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Factors of the Shadow Economy in Market and Transition Economies during the Post-Crisis Period: is there a Difference?

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The shadow economy (SE) is a global phenomenon that affects every country. However, its forms and mechanisms may differ depending on a country's socio-economic characteristics. The major characteristic is a country's economic system. Hence, market and transition economies can be affected differently. Given that the size of the SE directly affects the level of tax revenue, it is particularly important to investigate the factors of the SE during the post-crisis period, when policymakers need sufficient budgetary funds to implement anti-crisis measures. In that sense, this paper aims to identify the differences in the factors that boosted the SE in 17 market and 19 transition economies in Europe between 2009-2014. The research is based on the PLS-SEM method. A country's wealth and development, market openness, tax system and political environment are employed as the major SE factors. These factors are the most common in previous literature when investigating the issues of the shadow economy and are most appropriate for this research. The results suggest that particular factors of the SE differently affect market and transition economies. In transition economies, a favourable political environment, greater wealth and development, as well as a lower tax burden contribute to a smaller size of the SE, whereas greater market openness and a higher tax burden lead to a larger size of the SE. The links between market openness, tax system and the SE are not, however, statistically significant. Like transition economies, market economies are characterized by the positive impact of political environment and wealth and development when combating the SE. Unlike in transition economies, the size of the SE in market economies is reduced by a high tax burden and greater market openness. In the latter case, there is only one statistically insignificant path coefficient – it represents the relationship between the SE and market openness. The Multi-Group Analysis (MGA) method was employed to compare the path coefficients estimated for the country groups under consideration. The results indicate that the only difference in the path coefficients representing the relationship between market openness and the SE is not statistically significant. Based on the research results, some recommendations for policymakers in transition and market economies are provided in the conclusion.

Keywords: *Shadow Economy; Market Economy; Transition Economy; Global Economic Crisis; PLS-SEM Model.*

Introduction

The interest of economists and policymakers in the SE is not decreasing. With the importance of the SE analysis for policymaking in mind, many researchers are still interested in this topic, and the literature on this subject is relatively comprehensive. It is particularly true after the global economic shocks that spread worldwide rapidly in the era of intensive globalization. The emergence of the global economic crisis in 2008 and the sovereign debt crisis in 2010 indicated once again the necessity of solving this problem, given that the widespread SE tends to reduce the amount of available budgetary funds necessary for overcoming the crisis (Brondolo, 2009).

The global economy has recently experienced another great shock: the COVID-19 pandemic crisis. The health crisis that resulted from the fast spread of the virus developed into a new economic crisis on a global scale. Although the causes of this crisis differ from the ones of the global economic crisis, it can be stated that it will certainly affect the growth of the SE due to rising unemployment and the prolonged quarantine. The measures undertaken to stop the spread of the virus led to the loss of corporate revenue and labour income, which motivated business companies and workers to operate in the informal sector (Williams & Kayaoglu, 2020). Bracci et al. (2021) state that "the combination of a public health emergency, economic distress, and misinformation-driven panic has pushed customers and vendors towards the shadow economy," which will inevitably affect the economic recovery.

A high level of the SE can induce policymakers to make the decisions that are not based on realistic information. In such conditions, so-called "positive indicators" (those to be maximized), such as GDP, labour productivity, employment, and industrial production indices, are underestimated. In contrast, the "negative indicators" (those to be minimized), like inflation and unemployment, are overestimated. Hence, policymakers strive to include the measures aimed at combating the SE in their long-term economic growth and development strategies because a smaller size of the SE allows economic policy decision-making based on relevant facts (Gonzalez-Fernandez & Gonzalez-Velasco, 2015).

The precise definition of the SE is one of the key preconditions for a high-quality and comprehensive analysis of the factors that create a favourable environment for its emergence and spread. It also helps provide the relevant recommendations and guidelines for combating this negative social phenomenon. Different socio-economic characteristics of particular countries largely lead to heterogeneity when defining the SE in literature, and the character of an economic system is certainly very important. The phenomenon of the SE acquired a new dimension after the collapse of the centrally planned economic system in the late 80s. Under the framework of the Washington consensus, the World Bank, the International Monetary Fund and other influential institutions traced the transformation of the economic system in transition economies to establish market economy principles. Privatization, deregulation, trade liberalization, tax reform, and capital account liberalization were among the essential measures to promote free FDI inflows (Krajewska, 2004). The key prerequisite for implementing these reforms was reforming the institutional environment. The establishment of market-oriented institutions was quite slow, and the pace of this process varied considerably from country to country (Beck & Laeven, 2006). This situation led to developing a certain institutional vacuum since "the previous laws and social norms were not adapted to the new political, economic, and social reality" (Chelariu *et al.,* 2006). All of this negatively affected functioning of transition economies since they had to "reconstruct organizations and institutions, not on the ruins of communism, but from the ruins of communism" (Stark, 1996). According to Bruno (2019), slow and ineffective reforms led to the emergence and spread of various illegal activities, such as tax evasion, creative accounting, self-dealing, opportunistic managerial behaviour, perks consumption, contract enforcement difficulties, asset-stripping, outright expropriation of shareholders, tunnelling, and lobbying to limit active monitoring, to name a few.

The post-Soviet transition economies had to reform their regulatory and political environments by enacting pro-market reforms, such as property rights enforcement, ensuring the rule of law, combating corruption, reforming the court system, increasing the independence of the judiciary, improving an efficient regulatory framework, establishing regulatory institutions, and introducing other measures to support the implementation of economic reforms (Bruno, 2019). The success in establishing the principles of the market economy and democratic society significantly affected the welfare in these countries. Some of them overperformed the level of the pre-transition GDP. They narrowed the gap in living standards compared to advanced market economies, while others were still struggling to obtain economic growth and well-being.

Unlike transition economies, which were supposed to create a new political and institutional environment by reforming the old one, advanced market economies were upgrading their institutional and political environments over decades. Market economies posed additional challenges to transition economies by modernizing their institutional and regulatory frameworks. Transition economies had to continuously improve their business environment to keep up with institutional and regulatory development in advanced market economies. Nevertheless, market economies are also characterized by fast development of new business models, technologies and financial instruments, which poses the risk of tax evasion. The use of the modern technologies (in the form of sharing and gig economies, e-commerce, e-transfers, blockchain and crypto-currencies) in daily operations in a way that makes effective tracking difficult for tax administration results in new ways of misusing technology and leads to new types of the SE, such as so-called digital SE (Gaspareniene *et al.,* 2017; Gaspareniene *et al.,* 2018a; Gaspareniene *et al.,* 2018b), that are present in both market and transition economies. However, it should be noted that they are more pronounced in market economies due to the faster development of innovative business models, technologies and financial instruments, as well as a larger number of users of the innovative solutions.

Considering the characteristics of different economies, this paper aims to investigate the factors of the SE in market and transition economies during the post-crisis period to develop the appropriate post-pandemic measures for both groups of countries.

