Analysis of the Shadow Economy in the Czech Republic and a Process Model for its Prevention

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Abstract:

The primary aim of contribution is intended to assess the extent of the shadow economy the Czech Republic and to explain possible sources of inaccuracies in these estimates. A custom estimate of the shadow economy in the Czech Republic will be using the currency demand method, followed by conducting a comparison of the outcomes, and a process model for its prevention will be proposed. This contribution presents an exploration of the shadow economy over the period from 1993 - 2023, with a prediction of the current situation. These findings contribute to enhance the understanding of the shadow economy phenomenon and provide valuable insights for public policy formulation.

Key words:

Shadow economy, currency demand method, currency in circulation, process model, Czech republic

JEL Classification: E26, F41, E41

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1. Introduction

The topic of shadow economy persists decades ago through each country. Along with the new opportunities and challenges in our society is the issue of the shadow economy also developing and advancing. The range of this concept has grown thanks the unreported or illegal activities and currently move to the online world – for example gambling, cryptocurrency transactions (Mara 2021). It is impossible to have just only one exact point of view of the shadow economy. The term covers plenty of economic activities and therefore it is not easy to offer one official definition (Schneider & Enste 2013; Buszko 2018; Slovak Business Agency 2024). Thanks for diversity and divergence, the impossibility of a unified formulation is becoming more and more apparent. It depends for example by the purpose and goals – what kind of issue is identified and could be included into shadow economy. (Tylchyk et al. 2018; Remeikiene et al. 2018; Hošová 2019). Slight differences in the perception of the shadow economy can also relate to national culture – some nationalities accept this kind of economy, other fight against it (Buszko 2018). Nevertheless, it can be concluded that phenomenon of shadow economy is challenge also in the global environment. Economic impacts always go beyond the borders of one country. In the end it influences the main macroeconomic indicators no matter what the level of acceptance of a country is (Cíbik & Mikuš 2022).

Before we talk about the shadow economy, we consider it important to state some classification, or degree of this phenomenon. Slovak Business Agency offer levels of economy below:

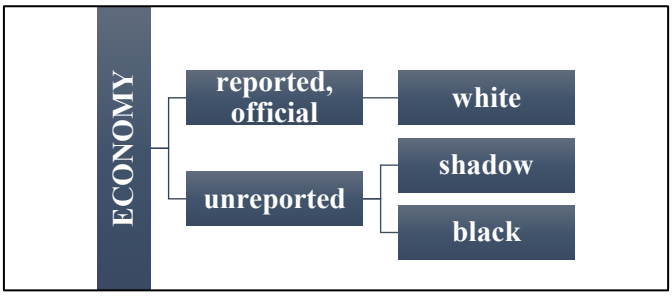

Fig. 1 Levels of economy
Source: The author´s draft based on Slovak Business Agency, 2024

Official economy includes regular activities without any doubts about the law or reports. Shadow and black economy could be included into unreported economy, but black economy has illegal features. This is just for illustration; we suspect that in practice both from unreported activities are complementary and don't work totally separate.

1.1. The Shadow Economy: Definition and Scope

The concept and term of shadow economy encompasses many other terms or expressions, for example *hidden economy, underground economy, shadow economy* etc. (OECD 2017). This summary of the OECD is shared by many other authors, shadow economy on the one side reflects international statistical needs and on the second reflects various economic or scientific studies (Dell'Anno 2016). It is important to note that these approaches are not mutually exclusive but complement each other and offer deeper insights into the topic.

European Commission (2024) use the term informal economy for "all economic activities by workers and economic units that are – in law or in practice – not covered or insufficiently covered by formal arrangements". On the EU level is also applied the concept of undeclared work, which means "any paid activities that are lawful as regards their nature but not declared to public authorities" (European Labour Authority 2024). The term related to non-observed economy is connected to activities that might not be included into data for generate national accounts (United Nations 2008).

Shadow economy can be also characterised as those revenues and incomes, whose want to be hidden, or activities which exclude payments (Fassmann 2007; Gërxhani 2004). Some of them are outright illegal – e.g. human trafficking, drug trafficking. Some of them are legal but contain an illegal element – avoidance of payments. Some of them relate to illegal employment (Hussmanns 2005). What all these activities have in common is that they try to avoid being officially exposed and the government should handle it. (Fleming et al. 1999; Boka & Torluccio, 2013).

1.2. Causes and consequences of shadow economy

The causes of shadow economy may be divided into several categories. The first of them are *economic factors,* where tax burden can be included, as well as the effort to reduce the costs related to the payment of taxes. In addition to economic factors, *legal and legislative factors*, which include, among other thing, the quality of provided public services. The problem may also be the low level of enforceability of the law and unsuccessful government decisions. Legislative framework also plays a role because it is often too cumbersome, bureaucratic and discouraging. *Geopolitical factors* also have their reasons, especially in connection with various crises – ecological, war – and the related employment of foreigners and migrants from the affected areas. (Slovak Business Agency 2024; Buszko 2018; Remeikiene et al. 2018; Kelmanson et al. 2019).

