

Reducing the Shadow Economy through Electronic Payments



Contents

Executive summary	1
Introduction	6
1 The shadow economy and its types	8
1.1. Definition of the shadow economy	9
1.2. Possible causes and potential consequences of the shadow economy	11
1.3. Passive and committed shadow economy	13
2 Shadow economy in Central and Southern Europe	16
2.1. Our approach to the estimation of the shadow economy	17
2.2. Analysed countries and data sources used	20
2.3. Estimated size, structure and sectorial breakdown of the shadow economy	25
3 Limiting the shadow economy through the promotion of electronic payments	34
3.1. Identified determinants of the passive shadow economy	35
3.2. Selected regulations and their impact on the shadow economy	37
3.2.1. Obligation to make an electronic payment of wages and salaries	39
3.2.2. Obligation to make an electronic payment of social security benefits	42
3.2.3. Threshold for cash payments	46
3.2.4. Obligation to possess cash registers	49
3.2.5. Obligation to operate POS terminals for selected types of businesses	52
3.2.6. Tax incentives for consumers	56
3.2.7. Tax incentives for merchants	62
3.2.8. Receipt lotteries	67
Conclusions	70

Executive summary

The shadow economy and its types

- ▶ The shadow economy is a complex phenomenon that can have various causes and consequences. The European Commission defines it as the non-observed part of the economy, comprising: (1) illegal activities where the parties are willing partners in economic transactions, (2) hidden and underground activities where the transactions themselves are not against the law, but are unreported to avoid official scrutiny, and (3) informal activities where typically no records are kept. Under this definition, the shadow economy can be approximated by unreported transactions made by both unregistered and registered entities.
- ▶ A high level of the shadow economy has significant economic and social implications. Its adverse consequences include: a reduced tax base, lower quantity and/or quality of public goods, distortions in market competition, the degradation of economic and social institutions, and – through these channels – lower economic growth. While the shadow economy may also have some advantages, it is evident that they are significantly outweighed by a wide range of negative consequences of unreported activities. Therefore, it is important to seek tools and solutions that might effectively reduce the shadow economy.
- ▶ A very important common factor for most types of shadow economy is that cash payments allow the seller not to report the transaction. With only a few exceptions, if an electronic payment was used instead of cash, it would hardly be possible not to register the transaction. Consequently, in this Report we focus on measuring unreported consumer cash transactions that should approximate the size of the shadow economy.
- ▶ We analyse the shadow economy in eight Central and Southern European countries: Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Poland, Serbia, Slovakia, and Slovenia. We have adopted an innovative approach to the measurement of the shadow economy, based on a combination of four different estimation methods: currency demand analysis, labour market analysis, multiple indicators multiple causes model, and sectorial structure analysis. Our approach exploits the strengths and limits the weaknesses of each of these methods. In particular, we address a number of methodological issues that seem to have led to an overestimation of the shadow economy in some other studies.
- ▶ The shadow economy related to unreported cash transactions can be divided into two categories, each requiring different measures. The first component is the part of the shadow economy that can be reduced by promoting electronic payments and limiting the use of cash in consumer transactions. Since cash payments leave no electronic trace, it is relatively easy to avoid reporting them. Cash payments can therefore be the cause of shadow economy activity, as they provide an incentive not to report the transaction and evade tax payment. We define this part of the shadow economy as the “passive shadow economy”, because one side of the transaction (the consumer) is “passive” in the sense that he/she does not benefit from not reporting the transaction, and may not even be aware that he/she is contributing to the expansion of the shadow economy through the cash payment.
- ▶ The second category is the remaining part of the shadow economy, where it is not cash payments that influence the decision not to report the transaction, but rather the motivation of both sides of the transaction to benefit from evading tax liabilities or to sell/buy illegal products or services. In this situation, cash payments are (usually) still required to hide the transaction, but it is no longer the source (or cause) of the illegal activity, but rather its consequence. We define this part of the shadow economy as the “committed shadow economy”, because in this case both sides of the transaction are “committed” to using cash in order not to report this transaction and to benefit from a lower price stemming from evaded tax payments.
- ▶ Since the passive shadow economy is caused by cash payments, it could be reduced either through actions promoting electronic payments, or through other measures aimed at increasing the share of cash transactions being registered. However, the promotion of electronic payments would not influence the behaviour of the committed shadow economy participants, who would continue to use cash payments in order to benefit from not reporting the transaction. Therefore, this part of the shadow economy has to be addressed with other measures, e.g.: increasing the labour inspections at building sites, introducing more restrictive penalty sanctions for counterfeiting of excise products, etc.

Executive Summary

The Shadow Economy in Central and Southern Europe

- ▶ Among the analysed countries, we estimate that in 2014 the total shadow economy (the sum of unreported consumer cash transactions) was most prevalent in Bosnia and Herzegovina (25.5% of GDP) and Serbia (20.7% of GDP). On the other hand, the smallest shadow economies relative to GDP were in the Czech Republic (11.3%), Poland (12.4%) and Slovenia (12.5%).
- ▶ The analysed countries differ in terms of the share of passive and committed components in their shadow economy. In particular, the Czech Republic is the country with by far the highest share of the passive (90.6% in 2014) and, consequently, the lowest share of the committed component (9.4%). By contrast, Bulgaria and Croatia record a relatively high share of the committed shadow economy (39.2% and 32.1% in 2014, respectively). Despite these differences, for all the countries the passive component accounts for a vast majority of their unregistered economy.
- ▶ The most important role in the passive shadow economy is played by the sector supplying food, beverages and tobacco. This conclusion applies to all of the analysed countries. On average, this sector accounts for 39.6% of the total passive shadow economy. The sector that ranks second, in terms of its contribution to the size of the passive shadow economy, differs among the analysed countries. It is fuels for vehicles in Bosnia and Herzegovina (9.4% of the total passive shadow economy), Bulgaria (9.4%) and Serbia (8.6%); the restaurants, bars and cafes sector in Croatia (8.7%), the Czech Republic (12.5%) and Slovakia (9.7%); and the sector of cars and motorcycles with related services and repairs in Poland (9.4%) and Slovenia (15.2%). Other sectors that have a relatively high share in the total passive shadow economy in the analysed countries comprise transport as well as clothing and footwear.
- ▶ The passive shadow economy may entail serious consequences, one of them being lost government revenues, which range from 1.6% of GDP (Slovenia) to 4.2% of GDP (Bosnia and Herzegovina). This revenue shortage does not account for the whole tax gap in the analysed countries. One reason is that the committed component of the shadow economy also includes unreported transactions that otherwise would be taxed. Another reason is that government revenues are also reduced because of tax fraud/ evasion mechanisms that often take place within registered transactions (one example being missing trader fraud), many of which are even paid electronically. Still, the estimated budgetary effects of the passive shadow economy are high enough to show that potential benefits from addressing this issue can be significant.

Limiting the shadow economy through the promotion of electronic payments

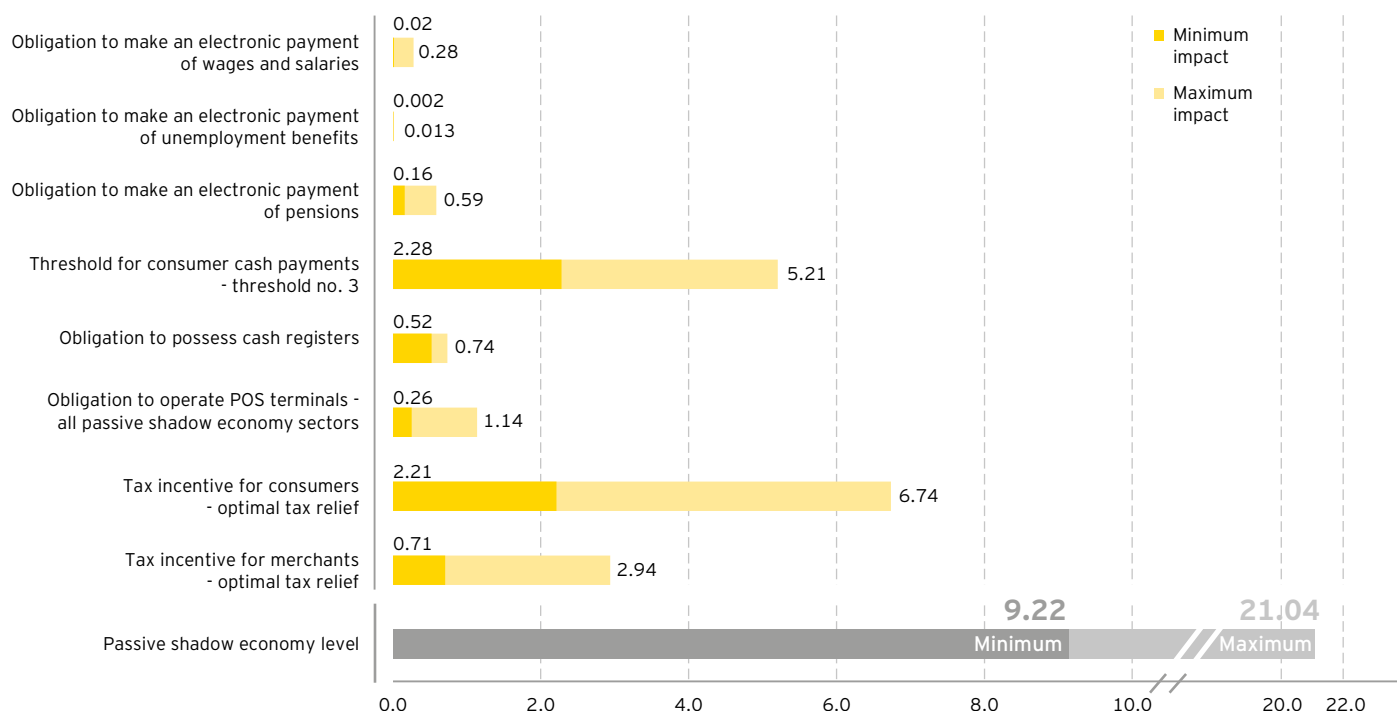
- ▶ Factors that turn out to have a significant impact on the level of the passive shadow economy include: the popularity of card payments, the ratio of taxes to GDP, and institutional and tax morale in a given country. These factors differ significantly in terms of policymakers' ability to influence them. For example, an improvement in institutional and tax morale may require a government to introduce many, often difficult, reforms, which may additionally take a long time. It is also not easy to significantly reduce the burden of tax and social security contributions. On the other hand, public policies leading to an increase in the popularity of non-cash payments seem relatively easier to implement. Consequently, in this study we analyse various regulations that, by replacing cash with electronic payments, or by increasing the share of registered consumer cash transactions, may lead to a reduction in the shadow economy. Many of the considered solutions are already present in other countries around the world. Some of them are based on enforcement or obligation mechanisms, whereas others focus on providing incentives, either to consumers or merchants. They include:
 - ▶ **Obligation to make an electronic payment of wages and salaries.** The requirement to make an electronic payment of wages and salaries would result in a situation in which people, who previously received their remuneration in cash, would have to make an additional effort to use it, e.g. through ATM withdrawals. Therefore, they should more often perform their transactions using payment cards, and less frequently in cash. This, in turn, should contribute to the reduction of the passive shadow economy by 0.02% of GDP (Serbia) to 0.28% of GDP (Poland). An increase in the number of reported activities should, in turn, lead to an improvement in government revenue by 0.003% of GDP (Serbia) up to 0.051% of GDP (Poland).
 - ▶ **Obligation to make an electronic payment of social security benefits.** The mechanism of this regulation is analogous to the obligation to make an electronic payment of wages and salaries. The potential reduction of the shadow economy resulting from this measure varies between 0.002% of GDP (Bosnia and Herzegovina, for a regulation limited to unemployment benefits) and 0.59% of GDP (Poland, for a regulation covering the payment of pensions). In terms of the impact on government revenues, the strongest effect has been estimated for the Czech Republic - at the level of 0.12% of GDP (for the electronic payment of pensions).
 - ▶ **Threshold for consumer cash payments.** This regulation introduces a threshold for a single transaction above which consumer cash payments are not allowed. Consequently, consumer cash transactions above this level should disappear

and be replaced with additional electronic payments, thereby reducing the size of the passive shadow economy and increasing government revenues. The effect of this regulation depends significantly on the threshold level – the lower it is, the more cash transactions would be replaced with card payments, and the more the passive shadow economy would contract by. The strongest impact of the regulation on the shadow economy has been estimated for Bosnia and Herzegovina and for Serbia, while the weakest effect has been estimated for Slovenia. Establishing high thresholds for consumer cash payments would have little, if any, impact on the passive shadow economy.

- ▶ **Obligation to possess cash registers.** This regulation obliges a wide group of businesses to use cash registers or related fiscal devices in order to record every individual transaction, regardless of the means of payment. The process of introducing cash registers, often described as the process of fiscalisation, is intended to provide a mechanism for the tax administration to supervise the records in cash turnover and to monitor and detect non-compliance. In the Report, we calculate the potential benefits of the fiscalisation reform for the Czech Republic and Slovenia, which had not yet introduced this measure at the time of conducting this study. For these two countries, the potential reduction in the passive shadow economy amounts to 0.52% and 0.74% of GDP, respectively. An estimated increase in the Czech government revenues equals 0.13% of GDP, slightly exceeding the effect for Slovenia (0.12% of GDP). An additional analysis (due to limited data availability, conducted for Poland only) shows that an increase in the ratio of the number of cash registers to the number of active enterprises by 0.1 leads, on average, to a decrease in the passive shadow economy by 0.326 percentage points of GDP.
- ▶ **Obligation to operate POS terminals for selected types of businesses.** This regulation obliges businesses in certain sectors to operate point of sale (POS) terminals that enable customers to make card payments. The impact of this regulation on the size of the passive shadow economy is the highest for relatively large sectors and sectors where “saturation” with POS terminals is relatively low. The estimated effect on the shadow economy contraction ranges from 0.26% (Bulgaria) to 1.14% of GDP (the Czech Republic). The analysis of the impact on budgetary revenues includes the scenario in which the cost of financing each new POS terminal is incurred by the government. In this case, the net effect of the regulation on government revenues remains positive for all the countries and varies between 0.01% of GDP (Bulgaria) and 0.27% of GDP (the Czech Republic).
- ▶ **Tax incentives for consumers.** This regulation consists in providing financial incentives to consumers, e.g. in the form of a cash-back awarded to card payments. For every country we find a different optimum level of such intervention to maximise the difference between the additional revenues and the costs incurred by the government. The effect of this regulation seems to be particularly powerful, with the impact on the passive shadow economy contraction between 2.2 % of GDP (for Slovenia) and 6.7% of GDP (Bosnia and Herzegovina), and the effect on net government revenues ranging from 0.1% of GDP (Slovenia) to 0.63% of GDP (Czech Republic). This kind of consumer incentive may be introduced through various mechanisms, many of which allow the government to reduce the incurred costs, but at the same time also lower the potential benefits in terms of crowded out cash payments.
- ▶ **Tax incentives for merchants.** Tax incentives decreasing the cost of accepting card payments by merchants may stimulate the growth of the POS terminals network and electronic payments, thus leading to a reduction in cash payments. Similarly to the regulation providing an incentive to consumers, we estimate a different optimum level of tax relief for merchants for each country. The effect of this regulation, both on the contraction of the passive shadow economy and the increase in government revenues, is the strongest for Serbia (2.9% of GDP and 0.25% of GDP respectively). For Slovenia, the costs of this measure always outweigh the benefits, and thus the recommended solution is not to implement the regulation in this country.
- ▶ **Receipt lotteries.** The idea of receipt lotteries is to reduce the passive shadow economy by limiting unreported transactions through the increased issue of receipts in business-to-consumer transactions. Specifically, consumers are provided with an incentive to ask for a receipt, as it may also serve as a free-of-charge ticket in VAT lotteries, therefore giving its holder a chance to win attractive prizes. In the longer perspective, this measure aims to get consumers used to asking for fiscal receipts. It is often assumed that, after a certain period of time, people will develop such a habit (e.g. by making asking for receipts socially acceptable and desirable, or by raising awareness of the benefits of combating the shadow economy), and will therefore continue to demand fiscal receipts even without such an additional monetary incentive. In our research, we found that receipt lotteries seem to have some positive impact on card payments (and through that channel also on the passive shadow economy), though no quantitative conclusions on the strength of this impact can be drawn.

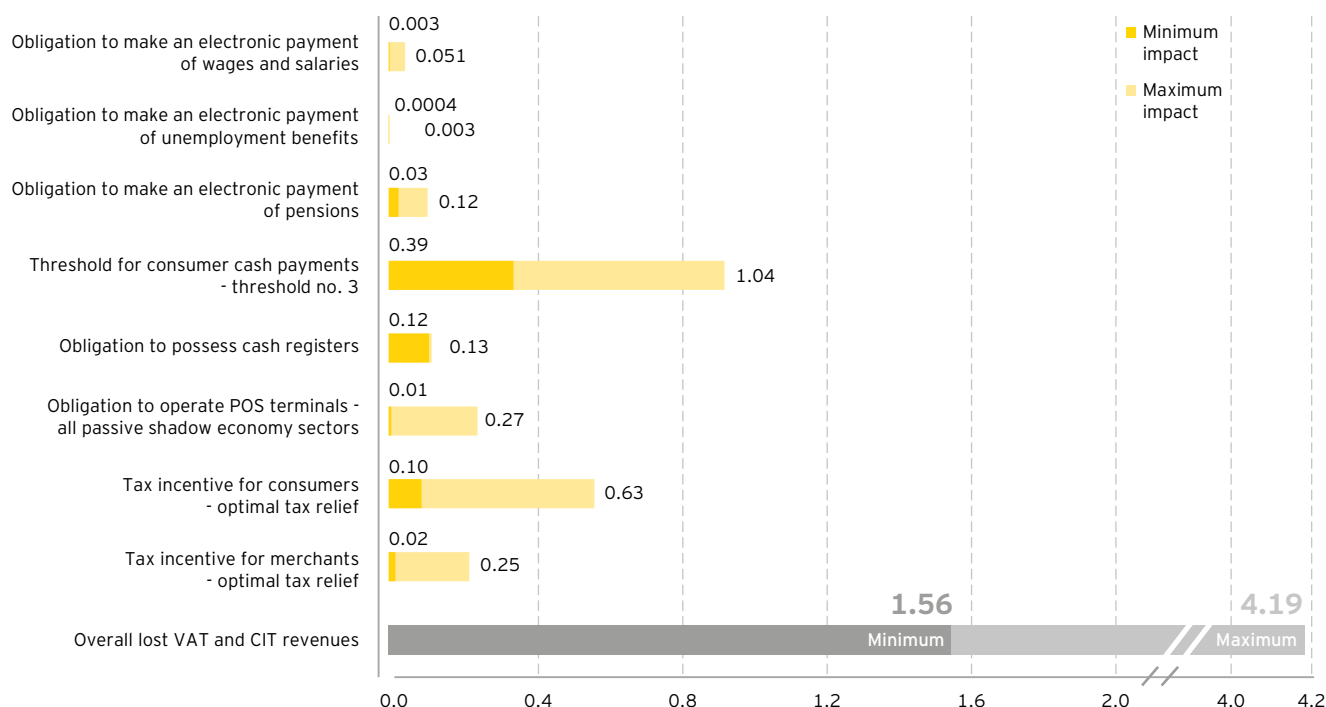
Executive Summary

Chart 1. Summary of the impact of the analysed regulations on the passive shadow economy, compared to the passive shadow economy level (% of GDP).



Source: EY

Chart 2. Summary of the impact of the analysed regulations on the government VAT and CIT revenues, compared to the overall lost VAT and CIT revenues due to the passive shadow economy (% of GDP).



Source: EY

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- ▶ The effects of the analysed regulations turn out to be highly country-specific and depend on such features of the analysed markets as the share of cash vs. card payments in the overall consumer transactions, the share of cashless payments in GDP, the size of the passive shadow economy and the effective tax rates. Despite these differences, we have shown that for every analysed country an increase in the popularity of electronic payments may be an important measure in addressing the problem of unreported activities. For example, an increase in the value card payments by 100% should lead to a reduction of the shadow economy in the analysed countries by 0.6-3.7% of GDP, and to an increase in government revenues by 0.1-0.8% of GDP.
 - ▶ Each of the presented measures should be regarded as one of many possible variants of a given type of regulation. Since these solutions may be modified in terms of their scope, timing and other parameters, their actual impact would change accordingly and will depend on the final decision of the regulators. Consequently, the measures analysed in this study should not be treated as recommendations, but rather as examples illustrating the effects of the potential regulations that may be considered by policymakers in their attempt to address the issue of the passive shadow economy.

Introduction



The shadow economy is a complex phenomenon that can have various causes and consequences. The literature uses many definitions of non-observed or shadow economy, with different authors often focusing on different aspects of this issue. The European Commission defines the non-observed economy as comprising: (1) illegal activities where the parties are willing partners in an economic transaction, (2) hidden and underground activities where the transactions themselves are not against the law, but are unreported to avoid official scrutiny, and (3) informal activities where typically no records are kept. Under this definition, the shadow economy can be approximated by unreported transactions made by both registered and unregistered entities.

A high level of the shadow economy has significant economic and social implications. Its adverse consequences include: a reduced tax base, lower quantity/quality of public goods, distortions in market competition, the degradation of economic and social institutions, and - through these channels - lower economic growth. While the shadow economy may also have some advantages, it is evident that they are significantly outweighed by a wide range of negative consequences of unreported activities. Therefore, it is important to seek tools and solutions that might effectively reduce the shadow economy. However, since there is no single measure that would address all the causes of the non-observed economy, such solutions should be tailored to the specifics of activities leading to the expansion of a given part of the shadow economy. In this respect, it is also recommended to distinguish between incentive mechanisms and obligation instruments.

Our approach is based on the observation that a common factor for most types of the shadow economy activities is that it is cash payments that allow the seller not to report the transaction. With only a few exceptions, if an electronic payment was made instead of cash, it would hardly be possible not to register the transaction. Nevertheless, as we show further in the Report, the motivation to use cash by either side of the transaction varies with the type of activities, which in turn require different solutions. In this study, we propose to distinguish the “passive” component of the shadow economy, where consumer cash payments are the cause rather than the result of unreported activities and consumers are often unaware of contributing to the expansion of the shadow economy. Importantly, this component of unregistered activities may be reduced through the promotion of electronic payments to crowd out consumer cash transactions. Other measures aimed at increasing the share of registered consumer cash payments may also help to address this issue.

While the relation between cash payments and the shadow economy has been broadly discussed in the literature, the influence of payment practices (including the popularity of electronic payments) on the non-observed economy has rarely been investigated in the empirical research. Our Report aims to fill this gap.

In this study we analyse the shadow economy in eight Central and Southern European countries: Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Poland, Serbia, Slovakia, and Slovenia. Our critical contribution consists in investigating the potential of different regulatory measures to reduce the size of the shadow economy in these countries through the promotion of electronic payments.

The Report has the following structure:

In Chapter 1, based on a review of the literature, we briefly discuss the various definitions of the shadow economy, together with the possible causes and potential consequences of this phenomenon. We also point to the fact that the impact of non-cash payments on the non-observed economy has rarely been investigated in empirical research. In order to fill this gap, we introduce a division of the non-observed economy into: (1) the passive shadow economy (where cash payments are the cause) and (2) the committed shadow economy (where cash payments are the consequence). We argue that only the first component may be reduced through the promotion of electronic payments, while the latter should be addressed with other measures (e.g. labour inspections).

In Chapter 2, we explain our approach to the estimation of the overall level of the shadow economy, the level of the passive shadow economy and its evolution over time. Moreover, we estimate the sectorial breakdown of the passive component, which is our other contribution to the shadow economy literature. Next, we discuss the selected characteristics of the analysed countries and various data sources used in the research. Finally, we present the obtained shadow economy estimates for the selected countries.

In Chapter 3, we focus on the measures aimed at limiting the shadow economy. First, we present the econometrically identified determinants of the passive shadow economy and their quantitative impact on the unreported cash transactions. In particular, we discuss the relation between the value of card payments and the size of the passive shadow economy. Second, we analyse the potential impact of introducing different regulatory tools on replacing consumer cash payments with card payments and, through this channel, on the contraction of the shadow economy. The resulting increase in the value of reported transactions is then translated into additional government revenues, adjusted for potential costs that a given regulation may entail. This kind of analysis, to our knowledge, has not yet been done in the literature. The final chapter concludes.

For each of the analysed countries, a separate report has been prepared, providing more insight into the specifics of a given country, including a more detailed description of the considered regulations and assessment of their economic impact.

The results of various calculations presented in the Report are discussed in greater detail in the appendices to this study¹.

This study was commissioned by MasterCard and was conducted independently by EY.



¹ The Report, technical appendices and individual country reports are available on: <http://www.ey.com/pl/electronic-payments>.



1

The shadow economy and its types

1.1. Definition of the shadow economy

The literature uses many definitions of the non-observed or shadow economy, with different authors focusing on slightly different aspects of the phenomenon. For instance, Schneider, Buehn and Montenegro² define the shadow economy by focusing mainly on the reason for the shadow economy to exist, i.e. the willingness of individuals and businesses to avoid taxes or regulations:

“(…) the shadow economy includes all market-based legal production of goods and services that are deliberately concealed from public authorities for any of the following reasons:

- (1) to avoid payment of income, value added or other taxes,
- (2) to avoid payment of social security contributions,
- (3) to avoid having to meet certain legal labour market standards, such as minimum wages, maximum working hours, safety standards, etc.; and
- (4) to avoid complying with certain administrative procedures, such as completing statistical questionnaires or administrative forms.”

This definition excludes illegal activities, which is not always the case in the literature. One of the most important (and relatively recent) definitions including illegal activities has been provided by the European Commission in a document with guidelines for the system of national accounts in the European Union (ESA 2010)³. The Commission uses the term non-observed economy, which comprises:

- ▶ Illegal activities where the parties are willing partners in an economic transaction (e.g. drug selling);
- ▶ Hidden and underground activities where the transactions themselves are not against the law, but are unreported to avoid official scrutiny (e.g. unreported part of revenues to avoid taxation);
- ▶ Activities described as ‘informal’, typically where no records are kept (e.g. households that occasionally let rooms, non-registered teaching assistants, etc.).

This definition excludes those illegal activities where at least one of the parties is not a willing participant (e.g. theft), as they are not economic transactions. It also excludes household and domestic services provided by members of households for their own consumption (e.g. cooking for a spouse), since it is difficult to assign to them a specific monetary value (they are generally excluded from the national account system, e.g. from GDP calculations).

The scope and coverage of the shadow economy analysis in this Report is largely consistent with the quoted definition of the European Commission. It is illustrated by Chart 1.1, showing that the shadow economy is approximated by unreported transactions, which are made by both registered and unregistered entities. A very important common factor for all types of shadow economy is that it is cash payments that allow the seller not to report the transaction. With only a few exceptions (such as e-commerce, online bookmakers or bartering), if an electronic payment was made instead of cash, it would hardly be possible not to register the transaction. Consequently, in our approach we focus on measuring unreported consumer cash transactions that should well approximate the size of the shadow economy⁴.

One should also note that if the estimated cash transactions were reported, it would translate into higher government revenues due to the improved tax collection (not least from CIT and VAT)⁵. However, this is not to say that eliminating the thus-defined shadow economy would at the same time eliminate the whole tax gap⁶. Chart 1.1 shows that tax fraud or tax evasion are also possible with registered transactions, paid either in cash or electronically⁷. One example is the missing trader fraud, where a transaction is reported, an invoice is issued, payment is made, but the seller “disappears” without paying its VAT liability. The fact of registering the transaction may, therefore, not suffice to ensure tax collection. In order to address such issues, additional measures have to be adopted that, however, are beyond the scope of this Report.

² Schneider F., Buehn A., Montenegro C. E., “Shadow Economies All over the World: New Estimates for 162 Countries from 1999 to 2007”, Policy Research Working Paper, 5356, The World Bank, 2010.

³ European Commission, “European System of Accounts. ESA 2010”, 2013. The definition provided by the European Commission influences the scope and coverage of the shadow economy estimated by national statistical offices. It also constitutes an important reference point for the shadow economy definitions utilised in the research on the non-observed economy.