Literature Review

As the consequences of the SE in the post-crisis period became more pronounced, more authors strived to define the concept and identify the determinants and size of the SE more precisely by applying different methods and models (Zukauskas & Schneider, 2016; Bayar, 2016; Schneider *et al.,* 2015; Navickas *et al.,* 2019; Achim et al. 2018; Borlea *et al.*, 2017). Estimating the size of the SE is, however, a very complicated and challenging task. Depending on the definition of the SE and characteristics of the research area, different authors employed different SE indicators and the causes of its emergence and spread (Kireenko & Nevzorova, 2015; Arsic *et al.,* 2015; Quintano & Mazzocchi, 2018). The literature on the SE both in less-developed and developed countries is sizeable, but most articles are focused on examining the size and determinants of the SE in a particular country (Katsios, 2015; Gonzalez-Fernandez & Gonzalez-Velasco, 2015; Bejakovic, 2015; Gaspareniene & Remeikiene, 2016; Dell'Anno & Davidescu, 2019; Popescu *et al.,* 2018) or on comparison of two or more economies (Williams & Horodnic, 2015; Markina *et al.,* 2018; Kireenko *et al.,* 2017; Almenar *et al.,* 2020).

There are also papers dealing with analysing the shadow economy in a larger group of countries (Manolas *et al.,* 2013; Bayar, 2016; Schneider *et al.,* 2015). Based on the data from 19 countries, Manolas et al. (2013) found that governmental quality, regulatory frameworks for goods, labour and credit markets, and tax burdens are the main factors affecting the SE. In their work, Acosta-González et al. (2014) examined the determinants that affect the size of the SE in the OECD countries. They concluded that the profit tax, domestic credit, the heritage from the socialist regime and corruption positively affect the SE growth. In contrast, the tax on capital gains, ethnic diversity, urbanization, globalization and data privacy negatively affect the size of the SE.

Special attention was paid to investigating the SE in the EU (Williams, 2014; Navickas *et al.,* 2019; Achim et *al.,* 2018; Borlea *et al.,* 2017; Schneider *et al.,* 2015). Based on the data from the EU Member States (EU27), Williams (2014) argues that wealthier and more equal economic systems with strong labour-market intervention, significant social protection and more effective redistribution through social transfers tend to have a smaller informal sector and less undeclared work.

Navickas et al. (2019) analysed the SE in Eastern EU Member States and concluded that the SE in these countries decreased during the 2003–2016 period, except between 2009-2010. Nevertheless, they still have a significantly higher size of the SE than Western EU Member States. Navickas et al.'s (2019) findings indicate that high corruption, income inequality or tax burden on consumption tend to increase the size of the SE in these countries. On the other hand, an increase in business freedom and GDP per capita (as an indicator of a country's development) tend to reduce the SE.

Many papers aim to analyse the determinants of the SE in transition economies (Luong *et al.,* 2020; Bayar & Ozturk, 2016; Bayar et al., 2018; Stepanova *et al.,* 2018; Bayar & Ozturk, 2019; Bejakovic, 2015). Bayar *et al.* (2018) conclude that reducing corruption and establishing the rule of law tend to reduce the size of the SE in the EU transition economies in the long run. Keeping this in mind, they propose that effective anti-corruption policies and improvements in the rule of law in transition countries can contribute to reduction in the size of the SE. Bayar and Ozturk (2016), who examined the interaction between the SE, financial sector development and institutional quality in the EU transition economies from 2003 to 2014, found that improvements in financial development and institutional quality tend to reduce the size of the SE in the long run. Luong et al. (2020) researched the data from 18 transition countries over the period 2002–2015. Their results indicate that the size of the SE could be controlled by improving the rule of law and promoting economic growth.

Considering the findings discussed above, it can be concluded that most authors focus on investigating the determinants of the SE in particular countries or in large groups of countries without comparing the differences in their economic systems, although an economic system can be treated as an important characteristic of any country. It is particularly true minding the fact that the size of the SE tends to decrease when an economic system is developing (Quintano & Mazzocchi, 2018). In that sense, the main contribution of this paper is conducting a comparative analysis of the SE factors in market and transition economies and identification of the differences in these two country groups.

Factors of the Shadow Economy

The factors of the SE considered in this paper are divided into four groups: wealth and development, the open market, tax system and political environment. Each group consists of several sub-factors that represent the situation in the relevant area.

A country's wealth and development (WD), viewed through the standards of living and general satisfaction of the citizens with their living and working conditions, is one of the major factors of the SE. A higher level of social welfare and economic development is associated with a lower level of the SE in all countries, regardless of the characteristics of their economic system (Schneider et al., 2010; Quintano & Mazzocchi, 2013; Quintano & Mazzocchi, 2018, Goel & Nelson, 2016). It certainly makes sense because operating in favourable conditions, economic entities and citizens have no reason to get involved in the informal sector. In recent years, the EU has been targeting the underdeveloped EU regions, like CEE and SEE countries, when allocating resources through the European structural funds to tackle informal work. It is also one more piece of evidence in favour of the positive effect of wealth and development on reducing the size of the SE (Dekker *et al.,* 2010). According to Šoltés and Nováková (2015), national economic performance is frequently compared to the national social development, but the level of GDP does not automatically reflect an increase in living standards. Thus, when evaluating the level of wealth and development in a country, the indicators related to quality of life, like the Human Development Index (HDI), should be considered. With this in mind, GNI per capita (as a measure of citizens' living standards), the share of national GDP in global GDP (as an indicator of competitiveness), and the HDI are employed to reflect wealth and development (as a synthetic indicator of living and working conditions) in this study.

The open market (OM) is another important determinant of the SE, especially in post-Soviet countries. Some authors examined the relationship between different aspects of the SE and the open market in the context of the neoliberal theory (Williams, 2020; Williams & Kedir, 2018). For neo-liberal scholars, informal entrepreneurship and undeclared work are rational economic choices for workers and enterprises facing high tax burdens and over-regulation. By analysing 69 national economies, Friedman et al. (2000) also concluded that highly regulated economies tend to have a greater share of the SE. In open, fast-growing economies, people have many chances to earn extra income in the formal economy, so they have no interest in engaging in the informal sector. On the other hand, in a closed, regulated, autarchic economy that faces a recession or slow growth, people try to obtain additional income in the informal sector. Therefore, a large number of authors, who analysed the links between the liberalization progress and the size of the SE in transition economies before the global economic crisis, stressed the importance of reducing regulation of economic flows for an effective fight against the SE (Goldberg & Pavcnik, 2003; Antunes & Cavalcanti, 2007). However, this is not the case during a recession, when many people try to compensate for their income loss through the additional SE activities (Quintano & Mazzocchi, 2013). Thus, stricter regulation can simply "push" the economy and citizens into the formal sector. This fact explains why some recent studies (Williams, 2020; Williams & Kedir, 2018) could not provide the evidence to support the assumptions of the neoliberal theory. They proposed that the SE directly results from a

de-regulated global economy, outsourcing and subcontracting. According to the political economy scholars, these factors determine integration of the SE into contemporary capitalism.