Interesting is also view motivation to work and to report the results in shadow economy – there is some kind of balance between cost and benefits. In this case, by cost is meant the risk of detection and benefits are flowing from saving money on taxes, social insurance etc. (Remeikiene et al. 2018). In addition, the above, we consider the life expectancy as a kind of motivation to avoid paying costs related to employment. For example, people with minimum wage who work in industry or agriculture want on the one had to earn more but pay less in taxes. Therefor they are included among the actors carrying out their activities in the framework of shadow economy. We assume that the weakness around law and higher tax rates, together with bureaucracy, are among the indicators for which individuals prefer to avoid the system. According to the International Labour Organization (2024) shadow economy grows mostly in combination with the high rate of unemployment and assawociated risk of poverty, gender inequality and unpromising job place for the future. A characteristic feature is also that there work uneducated people (La Porta & Shleifer 2014).

Let´s take a deeper look at the most common and obvious motivation – money. According to the World Bank, the topic of shadow economy is also increasingly being raised in tax reports and news. Those involved are aware that they are losing valuable tax revenue from shadow economy actors whose activities don't result in the payment of taxes (Awasthi & Engelschalk 2018). It can be assumed that higher tax rates will result in an increase in the shadow economy. Individuals tend to avoid paying more tax through informal working agreements. This in consequence leads to an increase in informal employment (Shneider et al. 2010; Dokas et al. 2024). The above is supported by the very base of the Laffer curve, which tells us about the appropriate tax rates relative to expected tax revenues. The issue of paying or not paying taxes is also connected to public trust in the tax system or a satisfactory and acceptable business environment (Awasthi & Engelschalk 2018; Alba & McKnight, 2022; Britannica 2024). All these activities have a common feature – they avoid tax and other regulations, statistical reporting including (Achim et al. 2024).

The long-term presence of shadow economy has its negative consequences, for example:

- thanks to the fact that there are less tax revenues in the public budgets, it can limit the supply of public goods and services
- additional public costs and expenditures for social security,

- risk for the employees – lack of insurance, lower income security in the event of retirement due to the lack of payments into the system,
- negatively affect the achievement of macroeconomic goals,
- discourage foreign investors,
- limit economic competition,
- support other illegal activities, risk of the low moral level of society (OECD 2017; Williams 2018; Schneider & Asllani 2022; Eilat & Zinnes 2002).

There are several ways on how to reduce these practices, on the one hand preventively, for example through education. If this strategy doesn't work, there remains on the other hand a reactive action – punish the pursuit (Schneider 2004).

2. Aim and Methods of measurement of shadow economy

The shadow economy encompasses various informal, unreported, and often illegal activities that fall outside traditional measurement methods, unlike standard transactions that are properly documented and accounted for. It is essential to note that no universal method exists to accurately quantify the size of the shadow economy due to the complexity of capturing it. Therefore, we are compelled to seek additional data sources outside of official statistics to improve comprehension of its consequences.

Primary aim of contribution is intended to assess the extent of the shadow economy the Czech Republic and to explain possible sources of inaccuracies in these estimates. A custom estimate of the shadow economy in the Czech Republic will be using the currency demand method, followed by a comparative analysis of the results, and a process model for its prevention will be proposed.

There are several approaches to measuring the shadow economy, each with its own advantages and disadvantages. The choice of a specific method or combination of methods depends on the measurement objectives—whether to gather data in terms the number and characteristics of persons involved in the shadow economy or to obtain more detailed information about businesses, their main activities, number of employees, income generation, and capital formation.

The main methods for measuring the shadow economy can be classified into categories:

- **Direct Methods:** These gather data directly from individuals and businesses involved in the shadow economy.
- **Indirect Methods:** These use analytical techniques and estimates to infer the size and characteristics of the shadow economy.
- **Model Approaches:** These apply econometric and mathematical models to predict the extent and development of the shadow economy based on various input variables and assumptions (Schneider, Klinglmair 2004).

Each of these approaches provides a different perspective on the shadow economy and can be adapted to meet specific research needs. For our research, we chose to use an indirect method, specifically the currency demand method (monetary method) in the Czech Republic. Indirect methods, also known as "indicator approaches," differ from direct methods in that they are based on a macroeconomic approach, analyzing the impact of various indicators concerning the development of the shadow economy over time. Their main advantage is that they use data not originally collected for measuring the shadow economy, thus avoiding the influence of the observer's subjective assessment. These methods can estimate long-term trends in the size of the shadow sector; however, due to the nature of this approach, they cannot provide information about qualitative changes.

