in some of the EU countries (7 in manufacturing and 11 in services, mainly the EU-12). In general, the index value increased in most of the EU-12 countries, and the strongest growth took place during the pre-crisis period. One should note that the index growth rates in some of the EU-12 countries were really impressive then (e.g. in manufacturing: 50 pp in Romania, 34 pp in Lithuania, 32 pp in Czechia,

25 pp in Hungary; and in services: 58 pp in Romania, 27 pp in Latvia, 22 pp in Bulgaria, 18 in Czechia). As a result, the EU-12 index average growth rates reached the highest values (16 pp in manufacturing and 12 pp in services).

An upward trend continued during the crisis period, but it was much weaker. In the EU-15 countries, the situation was similar, but only regarding the service sector. The index growth rate in manufacturing was negative (due to its sharp decline in Finland and Sweden, as well as a downward trend in three large countries, i.e., Germany, Italy, and Spain). Surprisingly, this trend was reversed already during the crisis period. The post-crisis period was characterised by much higher growth rates than the crisis period (2–3 times higher), though in the EU-12 they did not reach the pre-crisis values. This was the case only in manufacturing as the index growth rates in the services sector declined in the post-crisis period (it even reached a negative value in the EU-15). In general, the index values in the EU-12 were higher than in the EU-15.

During the pre-crisis period, the IIR&D index declined or did not change its value in almost all EU-15 countries (the average growth rate remained unchanged). The tendency was the reverse in the EU-12, but the average growth rate was low (1 pp). During the crisis period, the index value declined significantly in most of the EU countries (more heavily in the EU-15 and in manufacturing). An upward trend returned in the next period, and what is worth stressing, the growth rates were higher then than in the pre-crisis period. Ireland and Hungary (in manufacturing) and Sweden (in services) stood out due to the relatively high and stable growth rates of both indexes through the whole analysed period. Finally, the R&D index recorded an upward trend throughout all periods. In some cases, the growth rates were very high. One should note, however, that the index values were usually low and, in such a case, even a small increase (e.g. +0.1 pp) may result in a relatively high growth rate. In general, the EU-15 experienced higher growth rates than the EU-12.

To sum up, IIR&D is the only index that recorded negative growth rates during the crisis period. During the non-crisis periods, the highest growth rates can be assigned to IIKIBS in both groups of countries and to R&D in the EU-12.

Table 3. Average annual growth rates of the HHS, PROFS, IIKIBS, IIR&D, R&D indexes (in pp) in the three sub-periods in manufacturing and services in the EU countries

Index	HHS		PROFS		IIKIBS			IIR&D			R&D		
Period[a]	I	II	II	III	I	II	III	I	II	III	I	II	III
Country	Manufacturing												
AUT	6	8	5	6	2	–1	5	–1	–19	4	2	3	4
BEL	2	–5	2	3	7	28	15	0	8	7	–1	4	4
DNK	4	5	13	2	0	–5	–10	7	–10	3	–	0	1
FIN	2	10	9	4	–15	10	–10	–2	–31	–6	4	8	–6
FRA	4	5	1	0	4	–6	8	0	–14	2	–	1	2
GER	2	8	6	1	–5	0	8	–1	–19	2	–1	3	3
GBR	5	–2	–1	1	9	6	4	0	–15	–1	–	–1	6
GRC	4	–5	–6	2	18	–5	–19	–	–	–	3	–	8

Index	HHS		PROFS		IIKIBS			IIR&D			R&D		
Period[a]	I	II	II	III	I	II	III	I	II	III	I	II	III
IRL	6	11	11	1	7	65	30	6	8	8	–4	–3	–3
ITA	7	–1	–4	4	–4	–2	12	0	–28	1	0	9	4
LUX	2	46	–28	2	–31	36	–18	–4	19	7	–	–	–
NLD	5	2	5	4	0	–18	–15	0	–21	–1	–1	0	2
PRT	4	15	–5	5	13	–1	–1	1	–28	–4	12	–1	1
ESP	5	6	11	3	–2	14	4	0	–19	4	3	–3	0
SWE	6	6	1	3	–15	–13	11	–1	0	7	–	4	–1
BGR	4	15	3	–1	15	21	–1	–4	–37	2	–	–7	33
CYP	0	8	10	10	16	–11	–3	–	–	–	–	–4	20
CZE	2	12	–8	9	32	13	5	1	–29	5	–3	1	5
EST	1	2	12	4	–6	1	4	5	–33	5	–	50	–22
HUN	2	5	3	3	25	–20	24	3	11	6	2	3	3
LTU	2	4	0	1	34	–6	3	4	–61	–1	–	–3	11
LVA	2	–10	9	–4	16	–2	–5	0	–2	4	–	50	–3
MLT	4	15	2	7	–35	4	14	–	–	–	–	–1	–4
POL	5	9	3	3	–4	4	2	2	–4	–2	–7	8	16
ROU	4	15	–1	1	50	12	7	2	–8	9	–7	–2	1
SVK	1	6	6	0	8	3	30	–8	–17	1	–9	24	14
SVN	3	12	1	4	4	2	4	–1	–23	1	3	14	–3
EU15	4	4	3	2	–1	2	6	0	–18	2	–	3	3
EU12	3	10	0	4	16	4	8	1	–13	3	–	7	9
Services													
AUT	5	1	–	4	9	0	2	1	–9	3	7	7	1
BEL	3	7	5	4	21	9	6	–1	18	5	2	9	7
DNK	2	–3	4	1	12	–4	–4	5	–12	2	–	–6	–2
FIN	1	5	1	3	3	21	7	–4	–32	–11	6	–5	1
FRA	3	4	–	5	11	1	2	1	–10	0	–	11	0
GER	2	7	3	1	11	–3	3	–2	–20	1	10	11	3
GBR	3	5	3	1	3	1	–1	–2	–28	–2	–	0	–1
GRC	2	12	0	1	23	2	–4	3	–42	0	6	–	16
IRL	4	1	1	1	3	–20	2	16	–18	–1	–	–	–4
ITA	5	–4	–1	3	–2	9	–8	–1	25	–1	9	4	6
LUX	3	7	–	–	–27	1	2	–9	27	–6	–	–	–
NLD	4	1	2	3	0	5	–10	–1	–3	–2	5	6	0
PRT	3	2	–	–	–3	0	3	–2	–25	–2	21	2	–2
ESP	4	4	3	3	0	16	0	2	–35	3	12	13	–1
SWE	4	3	–2	3	–6	4	4	3	45	2	–	–6	9
BGR	4	3	–	–	22	29	–1	–4	–28	1	–	69	5
CYP	0	–1	–	–	14	2	2	4	–7	–5	–	–9	20
CZE	2	7	–5	5	18	5	–5	2	–24	9	–	8	5
EST	–1	6	–	–	10	5	7	5	–27	3	–	9	–3
HUN	3	1	4	2	9	8	4	0	–18	8	18	53	9
LTU	–1	5	9	3	15	–4	–6	1	–53	–2	–	28	6

Index	HHS		PROFS		IIKIBS			IIR&D			R&D		
Period[a]	I	II	II	III	I	II	III	I	II	III	I	II	III
LVA	–2	18	–	–	27	4	4	–2	4	1	–	3	–2
MLT	4	9	–	–	–8	4	4	–5	–33	–4	–	17	6
POL	3	12	5	4	–1	6	1	3	3	–1	8	0	24
ROU	2	4	4	1	58	0	0	–1	–4	5	–2	5	11
SVK	3	10	–	–	13	2	21	–5	–14	1	–5	2	6
SVN	4	1	1	2	–1	5	3	–2	–22	2	4	41	–7
EU15	3	4	2	3	6	3	–0.3	–0.1	–11	2	–	7	2
EU12	2	8	3	3	12	5	2	1	–11	12	–	12	12

[a] I – 1995–2007 or 2000–2007 (depending on the period for which the relevant data is available); II – 2008–2010; III – 2011–2016/19 (depending on the period for which the relevant data is available.
Source: own calculations based on data presented in Tables 1–2.

As far as individual countries are concerned, Ireland and Finland stood out. Ireland recorded the highest values of the following indexes: HHS, IIKIBS (in manufacturing) and IIR&D, as well as the highest dynamics of IIKIBS (in manufacturing) and IIR&D. Moreover, it was the only country where external R&D played a much more important role than internal ones in both sectors. Finland recorded the highest value of PROFS, the second-highest of IIKIBS and among the highest values of other indexes (high dynamics of PROFS in manufacturing and IIKIBS in services, whereas there was a sharp decline of IIR&D). The relatively high values of all indexes and usually their high dynamics can also be noticed in Great Britain (except IIR&D in manufacturing) and France.

Among the EU-12, it is more difficult to identify the leading countries, as the variation within this group is usually less visible than in the EU-15. Malta and Slovenia recorded the highest values of PROFS and IIKIBS, Estonia of HHS and Hungary of R&D (both external and internal). While taking into account the dynamics, Romania stood out with its high growth rates of IIKIBS – during the pre-crisis period it was four times higher (manufacturing) / three times higher (services) than the EU-12 averages. The high growth rates of IIKIBS through all periods can be noticed in Czechia, Hungary (except the crisis period), Romania, Slovakia (only in manufacturing) and in Estonia, Hungary, Latvia, and Slovakia (only in services). Cyprus recorded the highest growth rate of PROFS (only in manufacturing) and Hungary of R&D (both external and internal).

In Poland, three indexes, i.e., HHS, PROFS and R&D, recorded higher values and dynamics than the EU-12 average. One should note that during the post-crisis period, Poland experienced the highest growth rate of R&D in services (24 pp) and its third-highest rate in manufacturing (16 pp), but the R&D value in manufacturing was still five times lower than the EU-15 average. The IIKIBS values reached the EU-12 average, while its dynamics was usually far below the EU-12 average.

Finally, the Pearson correlation coefficient was used to examine the correlation between the average annual growth rates of each index and TFP in the three following sub-periods (Table 4). The results proved that the growth rates of IIR&D and PROFS

were positively correlated with the growth rates of TFP – in the first case, a stronger correlation took place in services, while in the second case, the situation was the reverse. A higher correlation between the growth rates of IIR&D and TFP in the services sector than in manufacturing is because service companies usually do not have their own research base to conduct their internal R&D activities, and therefore, they outsource them more often than manufacturing companies.

Table 4. Average annual TFP growth rates in the EU countries in the period 1995–2015 (in pp)

Country	Manufacturing			Services		
	1995–2007	2008–2010	2011–2015	1995–2007	2008–2010	2011–2015
AUT	2.6	–2.4	0.7	0.6	0.3	0.3
DNK	1.3	1.4	3.1	0.2	1.0	0.5
FIN	6.4	–4.5	–0.6	1.3	–1.5	–0.5
FRA	2.9	1.9	1.1	2.0	–1.0	0.3
GER	3.1	1.1	0.5	1.3	–2.0	0.8
GBR	2.3	1.8	–0.1	1.1	0.6	0.7
GRC	1.0	–4.6	1.1	0.4	–4.5	1.7
ITA	0.5	0.2	1.0	–0.2	–0.8	0.2
LUX	1.4	–3.8	8.5	0.5	0.1	–0.5
NLD	2.8	–1.3	0.6	1.0	–0.9	0.9
ESP	0.0	–0.6	3.0	–0.6	–0.7	1.1
SWE	4.0	1.3	–1.1	1.1	–2.5	2.2
CZE	4.8	1.3	–0.4	0.7	–1.6	2.4
EST	0.7	3.9	3.5	4.2	–0.5	1.1
HUN	–	–	0.3	–	–	0.9
LTU	5.0	0.9	4.4	2.9	–4.8	1.4
POL	8.4	5.3	2.2	3.1	0.0	–0.8
SVK	8.4	6.5	5.9	2.4	–2.2	1.2
SVN	5.3	–0.2	1.1	2.1	–2.8	0.7
EU12	2.3	0.6	0.8	0.9	–1.0	0.7
EU6/7	6.1	3.4	1.9	2.1	–0.9	0.3

GBR – 1997–2007 and 2011–2014; GRC, ITA, SWE – 2011–2014; NLD – 2000–2007; EST, LTU, SVN – 2000–2007; POL – 2003–2007; SVK – 2004–2007.
Source: own calculations based on data derived from EU KLEMS 2017.

The negative correlation between the growth rates of R&D and TFP in services may indicate that the service industries that experience TFP growth (i.e., information and communication services, financial services, retail and wholesale trade, real estate activities – see Wyszkowska-Kuna 2019) shifted from internal to external R&D activities during the periods covered by the present study. The correlation between these variables in manufacturing companies appeared to be very weak, which may result from the fact that in general the higher TFP growth rates usually occur in less technologically advanced companies that catch up with more advanced companies. One should note, however, that less developed companies do not have their own research

base, and thus, if they do R&D activities, they also outsource them. Moreover, there may be other sources of their productivity improvement, as many different factors affect TFP growth (Wyszkowska-Kuna 2016). As far as the growth rates of IIKIBS are concerned, a weak positive correlation with the TFP growth rates is visible but only during the pre-crisis period. While dividing the sample into the EU-15 and EU-12, some better results are obtained for the EU-12, which is due to this group's stronger reliance on external knowledge sources. What came as a surprise is that the correlation was negative in the case of the HHS index. This may be explained as follows: the growing share of high-skilled hours worked resulted in a disproportionate growth of labour input costs, thus leading to the growing contribution of labour input and the decreasing contribution of TFP to valued added growth.

Conclusions

Based on the study carried out in this paper, a few conclusions can be formulated:

1. Knowledge base, developed through both internal and external sources, played a significantly more important role in the EU-15 than the EU-12, with a tendency to decrease these disparities in most cases (most visible with respect to IIKIBS). The highest disparities referred to R&D expenditures in manufacturing enterprises (both internal and external R&D), and in general, they were more visible in manufacturing than in service enterprises. Variation within the EU countries was high with respect to all indexes.
2. The development of an internal and external knowledge base took place through all periods covered by the study in both sectors and in both groups of countries. The impact of the recent financial crisis, resulting in lower but – what is worth stressing – still positive growth rates, can be observed regarding KIBS expenditures in service enterprises (in both groups), as well as with respect to the share of professionals in employment and KIBS expenditures in manufacturing (only in the EU-12). In the EU-12 countries, the post-crisis period restored higher growth rates in these fields, though not always at the pre-crisis level (KIBS expenditure). The opposite trend can be noticed in the case of KIBS expenditures in services. External R&D expenditures were the only knowledge source that was heavily affected by high negative growth rates during the crisis period. One should note that, at the same time, internal R&D expenditures enjoyed positive growth rates, meaning that the recent crisis significantly reduced the outsourcing of R&D activities. Such a trend occurred only during the crisis period as in the following years, the growth rates of expenditures on external R&D were higher than before the crisis.
3. The growing importance of an external knowledge base is clearly visible in the EU-12 (throughout all periods), whereas in the EU-15 it was less obvious and stable (it occurred in manufacturing in the pre-crisis period and in services in the post-crisis period). The situation was the reverse regarding R&D expenditures.

This means that the increasing trend and significance of accessing external suppliers for undertaking R&D based on contractual modes, which has been discussed at length by innovation scholars (Howells 1999; Gassmann 2006; Martinez-Noya et al. 2012; Kamuriwo and Baden-Fuller 2016), is not confirmed by the findings of the present study.

4. All indexes except R&D expenditures (both external and internal) recorded higher values in services than in manufacturing. This is due to the fact that, along with the structural transformation towards economies based on knowledge and innovation, the growing use of services, especially those related to knowledge and new technologies, was observed. As a result, knowledge-intensive services, which are classified based on the share of tertiary educated people (Eurostat 2020c), have become the main driving force behind the shift to the new service economy. Moreover, the outsourcing of business services, including knowledge-intensive ones (the process that started before 1995 in high-income countries), reduced the employment of tertiary educated people in manufacturing enterprises. This explains the higher values of HHS and PROFS in services than manufacturing. As far as KIBS input is concerned, one should note that among the industries with the most intensive KIBS intermediate consumption, the following can be mentioned: financial services, telecommunication services, business services, wholesale and retail trade and high-tech manufacturing (Wyszkowska-Kuna 2016). The share of these service industries in the service sector's GDP (defined as including only services of the business economy, as in the present study) is much higher than the high-tech manufacturing industries' share in the manufacturing sector's GDP. The opposite trend regarding R&D expenditures results from a relatively lower reliance on R&D activities within service enterprises in comparison with manufacturing ones (Wyszkowska-Kuna 2013).
5. Ireland and Finland stood out with the highest importance of knowledge acquired from external and internal sources. Moreover, Ireland was the only country where external R&D played a much more important role than internal R&D. This may be due to Ireland's Research and Development Tax Credit[2], as well as the strong involvement of companies located in Ireland in global value chains, including KIBS and R&D activities (Wyszkowska-Kuna 2018).
6. In Poland, the development of the internal knowledge base played a more important role than the external one in the periods covered by the present study. All indexes recorded values more characteristic for the EU-12 than the EU-15, quite often at the level lower than the EU-12 average.
7. The growth rates of external R&D expenditures and professional employment appeared to be positively correlated with productivity performance.

2 The tax (introduced in 2004) aims at encouraging both national and international companies to undertake R&D activities within Ireland, and it is regarded as one of the best in the world.

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Streszczenie

Wewnętrzne i zewnętrzne źródła wiedzy w przedsiębiorstwach przetwórczych i usługowych. Analiza porównawcza krajów Unii Europejskiej

Znaczenie wkładu wiedzy w procesy produkcyjne wzrasta wraz z rozwojem gospodarek opartych na wiedzy. Przedsiębiorstwa mogą nabywać wiedzę poprzez rozwój własnej wewnętrznej bazy wiedzy i/lub przez nabycie wiedzy od zewnętrznych podmiotów. Wewnętrzna baza wiedzy może być rozwijana głównie poprzez zatrudnianie wysoko wykwalifikowanych pracowników oraz prowadzenie własnych badań. Celem pracy jest zbadanie znaczenia tych źródeł wiedzy w przedsiębiorstwach przetwórczych i usługowych, a ponadto porównanie zmieniającej się ich roli ze zmianami w produktywności w krajach UE. Badanie oparte jest na danych pochodzących z World Input-Output Database, Eurostat, OECD i EU KLEMS. Z uwagi na dostępność danych, analizowany okres obejmuje lata 1995–2018. Badanie wykazało, że rozwój bazy wiedzy, zarówno przy udziale źródeł wewnętrznych jak i zewnętrznych, odgrywa dużo większą rolę w krajach UE-15 niż UE-12, z tendencją do zmniejszania się tych dysproporcji (najwyraźniejszą w przypadku wkładu KIBS). Wzrost znaczenia zewnętrznych źródeł wiedzy był bardziej widoczny i stabilny w krajach UE-12 niż UE-15. Wyjątkiem były wydatki na działalność B&R. Wydatki na zewnętrzne B&R były jedynym źródłem wiedzy, które zostało mocno dotknięte przez ostatni kryzys finansowy.

Słowa kluczowe: wiedza, B&R, usługi, przetwórstwo, UE

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Negative Feedback Loop between Banks and Sovereigns in the Euro Area – Experience of the Crisis and Post-Crisis Perspective

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Abstract

The euro area crisis was characterised by a negative feedback loop between banks and sovereigns. The paper aims to indicate the genesis of this phenomenon and to determine the scale of its operation during the crisis and post-crisis conditions, as well as to identify the threats it brings. In addition, the paper discusses the actions that have been taken so far at the euro area level to reduce the feedback loop and the existing challenges in this area. The following hypothesis has been formulated: in the post-crisis conditions the euro area remains vulnerable to the sovereign-bank nexus, which in particular stems from the very legacy of the crisis, bank-based financial system, as well as incomplete reforms of the euro area institutional architecture. The research methods include data selection and evaluation as well as descriptive statistics. The main contribution of the study stems from the adoption of a post-crisis perspective and the assessment of the loop with the use of the most recent data and in relation to the crisis period. The results show that in the post-crisis period, a reduction in interconnectedness has been observed, although it has not been evenly experienced by all euro area countries. At the same time, despite some progress in recent years, institutional reforms aimed at breaking the sovereign-bank nexus are far from complete.

Keywords: bank-sovereign nexus, euro area crisis, contagion risk, safe assets

JEL: F15, F36, F45

Introduction

From today's perspective, it can be said that the euro area countries have already left behind the period of the most acute tensions related to the course of the global financial crisis of the early 21st century. 2018 was the fifth year in a row when positive economic growth was recorded in the euro area. An increasing number of indicators used to measure the degree of financial convergence in the euro area point to a continuing trend towards reintegration after a severe collapse during the crisis (cf. ECBb 2018). The risk of a partial breakup of the European Economic and Monetary Union (EMU) and a return to national currencies is no longer the main topic of discussion among policymakers and members of the academic community.

Nevertheless, the question remains whether the issue of the negative feedback loop between the banking sector and the public finance sector that characterised the crisis in the euro area has been resolved, and, if so, to what extent. Bilateral risk transfer between these sectors was observed at that time, which was fostered by the bank-based financial system in the EMU and institutional determinants (the transfer of the monetary policy to the central level, while leaving the responsibility for financial stability at the national level). The significance of the problem was evidenced by the fact that the motive for undertaking one of the most important reforms to change the structure of the euro area, i.e. establishing the EU banking union, was to "break the vicious circle between banks and sovereigns" (Euro Area Summit Statement 2012).

The aim of the paper is to indicate the genesis of the negative feedback loop between banks and sovereigns in the EMU, to determine the mechanism and scale of its operation during the crisis and in post-crisis conditions, as well as to identify the threats it brings. In addition, the paper will discuss current actions taken at the euro area level to reduce the feedback loop and the existing challenges in this area.

The co-occurrence of banking and sovereign debt crises Phases of the euro area crisis

The global financial crisis of the 21st century, and especially its course in the euro area, was characterised by a strong positive correlation between the country's risk and the banking sector's risk. Governments and banks are among the most important economic entities and, as a consequence, their situations are mutually determined. During sovereign debt crises, governments implement austerity policies, which – at least in the short term – reduce economic activity, negatively affecting the banking sector, e.g., by deteriorating the quality of the banking sector loan portfolio or by a decrease in demand for loans on the part of companies and households. On the other hand, in the case of a banking crisis, governments engage public funds to rescue institutions that are too big/too important to fail, which translates into a deterioration in public finances. That is why banking and sovereign debt crises often occur one after anoth-

er. According to the estimates of Dell'Ariccia et al. (2018, p. 5) conducted for a group of 66 countries in the period 2000–2014:

1) the probability of the occurrence of a sovereign debt crisis, provided that a banking crisis has previously occurred, is 51.0%;
2) the probability of the occurrence of a banking crisis, provided that a sovereign debt crisis has previously occurred, is 22.3%.

Similar results were obtained by Reinhart and Rogoff (2011), who conducted a study concerning a group of developed and developing countries using time series covering the years 1824–2009. The estimation of parameters of the multinomial logit model allowed the authors to conclude that systemic banking crises increased the likelihood of sovereign debt crises. The results proved to be stable when divided into sub-samples and were robust to changes in specifications.

De Paoli et al. (2009) studied the impact of sovereign debt crises on economic growth in a group of emerging economies in the years 1970–2000. The results of their study show that sovereign debt crises rarely occur in isolation. They are more often accompanied by banking or currency crises. In their sample, however, sovereign debt crises were more often the first to break out. The duration of sovereign debt crises and the accompanying recession depends on whether they coexist with other crises. Isolated episodes have the least severe consequences, while triple crises – debt, currency, and banking – have the most severe ones (see Table 1).

Table 1. Duration and output losses per year depending on different types of financial crisis

Type of crisis	Number of crises	Duration (years)		Loss (per year)	
		Average	Median	Average	Median
Sovereign only	1	4.0	4.0	2.5	2.5
Sovereign and banking	4	11.0	10.5	4.9	7.6
Sovereign and currency	10	8.9	9.5	13.7	14.3
Triple crises	17	12.5	14.0	12.7	11.1
All	**32**	**10.9**	**11.5**	**11.8**	**10.6**

Source: De Paoli et al. 2009, p. 22.

In terms of the characteristics of the euro area crisis, its onset is associated with the first tensions in the USA subprime mortgage market in 2007. Over time, it took the form of a debt crisis of some of its members. In particular, the following phases can be distinguished (cf. Cour-Thimann and Winkler 2013):

1. *The financial turmoil phase*, which began in August 2007. It was mainly characterised by tensions in the interbank market. At the same time, the economic outlook for the euro area was then assessed as relatively stable.
2. *The financial crisis phase*. The beginning of the phase dates back to 15th September 2008, when Lehman Brothers declared bankruptcy. In this phase, tensions in the financial market intensified, the governments of the euro area countries were forced to save banks using taxpayers' money, and the crisis also spread to the real economy.

3. *The debt crisis phase*. Its beginning falls at the turn of 2009/2010. The disclosure by the Greek government of unfavourable data on the state of public finances in the country was a flashpoint. In this phase, strong increases in government bond yields were observed in the peripheral euro area countries, which *de facto* cut off these countries from market sources of financing and forced them to seek assistance from international creditors. The sustained decline in the yields occurred only after the announcement by the European Central Bank (ECB) of the Outright Monetary Transactions (OMT) program, allowing unlimited purchases on the secondary market of short-term sovereign bonds, which took place in July 2012.

After the announcement of the OMT programme, a lasting decline in tensions in the sovereign debt market in the euro area was observed. The improvement was also recorded in the real sphere. Since 2014, GDP growth has remained positive in the vast majority of EMU countries, and unemployment has been steadily decreasing, although it remains high in some of the countries (Greece, Spain). Assessing the situation of public finances, a substantial decrease in the ratio of general government (GG) deficit to GDP has been observed in recent years. In 2018, almost all EMU countries met the Maastricht deficit criterion.[1] The debt-to-GDP ratio of the GG sector has also been systematically falling. It should be noted, however, that the ratios remain high in the countries most affected by the sovereign debt crisis (except Ireland). In particular, in 2018, the ratio exceeded the reference value of 60% more than three times in the case of Greece and twice in the case of Portugal and Italy.

The essence of the feedback loop mechanism

It is recognised that the International Monetary Fund was the first to draw attention to the occurrence of the negative feedback loop between banks and sovereigns in the EMU (cf. e.g., Mody 2009). This mechanism is characterised as a combination of direct and indirect links between these sectors and the national economy (Véron 2017, p. 8). Figure 1 presents the most important feedback loop channels.

Triggering the loop can occur through the deterioration of the performance of the banking sector (e.g., in Ireland and Spain) or the public finance sector (e.g., the case of Greece). If the first case is considered, the course of events may be as follows. The problems of the banking sector, whose stability is perceived as a global public good (Flejterski 2008, p. 17), force the government to provide assistance (e.g., in the form of direct recapitalisation), which leads to an increase in GG deficit and debt. As a result, the country's creditworthiness deteriorates, which is reflected in downgrades of government bond ratings and an increase in their yields. In an extreme situation, the government may lose access to market-based financing, and it will be forced to apply

1 Eurostat data (accessed: 28.09.2019).

to international creditors for assistance. At the same time, falling government bond prices worsen the balance sheets of banks holding them in their portfolios. In particular, it is more difficult for banks to use them as collateral in operations on the interbank market and with the central bank. The situation in the banking sector is further complicated by the fact that the government's capacity for further support is significantly weakened.

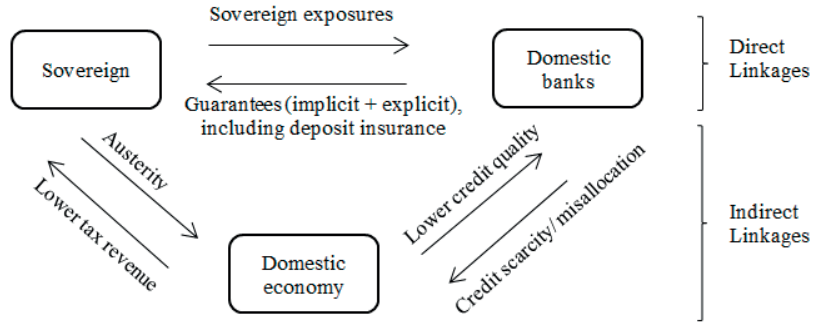

Figure 1. Selected contagion channels between banks and sovereigns
Source: Véron 2017, p. 8.

As regards indirect links, the austerity policy in the form of raising taxes and introducing cuts in public expenditure limits economic activity, negatively affecting the income of enterprises and households. Moreover, the fall in government bond prices incurs losses for the households holding these bonds, and it can also translate into an increase in corporate bond yields (according to the ceiling doctrine[2]). The worsened situation of real economy entities contributes to an increase in the share of non-performing loans, reducing the profitability of banks and threatening their stability. At the same time, there is ample evidence that banking crises are associated with economic slowdowns. In a situation where banks are forced to limit lending (e.g. due to a lack of access to external financing), entities dependent on bank financing sources will limit consumption and investment, which will lead to lower tax revenues (Dell'Ariccia et al. 2018, pp. 31–32).