Contrary to supporters of the modernization theory, representatives of the political economy theory argue that the SE is far from a heritage from the earlier stages of economic development. Instead, informality is an integral part of the modernization processes. From the political economy perspective, the SE results from weak state intervention in the economy and the lack of employee protection. It is particularly relevant for transition economies. This was proved in the study conducted by Shostya (2014) who found that characteristics commonly considered to be strengths of transition economies during regular times (e.g. a high degree of economic freedom and trade liberalization, sophistication of the financial system, and the developed service sector) became weaknesses during the crisis period. The author investigates this feature of the SE by employing the sub-indexes within the Index of Economic Freedom: business freedom, investment freedom, and financial freedom.

The size of the SE and the motivation of both citizens and economic entities to engage in the informal sector are directly dependent on a country's *tax system* (TS). The actions of economic entities and citizens in the SE sector are tightly connected with tax evasion (Andreoni *et al.,* 1998). Companies often declare unrealistic losses at the end of the fiscal year to evade taxes. In addition to being a criminal offense, this practice negatively affects other companies doing business within the law because their market competitiveness is decreasing in comparison to competitiveness of tax evaders (Schneider *et al.,* 2015). The evasion of other types of taxes has a similar effect. Non-payment of the labour tax reduces business costs, which entails a lower cost and a lower selling price than the competitive costs and prices. At the same time, the evasion of VAT payments directly affects the selling price. The evasive behaviour depends on taxpayers' perception of the balance between the benefits generated by tax evasion and the potential loss incurred in case the faulty practice is detected. This perception is formed by the frequency of inspections, severity of penalties and, in general, the efficiency of the legislative, regulatory and institutional environment. Considering conditions in transition economies, Bruno (2019) concluded that "after almost three decades of transition, these economies are still characterized by widespread shadow economies and limited or selective tax enforcement." In this research, tax system is represented by the level of income tax, labour tax and total tax.

The emergence of the SE is certainly connected to the political situation, the level of democracy, the quality of regulation, and, in general, the *political environment (PE)*. Bearing in mind that political and economic development are closely connected and mutually conditioned, the importance of public management in transition economies is reflected in finding the optimal relationship between the government and the market, considering that their actions are complementary. Teobaldelli & Schneider (2013) concluded that democratic countries have fiscal policy measures that are developed to reflect the attitudes and preferences of citizens; therefore, they tend to have a smaller size of the SE. According to D'Hernoncourt and Meon (2012), the greater confidence of citizens in the government and state institutions results in a smaller size of the SE. Nevertheless, the level of this confidence depends on the quality of government. Goel & Nelson (2016) argue that "the risk of exposure and a relatively transparent legal process in democratic countries are likely to check all illegal activities, including the shadow economy."

An important aspect of the quality of government, which directly affects the size of the SE, is tax collection efficiency (Ruge, 2012). The best examples are Northern and Western European countries where, despite high tax rates, the SE is at a relatively low level due to strict and efficient tax collection control. At the other end are the countries of Eastern Europe, among which the best example is Bulgaria, which, despite its relatively low tax rates, has been struggling with the SE for years. This situation also leads to a higher budget deficit and public debt, further stimulating the growth of the SE (Schneider *et al.,* 2015; Gonzalez-Fernandez & Gonzalez-Velasco, 2015). The economic position of both citizens and economic entities is deteriorating due to the country's credit rating declining and worsening the macroeconomic situation (in particular because austerity measures are implemented in such circumstances); as a result, citizens and economic entities are becoming more involved in the informal sector.

From a legal perspective, the pursuit of the SE plunges into several areas of law. Tax law covers non-reporting income and deduction of indirect taxes; the avoidance of social security contributions and other aspects of undeclared work are covered by criminal law; customs law covers illegally imported goods. The EU pays special attention to designing and implementing an efficient regulatory framework in this area. The EU Customs Code was created to address the SE by laying out the standard norms and procedures for handling goods trade between the EU and third countries in a single text. The Code serves the interests of both traders and customs and facilitates movement of goods within the internal market. Under the provisions of the Code, imports from outside the EU are subject to a uniform system of collection or suspension of customs duties, and no customs duties are payable at the EU borders. The Union Customs Code (UCC) came into force in May 2016. The Code also included certain transitional measures, particularly regarding transferring customs formalities to electronic space. The transitional period was considered necessary due to the need to develop new IT systems or upgrade the existing ones. The UCC set a deadline of 2020 for deploying the IT systems and techniques required in the electronic customs environment. In January 2018, the Commission published a report on implementing the UCC. In March 2018, the transition period for full implementation was extended from 31 December 2020 to 2025 (European Parliament, 2018).

The political environment is represented by the World Bank Governance Indicators (WGI) related to the government efficiency, the rule of law, political stability, and voice and accountability.

Indicators of the Shadow Economy

Previous literature proposes a variety of the indicators of the SE. Selection of particular indicators depends on understanding of the SE and its definition. There are various definitions of the SE (Smith, 1994; Schneider & Enste, 2000; Feld & Schneider, 2010; Schneider et al., 2010), but the most commonly used definition was suggested by Schneider et al. (2010), stating that the SE represents "goods and/or services the income received for which is deliberately hidden from authorities to evade income, VAT or other taxes, social insurance contributions, avoiding compliance with particular legal labour market regulations such as minimum wages, maximal duration of working hours, safety standards, etc." Borlea et al. (2017) argue that the shadow economy comprises two major components: undeclared work (which refers to the salaries that employees and businesses do not declare to avoid taxation or labour market regulations) and underreported business revenue. In addition, the authors state that circumvention of regulations, tax evasion and lower tax revenues are common characteristics of corruption and the SE.

Based on the literature analysis, this study employs the following indicators of the SE: wage and salaried workers (% of total employment), tax revenue (% of GDP), and control of corruption.

Wage and salaried workers represent a fairly reliable indicator of the SE. This indicator shows the number of workers "who hold the type of jobs defined as paid employment jobs, where the incumbents hold explicit (written or oral) or implicit employment contracts that give them a basic remuneration that is not directly dependent upon the revenue of the unit for which they work (ILO, 2014)." It is an important indicator of the SE because the low share of wage and salaried workers in a country can indicate the large presence of undeclared work in the economy. Undeclared work and the SE are closely connected, especially minding the fact that they imply tax evasion and non-respect for regulation (OECD, 2017; Williams, 2019; World Bank, 2019). It is a widespread phenomenon (Williams & Schneider, 2016) in both market and transition economies. Due to the high labour supply (resulting from privatization of state-owned enterprises and the relatively slow development of the SMEs sector), people in transition economies accept unfavourable work conditions, such as extremely low salaries, unsafe workplaces, limited access to social protection, frequent exploitation, and so forth (Sundar, 2007). This is especially true in the post-crisis period when the number of employees is decreasing in both the public and commercial sectors due to staff rationalisation and austerity measures.