After estimating the size of the shadow economy, the results of the method will be analyzed in detail. Comments will be included on potential causes of deviations from reality, and a comparison with estimates from other authors and measurement statistics for the Czech Republic will be conducted. This will take into account factors that may affect measurement accuracy and differences between individual studies. In conclusion, the authors will identify and visualize the fundamental elements of the Global Model for Shadow Economy Prevention Management, as a means of tackling the shadow economy within the specific conditions of the country.

2.1. Research questions

1. **What are the primary drivers of the shadow economy in the Czech Republic, and how do they evolve over time?**

Evaluation: Confirmed. The article identifies economic factors (e.g., tax burden, unemployment), legal factors (e.g., bureaucratic inefficiencies), and geopolitical factors (e.g., crises) as key drivers. It also shows how these factors evolve, particularly during economic transitions, crises, and policy changes (e.g., VAT adjustments, EU accession).

2. **How does the size of the shadow economy in the Czech Republic fluctuate in response to macroeconomic conditions and policy changes?**

Evaluation: Confirmed. The article demonstrates that the shadow economy fluctuates significantly in response to economic cycles, tax reforms, and crises (e.g., the 2008 financial crisis, COVID-19 pandemic). For example, the shadow economy peaked during the 2002 tax reforms and the 2022 inflation surge.

3. **What role does cash circulation play in the shadow economy, and how has it changed over time?**

Evaluation: Partially Confirmed. The article confirms that cash remains a significant medium for shadow transactions, but it also notes the growing role of digitalization. While cash circulation has increased, the article suggests that digital payments are becoming more prevalent, though cash still dominates in certain sectors.

4. **How effective are preventive measures in reducing the shadow economy, and what are the key components of a successful prevention strategy?**

Evaluation: Confirmed. The article proposes a Global Model for Shadow Economy Prevention, emphasizing economic, political, legal, and social measures. It highlights the effectiveness of reducing tax burdens, improving public services, and enhancing legal frameworks, as seen in the decline of the shadow economy during stable economic periods**.**

Evaluation of the research questions:

Most research questions were **confirmed** by the article's findings, as it provides detailed analysis of the shadow economy's drivers, fluctuations, and consequences in the Czech Republic. The article also confirms the effectiveness of preventive measures and the applicability of the currency demand method, while acknowledging its limitations. Confirms that, cash remains a significant medium for shadow transactions, but it also notes the growing role of digitalization. While cash circulation has increased, the article suggests that digital payments are becoming more prevalent, though cash still dominates in certain sectors. The article too confirms that the shadow economy fluctuates significantly in response to economic cycles, tax reforms, and crises (e.g., the 2008 financial crisis, COVID-19 pandemic).

2.2. Calculation of an estimate of the size of the shadow economy using the currency demand method between 1993 and 2023 for the Czech Republic

The currency demand method assumes that transactions within the shadow economy are primarily conducted in cash to evade the scrutiny of authorities. It presumes that the ratio of currency to demand deposits remains stable over time, and any deviations from this ratio are interpreted as changes in the size of the informal sector.

This method relies on identifying a reference year in which the shadow economy was minimal or nonexistent. The ratio of currency in circulation to non-term deposits from that year is then used as a benchmark to compare data for subsequent years. It is assumed that this ratio remains stable within the formal economy, so any increase in the ratio in later years indicates growth in the informal sector.

To determine the size of the shadow economy, it is also necessary to consider the velocity of money turnover, which, according to the authors of this method, is assumed to be the same as in the official economy. The estimate of the informal sector thus includes all informal activities, including those that may already be partially counted in official GDP (Slovak Business Agency 2024).

The currency demand method was chosen because of its relative simplicity, since the determination of the base year is not problematic in the case of the Czech Republic. Fassmann (2007) identifies this year as 1993, when monetary separation occurred. The choice of 1993 was not motivated by the assumption of a zero informal sector, but rather by the assumption that the natural ratio of currency in circulation to demand deposits at that time accurately reflected the needs of the official economy. The data for this method are obtained from the statistics of the Czech National Bank and the Czech Statistical Office, which are considered reliable and suitable for further use.