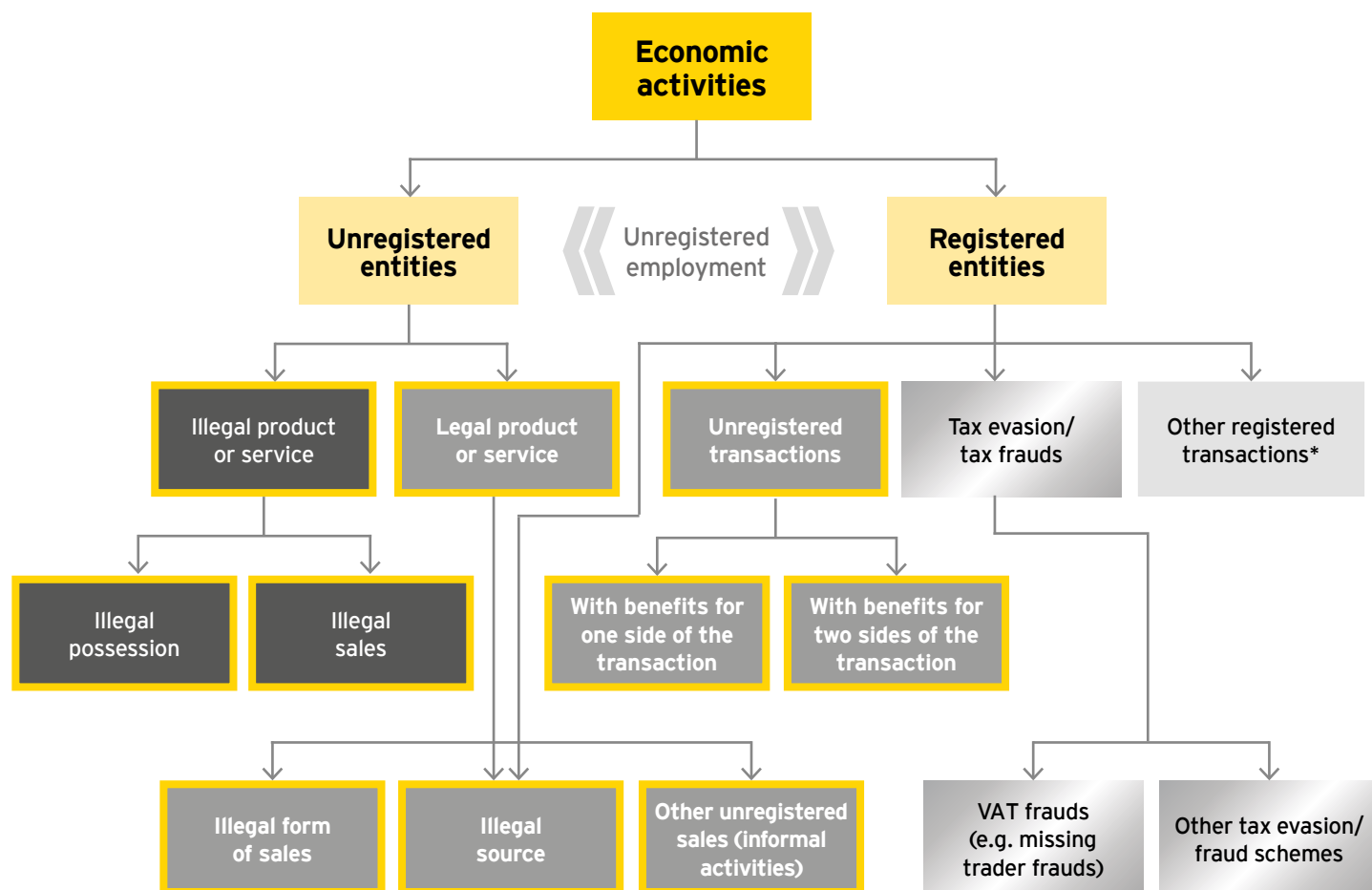
⁴ Since our approach concentrates on cash transactions, it also accounts for the so called “black market” transactions (illegal activities). However, it does not account for those shadow economy transactions that are conducted in the form of a barter (in exchange for other goods and services rather than for money), or with the use of electronic payments.

⁵ The only exception being illegal products and services, which are not taxed anyway.

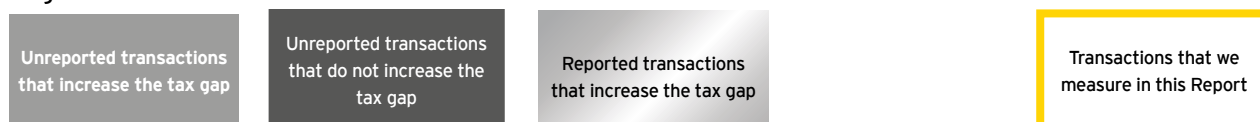
⁶ Various definitions of the tax gap and alternative methods of its measurement are discussed, for example, in Gemmel N., Hasseldine J., “The Tax Gap: A Methodological Review”, Working Paper 09/2012, Victoria Business School, and Raczkowski K., Mróz B., “Tax gap in the global economy”, mimeo, University of Social Sciences, Warsaw School of Economics, September 2015.

⁷ On the VAT gap see, for example, “Study to quantify and analyse the VAT Gap in the EU Member States”, Center for Social and Economic Research, 2015.

Chart 1.1. Different elements of the shadow economy.



Legend:



Notes: Unreported transactions are equivalent of non-observed economy, as defined by the European Commission.

Source: EY

* Other registered transactions may also increase the tax gap, for example, in the case of tax avoidance, the abuse of transfer pricing, non-payment due to insolvency or differences in the legal interpretation of the rules. For more details see, for example, HM Revenue & Customs, "Measuring tax gaps 2015 edition. Tax gap estimates for 2013-14", 2015.

1.2. Possible causes and potential consequences of the shadow economy

The shadow economy is a very complex phenomenon that can have various sources, varying over time and among countries. On the basis of the literature⁸ it is possible to divide the possible causes of the shadow economy into the following categories:

- **Taxes**

Avoiding the payment of income, value added and other taxes is often considered as an important factor driving individuals into the non-observed economy;

- **Social security contributions**

Both employees and employers might be interested in entering the shadow economy by paying less (or none) social security contributions, to increase take home earnings and decrease labour costs, respectively;

- **Administrative**

Registered activity may be hindered by a high burden imposed by administrative rules that generate high costs for businesses and are costly to comply with;

- **Quality of administration and justice system**

A sense of protection by the law, which can be understood as a stable law and effective judicial system, creates incentives to act in the registered economy. Furthermore, increasing the risk of detection discourages individuals from entering the shadow economy. By contrast, a low quality of administration and justice system may be conducive to entering or remaining in the non-observed economy;

- **Economic institutions**

The flexibility of employment contracts, minimum wages and other rules defining the economic environment can either encourage or discourage businesses to operate within the legal framework;

- **Business cycle**

An economic slowdown and reduced opportunity of finding a job in the official sector may encourage workers to enter the non-observed economy;

- **Payment practices and systems**

Cash is easier to hide from the police and other authorities, so transactions that are performed with cash are more likely to be unregistered;

- **Values and moral aspects**

A high level of social capital and trust in other people discourages cheating behaviour, such as activity in the shadow economy, and vice versa;

- **Other subjective factors**

People's general satisfaction from public goods and services can increase tax morale and contract the shadow economy, and vice versa.

Some of the presented causes affecting the size of the shadow economy can be difficult to measure. Consequently, in order to analyse and quantify their effect on the size of non-observed economy, it is necessary to use proper proxies, i.e. observable variables that are assumed to capture the prevalence and intensity of a particular cause of the shadow economy. Therefore, in the further part of our analysis, we use not only the official statistical data, but also the results of surveys and reports concerning such things as public policy quality.

The shadow economy has significant economic and social implications. **The potential adverse consequences** of a (high) shadow economy include⁹:

- **Lower observable tax base**

The shadow economy is associated with a willingness of individuals and enterprises to evade taxation, so an increase in its size means that a larger part of the economy is not covered by the tax system, which leads to a decline in government revenues.

- **Lower quantity and/or quality of public goods**

By decreasing government revenues, the shadow economy negatively impacts the provision of public goods (e.g. public infrastructure);

- **Distortions in competition**

Companies operating in the shadow economy benefit from reducing their costs and thereby increase their competitiveness compared to companies operating exclusively on the official market;

- **Degradation of economic and social institutions**

Lowered tax revenues may force the government to additionally increase tax rates to cover its expenses, which would mostly affect legally operating companies. As a result, many honest companies might be forced to move to the shadow economy or leave the market;

- **Economic growth**

The shadow economy can adversely affect legal economy activity by degrading the quality of economic and social institutions, decreasing the availability of public goods, etc.

⁸ Thiessen U., "The Shadow Economy in International Comparison: Options for Economic Policy Derived from an OECD Panel Analysis", International Economic Journal, vol. 24(4), 2010, pages 481-509.

⁹ For a review of the literature on the consequences of the shadow economy see: Enste D. H., Schneider F., "Shadow Economies: Size, Causes, and Consequences." Journal of Economic Literature, vol. 38(1), 2000, pages 77-114.

In some areas, the effects of the shadow economy are subject to a vigorous debate. For example, some authors present evidence that the shadow economy and corruption are complementary (the larger the shadow economy, the more prevalent is corruption)¹⁰. On the other hand, some claim that the shadow economy can mitigate government-induced distortions¹¹ and work as a substitute for corruption (decreasing its scale).

Another controversial aspect of the shadow economy consequences is related to the labour market. It is likely that some people are only able to find jobs in the shadow economy, especially in a period of economic downturn when the unemployment rate is high¹². In this context, it could be argued that a job in the shadow economy is better than no job. Moreover, even if a person is employed “off the books”, there is some evidence that a vast majority of his or her income¹³ is usually spent on products and services provided by legal businesses. However, such a form of employment entails many risks and costs. People that are unofficially employed most often lack social and legal protection. They may also find it very hard to

develop skills, be promoted, increase their earnings and get a legal employment contract in the future, thus being trapped in the shadow economy^{14 15}. Moreover, the reduced cost of work due to using unregistered employment provides some companies with an unfair competitive advantage over other companies that report their employment and pay all required taxes and social contributions.

The above examples illustrate that, while the shadow economy may have some advantages (controversial though they may be), it is rather evident that they are significantly outweighed by the wide range of negative consequences of the non-observed economy. Therefore, it is important to seek tools and solutions that might effectively reduce the shadow economy and its negative consequences. Such solutions should be tailored to the specifics of activities leading to the expansion of the shadow economy. In particular, one should first investigate the size, dynamics, structure and sectorial breakdown of the shadow economy in a given country.

¹⁰ Dreher A., Schneider F., “Corruption and the shadow economy: an empirical analysis”, *Public Choice*, vol. 144(1), 2010, pages 215-238.

¹¹ Choi J. P., Thum M., “Corruption And The Shadow Economy”, *International Economic Review*, vol. 46(3), 2005, pages 817-836, 08.

¹² Bajada Ch., Schneider F., “Unemployment and the Shadow Economy in the OECD”, *Revue économique*, Presses de Sciences-Po, vol. 60(5), 2009, pages 1033-1067.

¹³ At least two-thirds in case of Germany and Austria. See: Enste and Schneider (2000), op. cit.

¹⁴ Bajada and Schneider (2009), op. cit.

¹⁵ ILO, “Transitioning from the informal to the formal economy”, 2014, pages 1-86.

1.3. Passive and committed shadow economy

While approximating the size of the shadow economy by estimating the value of unreported cash transactions, we distinguish two categories of the shadow economy, each requiring different measures. The first component is that part of the shadow economy that can be reduced by promoting electronic payments and limiting the use of cash. Since cash payments leave no electronic trace, it is relatively easy to avoid reporting them. Cash payments can thus generate shadow economy activity, as they provide an incentive for the merchant not to report a transaction and evade paying tax. The second category is the remaining part of the shadow economy, where it is not the cash payment that influences the decision not to report the transaction, but the motivation of both sides of the transaction to benefit from evading tax liabilities or to sell/buy illegal products/services. The cash form of payment is (usually) still required to hide the transaction, but it is no longer the source of illegal activity.

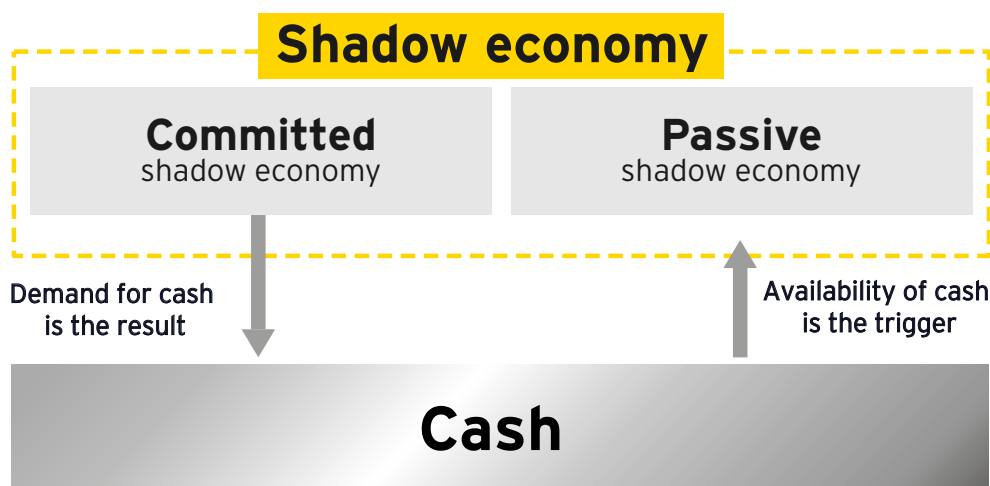
The key differentiating factor between these two components is the causal relationship between cash payments and the shadow

economy. In the first category, cash payments contribute to the expansion of the shadow economy, while in the second component increased cash payments are simply a result of the shadow economy activities. We therefore distinguish situations where:

- cash is a **cause** (or one of the causes) of the shadow economy from situations where
- cash is a **consequence** of the shadow economy

The shadow economy where cash is a **cause** we label as the “**passive shadow economy**”, because one side of the transaction – the consumer, is “passive” in the sense that he/she does not benefit from not reporting the transaction, and may not even be aware that he or she is contributing to the expansion of the shadow economy through the cash payment. The shadow economy where cash is a **consequence** we define as the “**committed shadow economy**” (see Chart 1.2), because both sides of the transaction are “committed” to using a cash payment in order not to report a transaction, and thereby benefit from a lower price stemming from evaded tax payments. Table 1.1 includes a more detailed description and examples of the committed and passive shadow economy transactions.

Chart 1.2. Types of shadow economy with respect to the role of cash.



Source: EY

As this shows, the shadow economy is not homogenous – there are different shades of grey. Therefore, the consequences and measures to limit the shadow economy may also differ depending on its type.

Actions aimed at limiting the **committed shadow economy** should result in a lower demand for cash, and thus lead to the increased use of electronic payments. Nevertheless, measures to reduce the **committed shadow economy** are not related to promoting cashless

payments, and would rather include, for example: increasing the labour inspections at building sites, introducing more restrictive penalty sanctions for counterfeiting of excise products, etc.

In contrast to the committed shadow economy, the **passive shadow economy** is caused by cash payments. Therefore, it could be reduced either through actions promoting electronic payments or through measures increasing the share of cash transactions being registered.

Table 1.1. Differences between the committed and the passive shadow economy.

	Committed shadow economy	Passive shadow economy
Description	<ul style="list-style-type: none"> ▶ Mutual agreement between both sides of a transaction ▶ Each side draws benefits from not reporting the transaction ▶ Associated with both illegal and legal products/services 	<ul style="list-style-type: none"> ▶ Only one side of a transaction is interested in hiding income, whereas the other side is not directly interested in the fraud (and takes no benefit from it) ▶ Consists in underreporting revenues from consumer retail transactions by registered, legally operating entities ▶ Associated with legal products/services
Examples of shadow economy situations	<ul style="list-style-type: none"> ▶ A construction worker and his client agree that the renovation of a flat will be conducted in the shadow economy, i.e. without invoicing and a formal contract. In this way both parties can benefit from not paying taxes (e.g. VAT in the case of a consumer, PIT or CIT in the case of a service-provider) ▶ An employer and an employee agree that the latter will provide services informally, which will allow the company's owner to save on social security contributions, but part of these "savings" will be shared with the employee, who will thus receive a higher payment in net terms 	<ul style="list-style-type: none"> ▶ A consumer pays for a service (for example in a restaurant) in cash. The seller does not register the transaction and does not pay VAT or income tax for the service
Shadow economy trigger	<ul style="list-style-type: none"> ▶ Agreement between both sides of the transaction to benefit from tax evasion or buying/selling illegal products/services. Their behaviour would not be influenced by improved access to electronic payments infrastructure 	<ul style="list-style-type: none"> ▶ Cash payment. If an electronic payment was made, the possibility to not register the transaction would be significantly reduced
Examples of solutions	<ul style="list-style-type: none"> ▶ Labour inspections ▶ Reduction of administrative burden related to compliance with the regulations 	<ul style="list-style-type: none"> ▶ Promotion of electronic payments ▶ Receipt lotteries ▶ Information campaign, e.g. promoting the collection of receipts
Main beneficiaries	<ul style="list-style-type: none"> ▶ Two sides of the transaction (seller and buyer) 	<ul style="list-style-type: none"> ▶ One side of the transaction (seller)

Source: EY

In this Report, we concentrate on solutions related to the development of non-cash payments (e.g. through an increased use of payment cards) as a means of reducing the passive shadow economy. While the relation of cash payments and the shadow economy has been broadly discussed in the literature (it constitutes, among other things, a basis for the currency demand analysis – an estimation method of the size of the shadow economy, see Chapter 3.1), the influence of payment practices (e.g. the popularity of

non-cash payments) on the non-observed economy has rarely been investigated in the empirical research¹⁶. Our Report aims to fill this gap.

¹⁶ Data on electronic payments was used in e.g.: Ardizzi G., Petraglia C., Piacenza M., Turati G., "Measuring the underground economy with the Currency Demand Approach: A reinterpretation of the methodology, with an application to Italy", Review of Income and Wealth, vol. 60(4), 2014, pages 747-772.





2

Shadow economy in Central and Southern Europe

In this section we briefly discuss our approach to estimating the shadow economy and present the obtained estimates for the eight analysed countries: Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Poland, Serbia, Slovakia and Slovenia. The estimates comprise the overall level of the shadow economy, its decomposition into the passive and committed components, their evolution over time and the sectorial breakdown of the passive shadow economy.

More details on the applied methodology and obtained results are presented in Appendix 1.

2.1. Our approach to the estimation of the shadow economy

There are many methods for estimating the shadow economy, as discussed in the economic literature. The most common include:

- **Currency Demand Analysis (CDA)**,¹⁷ which is based on the idea that the currency in circulation (cash) conveys useful information about all (not only officially registered) economic activities;
- **Multiple Indicators Multiple Causes Model (MIMIC)**,¹⁸ which allows the changes of unobservable variables (such as the shadow economy size) over time to be estimated on the basis of their observable causes and consequences;
- **Energy Demand Approach**,¹⁹ which assumes that electric energy is demanded by both official and shadow market entities.

There are also other, less common methods of estimating the shadow economy, such as direct surveys or analyses of the structural aspects of the labour market (for example, a comparison of official and survey-based labour statistics)²⁰.

We adopt a combined and innovative approach that exploits the strengths and addresses the weaknesses of the methods outlined above, as applied in various studies. Our approach comprises the following steps:

Step 1

Estimating the overall level of the shadow economy (i.e. total unregistered cash transactions) using the **currency demand analysis (CDA)**.

Step 2

Splitting the shadow economy into its committed and passive components with the **labour market analysis (LMA)**, based on the assumption that the output of the committed shadow economy is correlated with and mirrored by shadow labour force inputs.

Step 3

Estimating the evolution of the passive shadow economy over time, and identifying its determinants using **the MIMIC model**.

Step 4

Assessing how the passive shadow economy volumes were spread between various sectors using the **sectorial structure analysis (SSA)**.

Our four-step approach is illustrated in Frame 2.1. For technical details see Appendix 1.

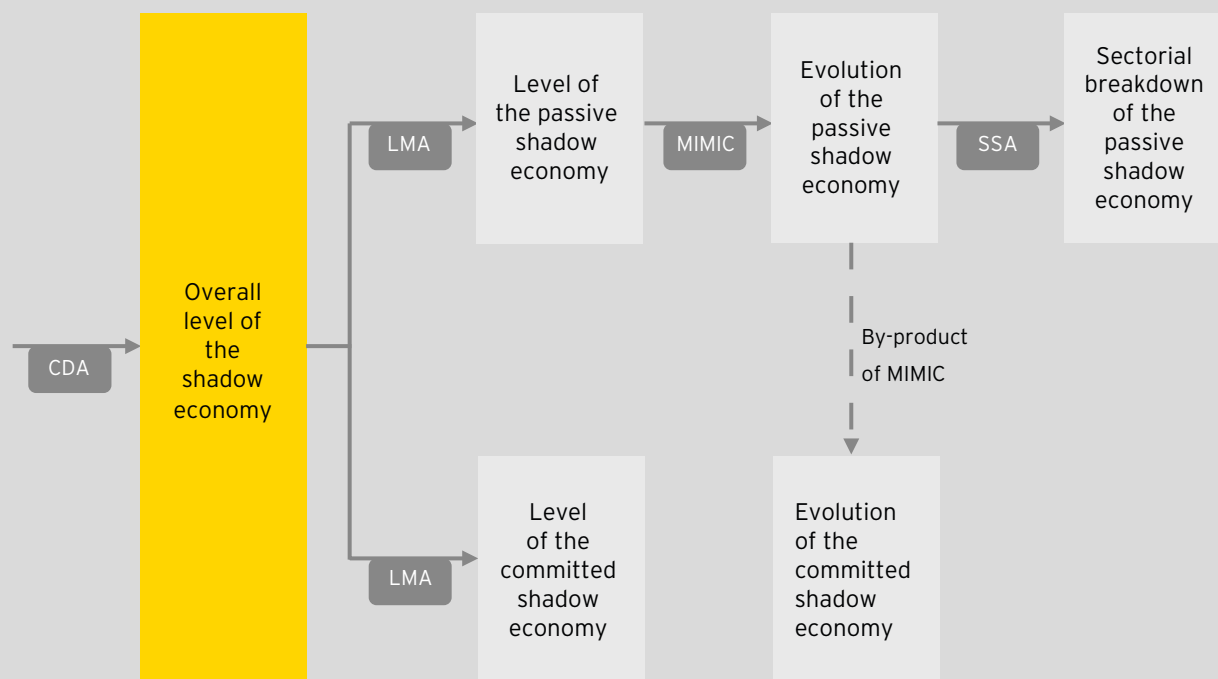
¹⁷ See, for example, Tanzi V. "The Underground Economy in the United States: Annual Estimates, 1930-80", Staff Papers - International Monetary Fund, Vol. 30, No. 2, 1983, pp. 283-305 and Ardizzi G., Petraglia C., Piacenza M., Turati G., "Measuring the underground economy with the Currency Demand Approach: A reinterpretation of the methodology, with an application to Italy", Review of Income and Wealth, vol. 60(4), 2014, pages 747-772.

¹⁸ See, for example, Schneider F. (editor), "Handbook on the Shadow Economy", Cheltenham (UK): Edward Elgar Publishing Company, 2011 and Buehn A., "The Shadow Economy in German Regions: An Empirical Assessment", German Economic Review Vol. 13, No. 3, 2010, pp. 275-290.

¹⁹ See, for example, Lacko M., "Hidden Economy - an Unknown Quantity? Comparative Analysis of Hidden Economies in Transition Countries, 1989-95", Economics of Transition, Volume 8, No. 1, 2000, pp. 117-149.

²⁰ The pros and cons of the various methods of estimating the shadow economy are discussed in greater detail in Appendix 1.

Frame 2.1. Estimation and decomposition of the shadow economy - an EY approach.



Notes: Currency Demand Analysis (CDA), Labour Market Analysis (LMA), Multiple Indicators Multiple Causes model (MIMIC), Sectorial Structure Analysis (SSA).

Source: EY

Our contribution to the literature includes:

- ▶ the breakdown of the shadow economy into its passive and committed components;
- ▶ a formalised calculation of the sectorial structure of the passive shadow economy;
- ▶ addressing a number of methodological issues, often leading to the overestimation of the shadow economy in other studies.

While many publicly available analyses of the shadow economy do not provide methodological insights, the methodology applied in this study is described in detail (see Appendix 1). Since it is impossible to avoid adopting certain assumptions in the procedure of estimating the shadow economy, our approach can also be questioned on some grounds. Nevertheless, we would not seek to avoid criticism by limiting our transparency, and think openness is crucial. Importantly, we have improved some methodologies applied in the shadow economy literature so far, which has allowed us to significantly reduce the number of required assumptions and discretionary steps to be taken in the estimation procedure. Consequently, we believe that our estimates of the shadow economy should be more objective, and thus more reliable, than the results of many other studies based on the CDA and/or MIMIC approaches. Moreover, we test the robustness of our conclusions by subjecting our assumptions to sensitivity analysis.

Appendix 1 and Appendix 2 include a discussion of the methodological issues that we have identified in other studies of the shadow economy. In particular, we argue that some often quoted estimates of the shadow economy seem to be inflated and based on too many arbitrary assumptions. Importantly, in the appendices we present in detail how we have addressed these methodological issues. In particular:

1 We reject some questionable assumptions applied in the CDA literature (e.g. that with no taxes the shadow economy would totally disappear), which seem to lead to an overestimation of the shadow economy.

2 In the MIMIC modelling, we do not use external estimates of the shadow economy level from dubious and often outdated sources, which seems to have resulted in an overestimation of the shadow economy in some studies.

3 We do not apply arbitrary data transformation in the MIMIC model, which may significantly affect the obtained estimates, but instead we use a transformation developed by EY that is fully objective and thus not influenced by any discretionary decisions.

4 In the CDA, we use more reliable assumptions regarding the so-called velocity of money, which allows us to avoid the problem of overestimating the size of the shadow economy. Moreover, we do not need to assume that the velocity of money is constant.

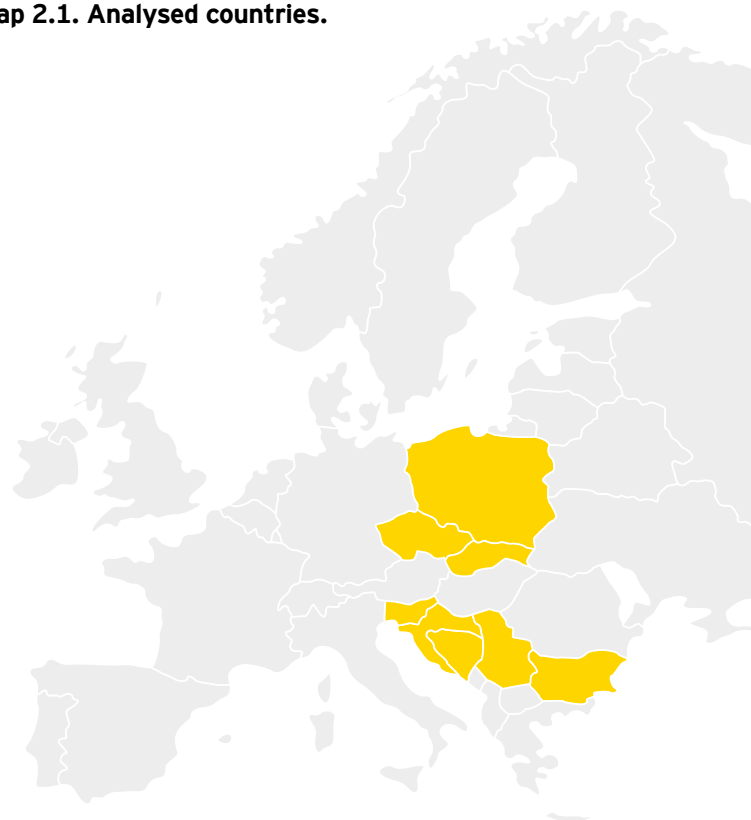
5 We have introduced the transformation of the parameters of the MIMIC model that allow us to interpret the strength of economic relationships between variables entering the MIMIC analysis (as far as we are aware, in previous studies using the MIMIC model, it was only possible to analyse the direction of these relationships). This, in turn, enables us to assess the strength of the impact of the development of electronic payments on the size of the passive shadow economy.

2.2. Analysed countries and data sources used

Our analysis focuses on eight countries in Central and Eastern Europe, namely: Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Poland, Serbia, Slovakia, and Slovenia (see map 2.1). The time scope of the analysis is determined by the availability of data for each of those countries (the maximum time range is 2000–2014). In some parts of our analysis, we also include additional countries in order to increase the size of the data set and maximise the potential of the econometric estimation²¹.



Map 2.1. Analysed countries.



Source: EY

We take into account the complexity of the possible causes of the shadow economy and difficulties related to their measurement (see Chapter 1). To address these issues we have created a vast dataset based on various sources, including (among other things):

- ▶ Eurostat and statistical offices of the investigated countries;
- ▶ Databases of national central banks;
- ▶ Databases of international organisations (e.g. World Bank, International Monetary Fund, International Labour Organization);
- ▶ Data from economic reports (e.g. World Competitiveness Report, Doing Business);
- ▶ Data provided by MasterCard.

Based on the existing literature, and with the use of statistical testing (where appropriate), we have chosen a set of major causes and indicators of the shadow economy that have later been used to estimate the size, structure and sectorial breakdown of the shadow economy (see Table 2.1 for the summary of main groups of these variables, and Appendix 1 for further details).

²¹ Including additional countries increases the available information set and improves the quality of econometric estimates. These countries comprise: Hungary, Denmark, Norway, Sweden, the United Kingdom, Austria, Finland, Germany, Italy, Portugal and Spain.

Table 2.1. Types and sources of variables used in the analyses.

Group	Description	Sources
Monetary aggregates	Variables related to the quantity of cash and total amount of money used for transactional purposes (e.g. cash in circulation, M1 monetary aggregate)	EcoWin (International Monetary Fund), national central banks, European Central Bank
Non-cash transactions indicators	Indicators related to the development of non-cash transaction systems (e.g. number of payment cards, number of payment terminals, value of card transactions, etc.)	MasterCard, European Central Bank, national central banks
Macroeconomic indicators	Macroeconomic indicators (e.g. GDP, consumption expenditure of households, etc.)	Eurostat, EcoWin, national central banks, national statistical offices
Labour market	Variables related to the labour market (e.g. total employment, unemployment rates, etc.)	Eurostat, local statistical offices, EcoWin, International Labour Organization
Tax burden variables	Variables describing the level of taxation and social security contributions (e.g. taxes and social contributions as % of GDP)	EcoWin, national statistical offices, Eurostat, World Bank
Institutional and tax morale variables	Qualitative variables allowing a comparison of the analysed countries in terms of their institutional development, governance and tax morale (e.g. rule of law index)	World Bank, Heritage Foundation
Socio-demographic variables	Variables related to socio-demographic factors (e.g. the size of the population, the share of population with internet access, etc.)	Eurostat, EcoWin, International Telecommunication Union (United Nations)
Auxiliary indicators of the passive shadow economy	Variables used in the MIMIC model as auxiliary indicators of the evolution in time of the passive shadow economy (e.g. the difference between the standard VAT rate and the ratio of the actual VAT revenues to the domestic demand)	EY calculations based on Eurostat, OECD, World Bank and additional data sources, including national ministries of finance
Sectorial variables	Variables used in the sectorial breakdown of the passive shadow economy (e.g. sectorial household consumption structure, value of sectorial card transactions)	National statistical offices, Eurostat, MasterCard

Source: EY

The eight analysed countries differ significantly with respect to the variables considered in Table 2.1. It applies not only to the payment infrastructure, which is the central focus of this study, but also to other variables. We account for all these differences in our calculations. In particular, we account for the institutional and tax morale (motivation to pay taxes, other than legal) differences through the use of the World Bank's rule of law index²².