In market economies, illegal employment should be viewed in light of foreign workers' immigration caused by the migrant crisis and the significant migration of workers from CEE to Western countries; the major motive of the migrants is improving their financial situation. The EU accession of CEE countries in 2004, 2007 and 2013 enabled freedom of labour movement and stimulated the wave of economic migration from East to West. Most voluntary migrants are working-age adults who increase the labour force in destination countries. Language barriers, regulatory requirements and other factors make it difficult for immigrants to find work (OECD, 2017). This is why addressing undeclared work and the informal economy has risen to the top of development strategies across the relevant supranational and national institutions (ILO, 2015; European Commission, 2016; World Bank, 2019).

One of the major macroeconomic problems caused by the SE and, consequently, an important indicator of this phenomenon is reduction in tax revenues. At the beginning of the transition, the governments in transition economies had to establish efficient revenue collection institutions and adopt new taxation principles that would be in line with the character of the new economic system. It was necessary to improve tax collection which had a direct impact on the size of the SE. The pace of improving tax collection was, however, divergent among transition economies, and, accordingly, the level of collected tax revenues differed significantly from country to country. In that sense, Silvani & Baer (1997) emphasized the importance of the so-called "tax gap" as a "difference between the tax that should be paid and the tax which is collected." Countries with efficient tax collecting institutions tend to have higher tax revenue and a lower tax gap.

In addition, it should be borne in mind that a higher tax burden does not guarantee higher revenue because it reduces the size of the official economy and enhances the growth of the informal sector. As a result, tax revenues eventually start declining. This fall in tax revenues forces governments to an additional increase in tax burden, which, in its turn, leads to a "vicious spiral" in public finances (Aktuna-Gunes et al., 2014). After a while, it would certainly lead to a collapse of the fiscal system and to serious problems in financing government expenditures (e.g. purchasing public services and goods, making capital expenditures, paying pensions, etc.) (Magessi & Antunes, 2015).

In this paper, the authors used the control of corruption as the third indicator of corruption. This indicator presents "the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as the capture of the state by elites and private interests" (Apaza, 2009). Kar et al. (2020) suggest that a large size of the SE is "an outcome of corruption among public enforcement authorities who use state machinery to extract rents from illegal activities in exchange for non-intervention." Such practices also have many negative economic consequences, such as reduced tax revenue, increased illegal trade, and the traps of slow development (Saha et al., 2021). Borlea et al. (2017) also point out that a higher level of corruption leads to a higher level of the SE. Kostakis (2017) goes one step forward, arguing that "corruption and the shadow economy are likely to reinforce each other within low-income economies (they are complements)." Buehn & Schneider (2012) state that these two phenomena could be substitutes or complements. The findings of Bayar et al. (2018) suggest that there is a bilateral causality between the control of corruption and the SE in transition economies. However, based on the literature analysis, it can be concluded that the interconnection between them is very strong in both market and transition economies.

Data and Methodology

The structural model was based on the Partial Least Squares Structural Equation Model (PLS-SEM) to assess the degree and direction in which the relevant factors affect the incidence of the SE in transition and market economies. There are several reasons why this method is common when investigating the SE. The scientific community has been debating for many years the advantages and limitations of the two most commonly used SEM methods: PLS-SEM and covariance-based structural equation modelling, or CB-SEM (Hair *et al.,* 2017; Gadzo *et al.,* 2019; Hair *et al.,* 2011; Rigdon, 2016; Mohamad *et al.,* 2019). The general conclusion is that the PLS-SEM analysis has considerable advantages in comparison to the CB-SEM analysis. The PLS-SEM analysis is considered to be more suitable in the following situations:

1. when the sample size is very small (smaller than 100);
2. when the purpose of a study exceeds the capabilities of the CB-SEM model (especially when the number of indicators representing the latent variable is too large);
3. when the data are not normally distributed;
4. when the purpose of a study is to predict the key target constructs or identify the key "driver" constructs;
5. when research is exploratory, or it is an extension of an existing structural theory;
6. where the data are secondary/archival, particularly for single-item measures.

It can be concluded that there are many situations where the PLS-SEM method is preferred over the CB-SEM. Moreover, some of the PLS-SEM features do not apply to the CB-SEM, including forecasting with consideration of the latent variable scores. In the latter case, the problems of indeterminacy, continuous moderators, and higher-order constructs with only two first-order constructs arise (Hair *et al.,* 2017).

There are, however, some limitations to the usage of the PLS-SEM. The most significant of them are as follows (Mojtahedi & Oo, 2014; Hair *et al.,* 2011):

1. the limited application for theory testing and confirmation because the method does not provide any sufficient global goodness-of-fit measures;
2. the parameter estimates are not optimal in terms of bias and inconsistency;
3. it is not an appropriate method if a study aims at theory testing, confirming or comparing alternative theories.

It should be taken into account that the above-mentioned SEM methods (the CB-SEM and the PLS-SEM) were developed "as complementary, but different statistical methods with distinctive goals and requirements" (Sarstedt *et al.,* 2014). Considering all the arguments discussed above and the type of the research issue, the authors of this study decided to use the PLS-SEM method.

The appropriate theoretical model was designed based on all the above-elaborated factors and indicators of the SE (see Figure 1).