2.3. Methodology and calculation

The application proceeds in several steps, which will be described in detail here. The first of these is the determination of a basic ratio between the amount of currency in circulation C and demand deposits D. The values of demand deposits D as well as of the monetary aggregate M1 are used from the official statistics of the Czech National Bank. The values of the quantity of currency in circulation C are calculated as the difference between the monetary aggregate M1 and the demand deposits D. The base year, the so-called reference year, must then be determined. The ratio C/D is called the base ratio. Thus, in the case of the Czech Republic, it is 1993 and its value is 22%. In the second step we determine the year or period in which we want to calculate the size of the grey economy, the example of 1994 will be given. We denote the ratio of currency in circulation to demand deposits in this year by C^{1994}/ D^{1994}. C^{1994} represents the amount of currency needed for both parts of the economy, so it contains the "natural" amount of currency in 1994, $C^{1994}*$, and the currency needed for the informal sector, $C^{1994}{}_S$ ($C^{1994}= C^{1994}*+ C^{1994}{}_S$). A subsequent comparison with the baseline C/D ratio and the ratio in the survey period C_{1993}/ D_{1993} yields $C^{1994}*$, which represents the amount of currency needed for the official sector in the survey period. The next step is to find the velocity of money circulation in the official sector, which is assumed to be the same as in the informal sector. The values of officially measured GDP are obtained from the official statistics of the Czech Statistical Office. The V^{1994} money velocity is calculated as the ratio of the size of GDP to M1. We then determine the amount of currency needed for the shadow sector $C^{1994}{}_S$ given by the difference between the total amount of currency in 1994 C^{1994} and the amount of currency needed for the official sector $C^{1994}*$. The size of the grey economy SE is the product of the quantity of currency in the grey sector $C^{1994}{}_S$ and the velocity of money turnover V^{1994}. The

final step is to determine the share of the grey economy in the official GDP of SE* and its year-on-year increases Δ SE. (Schneider 2002)

This approach allows quantifying the grey economy on the basis of money demand, based on the assumption that excess demand for cash may indicate activities outside the formal economy. Table 1 below shows the calculations of the grey economy from 1993 to 2023 in the Czech Republic.

Table 1 Calculating the size of the grey economy using the currency demand method

	C	D	C/D	C*	M1	GDP	V	C_s	SE	SE*	Δ SE
1993	51	232,0	22	51	283,0	1144,6	4,0	0	0	0	0
1994	76,8	348,1	22,1	76,6	424.9	1376,1	3,8	0,2	0,76	0,05	5,75
1995	79,5	269,7	29,5	59,3	349,2	1607,6	3,8	20,2	76,7	5,80	5,80
1996	97,8	349,3	28,0	76,8	447.1	1840,6	4,1	21	86,1	4,68	4,63
1997	104	314,9	33,0	69,3	418.9	1982,4	4,7	34,7	163,1	8,23	3,55
1998	104,3	299,7	34,8	65,9	404.0	2168,9	5,4	39,0	210,6	9,71	1,48
1999	129,2	318,6	40,6	70,1	447.8	2267,3	5,1	59,1	301,4	13,29	3,58
2000	135,0	362,7	37,2	79,8	497,7	2399,7	4,8	55,2	264,9	11,04	-2,25
2001	141,0	442,6	31,9	97,4	583,6	2591,5	4,4	43,6	191,8	7,40	-3,64
2002	260,7	581,0	44,9	127,8	841,7	2704,5	3,2	132,9	425,3	15,73	8,33
2003	269,1	695,1	38,7	152,9	964,2	2833,2	2,9	116,1	336,7	11,88	-3,85
2004	287,1	739,2	38,8	162,6	1026,3	3087,8	3,0	124,4	373,2	12,08	0,2
2005	319,3	843,5	37,9	185,6	1162,8	3288,5	2,8	133,7	374,4	11,38	-0,7
2006	376,8	948,9	39,7	208,8	1325,6	3530,3	2,7	168,0	453,6	12,84	1,46
2007	399,1	1127,5	35,4	248,1	1526,6	3856,6	2,5	151,0	381,0	9,88	-2,96
2008	453,0	1221,9	37,1	268,8	1674,9	4037,6	2,4	184,2	444,9	11,01	1,13
2009	446,7	1325,1	33,7	291,5	1771,8	3945,5	2,2	155,2	345,4	8,75	-2,26
2010	564,0	1457,7	38,7	320,7	2021,7	4032,9	2,0	243,4	486,8	12,07	3,32
2011	602,2	1547,6	38,9	340,5	2149,8	4095,4	1,9	261,7	497,2	12,14	0,07
2012	634,1	1702,1	37,2	374,5	2336,3	4118,4	1,8	259,6	467,3	11,35	-0,79
2013	653,7	1860,6	35,1	409,3	2514,3	4169,0	1,6	244,4	391,0	9,37	-1,98
2014	729,2	2074,1	35,2	456,3	2803,3	4377,9	1,5	335,9	503,9	11,51	2,14
2015	802	2299,2	34,9	505,8	3101,2	4651,8	1,5	296,2	443,3	9,53	-1,98
2016	835	2587,7	32,3	569,3	3422,7	4843,0	1,4	265,7	371,9	7,68	-1,85
2017	792	2981,4	26,6	655,8	3773,4	5179,3	1,4	136,2	228,5	4,41	-3,37
2018	855,7	3102,9	25,6	682,6	3958,6	5475,8	1,4	173,1	242,3	4,42	0,01
2019	919,9	3210,3	28,7	706,3	4130,2	5888,8	1,4	213,6	299,0	5,01	0,59
2020	1050,4	3747,3	28,0	823,5	4797,7	5828,3	1,2	226,9	272,3	4,67	-0,34
2021	1115,5	3941,6	30,9	867,2	5057,1	6307,8	1,2	248,3	298,0	4,72	0,05
2022	1194,3	3604,8	33,1	793,1	4799,1	7049,9	1,5	401,2	601,8	8,54	3,82
2023	1201,9	3783,0	31,8	832,3	4984,9	7618,6	1,5	378,6	567,9	7,45	-1,09