The operation of the negative feedback loop is reinforced by the fact that banks are susceptible to contagion, and thus the crisis can spread from one institution to the entire system. Contagion can occur directly through mutual financial exposures of institutions or indirectly through a general decline in confidence in the banking sector. In an extreme situation, depositors may start a run, which – as demonstrated by the experience of Northern Rock Bank in the United Kingdom in 2007 or Countrywide

2 As shown by the experience of emerging countries and distressed advanced economies, the sovereign rating downgrade results in cuts in the ratings of domestic debt instruments. This policy of credit rating agencies reflects the widespread belief that private debt is always riskier than sovereign debt (Luitel et al. 2016, p. 288).

Bank and IndyMac Bank in the United States in 2008 – may also occur in highly developed countries.

To sum up, the mechanism under analysis operates as a multiplier and accelerator of vulnerabilities in the banking and public finance sectors. The described channels mutually determine and strengthen one another (Dell'Ariccia et al. 2018, p. 6). It should also be emphasised that the strength of the feedback loop depends on the type of financial system. In bank-based systems, governments will be more likely to get involved in bank bailouts. They will also be more dependent on banks as investors in the sovereign debt market. Moreover, the interdependencies should be viewed differently in normal times and during a crisis. In the first case, the government provides a financial safety net, and sovereign bonds hold the status of safe assets. However, during a crisis, these links can be a source of severe tensions (Bekooij et al. 2016, pp. 4–5).

Direct links within the EMU. The operation of the feedback loop during the crisis and risk assessment in the post-crisis years

Banks occupy a special position in the economy due to their functions. In particular, banks conduct deposit-taking and lending activities, provide operational services, and they also play an important role in the monetary policy transmission mechanism. Therefore, the links between banks and sovereigns are strong. Nevertheless, the negative feedback loop between the two sectors during the recent crisis was revealed with particular intensity in the euro area. The main reasons for the greater vulnerability of the common currency area to the occurrence of the feedback loop include the following.

1. The size and importance of the banking sector in the EMU. In 2017, the ratio of banking sector assets to the euro area GDP was around 270%, i.e., three times higher than in the USA. Analysing the use of bank and market sources of financing, enterprises from the EMU countries take advantage of the former three times more often than the latter. For comparison, bank loans account for only about 30% of the external financing of American companies. The dependence on bank financing in the euro area is even more evident in the group of households as these use bank loans in 90% of cases (Singh et al. 2019, p. 3, 16).
2. The presence of large, cross-border banking groups.
3. "Deficiencies" in the pre-crisis architecture of the EMU. In particular, the following "flaws" should be mentioned: a failure to entrust the ECB with the function of a lender of last resort (LOLR), the lack of a banking union, including above all the supranational mechanism of bank resolution, and the lack of risk-sharing mechanisms such as the later-established European Stability Mechanism (cf. Navaretti et al. 2016, p. 11; Merler and Pisani-Ferry 2012, p. 2).

Risk transfer from banks to sovereigns

The most evident way in which pressure in the banking sector can shift to the public finance sector is the (perceived) cost of bank bailouts. According to the European Commission (EC) estimates, the total value of approved aid for the banking sector in the EU in the years 2008–2017, the majority of which was addressed to institutions from the euro area countries, amounted to almost EUR 5.132 trillion, which is approx. 33% of 2017 EU GDP.[3] Four forms of support dominated:

- recapitalisations,
- impaired asset measures,
- guarantees,
- other liquidity measures.

Table 2 presents the approved state aid for banks from the EMU countries broken down into support instruments. As can be seen, two forms were most often used – guarantees and recapitalisations. In the case of the former, the high value of 2008 aid is noteworthy, suggesting a quick response by the governments to the escalation of the crisis. As indicated by the EC, the majority of aid committed in the period September 2008 – December 2010 was used in the fourth quarter of 2008, as the governments sought to show their determination to restore confidence after the Lehman Brothers collapse (EC 2011, p. 37). The analysis of the data in Table 2 also confirms earlier conclusions that since 2013 a gradual reduction of tensions in the EMU can be observed. One exception is the size of approved guarantees in the years 2015–2017, which reflects the problems of Greek, Portuguese and, above all, Italian banks at the time.

Table 2. State aid to euro area banks approved by the EC in the years 2008–2017 (EUR billion)

Form of aid/year	Recapitalisation	Impaired asset measures	Guarantees	Other liquidity measures
2008	204.9	4.8	1996.8	40.1
2009	38.5	90.4	9.8	0.3
2010	181.1	78.0	51.5	54.9
2011	37.5	6.3	179.7	50.2
2012	121.0	155.2	206.6	35.7
2013	29.6	14.7	37.9	9.7
2014	19.5	3.5	0.4	0.1
2015	18.0	0.9	127.2	0.0
2016	0.8	0.0	274.1	0.0
2017	18.1	0.0	290.9	13.3

Source: author's own calculations based on Internet source 1.

3 Data on GDP were obtained from Eurostat (accessed: 27.08.2019). It should be noted that the aid actually used was smaller. Its value is estimated at ca. EUR 1.962 trillion (cf. Internet source 1).

Government support for the financial sector can also be assessed in terms of costs for taxpayers. For this purpose, Eurostat data on the impact of government interventions on the balance and debt of the GG sector and contingent liabilities will be used.

Referring to the first two of these categories, Figure 2 shows the impact of interventions on government deficit and debt in relation to GDP in the euro area in the years 2008–2018. The largest increase in the deficit due to support for the financial sector occurred in 2010 and then in 2012. In subsequent years, a reduction of the impact was observed; an increase occurred in 2017, which should be associated with the interventions undertaken by the governments of Italy, Portugal, and Cyprus (EC 2019, p. 4). The impact of aid measures on the debt to GDP ratio reached its highest value in 2012 (slightly over 6%). In subsequent years, a gradual reduction has been observed.

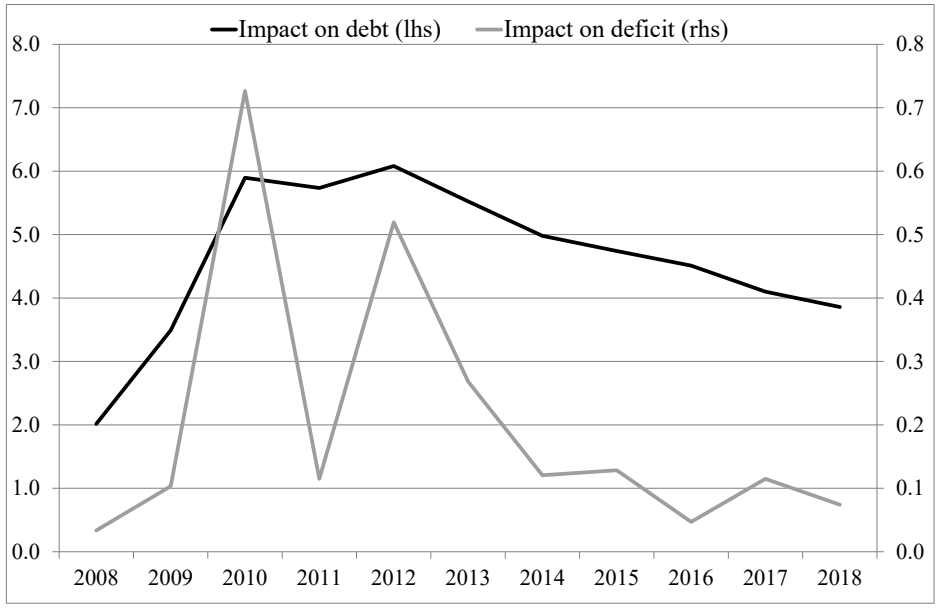

Figure 2. Impact of interventions on government deficit and debt in the years 2008–2018 (% GDP)
Source: author's own calculations based on Eurostat data (accessed: 28.08.2019). Positive values denote an increase in the deficit and debt.

It is worth noting that in the analysed period only four countries – Estonia, Finland, Malta and Slovakia, which together represent 3% of the euro area GDP – did not need to take any measures that affected their deficit or debt (ECBa 2018, p. 48). At the same time, the size of the interventions, as well as their impact on the balance and debt of the GG sector in individual economies, varied. To illustrate the differences discussed, two groups were created, consisting respectively of the so-called peripheral euro area countries (Cyprus, Greece, Spain, Ireland, Portugal, and Italy) and the economies of the so-called core (Austria, Belgium, France, the Netherlands, Luxembourg, and Germany). Tables 3–4 present the impact of interventions on the balance of the GG

sector in relation to GDP for both groups.[4] In the case of the peripheral euro area countries, the impact of interventions was strong. A record high deficit increase (equivalent to 21.2% of GDP) was recorded in Ireland in 2010. Also noteworthy is the deterioration in the balance of the GG sector in Greece in 2013, and in Cyprus in 2014 and 2018. In the analysed group, it is possible to indicate those countries in which the strongest effects of interventions occurred during the crisis (Ireland) and those struggling with these effects mainly in the post-crisis years (Cyprus, Portugal). In the group of core countries, the impact of interventions on the balance of the GG sector was clearly smaller. In most of these countries, it ranged from -0.2 to 0.2% of GDP over the vast majority of the period under review. Austria was an exception, as it experienced slightly higher deficit increases – in particular, in 2009 and 2014 (of 0.9% and 1.6% of GDP, respectively).

Table 3. Impact of interventions on the balance of the GG sector (% of GDP): peripheral countries

Country	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Ireland	–2.21	–21.19	–3.73	0.20	0.24	0.01	–0.70	–0.01	–0.11	–0.11
Greece	0.16	0.42	0.31	–2.80	–10.76	0.08	–2.73	0.20	–0.06	–0.05
Spain	0.06	0.07	–0.33	–3.68	–0.32	–0.13	–0.05	–0.21	–0.04	–0.01
Italy	0.00	0.01	0.01	0.03	0.04	0.05	–0.05	0.00	–0.33	0.02
Cyprus	0.05	0.14	0.13	0.03	–0.46	–8.91	–1.38	–0.44	–0.43	–8.41
Portugal	0.01	–1.23	–0.49	–0.56	–0.39	–2.96	–1.58	–0.19	–2.34	–0.77

Source: author's own calculations based on Eurostat data (accessed: 28.08.2019). Negative values denote a deterioration in the balance of the GG sector.

Table 4. Impact of interventions on the balance of the GG sector (% of GDP): core countries

Country	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Belgium	0.00	0.08	–0.15	–0.59	0.15	–0.02	–0.04	–0.07	0.04	0.07
Germany	–0.12	–1.29	0.01	–0.05	0.05	0.01	0.00	–0.07	–0.06	–0.18
France	0.07	0.05	0.03	–0.11	0.01	0.00	0.00	0.00	0.00	0.00
Luxembourg	–0.18	0.12	0.12	0.07	–0.06	0.03	0.03	0.04	0.07	0.05
Netherlands	–0.37	–0.17	–0.02	–0.03	–0.18	–0.01	0.06	0.05	0.06	0.09
Austria	–0.92	–0.11	–0.09	–0.41	–0.46	–1.60	–0.65	–0.07	–0.09	–0.06

Source: author's own calculations based on Eurostat data (accessed: 28.08.2019). Negative values denote a deterioration in the balance of the GG sector.

Figure 3 presents the impact of government interventions on the GG debt in the years 2008–2018 for the two groups of countries under consideration. An analysis of the figures allows us to see clear differences. In the case of peripheral euro area economies, the impact was definitely stronger. In all countries under EU/IMF assistance programmes (Greece, Ireland, Portugal, and Cyprus), there were increases that exceeded 10% of GDP (often multiples of 10% of GDP). It is worth noting that in some

4 The tables do not include data for 2008 due to the marginal impact of government interventions on the balance at that time in most of the analysed countries.

of these countries, the impact of interventions on the debt has risen (Portugal, Cyprus) or has remained at a high level (Greece) in recent years. Only Ireland has experienced a clear decline in the impact from a record value (49% of GDP in 2011). In turn, for most core countries, interventions in the financial sector increased the debt of the GG sector, mainly during the crisis. Since 2013/2014, the impact has been gradually weakening, which has been influenced by the income generated from the aid measures (e.g. dividends received from shares in financial institutions or fees received for public guarantees; ECBa 2018, p. 49).

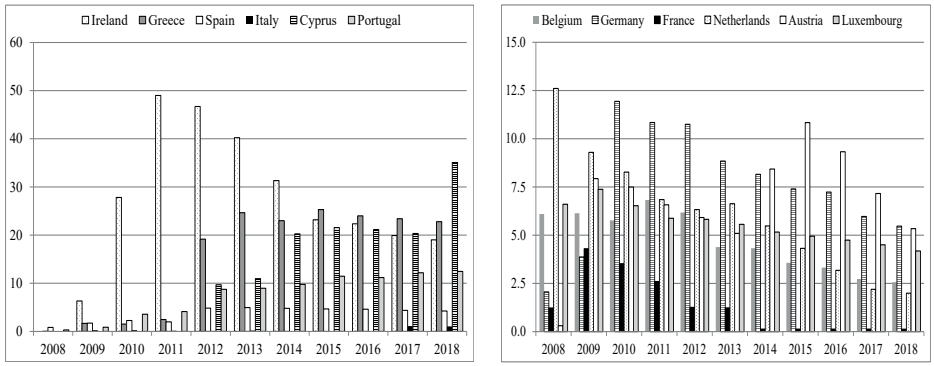

Figure 3. Impact of interventions on government debt (% of GDP): peripheral and core countries
Source: author's own calculations based on Eurostat data (accessed: 28.08.2019).

Figure 4 presents the volume of contingent liabilities in relation to GDP in the analysed EMU countries. As can be seen, in both groups, after increases in the period of highest tensions, a decrease in the analysed ratio is observed. This phenomenon should be assessed positively, as a return to financial stability means that there is no need to renew expiring guarantees. Nevertheless, some guarantees have been called, which means that the reduction in the guarantee was matched by an equivalent increase in government debt and/or deficit (ECBb 2018, p. 50).

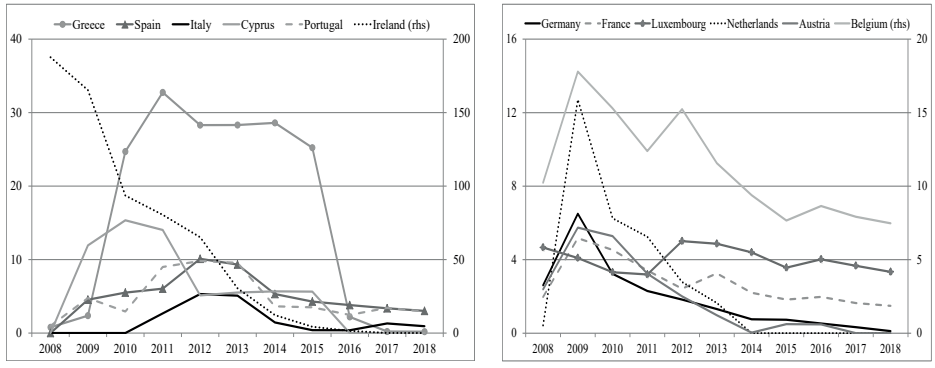

Figure 4. Volume of contingent liabilities (% of GDP): peripheral and core countries
Source: author's own calculations based on Eurostat data (accessed: 28.08.2019).

Risk transmission from banks to sovereigns has also been the subject of numerous empirical analyses. For example, Gerlach et al. (2010) examined the determinants of sovereign bond spreads in selected euro area countries (vis-à-vis German bunds) in the period January 1999 – February 2009. Their results indicate that in periods of high aggregate risk, countries with larger banking sectors experience higher increases in spreads. This relationship is amplified by low equity ratios in the banking sector. Mody (2009) identified a stronger interdependence between potential government interventions in the banking sector and the state of public finances after the rescue of Bear Stearns in March 2008. It was reflected in growing spreads in the EMU countries with deteriorating prospects for the financial sector. Attinasi et al. (2009), who examined the determinants of spreads in selected euro area countries in the period July 2007 – March 2009, confirmed the occurrence of risk transfer from the private financial sector to the government sector after the announcements of rescue programmes using taxpayers' money. Importantly, the authors conclude that the change in the perception of credit risk of EMU countries was primarily related to the credibility of the announcements of assistance, not its scale (in particular, after excluding Ireland from the sample). Stânga (2014) compared the transfer of risk from the banking sector to the public finance sector generated by the announcements of aid programmes for banks in the USA and six European countries. In general, the results of her study showed stronger contagion in Europe than in the USA. At the same time, the author identified the stabilising effect of the announcements in the form of strong declines in banks' CDS spreads only for the USA. In Europe, this effect proved to be temporary.

In addition, many papers that focus on the mutual nature of feedback loops in the EMU point out that the triggering of the crisis loop was determined by the situation in the banking sector. Acharya et al. (2014), using CDS rates on European sovereigns and banks for 2007–2011, show that changes in the former began to explain changes in the latter after bank bailouts. The results obtained by the authors indicate that the rescue of banks by the euro area countries resulted in an increase in their credit risk, which then weakened the condition of the financial sector. Similar results were obtained by Alter and Schüler (2012) as well as Yu (2017), who also used data from the European CDS market. State aid for banks only temporarily eased tensions in the financial sector at the expense of increased sovereign credit risk. As a result, the increase in fiscal burdens in the EMU became a risk factor for both the governments and banks. A slightly different scheme of contagion is presented in the study of Gómez-Puig et al. (2015). According to their work, after the collapse of Lehman Brothers, interrelationships between the two sectors intensified, with most of the identified episodes of contagion spreading from banks to sovereigns (the reverse flow of risk prevailed up to 2008 Q3).

Risk transfer from sovereigns to banks

Contagion from sovereigns to banks in the EMU is most often considered in the context of banks' exposures to government debt. Although investments in sovereign bonds of advanced economies are widely considered safe (between 1950 and 2010, no OECD country defaulted on its domestic debt; Navaretti 2016, p. 12), the euro area crisis has shown that they are not risk-free.

There is a variety of reasons why commercial banks purchase sovereign bonds. In particular, their demand is associated with managing their inherent maturity mismatches, performing the functions of primary dealers and market makers, using collateral in repo market transactions and transactions with the central bank, and fulfilling prudential requirements (IMF 2012, p. 89). Moreover, sovereign bonds of developed countries, and of issuers of reserve currencies, in particular, hold the special status of safe assets. This means that, among others, they act as safe havens in adverse economic conditions, their yields are used as a proxy for the risk-free rate, and they support the pricing of other assets (cf. BIS 2017).

While commercial banks' motives for holding sovereign debt are well recognised, during the euro area crisis, home bias in banks' holdings of domestic government debt was observed.

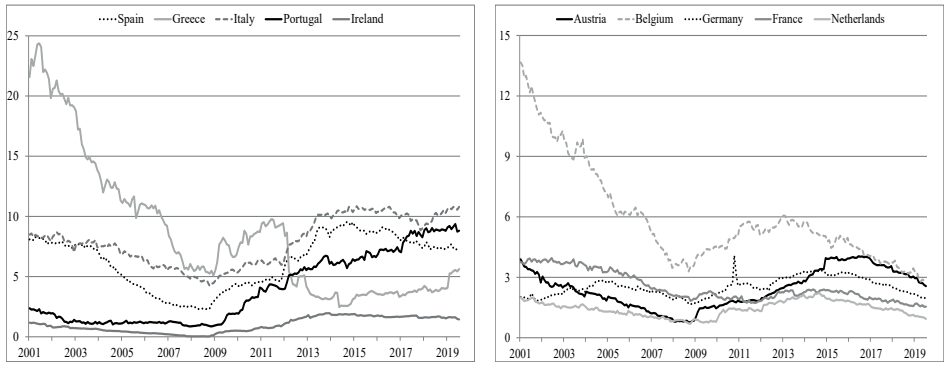

Figure 5. Sovereign exposures of monetary and financial institutions (% of total assets)
Source: author's own calculations based on Eurostat data (accessed: 1.09.2019).

Figure 5 presents the scale of this phenomenon for selected EMU members since 2001. As can be seen, in both the peripheral and the core countries, from the beginning of the common currency area to the outbreak of the global financial crisis, a decrease in the propensity of banks to invest in bonds of their own sovereigns was observed. Since 2008 Q4, a clear change in tendency can be seen, with the scale of the home bias reaching larger proportions in the countries most affected by the sovereign debt crisis, including primarily Italy, Spain, and Portugal. Moreover, in most of these countries, the share of domestic sovereign bonds in total banking sector assets exceeded the level recorded at the beginning of the examined period, which proves financial

disintegration in the EMU during the crisis. It is also worth noting that the analysed ratio has been decreasing in the group of core countries since 2015/2016; it has reached pre-crisis levels in most of them. In turn, in the majority of peripheral economies, the ratio remains at a high level, with an increase recorded in Italy, Portugal, and Greece at the end of the research period.

To illustrate the risks associated with home bias, the following example can be used. For a hypothetical bank with a leverage ratio of 6.6% (the bank's assets are 15 times its capital) and exposure to domestic sovereign debt at 10% (i.e. as in Italy or Portugal), a 10% loss on sovereign bonds would entail a 15% capital reduction for the bank (Dell'Ariccia 2018, p. 13).

The question, therefore, arises why during the crisis, banks, especially those from peripheral euro area countries, increased their holdings of domestic sovereign bonds. It seems particularly justified in the context of the growing concerns about the insolvency of these countries at that time, with neither exchange rate risk in the euro area, nor any regulatory framework that would incentivise banks to maintain domestic sovereign exposures as opposed to foreign sovereign exposures (i.e. exposures in other EMU countries). In addition, as noted by Corsetti et al. (2016, p. 21), financial segmentation resulting from the home bias significantly hindered the ECB from pursuing the common monetary policy and achieving its inflation target.

Acharya and Steffen (2015) made an important contribution to the explanation of the home bias in the EMU. They argued that banks with low capital ratios, in search of yield, invested excessively in sovereign bonds of GIIPS countries (Greece, Ireland, Italy, Portugal, Spain), financing their purchase with cheap credit from the ECB (in particular, this was enabled by two 3Y LTROs of December 2011 and February 2012). The authors considered this to be "the greatest carry trade ever".

It should be noted, however, that the carry trade motive only explains why banks from the peripheral euro area countries invested in high-yield GIIPS bonds. It does not indicate why they preferred bonds of their own sovereigns. Some authors see the explanation in moral suasion, which is a form of financial repression that involves the government exerting pressure on financial sector institutions to undertake certain actions. In the context of the EMU crisis, it is argued that banks were under pressure to acquire government debt instruments. Ongena et al. (2016) analysed the behaviour of banks from GIIPS countries in the years 2010–2012. They confirmed the existence of the moral suasion mechanism at times when those countries increased their debt issuance to roll-over maturing debt. State-owned banks and those with low initial holdings of domestic sovereign bonds came under particular pressure.

The role of the political factor (public banks, politicians on the board) as the factor that determines the phenomenon of moral suasion in GIIPS countries was also identified in the works of De Marco and Macchiavelli (2016) as well as Dell'Ariccie et al. (2018). Furthermore, the results of some studies (Navaretti et al. 2016; Altavilla et al. 2017) expand the group of banks under pressure to include those that were previously bailed out. At the same time, there is no consensus in the literature about the

importance of the ECB's liquidity support as a catalyst for moral suasion. Some works suggest that the fixed-rate full-allotment procedure and two 3-year LTROs facilitated banks' increased exposure to domestic sovereign debt (cf. e.g., Altavilla et al. 2017). However, the link has not been identified in other works (Dell'Ariccia et al. 2018).

Among other potential explanations for the home bias in the euro area, the following two can be identified (Corsetti 2016, p. 19). According to the first interpretation, banks in the peripheral EMU countries could "bet on" preferential treatment by national authorities in the event of a partial default. Moreover, the home bias of banks' sovereign portfolios should motivate the government to repay its debt more than a possible loss of credibility and international sanctions (Gennaioli et al. 2014, p. 1). The other interpretation assumes that banks sought to match the currency of their assets and liabilities in the event that the risk of a return to national currencies materialised.

Assessing the home bias, some authors claim that it was conducive to reducing tensions in the EMU sovereign debt market. As they argue, banks from the peripheral countries played the role of "buyers of last resort" in a situation where other players (foreign banks, insurance companies, money market funds) withdrew from the market. If they had not taken on this role, then yields and spreads would have been even higher, and some countries would have been forced into insolvency (cf. Asonuma et al. 2015; Ongena et al. 2016, p. 36).

In general, however, the conclusions of many studies suggest that the shock absorption effect occurred only in the short term, and home bias in the banks' sovereign debt holdings had a destabilising effect on the functioning of the common currency area (Véron 2017, p. 13). For example, Dell'Ariccia et al. (2018, p. 21) indicate that CDS spreads of banks from GIIPS countries increased along with the increase in the share of domestic sovereign bonds in their assets. The CDS spread for a bank with a 10% share was higher by 44.3 basis points than for a bank with a 0% share. According to estimates carried out by Altavilla et al. (2017), conducted for 226 euro area banks in the years 2007–2015, in the stressed euro area countries, banks with higher sovereign debt exposures experienced higher credit risk. In particular, an increase of 100 basis points in the domestic sovereign CDS premium translated into an increase of 31.5 basis points in the CDS premium for banks with a median exposure. The phenomenon of home bias also had a negative impact on credit supply. Altavilla et al. (2017) showed that banks from GIIPS countries with high sovereign exposures reduced lending to the domestic enterprise sector. Lending activity towards local companies was also reduced by subsidiaries of these banks in countries less affected by the crisis. In turn, Grigorian and Manole (2017) showed that home bias negatively affected banks' ability to attract deposits, and consequently their lending, which strengthened the pro-cyclical role of the banking sector in the transmission of fiscal shocks in the EMU.

Corrective measures

As already indicated in the Introduction, the construction of the EMU has been widely criticised since the beginning of the common currency area. Its "deficiencies" included a failure to entrust the ECB with the function of LOLR, the absence of a pan-European financial supervisory authority, and the lack of effective mechanisms of risk-sharing (cf. Bordo and Jonung 1999).

As shown by the experience of the crisis, the construction "deficiencies" in the euro area played a role in intensifying the sovereign-bank nexus. It is worth noting that contemporary criticism is in line with negative assessments formulated in the first years of the EMU. For example, Merler and Pisani-Ferry (2012, p. 2) emphasised that in the absence of a supranational banking resolution framework, governments were forced to rescue failing institutions on their own. Given the size of banking systems in the euro area, this meant transferring risk to the public sector. Navaretti et al. (2016, p. 11) indicated that, in addition to the overriding role of deepening macroeconomic imbalances, in particular, fiscal ones, the build-up of negative feedback loop at the beginning of the EMU crisis was determined by the inability of the Eurosystem to play the role of LOLR, the absence of a banking union, and the lack of effective fiscal support mechanism at the euro area level.

Various stabilisation measures were taken in the euro area during the crisis. Some of those measures were launched at the national level, while others were aimed at improving the economic situation of the euro area/EU as a whole. Referring to the latter group, the most important initiatives directly or indirectly aimed at delinking banks from sovereigns include the following:

1. Risk-sharing mechanisms – the temporary European Financial Stability Facility and the permanent European Stability Mechanism (ESM) (operating since 2012). The purpose of their creation was to provide financial support for EMU countries experiencing serious financial difficulties. In the context of the feedback loop problem, it was particularly important to include the instrument of direct recapitalisation of institutions in the ESM lending toolkit in 2014.
2. Fiscal strengthening measures, including, among others, Six-Pack, Two-Pack, and Fiscal Pact.
3. ECB measures – the Enhanced Credit Support (ECS) and entry into the role of LOLR for sovereigns. The ECS was a comprehensive package of measures that focused on providing liquidity to the banking sector. As part of the ECS, euro area banks received unlimited access to central bank liquidity on preferential terms (including longer maturities, reduced collateral requirements, etc.). In turn, the announcement of the OMT programme, associated with the ECB's entry into the role of LOLR for sovereigns, played a key role in reducing tensions in the EMU sovereign bond market. After this event, a permanent decline in spreads was observed, and governments gained additional time to improve the state of public finances.