In our econometric estimations, we also account for the income differences between countries (see Frame 2.2), which affect, for example, the demand for currency. Moreover, we account for the fact that Slovakia and Slovenia joined the euro area in the analysed period, which entailed substantial changes in monetary aggregates in these countries (i.e. a gradual decrease of cash in circulation in the months preceding the euro cash changeover).

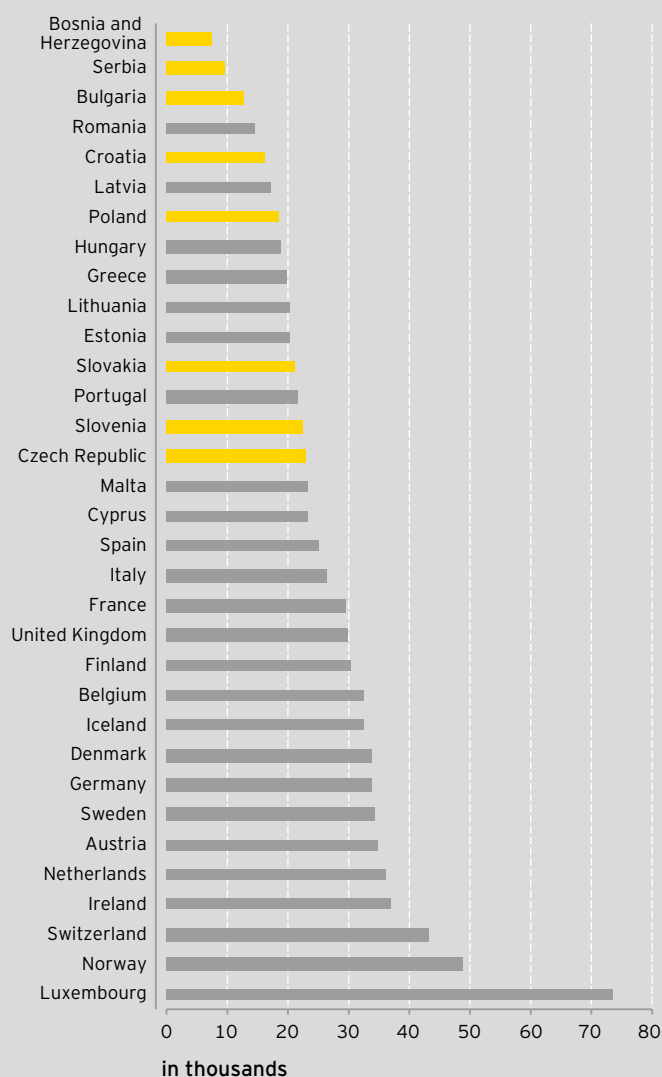
²² The World Bank's rule of law index reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. This variable is also a good proxy for tax morale (see, for example, Frey B. S., Torgler B., "Tax Morale and Conditional Cooperation", IEW - Working Papers 286, Institute for Empirical Research in Economics - University of Zurich, 2006).

Frame 2.2. Comparison of the economic development and card payment infrastructure in selected European countries

Considerable differences in income per capita adjusted for purchasing power standards (PPS, different price levels among the countries) that can be observed across the analysed economies (see Chart 2.1) are one of the factors affecting the level of card infrastructure development, that in turn decreases the willingness of individuals and business entities to operate in the shadow economy. In the group of analysed countries, the Czech Republic and Slovenia have the highest level of GDP per capita (in PPS), which is almost three times as large as in Bosnia and Herzegovina.

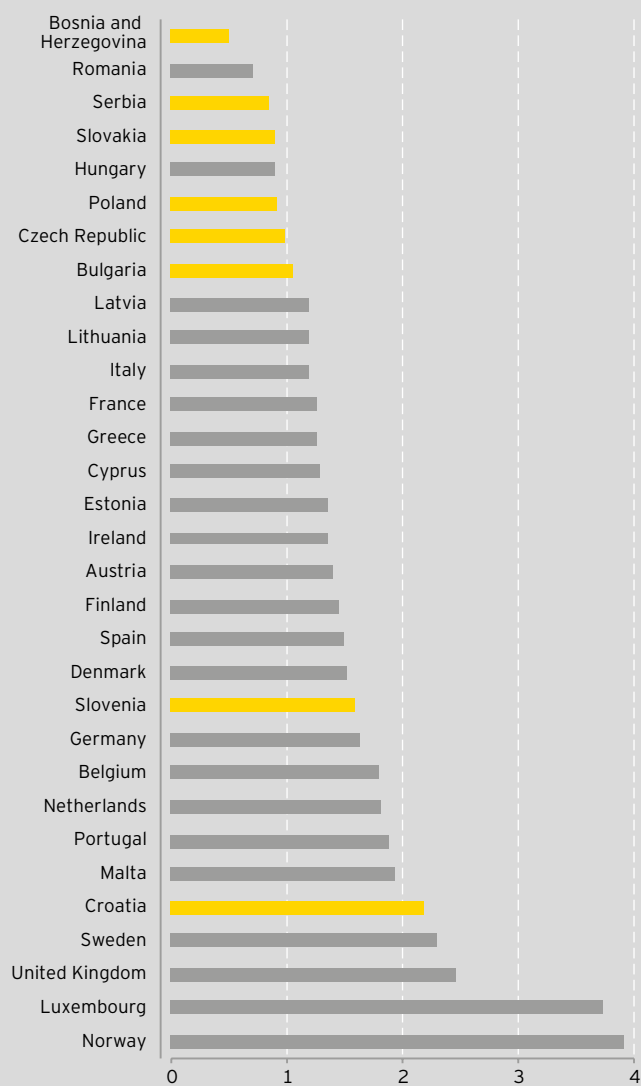
In the analysed group of countries, the largest number of cards per capita is recorded in Croatia and Slovenia (see Chart 2.2). Interestingly, Croatia, with 2.2 cards per capita, is in the top group of European countries, next only to Norway, Luxemburg, the United Kingdom and Sweden. On the other hand, in Bulgaria, the Czech Republic, Poland, Slovakia and Serbia, the number of cards per capita is among the lowest in Europe and amounts to approximately 1, and in most cases even below this value. This ratio is by far the lowest in Bosnia and Herzegovina (0.5).

Chart 2.1. GDP per capita in the analysed countries in 2014 (Purchasing Power Standards, current prices).



Source: Eurostat, World Bank, CIA (the World Factbook).

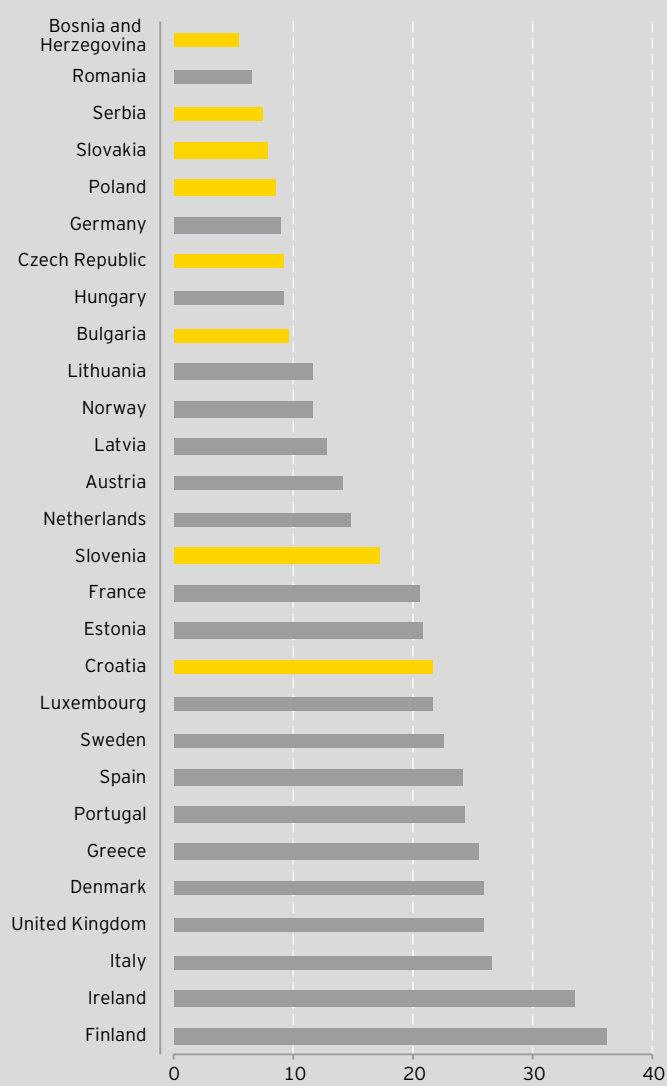
Chart 2.2. Number of cards per capita in selected European countries.



Source: ECB, MasterCard, National Bank of Serbia, Central Bank of Bosnia and Herzegovina, Eurostat.

Croatia and Slovenia also have the most developed network of POS terminals among the analysed countries, although they no longer rank that high (as based on the number of cards per capita criterion) when compared to other European countries with the most developed card payments infrastructure (see Chart 2.3). Once again, the remaining six out of the eight analysed countries turn out to be among the least developed European economies in terms of available payment infrastructure.

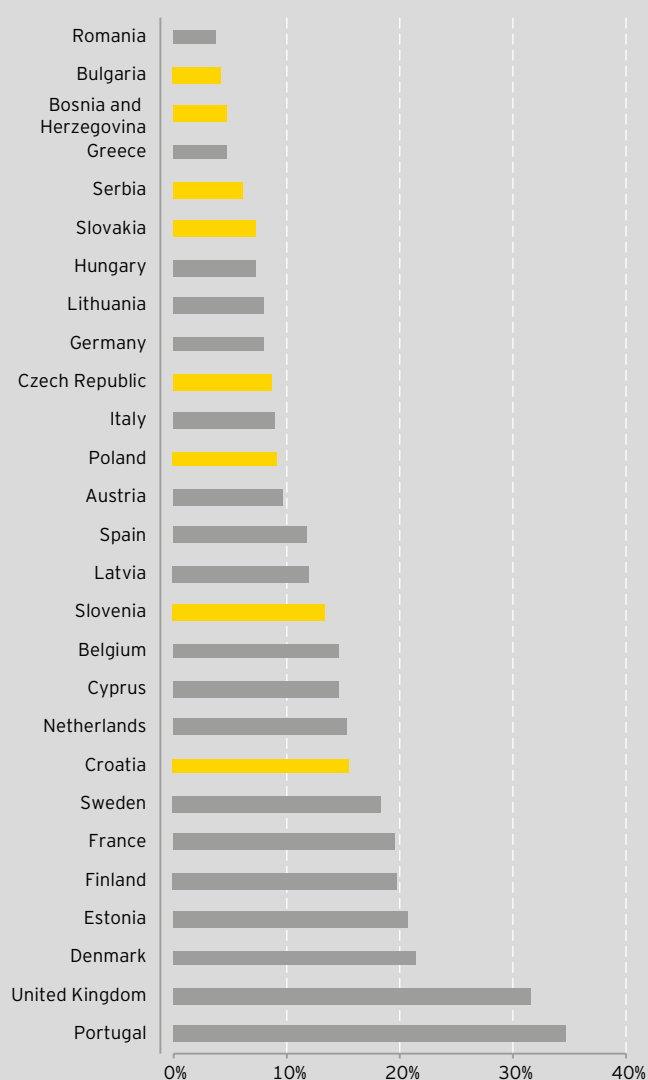
Chart 2.3. Number of terminals per 1000 people in selected European countries.



Source: ECB, MasterCard, National Bank of Serbia, Central Bank of Bosnia and Herzegovina, Eurostat.

Since the most extensive card networks among the eight countries analysed in this project are available in Croatia and Slovenia, it is perhaps unsurprising that the value of card transactions²³ (as % of GDP) is the highest in those countries (see Chart 2.4). Poland and the Czech Republic record a relatively high value of card transactions in comparison with Bulgaria and Slovakia that have achieved a similar development of card payment infrastructure. This indicates that Slovakia and, in particular, Bulgaria have the potential to expand the card payments market by increasing the utilisation of the existing infrastructure. Furthermore, there seems to be significant room for improvement in the card network infrastructure in all the countries analysed in this project. This, in turn, should result in an increased popularity of electronic payments, which in turn – through crowding out cash payments – should lead to a decrease in the level of the shadow economy (see Chapter 3).

Chart 2.4. Card transaction value (% of GDP) in selected European countries.



Source: ECB, MasterCard, National Bank of Serbia, Central Bank of Bosnia and Herzegovina, Eurostat

²³ Our analysis takes into account point-of-sale (POS) card payments performed in a given country by residents and non-residents. Our main sources of data are the European Central Bank (ECB), publications of the National bank of Serbia and the MasterCard data. The value of card payments in Bosnia and Herzegovina has been estimated on the basis of the data provided by MasterCard and publications of the Central Bank of Bosnia and Herzegovina. Our focus on the card payments instead of a broader measure, such as electronic payments in general, is a result of data availability and the fact that POS card payments constitute most consumer electronic payments. In addition, we focus on consumer face-to-face transactions because these are the nearest substitute to consumer cash transactions that are related to the problem of the passive shadow economy.

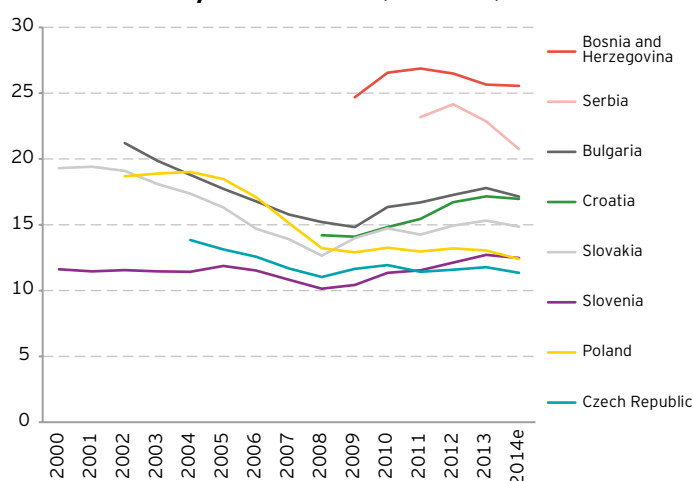
2.3. Estimated size, structure and sectorial breakdown of the shadow economy

Overall level of the shadow economy

In general, in the period preceding the global financial turmoil, the level of the shadow economy (expressed as % of GDP²⁴) in the analysed countries was declining (see Chart 3). After the outburst of the crisis, however, this tendency either reversed or came to a halt. Moreover, our estimates suggest that in 2014 the shadow economy contracted in all the analysed countries, with a particularly significant decline in Serbia.

Currently, among the analysed countries, the largest shadow economies (in relation to GDP) are in the south of Europe (see Chart 2.5). We estimate that in 2014 the shadow economy was the most prevalent in Bosnia and Herzegovina (25.5% of GDP) and Serbia (20.7%). On the other hand, the smallest shadow economies were in the Czech Republic (11.3%), Poland (12.4%) and Slovenia (12.5%).

Chart 2.5. Overall levels of the shadow economy in the analysed countries (% of GDP).



Shadow economy figures for 2014 are based on the estimates/forecasts of some of the explanatory variables (shadow economy determinants)²⁵.

Source: EY

²⁴ In our elaboration, we present our estimates of the shadow economy as “% of GDP”, which should be understood as a percentage of official GDP (GDP that is officially reported by national statistical offices). We use this approach, since it is consistent with the way of presenting shadow economy estimates in the literature. However, this expression is not fully equivalent to “the share of the shadow economy in the total economy”, because the official GDP data already includes some shadow economy estimates, as conducted by the national statistical office. Whether the applied approach results in a higher or lower shadow economy figures than in terms of “the share of the shadow economy in the total economy”, depends on the ratio of the obtained shadow economy estimates to the shadow economy estimates of the statistical offices. Still, the comparison of the results for the two approaches shows that, for the analysed countries, the differences are rather minor (less than 1.8 percentage points).

²⁵ Description of the estimates/forecasts of some of the shadow economy determinants for 2014 is presented in Appendix 1.



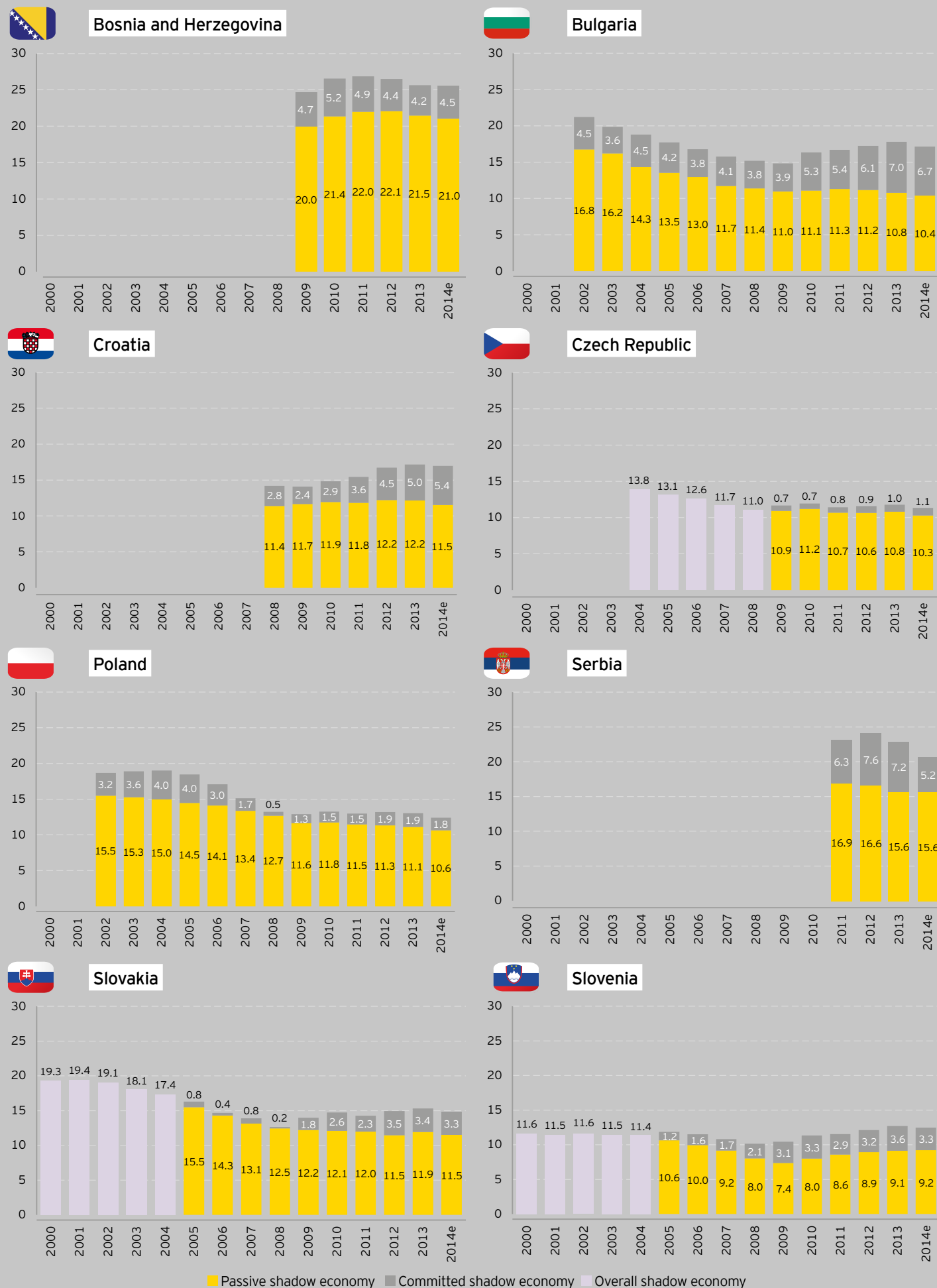
Passive and committed shadow economies

Splitting the shadow economy into its passive and committed components provides a more detailed insight into the situation of individual countries. To the best of our knowledge, no such breakdown has been done in other research, and thus constitutes a contribution of this study to the literature. As discussed in Chapter 1, the passive component is that part of the shadow economy that can be reduced by promoting electronic payments, and so limiting the use of cash that otherwise facilitates unregistered transactions. The committed shadow economy is the remaining part of the non-observed economy and should be dealt with using other tools.

Our approach to distinguishing the two components is based on the assumption that the output of the committed shadow economy is correlated with and mirrored by shadow labour force inputs (for a detailed estimation methodology see Appendix 1). It should be noted, however, that unreported employment is also possible in the registered companies that are not involved in the committed shadow economy (see Chart 1.1). Therefore, from this perspective, our assumption can result in an overestimation of the committed and an underestimation of the passive component. On the other hand, however, we do not account for the fact that some companies with no unreported labour force may also be involved in the committed shadow economy.

Chart 2.6 shows that an increase in the level of the shadow economy after the crisis outbreak was often the effect of the rise in its committed component, which in turn reflected the rebound in unregistered employment in the period of economic slowdown. The pattern of the passive shadow economy development among the analysed countries is, however, less clear. In Poland, Bulgaria, Serbia and Slovakia, it was in the decline over the last years of the sample period, in the Czech Republic its level was rather stable, while Bosnia and Herzegovina, Croatia and Slovenia recorded an increase in the passive shadow economy.

Chart 2.6. The overall level of the shadow economy in the analysed countries (% of GDP).



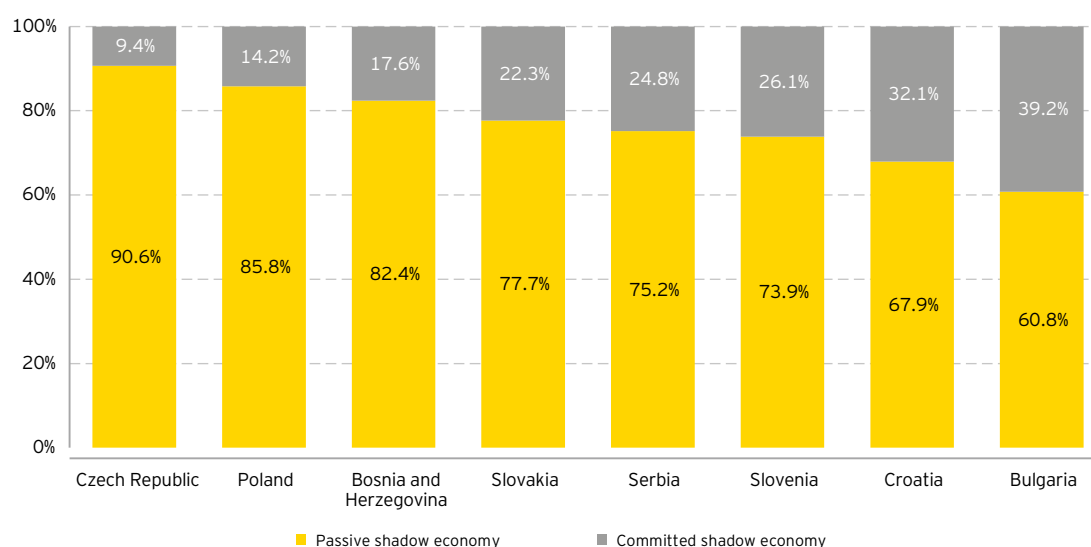
Notes: Shadow economy figures for 2014 are based on the estimates/forecasts of some of the shadow economy determinants.

Source: EY

The analysed countries differ in terms of the share of the passive and committed components in the total shadow economy (see Chart 2.7.). In particular, the Czech Republic is the country with by far the highest share of the passive (90.6% in 2014) and, consequently, the lowest share of the committed component (9.4%). By contrast,

Bulgaria and Croatia record a relatively high share of the committed shadow economy (39.2% and 32.1% in 2014, respectively). Still, the common factor for all the countries considered is that the passive component accounts for a majority of their unregistered economy.

Chart 2.7. Structure of the shadow economy in 2014 across the analysed countries.



Notes: Shadow economy figures for 2014 are based on the estimates/forecasts of some of the shadow economy determinants.
Source: EY

Sectorial breakdown of the passive shadow economy

Additional insight into the passive shadow economy in the analysed countries is provided by the sectorial breakdown of this component, based on our innovative and formalised approach (see Appendix 1).

Most of the available estimates of the sectorial structure of the shadow economy in the literature are based on the sectorial breakdown of unregistered employment. For example, an OECD 2014 statistical brief²⁶ shows a high share of unregistered employment in the construction sector in selected countries (including Poland and the Czech Republic). Another analysis, performed for Croatia and Slovenia, indicates that the highest share of unregistered labour force can be found in construction, hotels and restaurants, as well as in the transport services²⁷. However, the sectorial breakdown of unregistered employment provides little, if any, information on the sectors where retail sales are often

unregistered and that should therefore be targeted with measures aimed at increasing the share of reported consumer transactions (e.g. through the promotion of electronic payments). Unfortunately, there are not too many studies that would investigate the sectorial structure of unregistered consumer transactions. Still, where such estimates are provided, the method of obtaining these results - to the best of our knowledge - remains unexplained²⁸. We aim to fill this gap and present a detailed description of our approach in Appendix 1. Moreover, as already emphasised, the natures of the committed and passive components of the shadow economy are different, and each need to be addressed with different solutions. Therefore, we concentrate on the sectorial breakdown of the passive shadow economy, which seems to be the first such attempt in the literature, and which should be of particular interest in the context of the role of cash vs. electronic payments.

Since the passive shadow economy is driven by mechanisms prevailing in the retail sales of goods and services, it can be disaggregated either from the buyers' perspective (on the basis of the consumption expenditure structure) or that of the sellers

²⁶ OECD, "The Non-Observed Economy in the System of National Accounts", OECD Statistics Brief, No. 18, 2014.

²⁷ See: Bojan N., Štefan B., "The Shadow Economy in Bosnia and Herzegovina, Croatia, and Slovenia: The Labor Approach", Eastern European Economics, 2007.

²⁸ See, for example, AT Kearney, Schneider F., "The Shadow Economy in Europe, 2013", 2013.

(depending on the type of the point of sale). Given the available data, we have developed a classification of 17 sectors that allows us to match these two perspectives for our distinct data sources – Harmonised Index of Consumer Prices data on consumption structure (buyers) and card payments data for different types of retailers (sellers), the latter provided by MasterCard^{29 30}.

In our approach to the estimation of the sectorial breakdown of the passive shadow economy, the share of a given sector in the passive component of unreported activities in an analysed country is proportional to:

- ▶ the share of this sector in the total consumption spending (this number is a proxy for the size of the sector in consumer transactions);
- ▶ the share of cash spending in the total consumption spending that has been estimated with the use of MasterCard data (this number is a proxy for the “cash saturation” of the transactions conducted in the sector).

Therefore, in our approach, the larger the sector and the more saturated with cash payments, the higher share in the total passive shadow it has. For more details on our methodology see Appendix 1.

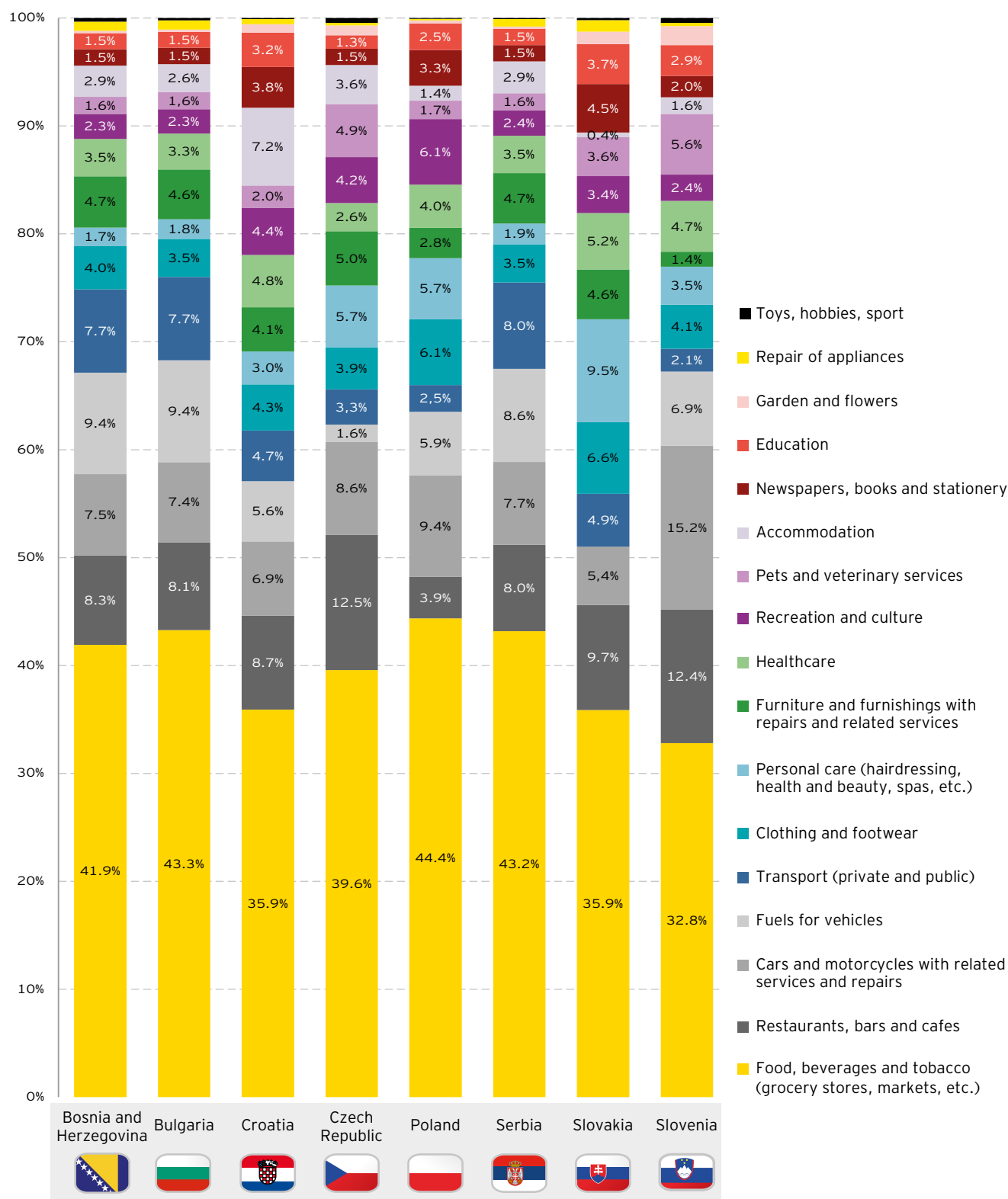
It turns out that the most important role in the passive shadow economy is played by the sector supplying food, beverages and tobacco (see Chart 2.8). This conclusion applies to all of the analysed countries. On average, this sector accounts for 39.6% of the total passive shadow economy. This is mainly the result of its large share in the total consumption expenditure. The sector that ranks second, in terms of its contribution to the size of the passive shadow economy, differs among the analysed countries. It is fuels for vehicles in Bosnia and Herzegovina (9.4% of the total passive shadow economy), Bulgaria (9.4%) and Serbia (8.6%); the restaurants, bars and cafes sector in Croatia (8.7%), the Czech Republic (12.5%) and Slovakia (9.7%); and the sector of cars and motorcycles with related services and repairs in Poland (9.4%) and Slovenia (15.2%). Other sectors that have a relatively high share in the total passive shadow economy in the analysed countries comprise transport as well as clothing and footwear.