Source: Czech National Bank – ARAD (M1, D) 2024. Czech Statistical Office (GDP), 2024. The author's resources, 2024

Abbreviations in the table stand for:

C- total circulating capital in the economy, contains the amount needed for both the official and the informal sector, expressed in billions of CZK,
D- non-term demand deposits, in billions of CZK,
C/ D- ratio of total current assets to non-term deposits, expressed in %,
C*- currency needed in the official economy, calculated as the product of the benchmark ratio of 0.22 and non-term deposits for the year, in billions of CZK, in % of total deposits,

M1- monetary aggregate, comprising currency in circulation and non-terminated deposits, calculated as an average for the year, in billions of CZK,
GDP- gross domestic product for the year, calculated using the expenditure method, in billions of CZK,
V- velocity of money turnover, calculated as the ratio of GDP to monetary aggregate,
Cs- the amount of currency needed for the informal sector, in billions of CZK,
SE- size of the grey economy, calculated as the product of the amount of currency in the informal sector and the money turnover rate, in billions of CZK,
SE*- the ratio of the size of the shadow economy to GDP, expressed in %,
Δ SE- year-on-year difference in the share of the shadow economy in GDP, expressed as % of GDP

3. Results

As we can see, the size of the grey economy in the Czech Republic has fluctuated from 0.05% to 15.73% of GDP. There may be several reasons for this considerable fluctuation. The first is possible measurement errors, which may be caused by the assumptions of the chosen method itself, which may not always correspond to reality. The currency demand method has not escaped criticism; it has been accused of assuming a zero size of the grey sector in the base year. However, this assumption can be considered fulfilled in the case of the Czech Republic according to Fassmann (2007) for the reasons mentioned above.

The second is the changes brought about by the transition process. After 1993, the table shows that the informal sector grew until 1999, when it reached 13.29% of GDP. According to Kaufmann and Kaliberda (1996), the positive side of the existence of the informal sector is precisely the mitigation of the "transition shock" and the maintenance of a functional economy, since during this period laws and other tax and social regulations change frequently, and production costs increase sharply. It is thus a kind of "entrepreneurs' school", which can bring considerable improvement to the formal economy once it is registered in the formal sector. A third cause of fluctuations in the size of the shadow economy may be changes in the economic cycle. The table shows that the peak in 1999 was followed by a decline until 2002, when the informal sector grew to 15.73% of GDP, the maximum for the observed period. In this year we can also observe a significant year-on-year change (Δ SE), which was at the level of an increase of 8.33%. The year-on-year changes are mainly related to fluctuations in cash flows and to external economic factors such as crises or periods of growth. In this year, the Czech Republic experienced an increase in the tax burden and mandatory social security contributions. This adjustment was related to the harmonization of VAT with EU standards. Following the country's accession to the EU in 2004, it became necessary to align the tax system with European regulations, resulting in an increase of the reduced VAT rate from 5% to 9%. The unemployment rate was high during this period, especially in 2003 at 7,8 %.

Another significant year-on-year change (Δ SE) can be observed in 2010 with a 3.32% increase in the shadow economy. These changes were due to the global economic crisis, which significantly affected the economic growth of both sectors. In response to the economic crisis, the Czech government made significant tax adjustments. In 2010, the standard VAT rate was increased from 19 % to 20 % and in 2012 the standard VAT rate was increased to 21 % and the reduced rate to 15 %. The crisis also led to a rise in unemployment, which peaked at 7.3% in 2010. Rose (1992) argues that the grey economy is a kind of "social pillar" that replaces a lot of people's lost jobs in times of crisis, implying that the size of the shadow economy increases in crisis years, which is consistent with the above results. This share of the size of the grey economy in GDP as a percentage of GDP over the last 20 years in the Czech Republic is also shown in Graph 1.