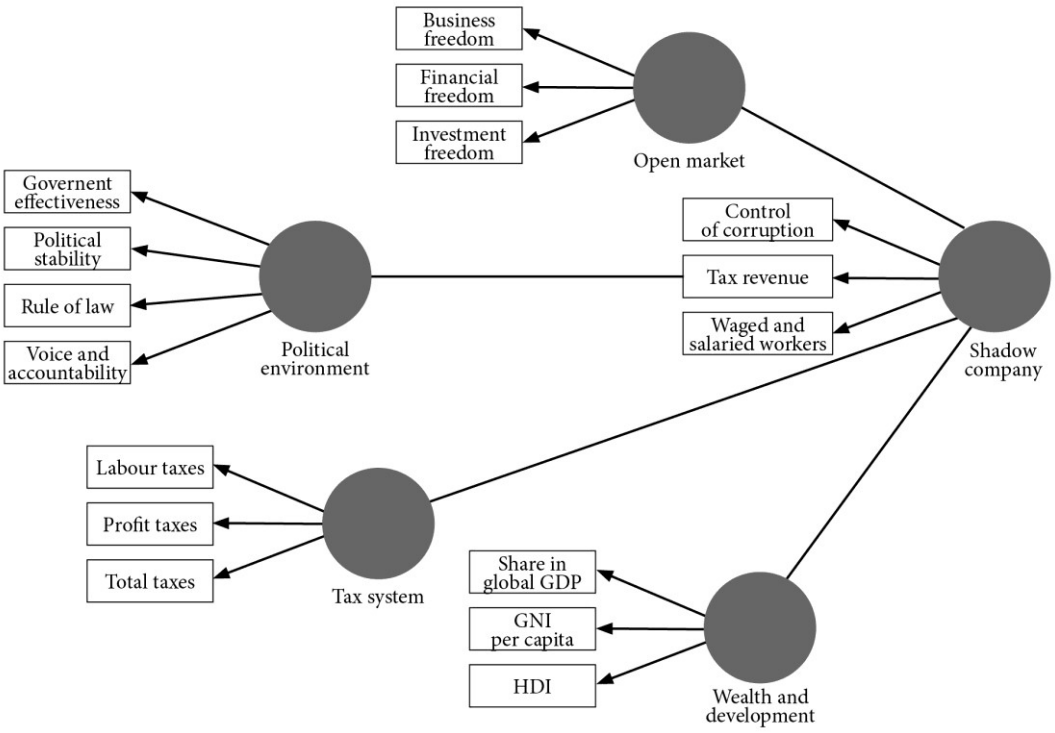

Figure 1. Theoretical Model

When conducting the research, the authors used the data representing the determinants and indicators of the SE over the period 2009–2014 in 19 transition economies (Albania, Belarus, Bulgaria, Bosnia and Herzegovina, Estonia, Croatia, Armenia, Latvia, Lithuania, Hungary, North Macedonia, Poland, Romania, Slovakia, Slovenia, Serbia, Turkey, Ukraine, and Montenegro) and 17 market economies (Austria, Belgium, Denmark, Finland, France, Greece, the Netherlands, Ireland, Italy, Cyprus, Luxemburg, Germany, Norway, Portugal, Spain, Sweden, the United Kingdom). The selection of the countries was made taking into account whether a country was considered a transition economy in the Transition Report 2014 (the last year considered in the research), which is published every year by the European Bank for Reconstruction and Development (2014). Data availability for particular countries was also taken into consideration. The data on the selected indicators were extracted from several databases: the Heritage Foundation Index of Economic Freedom database, the Human Development Report database, the Doing Business database, the World Development Indicators (WDI) database, and the Worldwide Governance Indicators (WGI) database. The period 2009-2014 was selected because it was the timespan when all the countries under consideration experienced a significant economic downturn due to the global economic crisis. Most authors, who investigated the post-crisis period, considered this timespan (Huidumac-Petrescu & Stan, 2019; Miklaszewska & Kil, 2016; Ziolo *et al.,* 2017; Mihai & Oprea, 2015). Also, Schneider (2015) argued that the recovery from the worldwide economic and financial crises started in 2015, contributing to the subsequent economic development and a decrease in the size of the SE.

In such conditions, economies usually suffer from a high level of the SE, and the impact of the SE determinants is significant. This research was conducted separately for transition and market economies to determine the eventual difference in the impact of the factors under consideration.

The Measurement Model

The measurement model was developed to assess the measurement quality as the key prerequisite step when applying the PLS-SEM methodology. Table 1 presents the most common evaluation criteria provided by SmrtPLS 3.3.3 software to evaluate reliability and validity of the construct.

Table 1

The Construct Reliability and Validity Criteria

Constructs	Cronbach's Alpha	CR	AVE
OM	0.852	0.908	0.766
PE	0.953	0.967	0.879
SE	0.796	0.879	0.707
TS	0.956	0.964	0.900
WD	0.958	0.973	0.922

Source: Authors' own calculations

Cronbach's Alpha and Composite Reliability (CR) are both used to determine the reliability of internal consistency. Nannally (1978) states that values higher than 0.7 are considered acceptable for both indicators. Thus, the results presented in Table 1 confirm that all the constructs achieve a satisfactory level of composite reliability. On the other hand, according to Hair et al. (2017), values for CR and Cronbach's alpha above 0.90 (and especially above 0.95) are not desired because they imply that all the variables are measuring the same phenomenon and are hence unlikely to be a valid measure of the construct. Such composite reliability scores are obtained when semantically redundant items are used by rephrasing the same question during the primary data collection. However, when a construct does not contain any semantically redundant items but contains the items that assess quite diverse measures of the construct domain (as in this case when secondary data are used), the high-reliability concerns are unjustified.

The Average Variance Explained (AVE) was employed to assess convergent validity. The data from Table 1 indicate that convergent validity is also achieved, considering that the AVE for all the constructs is above the threshold of 0.5 (Fornell & Larcker, 1981).

Hair et al. (2011) argue that discriminant validity means that a construct measure is empirically distinctive and represents the facts of interest that other measures in the SEM do not capture. A Fornell–Larcker criterion was used for discriminant validity, so the correlations among the latent variables with square roots of AVE, which were estimated for each latent variable, are presented in Table 2.

Table 2

The Correlation among the Latent Variables with Square Roots of AVE

	OM	PE	SE	TS	WD
OM	**0.875**				
PE	0.798	**0.938**			
SE	0.530	0.832	**0.842**		
TS	-0.085	0.029	0.131	**0.949**	
WD	0.666	0.889	0.841	0.079	**0.960**

Source: Authors' own calculations

The Fornell–Larcker criterion argues that the square root of AVE must be higher than the correlation of the construct with all other constructs in the structural model (Fornell & Larcker, 1981). Table 2 indicates that the square root of AVE for all the constructs under consideration is higher than the correlation among the constructs, which indicates that discriminant validity is achieved. As additional evidence of discriminant validity, the values of cross-loadings are presented in Table A1 in the Appendix.

The Results and Discussion

The structural model results, obtained by using the SmartPLS 3.3.3 software, are presented in Figure 2.