There is a significant difference between our approach to the sectorial analysis of the passive shadow economy and other approaches based on an analysis of unregistered employment. While we tend to agree with the view that in many countries it is the construction sector where the share of unregistered employment is particularly high, this category of the shadow economy should be dealt with using tools other than, for example, the promotion of electronic payments. By contrast, in our approach we focus on the sectorial breakdown of the passive shadow economy activities in retail sales, where consumer cash payments are the source of unreported transactions.

²⁹ Further information concerning the utilised data and methodology can be found in Appendix 1. Details on the sectorial matching of the data are presented in Appendix 3.

³⁰ The data used accounts also for the consumption expenditure and card payments of non-residents (mainly tourists).

Chart 2.8. Shares of sectors in the passive shadow economy (% of total passive shadow economy, long-term averages).



Source: EY

Our sectorial estimates are based on the assumption that each cash unit spent in a given country is equally likely to trigger a shadow economy transaction regardless of the sector in which it is spent. While this assumption may not be true, limited data availability

does not allow us to adopt a different approach. However, to test this assumption and take more insight into the cross-sectorial differences, we have conducted an additional econometric analysis whose results are presented in Frame 2.3.

Frame 2.3. Testing the validity of assumptions underlying the sectorial structure analysis.

In order to test assumptions underlying our approach to the sectorial breakdown of the passive shadow economy, we built an additional econometric model to investigate the relationship between the passive shadow economy and changes in the value of card payments in different sectors. If the total passive shadow economy is more (less) sensitive to the value of card payments in a given sector than in other sectors, this means that the passive shadow economy within this sector constitutes a higher (lower) share of cash transactions than is the case, on average, for other sectors. This analysis allows us to draw the following conclusions. For the most of the sectors and countries, our assumption that each cash unit spent is equally likely to trigger a shadow economy

transaction is satisfied (sectors in countries without "+" or "-" signs). However, in the analysed countries there are some sectors in which the cash unit spent leads, on average, to a stronger or a weaker increase in the shadow economy than in other sectors. Consequently, the values presented in Chart 2.8 might, to some extent, be higher ("+") or lower ("-"), respectively. Unfortunately, the available data and applied econometric analysis does not allow us to precisely conclude on the scale of the difference. Still, the results presented in Table 2.2. may be helpful in guiding the selection of sectors that one might want to focus on. For more details on our methodological approach, see Appendix 1.

Table 2.2. Results of the econometric estimation showing that in some countries shares of individual sectors in the total passive shadow economy may to some extent be higher ("+") or lower ("-") than presented on Chart 2.8.

	Bosnia and Herzegovina	Bulgaria	Croatia	Czech Republic	Poland	Serbia	Slovakia	Slovenia
Food, beverages and tobacco (grocery stores, markets, etc.)	-					-		+
Restaurants, bars and cafes	+	+						
Cars and motorcycles with related services and repairs	+		-		-	+		
Fuels for vehicles	-		+		+			
Transport (private and public)	+							
Clothing and footwear					+	+	-	-
Personal care (hairdressing, health and beauty, spas, etc.)	-		+					+
Furniture and furnishings with repairs and related services					+	+		+
Healthcare	+		-		-			-
Recreation and culture	+				-			-
Pets and veterinary services	+				-			-
Accommodation				+	+		-	
Newspapers, books and stationery	+		-		-			
Education	+		-		-			-
Garden and flowers			-			+		-
Repair of appliances	+							-
Toys, hobbies, sport		+				+		

Source: EY

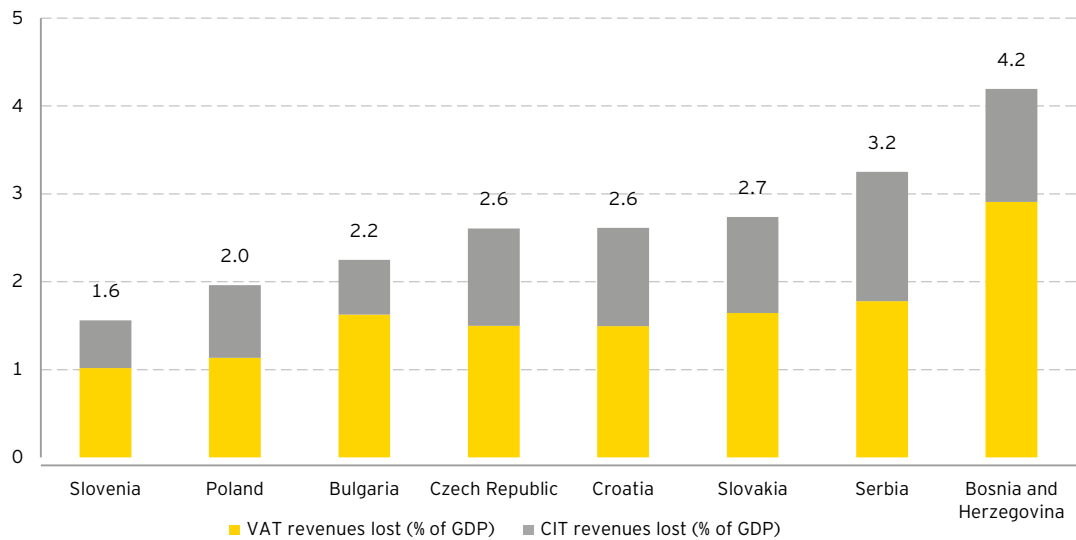
Passive shadow economy and lost government revenues

The passive shadow economy may entail serious consequences, many of which have been discussed in Chapter 1. Here, we present estimates of additional government revenues that would be collected if all the passive shadow economy cash transactions were reported. This allows us to illustrate the potential budgetary benefits from addressing this issue.

The categories of government revenues that we consider in our analysis are VAT and CIT revenues. If a consumer transaction is not registered, then the VAT, despite being included in the consumer price, will not be paid by the seller. Moreover, the merchant's revenue from this transaction would not be reported either. Consequently, it would translate into lower than otherwise CIT revenues collected by the government³¹.

The details of how we have calculated the VAT and CIT revenue shortfall due to the passive shadow economy activities are presented in Appendix 6. Here we just indicate that we do not apply the standard VAT or CIT rates in our calculations, since it would lead to an overestimation of the budgetary effect. In our approach, we take into account how VAT rates differ among sectors in various countries, and what the effective CIT rate is relative to gross operating surpluses recorded by companies. This is consistent with our preference to be on the conservative side rather than presenting biased, overestimated figures that could weaken the credibility of our conclusions.

Chart 2.9. Lost government revenues due to the existence of the passive shadow economy in 2014.



Source: EY

The obtained results show that the game is worth the candle, since potential government revenues from eliminating the passive shadow economy stem from 1.6% of GDP to as much as 4.2% of GDP³². Consequently, even a partial success in dealing with this category of unregistered transactions can significantly improve the public finance situation in the analysed countries. It therefore leads to a question about the measures that could be adopted in order to address the passive component of the shadow economy. This is the issue that we investigate in the next chapter.

³¹ We are aware of the fact that some merchants (depending on the country and the sector considered) may not be CIT payers, but, for example, PIT or another category of tax payers. However, here we assume that all the passive shadow economy transactions are made by CIT payers.

³² Our analysis does not take into account the fact that some merchants whose activity has so far been based on the unfair competition by not declaring part of their profits, may become worse-off as a result of being forced to register all of their profits and pay more taxes, accordingly. In order to defend their previous level of net disposable income, some merchants might try to increase prices, which should be limited by the market competition, or to decrease the wages of their employees, which should be tempered by competition on the labour market, or might simply accept lower margins.





3

Limiting the shadow economy through the promotion of electronic payments

Having estimated the size and structure of the shadow economy, and the sectorial breakdown of its passive component, in this chapter we focus on measures that, if implemented, could reduce the shadow economy. However, prior to discussing distinct regulatory solutions, we first present the identified determinants of the shadow economy and their quantitative impact on the passive component. In particular, we analyse the relationship between the value of card payments and the level of cash-driven unregistered transactions. The obtained results allow us to verify our hypothesis that the shadow economy may be reduced through the promotion of electronic payments. Next, we conduct an impact assessment of various regulatory tools for each of the eight analysed countries. The considered tools may (1) promote electronic payments and thereby reduce the value of cash payments, or (2) increase the share of reported consumer cash transactions, and through these channels decrease the size of the passive shadow economy. In our assessment, where possible, we show the quantitative impact of the considered regulations on the contraction of the passive shadow economy, and on the resulting growth in government revenues. We discuss the effect on public finance in net terms, since we also account for some potential costs that a given regulation may entail for the government.

3.1. Identified determinants of the passive shadow economy

In our econometric analyses (see Chapter 2), we have estimated the size of the overall shadow economy (total unregistered consumer cash transactions) using the CDA approach, as well as the passive component of the non-observed economy using the MIMIC approach. Both approaches required the identification of key factors that determine the level or changes in the shadow economy and an estimation of the impact that each of those determinants has on the shadow economy (or its passive component). Since the main focus of the regulatory analysis is the reduction of the passive shadow economy, in this subchapter we focus on determinants obtained in the MIMIC approach only (see Table 3.1)³³.

Table 3.1. Impact of the identified determinants on the passive shadow economy (MIMIC model).

Determinant	Impact of the determinant on the passive shadow economy
The ratio of the total value of card payments at physical terminals to GDP	<ul style="list-style-type: none"> An increase in the total value of card payments at physical terminals in relation to GDP by 1% led, on average in the analysed sample period, to a decrease in the passive shadow economy by 0.037 percentage points of GDP
The ratio of taxes and social security contributions to GDP	<ul style="list-style-type: none"> An increase in the total value of taxes and social security contributions by 1% of GDP led, on average in the analysed sample period, to a growth of the passive shadow economy by 0.272 percentage points of GDP
World Bank's rule of law index (ranges from approximately -2.5 (weak rule of law) to 2.5 (strong rule of law))	<ul style="list-style-type: none"> An increase (improvement) in the World Bank's rule of law index by 1 led, on average in the analysed sample period, to a decrease in the passive shadow economy by 1.583 percentage points of GDP

Notes: The presented impact of a given determinant is valid when it is not accompanied by any other changes in the remaining listed determinants.

Source: EY

According to the MIMIC analysis, an increase in the card payments to GDP ratio³⁴ reduces the passive shadow economy. Moreover, a decline in the ratio of taxes to GDP turns out to reduce shadow economy activities. Another factor positively influencing the merchants' propensity to register transactions is their institutional and tax morale, approximated by the World Bank's rule of law index³⁵.

For policymakers, it may be easier to influence some of the identified determinants of the shadow economy, while it may be difficult to affect others. For example, changes in the rule of law index seem very relevant for the overall and passive shadow economy levels. However, a significant improvement in this area may require introducing many, often difficult, reforms by a government, which may additionally take a long time. It is also not easy to significantly reduce the burden of tax and social security contributions, not least in light of the fiscal challenges in many countries in the aftermath of the economic crisis. On the other hand, public policies leading to an increase in the popularity of non-cash payments (especially card payments, which have been proven in the model to have a significant impact on the contraction of the shadow economy) seem relatively easier to implement.

In this context, we calculate the impact of the observed changes in determinant values in 2010–2014 on the evolution of the passive shadow economy. In this period, the growing value of card payments in the analysed countries led, on average, to a decrease in the passive shadow economy by 1.17 percentage points of GDP. This effect for the rule of law index amounted to just 0.09 percentage points of GDP, while the observed changes in taxes and social contributions were associated, on average, with an increase in the passive shadow economy by 0.27 percentage points of GDP. This shows that the recent changes in the value of card payments in the analysed countries have already had a relatively strong impact on the reduction of the passive shadow economy.

³³ For more details see Appendix 1, which also includes estimation results for the total shadow economy (total unregistered consumer cash transactions), based on the currency demand analysis.

³⁴ The total value of card payments was not appropriate for the estimation process of the currency demand equation (the overall level of the shadow economy) due to certain technical reasons (the "endogeneity issue", see Appendix 1).

³⁵ In the MIMIC model we have included also other variables, such as GDP in PPS per capita or regulatory measures applied by particular countries. For more details see Appendix 1.



It should be emphasised, however, that we do not use the estimation results presented in Table 3.1 to analyse the impact of the considered regulations - through the channel of an increased usage of electronic payments - on the passive shadow economy. If we did, we would likely obtain biased results, because the estimated parameters describe the average impact of selected determinants on the passive shadow economy based on their historical developments. Most importantly, one should note that it is not so much a given percentage increase in card payments, but the resulting proportion of crowded out consumer cash payments that determines the contraction of the passive shadow economy. And a given regulation-induced percentage increase in card payments leads to a different percentage decline in consumer cash payments, with the latter depending on the current ratio of card to cash transactions value³⁶. That ratio, in turn, varies among countries and over time. We account for these factors in our approach to the regulatory analysis, which is discussed in the next section.

³⁶ For example, in a country with 60% of card and 40% of cash consumer payments, a 10% increase in card payments (to 66% of total consumer transactions) leads to a 15% decline in cash payments (from 40% to 34% of total consumer transactions). In another country with 20% of card and 80% of cash consumer payments, a 10% increase in card payments (to 22% of total consumer transactions) leads to a mere 2.5% decrease in cash payments (from 80% to 78% of total consumer transactions).

3.2. Selected regulations and their impact on the shadow economy

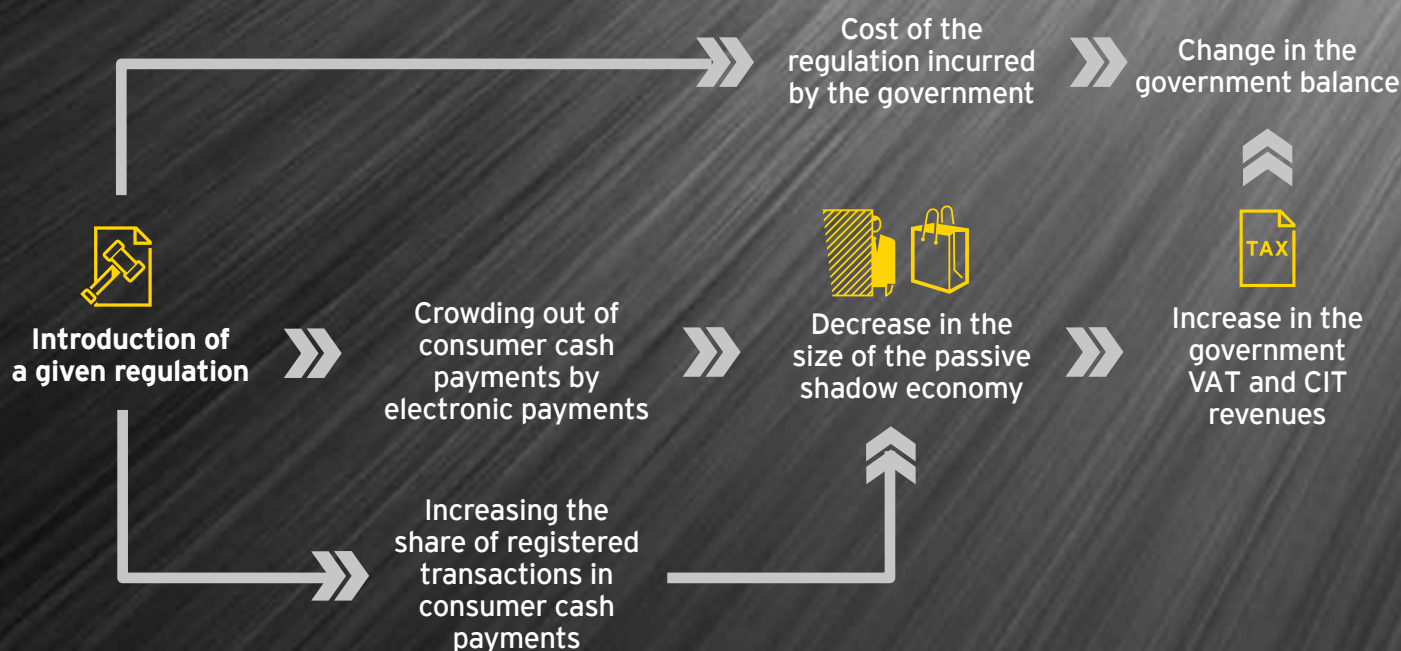


Chart 3.1. Considered mechanisms of the impact of regulations aimed at combating the passive shadow economy.

Source: EY

Our estimation results show that an increased popularity of cashless payments had a significant impact on the reduction of the passive shadow economy in the sample period. In the remainder of this chapter, we discuss selected policy measures that are aimed mainly at replacing cash with electronic payments, or increasing the share of registered consumer cash transactions in the analysed countries. We first briefly describe the mechanism of each regulation and discuss the potential channels of its impact. Next we demonstrate the estimated effect of a given tool on the passive shadow economy and government revenues (for methodological details, see Appendix 5 and Appendix 6). When a considered regulation positively affects the value of card payments³⁷, we assume that the resulting reduction in the value of consumer cash transactions leads to a proportional decline in the passive shadow economy in the analysed country³⁸. If, in turn, a regulation is focused on increasing the share of registered cash transactions in total consumer cash payments, its impact on the passive shadow

economy is much more straightforward and proportional to a decline in the share of unreported cash transactions (see Chart 3.1). Calculating the impact of the regulation on the passive shadow economy allows us to estimate the resulting change in government revenues (for methodological details, see Appendix 6). In addition, for some regulations we present the cost-benefit analysis that accounts not only for additional revenues, but also for the costs that the government may incur due to the introduction of the regulation.

In most of the regulations, we use our estimate of the share of cash transactions in the overall consumer transactions (and the corresponding share of card transactions in the overall consumer transactions; for details see Appendix 4). A sensitivity analysis of the results with respect to the structure of consumer payments is presented in Appendix 7.

³⁷ This impact on the value of card payments is either estimated or simulated, depending on the regulation considered.

³⁸ Consider an example country in which the passive shadow economy equals 20% of GDP. If a given policy tool leads to a decrease in consumer cash payments by 25%, the passive shadow economy contracts by $20\% \times 25\% = 5$ p.p., to the level of 15% of GDP. There are, however, some situations when this assumption may not hold. In such circumstances, we make an explicit disclaimer and describe the consequences of modifying this assumption.

Table 3.2. gives examples of such regulations already introduced in selected countries. Some of the presented solutions are based on enforcement or obligation mechanisms, whereas others focus on providing incentives either to consumers or merchants. Moreover, similar regulations in various countries often differ in terms of their scope and other parameters that may play a critical role for the ultimate impact of the considered instrument. Therefore, our analyses of the effects of different regulations should be regarded as examples of the impact that various solutions may have on the shadow economy and public finance. Since these solutions may be modified in terms of their scope, timing and other parameters, their actual effect would change accordingly and would depend on the final decision of regulators.

Table 3.2. Examples of regulations implemented in different countries.

Regulation	Countries of implementation
Obligation to make an electronic payment of wages and salaries	Croatia, Slovenia, Bosnia and Herzegovina (Republika Srpska), Uruguay
Obligation to make an electronic payment of social security benefits	Bulgaria, Croatia, Slovenia, Italy, Denmark, Sweden, Uruguay
Threshold for consumer cash payments	Bulgaria, Slovakia, Czech Republic, Slovakia and Slovenia (though in all countries at relatively high levels*)
Obligation to possess and use cash registers	Bulgaria, Poland, Croatia, Serbia, Slovakia, Bosnia and Herzegovina, Italy, Sweden, Hungary
Obligation to operate POS terminals	South Korea
Receipt lotteries	Bulgaria, Slovakia, Croatia, Poland, South Korea, Brazil, Taiwan, Malta, Portugal
Tax incentives for consumers	South Korea, Brazil (Sao Paulo), Colombia
Tax incentives for merchants	South Korea, Uruguay

*In some of these countries, consumer cash payments above a given threshold may be accepted, but generate a lot of administrative obligations for a merchant.

Source: EY

When analysing the impact of regulations on the passive shadow economy and government revenues, it is important to remember that the total impact of a given regulatory package will usually be lower than the sum of the effects of each regulation that this package comprises.

3.2.1. Obligation to make an electronic payment of wages and salaries



Chart 3.2. Mechanism of the regulation - Obligation to make an electronic payment of wages and salaries.

Source: EY

This regulation introduces the obligation to make an electronic (non-cash) payment of wages and salaries. In its basic form, the regulation requires that this kind of payment be performed via a bank transfer, though it is possible to allow payment also in the form of prepaid cards³⁹.



Obligation to make an electronic payment of wages and salaries - examples

This regulation is already in force in Croatia, Slovenia and in one region of Bosnia and Herzegovina (Republika Srpska). In those countries, employers are obliged to pay remunerations via bank transfers. Consequently, some employees have had to open bank accounts in order to receive their salaries.

According to the World Bank data (Global Findex Database), in 2014 more than 70% of the wage recipients in the analysed countries received their wages into their accounts at financial institutions (e.g. 74.6% in Bulgaria, 77.5% in Bosnia and Herzegovina, and the highest share of 97.0% in Slovenia). This suggests that, at least in some countries, a significant amount of wages and salaries is still paid in cash. It is very likely that most of this money is later spent also in cash, part of which may contribute to passive shadow economy transactions. The introduction of the considered regulation should shift all or most of the wages and salaries that were so far paid in cash to bank accounts (or prepaid cards)⁴⁰. This should naturally increase the volume of electronic payments (especially of payments performed with cards offered with most bank accounts), thereby replacing cash transactions, which in turn, as shown in Chapter 3.2, should lead to a decrease in the size of the passive shadow economy (see Chart 3.2).

Since the discussed regulation is already in force in Croatia and Slovenia, we do not estimate its effect for these countries. In Bosnia and Herzegovina this kind of law is binding in the Republika Srpska, but is not present in the Federation of Bosnia and Herzegovina. We therefore estimate the effect of this regulation on the value of card payments for Bosnia and Herzegovina as if the solution was absent, and then consider only part of the effect, corresponding to the population share of the Federation of Bosnia and Herzegovina in the population of the whole country.

³⁹ The employer can load prepaid payment cards with the net salary or wage and give them to employees who can use the card for their everyday payment transactions in the same way as a regular debit or credit card. We assume that the effects discussed here are similar for wage and salary payments whether paid by bank transfers or as prepaid cards.

⁴⁰ We account for the fact that this regulation will not influence the form of compensation received by unregistered employees, who will continue to receive their remuneration in cash - for more details see Appendix 5.

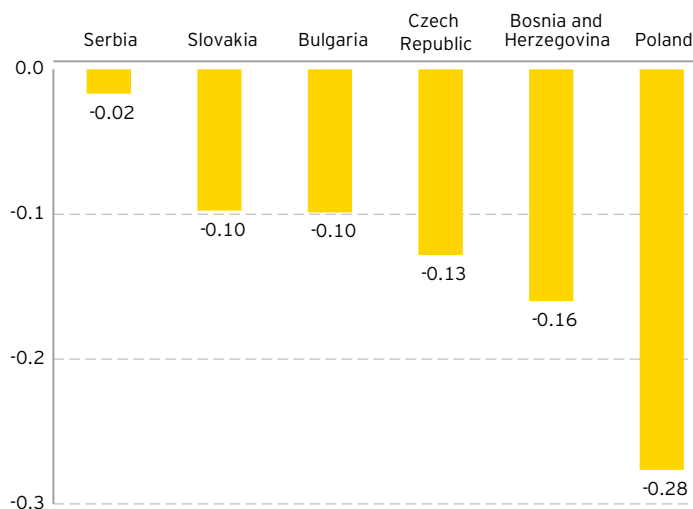
Impact of the regulation on the passive shadow economy

The electronic payment of wages means that people who previously received their remuneration in cash would have to make an additional effort to use cash, e.g. through ATM withdrawals, if they would like to continue to use cash. Therefore, they should more often perform their transactions with payment cards and, consequently, make less cash payments. This, in turn, should contribute to the reduction of the passive shadow economy (see Chapter 3.1).

We estimate the impact of this regulation on the value of cash payments replaced with card payments in a few steps. First, we use the World Bank's survey data (Global Findex Database) to calculate the number of people receiving their wages in cash in 2014. Second, we assume that all unregistered employees receive their remuneration in cash. Third, we conservatively assume that cash recipients are paid, on average, the minimum wage for their work. Finally, with the use of data on household savings rate and the payment behaviour of a typical card holder, we estimate the value of cash expenditure replaced with card payments in the situation when all registered employees receive their wages in an electronic form. For more details on the applied approach and calculations see Appendix 5.

The most significant decline in the passive shadow economy for the considered regulation (see Chart 3.3) has been estimated for Poland (0.28% of GDP), followed by Bosnia and Herzegovina (0.16% of GDP) and the Czech Republic (0.13% of GDP). A relatively low effect for Serbia (e.g. in comparison with Bosnia and Herzegovina) is mainly due to the large share of unregistered employees in the total employment in this country. This implies that a significant share of wages paid in cash in Serbia are remunerations obtained by unregistered employees, who would not be influenced by the regulation and would continue to receive their wages in the form of cash.

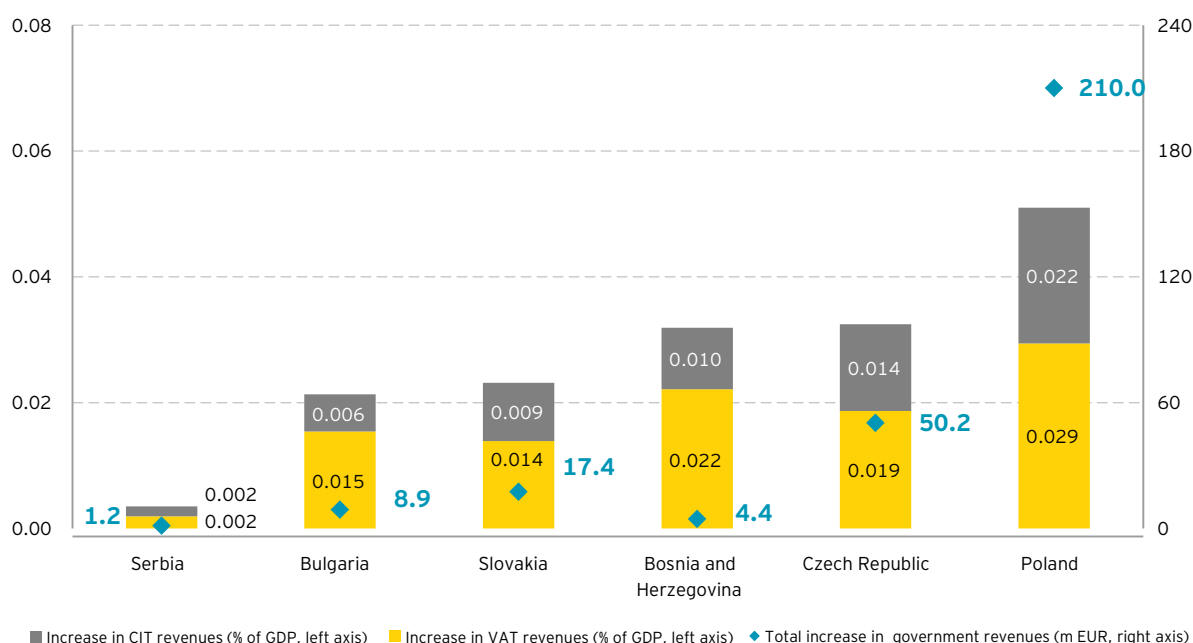
Chart 3.3. Obligation to make an electronic payment of wages and salaries - impact on the passive shadow economy (% of GDP).



Source: EY



Chart 3.4. Obligation to make an electronic payment of wages and salaries - impact on government revenues.