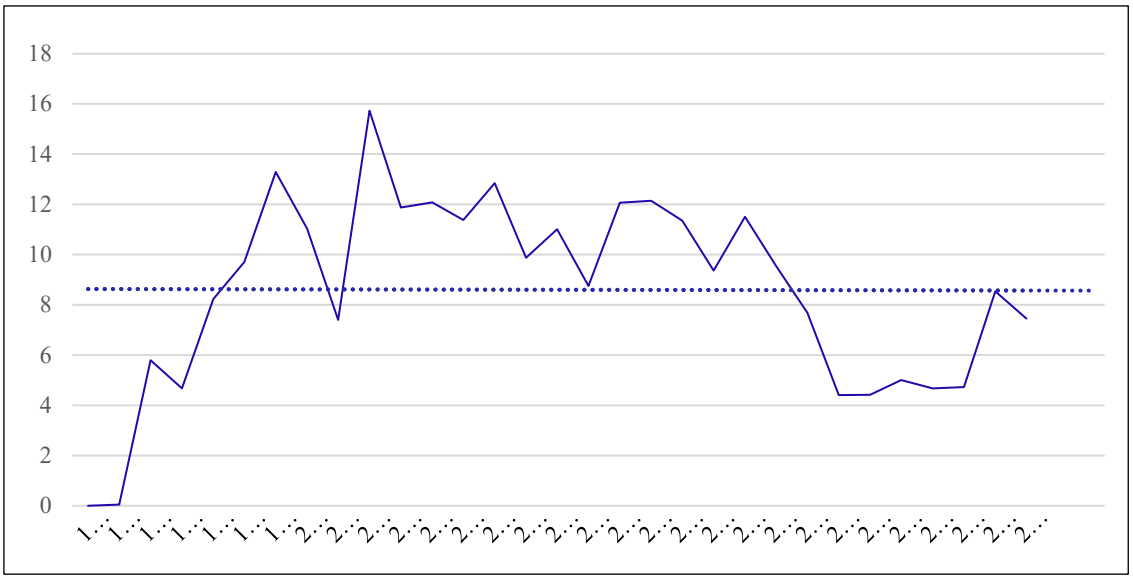

Fig. 2 The Share of the Size of the Gray Economy in GDP in %

Source: Own processing, 2024

Between 2015 and 2021, we observe a reduction in the share of the shadow economy in GDP, reaching one of the lowest percentages (4.41%) in 2017. This reduction is directly related to the improvement of the economic environment and measures to reduce informal employment in the Czech Republic. Special measures related to the pandemic in 2020 such as - subsidies for businesses, special financial support for individuals and especially public investment in infrastructure, which led to GDP growth and at the same time to stabilization in the labor market, also contributed to the decline. During the pandemic, the unemployment rate did rise slightly (2.6%), but not as significantly as in other EU countries. The VAT rate for some sectors, such as catering, accommodation, culture and sport, was also reduced to 10% in 2020 to support these sectors during the COVID-19 pandemic. Changes were also introduced to excise duties on alcohol and tobacco.

When compared with OECD estimates, we find that the development in the Czech Republic follows the overall OECD trend, where the average share of the shadow economy has fallen from 21% in 2003 to 14.98% in 2019. However, this decline was temporarily disrupted by the COVID-19 pandemic, which caused the share of the shadow economy to increase to 16.48% in OECD countries in 2020, while a similar phenomenon can be observed in the Czech Republic, where the share of the shadow economy increased between 2020 and 2021. This increase reflects the OECD findings that there was an increase in shadow economic activities due to the pandemic due to limited access to formal employment and increased economic hardship. The economic hardship is also reflected in the increase in the % share of the shadow economy in the Czech Republic in the year-on-year change of 3.82% in 2022.

In 2022, the share of the grey economy rose again to 8.54%. The Czech Republic has experienced significantly elevated inflation due to several factors, including the energy crisis, supply chain disruptions and the impact of the Russian invasion of Ukraine. These factors have led to high price increases, especially for energy, food and other basic necessities. The average annual inflation rate in the Czech Republic reached 15.1% in 2022, according to the Czech Statistical Office, the highest since the 1990s. This increase in significance also affected the amount of cash flows in the Czech economy and therefore the demand for cash. The evolution of the Czech currency's currency in circulation from 2003 to 2023 is illustrated in Chart 2. Cash

circulation is the circulation of cash, i.e. the circulation of banknotes and coins, which can be collectively referred to as currency in circulation (M1).

Fig. 3 Total Annual Growth Rates M1
Source: Czech National Bank, 2024

The value of currency (all current and commemorative banknotes and coins) totalled CZK 711.9 billion as of 31 December 2020 and increased by a record CZK 67.5 billion during the year. So far, the highest annual increases in circulation were recorded in 2016 by CZK 46.6 billion and in 2008 by CZK 45.5 billion. Current assets have been consistently increasing in the Czech economy, averaging 5.25% annually over the last 10 years (Duchacek 2020). In principle, there are only two exceptional situations in this long period that have led to a more progressive growth of the circulating stock due to the reaction of the public and other money market actors to unexpected crisis events - the second half of 2008 (subsequently, the circulating stock declined to its usual trajectory) and the first half of this year in the context of the Covid-19 pandemic.