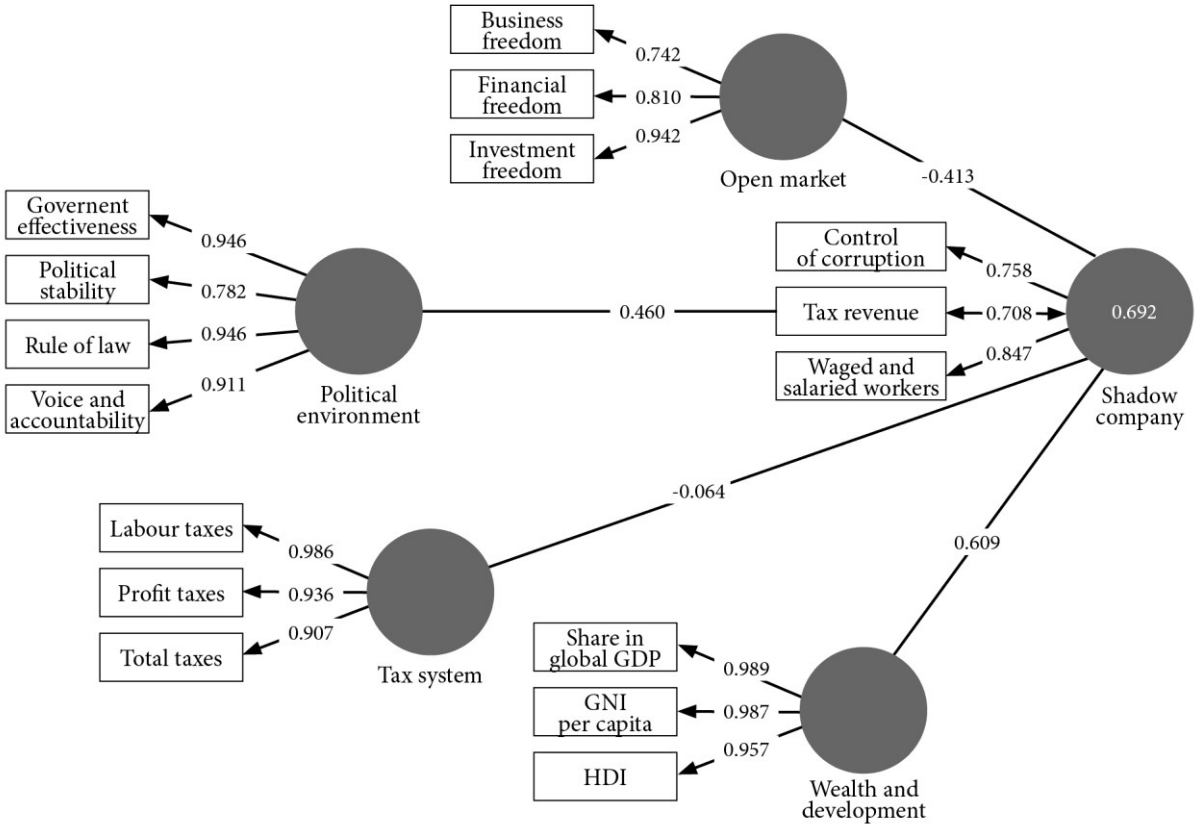

Figure 2. Initial Results of the PLS-SEM Analysis for Transition Economies

Loadings for all the items exceed the usual threshold of 0.7 (Carmines & Zeller, 1979). The path coefficients for the open market and tax system are negative, while the path coefficients for the political environment and wealth and development are positive. The bootstrapping procedure was performed to identify which of these relations are statistically significant. The results for transition economies obtained after bootstrapping are presented in Table 3.

Table 3

Results of the PLS-SEM Model for Transition Economies

Relations	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Open Market (OM) → Shadow Economy (SE)	-0.413	-0.227	0.300	1.374	0.170
Political Environment (PE) → Shadow Economy (SE)	0.460	0.428	0.145	3.179	**0.002**
Tax System (TS) → Shadow Economy (SE)	-0.064	-0.065	0.062	1.032	0.302
Wealth and Development (WD) → Shadow Economy (SE)	0.609	0.623	0.127	4.783	**0.000**

According to the results presented in Table 3, it can be concluded that the relationship between the political environment and the SE, as well as the relationship between wealth and development and the SE are statistically significant with a positive path coefficient. Considering the fact that lower values of the SE indicators represent a larger size of the shadow economy, it can be concluded that an inefficient political environment and low wealth and development result in a larger size of the SE.

The higher path coefficient amounting to -0.609, which indicates the link between wealth and development and the SE, proposes that higher economic development and social well-being lead to a smaller size of the SE. Such results can be explained by the fact that citizens and economic entities in advanced post-Soviet economies are not motivated enough to engage in the SE activities because their income in the formal sector is sufficiently high to achieve a satisfactory quality of living and working conditions, as suggested by Schneider et al., (2010), Quintano & Mazzocchi, (2013), Quintano & Mazzocchi, (2018), Goel & Nelson (2016), Navickas *et al.,* (2019), Luong *et al.,* (2020), etc.

Somewhat lower, but also a positive path coefficient, amounting to 0.460, was obtained to represent the

relationship between the political environment and the size of the SE. This value indicates that improvement in a country's political environment (which implies the rule of law, higher government effectiveness, and a satisfactory level of democracy and political stability) results in a lower level of the SE. It is particularly important for transition countries, considering that the development of a market-oriented institutional and regulatory environment depends on the characteristics of the political environment. These results are similar to those obtained by Luong et al. (2020) who stressed that improving the rule of law and economic development tends to reduce the size of the SE in transition economies.

The relatively high but statistically insignificant path coefficient (-0.413) was obtained for the relationship between the open market and the SE. It means that the greater is the openness of the economy (i.e. less strict regulation of economic activities is applied by the government), the larger is the size of the SE. The results suggest that milder state control over the economy creates a favourable environment for the development of the SE. It is in line with the debate on the validity of the neoliberal economic policy concept launched after the global economic crisis. The majority of authors emphasize the negative aspects of this concept. Thus, the results provide evidence for the political economy theory and indicate that the SE is a result of weak state intervention in the economy, especially in transition countries (Williams, 2020; Williams & Kedir, 2018). It is also opposite to the findings of Navickas et al. (2019) who emphasized that a higher degree of business freedom tends to reduce the size of the SE.

A lower but also negative and statistically insignificant path coefficient (-0.064) was obtained for the relationship between the tax system and the size of the SE. It means that the higher is the tax burden, the larger is the size of the SE.

To identify the direction and intensity of the impact of the latent variables on the SE in market economies and to assess the differences in market economies in comparison to transition economies, the same procedure was performed for the market economies under consideration. The results are presented in Figure 3.