Source: EY

Impact of the regulation on government revenues

In line with the estimated effects for the passive shadow economy, Poland, the Czech Republic and Bosnia and Herzegovina can expect the highest increase in government revenues due to the implementation of the regulation - 0.051%, 0.032% and 0.032% of GDP, respectively (which is equivalent to EUR 210.0 m, EUR 50.2 m and EUR 4.4 m, respectively, see Chart 3.4).

Potential costs of the regulation

The introduction of obligatory electronic payments for wages and salaries should not generate significant costs. The likely costs are associated with the fees related to maintaining additional bank accounts (or related to the use of prepaid cards). These costs, depending on the legislation, may be covered either by the employer, employee or the government (or shared among them). However, it is worth noting that in 2014 the European Parliament passed legislation⁴¹ aimed at increasing the availability of financial accounts for all types of consumers. It states that all Member

States must introduce laws that oblige banks and other financial institutions to offer accounts with basic features free of charge or at a reasonable cost⁴².

Estimated timing of the impact of the regulation

The majority of the estimated impact should take place almost immediately after the introduction of the regulation. The remainder should materialise within 1-2 years, when the behaviour of new card holders will converge to the behaviour of a typical card holder (e.g. in terms of the frequency of card payments and ATM withdrawals). Some of the estimated effects may occur even before the introduction of the regulation (but after its announcement), since some entities will start acting in compliance with the regulation already in the transition period.

⁴¹ Article 46 of DIRECTIVE 2014/92/EU of 23 July 2014 on the comparability of fees related to payment accounts, payment account switching and access to payment accounts with basic features. <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014L0092> (accessed: 20.08.2015).

⁴² These features are not defined in the EU legislation and should be determined at a national level.

3.2.2. Obligation to make an electronic payment of social security benefits



Chart 3.5. Mechanism of the regulation - Obligation to make an electronic payment of social security benefits.

Source: EY

This regulation obliges the government to pay at least some kinds of social security benefits in the form of electronic payments, e.g. through bank transfers and/or prepaid cards. The mechanism of this regulation is analogous to the obligation to make an electronic payment of wages and salaries (see Chart 3.5 and Chapter 3.2.1).

The main difference is the targeted group and the fact that social benefits payments are performed only by public institutions (not by private businesses), so once the regulation has been introduced, there should be no violations of the law (which may sometimes take place in the case of legislation concerning wages and salaries).



Obligation to make an electronic payment of social security benefits - examples

The payment of unemployment and sickness benefits via bank transfer is already obligatory in Bulgaria, Croatia and Slovenia. In Italy, all social aid disbursements are made using prepaid cards. In addition, all social security benefits (including pensions) are paid electronically in Denmark, while in Sweden they are paid electronically or using prepaid cards. A law on mandatory electronic payments of social security benefits has also recently been approved in Uruguay.

Since the regulation is already in force for unemployment benefits in Bulgaria, Croatia and Slovenia, we have not considered this scenario for these countries.

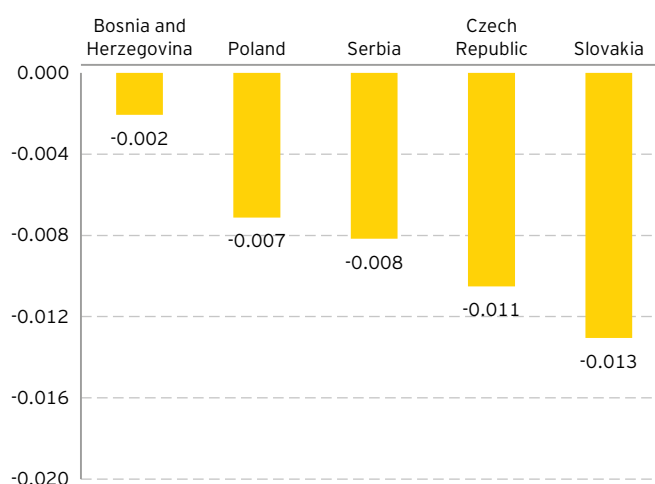
Impact of the regulation on the passive shadow economy

We consider this regulation for two kinds of social security benefits: (1) unemployment benefits, which constitute a relatively small category of government social expenditure in the analysed countries, and (2) pensions, which account for a significant share of the total social expenditure. The reason why we investigate only these two kinds of benefits is that comparable data (among the analysed countries) for other categories of social spending was not available. However, the results of our analysis may easily be rescaled for other kinds of social security benefits, if one assumes that these remaining categories of social transfers are currently paid in cash as often as unemployment benefits and pensions.

The estimation of the impact of this regulation on the value of cash payments replaced with electronic payments is similar to the approach applied to obligation to make an electronic payments of wages and salaries. First we obtain data on the total net value of the considered benefits for the analysed countries using databases and publications of OECD, Eurostat, EcoWin and national sources.

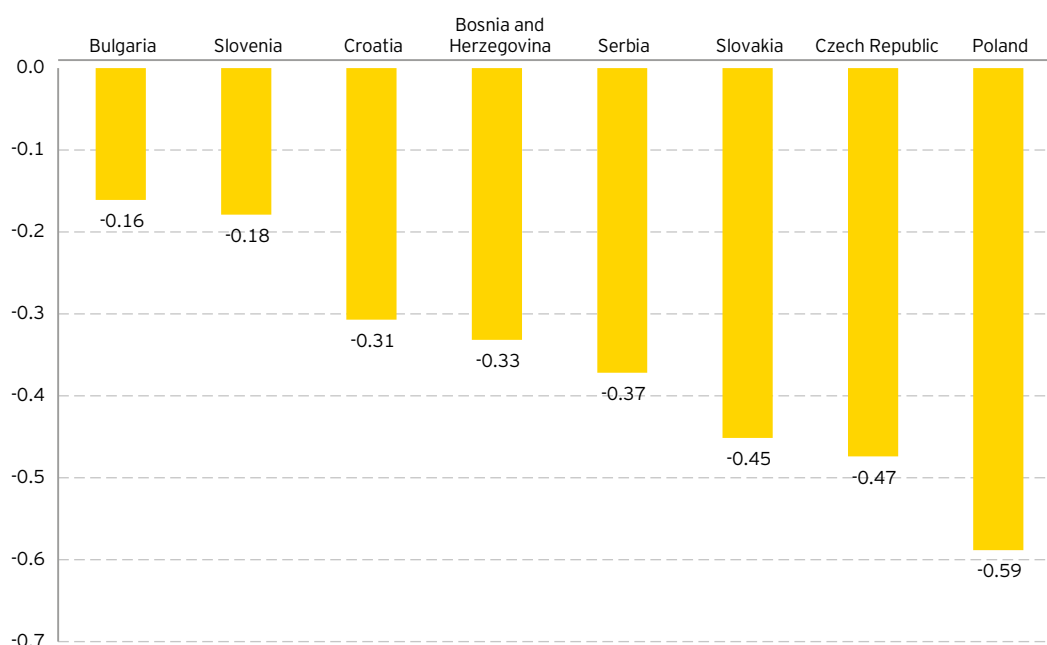
Then we use the World Bank's survey data (Global Findex Database) on the percentage of recipients of government transfers in the analysed countries that received these transfers in cash in 2014. We assume that these figures are also applicable to unemployment benefits and pensions recipients. In the last step, we take into account the household saving rate and the payment behaviour of a typical card holder in the analysed countries in order to estimate the value of cash payments replaced with card transactions due to the introduction of the regulation. For more details on the applied approach and calculations see Appendix 5. The potential decrease of the passive shadow economy caused by the obligatory payment of unemployment benefits to bank accounts (or on prepaid cards) is much smaller than in the case of the considered regulation for pensions (see Chart 3.6. and Chart 3.7). In the latter, Poland can reduce the passive shadow economy by as much as 0.59% of GDP. One can also observe considerable effects for the Czech Republic (0.47%), Slovakia (0.45%), Serbia (0.37%), Bosnia and Herzegovina (0.33%) and Croatia (0.31%).

Chart 3.6. Obligation to make an electronic payment of unemployment benefits - impact on the passive shadow economy (% of GDP).



Source: EY

Chart 3.7. Obligation to make an electronic payment of pensions - impact on the passive shadow economy (% of GDP).



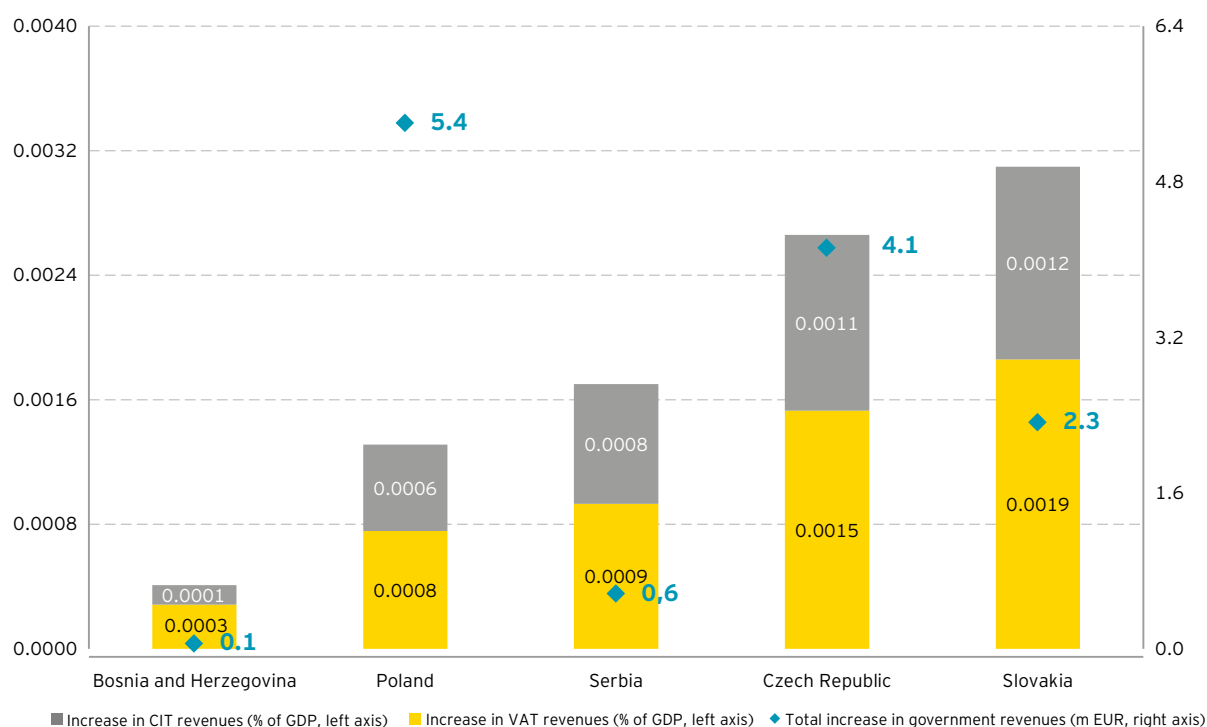
Source: EY

Impact of the regulation on government revenues

Similarly to the impact on the shadow economy, the effect of obligatory electronic payments of unemployment benefits on government revenues is much smaller than the impact of that regulation for pension transfers (see Chart 3.8 and Chart 3.9).

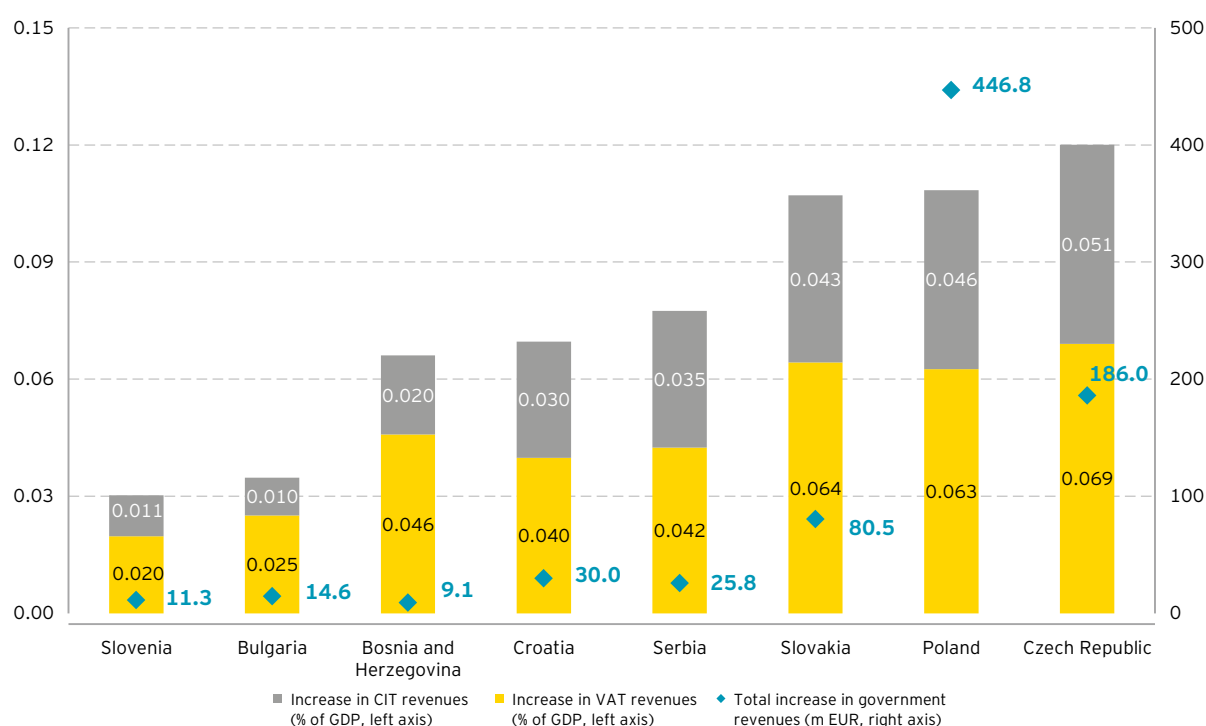
The latter increases government revenues the most in the Czech Republic (by 0.12% of GDP or EUR 186.0 m), while in Poland and Slovakia the additional revenues amount to approximately 0.11% of GDP.

Chart 3.8. Obligation to make an electronic payment of unemployment benefits - impact on government revenues.



Source: EY

Chart 3.9. Obligation to make an electronic payment of pensions - impact on government revenues.



Source: EY

Potential costs of the regulation

The costs of these measures are analogous to the case of the electronic payment of wages and salaries, comprising mainly the costs of maintaining additional bank accounts (see Chapter 3.2.1). Yet, as it has already been mentioned, in EU countries the new directive enforces the introduction of basic accounts that must be offered by all financial institutions free of charge or at reasonable cost, as defined by the Member States.

It is also worth noting that traditional methods of paying pensions, such as delivery by post, can be relatively expensive. According to the Polish Social Insurance Institution (ZUS), the delivery cost of pensions by post is 10 times higher than in the case of electronic payments to bank accounts⁴³, which is why ZUS, together with one commercial bank, decided to promote a special bank account for pensioners (bank account with additional features, such as payback for payments at pharmacies, and with bank services, such as bank transfers and ATM cash withdrawals, free of charge for the first two years)⁴⁴. Transferring pension benefits directly to a bank account instead of a delivery by post would therefore decrease the costs of paying pensions incurred by the government. On the other hand, one should not forget about the technological barrier for some elderly pensioners, who may have difficulties in using payment cards and might not be willing to use a bank account.

Estimated timing of the impact of the regulation

While the electronic payment of pensions may constitute a technological barrier for some elderly people, most of the estimated impact should take place soon after the introduction of the regulation. The remainder of the effect should materialise when the behaviour of new card holders will converge to the behaviour of a typical card holder (e.g. in terms of the frequency of card payments and ATM withdrawals), which - in the case of social benefits recipients - may take longer than in the case of employees.



⁴³ <http://www.zus.pl/default.asp?id=1&p=1&idk=1807> (accessed 17.11.2015)

⁴⁴ <http://www.zus.pl/default.asp?id=1&p=1&idk=2453> (accessed 17.11.2015)

3.2.3. Threshold for cash payments

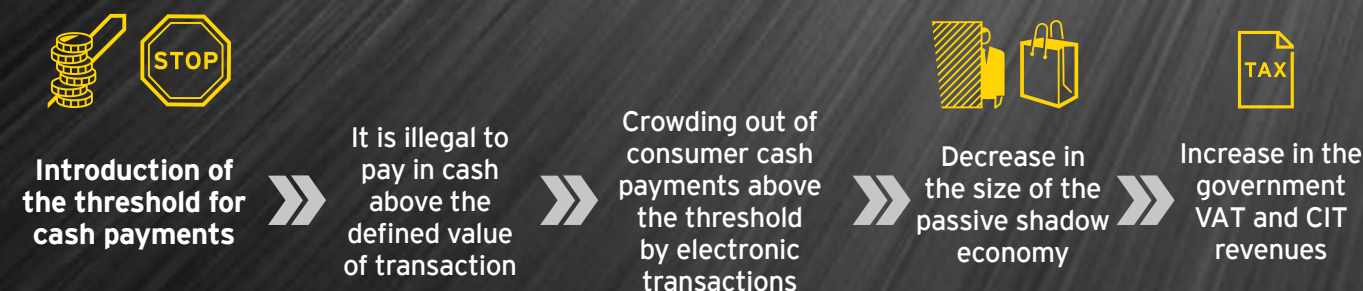


Chart 3.10. Mechanism of the regulation – Threshold for cash payments.

Source: EY

This regulation defines a certain monetary value (threshold) for a single transaction above which consumer cash payments are not allowed. Consequently, consumer cash transactions above the introduced threshold should disappear and be replaced with

additional electronic payments, thus reducing the size of the passive shadow economy and increasing government revenues (see Chart 3.10).



Threshold for consumer cash payments - examples

Thresholds for cash payments are already present in Bulgaria, Croatia, the Czech Republic, Slovakia and Slovenia (in some of them consumer payments above the threshold may be accepted, but generate a lot of administrative obligations for a merchant). Yet, the current thresholds are relatively high (between EUR 5 000 and 15 000) so their impact on reducing cash payments is marginal, as cash is mostly used for lower-value transactions. Moreover, as we argue in this section, such high cash payments in retailing are already reported, not least for the sake of consumer warranty, and replacing them with card payments therefore has no effect on the passive shadow economy.

Similar regulations for B2B payments are present in all of these countries, but they do not influence the passive shadow economy, since it is related to consumer transactions.

Source: EY, MasterCard.

For the purpose of this analysis, we consider five different cash payment thresholds⁴⁵. These thresholds have been selected based on the distribution of consumer cash payments in Poland, provided by the courtesy of the Polish central bank. For the sake of comparability across the analysed countries, threshold levels (originally round values in Polish Zloty, PLN) have been expressed in EUR. Moreover, for each country the respective threshold values have been adjusted for the differences in nominal GDP levels per capita between a given country and Poland (for more details see Appendix 5). The resulting figures are presented in Table 3.3.

⁴⁵ In an additional, less conservative variant of calculating the effects of this regulation, presented in Appendix 5, we also consider a sixth threshold.

Table 3.3. Considered thresholds for the maximum allowed value of consumer cash payment (EUR).

Threshold number	Bosnia and Herzegovina	Bulgaria	Serbia	Poland	Czech Republic	Croatia	Slovenia	Slovakia
1	1.6	2.5	2.1	4.7	6.5	4.5	8.0	6.1
2	4.0	6.4	5.1	11.8	16.3	11.2	20.0	15.3
3	8.0	12.7	10.3	23.6	32.6	22.4	39.9	30.7
4	12.0	19.1	15.4	35.5	48.8	33.5	59.9	46.0
5	15.9	25.5	20.6	47.3	65.1	44.7	79.9	61.4

Source: EY

It should be emphasised that the considered thresholds are presented as nothing more than simply examples of different maximum levels of allowed consumer cash payments. We agree that the presented limits, especially the lowest ones, may seem unacceptable and hardly feasible to implement. Nevertheless, these thresholds have been largely determined by data availability from the research conducted by the National Bank of Poland. Moreover, as confirmed by the data on the distribution of consumer cash payments, above the higher transaction levels the value of consumer cash payments is marginal. For example, the value above the fifth threshold (for example EUR 47.3 in Poland) accounts for only 7% of all consumer cash transactions. This share would further decline with an increase in the threshold level. In addition, above a (relatively) high threshold of the transaction value there should be almost no passive shadow economy, because one can expect that consumers tend to demand receipts for more expensive, durable

goods in order to obtain a warranty. Obviously, there are high-value cash payments in the committed shadow economy. However, these would remain unaffected by the regulation, as both parties benefiting from this kind of activity would continue to use cash in order to avoid reporting the transaction. The arguments outlined above thus strongly suggest that establishing high thresholds for consumer cash payments would have little, if any, impact on the passive shadow economy.

Impact of the regulation on the passive shadow economy

To estimate the effect of establishing different thresholds for consumer cash transactions on the value of cash and card payments, we apply a simulation approach (for more details see Appendix 5). The impact of the regulation on the change in size of the passive shadow economy is presented in Table 3.4.

Table 3.4. Introducing thresholds for consumer cash payments - impact on the passive shadow economy (% of GDP).

Threshold number	Bosnia and Herzegovina	Bulgaria	Serbia	Poland	Czech Republic	Croatia	Slovenia	Slovakia
1	-17.7%	-8.7%	-13.1%	-8.9%	-8.6%	-9.7%	-7.7%	-9.7%
2	-10.6%	-5.3%	-7.9%	-5.4%	-5.2%	-5.8%	-4.7%	-5.8%
3	-5.2%	-2.6%	-3.9%	-2.6%	-2.5%	-2.8%	-2.3%	-2.9%
4	-2.7%	-1.3%	-2.0%	-1.4%	-1.3%	-1.5%	-1.2%	-1.5%
5	-1.8%	-0.9%	-1.3%	-0.9%	-0.9%	-1.0%	-0.8%	-1.0%

Source: EY

In each country, the lower the threshold level, the more cash transactions would be replaced with card payments, implying a stronger impact of the regulation on the passive shadow economy. The source of differences in the results obtained for the analysed countries is the different size of their passive shadow economy (in % of GDP). For that reason, the impact of, for example, the implementation of threshold No 3 on the shadow economy is the highest in Bosnia and Herzegovina (-5.2% of GDP) and Serbia

(-3.9% of GDP), while the lowest effect has been estimated for Slovenia (-2.3% of GDP).

It should be noted that this regulation may also encourage the purchase/lease of POS terminals and, through the increased acceptance of card payments, additionally stimulate growth in the value of card payments below the established threshold. This effect will be stronger, the lower the threshold for consumer cash

payments. However, we do not account for that additional impact in our calculations, which makes our results - at least in this context - conservative.

On the other hand, we have assumed that the passive shadow economy is uniformly distributed in the considered range of unit transaction values, while it is likely that a relatively large share of the passive shadow economy is "concentrated" around lower-value transactions. Moreover, we do not account for the fact that some consumers might split their cash payments into several transactions, so that the value of each cash transaction is lower than the imposed threshold. Consequently, these factors, if accounted for, would reduce the estimated effect of the considered thresholds.

Impact of the regulation on government revenues

The impact of the regulation on government revenues corresponds to the estimated changes in the size of the passive shadow economy in the analysed countries. Therefore, the strongest (% of GDP) effect of establishing threshold No 3 on government revenues is observed for Bosnia and Herzegovina (1.0% of GDP or EUR 143.3 m) and Serbia (0.8% of GDP or EUR 267.8 m), while the weakest impact has been estimated for Slovenia (0.4% of GDP or EUR 143.5 m).

Table 3.5. Introducing thresholds for consumer cash payments - impact on government (VAT and CIT) revenues % of GDP).

Threshold number	Bosnia and Herzegovina	Bulgaria	Serbia	Poland	Czech Republic	Croatia	Slovenia	Slovakia
1	3.5%	1.9%	2.7%	1.6%	2.2%	2.2%	1.3%	2.3%
2	2.1%	1.1%	1.6%	1.0%	1.3%	1.3%	0.8%	1.4%
3	1.0%	0.6%	0.8%	0.5%	0.6%	0.6%	0.4%	0.7%
4	0.5%	0.3%	0.4%	0.3%	0.3%	0.3%	0.2%	0.4%
5	0.4%	0.2%	0.3%	0.2%	0.2%	0.2%	0.1%	0.2%

Source: EY

Table 3.6. Introducing thresholds for consumer cash payments - impact on government (VAT and CIT) revenues (EUR m).

Threshold number	Bosnia and Herzegovina	Bulgaria	Serbia	Poland	Czech Republic	Croatia	Slovenia	Slovakia
1	486.0	791.2	908.3	6776.6	3383.0	943.7	486.8	1726.7
2	292.8	476.7	547.3	4083.3	2038.5	568.7	293.3	1040.4
3	143.3	233.3	267.8	1998.2	997.6	278.3	143.5	509.2
4	74.8	121.7	139.7	1042.6	520.5	145.2	74.9	265.6
5	49.8	81.1	93.2	695.0	347.0	96.8	49.9	177.1

Source: EY

Potential costs of the regulation

Likely costs are linked to the use of additional bank accounts (or prepaid cards) that enable conducting transactions whose value exceeds a given threshold. However, in 2014 the EU obliged financial institutions to offer accounts with basic features free of charge or at a reasonable cost. Moreover, the regulation may force some merchants to purchase (or lease) POS terminals and incur respective costs.

Estimated timing of the impact of the regulation

The estimated impact of the regulation should materialise almost immediately after its introduction. In the longer run, the regulation may also stimulate growth in the value of card payments below the threshold.

3.2.4. Obligation to possess cash registers

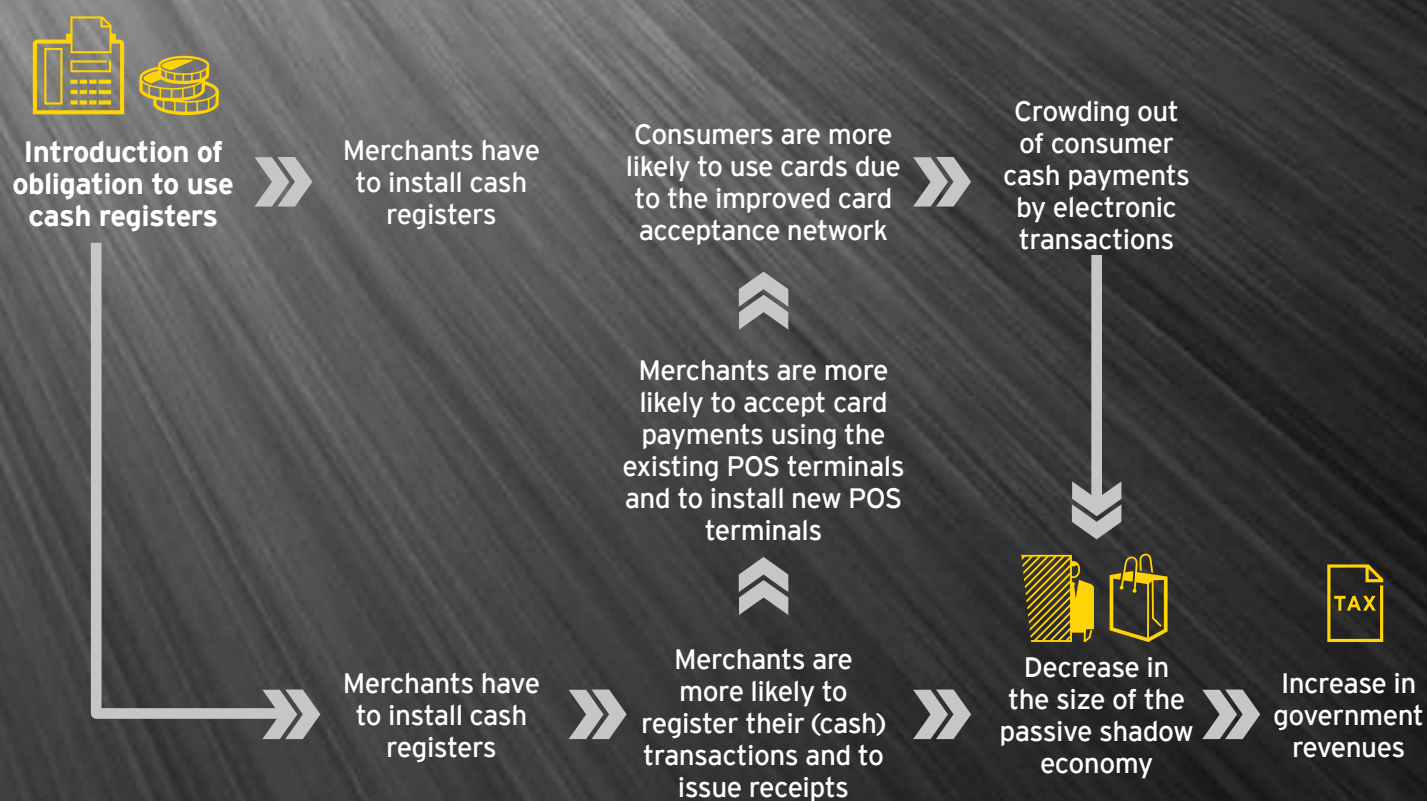


Chart 3.11. Mechanism of the regulation - Obligation to possess cash registers.

Source: EY

This regulation obliges a wider group of businesses (depending on the type of business activity or the value of the yearly turnover) to use cash registers or related fiscal devices in order to record every individual transaction, regardless of the means of payment.

The process of introducing cash registers, often described as the process of fiscalisation, is intended to provide a mechanism for tax administrations to supervise the records in the cash turnover and monitor and detect non-compliance (see Chart 3.11).

It should be noted that several factors affect the efficiency of this regulation. First, the introduction of mandatory cash registers is usually accompanied with intensified fiscal controls and audits. Second, modern fiscalisation solutions, such as so-called online cash registers, which have become increasingly popular over the last few years, may provide better results. In this case, each fiscal device is equipped with internet connectivity and appropriate software that enables the delivery of individual transaction data on a real time basis to the tax administration. In this way, every invoice is authorised by the tax office before being presented to the buyer.