However, the evolution of circulation over the last 10 years points to the fact that cash continues to have a significant role in the economy and thus will not disappear immediately. Although some experts and analysts speculate that cash is slowly on its way out as more and more people use cashless payments as digitisation progresses, the network of payment terminals and self-service zones at merchants expands, and commercial banks reduce the number of branches with teller windows, replacing human labour with deposit/recycling ATMs. Although the number of non-cash payments is growing more progressively than the number of cash payments, the value of currency is also steadily increasing, and in the Czech Republic, according to (Duchacek 2019) Director of the CNB's Money Circulation and Banknote and Coin Issuance Section, it is still the case that cash is not king. Cash (meaning ATM withdrawals) accounted for 54% of the total value of "payments" by cards in 2019. In the Czech Republic, only partial surveys of the payment behaviour of the population have been conducted and these have basically confirmed that the payment behaviour of the population in the Czech Republic does not deviate from the payment behaviour of our closest neighbours such as Slovakia, Austria, Germany, Poland.

But why is the amount of currency in circulation increasing in the era of the development of cashless payments? Cash is popular in the Czech Republic not only as a means of payment, but also as a store of value. The popularity of cash is supported by its anonymity, immediate payment execution and higher confidence in its stability. Ducháček (2019) also points to the influence of facts such as higher incomes, demographics and crisis situations (inflation) that affect the preference for cash savings.

The problem of the shadow economy has persisted for decades, and it is necessary to eliminate the conditions that facilitate the growth of the shadow economy. To eliminate these conditions, we can use the proposed model of grey economy prevention, which is illustrated in the following chapter.

4. Model for Managing Shadow Economy Prevention

Prevention and elimination of the grey economy is a test for every government, including the government of the Czech Republic. Since its complete elimination is unrealistic, the primary goal becomes mitigating the negative impacts of the shadow economy and ensuring effective prevention. This objective implies a multidimensional approach to the management of prevention by state representatives. It is a coordinated system of measures in the political, legal, economic and social spheres. A prerequisite for the implementation of effective measures to reduce the grey economy is an understanding of the scope and methods of unofficial economic activities within the country.

The aim the Global Model for Shadow Economy Prevention Management is to create an abstraction that allows an understanding of the basic elements of the prevention process and their interaction. This model can be a methodological tool and an information source for the development of policies and strategies in the conditions of democratic countries. The process of preventing the shadow economy It comprises a set of four interconnected subprocesses. To illustrate the overall complexity of the system—without going into detail—a global process model has been developed by the authors of this contribution.