4. The Bank Recovery and Resolution Directive (BRRD) that obliged the EU Member States to establish resolution authorities and which specified the objectives, principles, and tools of bank resolution actions. The establishment of the bail-in mechanism, which imposes losses on the bank's shareholders and creditors, was particularly important for the feedback loop problem. Thus, bail-in is fundamentally different from bail-out, i.e. the situation when banks were rescued by governments using public funds.
5. Banking union. Its current shape is based on two pillars – the Single Supervisory Mechanism (SSM) (operating since 2014) and the Single Resolution Mechanism (SRM) (fully operational since 2016). The first pillar was created to enhance the supervision of large, cross-border banks, including the solution to the problem of too lenient national supervisors (NBP 2014, pp. 78–79). The other pillar sets out rules for dealing with institutions that are failing or that are likely to fail at the European level. The bank resolution process should be conducted in a way that minimises the effects on the real economy and the state of public finances of the participating countries. The banking union, according to its original assumptions (Van Rompuy 2012), is an unfinished project. The European Deposit Insurance Scheme (EDIS) remains the missing pillar.

In the literature, existing solutions are widely regarded as insufficient. Presented below are proposals being currently discussed to weaken the links between banks and sovereigns.

A large number of these solutions focus on changing regulations that favour the home bias. The principle of zero risk weight for euro area sovereign bonds is particularly criticised. It is argued that this principle does not reflect the actual country credit risk, encourages banks to give preferential treatment to government bonds over other assets (like loans to firms and households), does not create incentives to diversify the investment portfolio, and also allows politicians to resort to moral suasion.

Pagano (2016, pp. 133–134) notes that potential solutions, such as imposing positive risk weights on sovereign debt or introducing limits on banks' exposure towards individual euro area sovereign issuers, are, in practice, difficult to implement. First, as the author points out, regulatory changes of this type would trigger unpredictable adjustments in banks' sovereign portfolios and an increase in the volatility of sovereign bond yields. For example, the application of higher risk weights on peripheral countries' public debt could result in a massive sell-off of these securities and the increased involvement of banks in the bonds of countries with stable macroeconomic foundations. This, in turn, could lead to a new debt crisis in the EMU. Secondly, the concerns of policymakers from GIIPS countries that the reduction in demand for domestic sovereign bonds as a result of the discussed regulatory changes would result in permanently higher debt servicing costs and limited possibilities of resorting to moral suasion play a large role.

The proposal to create sovereign bond-backed securities (SBBS) is a kind of response to the above-presented concerns (cf. Brunnermeier et al. 2016; ESRB 2018). The issuers

of these assets, i.e. private or public financial institutions (such as the European Investment Bank), would buy a diversified portfolio of euro-denominated central government bonds (the shares would be defined by the ECB capital key) and they would use it as collateral to issue their own securities. The project provides for two tranches – a senior one (senior SBBS tranche) and a junior one (junior SBBS tranche).[5] The first of the tranches would be protected against losses of up to 30% on the underlying bond portfolio, which would allow it to perform the function of safe assets for the euro area. The other would be much riskier. As the proponents of the project argue, risk diversification in the underlying portfolio would weaken the link between banks and their governments. In particular, in times of stress, the destabilising capital flows from countries with worse macroeconomic foundations to so-called safe havens would be replaced by the flow of capital from more to less risky asset classes, i.e. from junior SBBS to senior SBBS.

Other suggestions can be found in the work of Véron (2017). He takes the view that, despite the initial successes of the banking union, its aim, i.e. breaking the vicious circle between banks and sovereigns, has not been achieved. In his assessment, the priority is to reduce the home bias in investors' portfolios, which can be accomplished by simultaneously completing the banking union, i.e. the creation of EDIS in line with the EC's original proposal (EC 2015), and introducing regulatory changes aimed at reducing highly concentrated sovereign exposures. He argues that EDIS has not been established due to suspicion that financially stressed countries would exert pressure on banks to use deposits protected by EDIS to increase their purchases of bonds issued by these countries' governments. Therefore, an indispensable part of the proposal is the introduction of sovereign exposure limits. The author postulates a system of charges for concentration exposures to individual euro area countries which would increase after exceeding pre-defined thresholds. The expected effect of the regulation would be a reduction in the share of domestic sovereign bonds in banks' investment portfolios and an increase in the share of bonds of other members of the EMU.

Conclusions

The negative feedback loop between banks and sovereigns characterised the crisis in the euro area. Strong interdependences between these sectors were determined by, among others, the dominant role of banks in the EMU financial system, growing macroeconomic imbalances in some economies, as well as "deficiencies" in the institutional architecture of the euro area.

The transfer of risk between the analysed sectors was bilateral. In the phase of the global financial crisis, the governments intervened to rescue banks using taxpayers' money, which translated into a deterioration of the state of public finances. In turn,

5 To be precise, in the ESRB project, subordinated securities are divided into mezzanine security and junior security.

during the sovereign debt crisis phase, the negative consequences of excessive exposures of banks towards domestic sovereign issuers were revealed.

As regards the post-crisis situation, a reduction in interconnectedness has been observed in recent years. In particular, this is evidenced by a smaller size of public aid for the banking sector, and consequently, a weaker impact of interventions on the debt and balance of the GG sector, a decreasing level of contingent liabilities, as well as a reduction in the home bias phenomenon. However, this does not mean that all EMU countries have experienced an even reduction in the risk of restarting the crisis loop. The results of the analysis clearly show the differences between the so-called core and periphery of the EMU. In the case of the latter group, it is possible to indicate countries for which some indicators that determine their vulnerability to feedback loops (such as the ratio of public debt to GDP or the share of government bonds issued by own government in the assets of the domestic banking sector) are less favourable than before the outbreak of the crisis.

Since the outbreak of the crisis, the euro area countries have introduced various measures explicitly or implicitly aimed at breaking the "vicious circle between banks and sovereigns". These include, among others, the establishment of the ESM, the ECB's adoption of the role of the LOLR, and the launch of the banking union. All these measures constituted an important response to the crisis, but they cannot be regarded as enough to break the strong interdependence between the two sectors and thus protect the EMU from future crises.

The home bias in debt securities holdings remains a particular challenge; hence many recent proposals concentrate on solving this problem. The restriction of the principle of zero-risk weight for sovereign exposures, completing the banking union by establishing EDIS, and creating a "safe asset" for the euro area are among them. It is likely, however, that attempts to implement them would encounter political resistance at the national level.

All in all, the study contributes to the existing literature on the negative feedback loop between banks and sovereigns in the euro area by adopting a post-crisis perspective and assessing this phenomenon in relation to the crisis period. The results show that in the post-crisis conditions, a reduction in interconnectedness has been observed, although it has been experienced to a greater extent by the core than the peripheral euro area countries. At the same time, despite some progress in recent years, institutional reforms aimed at breaking the sovereign-bank nexus are far from complete. Therefore, the results of the study support the research hypothesis that the EMU remains vulnerable to the mutual transfer of risks generated in each of these sectors.

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Streszczenie

Negatywne sprzężenia zwrotne między sektorem bankowym i sektorem finansów publicznych w strefie euro. Doświadczenia kryzysu i perspektywa pokryzysowa

Przebieg kryzysu w strefie euro charakteryzowało zjawisko negatywnych sprzężeń zwrotnych między sektorem bankowym a sektorem finansów publicznych. Silne zależności między tymi sektorami warunkowała m.in. dominująca rola banków w systemie finansowym UGiW, narastające nierównowagi makroekonomiczne, a także „braki" w architekturze instytucjonalnej strefy euro. W artykule przedstawiona jest geneza omawianego zjawiska w UGiW, a także istota i skala obustronnego transferu ryzyka w czasie kryzysu i w latach pokryzysowych. Dodatkowo, omówiono dotychczasowe działania w kierunku ograniczenia negatywnych sprzężeń, a także wskazano pozostające wyzwania w tym obszarze.

Słowa kluczowe: efekt zarażania, kryzys w strefie euro, aktywa bezpieczne

JEL: F15, F36, F45

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The Innovation Gap between the Polish Economy and the European Union

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Abstract

Knowledge and innovations are considered to be among the most important factors that determine the pace and quality of economic growth. Therefore, Poland is facing a serious challenge to effectively transform its economy into an innovative economy capable of competing with the most developed countries.
The aim of the paper is to present the results of analysis aimed at estimating the innovation gap between Poland and the European Union countries on the basis of the Summary Innovation Index (SII), which was developed by the European Commission within the European Innovation Scoreboard (EIS) in the years 2010–2018. It reviewed the literature on the innovativeness of economies and the innovation gap. Descriptive analysis, statistical data analysis and comparative analysis methods were applied. Statistical data from the European Innovation Scoreboard 2019 were used. The paper formulates a research thesis that assumes that the level of innovativeness of the Polish economy in the analyzed period remained at a lower level than the EU average and therefore there is still an innovation gap between the Polish economy and the average for European Union countries. The results of the analysis confirm this thesis.

Keywords: innovation, innovativeness, innovation gap, European Innovation Scoreboard (EIS), Summary Innovation Index (SII)

JEL: O30, O31, O33, O43

Introduction

In developed market economies, a belief has developed that the ability of enterprises to create, apply and disseminate innovation is the most important manifestation of their modernity and an important premise for the civilization progress of the entire country. Many reputable economists present the view that the scope and pace of innovative processes are of great importance for the competitive advantage of enterprises and national economies (Porter 2001, pp. 215–216; Freeman 1982; Kotler 1999). The winners in the competitive game on a globalized market are those economies that have mastered the ability to quickly and efficiently transform the gains of scientific and technical thought into new or improved products, technologies and solutions in the area of organization and management. Knowledge and innovations are considered to be among the most important factors that determine the pace and quality of economic growth (Witkowska, Wysokińska 2006, pp. 23–24). Therefore, Poland is facing a serious challenge to effectively transform its economy into an innovative economy capable of competing with the most developed countries.

The aim of the paper is to present the results of analysis aimed at estimating theinnovation gap between Poland and the European Union countries on the basis of the Summary Innovation Index (SII), developed by the European Commission within the European Innovation Scoreboard (EIS) in the years 2010–2018. It reviewed literature on the innovativeness of economies and the innovation gap. Descriptive analysis, statistical data analysis and comparative analysis methods were applied. Statistical data from *the European Innovation Scoreboard 2019* were used. The paper formulates a research thesis that assumes that the level of innovativeness of the Polish economy in the analyzed period remained at a lower level than the EU average and therefore there is still an innovation gap between the Polish economy and the average for European Union countries. The results of the analysis confirm this thesis.

The concept of the innovation gap

The concept of the innovation gap is variously interpreted in the economic literature. Kubielas defines the innovation gap as differences in the level of technological advancement between countries and proposes several methods to measure its size. He says that it can be measured by the distance between the level of technological activity of a country and the countries at the technological frontier, calculated either as a ratio of the number of patents per capita or the share of research expenditure in value-added or national income (Kubielas 2009, p. 137). The literature review also shows indirect measures such as the share of high-tech products in exports in relation to a similar indicator for the technology frontier, the relation of the productivity of a given branch of the country to the country on the verge of technological frontier or, in aggregate terms, the relationship between GDP per capita and the corresponding

indicator of the technological frontier (Kubielas 2009, p. 137). The last two approaches identify the technological gap with a productivity gap or income gap. The global technological frontier shall be deemed as the GDP level, which can be achieved by using the given inputs of capital and labor, and the best possible technologies (Growiec 2012). This level of GDP is now achieved by the U.S. economy, in which, as stressed by Kubielas, the distribution of specialization (between Pavitt's four sectors) is the standard for a technology leader. The highest competitive advantages are demonstrated by the science-based sector, followed by the specialized supplier sectors; the scale-intensive and traditional are characterized by negative indices of the comparative advantage, of which the traditional is the lowest on the scale of advantages of the U.S. economy (Kubielas 2009, p. 153).

In the literature, there is also the concept of the innovation gap, understood as the distance between individual economies and the so-called modern technological frontier. It is identified with the last stage of the socio-economic development of economies, i.e., the emergence of a knowledge-based economy (Zacher 2007, p. 530; Pawlik 2014, pp. 68–69, *National Systems of Innovation* 1992, pp. 25–36). To investigate this approach to the innovation gap, one should use a point of reference, which involves the initial conditions of building a knowledge-based economy, as formulated by Kleer (Kleer 2009): (a) the economy must achieve a sufficiently high level of income (about $20,000 per capita), and the structure of GDP should be characterized by a high share of services in GDP – 70% or more; (b) society should be characterized by a high level of education, in which secondary education is widespread, and higher education covers at least half of the economically active population; (c) there should be a high share of expenditure on R&D (it is generally recognized that the size of the required outlays is about 3% of GDP); (d) the innovativeness of the economy manifests itself in minimizing regulations and supporting innovative projects, not only in purely economic areas, but also in high expenditure of the public sector on research that directly and indirectly promotes development; (e) the economy and society are involved in the exterior exchange, which concerns not only the exchange of goods and services, but also the circulation of ideas (for which the information revolution has created enormous opportunities); (f) the modern public sector needs to be a mixed model, and not purely liberal.

The United Nations defines the innovation gap quite generally, as the distance between those who have access to technologies and know how to use them effectively, and those who are not able to do it (Kraciuk pdf.). The innovation gap can be considered from the perspective of creating new technology in the home country, as well as from the perspective of its transfer from other countries and effectively adapting it to the needs and capabilities of the nation.

In summary, it can be stated that measuring the innovation gap means estimating the distance between a given country's economy and the most developed economies of Europe and the world, known today as knowledge-based economies, in many areas, e.g., in the sphere of innovation, education, and institutional system. Estimating the innovation gap is possible by comparing synthetic measures of innovation, e.g.,

the *Summary Innovation Index* developed by the European Commission, the *Global Innovation Index* developed by Cornell University (*The Global Competitiveness Report 2018–2019)* in cooperation with the World Intellectual Property Organization (Weresa 2014, p. 64; Mielcarek 2013), or indicators that describe the advancement of the knowledge-based economy, e.g., the *Knowledge Index* and the *Knowledge Economy Index*, derived from the *Knowledge Assessment Methodology*.

Assessing the innovation gap between the Polish economy and the European Union countries based on the Summary Innovation Index

Innovation measurements are made based on various methods and measures. One such method is the *European Innovation Scoreboard*, developed by the European Commission. *The European Innovation Scoreboard* has been published since 2000, and it is an attempt to estimate the achievements of innovative European economies based on the SII. It is estimated using weighted values of normalized data, with the highest value of the indicator in the examined group of countries equaling 1 and the lowest value equaling 0. Based on this indicator, four groups of EU economies that show different levels of innovativeness can be distinguished: *innovation leaders* – which present the highest level of innovativeness of the economy, *innovation followers, moderate innovators,* and *modest innovators*.

This paper presents an attempt to estimate the innovation gap based on the indicator that shows the difference between the level of the SII for Poland and the average value of this index for the European Union. The indicator of the innovation gap defined in this way takes the following form (Weresa 2014, p. 64):

$$L_{pt} = \frac{SII_{pt}}{SII_{UE_t}}, \tag{1}$$

where:
L_{pt} – the innovation gap index for Poland in relation to the EU average in year t,
SII_{pt} – the Summary Innovation Index for Poland in year t,
SII_{UEt} – the average Summary Innovation Index for the EU in year t.

The value of the innovation gap index exceeding 1 means that the analyzed country presents a higher level of innovativeness than the EU average, while a value lower than 1 indicates the innovation gap exists between a given country and the EU average.

In order to assess the changes in the level of the innovation gap over time, a formula presenting the difference between the innovation gap index (L_{pt}) in a given year and the value of this index for the previous year should be used. It is written as follows (Weresa 2014, p. 64):

$$D_{pt_1} = \left[\frac{SII_{pt_1}}{SII_{uet_1}}\right] - \left[\frac{SII_{pt}}{SII_{uet}}\right], \quad (2)$$

where:
D_{pt_1} – index of changes in the level of the innovation gap between Poland and the EU average in year t1 compared to year t,
SII_{pt} – the Summary Innovation Index for Poland in year t,
SII_{uet} – the average Summary Innovation Index for the EU in year t,
SII_{pt_1} – the Summary Innovation Index for Poland in year t1,
SII_{UEt_1} – the average Summary Innovation Index for the EU in year t1.

The index of the change in the innovation gap level (D_{pt_1}) takes values from -1 to +1. Negative values indicate an increase in the innovation gap between a given country and the EU average, while positive ones indicate a decrease. Nevertheless, it should be emphasized that the analyzed index only indicates the direction of changes, but it does not allow us to determine whether the distance shortens or the previously gained advantage is gradually being lost (Weresa 2014, p. 65). Therefore, it is necessary to analyze the index of changes in the level of innovation gap (D_{pt_1}) in relation to the index of the innovation gap (L_{pt}).

Table 1 shows the values of the Summary Innovation Index for Poland and the average value for 28 EU countries, the values of the innovation gap index for Poland in relation to the EU average (L_{pt}), and the index of changes in the level of the innovation gap between Poland and the EU average (D_{pt_1}) in the years 2010–2018.

Table 1. The Summary Innovation Index for Poland and the average value for 28 EU countries, the innovation gap index for Poland in relation to the EU average (L_{pt}), and the index of changes in the level of the innovation gap between Poland and the EU average (D_{pt_1}) between 2010 and 2018

Index	2010	2011	2012	2013	2014	2015	2016	2017	2018
SII for the EU	0.493	0.482	0.478	0.483	0.482	0.490	0.503	0.513	0.525
SII for Poland	0.261	0.257	0.242	0.252	0.242	0.248	0.260	0.273	0.295
L_{pt} for Poland	0.529	0.533	0.506	0.522	0.502	0.506	0.516	0.530	0.560
D_{pt_1} compared to the previous year	–	0.04	–0.027	0.016	–0.02	0.004	0.01	0.014	0.03
D_{pt_1} compared to 2010	–	0.04	–0.023	–0.007	–0.02	–0.023	–0.013	0.001	0.031

Source: own calculations based on the *European Innovation Scoreboard 2019*, www.proinno-europe.eu/metrics (accessed: 7.08.19).

The analysis of the innovation gap index for Poland (L_{pt}) indicates that throughout the entire analyzed period, the level of innovativeness of the Polish economy was below the EU average. Based on the index of changes in the level of the innovation gap (D_{pt_1}), it can be concluded that in 2012 and 2014, the difference between the level of innovativeness of the Polish economy and the EU average increased compared to the previous

year. Meanwhile, the index of changes in the level of the innovation gap (D_{pt_1}) in 2018 compared to 2010 showed positive values – 0.031, which indicates a decrease in the distance between the innovative position of the Polish economy and the EU average (it was similar in 2011 and 2017). When estimating the level of innovativeness of the Polish economy, it is also worth comparing Poland's innovative position in relation to individual European Union countries over time. Table 2 shows the values of the SII for all European Union countries in 2010 and 2018. Based on the value of the index, the innovation gap index (L_{pt}) for the Polish economy in 2010 and 2018 in relation to other EU countries was calculated, as well as the index of changes in the level of the innovation gap (D_{pt_1}) between Poland and another EU country in 2018, compared to 2010. The following assumptions should be made for this analysis:

$$L_{pt} = \frac{SII_{pt}}{SII_{mt}}, \tag{3}$$

where:
L_{pt} – the index of the innovation gap for Poland in year t,
SII_{pt} – the Summary Innovation Index for Poland in year t,
SII_{mt} – the Summary Innovation Index for the EU country in year t,
and

$$D_{pt_1} = \left[\frac{SII_{pt_1}}{SII_{mt_1}}\right] - \left[\frac{SII_{pt}}{SII_{mt}}\right], \tag{4}$$

where:
D_{pt_1} – the index of changes in the level of innovation gap for Poland vs. another EU country in year t1 compared to year t,
SII_{pt} – the Summary Innovation Index for Poland in year t,
SII_{mt} – the Summary Innovation Index for the EU country in year t,
SII_{pt_1} – the Summary innovation index for Poland in year t1,
SII_{mt_1} – the Summary innovation index for the EU country in year t1.

Table 2. The Summary Innovation Index for European Union countries in 2010 and 2018, the innovation gap index for the Polish economy in relation to the EU country (L_{pt}) in 2010 and 2018, and the index of changes in the level of the innovation gap between Poland and the EU country (D_{pt1}) in 2018 compared to 2010

Country	*SSI* in 2010	L_{pt} in 2010	*SII* in 2018	L_{pt} in 2018	D_{pt_1} compared to 2010
Belgium	0.590	0.442	0.618	0.477	0.035
Bulgaria	0.234	1.115	0.235	1.255	0.14
Czech Republic	0.434	0.601	0.431	0.684	0.083
Denmark	0.688	0.379	0.680	0.433	0.054

Country	*SSI* in 2010	L_{pt} in 2010	*SII* in 2018	L_{pt} in 2018	D_{pt_1} compared to 2010
Germany	0.627	0.416	0.618	0.477	0.061
Estonia	0.411	0.635	0.500	0.590	–0.045
Ireland	0.554	0.471	0.567	0.520	0.049
Greece	0.333	0.783	0.394	0.748	–0.035
Spain	0.395	0.660	0.409	0.721	0.061
France	0.525	0.497	0.535	0.551	0.054
Croatia	0.277	0.942	0.287	1.027	0.082
Italy	0.372	0.701	0.410	0.704	0.003
Cyprus	0.432	0.604	0.419	0.704	0.100
Latvia	0.244	1.069	0.370	0.797	–0.272
Lithuania	0.288	0.906	0.391	0.754	–0.152
Luxembourg	0.592	0.440	0.623	0.473	0.033
Hungary	0.350	0.740	0.333	0.885	0.145
Malta	0.318	0.820	0.413	0.714	–0.106
Netherlands	0.588	0.443	0.651	0.453	0.01
Austria	0.555	0.470	0.602	0.490	0.02
Portugal	0.421	0.619	0.471	0.626	0.007
Romania	0.236	1.105	0.165	1.787	0.682
Slovenia	0.483	0.540	0.423	0.697	0.157
Slovakia	0.306	0.852	0.333	0.885	0.033
Finland	0.671	0.388	0.704	0.419	0.031
Sweden	0.697	0.374	0.713	0.413	0.039
United Kingdom	0.560	0.466	0.616	0.478	0.012

The *SII* for Poland in 2010 was 0.261; in 2018, it was 0.295.
Source: own calculations based on the *European Innovation Scoreboard 2019*, www.proinno-europe.eu/metrics (accessed: 8.07.2019).

Based on the data presented in Table 2, it can be stated that in 2010, the Polish economy showed higher innovation potential than the economies of three EU countries – Bulgaria, Latvia, and Romania (the L_{pt} index was above 1). In 2018, the level of innovativeness of the Polish economy was higher than that of Bulgaria, Romania, and Croatia. Therefore, it is worth emphasizing that the innovative position of the Polish economy was lower not only in relation to the "old" member states of the European Union, but also to the majority of "new" EU member states.[1] However, it should be noted that between 2010 and 2018, the innovation gap between the Polish economy and most EU countries decreased. Only in relation to a few countries (Estonia, Greece, Latvia, Lithuania, and Malta) did this distance increase.

1 Those countries which joined the EU in 2004 and later.

Remarks and recommendations

In the 2015 EIS ranking, Poland was included in the group of moderate innovators, which means that it had improved its position in relation to previous years; however, it was still in the "tail-end" of the group. In the overall EIS statement, Poland ranked 25th and has not improved its position since then. This fact and the analysis of the innovation distance between the Polish economy and the EU countries allow us to conclude that the effects of the innovation policy pursued so far are small. It is, therefore, necessary to make an effort to reconstruct the existing model of supporting the development of innovation in Poland. The success of this project depends on many different factors which affect not only the sphere of economic policy but also social and cultural conditions.

Firstly, it is important to raise the level of innovativeness of the Polish economy, bridging the innovation gap in relation to most EU countries, and formulate a long-term strategy for socio-economic development. Without such a strategy it is not possible to pursue an internally coherent and consistent policy for the development of science and technology, which would decide on the development directions of scientific research and technology areas preferred by the state, allowing the use of the national potential and achievements of Polish inventors (Dworak 2012, p. 219).

Secondly, the development of innovation requires a well-functioning institutional system. An appropriate institutional order affects the utilization of the economy's technological potential. Empirical studies confirm the existence of a positive, statistically significant correlation between the degree of development of the economy and the efficiency of the State's systemic activities in developing the institutional order.[2] The institutional environment includes an important element, a widely understood business environment, which facilitates the development of entrepreneurship and innovation. This means, among others, the need to simplify administrative and judicial procedures.

Thirdly, the creation of an effective system for promoting innovation requires an increased and adequate allocation of financial outlays on R&D and implementation, coming from the state budget and industry (Orłowski 2013, p. 10). Changes in this area should primarily involve increasing industry expenditure on R&D by facilitating access to capital in all phases of R&D projects (Dworak 2012, p. 221; Gorynia-Pfeffer 2012, p. 216). Budgetary outlays on R&D should also be increased, provided that the R&D investments of private enterprises also increase (Okoń-Horodyńska 2004, p. 33).

Fourthly, to significantly raise the level of innovativeness of the economy, it is necessary to develop permanent links between the entities of the R&D sphere and industry. Building a close relationship between R&D institutions and enterprises should focus on the development of projects involving support for: (a) the movement of personnel between R&D institutions and the economy, including internships of R&D workers

2 The study included the OECD countries in the years 2001–2005 (Balcerzak 2009, pp. 231–241).

in enterprises and employees of enterprises at universities; (b) cooperation within the clusters, which increase the ability of operators to create, absorb, and diffuse innovation (Skawińska, Zalewski 2009, pp. 173–181, 254–260); (c) the establishment and development of institutions in the innovative environment, such as technological incubators, technology transfer centers, and science and technology parks.

Fifthly, what is crucial for financing firms' innovative projects is the development of the private equity and venture capital market (Gasz 2015, p. 221). The existing involvement of private equity funds or venture capital funds in financing this type of activity in Poland is insufficient (*European Innovation Scoreboard 2019*, p. 83).[3] The development of the public-private partnership system in financing strategic technologies creates opportunities to overcome barriers to the capital, which now discourages companies, especially small and medium-sized enterprises, from undertaking innovation (*Raport o partnerstwie publiczno-prywatnym w Polsce* 2013).

Sixthly, the education system is an important pillar of the strategy for improving innovativeness. It focuses on developing creativity and the ability to work together. The efficient use of human capital requires an increase in social capital (*Raport o partnerstwie publiczno-prywatnym w Polsce* 2013, p. 37). The indicators that characterize this capital in Poland are currently the lowest in the European Union. According to a study in the framework of "Social Diagnosis 2013," only 14% of Poles trust other people, with an average confidence level of 32% in the European Union (*Diagnoza społeczna* 2013; *Warunki i jakość życia* 2014, p. 320).

Conclusions

The experience of the economies that joined the group of innovation leaders in recent decades shows that supporting the development of innovation is a long-term activity and requires that many conditions be met. In the context of considerations on the innovativeness of the Polish economy, it must, therefore, be stated that a necessary condition for its increase is the formulation of a long-term strategy for the innovation policy that takes into account the real potential of the economy at its current stage of development. It seems reasonable to assume that in the near future Poland should implement a strategy based on a specific version of the imitation model. Therefore, catching up in the area of research and innovation should be possible thanks to the transfer of knowledge and innovation, mainly through foreign direct investment.

A necessary prerequisite for the effectiveness of this solution, however, is the introduction of regulations that will cause foreign companies to locate in Poland not only the production cycle but also elements of the value chain related to R&D. It should be added that the transfer of new technologies through direct investment requires

3 Venture capital investments in relation to GDP accounted for 0.054%, and the average rate for the European Union was 0.149%. *European Innovation Scoreboard 2019*, www.proinno-europe.eu/metrics, 2019, p. 83.

a company's own R&D facilities and educated engineering and technical employees, as well as financing the development of imported technologies. However, it should be remembered that the application of the imitation strategy may be limited e.g., due to limited access to technology. Therefore, it is necessary for native R&D institutions to generate innovation. The Polish economy should selectively move to the group of technological leaders, searching for niches in those areas of science and technology that are Polish specialties and have a chance to achieve market success.

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Streszczenie

Luka innowacyjna między polską gospodarką a Unią Europejską

Wiedza i innowacje są uznawane za jeden z najistotniejszych czynników determinujących tempo i jakość wzrostu gospodarczego. Przed Polską staje poważne wyzwanie efektywnego przekształcenia jej gospodarki w gospodarkę innowacyjną, zdolną do konkurowania z najbardziej rozwiniętymi krajami.
Celem artykułu jest oszacowanie luki innowacyjnej między Polską a krajami Unii Europejskiej na podstawie sumarycznego indeksu innowacyjności, opracowanego przez Komisję Europejską w ramach European Innovation Scoreboard (Europejskiej Tablicy Innowacji) w latach 2010–2018. Dokonano w nim przeglądu literatury na temat innowacyjności gospodarek i luki innowacyjnej. Zastosowano metody analizy opisowej, analizy danych statystycznych w czasie i analizy porównawczej. W badaniu wykorzystano dane statystyczne pochodzące z European Innovation Scoreboard 2019. W artykule sformułowano tezę badawczą, która zakłada, że w analizowanym okresie poziom innowacyjności polskiej gospodarki utrzymuje się na niższym poziomie od średniej unijnej, a zatem wciąż istnieje luka innowacyjna między polską gospodarką a średnią dla krajów Unii Europejskiej. Wyniki przeprowadzonej analizy potwierdzają tę tezę.