Obligation to possess cash registers - examples

Poland, Italy and recently Sweden - these are some of the European countries that have already obliged a wider group of businesses (with certain exceptions depending on the type of business or limits of turnover) to record every individual money transfer via fiscal devices, regardless of the means of payment. Furthermore, in the case of Bosnia and Herzegovina, Croatia, Slovakia, Serbia and Hungary, cash registers must be equipped with internet connectivity so that data on each transaction can be delivered on a regular time basis (e.g. real time, daily) to the tax administration server.

Additionally, a law on fiscalisation becomes effective in 2016 in Slovenia, and one is currently in preparation in the Czech Republic.

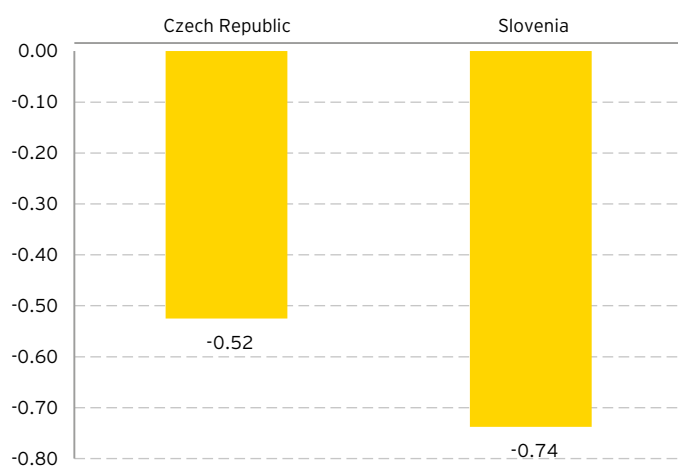
Impact of the regulation on the passive shadow economy

We estimate the impact of the obligation to possess and use cash registers on the passive shadow economy based on two kinds of econometric analysis:

- **Panel, international econometric analysis** of the impact of this obligation on the value of card transactions;
- **Time-series econometric analysis for Poland** of the impact of the number of cash registers on the size of the passive shadow economy⁴⁶.

In the panel econometric analysis, we use the regulatory data from 17 European states⁴⁷. The obtained results suggest that a regulation obliging businesses to record every transaction using a cash register significantly increases the value of card payments per capita. Such findings confirm that the regulation-driven increased propensity of businesses to report transactions not only leads to an increased share of registered consumer cash payments, but also promotes electronic transactions through increased card acceptance. This implies crowding out consumer cash payments with card payments, which in turn translates into the reduction of the passive shadow economy. We apply the estimation results to assess the potential benefits of the fiscalisation reform for the Czech Republic and Slovenia, which as of end-2015 had not yet introduced this measure. For these two countries, a potential drop in the passive shadow economy amounts to 0.74% and 0.52% of GDP respectively (see Chart 3.12).

Chart 3.12. The impact of the obligatory possession of cash registers on the change in the size of the passive shadow economy (% of GDP).



Source: EY

It should be stressed, however, that we assess the expected average effect of this reform based on the variety of country-specific solutions applied in the past. Therefore, the actual effect for the Czech Republic and Slovenia might differ from the presented results, depending on particular regulation characteristics and the level of compliance with the new law. Moreover, it should be remembered that the panel econometric analysis can capture only part of the impact of fiscalisation on the passive shadow economy. As it is focused on measuring the impact of this regulation on the value of card payments at POS terminals, it does not account for the effect of the increased likelihood of consumer cash payments being registered due to fiscalisation requirements.

The time-series econometric analysis is complementary to the panel analysis discussed above and is intended to estimate the effect of the “fiscalisation level” on the passive shadow economy, using the example of Poland. We provide this analysis for Poland due to the lack of necessary data (i.e. the number of cash registers) for other countries⁴⁸. This approach complements the results of the panel analysis as it takes into account not only the implementation of the reform, but also its scope and evolution over time. Furthermore, in this approach we measure the direct impact of cash registers on the passive shadow economy. It means that it accounts not only for the effect of crowding out cash by card payments (like in the panel econometric analysis), but also for the effect related to an increased number of cash payments reported to the tax authority.

The obtained estimates suggest that an increase in the ratio of the number of cash registers to the number of active enterprises by 0.1 leads, on average, to a decrease in the passive shadow economy by 0.326 percentage points of GDP. In the fourth quarter of 2013, the ratio of the number of cash registers to the number of active enterprises in Poland amounted to 1.07. It means that a rise by 0.1 would correspond to a 9.3% increase in the fiscalisation level.

⁴⁶ For more details on both approaches see Appendix 5.

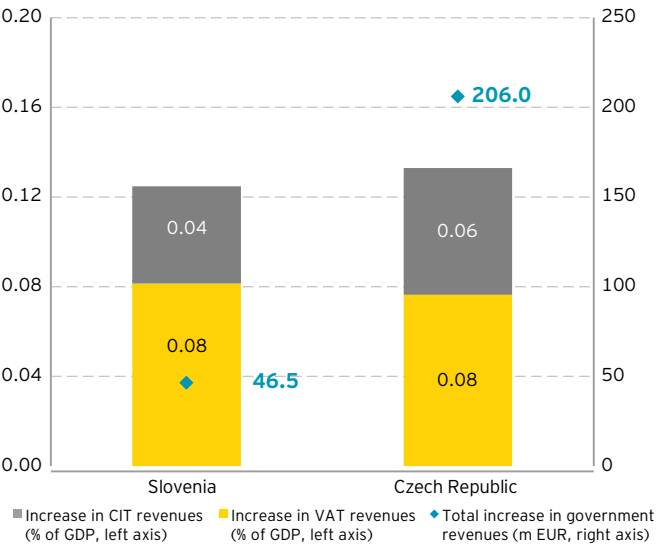
⁴⁷ These countries include Poland, Croatia, Serbia, Slovenia, Slovakia, the Czech Republic, Bosnia and Herzegovina, Hungary, Denmark, Norway, Sweden, the United Kingdom, Austria, Finland, Germany, Portugal and Spain.

⁴⁸ We are particularly grateful to the Polish Ministry of Finance for providing us with time series on the number of active cash registers in Poland.

Impact of the regulation on government revenues

Results of the panel econometric model suggest that if a law on the mandatory possession of cash registers came into force, government revenues in the Czech Republic and Slovenia would increase by 0.13 and 0.12% of GDP, respectively (in absolute terms, additional revenues amount to EUR 206.0 m in the Czech Republic and EUR 46.0 m in Slovenia, see Chart 3.13).

Chart 3.13. The impact of the obligatory possession of cash registers on government revenues.



Source: EY

Potential costs of the regulation

Purchasing cash registers may constitute a significant implementation cost of the regulation. Furthermore, during the implementation phase, intensified fiscal controls are necessary in order to monitor how businesses comply with the new law. In addition, in the case of online cash registers, the cost of dedicated equipment and software tracking and transferring each receipt to the tax authority should be taken into account. This infrastructure should be installed both by merchants and the tax authority.

Estimated timing of the impact of the regulation

The regulation may take some time to implement, due to the need to purchase and install new devices and software both by merchants and the tax authority (depending on the scope of the regulation). Most of the estimated impact will most likely have materialised by the end of the transition period. Some effects may emerge even before the introduction of the regulation (but after its announcement), since some entities will start acting in compliance with the regulation already in the transition period.



3.2.5. Obligation to operate POS terminals for selected types of businesses

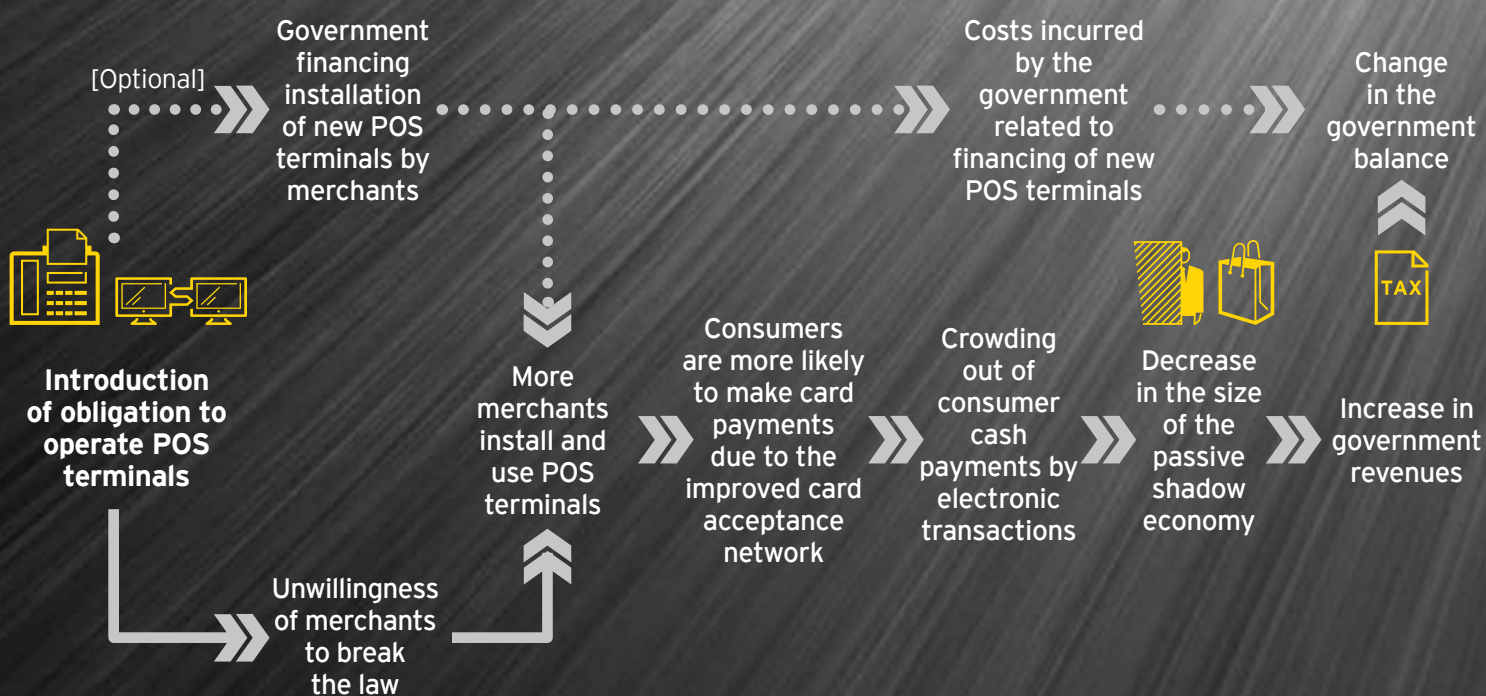


Chart 3.14. Mechanism of the regulation - Obligation to operate POS terminals for selected types of businesses.

Source: EY

This regulation obliges certain types of businesses to operate POS (point of sale) terminals (see Chart 3.14). POS terminals are devices that enable customers to settle their payments with payment cards. Since the development of the acceptance network is an important determinant of the popularity of electronic transactions, it is possible to stimulate the growth of card payments (replacing

consumer cash payments) through the obligation to install POS terminals in selected sectors. This should be most effective in the sectors accounting for a high share of the total passive shadow economy, and for business activities in which the prevalence of POS terminals is currently relatively low.



Obligation to operate POS terminals - an example

South Korea is known for promoting electronic transactions by applying a wide range of policy tools. In 2001, card acceptance was mandated for all VAT-paying businesses in the country. Moreover, in 2002 South Korea imposed fines for card refusal.

Impact of the regulation on the passive shadow economy

We evaluate the impact of the considered regulation on the value of card and cash payments using a simulation approach. The crucial element of our analysis is the estimation of the gap between the regulation-implied and current number of POS terminals. Importantly, we estimate this gap and the resulting increase in the number of terminals, taking into account the sectorial breakdown of the economy. As a further step, based on the regression analysis, we translate the estimated changes in the number of terminals into the growth in the value of card payments, which in turn allows us to calculate the value of crowded out cash payments and the resulting decrease in the size of the passive shadow economy. We assume perfect compliance of merchants with the regulation. For more details on the applied approach and obtained results see Appendix 5.

The estimated impact of the regulation on the size of the passive shadow economy is presented in Table 3.7. It is the highest for (1) the relatively large sectors (in which an increase in the prevalence of POS terminals significantly contributes to a growth in the total number of POS terminals in the economy) and (2) the sectors in which “saturation” with POS terminals is relatively low. In all the countries, except Slovenia and Croatia, the estimated effect is the highest for the sector of food, beverages and tobacco (for Slovenia and Croatia it is restaurants, bars and cafes, though differences with the food, beverages and tobacco sector are marginal). Since the number of POS terminals per capita in Bosnia and Herzegovina is the lowest among the analysed countries, the potential effect of the regulation for this country is the most significant.

Table 3.7. Obligation to operate POS terminals for selected types of businesses - impact on the passive shadow economy (% of GDP).

	Bosnia and Herzegovina	Bulgaria	Croatia	Czech Republic	Poland	Serbia	Slovakia	Slovenia
Food, beverages and tobacco (grocery stores, markets, etc.)	-0.30%	-0.13%	-0.14%	-0.48%	-0.44%	-0.39%	-0.36%	-0.20%
Restaurants	-0.12%	-0.04%	-0.14%	-0.31%	-0.07%	-0.15%	-0.20%	-0.21%
Fuels for vehicles	-0.08%	-0.03%	-0.01%	-0.06%	-0.11%	-0.10%	0.00%	-0.09%
Accommodation	-0.04%	-0.01%	-0.11%	-0.10%	-0.04%	-0.05%	-0.02%	-0.06%
Transport (private and public)	-0.05%	-0.02%	-0.03%	-0.04%	-0.02%	-0.07%	-0.05%	-0.01%
Recreation and culture	-0.01%	0.00%	-0.02%	-0.02%	-0.03%	-0.01%	-0.02%	-0.01%
Top 6 sectors with the highest effects*	-0.60%	-0.24%	-0.43%	-1.01%	-0.71%	-0.77%	-0.67%	-0.58%
All passive shadow economy sectors	-0.64%	-0.26%	-0.47%	-1.14%	-0.79%	-0.82%	-0.80%	-0.63%

*These sectors have been selected based on the average results for all the countries.

Source: EY

Impact of the regulation on government revenues

The purchase or lease of POS terminals constitutes a major cost of the considered regulation. This cost may be borne by businesses, the government or shared between them. We consider two variants:

- at no cost to the government, in which we focus only on the impact of the regulation on government revenues;

- where the government finances 100% of the cost of installing new POS terminals, which is assumed to equal EUR 100 per device in each country. This variant is marked as “Optional” in Chart 3.14.

The estimated impact of the regulation on government revenues is presented in Tables 3.8 and 3.9).

Table 3.8. Obligation to operate POS terminals for selected types of businesses - impact on government (VAT and CIT) revenues (% of GDP).

	Bosnia and Herzegovina	Bulgaria	Croatia	Czech Republic	Poland	Serbia	Slovakia	Slovenia
Food, beverages and tobacco (grocery stores, markets, etc.)	0.06%	0.03%	0.03%	0.12%	0.08%	0.08%	0.09%	0.03%
Restaurants	0.02%	0.01%	0.03%	0.08%	0.01%	0.04%	0.05%	0.03%
Fuels for vehicles	0.02%	0.01%	0.00%	0.02%	0.03%	0.02%	0.00%	0.02%
Accommodation	0.01%	0.00%	0.02%	0.02%	0.01%	0.01%	0.01%	0.01%
Transport (private and public)	0.01%	0.00%	0.01%	0.01%	0.00%	0.02%	0.01%	0.00%
Recreation and culture	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%
Top 6 sectors with the highest effects*	0.12%	0.05%	0.09%	0.26%	0.13%	0.16%	0.17%	0.10%
All passive shadow economy sectors	0.13%	0.06%	0.10%	0.29%	0.15%	0.17%	0.20%	0.10%

*These sectors have been selected based on the average results for all the countries.

Source: EY

Table 3.9. Obligation to operate POS terminals for selected types of businesses - impact on government (VAT and CIT) revenues (EUR m).

	Bosnia and Herzegovina	Bulgaria	Croatia	Czech Republic	Poland	Serbia	Slovakia	Slovenia
Food, beverages and tobacco (grocery stores, markets, etc.)	8.6	12.6	12.4	183.7	321.4	25.6	69.3	12.1
Restaurants	3.4	4.2	12.6	131.5	46.2	12.5	39.4	11.6
Fuels for vehicles	2.3	2.9	1.1	25.4	119.3	6.2	0.0	7.7
Accommodation	1.1	0.9	9.8	36.2	23.6	3.3	4.1	3.2
Transport (private and public)	1.4	1.6	3.5	14.5	12.2	5.6	9.6	0.6
Recreation and culture	0.2	0.2	1.4	8.5	17.3	0.4	1.3	0.5
Top 6 sectors with the highest effects*	17.0	22.4	40.7	399.9	539.9	53.5	128.0	35.6
All passive shadow economy sectors	18.1	23.6	44.3	454.3	617.3	57.5	152.6	38.7

*These sectors have been selected based on the average results for all the countries.

Source: EY

In the “optional” variant, we have to account not only for additional revenues, but also for the costs that the government has to incur due to financing the cost of installing new POS terminals. The net effects for the government balance in relative (as % of GDP) and absolute terms are presented in Table 3.10 and 3.11, respectively.

The results show that, even if the government covers the cost of the regulation, the net impact on the government balance remains positive for all the analysed sectors and countries, with the only exception being the accommodation sector in Bulgaria.

Table 3.10. Obligation to operate POS terminals for selected types of businesses - impact on the government balance (% of GDP).

	Bosnia and Herzegovina	Bulgaria	Croatia	Czech Republic	Poland	Serbia	Slovakia	Slovenia
Food, beverages and tobacco (grocery stores, markets, etc.)	0.02%	0.01%	0.02%	0.11%	0.07%	0.05%	0.09%	0.03%
Restaurants	0.01%	0.00%	0.02%	0.08%	0.01%	0.03%	0.05%	0.03%
Fuels for vehicles	0.01%	0.00%	0.00%	0.02%	0.03%	0.01%	0.00%	0.02%
Accommodation	0.00%	-0.00%	0.02%	0.02%	0.00%	0.01%	0.01%	0.01%
Transport (private and public)	0.00%	0.00%	0.01%	0.01%	0.00%	0.01%	0.01%	0.00%
Recreation and culture	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%
Top 6 sectors with the highest effects*	0.04%	0.01%	0.08%	0.24%	0.11%	0.10%	0.16%	0.09%
All passive shadow economy sectors	0.04%	0.01%	0.09%	0.27%	0.13%	0.11%	0.19%	0.09%

*These sectors have been selected based on the average results for all the countries.

Source: EY

Table 3.11. Obligation to operate POS terminals for selected types of businesses - impact on the government balance (EUR m).

	Bosnia and Herzegovina	Bulgaria	Croatia	Czech Republic	Poland	Serbia	Slovakia	Slovenia
Food, beverages and tobacco (grocery stores, markets, etc.)	2.9	2.2	10.4	171.5	276.4	15.3	63.9	10.7
Restaurants	1.1	0.7	10.5	123.8	38.7	8.6	36.4	10.2
Fuels for vehicles	0.8	0.5	1.0	23.9	107.7	3.6	0.0	7.1
Accommodation	0.4	-0.2	8.2	33.7	19.8	1.9	3.8	2.8
Transport (private and public)	0.5	0.3	3.0	13.5	10.1	3.8	8.9	0.5
Recreation and culture	0.1	0.0	1.1	8.0	14.5	0.1	1.1	0.5
Top 6 sectors with the highest effects*	5.7	3.5	34.1	374.3	467.3	33.3	118.1	31.8
All passive shadow economy sectors	6.0	3.6	37.1	425.4	535.6	35.9	140.6	34.5

*These sectors have been selected based on the average results for all the countries.

Source: EY

Estimated timing of the impact of the regulation

Most of the estimated impact should materialise almost immediately after the introduction of the regulation. Some effects may take place even before the introduction of the regulation, since

some entities may start acting in compliance with the regulation soon after its announcement.

3.2.6. Tax incentives for consumers

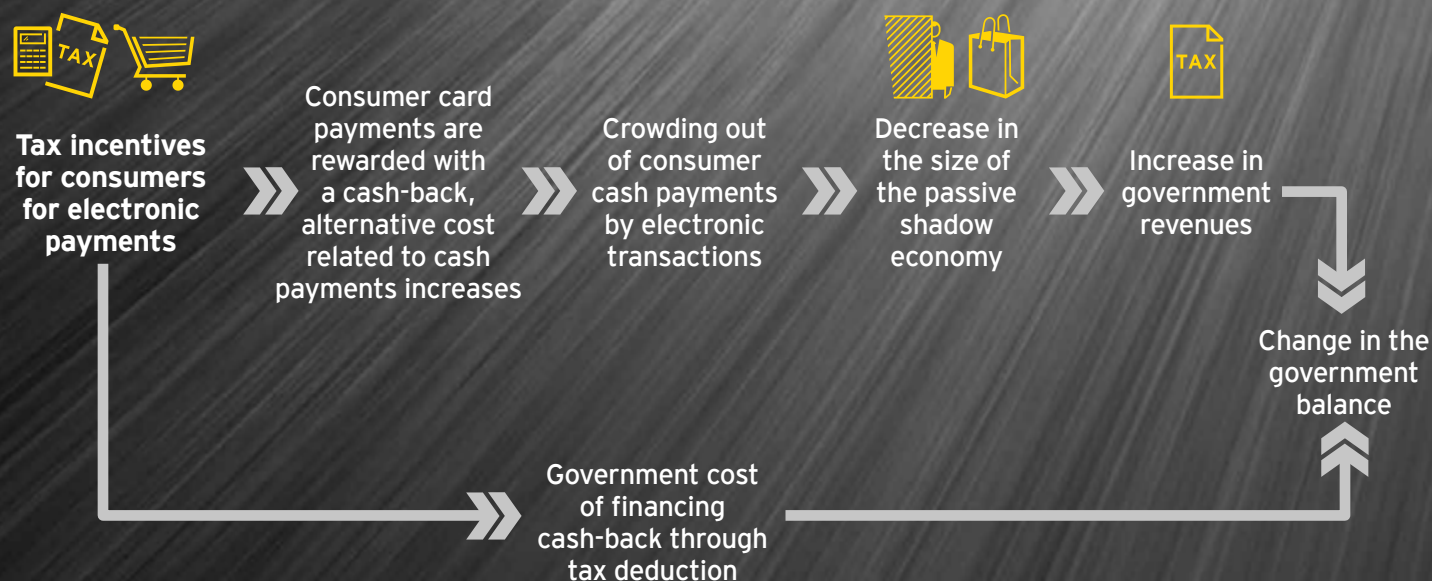


Chart 3.15 Mechanism of the regulation - Tax incentives for consumers.

Source: EY

Another way to promote electronic payments is to make them financially more attractive for consumers compared to cash payments. This can be achieved by providing payment card users with special benefits directly related to their cards, such as discounts, cash-back or reward points redeemable for prizes. Such methods have been widely used by private financial institutions, and their effectiveness has been confirmed by a number of studies based on survey data⁴⁹. By analogy, such a financial motivation may be provided by the government, for example, through appropriately designed tax incentives to reduce the tax component of retail

prices such as VAT, provided that a consumer makes a card payment at the point of sale⁵⁰. This should then lead to a reduction in cash payments and, as a result, to a decrease in the size of the passive shadow economy and a resulting increase in government revenues (Chart 3.15). It should be stressed that such incentives for consumers may be introduced through various mechanisms, many of which allow the government to reduce the incurred costs, but at the same time lower potential benefits in terms of crowded out cash payments (see also below).

⁴⁹ See, for example, Ching A. and F. Hayashi (2010), "Payment Card Rewards Programs and Consumer Payment Choice", *Journal of Banking & Finance*, Vol. 34, No. 8, pp. 1773-1787 for the USA, Santiago Carbó-Valverde, José Manuel Liñares-Zegarra (2009), "How effective are rewards programs in promoting payment card usage? Empirical evidence", ECB Working Paper No. 1137 for Spain or Carlos A. Arango, Kim P. Huynh, Leonard Sabetti (2011), "How Do You Pay? The Role of Incentives at the Point-of-Sale", ECB Working Paper No. 1386 for Canada.

⁵⁰ A similar effect may be achieved through the use of subsidies.



Tax incentives for consumers - examples

In 1999, South Korea introduced such a programme, whereby consumers could deduct from their income tax base 10% of the amount paid through credit cards in excess of 10% of the person's total salary. To prevent excessive tax deductions, the deduction cap was set at the lower of KRW 3 m or 10% of total annual salary. In the years that followed, both the deduction ratio and the annual total salary threshold were significantly raised. In addition, debit card payments were also included. This mechanism allows the government to react (relatively) flexibly to a changing environment and to control the level of the incurred costs, though it also means that the effectiveness of this regulation in terms of reducing the passive shadow economy is lower than in the case of direct cash-backs awarded to consumer card payments (the Korean regulation does not cover non-resident payments and requires some effort from the consumer to obtain benefits related to card payments).

Another example of this kind of regulation is Colombia, where consumers making card payments are entitled to a 2% VAT rebate.



Impact of the regulation on the passive shadow economy

Although different variants of the consumer incentives discussed here have already been implemented in some countries, to the best of our knowledge, no quantitative assessments of such measures are publicly available⁵¹. Due to the lack of sufficient data for the countries where the analysed tax incentives were introduced, we use the available research on consumer reactions to card payments rewards. Our analysis of the impact of tax incentives on the popularity of card payments and, as a result, on the passive shadow economy is based on the microeconomic study of Arango et al.⁵² who use the Bank of Canada 2009 Method of Payment survey, containing detailed data at the level of individual transactions. The authors estimate, among other things, that the impact of a 0.78% cash-back for credit card transactions on the choice of means of payment by consumers. Based on these results, we conduct necessary transformations and calculate the effect of a given level of cash-back awarded to all card transactions on the reduction in the popularity of cash payments. For more details on the applied approach see Appendix 5.

For illustrative purposes, we consider a cash-back that amounts to 0.5% of the card transaction value. We estimate that such a reward would lead to a reduction in the value of cash payments by 9.5%⁵³. We assume that the tax relief of the same scale ("government cash-back") would have an analogous impact on the value of cash payments. The quicker the tax relief works and the simpler the construction it has, the higher the chance is of this condition being satisfied. It is likely that, for example, an immediate benefit for the consumer in the form of a VAT deduction (corresponding to a predefined percentage value of a card transaction) would be more effective in stimulating card payments than complicated mechanisms of tax refunds based on the collection of payment card receipts, or the South Korean example of income tax deduction. The latter mechanisms might allow the government to control regulation-driven costs more effectively, which is their great advantage, but at the same time would reduce the number of card transactions covered by the regulation and limit the interest of some consumers in the implemented solution due to the additional administrative burden.

⁵¹ For further discussion for Korea, see the study of Jeon B. M. (2013), "Fight against Underground Economy: Credit card and cash receipt income deduction policy", KWE 12th conference paper, Tehran (Ifsahan).

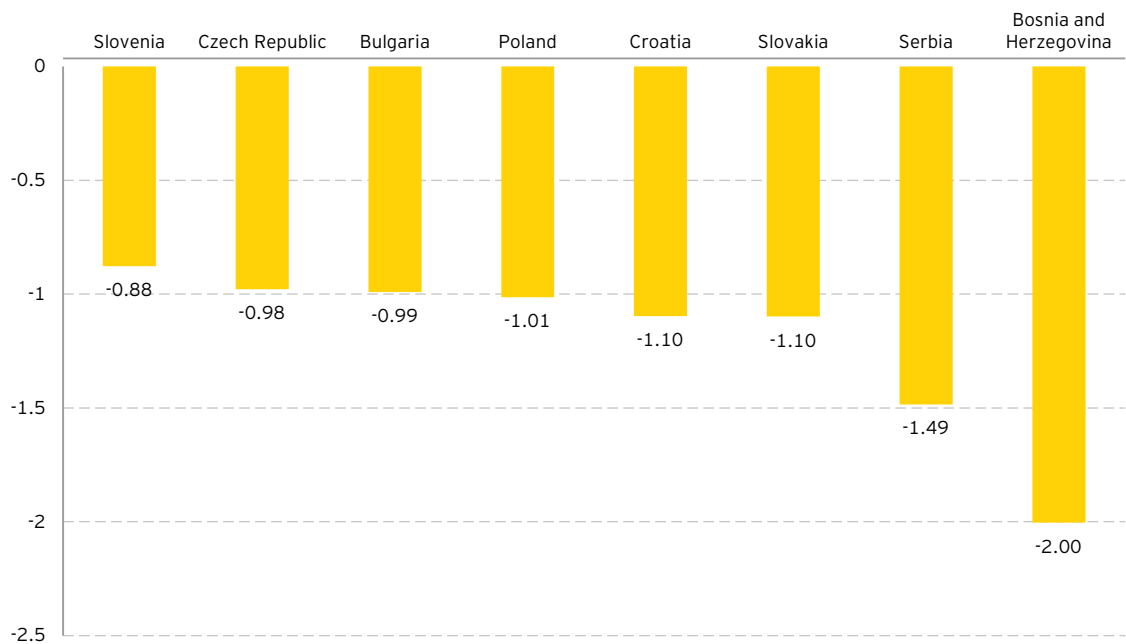
⁵² Arango et al. (2011), op. cit.

⁵³ See Appendix 5.

The potential benefits of the regulation in terms of the passive shadow economy contraction are higher in those countries where the level of the passive shadow economy (as % of GDP), the ratio of consumer cash to card payments and the average effective CIT and VAT rates⁵⁴ are relatively high. The biggest reduction in the shadow

economy as a result of a 0.5% tax relief has been estimated for Bosnia and Herzegovina (2.0% of GDP) and Serbia (1.49% of GDP), while the weakest effect has been found for Slovenia (0.88% of GDP, see Chart 3.16).