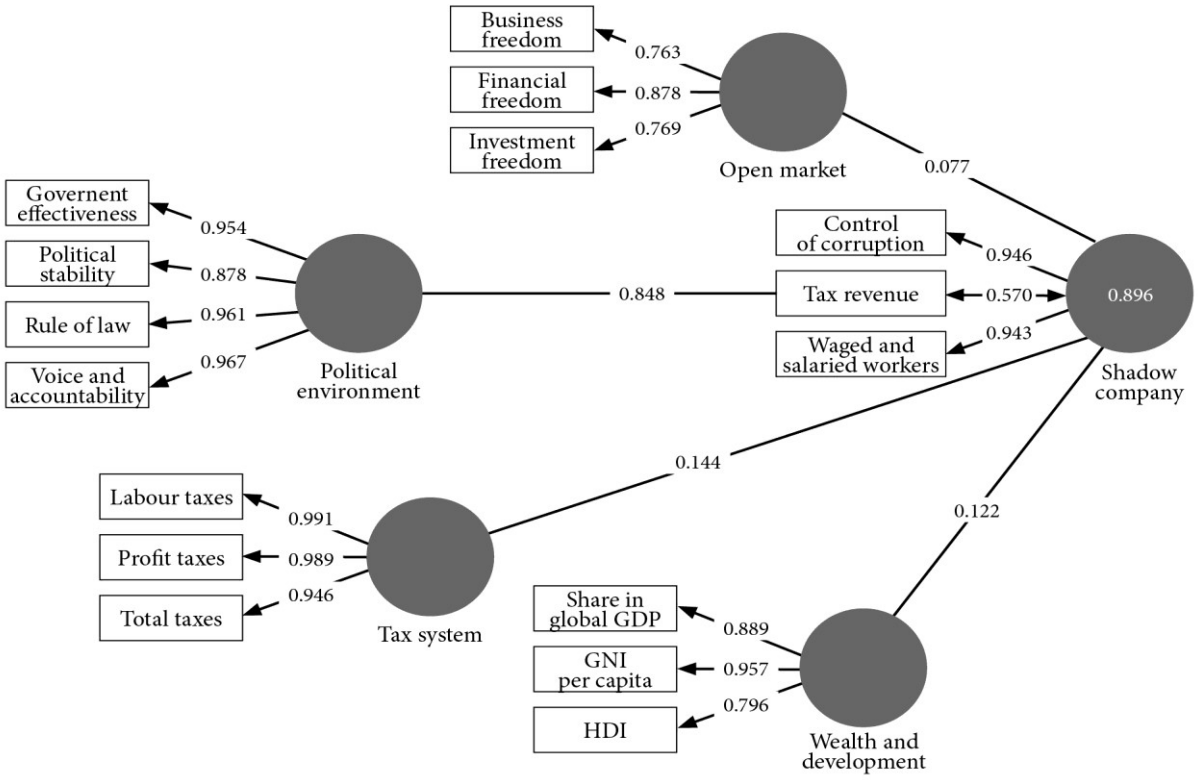

Figure 3. Initial Results of the PLS-SEM Analysis for Market Economies

Figure 3 indicates that most loadings exceed the threshold of 0.7, except for one item (Tax revenue). However, it is retained to support the scale's content validity. Somewhat lower values are not so problematic as long as the construct validity and reliability criteria are met (Benitez *et al.,* 2020). Some authors consider loadings above 0.5 acceptable in such cases (Duarte & Raposo, 2010; Gadzo *et al.,* 2019). Moreover, the threshold should not be so rigid when scales are applied to different contexts (Barclay *et al.,* 1995), like in this case. In contrast to the results obtained for the transition economies, in this case, all of the path coefficients are positive. After the bootstrapping procedure, the appropriate t-values and p-values were obtained to identify the statistically significant relations which are presented in Table 4.

Table 4

Results of the PLS-SEM Analysis for Market Economies

Relations	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Open Market (OM) → Shadow Economy (SE)	0.077	0.084	0.044	1.760	0.079
Political Environment (PE) → Shadow Economy (SE)	0.848	0.840	0.042	20.141	**0.000**
Tax System (TS) → Shadow Economy (SE)	0.144	0.138	0.062	2.305	**0.022**
Wealth and Development (WD) → Shadow Economy (SE)	0.122	0.125	0.039	3.106	**0.002**

The results presented in Table 4 indicate that all path coefficients are positive in the case of market economies. Only the link between the open market and the SE is statistically insignificant. The highest path coefficient (0.848) was obtained for the link between the political environment and the SE, indicating that improvement in a country's political environment tends to promote the formal sector activities. A better regulatory framework, a higher level of government efficiency when implementing a given regulation, the rule of law, and a higher level of democracy certainly create the preconditions for an effective fight against the SE, as was suggested by Goel & Nelson (2016).

It should be noted that a positive regression coefficient was obtained for the link between wealth and development and the SE (0.122). It indicates that economic entities and citizens in the countries with higher levels of wealth and development are less motivated to act in the informal sector, as many authors suggest (Schneider *et al.,* 2010; Quintano & Mazzocchi, 2013; Quintano & Mazzocchi, 2018, Goel & Nelson, 2016).

Contrary to transition economies, market economies tend to have a positive relationship between the open market and the SE (0.077), which indicates that deregulation of economic flows, being one of the key principles for functioning of these economies, diminishes the interest of economic entities and citizens to act in the informal sector. Nevertheless, it should be noted that this path coefficient is not statistically significant, and it is very low.

Finally, it should be noted that a positive path coefficient (0.144) was obtained for the link between the SE and the tax system. It points to the already mentioned fact that a higher tax burden forces economic entities and citizens to be less engaged in the informal sector, even in market economies.

Multi-Group Analysis (MGA)

A multi-group analysis was performed to research the differences between the groups of countries under consideration. Following the concept of Baron and Kenny (1986), group effects represent a moderating effect of a variable whereby the categorical moderator variable expresses membership in each observation group (Henseler et al., 2009). As a result, MGA is commonly considered a special case for modelling continuous moderating effects (Henseler & Chin, 2010; Henseler & Fassott, 2010). The MGA is applied by following the parametric approach to check if the variances of the path coefficients differ significantly across the two experimental groups, as was suggested by Keil et al. (2000).

To minimize the potential misspecification bias and misleading results, invariance testing should be performed before using a multiple-group analysis (MGA) to compare the path coefficients across market and transition economies. Henseler et al. (2016) suggested using the MICOM (Measurement Invariance of Composite Models) method consisting of three steps to find measurement invariance. The steps are as follows:

1. assessing the configural invariance (the same algorithm for both considered groups),
2. assessing the compositional invariance, and
3. assessing the equal means and variances.

This method allows researchers to determine whether the structural and measurement model parameters are equivalent across two or more groups (Sarstedt *et al.,* 2011). It would be difficult to determine whether the analysed differences result from the actual differences if measurement invariance was not established (Hult *et al.,* 2008, p. 1028). Partial measurement invariance is proven when configural and compositional invariance is established. After that, the path coefficient estimates for both groups under consideration can be compared.

Following the MICOM analysis, Table A2 in the Appendix shows that partial measurement invariance is established, which requires comparing groups and testing any significant differences. The results of MGA are presented in Table 5.

Table 5

PLS-MGA Results

Relations	**Path coeff. Transit.**	**Path coeff. Market**	**Path coeff. differ.**	**(WS) p-value**	**(P) p-value**
OM→SE	-0.413	0.077	0.490	0.096	0.113
PE → SE	0.460	0.848	0.388	**0.008**	**0.011**
TS→ SE	-0.064	0.144	0.208	**0.017**	**0.017**
WD → SE	0.609	0.122	-0.487	**0.000**	**0.000**

Source: Authors' own calculations; WS: Welch-Satterthwait; P: Parametric.

Following Mubarak & Petraite's (2020) approach, the statistical significance of the differences observed in the path coefficients, estimated for transition and market economies, is evaluated using the Welch-Satterthwait and Parametric tests. As it can be seen from Table 5, the results of both tests suggest that the only difference in the path coefficients representing the relationship between the open market and the SE is not statistically significant. Such results also contribute to a growing literature body, where authors emphasize that implementing the neoliberal economic policy during the post-crisis period is inefficient when combating the SE in both transition and market economies.