Słowa kluczowe: innowacja, innowacyjność, luka innowacyjna, Europejska Tablica Innowacji, sumaryczny indeks innowacji

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Labour Market Institutions and Income Inequalities in the Visegrad Group Countries

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Abstract

The diversity of the labour market in the Visegrad Group countries is presented in the article from an institutional perspective. Institutions such as different tax and transfer policies, employment protection legislation, or active and passive labour market policies can affect not only the effectiveness of the economy from a macro perspective, but they can also be crucial in determining the system of rules and incentives for earning money. The institutional conditions of the labour market directly affect the behaviour of labour market participants, their incomes, and therefore income inequalities. To asses and compare the situation between the Visegrad group countries, a synthetic measure of labour market institutions is calculated. A taxonomic analysis is done to group the V4 countries against other selected European Union countries, which enables the assessment and comparison of similarities and differences across the Visegrad countries. Finally, the trade-offs between a synthetic measure of labour market institutions and income inequalities are analysed. The Pearson correlation coefficient and, additionally, the Spearman's rank correlation coefficient are applied. The analysis is done for 2016, as it was the most recent data available while writing the article. The results from such an analysis can help to answer the question of the state's role in limiting income inequalities through labour market institutions and to identify the policies which are the most effective in this field.

Keywords: income inequalities, labour market, institutions

JEL: B52, D63, E02, J88, O43

Introduction

Income inequalities, which result from uneven development, are considered to be a fundamental issue due to their negative consequences for society. Therefore, it is the state's role to limit inequalities through different policies. Creating labour market conditions seems to be a very crucial issue because it determines the rules for earning money and therefore, income inequalities. Even though a redistribution policy is particularly important in decreasing inequalities, special attention was paid to labour market institutions as the most important institutions.

Members of the state regulate the rules in force on the labour market. In other words, the state creates the environment by defining the instructions, i.e., what is required, prohibited, and permitted on the labour market (Ostrom 2011, p. 17; Ostrom 2005, p. 17). Additionally, the state funds market intervention, enforces the rules and creates the official authorities. According to North's approach, the rules belong to the institutions (North 1994, p. 2). According to the New Institutional Economics, institutions are a mix of formal (written) and informal constraints (norms, conventions, codes of conduct) (North 2005, p. 1). In this article, only formal rules, such as judicial rules, economic rules and contracts are included (North 1990, p. 47). The national rules laid down by the state must be coherent with EU law and other international rules, such as international conventions.

The aim of the article is to identify the state's role in decreasing income inequalities through labour market institutions. Different groups of labour market institutions (for example, protective labour market institutions, wage settings, systems of taxation and social insurance, or active and passive labour market policies) are analysed in the context of income inequalities. What is more, two measures of income inequalities are taken into consideration: Gini calculated on market income, and disposable income. We also analysed the differences between the Visegrad Group countries[1], both in terms of labour market institutions as well as income inequalities. We then compared them to the situation across selected countries of the European Union[2]. Finally, the questions which the article tries to answer are: Are the differences in income inequalities connected to labour market institutions? Are the V4 countries a homogenous group that takes into consideration those criteria in comparison with other European Union countries?

To evaluate and compare labour market institutions, a synthetic measure of labour market institutions is provided. A taxonomic analysis is done to group the V4 countries against other European Union countries. Finally, the trade-offs between the synthetic measure of labour market institutions and income inequalities are analysed. The Pearson correlation coefficient and, additionally, Spearman's rank correlation coefficient

1 We use V4 abbreviation for Visegrad Group countries in the article. V4 consistis of: Czech Republic, Slovakia, Poland and Hungary.

2 Because of data availability we chose the European Union countries which were members of OECD in 2016 and use the abbreviation OECD-UE (22) in the article.

were applied. The important advantage of our research is the institutional perspective used to characterise labour market conditions and the synthetic measure approach. What is more, two income inequality perspectives are considered: Gini calculated on market income and disposable income. This allows us to broaden the analysis to the interrelationships between labour market policies and redistribution policies.

The results of such analysis can help answer the question of the state's role in limiting the income inequalities through labour market institutions and to identify the policies which are most effective in this field.

Relationships between the state's role and income inequalities – a literature review

The relationships between labour market institutions and inequality are complex. There is no single explanation as to the role of the state in decreasing inequalities through labour market institutions.

On the one hand, a growing body of analysis provides evidence about the negative impact of labour market institutions on inequalities. However, few of them present the theoretical institutional perspective, where it is proved that the state, as the entity that influences the rules on the market, significantly affects both the labour market determinants directly, but also income inequalities (Szczepaniak, Szulc-Obłoza 2019). The majority of opinions are consistent with the neo-classical theory of economics, according to which active labour market policies result in a more elastic labour market and increased employment. However, they can also contribute to higher income inequality. However, on the other hand, some labour market institutions, like passive labour market policies or employment protection legislation, may reduce inequalities (Burniaux et al. 2006). Therefore at least two perspectives can be distinguished in the analysis of these trade-offs: the employee's or employer's perspective, and the flexibility or protection criterion.

The same labour market institutions can have an ambiguous influence on income inequalities. Such dual effects on income inequalities can be observed when employment protective labour market policies are taken into consideration. If employees are more protected, employment protective labour market policies can have a negative impact on wage dispersion and thus decrease inequalities. The impact of institutions occurs both through compressing the wage differential and a higher labour share (Checchi, Garcia-Penalosa 2008). Moreover, redistributive policies embedded in unemployment benefits decrease income inequalities (Checchi, Garcia-Penalosa 2010).

By contrast, the same institutions may increase unemployment directly or through an increase in the tax rate in the future, ultimately increasing income inequalities (Koeniger et al. 2004). From this perspective, if employees are less protected by employment protective labour market policies, the institutions of the labour market can increase inequalities because they reduce participation in the labour force and result

in an increase in taxes needed to finance unemployment benefits (Burniaux, Padrini, Brandt 2006; Berg 2015). Hence, the more flexible the labour market, the higher the unemployment rates, and the tendency to increase overall inequality by affecting the number of individuals with low incomes (Acemoglu 2003).

The majority of studies have concluded that the relationships between labour market institutions and income inequalities are negligible and depended on social group. For example, the lack of significance of the relationships between tax wedges and union density rate and inequalities is discussed by Checci and Garcia-Penalosa (Checci, Garcia-Penalosa 2010). Thus, even though different characteristics of labour market institutions have been considered, there were no synthetic measures analysed in relation to inequalities, which is the aim of this article.

Income inequalities in the V4 countries

Many countries, including the V4 countries, have seen rising inequalities over the past three decades. The Czech Republic, Hungary, Poland, and Slovakia comprise the group which successfully transitioned from centrally planned to market economies in the 1990s and joined the European Union in 2004. The effective transformation of these economies was based on institutional reforms which affected the labour market and income inequalities. Even though the state influence was radically weakened in favour of market liberalisations, it was economic policy (e.g., tax, transfers, education, family labour market) that helped alleviate the impact on the population. The unemployment benefits system, and family and child allowances, etc., provided financial protection for the most vulnerable citizens.

Nevertheless, the patterns of income inequalities and conditions on the labour market vary across these countries. The Czech Republic and Slovakia had lower inequalities at the beginning of the 1990s than Poland and Hungary. The Gini index in 1992 was about 23 in the Czech Republic and 22 in Slovakia. In Poland and Hungary, however, it was higher – 29 and 28, respectively (OECD 2018a). About 25 years after the transformation, the Gini index in Slovakia and the Czech Republic is about 25 and about 29 in Poland and Hungary. However, much of this rise is connected to the widening dispersion in labour income. That is why the analysis of labour market institutions and the investigation of the relations between these institutions and income inequalities can be valuable as a direction for the state's redistributive policy.

Income inequalities differ widely when two Gini measures (Gini calculated based on market income and Gini calculated based on disposable income) are taken into consideration. The difference (Gini gap) between these measures reflects the state's role in decreasing inequalities through different kinds of policies.

The inequality of income before taxes and transfer is wider in comparison to the inequality of disposable income. It shows that the state's interference through taxes and

transfers reduces inequality in all countries, but the extent to which the state's policy effectively decreases the Gini index differs across countries. What is important to notice is that income dispersion mainly reflects labour market income, which is shaped by differences in regulations on the labour market (Figure 1). Nevertheless, total market income (including capital income and self-employment) is more concentrated than when only labour income is taken into consideration (OECD 2012).

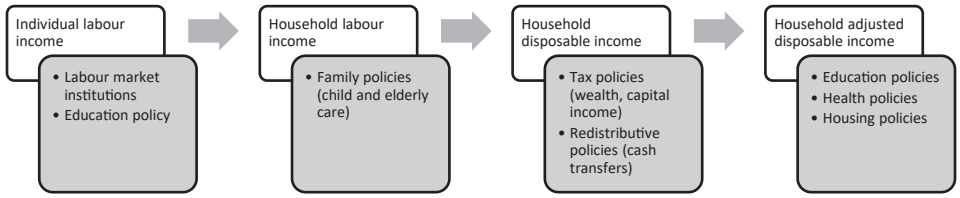

Figure 1. Income concepts and relevant state policies used to evaluate the inequalities
Source: own elaboration based on OECD 2012.

Table 1. Market income and disposable income inequalities in V4 countries and OECD-EU average; Gini gaps and rankings in 2016

Country	Gini market income	Ranking (Gini market income)	Gini disposable income	Ranking (Gini disposable income)	Change in ranking	Gini Gap	Ranking Gini Gap
Slovakia	40.2	1	25.1	2	– 1	15.1	20
Hungary	45.5	5	28.8	9	– 4	16.7	15
Poland	45.5	6	29.2	11	– 5	16.3	16
Czech Republic	46.0	8	25.8	3	+ 5	20.2	10
Average in OECD – European countries (22)	**48.7**		**29.5**			**19.2**	

Source: own elaboration based on OECD 2018a.

When analysing the income inequalities, the Gini calculated on disposable income is taken into consideration because it is the income after transfers and taxes that determines the consumption. Nevertheless, market income inequalities and disposable income inequalities were compared to show the role of state "effectiveness" in decreasing inequalities in each country.

Inequalities in income after taxes and transfers in each of the V4 countries, as measured by the Gini disposable income index, were lower than in OECD-EU(22) countries, and they were, on average, about 63% lower than inequalities in income before taxes and transfers in 2016. The Gini index after taxes and transfers ranged from 25 in Slovenia and Slovakia to 35 in Latvia. The Gini index before taxes and transfers ranged from 40.2 in Slovakia to 56.6 in Greece. In each V4 country, both indices were lower than in the OECD, on average (Table 1).

Slovakia was characterised both by inequality originating from market income and disposable income far below the OECD-European (22) average. The tax and transfers institutions are reducing household disposable income inequality far below the OECD average in the Czech Republic and Slovakia, while Hungary and Poland are characterised as being close to the OECD-EU average. Hungary, Poland, and the Czech Republic were characterised by inequality originating from the labour market that was close to but slightly below the OECD-EU average. It seems that cash transfers and taxes tend to have a smaller redistributive impact in Poland and Hungary. That is why inequalities in household disposable income are higher in Poland and Hungary than in the Czech Republic and Slovakia and close to the OECD-EU average (OECD 2012). Additionally, the only country in the V4 group which is improving its position in the ranking is the Czech Republic, which takes 3rd place instead of 8th in the ranking when disposable income is included in the analysis. This improvement is connected with the Czech Republic's Gini gap, which is slightly higher than the OECD-EU(22) average and much higher than the Gini gaps in Slovakia, Hungary and Poland.

Methods

The need to analyse whole sets of institutions is highlighted in the literature (Betcherman 2013, p. 2; Horwath, Szalai 2008). Identifying and analysing a sophisticated set of institutions remains a challenge because of the complexity of the institutions, the continuous changes in the institutions themselves, and additionally their mutual interactions (Batcherman 2013; Horwath, Szalai 2008; Gaweł, Klimczak 2005). The following may be included in the institutions which affect the demand as well as the supply side of the labour market: protective labour market institutions (rules for employing and dismissing), wage-setting system, taxes, rules of active contribution, passive labour market policies (LMPs) and labour market policy services (Table 2) (Higgins, Pica 2017; Woźniak-Jęchorek 2015; Horwath, Szalai 2008; Wiśniewski 1999). Institutions of active LMPs cover interventions such as training, employment incentives, supported employment and rehabilitation, direct job creation, and start-up incentives. In turn, the institutions of passive labour market policies include out-of-work income maintenance or support and early retirement. LMP services cover all activities of the Public Employment Services for jobseekers (Eurostat 2018, https://ec.europa.eu/eurostat/cache/metadata/fr/lmp_esms.htm) (accessed: 15.10.2018).

The V4 were ranked in order with selected European Union countries on the basis of the synthetic measure of labour market institutions in 2016. The following elements were included in the synthetic measure of labour market institutions, due to data availability: hiring and firing regulations (Fraser Institute[3]), centralised collective bargaining (Fraser Institute[1]), hours regulations (Fraser Institute[1]), mandated cost of worker

3 Only data for 2015 are available.

dismissal (Fraser Institute[1]), the ratio of minimum wage to value-added per worker (Doing Business), active labour market policy expenditures (Eurostat), passive labour market policy expenditures (Eurostat), labour market services expenditures (Eurostat), tax revenue paid by employees (OECD), tax revenue paid by employers (OECD), taxes on the incomes of individuals (OECD) and tax wedge (OECD). The Fraser Institute, as one of the main sources of data in the analysis, provided information with a delay. As a result, because the data from 2016 were the latest available, the research was done for that year. Diagnostic variable selection is based on substantive and statistical criteria (Zeliaś 2000). The diagnostic set of data is characterised by a low level of similarity (the variability coefficient which exceeds the threshold value of 10%) and low correlation among each other (the Pearson correlation coefficient is not more than 0.8) (Zeliaś 2000). Characteristics considered to be destimulants are modified into stimulants using the following transformation:

Table 2. Set of labour market institutions

Elements
1. Protective labour market institutions – employment protection legislation indicator (EPL)
2. Wage-setting system – minimum wage – union density – union coverage – wage bargaining coordination
3. System of taxation and social insurance – income tax – tax wedge – social contributions paid by employer and employees
4. Institutions of active labour market policies (LMP 2–7) – ALMP expenditure in percentage of GDP – ALMP expenditure per unemployed people in percent of GDP per capita
5. Institutions of passive labour market policies (LMP 8–9) – PLMP expenditure in percentage of GDP
6. Labour market services (LMP 1) – LMP services expenditure in percentage of GDP

Source: own analysis based on Horwath, Szalai 2008.

$$x_{ik} = \frac{1}{x_{ik}^{D}} \tag{1}$$

where:
x_{ik} – value of feature transformed into a stimulant,
i – i-th object ($i = 1,\ldots,N$),
x_{ik}^{D} – value of the k-th feature which is a destimulant.

In the next stage, the normalisation of final diagnostic variables by dividing each value by the range is applied:

$$z_{ik} = \frac{x_{ik} - x_{kmin}}{x_{kmax} - x_{kmin}} \tag{2}$$

where:

x_{ik} – value of the k-th feature in the i-th object,

z_{ik} – value of the normalised k-th feature in the i-th object (Zeliaś 2000; Kolenda 2006),

x_{kmin}, x_{kmax} – minimum and maximum value of the k-th feature.

The synthetic measure of diagnostic variables is achieved by calculating the mean of the final diagnostic variables for every country (Zeliaś 2000). Another possibility for the characterisation of labour market institutions as the set of rules is provided by the Employment Protection Legislation Index, the Index of Economic Freedom, and Labour Market Efficiency (OECD 2018b; Heritage Foundation 2018a; The World Bank 2018).

Additionally, selected European Union countries, including the Visegrad Group, were grouped. In order to group the objects by measure of the labour market institution, Ward's Method was applied (Mirkin 2005; Everitt et al. 2011). By using Ward's Method, the aim was to combine countries into clusters so that the variance within the clusters was minimised (Ward's minimum variance method).

To measure the dependence between the synthetic measure of institutions and inequality, the Pearson correlation coefficient and, additionally, Spearman's rank correlation coefficient were applied. The Gini coefficients calculated based on market income and disposable income as measures of inequality were used. Additionally, to evaluate the state's role in the intervention into inequalities, the Gini Gap was included. Microsoft Excel and R system were used for statistical computation and graphics.

Results of the analysis

The sorted sequence of 22 countries according to the estimated synthetic measure of labour market institution variables was prepared (Table 3).

The synthetic measure of labour market institutions ranged from 0.22 in the United Kingdom to 0.61 in France[4]. The United Kingdom and Ireland are characterised by the least regulated (most elastic) labour market according to synthetic measures. By contrast, France, Austria, Finland, and Belgium are the countries with the most regulated labour markets and the most protected employees. The Czech Republic, Poland and Slovakia were alike – relatively elastic when labour market institutions are considered. Hungary was distinguished from other V4 countries (Table 4). The employees were more protected in Hungary, but at a level near the OECD-UE average.

4 The more the labour market is regulated (the more the employee is protected), the higher the value of the synthetic measure of labour market institutions.

Table 3. Synthetic measure of institutional variables in selected European Union countries in 2016

Rank	Country	The synthetic measure of labour market institutions	Rank	Country	The synthetic measure of labour market institutions
1	United Kingdom	0.22	12	**Hungary**	0.38
2	Ireland	0.23	13	Portugal	0.38
3	Latvia	0.24	14	Netherlands	0.39
4	**Czech Republic**	0.28	15	Slovenia	0.40
5	**Poland**	0.29	16	Spain	0.44
6	**Slovakia**	0.30	17	Italy	0.44
7	Estonia	0.31	18	Germany	0.47
8	Denmark	0.35	19	Belgium	0.51
9	Luxembourg	0.35	20	Finland	0.51
10	Sweden	0.37	21	Austria	0.53
11	Greece	0.38	22	France	0.61

Source: own calculations.

Table 4. Ranking of Visegrad countries according to the selected indices

Country	The synthetic measure of labour market institutions	Labour freedom	Labour market efficiency	Strictness of employment protection			
				Individual and collective dismissals (regular contracts)	Individual dismissals (regular contracts)	Temporary contracts	Collective dismissals (additional restrictions)
Czech Republic	4	2	13	13	21	10	3
Hungary	12	7	16	4	2	9	18
Poland	5	10	17	9	11	12	7
Slovakia	6	13	20	6	5	15	13

Source: OECD 2018b; Heritage Foundation 2018b; World Economic Forum 2018.

Visegrad countries were classified in different positions, depending on the indices considered, and the components included in the indices influence the country's place in the ranking (Table 4). For example, labour freedom included the ratio of the minimum wage to the average value added per worker, hindrance in hiring additional workers, the rigidity of hours, the difficulty of firing redundant employees, legally mandated notice period, and mandatory severance pay (Heritage Foundation 2018b). Slovakia was classified as the last country from the V4 countries regarding both labour freedom as well as labour market efficiency. In turn, labour market efficiency covers redundancy costs, hiring and firing practices, cooperation in labour-employer relations, the flexibility of wage determination, the ease of finding skilled employees, the ease of hiring foreign labour, active labour market policies, pay and productivity, reliance on professional management, female participation in the labour force, male participation in the labour force, and salary tax wedge (World Economic Forum 2018).

The indicators of employment protection legislation measure the procedures and costs involved in dismissing individuals or groups of workers as well as the procedures involved in hiring workers on fixed-term or temporary work agency contracts (OECD 2018b). Just one component can influence the overall value of the index, and the consequences are observable in country rankings. For example, Hungary is distinguished by the scale of active labour market policy, which is included as a component of the estimated synthetic measure of labour market institutions. The consequence is observed in the last place it achieved within the group of Visegrad countries, the 12th place among 22 countries (Table 4). In turn, according to the World Economic Forum, Slovakia's restrictive labour market regulations are identified as one of the most problematic factors for doing business there (World Economic Forum 2016). Hence, the position within labour market efficiency is one of the lowest (Table 4).

As a result, the next step of our analysis divided the countries into eight groups by Ward's method. The Visegrad countries were classified into two groups. The Czech Republic and Slovakia, together with Latvia, were in the first group, while Hungary and Poland, together with Slovenia, Greece, Portugal, and Luxembourg were in the second group (Figure 2).

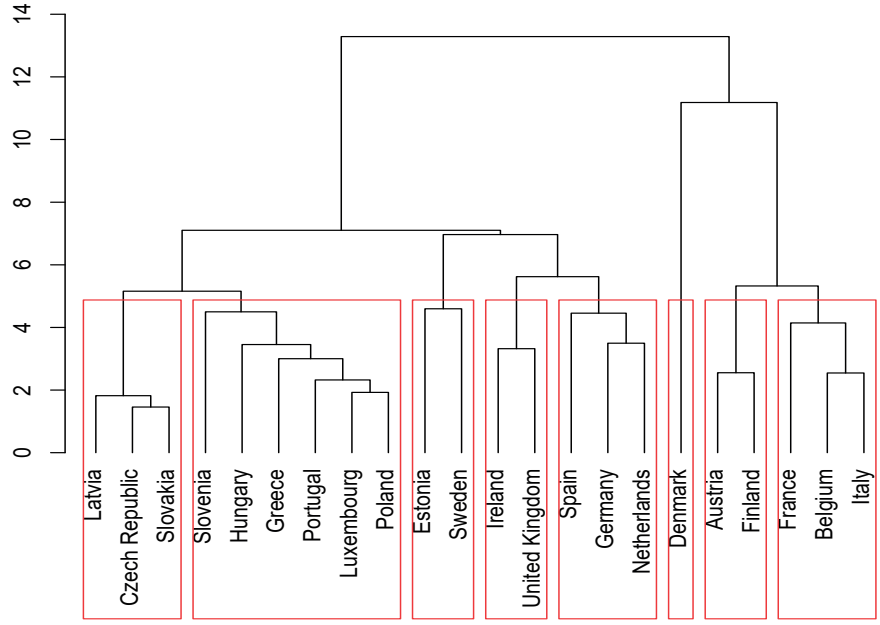

Figure 2. Dendrogram – groups of countries in 2016
Source: own elaboration.

The first group, i.e., the Czech Republic, Slovakia, and Latvia, was characterised by a very low tax burden (the Czech Republic and Slovakia are the lowest in OECD-UE 22), an average tax wedge, very elastic/flexible labour market policies services, elastic/

flexible active labour market policies and very elastic/flexible passive labour market policies. Protective labour market institutions, especially in the aspect of centralized collective bargaining, were relatively elastic in this group of countries.

The second group (Hungary, Poland, Slovenia, Greece, Portugal and Luxembourg) was characterized by lower than average taxes on the income of individuals but a relatively high tax burden connected with employees' social security contributions. Hungary was unique in this group. It can be described by the most elastic/flexible passive labour market policies, the most protective active LMPs, and one of the highest tax wedges among all OECD-UE (22).

The third group (Estonia and Sweden) was characterized by a relatively high employer social security contribution tax burden. Moreover, in the ranking, Estonia and Sweden were with countries with a synthetic measure at an average level depreciated by standard deviation.

The fourth group (Ireland and the United Kingdom) is very characteristic because of the very elastic labour market institutions, the low level of employee protection, and the extremely low tax wedge. Additionally, according to the synthetic measure of labour market institutions that was built, these countries were at the very top of the ranking.

The fifth group (Spain, Germany, and the Netherlands) is characterised by a relatively high tax wedge and moderate protective labour market regulations. The differences in this group appear when labour market institutions are analysed. Active and passive labour market institutions are relatively elastic in Germany, while passive labour market institutions that are relatively protective for workers were identified in the Netherlands and Spain. The synthetic measure of labour market institutions in these countries was at an average level.

Denmark is characterized by such special labour market conditions that it is the only country in the sixth group. The lack of minimum wage regulations, the very elastic wage-setting system and elastic protective labour market regulations were identified, along with very protective active labour market policies. The tax system is also very special because a relatively very high tax burden and no social security contributions were identified. In other words, flexicurity is the distinguishing element. The combination of the flexible labour market, generous social security and an active labour-market policy with rights and obligations for the unemployed are characteristic elements for flexicurity.

The seventh group consists of Austria and Finland, which are characterized by very protective passive labour market regulations and relatively protective active labour market regulations. Tax burden and tax wedge are relatively high. Austria was second-last on the ranking of countries according to synthetic measure of labour market institutions, and Finland placed third-last.

The eighth group (France, Belgium, and Italy) was characterised by a highly regulated EPL (especially hiring and firing regulations, centralised collective bargaining), and also setting wages (in the aspect of minimum wage); high active and passive LMPs

but relatively low employee social security contributions; high employer social security contributions and high individual income tax burden; and a high tax wedge.

The highest market income inequalities are identified in the group containing Ireland and the United Kingdom, where employees are the least protected. Additionally, the highest average Gini Gap results in transfers and taxes being highly effective in decreasing inequalities, and finally lower inequalities after taxes and transfers than in groups 2, 3, 5, and 7. The Czech Republic, Slovakia, and Latvia are characterised by the lowest average Gini market income and a very low Gini Gap, and one of the lowest averages of inequalities after taxes and transfers. Poland and Hungary, together with the rest of the countries from the second group, are characterised by a moderate average Gini market income and Gini Gap, but a relatively high average Gini disposable income (Table 5).

Table 5. Average Gini disposable income, market income, and Gini gap in country groups in 2016

Groups of countries	Average Gini disposable income	Average Gini market income	Average Gini gap
1	28.5	**44.50**	16.00
2	30.2	48.93	18.73
3	30.4	45.15	**14.75**
4	29.6	**53.25**	**23.60**
5	**30.9**	49.17	18.30
6	**26.3**	45.10	18.80
7	29.9	51.33	21.47
8	26.8	50.10	23.35

Source: own elaboration.

As the last step of the analysis, correlation coefficients were calculated to identify the relationships between labour market institutions and income inequalities. The Pearson coefficient calculations showed that there were weak or no relations between the synthetic measure of labour market institutions and the Gini index (before and after taxes and transfers) in 2016. It was 0.23 (not significant, p=0.34) and -0.15 (not significant, p=0.51), respectively. Furthermore, the results of the Pearson correlation coefficient and Spearman's rank correlation coefficient were comparable, 0.19 (not significant, p=0,45) and -0.13 (not significant, p=0.45), respectively. The signs of the correlation coefficients between the Gini market income and the labour income institutions were positive (the more regulated the labour market, the higher the income before taxes and transfers inequalities). When state policy (taxes and transfers) is taken into consideration, the more regulated the labour market, the lower the income after taxes and transfers inequalities. But the results cannot prove a strong relation.

The strongest but still weak positive relation 0.38 (significant, p=0.08) was identified between the synthetic measure of the labour market institutions and the Gini Gap. The higher the synthetic measure of the labour market institutions, the more regulated the labour market/the more protected the employees, the higher the Gini Gap. It can be in-

terpreted that state policy through transfers and taxes is more effective in decreasing inequalities when the labour market institutions protect employees to a great extent.

Conclusion

Our analysis allowed us to compare the situation on the labour market from an institutional perspective, compare the income inequalities, and present the relationships between labour market institutions and income inequalities from an institutional perspective.

Comparing two inequalities measures, i.e., Gini calculated on the basis of market income and disposable income, allowed us to evaluate the role of the state from the perspective of distributional policy. It confirmed that state policy, through taxes and transfers, decreases the inequalities to a different extent. Market income inequalities were lowest in Slovakia among the V4 group. Transfers and taxes tend to have a smaller redistributive impact in Poland and Hungary than in the Czech Republic and Slovakia. Inequalities in household disposable income are higher in Poland and Hungary than in the Czech Republic and Slovakia, and they are close to the OECD-EU average (OECD 2012). The Gini gap was much higher in the Czech Republic than in Slovakia, Hungary and Poland. That is why disposable income inequalities are the lowest in Slovakia and the Czech Republic in the V4 group.

Labour market institutions were estimated through a synthetic measure which was calculated for each country. Hungary stood out when analysing the estimated synthetic measure of labour market institutions. The Czech Republic, Poland and Slovakia were ranked one after the other. The position of the V4 was influenced by the components of the index analysed. There were changes of up to 11 places – in the case of the Czech Republic regarding labour freedom and labour market efficiency. Labour market efficiency is a more sophisticated index, in which more components are included than in labour freedom. For example, differences in the situation on the labour market between sexes are included. Hence, the critical element is the methodology of estimating the particular index.