Chart 3.16. The impact of a 0.5% cash-back for card payments on the passive shadow economy (% of GDP).



Source: EY



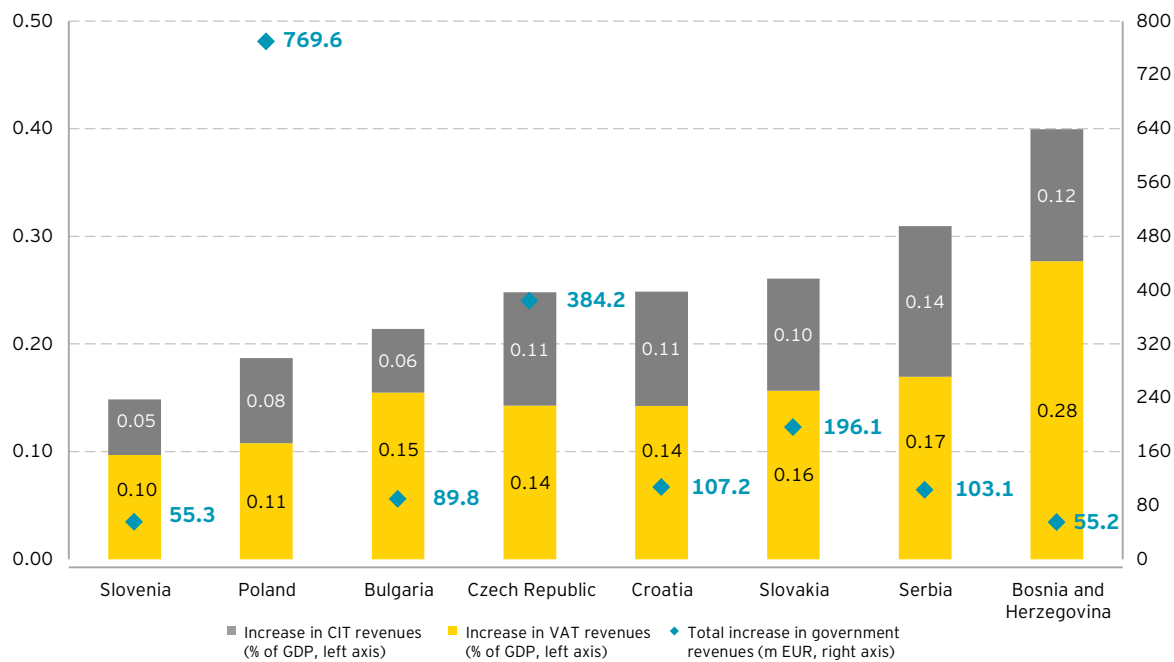
⁵⁴ Definitions of the effective CIT and VAT rates are presented in Appendix 6.

Impact of the regulation on government revenues

A reduction in the passive shadow economy is associated with a growth in government revenues. As a result of the regulation, the biggest increase in government revenues should occur in Bosnia and Herzegovina (0.40% of GDP) and Serbia (0.31% of GDP). On the other hand, the lowest growth of the revenues is expected in Slovenia (total change in the revenues of 0.15% of GDP) and Poland

(0.19% of GDP). In absolute terms, the additional government revenues are the highest in Poland and the Czech Republic (EUR 769.6 m and EUR 384.2 m, respectively), and the lowest in Bosnia and Herzegovina and Slovenia (EUR 55.2 m and EUR 55.3 m, respectively, see Chart 3.17).

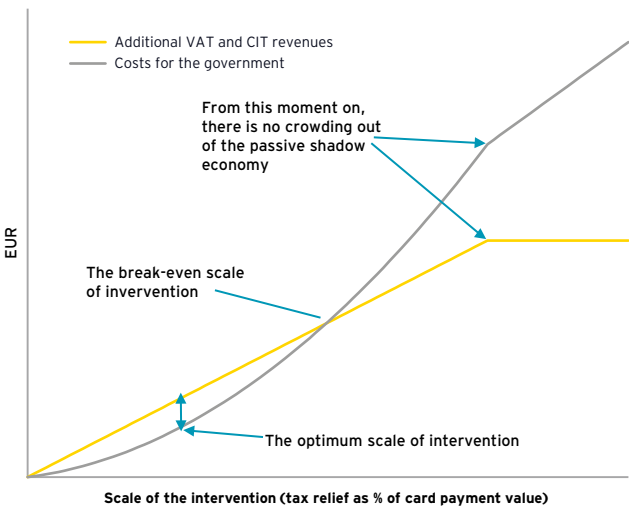
Chart 3.17. The impact of a 0.5% cash-back for card payments on government revenues.



Source: EY

Naturally, the analysed regulation not only provides benefits in the form of the contraction of the shadow economy and the resulting increase in government revenues, but it also entails costs in the form of reduced government revenues per registered card transaction, due to deducting a fraction of the tax burden. The actual level of costs and benefits, and the resulting net effect for government revenues, is highly country-specific. Consequently, the optimum level of consumer incentive varies with the country analysed. The illustration of the relationship between the tax relief level and the associated costs and benefits is demonstrated in Chart 3.18.

Chart 3.18. The impact of tax relief for consumer card payments on the government balance - an illustrative example.



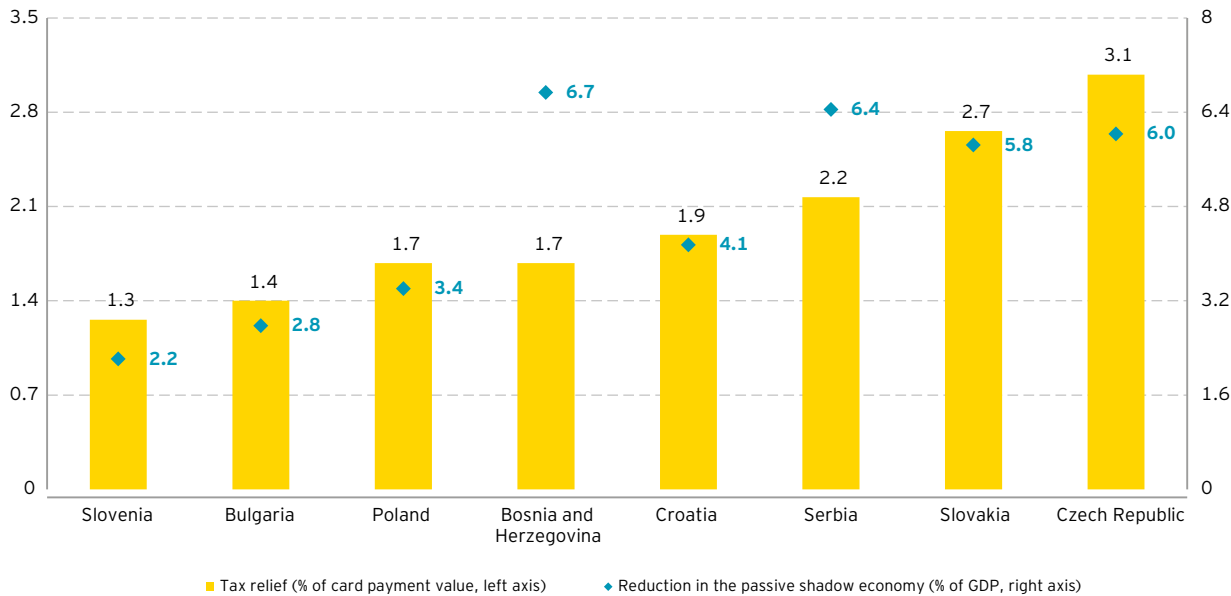
Source: EY

Note that the potential benefits of the regulation for government revenues are proportional to the fall in the value of the shadow economy transactions, which in turn is proportional to the decrease in cash usage by consumers. The flat benefit line indicates the area where the passive shadow economy no longer exists, and thus there are no additional benefits from a further increase in the level of tax relief. The shape of the cost curve is determined by the following two factors: the value of the tax benefit (as % of the card transaction value) and the overall value of card payments. Therefore, an increase in the level of cash-back awarded to consumer card payments elevates the costs incurred by the government, because this encourages an increase in the value of card transactions and

each unit of card payment is now rewarded with a higher prize. When there are no more consumer cash transactions to be crowded out by card payments, the cost curve becomes linear.

We therefore seek optimum levels of the tax incentive for consumers that maximise the difference between the benefits and costs of the regulation. The results, presented in Chart 3.19 and Chart 3.20, show that this regulation seems to have a significant potential to reduce the shadow economy and increase government revenues in all the analysed countries, with a particularly high net impact on the government balance (of at least 0.6% of GDP) in the Czech Republic, Bosnia and Herzegovina, Serbia, and Slovakia.

Chart 3.19. The optimum level of consumer tax relief and its impact on the passive shadow economy.

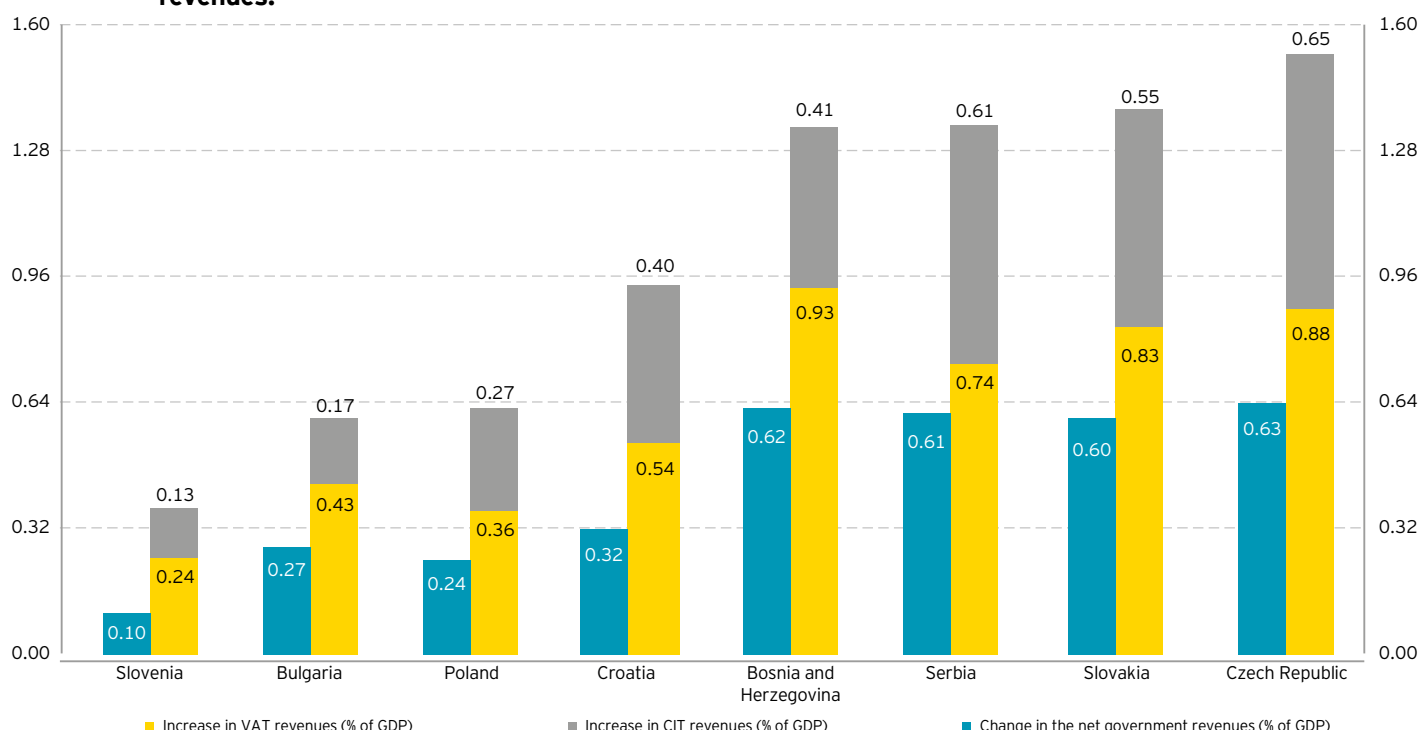


Source: EY

While the effects of this regulation seem to be particularly promising for all the countries, the major concern, from the perspective of public finance, might be that it entails **certain** and quite significant costs, while the benefits – although estimated to be much higher – take the form of **potential** additional revenues. Therefore, further research, dedicated to and accounting for the specifics of a given country, including the behaviour of domestic consumers and their reaction to financial incentives, might be

desirable. Moreover, there may be interest in adopting a solution that would allow the government to control the cost of the regulation more effectively. In this context, an example worth considering is that of South Korea, where an income tax deduction mechanism, including a deduction cap, was introduced. However, this is just one of many variants of this regulation, which may be modified in various ways.

Chart 3.20. The impact of the optimum cash-back (specific to each country) for card payments on government revenues.



Source: EY

Estimated timing of the impact of the regulation

A significant part of the estimated impact that is related to the behaviour of current cardholders should take place almost immediately after the regulation has been introduced. For those who do not own a payment card, the effects may emerge more gradually (and should materialise almost completely within 1-2 years, according to our expert judgement). Therefore, the analysed countries with a relatively high share of cardholders in the population (Slovenia, Slovakia and Croatia) may expect a quicker materialisation of the estimated impact than other countries. It is also likely that a relatively high tax incentive would accelerate this process (higher benefits should encourage people to apply for payment cards more quickly).

The effects that the considered regulation will have over time may also play a critical role in the cost-benefit analysis. For one might assume that, after many consumers have shifted from cash to card payments as a result of the cash-back incentive, their payment habits may often change permanently. Therefore, if the government reduces the level of the tax incentive, or even completely withdraws from the regulation, a significant proportion of consumers may not be willing to shift back to cash payments. Consequently, the costs of the regulation may be reduced (or eliminated) over time with a limited impact on the achieved benefits. Therefore, the net effects of the regulation on the government balance may increase over time.

3.2.7. Tax incentives for merchants

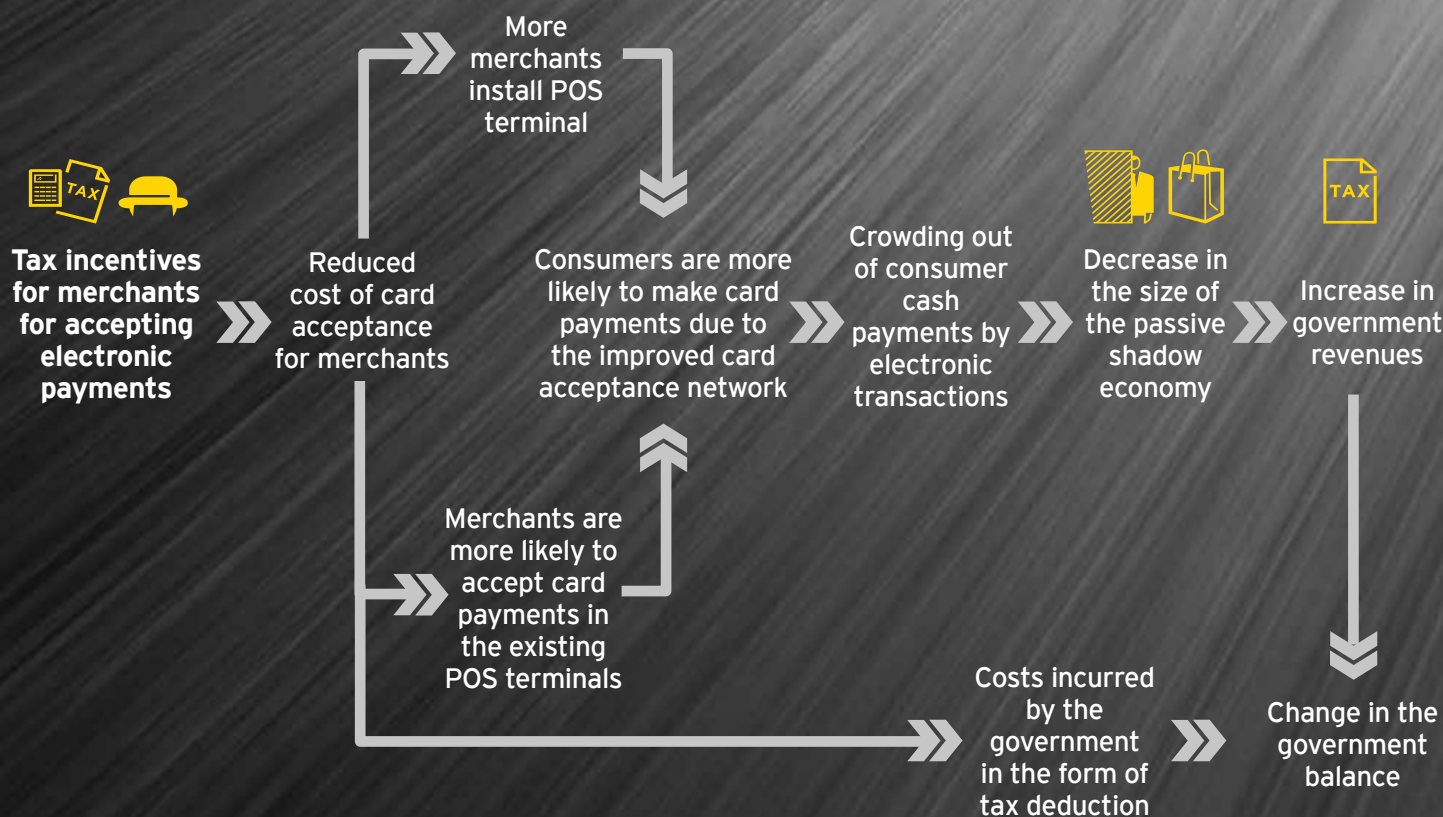


Chart 3.21. Mechanism of the regulation - Tax incentives for merchants.

Source: EY

In many countries, consumers are discouraged from using cards because of the limited number of places where cards are accepted. The slow development of POS terminals networks can be a result of high costs of card payments in some countries. On the other hand, large fees imposed on merchants may be an effect of the insufficient prevalence of electronic payments in the economy; if relatively few people make card payments, the maintenance costs incurred by merchants are divided over a small number of

transactions, resulting in large fees per transaction for merchants. In such cases, tax incentives decreasing the cost of accepting card payments by merchants may stimulate the growth of electronic payments, thus leading to a reduction in cash payments. This, in turn, would translate into a contraction of the passive shadow economy and a subsequent increase in government revenues (see Chart 3.21).



Tax incentives for merchants - examples

Merchant-targeted policies of South Korea include VAT deduction and income tax deduction schemes (the latter abolished in 2011), both providing merchants with tax benefits for accepting card payments. The VAT deduction ratio (accompanied by a deduction cap) has varied over time and across categories of goods and services.

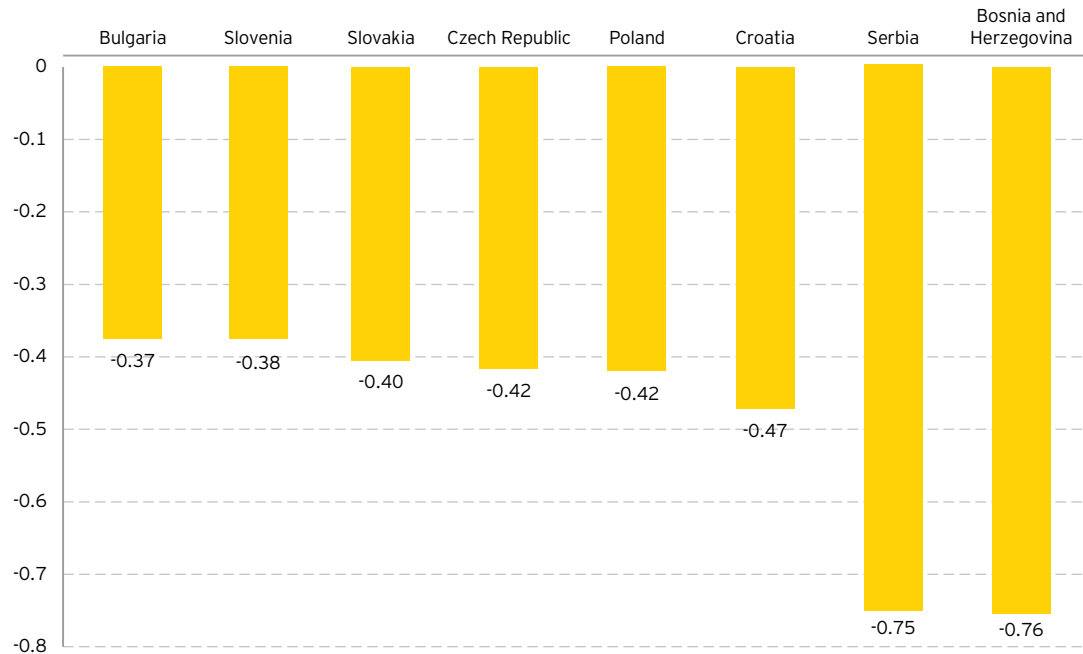
Another example is Uruguay, where a 2 p.p. VAT deduction on electronic payments accepted by merchants has recently been introduced.

Impact of the regulation on the passive shadow economy

Using a panel econometric model, we have estimated how merchant costs affect the value of card transactions in a panel of 19 countries⁵⁵. We approximate the merchant cost by calculating the sum of the interchange and assessment fees in each year and country, assuming that other components of merchant costs remained unchanged, or are insignificant on average over the sample period. For illustrative purposes, we first consider a tax incentive that amounts to 0.5% of the card transaction value. In the next step we translate the increase in consumer card payments into a decrease in consumer cash payments and calculate the resulting change in the passive shadow economy. For more details on the applied approach and obtained results see Appendix 5.

Due to the relatively low value of card transactions per capita at POS, as well as the significant size of the passive shadow economy, the strongest impact of the regulation on the shadow economy contraction has been estimated for Bosnia and Herzegovina and for Serbia (at the level of 0.76% and 0.75% of GDP, respectively). In other analysed countries, the effect ranges from 0.37% of GDP in Bulgaria to 0.47% of GDP in Croatia (see Chart 3.22).

Chart 3.22. The impact of the tax relief (0.5% of card payments value) for merchants on the passive shadow economy (% of GDP).



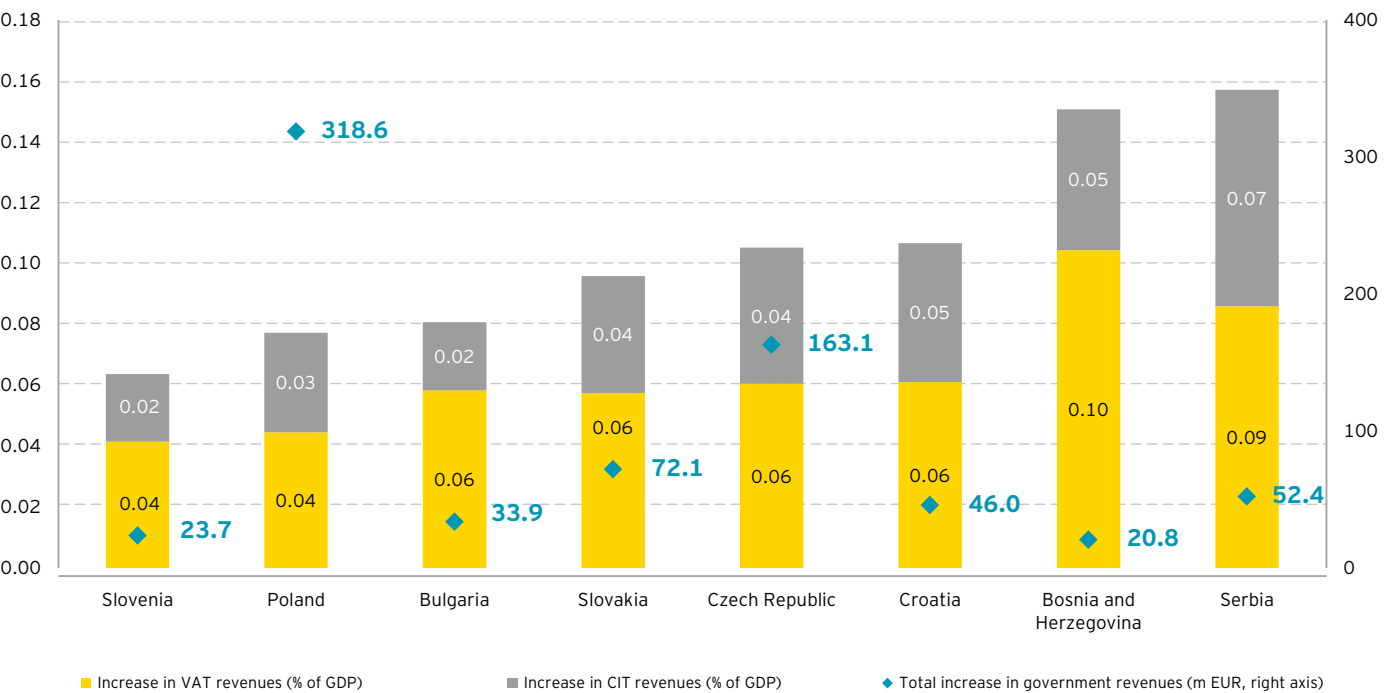
Source: EY

⁵⁵ These countries include Poland, Croatia, Serbia, Slovenia, Slovakia, the Czech Republic, Bosnia and Herzegovina, Hungary, Denmark, Norway, Sweden, the United Kingdom, Austria, Finland, Germany, Portugal, Spain, Italy and Bulgaria.

Impact of the regulation on government revenues

The reduction in the passive shadow economy is associated with a growth in government revenues. It is therefore not surprising that the highest increase in government revenues has been estimated for Serbia and Bosnia and Herzegovina (0.16% and 0.15% of GDP, respectively). In other countries, the effect does not exceed 0.11% of GDP (see Chart 3.23). In absolute terms, the increase in government revenues is the highest in Poland and the Czech Republic (EUR 318.6m and EUR 163.1m, respectively) and the lowest in Bosnia and Herzegovina (EUR 20.8m).

Chart 3.23. The impact of the tax relief (0.5% of card payments value) for merchants on government revenues.

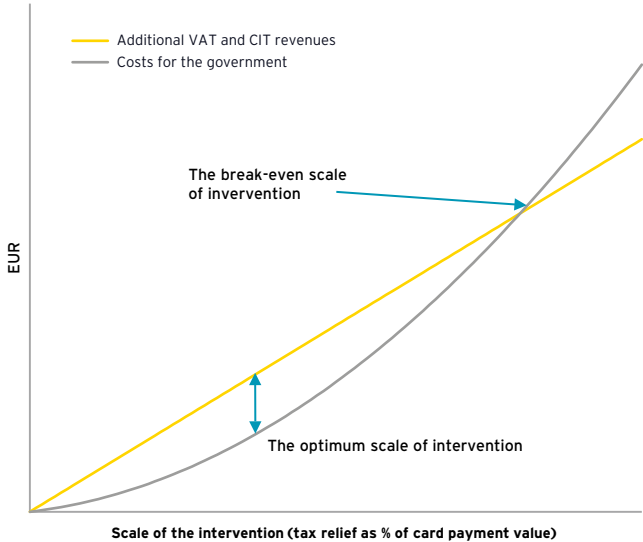


Source: EY



However, similarly to the tax incentive for consumers, the regulation considered here also provides not only benefits in the form of shadow economy contraction and the resulting increase in government revenues, but also costs in the form of reduced government revenues per registered card transaction, due to deducting a fraction of the tax burden. The actual level of costs and benefits, and the resulting net effect for government revenues, is highly country-specific. Consequently, the optimum level of consumer incentive varies with the country analysed. The relationship between the tax relief level and the associated costs and benefits is illustrated in Chart 3.24. The reasons for the constant slope of the benefits curve and the increasing slope of the costs curve are the same as described in Chapter 3.2.5 on tax incentives for consumers.

Chart 3.24. The impact of the tax relief (as % of card payments value) for merchants on the government balance - an illustrative example.