Conclusion

The SE is a problem affecting not only underdeveloped and developing economies. Almost all countries worldwide face it to a greater or lesser extent. Globally observed, the SE began its "take-off" in the 1960s, and it was especially pronounced in 2008, with the escalation of the global economic crisis. The ineffective and inconsistent implementation of transition processes in the former socialist countries created more room for its establishment and expansion. The emergence of the global economic crisis further encouraged citizens and economic entities, particularly in post-Soviet economies, to engage in the informal sector, which has already reached alarming levels in several economies.

The consequences of the SE are unfavourable and are reflected in: developing illegally, social stratification, reduction of public revenues, unfair competition, slowing down the growth of economic activities in the formal sector, etc. On the other hand, if there is anything positive to say about the SE, it can be said that it contributes to reducing social tensions by improving the living standards of the poorest segments of the population and, from an economic point of view, preventing a fall in the profit rate.

The determinants of the SE are also numerous and various. Many authors have attempted to systematize all of the factors contributing to its incidence, but there is no consensus. This paper considers wealth and development, open market, tax system, and political environment as the major determinants of the SE. These determinants are the most common causes of the SE mentioned in the relevant literature and are, therefore, appropriate for this research. The PLS-SEM model, developed for both transition and market economies, revealed that the changes in the political environment that promote wealth and development tend to reduce the size of the SE. On the other hand, the high tax burden and market openness also reduce the size of the SE in market economies but raise it in transition economies. The Multi-Group Analysis (MGA), employed in this study, indicates that only the difference in the path coefficients representing the relationship between the open market and the SE is statistically insignificant.

The SE is not only an economic, but also a political, sociological, psychological, and legal phenomenon. Due to its complexity, combating this negative phenomenon requires a multidisciplinary approach. The government in any country can undertake the whole "arsenal" of various measures and instruments to reduce the SE and bring it within acceptable limits. The efficient fight against the SE requires implementing a long-term strategy to combat this phenomenon. In transition economies, these measures and instruments largely coincide with the reform processes aimed at establishing a market system. They are related to:

- improvement of the business environment by stimulating business start-up and discouraging economic entities from engagement in the informal economic activities,
- creating conditions for development of the market economy,
- establishing an adequate tax system that stimulates socially responsible behaviour of taxpayer; this means settlement of their obligations towards the state (a broader scope, a lower base and the tax rate),
- strengthening social awareness of the harm of the SE,
- raising the level of taxpaying culture among economic entities and citizens,
- modern organising and functioning of the labour market,
- creating conditions for accelerating employment, primarily through entrepreneurship development,
- providing certain benefits to the most vulnerable population groups,
- affirming some modern business principles aimed at reducing the size of the SE, like transparency, legal certainty, property protection, online payment, and, especially, e-commerce to reduce bureaucratic procedures and the emergence of bribery and corruption,
- ensuring responsible work and full implementation of law by the competent state institutions - inspection services, police, prosecution, customs, courts, and alike.

Even market economies are not immune to the SE, but their share of the SE in GDP is much lower than in transition economies. The measures that these economies undertake should be directed towards:

- further development of their online payment systems and promotion of payment cards to make non-cash payments dominant in cash flows,
- wider involvement of professional associations, consumer organizations and NGOs, particularly those that are focused on raising awareness about the negative effects of this phenomenon, in the activities aimed at counteracting the SE,
- monitoring, reviewing and analysing all the challenges that arise in contemporary business due to evolution of new business models; this measure could help prevent any potential of illegal business,
- ensuring tighter international cooperation in terms of benchmarking the positive practices in the area of combating the SE, especially the practices aimed at supporting legal business as an essential precondition for normal functioning of the market economy.

Given the complexity and delicacy of the SE, it should be subject to constant monitoring, review, and analysis by governmental and state institutions. As a result of this process, national governments should establish the efficient and sustainable systems for combating the SE. It should be noted that the SE cannot be eliminated, but it can be reduced to acceptable limits.

Finally, some limitations of this study should be pointed out. The research is limited by unavailability of the data from reliable sources for all European countries. Also, due to some specificities of the COVID-19 pandemic crisis that are not well investigated, some additional determinants affecting the SE in the post-transition period were not incorporated.

APPENDIX

Table A1

Cross-Loadings

Indicators	Open market	Political environment	Shadow economy	Tax system	Wealth and development
Bus_fre	0.862	0.696	0.559	0.012	0.637
Finac_fre	0.876	0.688	0.390	-0.126	0.500
Inv_freed	0.888	0.709	0.400	-0.145	0.586
Government_effectiveness	0.821	0.972	0.815	-0.007	0.868
Political_stability	0.578	0.845	0.699	0.055	0.724
Rule_of_law	0.816	0.976	0.842	0.019	0.899
Voice_and_accountability	0.760	0.952	0.755	0.049	0.833
Tax_revenue	0.204	0.546	0.835	0.286	0.608
Control_of_coruption	0.786	0.875	0.933	-0.052	0.894
WS_workers	0.228	0.542	0.811	0.154	0.563
Labor_tax	-0.159	-0.037	0.054	0.956	-0.006
Profit_taxes	-0.037	0.068	0.065	0.916	0.039
Total_tax	-0.074	0.033	0.170	0.974	0.115
GDP3	0.590	0.805	0.760	-0.010	0.955
GNI4	0.653	0.872	0.838	0.073	0.989
HDI	0.673	0.880	0.825	0.158	0.936

Table A2

Compositional Invariance

	Compositional invariance									
						Equal mean value		Equal variance		
Constructs	Configural invariance	c=1	5% quantile of Cu	p values	Partial measurement invariance	Difference	$Cls_{95\%}$	Difference	$Cls_{95\%}$	Full measurement
Open market	Yes	0.995	0.994	0.063	Yes	1.213	[-0.268, 0.269]	-0.835	[-0.507, 0.488]	No/No
Political Environment	Yes	1.000	0.995	0.164	Yes	1.466	[-0.266, 0.265]	-0.625	[-0.293, 0.282]	No/No
Shadow Economy	Yes	0.998	0.995	0.053	Yes	1.399	[-0.269, 0.273]	0.059*	[-0.369, 0.359]	No/Yes
Tax system	Yes	0.999	0.888	0.924	Yes	0.279	[-0.273, 0.277]	0.196*	[-0.365, 0.352]	No/Yes
Wealth and Development	Yes	1.000	0.999	0.137	Yes	1.628	[-0.263, 0.270]	0.413	[-0.333, 0.326]	No/No

Note. If c exceeds the 5% quantile of Cu, compositional invariance is established
*There are no significant differences in the mean and variance values of the latent variables across the two groups because the original difference value is within the corresponding interval.

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