In the literature, the challenge of including the diverse range of labour market institutions is highlighted. The variety of data that characterised the labour market institutions was determined by the year of the analysis. Removing information from the Fraser Institute would enable us to include 2017 in the analysis, but it would simultaneously reduce the group of analysed institutions. Moreover, due to the relative stability of the rules, huge changes between particular countries are not observed over time. Additionally, it is worth highlighting that labour market institutions are only part of the institutional framework in which activities are executed. That is the argument for analysing inequalities and institutions from different angles.

Additionally, a taxonomic analysis of the group the V4 countries against other selected European Union countries was carried out. The Czech Republic with Slovakia were classified in one group, while Poland and Hungary were classified in another.

The analysis showed the diversity of the V4 countries both from the perspective of labour market institutions as well as income inequalities. The Czech Republic and Slovakia provided more flexible active and passive labour market policies than both Poland and Hungary. However, Hungary stood out in terms of the highest tax wedge and the most protective active labour market policies.

The V4 countries were not homogenous from the income inequalities perspective. Disposable income inequalities were one of the lowest (also in comparison the EU countries) in Czech Republic and Slovakia. However, when market income inequalities are considered, the situation changes drastically.

The results of the analysis are consistent with the literature, and they show weak relationships between labour market institutions and income inequalities, particularly if the difference between market and disposable income inequalities was considered. It means that the more regulated the labour market, the greater the redistributional policies decrease income inequalities.

In conclusion, the different approaches in measuring income inequalities may affect the results of the analysis of relationships between uneven income distribution and labour market institutions. However, from the institutional perspective, as used in this article, in both cases, it is the state which plays an important role in shaping the rules.

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Streszczenie

Instytucje rynku pracy i nierówności dochodowe w krajach grupy wyszehradzkiej

W artykule przedstawiono różnorodność rynku pracy w krajach Grupy Wyszehradzkiej z perspektywy ekonomii instytucjonalnej. Instytucje takie jak: regulacje w zakresie podatków i transferów, przepisy dotyczące ochrony zatrudnienia lub aktywna i pasywna polityka rynku pracy mogą wpływać nie tylko na efektywność gospodarki z perspektywy makroekonomicznej, ale również odgrywać kluczową rolę w określaniu systemu zasad i zachęt do zarabiania pieniędzy. W tej perspektywie warunki instytucjonalne rynku pracy bezpośrednio wpływają na zachowanie uczestników rynku pracy, ich dochody, a tym samym nierówności dochodowe.
W celu dokonania oceny i porównania sytuacji między krajami Grupy Wyszehradzkiej, obliczono syntetyczną miarę instytucji rynku pracy. Ponadto przeprowadzono analizę taksonomiczną, w efekcie której pogrupowano kraje V4 względem wybranych krajów Unii Europejskiej. Takie działanie umożliwiło ocenę i porównanie podobieństw i różnic między krajami wyszehradzkimi. Finalnie podjęto próbę identyfikacji i oceny związków między syntetyczną miarą instytucji rynku pracy a nierównościami dochodowymi. Zastosowano współczynnik korelacji Pearsona i dodatkowo współczynnik korelacji rang Spearmana.
Wyniki analizy są próbą odpowiedzi na pytanie o rolę państwa w ograniczaniu nierówności dochodowych za pomocą instytucji rynku pracy i pomagają zidentyfikować te działania, które są najbardziej skuteczne w analizowanej dziedzinie.

Słowa kluczowe: instytucje, nierówności dochodowe, rynek pracy

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No Commonality in Liquidity on Small Emerging Markets? Evidence from the Central and Eastern European Stock Exchanges[1]

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Abstract

The goal of this comparative research is to investigate intra-market commonality in liquidity on six small emerging Central and Eastern European (CEE) stock exchanges – in the Czech Republic, Hungary, Slovakia, Lithuania, Estonia, and Latvia. The CEE post-communist countries can be analyzed together as they are geographically close, and the stock markets are relatively similar. Three measures based on daily data are utilized as liquidity/illiquidity proxies: (1) a modified version of the Amihud (2002) measure, (2) the percentage relative spread, and (3) the Corwin-Schultz (2012) high-low two-day spread estimator. The OLS regression with the HAC covariance matrix estimation and the GARCH-type models are employed to explore the patterns of market-wide commonality in liquidity on the CEE stock exchanges. The main value-added comes from the methodology and the novel empirical findings. To the best of the author's knowledge, this is the first study that investigates commonality in liquidity in the aforementioned group of countries using three liquidity proxies and the time rolling-window approach to provide robustness tests. The regressions reveal no pronounced evidence of co-movements in liquidity within the CEE markets, taken separately. What is important, the empirical results are homogeneous for all investigated markets. Therefore, no reason has been found to reject the research hypothesis that there is no commonality in liquidity on each individual market. This paper aspires to fill the gap in the knowledge of liquidity patterns on the CEE emerging markets.

Keywords: Central and Eastern Europe, commonality in liquidity, GARCH, OLS-HAC, time rolling-window, daily data

JEL: C32, C58, G12, G15, O52

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Introduction

According to the literature, the existence of commonality in liquidity indicates that individual company liquidity is sensitive to changes in aggregate stock market liquidity. It is well documented that assessing co-movements in liquidity is important for a number of reasons. There are some crucial topics that are especially frequently investigated in this context, including the consideration of commonality in liquidity in non-classical asset pricing models since it could represent a source of non-diversifiable risk, the relationship between shareholders structure and individual firm liquidity, the influence of commonality in liquidity on investment strategies, and the importance of commonality in liquidity to regulators and central bankers (Olbryś 2019a, p. 252). Narayan et al. (2015) emphasize that empirical evidence of common liquidity movements would assist regulators in improving stock market design.

Bekaert et al. (2007) pointed out that liquidity is more critical for emerging than developed markets. The six small Central and Eastern European (CEE) stock exchanges are emerging markets, but four of them (Slovakia, Lithuania, Estonia, and Latvia) are, in fact, frontier markets (Kiviaho et al. 2014). Therefore, one might expect them to be very sensitive to changes in liquidity. Moreover, Brockman et al. (2009) examined the impact of domestic macroeconomic announcements on commonality in liquidity for individual stock exchanges, and their results revealed that the announcement effects are stronger for emerging markets as a group than for developed markets. The small post-communist CEE stock exchanges can be analyzed as a group of markets because they are geographically close and relatively similar. Taking the above into consideration, one might expect that commonality in liquidity exists on these markets. Unfortunately, a large number of companies listed on the CEE exchanges reveal a substantial non-trading problem (Olbryś 2018). The non-trading effect means there is a lack of transactions over a particular period when an exchange is open for trading, with illiquidity as its consequence. Therefore, in the current paper, the research hypothesis that there is no commonality in liquidity on each individual CEE stock market is tested.

The goal of this comparative research is to thoroughly investigate intra-market co-movements in liquidity on six small CEE stock markets – in the Czech Republic, Hungary, Slovakia, Lithuania, Estonia, and Latvia. The Polish stock exchange is not included in this study because it is large compared to the other CEE stock exchanges in the region. However, intra-market commonality in liquidity on the Warsaw Stock Exchange has recently been quite deeply explored in the papers (e.g., Olbryś 2019a; Będowska-Sójka 2019). The empirical results revealed rather weak evidence of co-movements in liquidity on the WSE, regardless of the choice of liquidity proxy.

It is worth noting that Olbryś (2018) conducted a preliminary study of commonality in liquidity on the small CEE exchanges in the context of the non-trading problem. A modified version of the Amihud (2002) measure was used as a daily liquidity proxy in the period from January 2, 2012, to December 30, 2016. The classical market model

of liquidity proposed by Chordia et al. (2000) was employed. The empirical results revealed no evidence of commonality in liquidity on any of the investigated CEE stock markets. To confirm this phenomenon, in the current research, the daily percentage relative spread and Corwin and Schultz's (2012) high-low spread estimator are utilized as additional liquidity proxies. The common feature of the measures used in the study is that they are all based on daily data and are calculated in daily frequency. Moreover, the time rolling-window approach is used to test the stability of the empirical findings in different sub-periods. Following Olbryś (2018), the classical market model of liquidity is utilized in this study. The OLS regression with the HAC covariance matrix estimation (Newey, West 1987) and the GARCH-type models (if necessary, as the OLS-HAC may not fully accommodate the ARCH effect) are employed to infer the patterns of commonality in liquidity.

The main contribution of this research lies in its thorough assessment of commonality in liquidity on six small CEE stock exchanges. The value-added derives from the methodology and the novel empirical findings. To the best of the author's knowledge, this is the first study that investigates commonality in liquidity in the aforementioned group of countries using three liquidity proxies and the time rolling-window approach to provide robustness tests. The regressions reveal no pronounced evidence of commonality in liquidity on the CEE stock markets, taken separately. Importantly, the empirical findings are homogeneous for all investigated markets. It means that individual firm liquidity is not significantly influenced by co-movements in the liquidity of all other firms traded on the same exchange. The findings fill the gap in the knowledge of commonality in liquidity on emerging and frontier stock markets. According to the literature, the results for the CEE stock exchanges reported in this paper substantially differ from findings that have been obtained for developed markets around the world.

The remainder of the study is organized as follows. Section 2 provides a brief literature review of commonality in liquidity on emerging markets. Section 3 specifies the methodological background concerning the measurement of commonality in liquidity. Section 4 describes the data and discusses the empirical results for the six stock exchanges. The paper is summarized in the presentation of conclusions, implications for practice, as well as limitations and suggestions for further research.

Commonality in liquidity on emerging markets

The first empirical study of commonality in liquidity was conducted by Chordia et al. (2000). Beginning with this seminal paper, identifying commonality in liquidity emerged as a fast-growing strand of the literature on liquidity, especially for the U.S. stock market (e.g., Chordia et al. 2000; Kamara et al. 2008; Kang, Zhang 2013; Korajczyk, Sadka 2008). Commonality in liquidity has also been explored for other individual emerging and developed equity markets in the world. In general, the em-

pirical results from various markets are ambiguous. The majority of researchers suggest that market structure and trading mechanisms play important roles in different effects of commonality in liquidity for the observed markets. Moreover, the non-trading problem may substantially affect the findings of liquidity co-movements on small emerging stock exchanges. This is because infrequently traded stocks cannot provide reliable information.

Kearney (2012) pointed out that although the term "emerging market" is in common usage, there is no agreement on either the theoretical or operational definition of what it constitutes, and the classification of countries as emerging markets is consequently somewhat arbitrary. As this research aspires to draw attention toward emerging economies, the analysis of previous literature focuses on studies that relate mostly to emerging stock exchanges. However, the majority of papers concern Asian emerging markets, which, in general, are not comparable to European small stock exchanges. For example, Pukthuanthong-Le and Visaltanachoti (2009) assessed the Stock Exchange in Thailand, and they confirmed market-wide commonality in liquidity on this market. Narayan et al. (2015) found strong support for commonality in liquidity on the Chinese stock exchanges in Shanghai and Shenzhen. Syamala et al. (2017) analyzed the Indian stock market, and presented evidence for both supply-side and demand-side factors that contribute to liquidity commonality. Wang (2013) examined the impact of a set of common factors on liquidity variations on eight emerging equity markets in Asia, namely China, India, Indonesia, Korea, Malaysia, the Philippines, Taiwan, and Thailand. Meanwhile, Sensoy (2016) investigated the influence of specific macro-announcements on liquidity commonality in Turkey.

A limited number of studies investigate commonality in liquidity for a group of equity markets, with Central and Eastern European economies receiving particularly little attention. For example, Brockman et al. (2009) utilized the methodology of Chordia et al. (2000) on 47 stock markets from different contingent-based regions, but their database included only two of the CEE countries, namely Poland and Hungary. Karolyi et al. (2012) analyzed cross-country commonality in liquidity using daily data for stocks from 40 developed and emerging markets, but their database contained only the Polish stock exchange. Bai and Qin (2015) investigated commonality in liquidity in 18 emerging countries, but, as with Karolyi et al., only Poland was included in their research. Importantly, the authors pointed out that liquidity co-movements across emerging stock exchanges have a pronounced geographic component. This evidence might be crucial in the case of CEE countries that are geographically close. Olbryś (2019b) assessed market-wide commonality in liquidity on the CEE-3 stock exchanges in Poland, the Czech Republic, and Hungary. The empirical findings confirmed weak evidence of co-movements in liquidity on the analyzed markets, considered separately.

None of the aforementioned studies concerns the whole group of the CEE countries. Table 1 includes brief information on the six small stock markets that are investigated in this research, namely the Czech Republic, Hungary, Slovakia, Lithuania, Estonia, and Latvia.

Table 1. The six small Central and Eastern European stock markets highlights

Country	Stock exchange	Index	Stock market established	Market Cap., EUR billion, Dec 2016
Czech Republic	Prague Stock Exchange (PSE)	PX	1993	22.19
Hungary	Budapest Stock Exchange (BSE)	BUX	1991	21.27
Slovakia	Bratislava Stock Exchange (BSSE)	SAX	1993	5.28
Lithuania	NASDAQ Vilnius	OMXV	1993	3.50
Estonia	NASDAQ Tallinn	OMXT	1995	2.29
Latvia	NASDAQ Riga	OMXR	1995	0.80

Source: National stock exchange websites.

Methodology

In this section, the methodological background concerning the measurement of commonality in liquidity is presented. Selected liquidity/illiquidity proxies derived from daily data and econometric methods applied in the study are described in detail.

Liquidity proxies derived from daily data

An investigation of liquidity is complicated by various obstacles. A lack of access to intraday data on most emerging stock markets might be considered one such inconvenience, and it is a problem that is widely known and amply reported in the literature (e.g., Bekaert et al. 2007; Olbryś 2014). High-frequency data are not freely available for the analyzed CEE stock exchanges. Therefore, in this study, three liquidity proxies approximated from daily data are utilized to capture various sources of market liquidity, which is, in fact, a latent variable. Table 2 presents the formulas of these proxies.

Table 2. Definition of daily liquidity/illiquidity proxies utilized in the study

	Liquidity proxy	Definition
1	The modified version of the Amihud (2002) measure $MAmih_t$	$MAmih_t = \begin{cases} log\left(1+\frac{\lvert r_t \rvert}{V_t}\right), when V_t \neq 0 \\ 0, when V_t = 0 \end{cases}$
2	The percentage relative spread $\%RS_t$	$\%RS_t = \frac{200 \cdot \left(P_t^H - P_t^L\right)}{P_t^H + P_t^L}$

Tabel 2. (continued)

	Liquidity proxy	Definition
3	The Corwin-Schultz (2012) high-low two-day spread estimator S_t	$S_t = \frac{2\left(e^{\alpha}-1\right)}{e^{\alpha}+1}$

Where:
r_t is the simple rate of return of stock on day t,
V_t is the trading volume of stock on day t,
P_t^H, P_t^L are the high and low prices of stock on day t, respectively,
$\alpha = \frac{\sqrt{2\beta}-\sqrt{B}}{3-2\sqrt{2}} - \sqrt{\frac{\gamma}{3-2\sqrt{2}}}$ is the main parameter in the formula for the S_t estimator,
and $\beta = \left[ln\left(\frac{P_t^H}{P_t^L}\right)\right]^2 + \left[ln\left(\frac{P_{t+1}^H}{P_{t+1}^L}\right)\right]^2$, $\gamma = \left[ln\left(\frac{\max\left(P_t^H, P_{t+1}^H\right)}{\max\left(P_t^L, P_{t+1}^L\right)}\right)\right]^2$.

Source: author's own elaboration based on Karolyi et al. 2012; Olbrys, Mursztyn 2018; Olbryś 2019a; and Corwin, Schultz 2012.

Table 2 requires some comments. The value of the daily proxy $MAmih_t$ is defined to be equal to zero when the total daily volume is equal to zero. In the literature, the Amihud measure is usually calculated for a stock for each month (e.g., Fong et al. 2017; Olbryś 2014). However, in this study, daily time series of the modified Amihud proxy are estimated. The percentage relative spread $\%RS_t$ is a measure of illiquidity because a high value of this indicator denotes low liquidity while a small value of the $\%RS_t$ indicates high liquidity. The S_t estimator is quite easy to compute as it requires only the high and low prices from two consecutive days, t and $t+1$. It is calculated for a stock on each trading day. However, Corwin and Schultz (2012) emphasize that infrequent trading is a crucial problem if all trades occur at the same price, and then $P_t^H = P_t^L$. In fact, the S_t measures illiquidity, so usually the higher are the values of this indicator, the lower liquidity is observed on a given day.

Assessing commonality in liquidity

To investigate commonality in liquidity, the classical market model of liquidity proposed by Chordia et al. (2000) is the most frequently employed model in the literature. In this research, a modified version of this model, including the Dimson (1979) correction for daily data, is applied:

$$DL_{i,t} = \alpha_i + \beta_{i,-1} \cdot DL_{M,t-1} + \beta_{i,0} \cdot DL_{M,t} + \beta_{i,+1} \cdot DL_{M,t+1} + \varepsilon_{i,t}, \qquad (1)$$

where $DL_{i,t}$ for stock i is the change in liquidity variable L from trading day $t-1$ to t, i.e., $DL_t = \frac{L_t - L_{t-1}}{L_{t-1}}$. The Dimson correction allows us to mitigate the non-synchronous trading problem. In this procedure, the $DL_{M,t-1}$, $DL_{M,t}$, and $DL_{M,t+1}$ variables are included in the model equation. These variables are the lagged, concurrent, and leading changes is a cross-sectional average of the liquidity variable L, respectively. It is crucial that in computing the 'market' liquidity proxy L_M, stock i is excluded and the measure L_M. is estimated as the equally-weighted average liquidity for the remaining stocks, for each individual stock market, so the explanatory variables in the model (1) are slightly different for each stock regression (Olbryś 2019a, p. 262). Positive and statistically significant slope coefficients $\beta_{i,0}$, $\beta_{i,-1}$, and $\beta_{i,+1}$ are especially desired since they indicate commonality in liquidity. Basically, they confirm liquidity co-movements in the same direction (e.g., Brockman et al. 2009; Olbryś 2018; 2019a; 2019b).

Model (1) is initially estimated for each stock by the OLS regression with the robust HAC estimates (Newey, West 1987), but the OLS-HAC may not fully correct for the influence problems introduced by the ARCH effect. In such cases, estimating model (1) as a GARCH-type model is more appropriate. Engle's (1982) test is employed to infer the ARCH effect. The GARCH(p, q) model is defined by Eq. (2):

$$\begin{gathered} DL_{i,t} = \alpha_i + \beta_{i,-1} \cdot DL_{M,t-1} + \beta_{i,0} \cdot DL_{M,t} + \beta_{i,+1} \cdot DL_{M,t+1} + \varepsilon_{i,t}, \\ \varepsilon_{i,t} = z_{i,t}\sqrt{\mathrm{h_{i,t}}},\ z_{i,t} \sim N(0,1), \\ \mathrm{h_{i,t}} = a_{i,0} + \sum_{k=1}^{q} a_{i,k}\varepsilon_{i,t-k}^2 + \sum_{l=1}^{p} b_{i,l}\mathrm{h_{i,t\text{-}l}}, \end{gathered} \tag{2}$$

where $a_{i,0} > 0, a_{i,k} \geq 0, k = 1,\ldots,q, q > 0, b_{i,l} \geq 0, l =,\ldots, p, p \geq 0$. The $\varepsilon_{i,t}$ is the innovation in a linear regression with $V(\varepsilon) = \sigma^2$, while $h_{i,t}$ is the variance function. The rest of the notation is the same as in Eq. (1) (see for example Olbryś 2018; 2019a; 2019b).

Data description and empirical results on the CEE stock exchanges

In the present study, daily data for stock exchanges from the Czech Republic, Hungary, Slovakia, Lithuania, Estonia, and Latvia, are utilized. Data comes from Bloomberg under a license agreement between Bloomberg and Bialystok University of Technology (grant No. 2016/21/B/HS4)[2]. The database contains the opening, high, low, and

2 The database was prepared specifically for the grant and it was purchased from Bloomberg in January 2017. Therefore, to avoid internal inconsistency of the research, all empirical analyses concerning various aspects of liquidity for the six stock markets were conducted for the same period from January 2012 to December 2016 (e.g., Olbryś 2018; 2020).

closing prices, as well as the volume for each equity over each trading day, from January 2, 2012, to December 30, 2016. The database holds 1252 (for the PSE), 1240 (for the BSE), 1244 (for the BSSE), 1245 (for the NASDAQ Vilnius), 1251 (for the NASDAQ Tallinn), and 1242 (for the NASDAQ Riga) trading days, respectively. The Warsaw Stock Exchange (WSE) is not included in the study because it is large compared to the other CEE stock markets. For comparison, at the end of 2016, the total number of listed companies was 881 (WSE), 23 (PSE), 41 (BSE), 71 (BSSE), 34 (NASDAQ Vilnius), 17 (NASDAQ Tallinn), and 32 (NASDAQ Riga) (Olbryś 2018, p. 72).

It is widely known that a lot of equities listed on emerging stock markets display a substantial non-trading problem. To avoid this problem, the companies that exhibited an extraordinarily high number of non-traded days within the whole sample period (precisely, above 373 zeros in daily volume, which constituted about 30% of all trading days), were excluded from the data set. Finally, the database contained 10 (Prague), 18 (Budapest), 3 (Bratislava), 15 (Vilnius), 12 (Tallinn), and 7 (Riga) companies (65 firms in total) (Olbryś 2018, p. 73).

Testing for stock exchange-level commonality in liquidity

In the first step, using the ADF-GLS test (Elliott et al. 1996) or ADF test (Dickey, Fuller 1981), I tested whether the daily time series are stationary. It was proved that the unit-root hypothesis can be rejected at the 5% significance level for all time series utilized in the study. In order to reduce the effects of possibly spurious outliers, the data was 'winsorized' by the 1st and 99th percentiles for each time series (e.g., Korajczyk, Sadka 2008; Kamara et al. 2008).

In the second step, the OLS-HAC regression was employed to estimate the parameters of model (1). In total, 195 models for the six stock markets and three liquidity proxies ($MAmih_t$, $\%RS_t$, and S_t) were estimated, comprising 30 (Prague), 54 (Budapest), 9 (Bratislava), 45 (Vilnius), 36 (Tallinn), and 21 (Riga). For each stock, the daily proportional changes in individual stock liquidity variables were regressed in time-series on the changes of an equally weighted cross-sectional average of the liquidity variable for all stocks in the sample, excluding the dependent variable stock (Olbryś 2019a, p. 264). The empirical results showed that the OLS-HAC regressions proved to be appropriate for 29 models (Prague), 42 models (Budapest), 8 models (Bratislava), 35 models (Vilnius), 30 models (Tallinn), and 20 models (Riga) because the ARCH effect did not appear. Only for 31 models was the ARCH effect in the residuals detected. Therefore, for those companies, the GARCH(p, q), $p, q = 1,2$ models (2) were estimated. The number of lags p, q, was selected on the basis of the AIC and SC information criteria.

The cross-sectional estimation results of models (1) and (2) are presented in Table 3. This table contains the number of positive significant, positive insignificant, negative significant, and negative insignificant coefficients (at the 10% significance level), for each stock exchange and each liquidity proxy, separately.

Table 3. Testing for commonality in liquidity on the CEE stock markets

Prague Stock Exchange (10 companies)						
	$MAmih_t$		$\%RS_t$		S_t	
	OLS-HAC 9 models	GARCH 1 model	OLS-HAC 10 models	GARCH 0 model	OLS-HAC 10 models	GARCH 0 model
Concurrent $\beta_{i,0}$						
+ +	2	0	6	–	1	–
+	3	0	4	–	3	–
– –	2	0	0	–	2	–
–	2	1	0	–	4	–
Lag $\beta_{i,-1}$						
+ +	0	0	4	–	0	–
+	4	0	2	–	8	–
– –	2	0	0	–	0	–
–	3	1	4	–	2	–
Lead $\beta_{i,+1}$						
+ +	0	1	1	–	0	–
+	2	0	5	–	4	–
– –	2	0	0	–	2	–
–	5	0	4	–	4	–
Budapest Stock Exchange (18 companies)						
	$MAmih_t$		$\%RS_t$		S_t	
	OLS-HAC 14 models	GARCH 4 models	OLS-HAC 14 models	GARCH 4 models	OLS-HAC 14 models	GARCH 4 models
Concurrent $\beta_{i,0}$						
+ +	0	0	6	3	2	0
+	5	0	5	1	4	2
– –	3	1	1	0	3	1
–	6	3	2	0	5	1
Lag $\beta_{i,-1}$						
+ +	1	0	2	1	1	0
+	1	3	7	2	5	2
– –	6	0	2	0	1	0
–	6	1	3	1	7	2
Lead $\beta_{i,+1}$						
+ +	1	0	4	1	0	0
+	6	1	7	1	3	1
– –	4	1	1	0	0	2
–	3	2	2	2	11	1

Tabel 3. (continued)

Bratislava Stock Exchange (3 companies)						
	$MAmih_t$		$\%RS_t$		S_t	
	OLS-HAC 3 models	GARCH 0 model	OLS-HAC 2 models	GARCH 1 model	OLS-HAC 3 models	GARCH 0 model
Concurrent $\beta_{i,0}$						
+ +	0	–	0	0	0	–
+	3	–	2	1	1	–
– –	0	–	0	0	0	–
–	0	–	0	0	2	–
Lag $\beta_{i,-1}$						
+ +	0	–	0	0	0	–
+	1	–	2	0	2	–
– –	1	–	0	0	0	–
–	1	–	0	1	1	–
Lead $\beta_{i,+1}$						
+ +	0	–	0	0	0	–
+	1	–	0	1	2	–
– –	1	–	1	0	0	–
–	1	–	1	0	1	–
NASDAQ Vilnius (15 companies)						
	$MAmih_t$		$\%RS_t$		S_t	
	OLS-HAC 14 models	GARCH 1 model	OLS-HAC 12 models	GARCH 3 models	OLS-HAC 9 models	GARCH 6 models
Concurrent $\beta_{i,0}$						
+ +	0	0	5	1	0	1
+	9	0	6	2	4	4
– –	1	0	0	0	0	0
–	4	1	1	0	5	1
Lag $\beta_{i,-1}$						
+ +	0	0	2	1	2	1
+	3	0	9	2	5	4
– –	5	0	0	0	0	0
–	6	1	1	0	2	1
Lead $\beta_{i,+1}$						
+ +	0	0	2	0	1	1
+	9	1	3	2	2	1
– –	2	0	0	0	0	0
–	3	0	7	1	6	4

NASDAQ Tallinn (12 companies)						
	$MAmih_t$		$\%RS_t$		S_t	
	OLS-HAC 11 models	GARCH 1 model	OLS-HAC 10 models	GARCH 2 models	OLS-HAC 9 models	GARCH 3 models
Concurrent $\beta_{i,0}$						
+ +	0	0	5	0	0	0
+	6	1	3	0	3	
– –	2	0	0	0	1	1
–	3	0	2	2	5	1
Lag $\beta_{i,-1}$						
+ +	0	0	1	0	0	1
+	2	0	6	1	3	0
– –	5	0	1	1	0	2
–	4	1	2	0	6	0
Lead $\beta_{i,+1}$						
+ +	0	0	1	0	1	0
+	1	0	3	0	3	2
– –	3	0	1	2	0	1
–	7	1	5	0	5	0
NASDAQ Riga (7 companies)						
	$MAmih_t$		$\%RS_t$		S_t	
	OLS-HAC 7 models	GARCH 0 model	OLS-HAC 7 models	GARCH 0 model	OLS-HAC 6 models	GARCH 1model
Concurrent $\beta_{i,0}$						
+ +	0	–	1	–	1	0
+	4	–	5	–	0	1
– –	1	–	0	–	0	0
–	2	–	1	–	5	0
Lag $\beta_{i,-1}$						
+ +	0	–	0	–	0	0
+	3	–	5	–	4	1
– –	2	–	1	–	0	0
–	2	–	1	–	2	0
Lead $\beta_{i,+1}$						
+ +	0	–	0	–	0	0
+	2	–	2	–	2	0
– –	1	–	2	–	1	0
–	4	–	3	–	3	1

Notes: The table is based on the whole sample period from January 2, 2012, to December 30, 2016.
+ + positive significant coefficient
+ positive insignificant coefficient
– – negative significant coefficient
– negative insignificant coefficient

Source: author's own calculations with the use of STATA 14.