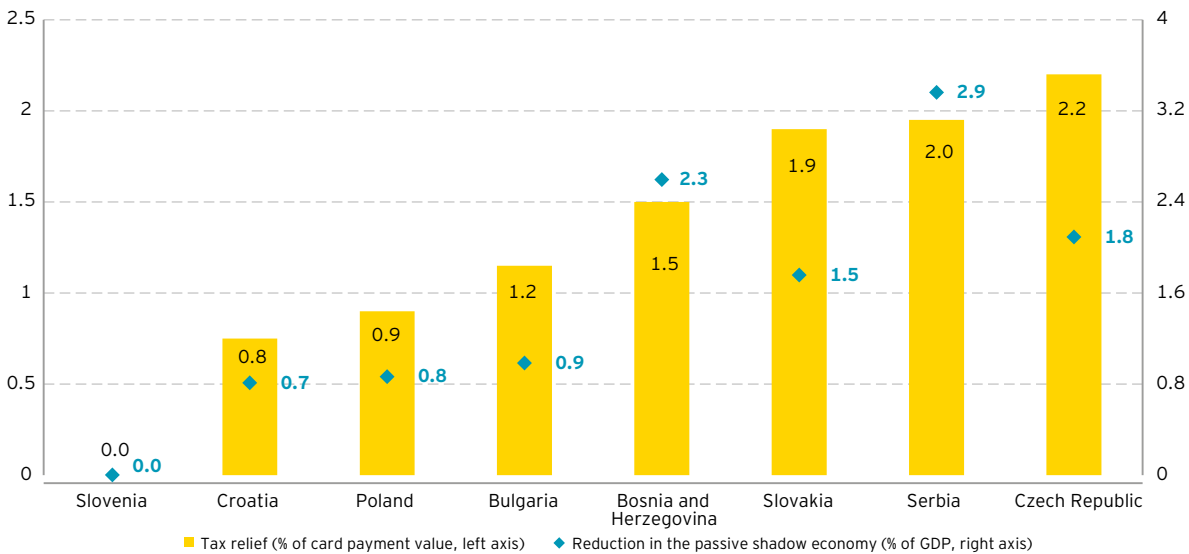


Source: EY

We therefore seek optimum levels of the tax relief for merchants that maximise the difference between the benefits and costs of the regulation. The results, presented in Chart 3.25 and Chart 3.26, show that this regulation generates smaller effects in terms of reducing the shadow economy and increasing government revenues than the previously discussed tax incentives for consumers (see Chapter 3.2.6). Nevertheless, the net impact on government

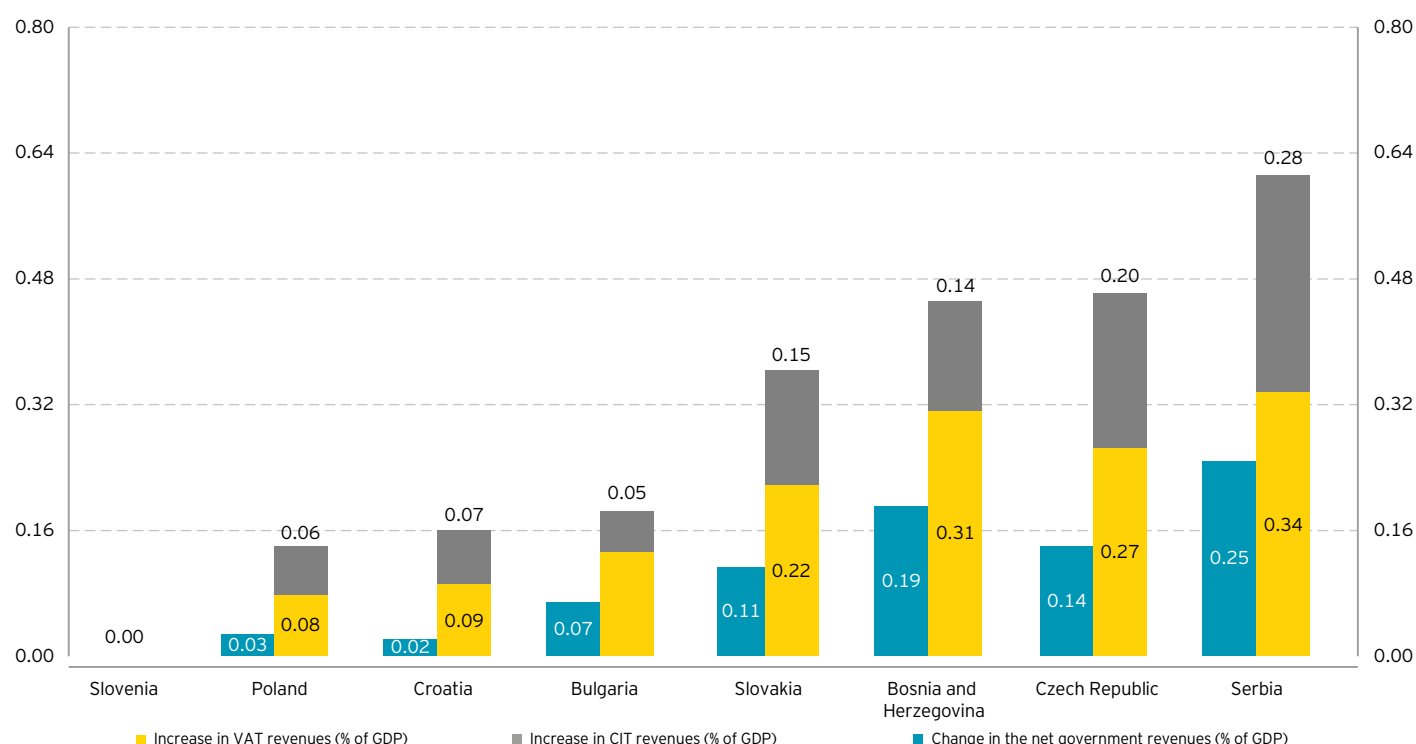
revenues is still significant for Serbia (0.25% of GDP), followed by Bosnia and Herzegovina (0.19% of GDP) and the Czech Republic (0.14% of GDP). In contrast, this effect for Poland and Croatia is marginal (0.02% and 0.03% of GDP, respectively), while for Slovenia the costs always outweigh benefits, and thus the recommended solution is not to implement this regulation.

Chart 3.25. The optimum level of the merchant tax relief and its impact on the passive shadow economy.



Source: EY

Chart 3.26. The impact of the optimum tax relief for merchants (specific to each country) on government revenues.



Source: EY

While we have repeatedly emphasised the conservative approach that we opt for in any situation subject to uncertainty, we have to admit that for this particular regulation the presented impact on government revenues may have been overestimated. The reason is that the estimated optimum levels of the tax relief seem to be too low to incentivise those merchants that benefit much more from not reporting some cash transactions to start registering these transactions by accepting card payments. Therefore, it is likely that it would be mostly those merchants that have so far registered cash transactions that may have the strongest motivation to replace cash transactions with card payments. In the latter case, however, the shift to electronic payments would not reduce the passive shadow economy, since crowded out cash payments were already reported and included in the registered tax base. Taking that into account, and the fact that in our approach we assume that a given percentage of crowded out consumer cash payments leads to a proportional decline in the passive shadow economy, the obtained results for the impact of the regulation on the contraction of the shadow economy and increase in government revenues may be overestimated.

On the other hand, it could be claimed that this regulation should contribute to the development of card payment infrastructure and stimulate electronic transactions. When the card network sufficiently develops, the costs of its maintenance (in terms of fees per transaction) should be reduced and tax incentives for merchants may no longer be necessary. The government may therefore withdraw from the regulation and no longer incur the cost of tax relief. In this context, the regulation may be considered as an investment, not least in countries with an underdeveloped payment infrastructure.

As with the regulation on tax incentives for consumer card payments, the tax relief for merchants entails **certain**, and quite significant costs, while the benefits – although usually estimated to be higher – take the form of **potential** additional revenues. Therefore, further research dedicated to and accounting for the specifics of a given country, including the behaviour of domestic merchants and their reaction to financial incentives, might be desirable.

Estimated timing of the impact of the regulation

A significant part of the estimated impact related to the behaviour of merchants who already operate POS terminals should take place almost immediately after the regulation has been introduced. For those merchants who do not have POS terminals, the effect will materialise more gradually. Therefore, the analysed countries with a relatively high number of terminals per 1000 persons (Croatia, Slovenia) may expect a quicker materialisation of the estimated impact than other countries. It is also likely that a relatively high tax incentive would accelerate this process. However, it might take some time for consumers to get used to the improved card acceptance network and to use cards more frequently.

Effects that the considered regulation will have over time may also play a critical role in the cost-benefit analysis. For one might assume that, after the card acceptance network has been improved as a result of the tax incentive for merchants, this process would not be reversed even if the government reduced the level of the tax incentive or even completely withdrew from the regulation. Consequently, the costs of the regulation may be reduced (or eliminated) over time with a limited impact on the achieved benefits. Therefore, net effects of the regulation on the government balance may increase over time.

3.2.8. Receipt lotteries

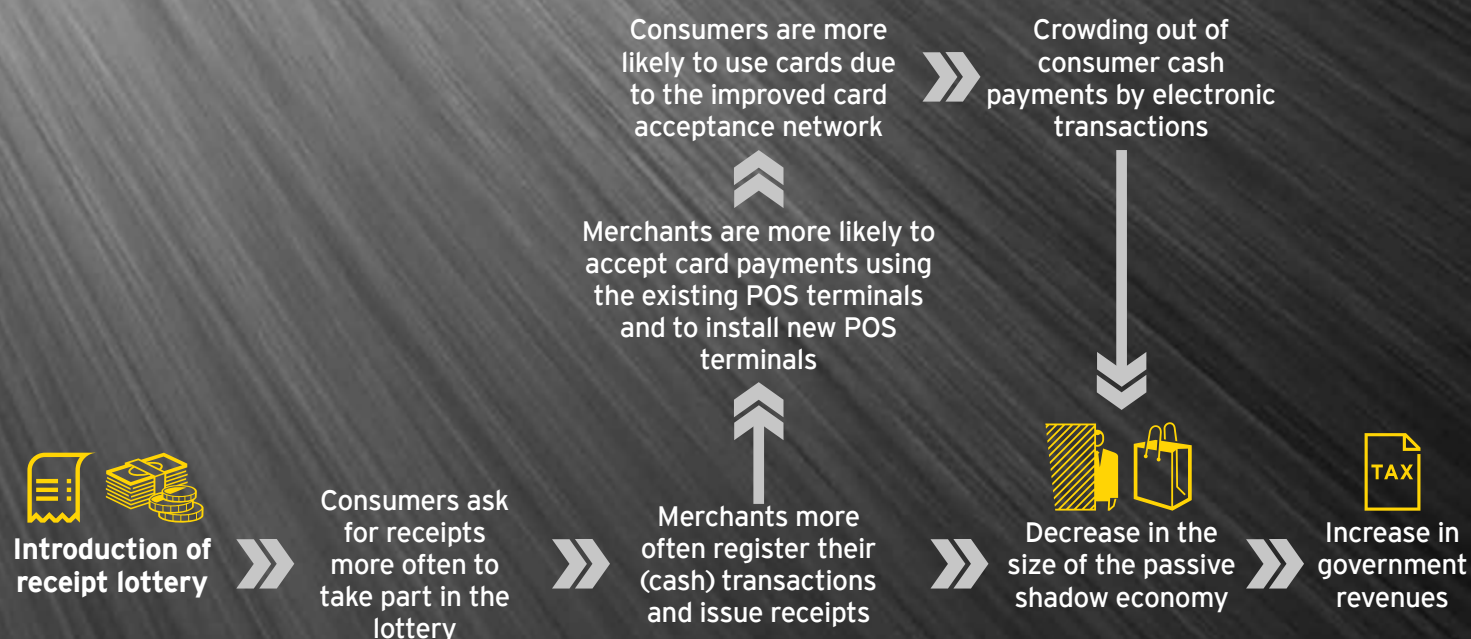


Chart 3.27 Mechanism of the regulation - Receipt lotteries.

Source: EY

The idea of receipt lotteries is to reduce the passive shadow economy by limiting unreported transactions through the increased issuance of receipts in business-to-consumer transactions. Specifically, consumers are provided with an incentive to ask for a receipt, as it may also serve as a free of charge ticket in VAT lotteries, therefore giving its holder a chance to win attractive prizes. In the longer perspective, this measure aims to get consumers used to asking for fiscal receipts. It is often assumed that, after a certain period of time, people will develop such a habit (e.g. by making asking for receipts socially acceptable and desirable, or by raising awareness of the benefits of combatting the shadow economy) and thus will continue to demand fiscal receipts even without such an additional monetary incentive.



Receipt lotteries - examples

National receipt lotteries have been introduced in several countries (starting from Taiwan in the early 1950s) in order to increase the issuance of receipts in consumer transactions. In Slovakia, Malta and Portugal, the lottery is considered as a continuous solution, whereas in some other countries, it is designed to run only for a specific period of time.

For instance, in Poland the programme is explicitly introduced for 12 months. In South Korea, a cash receipt lottery was organised for several years but was discontinued in 2010 after user involvement reached a desirable level. Another example is Bulgaria and Croatia, where several rounds of VAT lotteries have been organised, though not on a regular basis and on a relatively small scale (usually as part of the national educational campaigns to raise awareness of the existence of the shadow economy).

Impact of the regulation on the passive shadow economy and government revenues

It must be emphasised that the impact of this regulation on the shadow market may be twofold. Firstly, it is likely to have an impact on customers' "demand for receipts" and hence directly reduce the number of unreported transactions. Secondly, it can increase (at least to some extent) the propensity of merchants to accept electronic payments. In these new circumstances, in which more transactions have to be registered after all, card payments are not as unattractive for merchants when compared to registered cash payments as they would be when compared to unregistered cash transactions (Chart 3.27).

To the best of our knowledge, the efficiency of receipt lotteries in combatting the passive-shadow economy has not yet been thoroughly investigated in the literature. Due to the lack of data required to estimate the direct impact of receipt lotteries on the passive shadow economy, we focus on their indirect impact, related to the change in popularity of consumer card payments. For that purpose we use an econometric model similar to that already discussed in Chapter 3.2.3.

At first glance, the econometric analysis seems to confirm the positive impact of the introduction of a VAT lottery on the value of card payments. This regulation, however, is relatively scarce and recent, and usually follows the introduction of the mandatory possession of cash registers (see Chapter 3.2.3). After accounting for the latter in the model, the impact of receipt lotteries on the value of card payments becomes statistically insignificant. It means that, while receipt lotteries seem to have some positive impact

on card payments (and through that channel, also on the passive-shadow economy), no quantitative conclusions on the strength of this impact can be drawn. More details on the applied approach and obtained results may be found in Appendix 5.

With no clear impact on the value of card payments, it is also impossible to estimate the fiscal effect of receipt lotteries through the promotion of electronic payments. However, it is very likely that such lotteries are an efficient instrument in combatting the passive shadow economy in a direct way, i.e. by reducing the number of unreported cash transactions, since merchants should be more often asked to issue receipts. However, the scarcity of historical experience, and thus insufficient data, do not allow us to provide quantitative evidence of such a relationship. The challenge of data availability is additionally reinforced by the wide range of possible implementations of receipt lotteries (differing, for example, in terms of ease of participation, number and value of expected rewards, etc.).

Potential costs of the regulation

The main costs are linked to prizes and the expenditures related to organising the lottery, such as setting up a website, etc. The overall value of prizes offered in the lottery should be low in relation to the expected gains in terms of additional tax inflows from the newly registered transactions. Such costs can easily be controlled by the regulator.

Estimated timing of the impact of the regulation

The direct effects of lotteries should be visible almost immediately after introducing the regulation. However, the assessment of how many receipts have been recorded only due to the lottery remains hard to estimate.



Conclusions



A high level of the shadow economy has significant economic and social implications. Its adverse consequences comprise, among other things, a reduced tax base, a lower quantity/quality of public goods, more distortions in market competition, the degradation of economic and social institutions, and - through the above-mentioned channels - lower economic growth. Therefore, it is important to seek tools and solutions that might effectively reduce the shadow economy.

This report contributes to the literature with respect to the impact of cash vs. electronic payments on the non-observed economy. We have introduced a division of the shadow economy into: (1) the passive (where cash payment is the cause of unreported transactions) and (2) the committed component (where cash payment is the consequence). We have also proposed a refinement of the existing econometric methods of estimation of the shadow economy in order to better understand its determinants, especially of the passive component. In particular, we have discussed the relation between the value of card payments and the size of unregistered activities. In addition, we have addressed some methodological issues that - in our opinion - would otherwise lead to an overestimation of the shadow economy, as actually occurred in some other studies.

We have used our methodology to consistently analyse the shadow economy in the group of eight Central and Southern European countries: Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Poland, Serbia, Slovakia, and Slovenia. As shown in this report, these countries differ not only in terms of their size and level of economic development, but also in terms of other characteristics relevant for the passive shadow economy, not least the development level of their electronic payments infrastructure.

Our results show that the passive component accounts for the vast majority of the shadow economy in each of the analysed countries, ranging from 60.8% (Bulgaria) to 90.6 % (Czech Republic). The sectorial breakdown of these unregistered activities constitutes another contribution of this report to the literature. It shows that the bigger the sector and the higher the share of cash transactions in this sector, the greater its contribution to the passive shadow economy. Therefore, it should come as no surprise that the food, beverages and tobacco sector, which is by far the largest in all of the analysed countries, accounts for the largest share of unreported consumer cash transactions.

A critical element of our research is the budgetary cost related to the existence of the passive shadow economy. Our calculations show that lost government (CIT and VAT) revenues range from 1.6% of GDP (for Slovenia) to 4.2% of GDP (for Bosnia and Herzegovina). Importantly, one should remember that this revenue shortage does not account for the whole tax gap that individual governments suffer from. One reason is that the committed component of the shadow economy also includes unreported transactions that

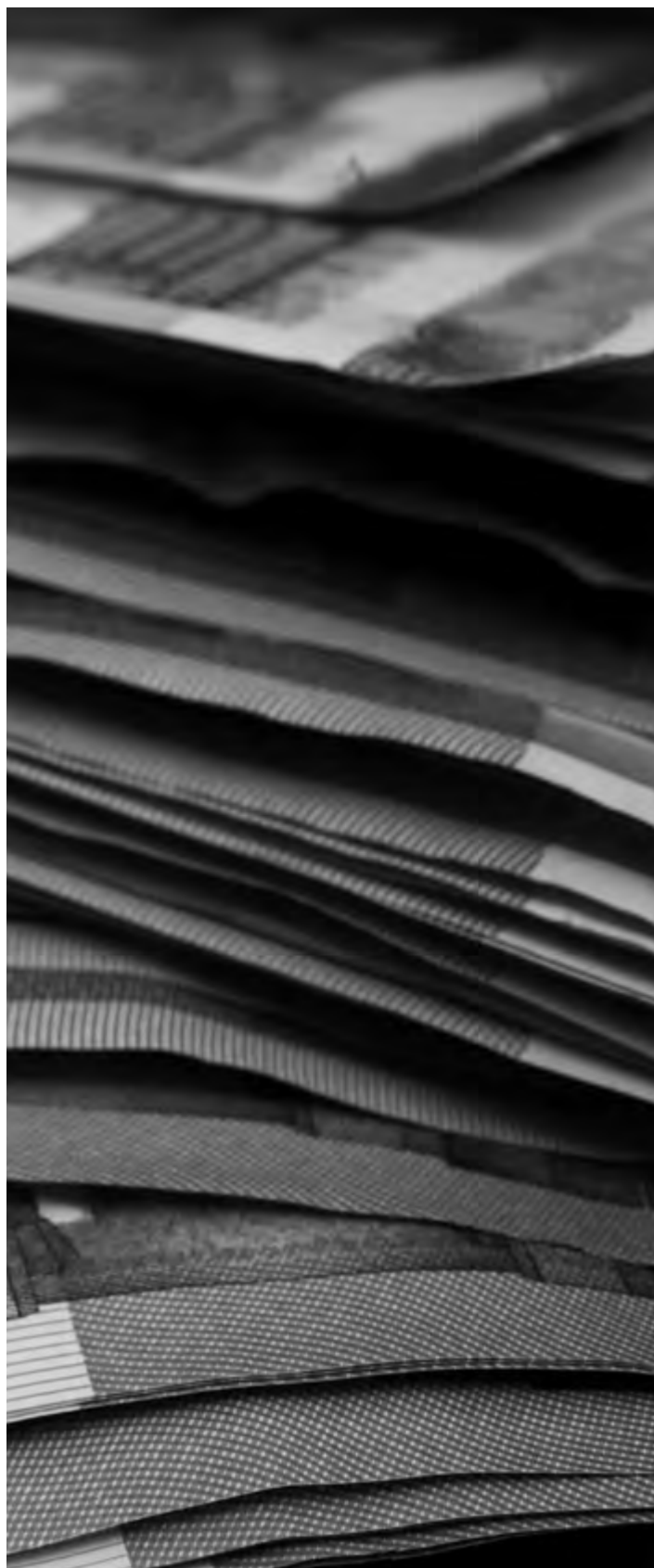
otherwise should be taxed. Another reason is that government revenues are also reduced because of tax fraud/evasion mechanisms that often take place within registered transactions (one example being missing trader fraud), many of which are even paid electronically. Still, the estimated budgetary effects of the passive shadow economy are high enough to show that the game is worth the candle, and that potential benefits from addressing this issue can be significant.

In our analysis we have identified the factors that impact the level of the passive shadow economy. The most important are: the popularity of card payments, the ratio of taxes to GDP, and institutional and tax morale in a given country. It is important to note that those factors differ significantly in terms of the policymakers' ability to influence them. For example, an improvement in the institutional and tax morale may require a government to introduce many, often difficult, reforms, which may additionally take a long time. It is also not easy to significantly reduce the burden of tax and social security contributions. On the other hand, public policies leading to an increase in the popularity of non-cash payments seem relatively easier to implement.

Consequently, in this study we analyse a set of varied regulations that - by replacing cash with electronic payments or by increasing the share of registered consumer cash transactions - may lead to the reduction of the shadow economy in the analysed countries. Many of the considered solutions are already present in countries around the world. Some of them are based on enforcement or obligation mechanisms, whereas others focus on providing incentives, either to consumers or merchants. The measures analysed in this Report include:

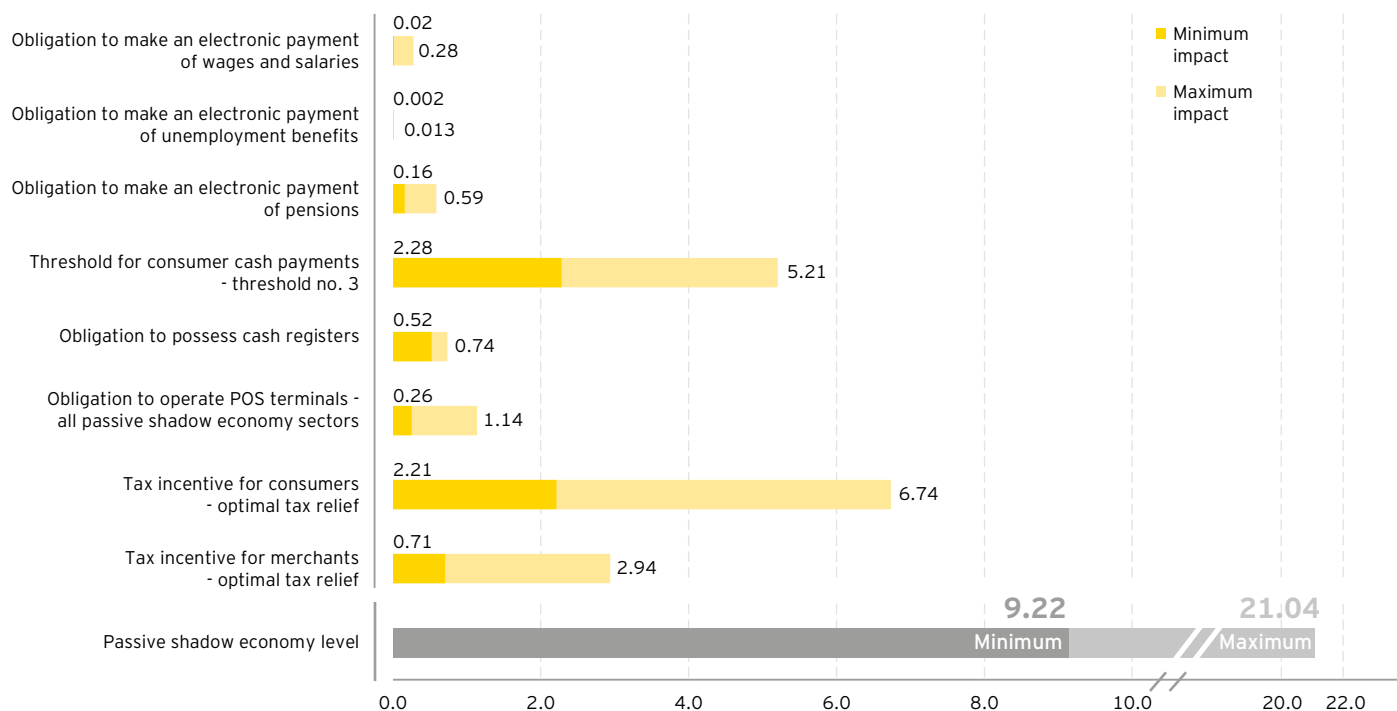
- Obligation to make an electronic payment of wages and salaries
- Obligation to make an electronic payment of social security benefits (including pensions and unemployment benefits)
- Introduction of thresholds for the maximum allowed consumer cash payments
- Obligation to possess and use cash registers
- Obligation to operate POS terminals (for selected types of businesses)
- Providing consumers with tax incentives for card payments
- Providing merchants with tax relief for accepting card payments
- Receipt lotteries

The effects of the considered regulations have been calculated with using econometric modelling or a simulation approach. The obtained results show that there is indeed a significant potential to reduce the passive shadow economy and increase government revenues through the promotion of electronic payments.



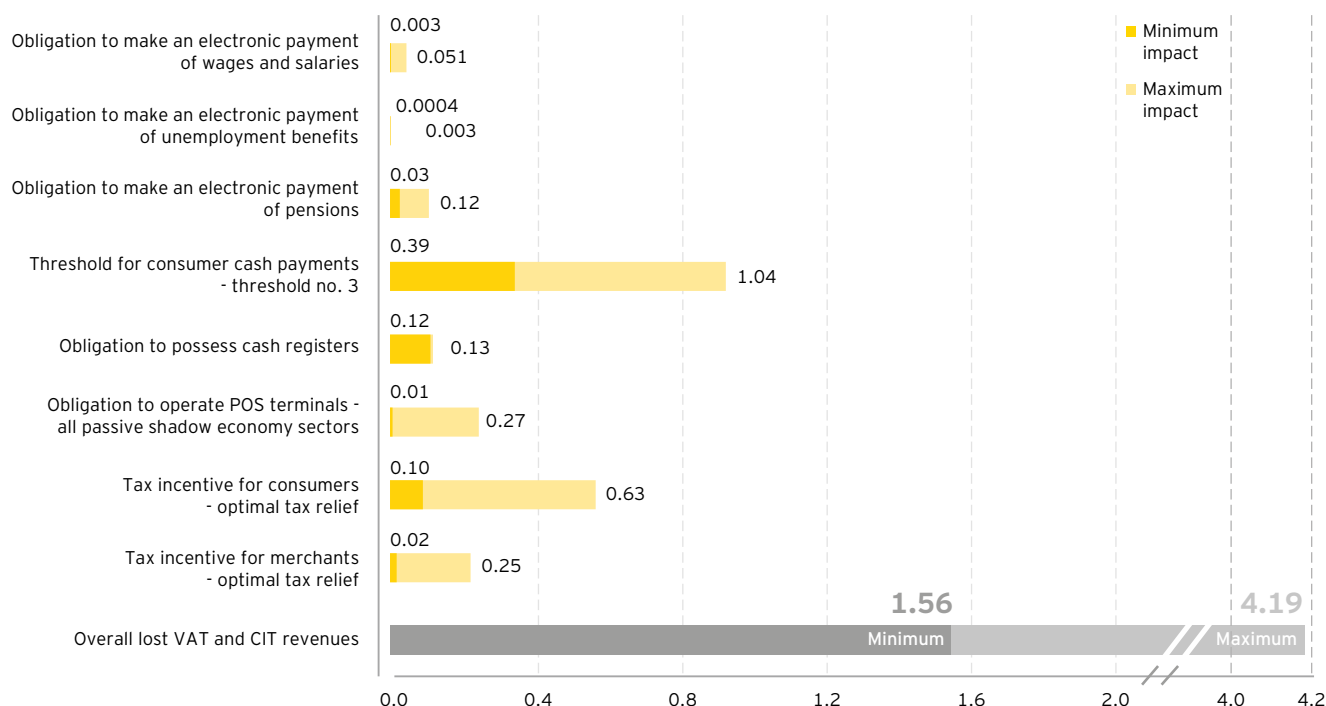
Conclusions

Chart C1. Summary of the impact of the analysed regulations on the passive shadow economy, compared to the passive shadow economy level (% of GDP).



Source: EY

Chart C2. Summary of the impact of the analysed regulations on the government VAT and CIT revenues, compared to the overall lost VAT and CIT revenues due to the passive shadow economy (% of GDP).



Source: EY

The impact of the considered measures (excluding limits on maximum consumer cash payments) on the contraction of the shadow economy varies with the analysed instrument. The most efficient regulation is the provision of financial incentives to consumers to use electronic payments, which may contribute to the reduction of the passive shadow economy by 2.2% of GDP (Slovenia) to 6.7% of GDP (Bosnia and Herzegovina). This regulation is also the most beneficial in terms of its impact on government net revenues, which ranges from 0.1% of GDP (Slovenia) to 0.63% of GDP (the Czech Republic).

Consumer cash payment thresholds may be regarded as a different category of the analysed measures, since, if established at a very low level (controversial though it may be), they may almost completely eliminate the passive shadow economy by crowding out a large share of the existing consumer cash payments. In this context, it should be emphasised that the thresholds considered here are presented as nothing more than examples of different limits on the maximum value of consumer cash payments. While we agree that the presented thresholds, especially the lowest ones, may seem unacceptable and hardly feasible to implement, they well illustrate how the impact of this regulation varies with a change in their level. Moreover, as confirmed by our analysis, establishing high thresholds for consumer cash payments would have little, if any, impact on the passive shadow economy.

The obtained results show that the effects of the analysed tools turn out to be highly country-specific and depend on such features of the analysed markets as the share of cash vs. card payments in the overall consumer transactions, the share of cashless payments in GDP, the size of the passive shadow economy and the effective tax rates. Despite these differences, for each country we can identify at least one regulation with considerable potential to reduce the shadow economy.

Consequently, we have shown that an increase in the popularity of electronic payments may be an important measure in addressing the problem of unreported activities. To illustrate this differently: an increase in the value of card payments by 100% should lead to a reduction in the shadow economy in the analysed countries by 0.6-3.7% of GDP, and to an increase in government revenues by 0.1-0.8% of GDP.

Finally, we have to emphasise that each of the presented measures should be regarded as just one of many possible variants of a given regulation. Since these solutions may be modified in terms of their scope, timing and other parameters, their actual impact would change accordingly and depend on the final decision of the regulators. Consequently, the measures analysed in this study should not be treated as recommendations, but rather as examples illustrating the effects of potential regulations that may be considered by policymakers in their attempt to address the issue of the passive shadow economy.

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