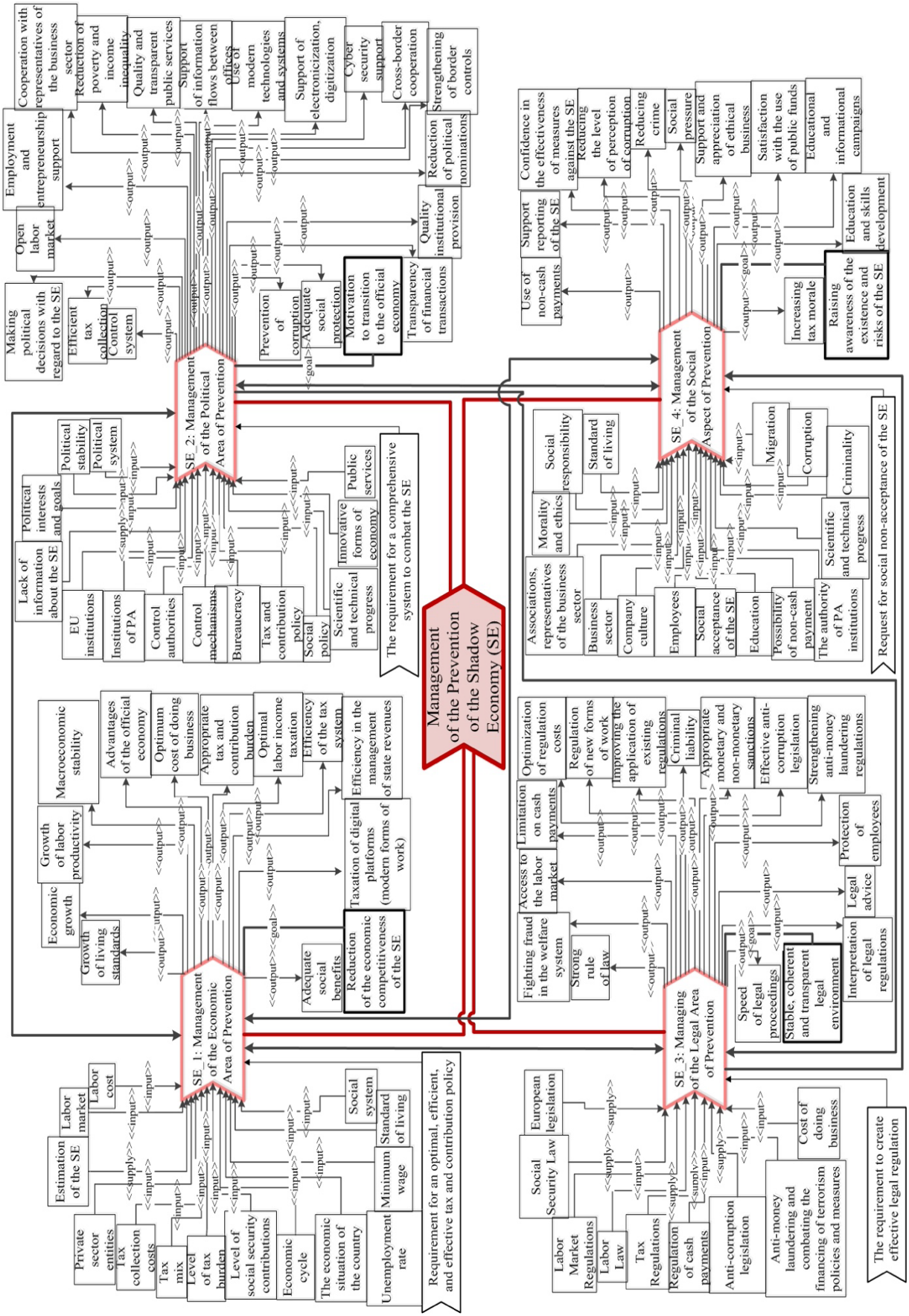

Fig. 4 The Global Model for Shadow Economy Prevention Management
Source: Own processing, 2024

Management of Shadow Economy Prevention consists of SE_1 Management of the Economic Area of Prevention, SE_2 Management of the Political Area of Prevention, SE_3 Management of the Legal Area of Prevention, and SE_4 Management of the Social Aspect of Prevention. According to H. Eriksson, each of these sub-processes has its own model elements: According to Řepa (2012), a system comprises events, information, inputs, outputs, and goals. The global model illustrates a network of subprocesses and their interrelationships, where the outputs of one subprocess serve as inputs to another.

Preventive measures effective in combating the shadow economy are a complex issue. State measures in the political sphere focus primarily on improving the quality of public administration institutions and services, enhancing effective control, and promoting transparency, digitalization, and electronic processes. State measures in the political field are mainly oriented towards improving the quality of public institutions and public services, effective control, promoting transparency, digitisation and electronification. In the economic area, measures aim at improving the country's economic situation, reducing unemployment, ensuring the adequacy of the tax and contribution burden, and creating an attractive business environment. The legal area of prevention includes labour regulation, protection of employees, reduction of corruption and criminality. The last social aspect focuses on education and the social unacceptability of the shadow economy. When the entire system is functioning effectively, there is a transition of entities from both economies.

5. Discussion and Conclusions

Measuring the size of the shadow economy and analyzing its impact on the official economy presents numerous challenges, although some progress has been achieved. This paper demonstrates that, despite the difficulties, estimating the size of the shadow economy is feasible. Using various methods, such as the currency demand approach, valuable insights can be gained regarding the size and development of the shadow economy.

The contribution highlights the variability of the size of the shadow economy in the Czech Republic over the years and its sensitivity to macroeconomic conditions. Over the years, there have been significant changes in the estimated size of the grey economy in the Czech Republic, with peaks around 2002 (CZK 425.3 billion) and a resurgence towards the end of the period, especially in 2022 (CZK 601.8 billion). Significant increases and decreases in the shadow economy coincide with economic cycles, including the financial crisis in 2009 and the pandemic in 2020, or inflation in 2022. Although this method is based on the assumption that transactions in the informal sector are made only in cash, which may be a disadvantage in today's digitalised world, it provides a useful picture of the evolution of the grey economy estimate, as cash still accounts for a significant share of all payments in the Czech Republic, which can be seen in the increase in currency circulation over the last 20 years.

Overall, the resulting analysis shows that in the Czech Republic is sensitive to macroeconomic factors and its share in GDP has been gradually declining, except during some turbulent periods, which may be indicative of more effective government interventions and better control of the grey economy. Based on this analysis, the paper recommends strengthening preventive measures and continuing to modernise control mechanisms to maintain the downward trend in the share of the shadow economy in GDP, which contributes to the overall economic stability of the country.

In the future, the authors plan to address the sectoral focus of the shadow economy in the Czech Republic and the Slovak Republic. The illustrated global process model will be further

expanded to include specific conditions for the prevention of the grey economy in these countries.

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