The summarized cross-sectional results reported in Table 3 require comments. The regressions provide no pronounced evidence of commonality in liquidity on the CEE markets because positive and statistically significant coefficients are scarce, especially in the case of the $MAmih_t$ and S_t proxies. For example, the positive and statistically significant concurrent coefficients constitute 2/10 (1/10), 0/18 (2/18), 0/3 (0/3), 0/15 (0/15), 0/12 (0/12), and 0/7 (1/7) of all concurrent coefficients for the PSE, BSE, BSSE, NASDAQ Vilnius, NASDAQ Tallinn, and NASDAQ Riga models, and the $MAmih_t(S_t)$ proxies, respectively. The evidence concerning the lag and lead coefficients is very similar. Moreover, for both the $MAmih_t$ and S_t measures, the numbers of negative and statistically significant coefficients are even greater for some investigated markets, which informs about liquidity co-movements in the opposite direction. This phenomenon observed for these two estimates could be explained by their relatively high sensitivity to non-trading effects (Corwin, Schultz 2012; Olbryś 2019a). The empirical results for the $\%RS_t$ proxy are slightly different. We observe more positive coefficients, but many of them are insignificant. For example, the positive and statistically significant (insignificant) concurrent coefficients constitute 6/10 (4/10), 9/18 (6/18), 0/3 (3/3), 6/15 (8/15), 5/12 (3/12), and 1/7 (5/7) of all concurrent coefficients for the PSE, BSE, BSSE, NASDAQ Vilnius, NASDAQ Tallinn, and NASDAQ Riga models, respectively. The findings concerning the lag and lead coefficients are similar.

Robustness tests

The related literature indicates that commonality in liquidity varies over time (e.g., Kamara et al. 2008; Karolyi et al. 2012). Therefore, to check the robustness of the empirical results, the time rolling-window approach is employed. The whole sample period covers five years; therefore, robustness tests based on the 2-year rolling-window are provided. Three 2-year time windows are utilized:

- Window 1 (January 2012 – December 2014),
- Window 2 (January 2013 – December 2015),
- Window 3 (January 2014 – December 2016).

The parameters of model (1) are estimated for each stock that is contained in the database, within each time window, and for each of three liquidity proxies. In total, 585 models are investigated, comprising 90 models for the PSE, 162 models for the BSE, 27 models for the BSSE, 135 models for the NASDAQ Vilnius, 108 models for the NASDAQ Tallinn, and 63 models for the NASDAQ Riga.

The results of the rolling-window tests are presented in Tables 4–6. These results reveal that in the case of the $MAmih_t$ and S_t proxies (Tables 4 and 6), the numbers of positive and statistically significant coefficients are predominately equal to zero for each window, and for all stock exchanges. Moreover, the proportions of negative and statistically significant coefficients are even greater, which informs about liquidity movements in the opposite direction. In the case of the $\%RS_t$ proxy, the empirical findings

are slightly better, especially for the Prague, Budapest, Vilnius, and Tallinn stock exchanges (Table 5). However, one can observe that robustness tests based on the 2-year rolling-window approach indicate no reason to reject the research hypothesis that there is no commonality in liquidity on the six stock markets considered separately.

Table 4. The rolling-window findings of testing for stock exchange-level commonality in liquidity on six small CEE stock markets (the $MAmih_t$ proxy)

Coefficient	The proportion of positive/negative and statistically significant slope coefficients		
	Window 1	Window 2	Window 3
Prague (10 models)			
Concurrent $\beta_{i,0}$	1/2	1/2	3/2
Lag $\beta_{i,-1}$	0/0	0/1	0/1
Lead $\beta_{i,+1}$	0/3	1/3	0/1
Budapest (18 models)			
Concurrent $\beta_{i,0}$	0/6	0/8	0/8
Lag $\beta_{i,-1}$	0/6	1/7	0/9
Lead $\beta_{i,+1}$	0/5	1/5	0/4
Bratislava (3 models)			
Concurrent $\beta_{i,0}$	0/1	0/1	0/1
Lag $\beta_{i,-1}$	0/1	0/0	0/2
Lead $\beta_{i,+1}$	0/1	0/3	0/3
Vilnius (15 models)			
Concurrent $\beta_{i,0}$	1/1	0/3	0/8
Lag $\beta_{i,-1}$	0/5	0/4	0/5
Lead $\beta_{i,+1}$	0/2	0/2	0/3
Tallinn (12 models)			
Concurrent $\beta_{i,0}$	0/2	1/3	0/4
Lag $\beta_{i,-1}$	0/4	0/3	0/3
Lead $\beta_{i,+1}$	0/4	0/2	0/2
Riga (7 models)			
Concurrent $\beta_{i,0}$	0/0	0/2	0/2
Lag $\beta_{i,-1}$	0/1	0/2	0/1
Lead $\beta_{i,+1}$	0/4	0/1	0/1

Notation as in Table 3. The significance level is equal to 10%.

Window 1: January 2012 – December 2014; Window 2: January 2013 – December 2015; Window 3: January 2014 – December 2016.

Source: author's own calculations with the use of STATA 14.

Table 5. The rolling-window findings of testing for stock exchange-level commonality in liquidity on six small CEE stock markets (the %RS_t proxy)

Coefficient	The proportion of positive/negative and statistically significant slope coefficients		
	Window 1	Window 2	Window 3
Prague (10 models)			
Concurrent $\beta_{i,0}$	6/0	6/0	5/0
Lag $\beta_{i,-1}$	3/0	4/0	1/0
Lead $\beta_{i,+1}$	1/0	1/0	1/1
Budapest (18 models)			
Concurrent $\beta_{i,0}$	6/0	7/1	5/1
Lag $\beta_{i,-1}$	1/0	1/2	2/3
Lead $\beta_{i,+1}$	3/1	5/1	3/3
Bratislava (3 models)			
Concurrent $\beta_{i,0}$	0/0	0/0	0/0
Lag $\beta_{i,-1}$	0/0	0/1	0/2
Lead $\beta_{i,+1}$	0/2	0/1	0/2
Vilnius (15 models)			
Concurrent $\beta_{i,0}$	5/0	5/0	4/0
Lag $\beta_{i,-1}$	4/0	4/0	5/0
Lead $\beta_{i,+1}$	1/0	2/0	4/0
Tallinn (12 models)			
Concurrent $\beta_{i,0}$	2/1	4/0	5/0
Lag $\beta_{i,-1}$	1/2	0/1	0/1
Lead $\beta_{i,+1}$	1/3	0/2	0/0
Riga (7 models)			
Concurrent $\beta_{i,0}$	1/1	0/0	1/0
Lag $\beta_{i,-1}$	0/1	0/0	0/0
Lead $\beta_{i,+1}$	0/1	0/0	0/2

Notation as in Table 4.

Source: author's own calculations with the use of STATA 14.

Table 6. The rolling-window findings of testing for stock exchange-level commonality in liquidity on six small CEE stock markets (the S_t proxy)

Coefficient	The proportion of positive/negative and statistically significant slope coefficients		
	Window 1	Window 2	Window 3
Prague (10 models)			
Concurrent $\beta_{i,0}$	2/2	1/0	0/0
Lag $\beta_{i,-1}$	1/0	1/0	0/0
Lead $\beta_{i,+1}$	0/0	0/0	1/2
Budapest (18 models)			
Concurrent $\beta_{i,0}$	3/2	3/2	1/1
Lag $\beta_{i,-1}$	1/2	1/1	1/0
Lead $\beta_{i,+1}$	0/1	0/2	0/2
Bratislava (3 models)			
Concurrent $\beta_{i,0}$	0/0	0/0	0/2
Lag $\beta_{i,-1}$	1/0	0/0	0/0
Lead $\beta_{i,+1}$	1/0	2/0	0/1
Vilnius (15 models)			
Concurrent $\beta_{i,0}$	0/0	0/0	0/1
Lag $\beta_{i,-1}$	3/0	4/1	3/0
Lead $\beta_{i,+1}$	0/0	2/0	3/0
Tallinn (12 models)			
Concurrent $\beta_{i,0}$	0/0	0/1	0/1
Lag $\beta_{i,-1}$	0/1	0/0	0/0
Lead $\beta_{i,+1}$	1/0	2/0	1/0
Riga (7 models)			
Concurrent $\beta_{i,0}$	1/0	1/0	1/0
Lag $\beta_{i,-1}$	0/0	0/0	2/0
Lead $\beta_{i,+1}$	0/1	0/1	0/0

Notation as in Table 4.
Source: author's own calculations with the use of STATA 14.

Discussion and conclusions

The purpose of this comparative study was to assess market-wide commonality in liquidity on six emerging Central and Eastern European stock exchanges, in the Czech Republic, Hungary, Slovakia, Lithuania, Estonia, and Latvia. The modified version of the Amihud proxy, the percentage relative spread bid/ask, and the Corwin-Schultz

high-low two-day spread estimator were utilized as daily liquidity/illiquidity measures for stocks. The OLS regression with the HAC covariance matrix estimation and the GARCH-type models were employed to infer the patterns of intra-market commonality in liquidity on the investigated exchanges. According to the literature, positive and statistically significant slope coefficients in the estimated models are especially desired, as they indicate co-movements in liquidity in the same direction, and therefore confirm commonality in liquidity.

In general, the estimation results provide no evidence of co-movements in liquidity on the CEE stock exchanges because positive and statistically significant coefficients rarely appear, regardless of the choice of the liquidity estimate. The empirical findings are somewhat homogeneous for all investigated markets. Therefore, no reason has been found to reject the research hypothesis that there is no commonality in liquidity on the CEE stock markets, taken separately. This is perhaps the most significant finding of our research. The results are novel and generally consistent with the literature concerning other emerging markets in the world but are in contrast to previous studies of developed markets. The findings fill the gap in the literature of commonality in liquidity on emerging and frontier markets, and therefore, our study contributes to the body of knowledge in that respect. Moreover, this paper proposes attributing the absence of commonality in liquidity on the small CEE stock exchanges mainly to the non-trading problem. It is worth noting that commonality in liquidity may depend on the structure of the stock market, and it is less pronounced in order-driven markets than for dealer or hybrid markets because quote-driven or hybrid systems offer a form of liquidity supplier.

The results of this research have important practical implications and may be useful in decision-making processes. From a practical point of view, the problem is crucial because the absence of commonality in liquidity influences investment strategies, portfolio management and risk diversification, domestic and international asset pricing, etc. Moreover, empirical findings concerning liquidity co-movements would help regulators and policymakers in improving stock market design. Undoubtedly, a low level of commonality in liquidity has some advantages because it reduces the susceptibility of a country's financial system to the drying up of liquidity across many securities during periods of market stress and crisis (Karolyi et al. 2012).

The empirical results presented in this study certainly cannot provide definitive conclusions as to commonality in liquidity on the investigated markets. Selected liquidity proxies based on daily data are utilized. According to the literature, there are several existing liquidity measures, and different frequencies of data are used. Various proxies derived from intraday data are particularly useful and frequently employed in assessing commonality in liquidity (e.g., Pukthuanthong-Le, Visaltanachoti 2009; Narayan et al. 2015; Olbryś 2019a). However, high-frequency data are not freely available for the analyzed CEE stock exchanges, and this is the main limitation of the study.

A possible direction for further investigation could be to identify components of liquidity on the CEE stock markets taken separately, applying methods based on principal component analysis. To the best of the author's knowledge, no such research has been undertaken thus far. Another important direction for further research could be a comparative investigation of commonality in liquidity on the same six small CEE stock exchanges before and after the COVID-19 pandemic. In all likelihood, the less liquid emerging stock markets will be among the most affected by the worldwide recession. Many firms will have serious problems surviving the COVID-19 pandemic period, and it is possible that the number of companies listed on small stock exchanges will substantially change. However, the non-trading problem will increase.

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Streszczenie

Brak wspólności w płynności na małych rozwijających się rynkach giełdowych? Wyniki dla giełd Europy Środkowo-Wschodniej

Celem pracy było badanie komparatywne tzw. wspólności w płynności (*commonality in liquidity*) na sześciu małych giełdach Europy Środkowo-Wschodniej. Analizowane rynki to: Czechy, Węgry, Słowacja, Litwa, Estonia i Łotwa. Wykorzystano trzy miary płynności/niepłynności aktywów kapitałowych, aproksymowane na podstawie danych dziennych. Próba objęła okres 5 lat, od stycznia 2012 do grudnia 2016. Do oszacowania modeli płynności zastosowano metodę estymatorów odpornych HAC oraz modele typu GARCH (w przypadku wystąpienia efektu ARCH w procesach resztowych). Dodatkowo przeprowadzono analizę stabilności wyników w czasie za pomocą procedury ruchomego okna. Wyniki empiryczne nie ujawniły wyraźnych wzorców w płynności na badanych rynkach oraz okazały się bardzo zbliżone na wszystkich giełdach, analizowanych oddzielnie. Na tej podstawie stwierdzono brak podstaw do odrzucenia hipotezy badawczej o braku wspólności w płynności na każdym z rynków. Badanie wypełnia lukę literaturową dotyczącą płynności na małych giełdach Europy Środkowo-Wschodniej, ponieważ żadne z wcześniejszych opracowań nie analizowało w sposób kompleksowy całej grupy wymienionych rynków.

Słowa kluczowe: Europa Środkowo-Wschodnia, wspólność w płynności, GARCH, HAC, ruchome okno czasowe, dane dzienne

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A Comparison of Corporate Governance and Tax Avoidance of UK and Japanese Firms

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Abstract

The present study was designed to determine the relationship between corporate governance and tax avoidance in an international setting.
Financial and governance data sourced from the Datastream database for a sample of Japanese and UK firms between 2012 and 2017 are used. First, we examine the direct effect of several corporate governance mechanisms on tax avoidance. Second, we divide the full sample into two groups (common law and code law legal system) to explore the relationship between law, corporate governance, and tax avoidance. We use both univariate and feasible generalized least square (FGLS) regression methods to examine our hypotheses.
This study finds that the board size, independent directors, and the presence of women on boards of directors reduce the likelihood of tax avoidance. However, we find an insignificant association between ownership concentration and tax avoidance. Second, it also finds that firms in countries with higher country-level governance engage in less tax avoidance. The results also suggest that the role of corporate governance is more pronounced for firms operating in common law countries than those in code law countries.
This manuscript is one of the few studies that examine the relationship between corporate governance and tax avoidance in an international setting with different legal

and institutional environment. This relationship differs across the two countries. This paper clearly identifies implications for research, practice, and society. It documents that when a country implements a good system of governance, which targets improving transparency and accountability, it will lead to less corporate tax avoidance.

Keywords: tax avoidance, corporate governance, comparative legal system

JEL: H25, H26, H32, H71, G32, G38

Introduction

The taxation of firms was considered a non-strategic activity of a technical nature whose governance was left to a group of experts of the firm. The tax department was rarely questioned, nor was there any follow-up by the board of directors or shareholders. The financial scandals of recent years have greatly changed the role of the tax function within companies. On the one hand, regulators, tax authorities, analysts, and other stakeholders pay more attention to large firms. On the other hand, the responsibilities assigned to boards of directors are broadened and now include the problem of tax evasion.

The extent, determinants, and consequences of tax evasion and corporate aggression have been topical issues.

There are many explanatory factors for tax evasion, which can act as an incentive or a constraint (Gul et al. 2018). Some of the incentive factors include pressure from shareholders and creditors, as well as certain specific contexts, such as capital increases or changes in management. Constraining factors include the accounting rules used (IFRS or other standards), the legal protection system ("common law" as opposed to "code law") and governance mechanisms, such as the ownership structure (Desai and Dharmapala 2008; Heitzman 2010) and board of directors (Minnick and Noga 2010; Khan et al. 2017; Armstrong et al. 2015; Richardson et al. 2016; Lanist et al. 2018; Muhammad and Yan 2019). Since La Porta et al. (1998, 2002), many studies in the law and finance literature have shown that institutional differences, e.g., the legal system, may affect corporate decisions, such as tax strategies (e.g., Anderson and Gupta 2009; Kanagaretnam et al. 2016).

The institutional context can also influence the power of shareholders in matters of governance. La Porta et al. (1999) showed that the dispersion of shareholding is associated with a significant protection of the interests of the shareholders. The legal protection system includes two elements: rules, which protect the interests of minority shareholders to a greater or lesser extent (the possibility to contest matters at general meetings, to vote by internet, etc.), and the capacity of shareholders to enforce their rights before the courts (inexpensive legal action, for example, class action suits, or higher penalties imposed on "cheaters" by the courts, etc.). The level of investor protection seems to influence the quality of accounting information. Leuz et al. (2003)

measured weaker management of results in common law countries, such as the United States and the United Kingdom, where shareholders are better protected and stock markets more developed than in code law type countries, such as Japan or the countries of Continental Europe.

The purpose of this study is to examine the effect of the board of directors' characteristics and ownership concentration on corporate tax avoidance in two countries (UK and Japan) with different legal origins (common law and code law) and business culture. This study addresses two questions: (1) does corporate governance influence corporate tax evasion? And (2) do diverse corporate governance mechanisms have a dissimilar impact on corporate tax evasion in different legal systems? The paper is organized as follows. Section 1 provides the theoretical background and hypotheses for the study. Section 2 describes the methodology used. Section 3 reports the results of the empirical study.

Literature review and hypotheses development

Tax avoidance and corporate governance

Dyreng et al. (2008) define tax evasion via the accounting transactions that exercised the tax liability of the company. This definition is not the dissimilarity of the different realities in a fiscal tax, the activities of a tax-deferred business challenge and the fiscal taxes of (Haned and Heitzman 2010). There is an important distinction between tax evasion and tax avoidance. Tax avoidance is the result of measures taken to minimize tax and which, while in keeping with the letter of the law, are contrary to the purpose and spirit of the law. When these arrangements are in keeping with the spirit of the law, we are talking about effective tax planning. Tax evasion refers to deliberately ignoring a specific part of the law. Tax evasion, unlike tax avoidance, has criminal consequences. In this study, we use the term aggressive tax planning, which encompasses the concepts of tax avoidance and tax evasion. We have made this choice because we cannot isolate companies that undertake tax avoidance from those that can undertake tax evasion (Chen et al. 2010; Lanis and Richardson 2012; Minnick and Noga 2010; Armstrong et al. 2015; Richardson et al. 2016; Kanagaretnam et al. 2016; Khan et al. 2017; Lanis et al. 2018; Muhammad and Yan 2019). Gohet et al. (2017) found that the cost of the shares of companies that avoided taxes was lower and, as a result, their market valuation was higher. The purpose of limiting tax evasion is to protect the interests of all stakeholders in the firm. It is thus an integral part of Stakehoders governance. Stakeholder governance is interested in the relationships the company has with its various stakeholders in order to achieve its objectives. Ortas and Gallego-Álvarez (2020) support the idea that those firms achieving high corporate governance performance are less likely to engage in aggressive tax practices.

The firm must take into account the expectations of all stakeholders and not just the shareholders. One of the most effective ways to manage financial risk is to put in place corporate governance that includes proactive risk management, listening to stakeholders, and transparent communication about the problems faced by the firm.

Board characteristics and tax avoidance

The board of directors is one of the main governance mechanisms (Jensen 1993). For that reason, several studies have examined the effect of the characteristics of boards of directors on corporate tax evasion (Minnick and Noga 2010; Lanis and Richardson 2011; Richardson et al. 2016; Lanis et al. 2018).

Board size

Jensen (1993) argues that when the size of the board is not large, it has effective control, but when it is large and less relevant, it becomes difficult to control the CEO. Previous studies suggest that the size of the board has a negative effect on a company's market valuation (e.g., Yermack 1996). More recently, Nguyen et al. (2016) found that firms with a large board achieve significantly lower market values. However, other research (e.g., Boone et al. 2007) has shown that the perfect board size depends on different characteristics of the company and consequently does not contribute to greater performance. Hoseini et al. (2019) found that firms with a larger board of directors are associated with more tax avoidance. In short, we can suggest that the effect of the size of the board on the value of the company is the subject of debate. While some authors insist on the mischiefs of a large board of directors, others prove the opposite.

H1: Board size is negatively related to tax avoidance.

Director independence

The composition of the board of directors plays a role in a company's financial transparency and reduces deficient behavior such as financial fraud; it can be assumed that the composition of the board of directors influences the level of tax evasion carried out by the firm.

The composition of the board of directors is a factor that determines the board's effectiveness; the board of directors must take into account the common interests of all shareholders (Fama 1980; Fama and Jensen 1983).

Independent directors are considered good controllers who act in the best interests of the firm to develop a good reputation as experts in control. The viability of the board can be improved by including external members. Lui et al. (2015) found that independent directors have an overall positive effect on firm operating performance. Moreover, Reguera-Alvarado and Bravo (2017) showed that the presence of independent directors on a board improves firm performance. Minnick and Noga (2010) postulated that in-

dependent directors can consolidate tax avoidance practices because they can supply essential knowledge and basic perceptions from their own sector and practice. Chytis et al. (2020) showed a significant positive association of board independence with tax planning, while Richardson et al. (2016) found a positive relationship between effective tax rate and independent directors. However, according to Lanis and Richardson (2011), the significant presence of independent directors on the board can increase its control effectiveness.

H2: The presence of independent directors is negatively related to tax avoidance.

Women on the board and tax avoidance

Activism that has developed around gender diversity in corporate governance bodies testifies to complex societal issues. Gender diversity has become ubiquitous in corporate governance thinking. It is part of a new approach to governance aimed at overcoming the shortcomings of the traditional conception, especially regarding the taking into account of the creative potential of the board in the production of value (Adams and Ferreira 2009). Women directors make specific contributions in terms of experiences, perspectives, and management styles, compared to male directors (Gregory et al. 2015; Smith et al. 2014). Kastlunger et al. (2010) predicted that women are stricter in tax compliance. However, men are less demanding (the gender effect). According to Richardson et al. (2016) and Zhou and Li (2018), the presence of women on a board reduces tax avoidance activities. Since women are generally better controllers, they behave the same way when they are dependent/independent administrators. They are relevant in reducing tax evasion. Jarboui et al. (2020) showed that the level of tax avoidance decreases when the number of women on the board increases.

H3: Gender diversity is negatively related to tax avoidance.

Ownership concentration and tax avoidance

The relationship between ownership structure and taxes is also important (Desai et al. 2007b; Desai and Dharmapala 2008). If the owner is the majority, he will issue his tax maneuvers. When the manager has succeeded, he is likely to expropriate the shareholder's way through tax evasion (Richardson et al. 2016). Concentrated property firms, Chen et al. (2010) can avoid being attributed to owners who control the desirability of savings. Klassen (1997) also thinks of companies with a higher tax avoidance, taxes can be avoided, however. On the other hand, family firms may avoid fewer taxes due to the potential costs of tax avoidance. Badertscher et al. (2013) found that ownership concentration is negatively associated with tax avoidance. However, Khan et al. (2017) found a positive relation between ownership concentration and tax avoidance. Cabello et al. (2019) found that firms with a greater concentration of management ownership avoid less tax, while Richardson et al. (2016) revealed a significant

but non-linear relationship between concentration of ownership and tax evasion. The authors argue that the concentration of ownership through voting rights is negatively related to tax evasion because of the convergence of interest effect.

H4: Ownership concentration is negatively related to tax avoidance.

Law, corporate governance, and tax avoidance

Our paper seeks to examine the practice of tax evasion in an international context. In the current literature, one of the approaches pursued to explain the disparities in this practice between countries is based on the disparities in the legal specificities of those countries (Daniel et al. 2012). A distinction is generally made between countries with a "common law" type legal system, built essentially on case law and aimed at defending the interests of private parties, and countries with a "civil law" type legal system, with a civil or codified law, whose objective is to defend the interests of the State (La Porta et al. 1998). This approach is today known as the legal-financial approach or the 'Law and Finance' approach. Corporate governance in the European Union is very heterogeneous, and the system is extremely varied from one country to another: a civil law model, a common law model, and a hybrid model (Kubíček et al. 2016).

The EU was built around two different legal systems. The first system includes countries belonging to the civil law tradition and which is also subdivided into two branches: the "French" branch and the "Germanic." The French branch inspired bordering and North Mediterranean countries, namely Belgium, Luxembourg, and the Netherlands, as well as Spain, Portugal, Italy, and Romania. The Germanic branch is represented by Germany and Austria, and to which we can add Central and Eastern European countries (Poland, Estonia, Latvia, Lithuania, the Czech Republic, Slovakia, Hungary, Slovenia, and Bulgaria) since the end of communism (Yeoh 2007). However, there is a sub-group, i.e., the Nordic countries, to which Denmark, Sweden, and Finland belong.

The second system includes countries under the common law system, namely England, Wales, and Ireland. Filatotchev et al. (2013) argue that board efficiency, the concentration of ownership, and incentives for executives can vary with the legal system and institutional specificities of a given country. Several studies suggest that the dichotomy of legal systems between "common law" and "civil law" influences tax evasion. They argue that in civil law countries, accounting regulation seems to be subject to strong political pressure from the state, which establishes and imposes the accounting rules. It follows that the accounting rules in civil law countries offer "insiders" a great deal of latitude to make manipulations to the detriment of the production of quality accounting information.

In contrast, accounting in common law countries seems to be directed more towards protecting the interests of private parties and serving, inter alia, the interests of investors Besides et al. (2004). According to governance theory, tax evasion by CEOs can be moderated or reduced by using various governance mechanisms. The compo-

sition of the board of directors (size, independence, and structure) and the ownership structure are examples of these mechanisms. However, their effectiveness in reducing CEOs' use of tax evasion appears to vary from country to country.

According to the legal and financial approach, tax evasion could be influenced by the level of legal protection that a country offers to its investors. In this context, it is considered to be less important in common law countries, which offer better legal protection to "outsiders" and which have a better quality of application of the rules of rights (Anderson and Gupta, 2009). Therefore, it should be more important in civil law countries, which are characterized by weak legal protection of outsiders and where rights are poorly enforced. Zeng (2019) found that firms that are resident in countries with stronger country-level governance engage in less tax avoidance. Beekes et al. (2016) found better disclosure in common law countries compared to code law countries. As discussed above, common law is more efficient than code law. So, we predict that the impact of corporate governance mechanisms (boards of directors and ownership concentration) will be more pronounced in common law countries than in code law countries.

H5: The impact of corporate governance on tax avoidance is more pronounced in common law countries than in code law countries.

Research methodology

In this section, we will detail the methodology. It includes the selection of the sample and the rationale for that selection. The specification of the empirical model, the operationalization of the variables, and the measures are also examined here.

Sample selection and data

United Kingdom and Japan are two typical countries in such comparative studies between common law and code law legal systems.

We chose these two countries for several reasons. First, corporate tax avoidance has been a major issue and is widespread in several countries located in Asia-Pacific markets (Japan is an example) (Gul et al. 2018). Second, UK and Japan have different cultures and traditions. UK follows the accounting standards used for the preparation of financial information based on the common law accounting system. By contrast, Japan is an Asian country that has a code law accounting system.

The sample consists of firms that were included in the FTSE Eurotop 100 index on December 30th, 2011. For several reasons, not all FTSE Eurotop 100 index listed firms are included in the sample of this study. The final sample consists of 52 firms (312 firm-year observations). Twenty-three of the 100 firms are excluded from the sample because they are financial companies. The necessary financial data was not available for every firm for such a long period, which is the case for 25 firms in the

sample. Our initial sample comes from Japanese firms covered by the TOPIX 100 index names made by the Tokyo Stock Exchange in January 2012 and December 2017. The final sample consists of 330 observations over a firm year. Table 1 presents details of the two countries.

Table 1. UK and Japan characteristic's comparison

	UK	Japan
Tax avoidance ETR (2012–2017)*	23.22	30.12
Legal origin	Common	Code
Tax revenues in (2012)/GDP in %	25.63	9.86
Market capitalization (2012)/GDP in %	6	8

* ETR is the dependent variable indicating the Corporate tax avoidance.
Source: authors' own compilation.

Variable measures

Tax avoidance

ETR is a measure of tax avoidance (Cash Effective Tax Rate). Following previous studies (Dyreng et al. 2008; Chen et al. 2010; McGuire et al. 2014; Chan et al. 2016; Dyreng et al. 2017).

$$ETR_{it} = \frac{TaxExpense_{it}}{PretaxIncome_{it}}$$

Obviously, there are differences not only between different contexts but also between European countries because corporate income taxes are not harmonized within the EU. Specifically, statutory tax rates from European countries differ considerably. Countries like Belgium and France have high tax rates. However, Poland and other Eastern European countries have rather low tax rates (Thomsen and Watrin 2018). Thomsen and Watrin found that the average EU cash ETR, which indicates corporate tax avoidance, is 25.04%. This rate is limited between UK and Japan. Janský (2019) documented that in the EU, "*the lowest ETRs are to be found in Hungary (7.5%), Bulgaria (9.5%), Cyprus (9.6%) as well as in the Netherlands (10.4%) and Latvia (10.6%). Within the EU, Italy and Greece have the highest ETR (30.4% and 28.4% respectively), with the third and fourth highest being Spain and Slovakia (21.8% and 20.2% respectively).*"

Characteristics of the board of directors

Board size (BS) is calculated as the total number of members of the board of directors (Anderson and Reeb, 2003; Reguera et al. 2017).

Director independence (IND) is measured as the percentage of independent directors sitting on the board (Reguera et al. 2017).

Female directors: Following Terjesen et al. (2015) and Luo et al. (2017), the presence of female directors (WOM) is measured as the ratio of the number of women serving on the board to the total number of directors on the board (Table 2).

Ownership concentration (CONC) is calculated as the total proportion of outstanding shares of shareholders who hold at least 5% of outstanding shares (Munisi et al. 2014; Nguyen et al. 2015).

Table 2. Variable definitions

Variable	Definition
Effective tax rate (ETR)	Tax expense/Pre-tax income
Independent directors (IND)	Percentage of independent directors sitting on the board
Female directors (WOM)	Percentage of female directors sitting on the board
Board size (BS)	The number of directors on the board
Ownership concentration (CONC)	The total proportion of outstanding shares of shareholders who hold at least 5% of outstanding shares
Firm size (SIZE)	Natural logarithm of total assets
Return on assets (ROA)	Pretax income/Total assets
Leverage (LEV)	Total debt/Total equity

Source: authors' own compilation.

Control variables

To control the effects of firm size, we introduced this variable (SIZE). Since the size of the firm is considered a key variable for tax evasion, we introduced the variable SIZE measured by the logarithm of the total assets (Slemrod 2007). Large firms are likely to be aggressive on the tax side. They possess economic and political power in comparison with small firms. Return on assets (ROA) is measured as pre-tax income divided by total assets (Mafrolla and D'Amico, 2016). Firms practice tax evasion to expand their returns. Leverage (LEV) is measured as total debt divided by total equity of firm *i* at the end of fiscal year *t*. The correlation between the level of indebtedness and tax avoidance has been highlighted by several studies (e.g., Mafrolla and D'Amico 2016; Salehi and Salami 2020).

The regression model

To examine the association between the board of directors, ownership concentration, and tax avoidance, we estimated the following tax avoidance model:

$$ETRit = \beta0 + \beta1\ BSit + \beta2\ INDit + \beta3\ WOW\ it + \beta4\ CONCit + \beta5\ SIZEit + \beta6\ ROAit + \beta7\ LEV\ it + \beta_8\ COUNTRY\ fixed\ effect_{it} + \beta_9\ YEAR\ fixed\ effect_{it} + \varepsilon_{i\,t}$$

Following previous research, we introduced several control variables in our model, and we added dummy variables to control for country and year fixed effects (COUNTRY and YEAR).To test our empirical model, we use a feasible generalized least squares (FGLS) regression. To overcome the potential problem of heteroskedasticity, the FGLS estimator can easily be performed and will result in an asymptotic estimator that is more efficient and tests more powerfully than the OLS estimator.

Results and discussions

Descriptive statistics and difference in mean

Table 3. Pearson correlations for independent variables

	BS	IND	WOM	CONC	SIZE	ROA	LEV	VIF
BS	1.000							1.37
IND	0.124***	1.000						2.06
WOM	0.109**	0.423**	1.000					1.42
CONC	−0.117**	0.256*	−0.106	1.000				1.23
SIZE	0.394***	0.489***	0.504**	−0.103**	1.000			2.09
ROA	−0.107	0.362***	0.418***	0.181***	0.147***	1.000		1.16
LEV	0.084	−0.057	0.176	−0.074	0.134	−0.097	1.000	1.31

* ** *** Indicate that the estimated coefficients are statistically significant with two-tailed p-values at the 10 percent, 5 percent, and 1 percent levels respectively.
Source: authors' own elaboration.

The Pearson correlations between the independent variables are not high (Table3). We have, for example, a significant correlation of 0.504 between firm size (SIZE) and the presence of female directors (WOM) on the board. Multicollinearity was also checked by calculating the variance inflation factors (VIF).

Table 4. Univariate test difference (312 British and 330 Japanese firm-year observations).

Variable		Mean	t-test
BS	*UK*	11.96	–0.64
	Japan	10.23	
IND	*UK*	0.56	–14.21***
	Japan	0.28	
WOM	*UK*	0.14	–14.67***
	Japan	0.03	
CONC	*UK*	0.17	0.65
	Japan	0.13	
SIZE	*UK*	9.12	12.51**
	Japan	7.34	
ROA	*UK*	0.11	7.42
	Japan	0.08	
LEV	*UK*	0.23	–0.27**
	Japan	0.28	

* ** *** Indicate that the estimated coefficients are statistically significant with two-tailed p-values at the 10 percent, 5 percent, and 1 percent levels respectively.
Source: authors' own compilation.

VIF is not high, which leads to the rejection of the multicollinearity problem between the independent variables of our model. Table 4 presents the mean of the test and control variables for the British and Japanese samples. There is no significant difference in the size of the board (BS) between the two samples. As expected, the mean of independent directors (IND) for British firms is statistically higher than for Japanese firms. Also, the mean of female directors (WOM) is statistically higher for British firms. We found a statistically insignificant difference in the ownership concentration (CONC) between British firms and Japanese firms. The British firms are, on average, larger than the Japanese firms.

Discussion of findings

Table 5 presents the regression results of the tax avoidance model tested over the entire sample of 312 British and 330 Japanese firm-year observations.

We applied the modified Wald test to check for heteroscedasticity; the test is significant at the 1% level. Therefore, in order to carry out more detailed empirical work, it is essential to overcome the problem of heteroscedasticity. To do this, we used FGLS. The Wald test is significant at the 1% level, so corporate tax avoidance is well explained by our independent variables in the model. The results obtained and summarized in Table 5 show that the board of directors and ownership concentration reduce corporate tax avoidance.

$$ETR_{it} = \alpha_0 + \beta_1 BS_{it} + \beta_2 IND_{it} + \beta_3 WOW_{it} + \beta_4 CONC_{it} + \beta_5 SIZE_{it} + \beta_6 ROA_{it} + \beta_7 LEV_{it} + \beta_8 COUNTRY\ fixed\ effect_{it} + \beta_9 YEAR\ fixed\ effect_{it} + \varepsilon_{it}$$

Table 5. FGLS regression analysis

Variable	(1)	(2)	(3)	(4)	(5)
Constant	0.127	0.188	0.399	0.263	0.752
BS	–0.253***	0.028***			
IND	–0.389**		–0.382*		
WOM	–0.163**			–0.269**	
CONC	0.112				0.314**
SIZE	0.058	–0.284***	–0.096***	–0.074	0.068
ROA	0.263	0.036	0.426***	0.062*	0.195
LEV	–0.048***	–0.058**	–0.041*	–0.082**	–1.203*
Country fixed effects	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES
Hausman test	1.77				
Modified Wald test	3.8^{e+06}***				
Wald test	39.31***	77.14***	52.23***	45.96***	49.72***

* ** *** Indicate that the estimated coefficients are statistically significant with two-tailed p-values at the 10 percent, 5 percent, and 1 percent levels respectively.
Source: authors' own elaboration.

Board size (BS) is significantly and negatively (β1=-0.253 and p<1%) associated with corporate tax avoidance, thus verifying H1. A large board makes it possible to pool a variety of resources, skills, and experiences that will benefit the management and control of tax evasion. As expected in hypothesis H2, the independence of the board of directors is a factor in reducing opportunistic accounting practices (β2=-0.389 and p<5%). These latest results confirm that the presence of independent directors on the board of directors increases the effectiveness of management control and encourages them to disclose more reliable financial information. These independent directors use their special skills and secondments to control the actions of the directors.

The results of a logit regression used by Lanis and Richardson (2011) for a sample based on 32 companies, including 16 companies with aggressive taxation and 16 companies with non-aggressive taxation, show that the involvement of one more large proportion of outside board members reduces the risk of tax aggression. Lanis and Richardson's sensitivity review backs up our key findings regarding board composition and tax aggression. Also, the results show a negative and significant relationship (β3=-0.163 and p<5%) between the proportion of women (WOW) on their boards and corporate tax avoidance. The presence of women on corporate boards has gained much importance due to their effective role in monitoring managerial performance. Lanis and Richardson (2016) reveal that women's presence on corporate boards can exert

a significant influence on reducing tax avoidance. Hoseini et al. (2019) showed that the presence of women on corporate boards reduces corporate tax avoidance, while Jarboui et al. (2020) showed that the level of tax avoidance decreases when the number of women on the board increases.

However, regarding the ownership structure variable, our results show that the effect of concentration (CONC) is not significant and positive (β4=0.112). This result does not agree with hypothesis H3. The concentration of shareholding is not associated with a lower intensity of tax evasion. The absence of a relationship observed by several authors in different contexts reflects, in particular, the two antagonistic effects of the concentration on tax evasion (alignment as opposed to entrenchment). This observation valid the assumption of passivity of control blockholders.

Regarding the control variables, during the analyzed period, the size (SIZE) and performance (ROA) of the company do not significantly affect tax evasion. However, the level of debt (β7=-0.048 and p<1%) has a significant effect. For highly indebted firms, the interest shown by their partners (creditors in particular) in their sustainability and, therefore, in their profitability, encourages tax evasion. In addition, firms whose financial health is the most precarious are more likely to engage in tax evasion.

The supplemental results are shown in Table 6. They are derived from separate analyses of 312 British and 330 Japanese firm-year observations.

$$ETR_{it} = \alpha_0 + \beta_1 BS_{it} + \beta_2 IND_{it} + \beta_3 WOW_{it} + \beta_4 CONC_{it} + \beta_5 SIZE_{it} + \beta_6 ROA_{it} + \beta_7 LEV_{it} + + \beta_8 YEAR\ fixed\ effect_{it} + \varepsilon_{i\,t}$$

Table 6. FGLS regression: UK common law and Japan code law comparison

Variable	UK (312)	Japan (330)
Constant	0.424	0.293
BS	−0.109**	−0.064*
IND	−0.346***	−0.172
WOM	−0.042*	−0.067*
CONC	−0.132**	−0.186
SIZE	0.059	0.171
ROA	0.243	0.483
LEV	0.124	−0.189**
Year fixed effects	Yes	Yes
Hausman test	28.34***	26.67***
Modified Wald test	2.7^{e5}***	6.0^{e6}***
Wald test	35.18***	21.69***

* ** *** Indicate that the estimated coefficients are statistically significant with two-tailed p-values at the 10 percent, 5 percent, and 1 percent levels respectively.
Source: authors' own compilation.

Table 6 shows a negative relationship between board size (BS) and corporate tax avoidance in both samples of British (β1=-0.109 and p<5%) and Japanese firms (β1=-0.064 and p<10%). According to Table 4, there is an insignificant difference for board size between the two samples. The coefficient for independent directors (IND) is negatively significant (β2= -0.346 and p<1%) for the British sample. In contrast to Japanese firms, IND is statistically insignificant for the Japanese firms. Few Japanese companies have adopted rules of structuring their board of directors inspired by North American standards. "American-style" governance standards are not very effective in Japanese culture, in which absolute loyalty is demanded in exchange for a contract, and where it is traditionally unthinkable to question authority or to express disagreement.

This example also shows that rules like governance cultures are not universal. They can favor the emergence of group thinking within boards of directors. The coefficient relating to the variable (WOW) is significant for both British and Japanese samples. This result reveals that despite the differences between the British and Japanese socio-economic environments, and despite the relatively low importance of the presence of women in top management, we empirically found that their presence has a negative influence on tax evasion. Thus, the presence of women in the TOP management of large companies is probably a significant resource that results in ethical and transparent behavior.

The coefficient for ownership concentration (**CONC**) is also statistically significant for British firms and insignificant for Japanese firms, but in both samples, **CONC** is positive. This relationship differs between the two countries. Ownership concentration negatively impacts corporate tax avoidance because blockholders are aware of the potential costs, such as firm reputation and penalties (Hanlon and Heitzman, 2010). British firms (low concentration) show that tax evasion is strongly determined by contextual motivations attached to a dynamic financial market. Initial public offerings and capital increases by public offering have strong motivations for excessive avoidance from British firms. Table 6 indicates that leverage (LEV) is positively (β7=-0.189) related to tax avoidance for Japanese firms. However, it shows an insignificant association with tax avoidance for British firms. Salehi and Salami (2020 show that financial leverage use is not inversely regarding companies' tax-aggressive policies.

In the Japanese institutional context, bank credits largely lead to an increase in tax evasion in order to avoid violating debt covenants. The increase in net profit symbolizes an optimistic indicator for lenders, especially financial institutions, who want to continue to provide funds to businesses on decent terms. Firm size (SIZE) and profitability (ROA) are not associated with less significant tax evasion behavior. Besides

Table 6 supports hypothesis H5. The results show that the differences in tax evasion can be explained by the cultural and legal differences between the two countries. In a code law county such as Japan, the company has a small degree of flexibility to improve its governance system, even if there is a need for this transformation. Although public and institutional shareholders have a growing role in diversifying the board, boards of directors of large listed firms do not show signs of greater gender diversity

(Morikawa 2016). This result can be explained by the additional control bodies installed in large companies to reduce agency costs. Complementary monitoring is more important in code law countries where the company's management is organized by several laws and regulations. Although board size (BS), independent directors (IND), and ownership concentration (CONC) have a negative impact on corporate tax avoidance in Japanese firms, only BS is statistically significant. However, for the British firms, these variables are all statistically significant. So, the impact of corporate governance mechanisms is more effective in common law countries than in code law countries.

Our results show that the impact of a country's legal system is a significant factor in explaining the relationship between specific corporate governance mechanisms and corporate tax avoidance means. The results similarly suggest that companies in common law countries have better governance. These companies do not intend to engage in tax evasion activities in the same way companies with a similar level of governance and which operate in code law countries do. More explicitly, for the entire sample, we find that the regression coefficients for BS, IND, and WOW are negative and significant in Table 5.

We found the same results for the British sample of 312 firm-year observations in Table 6. However, only board size (BS) has a significant coefficient for the Japanese sample. Board size, independent directors, the presence of women on boards of directors, and ownership concentration reduce the disparity between the statutory tax rate and the effective tax rate; thus, they reduce the likelihood of becoming tax avoidant in UK context.

Generally, firms with high debt ratios tend to manage their effective tax rates downward. This result, in Japan, seems to indicate a substitution effect between control by debt and control by shareholders and the board of directors. This result is consistent with several studies that support the hypothesis that the use of debt and the governance structure are two substitutable control mechanisms (Richardson et al. 2014; Chava et al. 2019). This divergence with the British context is indeed linked to the specificity of the Japanese banking context, which is based more on debt.

Conclusion

To the best of the authors' knowledge, this is the first paper to provide an empirical comparison between British and Japanese firms to study the impact of board characteristics and ownership identity on tax avoidance. More particularly, it compares the impact of governance mechanisms in two different legal contexts. This study contributes to the existing literature that focuses on the tax behavior of firms. By integrating the concerns of large accounting firms and the theory that suggest that the risk of aggressive tax planning should be taken into account by the board of directors and shareholders, we investigated different features that would allow better advice concerning this risk.

Based on a sample of British and Japanese firms over the 2012–2017 period, the results show a positive and significant association between board size, independent directors and ownership concentration, and the effective tax rate (ETR). Thus, these variables reduce the likelihood of corporate tax avoidance. However, we found an insignificant association between female directors and tax avoidance. We also found that the consequence of a country's legal system (British common law and Japanese law code) is important in explaining the relationship between tax evasion and the general level of corporate governance in a given country. The results also suggest that the role of corporate governance is stronger for companies operating in common law countries than those in code countries.

This paper makes several contributions to the existing literature by exploring the consequence of corporate governance on tax evasion in two diverse legal systems (common law versus code of law). Corporate governance mechanisms are expensive; regulators need to before applying for corporate governance mechanisms in their country. Countries that have complied with the rules can change their corporate governance rules by adopting certain rules in the firms. The paper's findings provide unique and useful information for company stakeholders and managers aiming to address the factors that enhance firms' incentives to engage in aggressive tax practices.

According to Pukeliene and Kažemekaityte (2016), the subject of tax evasion is a strategic priority for the European Union (as indicated in the annual growth survey for the European Union in 2016). However, there is still no strategy for the implementation of national tax compliance policy recommendations based on the determinants of tax evasion.

Regarding the corporate governance of Central and Eastern European countries (for example, Poland), it connected with the tradition of the German governance model due to close historical and economic ties. We can go along with the idea of Russo et al. (2015), who proposed that differences in Polish corporate governance must adapt to those with a history of success. Central and Eastern European countries must take into account the common positive characteristics of the two governance systems (UK and Japanese), in particular, the strengthening of transparency, accountability, investor protection, and business ethics; consequently, they will reduce tax evasion.

These results must, however, be interpreted taking into account certain limitations. Indeed, the criterion of accounting and financial expertise of the members of the audit committee and the nature of the shareholding (managerial shareholding, family shareholders, institutional investors, etc.) were not taken into account in our empirical study. These criteria that act as governance mechanisms could likely have a significant impact on opportunistic accounting practices. The most important limitation lies in the fact that our study covers a limited period and includes only large British and Japanese firms. Thus, our results may not be generalizable to smaller companies and different time frames. In addition, the lack of systematic tax avoidance measurement for other groups of companies imposes certain limitations on the generalizability of the findings. In the future, The inclusion of medium-sized firms might improve the research design.

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Streszczenie

Ład korporacyjny a unikanie zobowiązań podatkowych – porównanie przedsiębiorstw brytyjskich i japońskich

Celem niniejszego artykułu jest zbadanie wpływu ładu korporacyjnego na unikanie zobowiązań opodatkowych w ujęciu międzynarodowym.
W badaniu wykorzystano dane finansowe i dotyczące ładu korporacyjnego dla wybranych przedsiębiorstw japońskich i brytyjskich z okresu 2012–2017, pochodzące z bazy danych Datastream. Najpierw zbadano bezpośredni wpływ kilku mechanizmów ładu korporacyjnego na unikanie zobowiązań podatkowych. Następnie dokonano podziału wybranych przedsiębiorstw na dwie grupy (oparte o system prawa zwyczajowego i system prawa kodeksowego), aby zbadać związek między systemem prawa, ładem korporacyjnym, a unikaniem zobowiązań podatkowych. Do weryfikacji sformułowanych hipotez zastosowano zarówno jednoczynnikowe metody regresji, jak i Stosowalną Uogólnioną Metodę Najmniejszych. Kwadratów (FGLS).
Badanie wykazało, że wielkość zarządu, występowanie niezależnych dyrektorów oraz obecność kobiet w zarządach, zmniejszają prawdopodobieństwo unikania zobowiązań podatkowych. Zaobserwowano jednak nieistotny związek między koncentracją własności a unikaniem zobowiązań podatkowych. Wykazano również, że przedsiębiorstwa w krajach o wyższym poziomie zarządzania na szczeblu krajowym są mniej podatne na unikanie zobowiązań podatkowych. Wyniki sugerują też, że rola ładu korporacyjnego jest większa w przypadku firm działających w krajach opartych o system prawa zwyczajowego niż w krajach opartych o system prawa kodeksowego.
Opracowanie jest jednym z nielicznych badań, które badają związek między ładem korporacyjnym a unikaniem zobowiązań podatkowych w ujęciu międzynarodowym, z uwzględnieniem różnic w otoczeniu prawnym i instytucjonalnym. Związek ten jest różny w zależności od kraju. W tym artykule wyraźnie wskazano implikacje dla badań naukowych, praktyki i społeczeństwa. Wykazano w nim, że wdrożenie przez państwo prawidłowego systemu zarządzania, którego celem jest poprawa przejrzystości i odpowiedzialności, umożliwia ograniczenie unikania zobowiązań podatkow przez przedsiębiorstwa.

Słowa kluczowe: unikanie zobowiązań podatkowych, ład korporacyjny, porównanie systemów prawnych

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The Institutional Settings of the Recovery of the NGO Sector in Post-Communist Countries

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Abstract

The purpose of the paper is to describe the process of creating institutional settings in three post-communist countries and analyze the change of the social trust in these countries in line with the development of legal and accounting rules and norms for NGOs. The design and methodology include a literature analysis and the inductive method to analyze historical data for each country. The countries that were selected for the research are Lithuania – one of the Baltic states, which is in the last place in the World Giving Index (WGI) ranking, Poland with the average result in WGI ranking, and Croatia – the best post-communist country in the WGI ranking. Research limitations include the use of the descriptive method and the small number of countries included

in the analysis. The originality and value of this paper lie in the fact that the problem of low social trust in NGOs in post-communist countries is analyzed by linking it with the development of NGO accountability and civil control over them.

Keywords: NGOs, post-communist countries, institutional theory, NGOs accountability, civil trust

JEL: M41, I31

Introduction

In communist countries after the end of World War II , the state took control of public benefit organizations for more than forty years. Social activity was destroyed; foundations' assets were nationalized, and their activities were prohibited. Years of communism made people mistrust all private actions and convinced them that it is state entities that are responsible for eliminating all social problems. The result today is that some citizens in post-communist countries are still not interested in helping others (Waniak-Michalak and Michalak 2016). As the level of public trust in post-communist countries is low (Wike 2008), public benefit activities are sometimes regarded suspiciously. After the end of communism, the lack of social capital, i.e., informal values and ethical norms common to people creating such organizations, was an obstacle to the development of non-governmental organizations (NGOs).

In order to build these ties, it was first necessary to increase people's trust before then starting cooperations and obtaining mutual benefits. One way to build trust was through self-regulation, control, and accounting regulations for NGOs. The purpose of the paper is to describe the process of creating institutional settings in three post-communist countries and to analyze the change of the social trust in these countries in line with the development of rules and norms for NGOs. Although institutional theory posits that institutions are made up of three pillars (regulative, normative, and cultural-cognitive), only the first one was used in our study. The following research questions were asked:

- How did the regulations for NGOs, the norms, and the rules in the chosen post-communist countries change in the 20 years after the end of communism?
- Are the scopes of the changes different or similar?

Did public trust in NGOs in post-communist countries change for the better?

To answer these questions, we used a literature analysis and the inductive method to analyze the historical data for the chosen countries: Lithuania – the European country in the last place in the World Giving Index ranking (2017), Poland with the average result in WGI ranking and Croatia – the first (the best) among all post-communist countries in the World Giving Index ranking (2018).

We will analyze the period 2009–2017, because the CAF (Charities Aid Foundation) has not published the data for interviews conducted in 2018 in the report published in 2019.

Our paper is organized as follows. Firstly, the problem of regulations for NGOs and their development in light of institutional theory is discussed. In the second section, the development of the NGO sector, in comparison with public trust levels measured by the World Giving Index, is presented. Then the process of accounting regulations and control of NGOs in the three countries is presented in detail, and conclusions are drawn on the similarities and differences in the countries as well as the relationship between the social trust levels and their accounting regulations. Finally, the discussion and conclusions are presented.

Institutional theory

Institutions are sets of rules and practices, like formal and informal regulations, social norms and rules, shared understandings, and beliefs (Koster, Simaens & Vos 2019). According to North (1990, p. 3), "Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interactions. In consequence, they structure incentives in human exchange, whether political, social, or economic." Institutional theory recognizes that it can shape the meaning and validity of social behavior (Scott, 2008). Williamson (2000), a proponent of new institutional economics, suggested four levels of social analysis. The higher level of social analysis imposes constraints on the lower level, but also, the lower level causes some feedback for the higher levels (Williamson 2000):

- Level 1: embeddedness (informal institutions, customs, traditions, norms, religion).
- Level 2: institutional environment (formal rules of the game – esp. property, polity, judiciary, bureaucracy).
- Level 3: governance (play of the game – esp. contract aligning governance structures with transactions).
- Level 4: resource allocation and employment (prices and quantities, incentive alignment).

New institutional economics concentrates mainly on levels 2 and 3 (Williamson 2000).

One of the essential characteristics of the socialist economy was that public administrations could interfere with companies and their relationships. The change of the economic system in the late 1980s and early 1990s required extensive institutional changes, including the change of fundamental legal rules. The possibility of the direct intervention of the administration was limited, and the role of legal norms increased significantly (Lissowska 2004, pp. 8–10).

After the end of communism, most people did not believe in private activity, and cases of fraud at the beginning of the capitalist period did not improve the situation (Dąbrowska, Gumkowska and Wygnański 2002). Some NGOs were created not as a result of the growing interest of society in the problems of others (i.e., for altruistic reasons), but in order to commit fraud or run other activities that were contrary to the principles of social coexistence and the law.

Social behavior is shaped by the institutional context in which it takes place – faith or a lack of faith in private property, and regulating activities or not (Tolbert and Zucker 1996). However, social theory says that individuals always choose cost-benefit calculations (Coleman 1990; Hechter 1990). Therefore, the assumption that regulating NGO activities influences the social trust for them would be false.

Research conducted in post-communist countries shows that donors to NGOs do not use the financial information of NGOs to make decisions (Waniak-Michalak and Zarzycka 2015). Therefore, the decision to set financial reporting regulations for them was based on the global expectations of the accountability of all organizations. The politicians' approach to reforms and regulations was shaped by the political systems and institutions in other European countries. Poland, Lithuania, and Croatia, as EU members, were imposed to the influence of institutional settings of other European countries. The assumption that a state institution is autonomous was rejected by scientists in the 1980s when the theory of historical institutionalism was formed (Skocpol 1985). The evolution of existing institutions results from external factors (general operating conditions) that generate the possibility or need for new, better practices, or from pressure from groups interested in promoting institutional changes. As regards post-communist countries, there was a situation in which institutional continuity was broken, especially regarding formal norms and regulations. The nature of the transformation process, as a kind of imposed process, necessitated revolutionary changes, including the need to create a legal system that was adapted to the new political system, and which was influenced by institutions from other European countries (Lissowska 2004, pp. 60, 63–64).

Given the above, it was assumed that the chronology and scope of the regulations introduced for the activities and reporting of NGOs in post-communist countries were similar. We will try to prove this thesis in subsequent points of the article.

The same effect may appear in the NGO sector when some of them start to follow the rules and regulations. It is called isomorphism (Boxenbaum and Jonsson 2017). According to Powell and DiMaggio (1986), two types of isomorphism can be distinguished, competitive isomorphism and institutional isomorphism. Weber called competitive isomorphism the "cage of rationality" (Baehr 2001), pointing out that competitive processes force organizations to adopt similar forms and actions. Institutional isomorphism stems from (1) political changes and needs of greater legitimacy, (2) the response to uncertainty, and (3) the tendency for professionalization.

The more organizations are similar to their activities, the more isomorphic institutionalism deepens. The more NGOs prepare reports, the more reporting becomes in-

stitutionalized. Isomorphism can be strengthened by standardizing reporting or making it compulsory. Problems arise when the stakeholders' expectations and behavioral patterns conflict with the interests of the organization. Then the phenomenon of decoupling (stratification) takes place, i.e., formally, the organization prepares financial statements, but they do not reflect what the organization does (MacLean and Behnam 2010). So, organizations are driven by, e.g., institutionalized products, services, techniques, policies, and the reporting system, which function as powerful myths. Organizations that become isomorphic with those myths of the institutional environment gain legitimacy, stability, and enhanced survival prospects (Meyer and Rowan 1977). The following sections of the article attempt to describe what NGOs' institutional isomorphism in accounting looks like in post-communist countries.

The institutions (norm, rules, regulations) support entities that cannot be responsible, accountable, or sustainable on their own. As research indicates, sustainability is not at the core of an NGOs' mission, and the way they act does not always follow the principles they advocate (Fassin 2009). Moreover, access to NGOs' financial data will not necessarily increase the rationality of decisions made by donors and NGO other stakeholders. People have a limited ability to analyze reality and make rational decisions. According to Herbert Simon, in some situations, it is unreasonable for people to analyze huge amounts of data to achieve maximum satisfaction. They conclude that the search for a perfect solution is, in itself, a costly activity. Therefore, people apply limited rationality – they save their time and effort, ultimately making decisions that are not perfect, but good enough (Krugman and Wells 2018). For example, they may decide to imitate others. If most people give money to a particular NGO, it may be enough to make a positive decision to support this NGO. This behavior is very similar in post-communist societies, where people tend to conform and imitate (Hodges 2014). Thus, the trust for NGOs can be built not by the contents of a financial statement but because the reporting and financial control of NGOs are obligatory.

The historical background of non-profit organizations in Croatia, Poland, and Lithuania

The earliest roots of civil society in Croatia can be traced to the work of brotherhoods that reached their peak in the early 1800s. The first written brotherhood statute was written in 1463, and it proves that, even then, these organizations did some of the things that would today be under the domain of civil society organizations (Draft National Strategy – Working Material for Counseling 2017). In Poland, before the First World War, charitable activities were run by Church organizations. Because of the partitions of both Poland and Lithuania, Polish society could not integrate and cooperate for the common good. That is why the first foundations or associations set up by members of society can be distinguished after World War I (Waniak-Michalak and Michalak 2016).

According to Zalimienė and Rimšaitė (2007), the participation of the non-governmental sector in the provision of social services in Lithuania also has old historical traditions (around the 15th century). Members of parishes, dioceses, and religious and secular organizations (Caritas, Catholic Women's Society, Vincent Paulius, St. Nicholas, St. Zita, Lithuanian Women's Care, and other associations), established the first shelters for the elderly, the sick, and orphans. Until the first world war, the state was usually only a supporter of secular and Catholic non-governmental organizations that provided all basic social services. Organizations established homes for children and the elderly, and they took care of poor people, education, and caring for the sick. Members of the Catholic Women's Society of Lithuania even initiated the first training courses for social workers and tried to create the basis for a new profession; however, this never came to fruition due to the Second World War and Soviet occupation (Žalimienė and Rimšaitė 2007).

In Croatia, from the end of the 18th century up to the 1950s, the civil society developed through the growth of associations and societies that were funded by the initiatives of rich members of society. They founded and helped fund orphanages, hospitals, schools, and cultural institutions. These initiatives were also supported by the Catholic Church, which founded different organizations in order to help the poor (Bedžovan 2003b, p. 90). It was when associations and societies gradually formalized and started to make internal rules and statutes that defined membership, boards of directors, chairmen, and presidents (Draft National Strategy – Working Material for Counseling 2017).

In Poland, many associations and foundations were liquidated in on July 23, 1940, as a result of the order of Hans Frank, the governor-general of the occupied Polish territories (Kroll 1985). All associations in Poland had to stop their activity, and their property was confiscated.

According to Stasiukynas (2014), the breakthrough of community-based organizations, as well as the non-governmental, nonprofit sector in general, was associated with the proclamation of independence in Lithuania in 1918. In Lithuania, the number of NGOs grew before the Second World War. However, after the loss of independence, the situation changed, and civic initiatives were limited by the authorities (public organizations and cooperatives were left) (Šimašius 2007).

In Croatia, many foundations and humanitarian organizations were formed in the interwar period. After the Second World War, in all three countries, socialism was introduced, and freedom of society was limited. Foundations were nationalized or stopped existing. The state had complete control and monopolized all social services. The only exceptions were some associations that helped the sick or disabled, and the Church, which provided social aid and took care of the elderly and addicts through Caritas (the charity established by Church) (Bedžovan 2003b). In Poland, in 1952, with the power of the legal act, all private foundations and associations were liquidated, and their assets were seized by the government (Arczewska 2009). For many years, Polish citizens were taught that private organizations would only harm society and would

serve only as a mechanism to steal and launder money. However, in the late 1970s, Poles noticed that the government's mechanisms had not managed to satisfy society's needs, so they began to create informal charitable organizations.

The Soviet period negatively affected the activities of non-governmental organizations not only in Lithuania but also in other post-Soviet republics. Only after the collapse of Communism did new opportunities for the development of civil society and NGOs open up. According to recent research in the former republics of the Soviet Union, the revival of civil society was made possible only by restoring national identity and mutual trust among citizens (Kėrytė 2010).

More developed forms of civil society initiatives that were closer to the contemporary meaning of the term occurred in Croatia in 1982 with the introduction of the Law on social organizations and citizens' associations. That law served as a legal framework that made it legal to associate in such a manner. By 1985, 10,844 social organizations and 547 citizens' associations were officially registered (Draft National Strategy – Working Material for Counseling 2017).

In Poland, most associations and foundations also sprang up after the fall of communism. The first legal act regulating the activity of foundations in Poland was announced in 1984, and governmental control over these organizations was abolished. In 1997, 20,700 associations and 3400 foundations were registered.

Even though the roots of today's civil society can be found in different forms of social organization within the realms of the social-political paradigm established after World War II , the most significant development of civil society took place after 1991. It was at that time that the Republic of Croatia was formed as an independent country (Draft National Strategy – Working Material for Counseling 2017) and when Poland overthrew communism. The political changes of the time promoted freedom of assembly as a basic human right (Bedžovan 2003b).

After the restoration of independence of Lithuania in 1990, the mood of patriotism, nationality, and social initiatives took place. NGOs that had existed before the Second World War (such as the Scouts) were restored. Underground informal civic initiatives were legalized, and new organizations also emerged (e.g., "Social Service Volunteers," the LCCP "Step" and others). In reviewing the regulations of various public organizations established between 1992 and 1997, it can be argued that nationality, patriotism, assisting relatives, sobriety, and similar values were predominant (Stasiukynas and Žuromskaitė 2014). It is noteworthy that financial support and other support were given by Western countries (Sweden, the United States of America) as a significant contribution to the development of NGOs and communities in Lithuania. The country was flooded with ideas and methods of new (unusual) activities. The meaningfulness of the public activities and the purposeful employment were realized by methods different from what had existed before, which was very attractive for young, proactive people. The non-governmental sector is considered to be one of the fastest developing sectors in Europe, including Lithuania. Two hundred and sixty public organizations were registered in Lithuania in 1995, while in 2005, the number had reached

15,000. Various financial mechanisms have fostered and strengthened the NGO sector: PHARE (EU Program: Poland and Hungary: Assistance for Restructuring their Economies), and later mechanisms for strengthening the European Union and the European Economic Area.

Rural community support schemes had a significant influence on the development of rural communities. However, the number and activity of NGO organizations depend on the country's economic and political situation (Matonytė 2003). It should be emphasized that the slow development of non-governmental organizations in Lithuania was influenced by the political passivity of Lithuanian citizens (Kėrytė 2010) and lack of authority (Guogis, Gudelis and Stasiukynas 2007). It needs to be noted that there is no single NGO statistical database in Lithuania, and a significant number of registered organizations do not carry out any activities. The main reason is that NGOs rely on volunteering, and there is no systematic financing of organizations in this field. Meanwhile, the official termination and de-registration of an organization requires additional resources (Stasiukynas 2014).

In Croatia, the first nonprofit organizations were formed during the Croatian War of Independence and the following refugee crisis in the early 1990s. It was at that time that many humanitarian organizations were founded and started collecting and distributing aid, providing shelter for refugees and other victims of war (Bežovan 2003a). They managed to successfully create a network with similar organizations in Europe, and they relied on many international humanitarian aid organizations. International organizations tend to be more effective if they have strong local organizations, and much of their work is to establish local self-managing organizations, which was also part of their exit strategy from Croatia (Bedžovan 2003b). The nonprofit sector in Croatia mainly developed with international aid in a time of crisis, mostly to manage problems that arose as a direct consequence of the war (Bedžovan 1995, p. 211). At that same time, numerous professional associations (psychologists, doctors, social workers) and other associations self-organized in solidarity with groups endangered by the war (Bedžovan 2003b). Many of these organizations received extensive humanitarian aid.

NGOs in Poland, Croatia, and Lithuania face a series of challenges: financial problems, a lack of skilled personnel, poor networking with other associations, insufficient cooperation with local counties and cities, a shortage of volunteers, prejudice against NGOs, and long-term planning, which proved to be difficult due to a change in donor requests (Bedžovan 2003a). Regardless of this fact, the non-profit sectors in these countries still is a sector whose potential is considerable.

According to the data from the Croatian Ministry of Public Administration on 31.12.2017, 52,244 associations and 242 foundations were officially registered in Croatia. In Poland, there were 73,400 associations and 13,600 foundations, while the list of the Lithuanian State Enterprise Centre of Registers included 19,703 associations and 1005 foundations. A detailed comparison of the level of development of the nonprofit sector in Croatia, Poland, and Lithuania is shown in Table 1.

Table 1. The number of nonprofit organizations in Poland, Croatia, and Lithuania in 2017

	Associations	Foundations	Total	Associations per 10,000 inhabitants	Foundations per 10,000 inhabitants	Total per 10,000 inhabitants
Poland	73 900	14 200	91 000	19	4	23
Croatia	52 244	242	52 486	125	1	126
Lithuania	197 03	970	20 673	69	3	73

Source: own elaboration based on data from the Statistical Offices in each country.

The number of charitable organizations in the three countries does not prove that there is a difference in the development of the sector (Table 1). The most active per 10,000 inhabitants is Croatia; however, further analysis of NGOs' revenues shows that the capacity measured donations from society is much lower in Poland and Croatia (Table 2). The analysis of NGOs in Lithuania is complicated because there is no official registry of the sector. It indicates the lower control over their activity in Lithuania and thus may be a sign of the lower development of the sector. Moreover, the lack of data may decrease public trust in NGOs.

Table 2. Revenues of NGOs in Poland, Croatia, and Lithuania in 2017

	Annual gross income in EUR*	Annual gross income in EUR/average salary
Poland**	72,550.00	6.22
Croatia	26,878.00	2.80
Lithuania	–	–

* Values of revenues in national currency were changed to EUR using the currency prices for the last day of the year

** the values are for 2016; data for 2017 were not available
Source: own elaboration based on data from the Statistical Offices in each country.

Accountability, control, and public trust of NGOs

Accountability of NGOs

Until 1994, there was no separate accounting system for non-profit organizations in Croatia. Until the Republic of Croatia gained its independence, all business entities were state-owned. Thus, until 1992, there was a single accounting system in Croatia characterized by uniform accounting. In 1993, the Law on Accounting introduced a dual accounting system, which compiles financial statements for external users but also financial reports according to tax laws. Those reports are then submitted to state institutions.

In Poland, the first Accounting Act was introduced in 1994. Before then, singular accounting and separate accounting regulations for different industries were used.

The development of the nonprofit accounting sector in Croatia (shown in Table 3) started in 1994. In Poland the first act to regulate non-profit organizations that fulfill public benefit goals was issued in 2003, although the accounting rules for these organizations were prepared earlier, in 1998 (shown in Table 3), i.e., the Decree of the Ministry of Finance on accounting rules for some entities that are not trade companies and do not run a business activity. The Decree presented the structure of the balance sheet and income statement for these entities. Moreover, according to the rules, non-profit organizations did not have to follow the prudence principle. Later, in 2004, the Decree of the Ministry of Finance on the obligation of public benefit organizations to audit their financial statements was introduced. The goal was then to establish a system that would work with every specific organization from this sector.

In Lithuania, the activities of non-governmental organizations have been regulated since 1992, when the Government passed the Decree "On the Approval of the Basic Provisions of the Statutes of Non-profit Organizations (Enterprises)" (shown in Table 3). This legislation was the most important document regulating NGO activities, and it has defined the main principles of NGO activities and financing peculiarities for a long time. However, this Decree did not contain any provisions or requirements governing the accounting and financial reporting of NGOs. They were guided by general corporate accounting legislation, responses from tax administrations to individual inquiries, and creatively adjusting them to the specifics of NGO activities and funding.

Table 3. Accounting and other legal acts regulating the activity of NGOs in Croatia, Poland, and Lithuania in the years 1982–2008

Year	Croatia	Poland	Lithuania
1982	Law on social organizations and citizens' associations		
1984		Act on Foundations regulating the creation, activity, and reporting of foundations	
1992	Law of humanitarian aid		The Decree on the approval of the basic provisions of the statutes of non-profit organizations
1993	Accounting Act		
1994	A separate accounting system Fund accounting Modified accounting principle	Accounting Act, accrual principle, and double accounting introduced for all entities	
1995			Law on Religious Communities and Associations, and Law on Public Organizations

Year	Croatia	Poland	Lithuania
1996			Law on Charity and Sponsorship Funds, Law on Associations, and Law on Public Institutions
1998		Decree of the Ministry of Finance on detailed accounting rules for some entities that are not trade companies and do not run business activity	
1999	Establishment of the Government Office for Cooperation with NGOs		The Order on the Financial Accounting of Grants and Subsidies
2003		Law on public benefit activities and volunteering	
2004		The Decree of the Ministry of Finance on the obligation of public benefit organizations to audit their financial statements Activity reports are obligatory.	The Rules of Accounting and the Financial Reporting of Non-Profit Civil Liability Legal Entities
2008	The accrual principle Harmonizing with international financial and statistical reporting Accounting plan established according to international economic classification Harmonization with entrepreneurial accounting		

Source: own elaboration.

The first step in the non-profit sector accounting system in Croatia, Poland, and Lithuania was the introduction, between 1994 and 2008, of a dedicated accounting system that applied fund accounting and a modified accounting principle (Table 3). At the time, accounting for non-profit organizations was done according to the Decree on the accounting of non-profit organizations issued in Croatia in 1994 (based on the Law on accounting from 1992), in Poland in 1998, and in Lithuania in 1999.

In Poland, non-profit organizations could prepare their financial statements with the structure suggested by the Decree. It gave NGO managers general definitions of the revenues and costs of non-profit activities, but the rules of bookkeeping remained the same for all business and non-business units. To improve the accountability of Polish NGOs, in 2003, the Law on public benefit activity and volunteering was issued. The act introduced the obligation for public benefit organizations to prepare activity statements presenting the information not only on financial results but also employment, the number of volunteers, donations, and donors.

In Lithuania, the first attempt to regulate the accounting of NGOs was the Order of the Minister of Finance of the Republic of Lithuania of 1999 on the Financial Accounting of Grants and Subsidies. It attempted to regulate the accounting of NGOs, but it did not meet the needs of NGOs. In 2004, in order to move to international accounting standards, the accounting of companies was reorganized, and it was decided to regulate the accounting of non-profit legal entities, including NGOs. In 2004, by order of the Minister of Finance of the Republic of Lithuania, the Rules of Accounting and Financial Reporting of Non-Profit Civil Liability Legal Entities were approved. They were to be applied by NGOs when preparing the 2005 financial statements. These rules have taken over the mandatory application of the accrual principle, as well as other accounting provisions that are recorded in the Business Accounting Standards.

The main provisions of the new accounting rules have indeed been considerably simplified compared to the Business Accounting Standards – they did not contain some requirements specific to profit-making companies. However, the problem is that the key feature of uniting all non-profit legal entities is to benefit the public performance, but their requirements were not fully reflected in the new accounting rules. Not taking into account the specifics of NGO activities caused several accounting and tax accounting problems. Until 2005, the goal of NGO accountability was the only one to correctly reflect the performance of NGOs in knowing the real situation. Since 2005, besides financial reporting (balance sheet, performance report, and notes), NGOs are also required to provide tax reporting. The purpose of this is to present performance results for tax purposes in accordance with the NGO tax legislation.

In Croatia, the next step in the development of the accounting system happened in 2008 with the introduction of the new Decree on non-profit organizations accounting that introduced many changes and, as a consequence, successfully harmonized it with entrepreneurial accounting and international financial and statistical reporting.

Table 4. Accounting and other legal acts regulating the activities of NGOs in Croatia, Poland, and Lithuania in the years 2009–2018

Year	Croatia	Poland	Lithuania
2009	Monitoring financial data of non-profit organizations as a sector General data on subjects and data relevant for the database of financial reports from the Registry of non-profit organizations become available to the public according to the ordinates of the Law on the right to access information (the exception being small, non-profit organizations)		

Year	Croatia	Poland	Lithuania
2010			Rules for the Accounting and Financial Reporting of Non-Profit Civil Liability Legal Entities and the Evaluation of the Assets and Services of the Participants of the Political Company
2011		Obligation to publish the financial and activity report on the government website	
2013			Law on the Development of Non-governmental Organizations
2014		NGOs are obliged to fulfill the regulations of the Accounting Act as other entities. However, they can prepare simplified financial statements if they do not run a business activity.	
2015	The Law on Financial Operations and Accountancy of Non-Profit Organizations came into force The obligation to self-assess financial management and to enforce control. The obligation to make plans for large non-profit organizations The obligation to create financial reports All financial reports made public through the Registry of non-profit organizations	Law on public benefit activity and volunteering-full and simplified activity reports. Some NGOs do not have to prepare financial statements	Obligation to submit financial statements to the State Enterprises "Center of Registers" and "Statistics Lithuania."
2017		Creation of the National Institute of Freedom – the Center of Civil Society Development, which is responsible for the dis-tribution of grants and information on NGOs	
2018			Changing the Rules for the Accounting and Financial Reporting of Non-Profit Civil Liability Legal Entities and for the Evaluation of the Assets and Services of the Participants of Political Companies

Source: own elaboration.

In the case of Lithuania, The Rules of Accounting and Financial Reporting of Non-Profit Civil Liability Legal Entities were adjusted in 2010 (shown in Table 4). These rules were extended to include an evaluation of the assets and services of the participants of political companies. In 2015, NGOs were obliged to submit their financial statements to the Center of Registers. This somewhat increased the transparency of their activities, as these reports could be bought at the Registry Center. In 2018, the accounting rules of NGOs changed again, and NGOs were allowed to use simplified accounting.

Control over NGOs

As doubts about the misuse of humanitarian aid leaked into the public domain, in 1992, the Croatian government issued the Law of humanitarian aid. The government also founded a commission to monitor humanitarian organizations, to monitor and stop the processes of resale and the unlawful use of humanitarian aid (Bedžovan 2003b).

In Poland, since 2018, the Director of the National Freedom Institute has control over NGOs; previously, the task was performed by the Ministry of Work and Social Policy. According to the "Law on public benefit activity and volunteering," all charitable organizations with the status of public benefit organizations must publish their financial statements. If they do not fulfill the requirement, they may lose the status of a public benefit organization.

The Decree of the Government of the Republic of Lithuania, "On the areas of management entrusted to ministers," stipulates that the Ministry of Social Security and Labor is responsible for managing the development of communities and non-governmental organizations. One of the objectives of the Ministry of Social Security and Labor is to formulate the development policy of communities and non-governmental organizations, to organize, coordinate, and control its implementation. Meanwhile, the Authority of Audit, Accounting, Property Valuation, and Insolvency Management (under the Ministry of Finance) monitors the accounting of NGOs to ensure the reliability of financial reporting information.

In order to increase transparency in the work of associations and under some international pressure, the Croatian Government established the Government Office for Cooperation with NGOs in 1999, which significantly contributed to the transparent allocation of funds allocated to NGOs from the state budget (Bežovan, Zrinščak and Vugec 2005).

The same was done in Poland, but in 2017. In September of that year, the National Institute of Freedom – the Center for Civil Society Development was set up to support the development of civil society in Poland. The Institute receives government grants and allocates the money in projects carried out by nonprofit organizations in Poland.

Meanwhile, in Lithuania, the Commission for the Coordination of Non-Governmental Organizations' Affairs was established in 2010. It consists of representatives from state institutions, municipalities, and non-governmental organizations. The main functions of the Commission are to put forward proposals to the Government on leg-

islation regulating the activities of non-governmental organizations and on the development of new legislation; the development of cooperation between the state, municipal institutions and institutions, and non-governmental organizations; and the implementation of measures for the development of non-governmental organizations. In 2014, the activities of the commission were taken over by the Council of Non-Governmental Organizations.

Public trust in NGOs and their level of accountability

An important issue for NGOs operating in post-communist countries is the persistently low level of public trust in them (Waniak-Michalak and Zarzycka 2013; Borowiecki and Dziura (eds) 2014; Waniak-Michalak & Michalak 2016). For example, in Poland and Lithuania, 26 years after the fall of communism, society believes neither in the honesty nor in the effectiveness of NGOs. Research by the Klon-Jawor Association in Poland proves that the trust of Polish citizens in NGOs decreased in both 2014 and 2016. Almost 50% of respondents believed that NGOs embezzle the money they receive. One of the reasons for the low civil trust may be the lack of tools to evaluate NGOs, like the Charities Navigator in the USA or the website of the Charity Commission in the UK.

In the case of Poland and Lithuania, however, the only possibility for donors to evaluate an NGO's achievements is to analyze their financial statements themselves. Unfortunately, many donors do not have the skills or time for it, or, if they do, they find that the financial statements are of low quality (Ling and Gordon 2013). According to some researchers, accountability matters (Agyemang et al. 2009). Howard (2003) contends that post-communist countries have lower levels of organizational membership than democracies and other post-authoritarian states, with the weakness of civil society in the region stemming from the mistrust of the previous communist organizations, the persistence of personal contacts over community ones, and widespread disappointment with the reforms undertaken in the early post-communist era.

Faith in the non-profit sector has been questioned as a result of several high-profile scandals, prompting increasing calls for transparency. Discrepancies between what NGOs say and do are noticed and analyzed in research studies and papers (Epperly and Lee 2015; Gray, Bebbington and Colisson 2006; del Mar Gálvez-Rodríguez et al. 2014). At the same time, there is a significant gap in the research on NGO accountability and state control over them. It should be noted believe that before implementing regulations to control NGOs, an investigation should be carried out into whether they are required and, if so, what form they should take.

A few empirical studies conducted by various international and national NGOs can be found that cover NGO accountability and transparency. For example, Transparency International (2008) surveyed 605 Lithuanian NGOs concerning their goals and performance, accountability, and transparency issues. 66.9% of respondents asserted that NGOs are transparent, while 26.6% believe the opposite. Information disclosure of financial accountability to the public is evaluated the lowest – only 9% of respond-

ents believe that public accountability of NGOs is acceptable. These research results are consistent with the results of other research related to financial information disclosure and transparency. Below is a graph of the public trust indices in Poland, Lithuania, and Croatia.

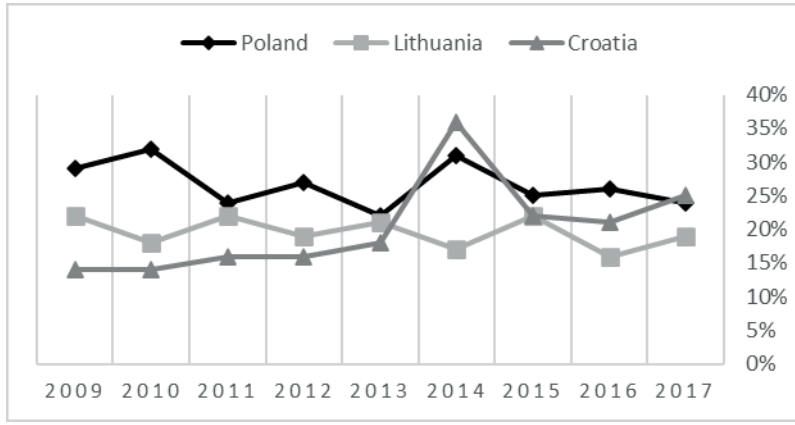

Chart 1. The civil trust in Poland, Lithuania, and Croatia in the years 2009–2017
Source: own elaboration of data of Charities Aid Foundation.

According to the research of the Charities Aid Foundation, social trust for NGOs increased in 2014 in some countries, mainly as a result of natural disasters (flooding in Croatia) or wars. At the time, people decided to make donations, not to a specific organization but for a specific purpose. It should also be noted that in 2015, two fundamental legal acts were introduced in Poland and Croatia. However, their effect would be expected in the next year or later when new financial statements of NGOs would be prepared.

In 2015, a further decline in social trust for NGOs can be observed in Poland. During this period, the conservative political party PIS gained a majority in the government, and it started to run a campaign against non-governmental organizations. PIS party members made allegations of misappropriation of public funds and fraud committed by NGOs, and as a result, some citizens turned against NGOs. One of the reasons for the government's attitude was its unwillingness to accept refugees. Therefore, it did not want to finance activities that aimed to support or integrate refugees, that supported human rights, or that aimed to give different minority groups the right to equal treatment, among others. This stance awakened a strong institution in Poles, intolerance, which became a tool to fight against NGOs and civil society. Therefore, the public trust for NGOs in Poland is even lower than in 2009, before all the most critical changes in legal requirements, including accounting rules, for NGOs.

In other countries, the lack of institutional mechanisms (imposed on citizens by the state as a social obligation) resulted in a decline in charity. In Poland, a 1% income tax mechanism was introduced in 2004. Initially, if Polish taxpayers wanted to make a contribution, they had to make their payments to selected non-governmental or-

ganizations and then show the amount of the donation as an item that was deductible from their income tax. However, it turned out that Poles were not ready to accept such a duty. It was not their business, and it required too much effort. Therefore, in 2007, a change was introduced in the way taxpayers transferred the 1%. Since then, taxpayers only have to indicate on their tax statement to whom they want to transfer the 1%, and the money is transferred by the tax authorities. In the following year (2008), this change resulted in four million more taxpayers making deductions to a charity.

Lithuania has the lowest level of public trust. Markšaitytė et al. (2017) point to the link between social trust in Lithuania and the low level of happiness of Lithuanians. Their lack of faith in the possibility of improving their well-being discourages Lithuanians from helping others. The compulsory reporting by non-governmental organizations (NGOs) to the Center of Registers (2015) only temporarily increased public trust in NGO organizations in 2015. In 2016, trust levels fell again. And while changing the rules for the accounting and financial reporting of NGOs in 2017 increased the transparency of these organizations, it takes time. Therefore, the problem of the low trust in NGOs will not be solved only by increasing the accountability of NGOs.

Conclusions

Philanthropic activities had early beginnings in the three countries (Poland in the 12th century, and both Croatia and Lithuania in the 15th century), but this did not result in the creation of social capital or trust in charity organizations. The experience of the communist regime was of great importance. In all three countries, the re-development of NGOs generally followed the fall of communism. Since the early 1990s:

- The introduced legal rules were intended to constitute a formal basis for the development of NGOs, in the absence of acquired and established social norms.
- The formal institutions that determined the development of NGOs are the introduction of laws, including the regulation of accounting for NGOs, access to reports, and the introduction of a supervisory body.

The institutional changes in the NGO sector in the analyzed countries followed the same path. However, their scope is different, and it is difficult to link the scope of the introduced regulations with the observed social trust in the analyzed countries. The fastest legal changes were introduced in Croatia:

- Accounting law for NGOs – 1994,
- Access to NGO reports – 2008,
- Control Body – the Croatian Government established the Government Office for Cooperation with NGOs in 1999.

However, this did not result in a high level of trust. In 2010, it was the lowest in comparison to Poland and Lithuania (one of the limitations of the study is that there are no trust data before 2010).

Changes in Poland took place a bit later:
- Accounting law for NGOs – 1998,
- Access to NGO reports (only public benefit organizations) – 2011,
- The creation of the National Institute of Freedom – Center of Civil Society Development – 2017.

Despite the slower institutional development of the Polish NGO sector, social trust in NGO activities has been higher than in Croatia since 2010.

The social trust in NGOs is lower in Lithuania compared to the situation in Poland since 2010 and to Croatia since 2015, although the development of the institutional environment is similar in all countries:
- Lithuanian Accounting law for NGOs – 1999 (but more important changes came in 2003),
- Access to NGO reports in 2015 – obligation to publish,
- Inspection body – in 2010, the Commission for the Coordination of Non-Governmental Organizations Affairs was established.

It is important to note that in Lithuania, NGOs' financial reports have become available to the public only since 2015, and, initially, they were only available for purchase from the State Enterprise "Centre of Registers." Since 2018, this information is free.

The assumption that regulating NGOs' activities influences the social trust for them has not been proven. However, it can be assumed that recent legal and accounting changes in NGO activities may increase social trust in these organizations' activities. It will take time and will depend on the quality of the implementation of these reforms. For this reason, in the future, it would be useful to extend the research by analyzing the period from 2018 onwards. In addition, it would be useful to analyze a greater number of post-communist countries in any further investigation.

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Streszczenie

Uwarunkowania instytucjonalne w rozwoju sektora organizacji pozarządowych w krajach postkomunistycznych

Celem artykułu jest analiza procesu tworzenia otoczenia instytucjonalnego sektora organizacji pozarządowych w trzech wybranych krajach postkomunistycznych oraz analiza zmian zaufania społecznego w tych krajach w odniesienu do zmian norm prawnych i rachunkowości dla organizacji pozarządowych. Metodologia badań obejmuje analizę literatury i indukcyjną metodę analizy danych historycznych dla wybranych krajów postkomunistycznych. Do badań wybrano trzy kraje postkomunistyczne: Litwę – jeden z krajów bałtyckich, zajmujący ostatnie miejsce w rankingu World Giving Index, Polskę i Chorwację – dwa najlepsze kraje postkomunistyczne w rankingu World Giving Index. Ograniczenia badawcze wynikają z zastosowania metody opisowej i niewielkiej liczby krajów objętych analizą. Oryginalność i wartość niniejszego opracowania polega analizie problemu niskiego zaufania społecznego do organizacji pozarządowych w krajach postkomunistycznych w kontekście rozwoju otoczenia instytucjonalnego organizacji pozarządowych oraz wzrostu ich rozliczalności i cywilnej kontroli nad nimi.

Słowa kluczowe: World Giving Index, kraje postkomunistyczne, organizacje pozarządowe, teoria instytucjonalna, rachunkowość