Reducing the Shadow Economy through Electronic Payments

CROATIA
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This document is a part of the broader study that consists of (1) the report: “Reducing the shadow economy through electronic payments” (hereinafter referred to as the “Report”), as well as (2) technical appendices and (3) individual country reports. The Report analyses the shadow economy in the eight Central and Southern European countries and investigates the potential of different regulatory measures to reduce the size of the non-observed economy. The current document provides more insight into the specifics of the Croatian economy, including a more detailed description of the considered regulations and their economic impact in this country.

Our approach to the measurement of the shadow economy and its breakdown, as well as to estimating the effects of various regulatory measures is discussed in greater detail in the Report and the technical appendices.

This study was commissioned by MasterCard and was conducted independently by EY.
1 The shadow economy and its types
The scope and coverage of the shadow economy analysis in this report is largely consistent with the definition of the European Commission (see Chapter 1.1 of the Report). It is illustrated by Chart 1.1, showing that the shadow economy is approximated by unreported transactions, 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 approximate the size of the shadow economy.

**Chart 1.1. Different elements of the shadow economy**

![Chart 1.1. Different elements of the shadow economy](image)

Legend:
- Unreported transactions that increase the tax gap
- Unreported transactions that do not increase the tax gap
- Reported transactions that increase the tax gap
- Transactions that we measure in this Report

Notes: Unreported transactions are equivalent to the non-observed economy, as defined by the European Commission. Despite the fact that reported transactions that increase the tax gap (such as VAT frauds) are often the result of criminal activity, they are not part of the shadow economy, according to the definition by the European Commission and the definition used in this study. For more details see the text.

Source: EY

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 the 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 therefore generate the shadow economy activity, as they provide an incentive not to report the transaction and evade paying tax. 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 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;
- cash is a **consequence** of the shadow economy.

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

<table>
<thead>
<tr>
<th>Shadow economy</th>
<th>Possible measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Committed shadow economy</td>
<td>CONTROL and EXECUTION (e.g. labour inspections)</td>
</tr>
<tr>
<td>Passive shadow economy</td>
<td>PROMOTION OF ELECTRONIC PAYMENTS</td>
</tr>
</tbody>
</table>

Two sides of the transaction (seller and buyer)

Example: Construction service provided at the discounted price, but without issuing an invoice

One side of the transaction (seller)

Example: A consumer pays the regular price for a service (e.g. in a restaurant) in cash, but a receipt is not issued

The shadow economy where cash is a **cause** is labelled 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** is defined as the “**committed shadow economy**” (see Chart 1.2), because both sides of the transaction are “committed” to using cash payments in order not to report a transaction and thereby benefit from a lower price stemming from evaded tax payments (for a more detailed description and further examples of the committed and passive shadow economy transactions see Table 1.1 in the Report).

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 labour inspections at building sites, introducing more restrictive penalty sanctions for counterfeiting of excise products, etc.

In contrast to the committed component, 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.

In this study, we concentrate on solutions related to the development of non-cash payments (e.g. through the increased use of payment cards) as a means of reducing the passive shadow economy.
2 Shadow economy in Croatia
In this section, we present estimates of the shadow economy in Croatia. The estimates comprise the overall level of the shadow economy, its split into the passive and committed components, their evolution over time and the sectorial breakdown of the passive shadow economy. Our approach, which exploits the strengths and addresses the weaknesses of various methods of estimating the shadow economy, is discussed in greater detail in Chapter 3 of the Report, as well as Appendix 1 and Appendix 2.

The obtained results show that the overall level of the shadow economy in Croatia significantly increased in the 2009-2013 period, from 14.1% to 17.2% of GDP (see Chart 2.1). The growth of the undeclared economy in Croatia took place at the time of the economic downturn and rising unemployment, as a consequence of the global financial crisis. In 2014, the shadow economy was estimated to slightly decline to 17% of GDP (approx. 7.3 bn EUR).

It has to be emphasised that the estimates presented in this document should not be compared with the often quoted results of another study where the shadow economy in Croatia was estimated to reach almost 30% of GDP in 2013. The reason is that there are methodological differences between EY’s approach and the approach adopted by the authors of the quoted and some other studies. Consequently, it would be a false conclusion to say that the shadow economy in Croatia declined from almost 30% of GDP to 17.0% of GDP in a short time span. In fact, changes in the level of the shadow economy in Croatia were much smaller, as illustrated by Chart 2.1.

Splitting the shadow economy into its passive and committed components, as well as sectorial breakdown of the latter, provide a more detailed insight into the Croatian non-observed economy. To the best of our knowledge, no such analysis has been done in other research, and thus constitutes a contribution of this study to the literature. As discussed, 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.

The passive shadow economy constitutes the main component of the overall non-observed economy in Croatia (see Chart 2.1). However, its share in the overall shadow economy saw a significant decline from 82.6% in 2009 to 67.9% in 2014. It was due to a relatively strong upward trend of the committed shadow economy, which increased from 2.4% of GDP in 2009 to 5.4% of GDP in 2014, while there was little change in the level of the passive component in the analysed period. Consequently, the rise of the Croatian overall shadow economy during the crisis was mainly caused by an increase in its committed component.

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3 Appendix 1 and Appendix 2 include the discussion of methodological issues that have been identified in other studies and the way they have been addressed in EY’s approach.
Chart 2.1. Shadow economy in Croatia (% of GDP)

Notes: Shadow economy figures for 2014 are based on estimates/forecasts of some of the shadow economy determinants. The components of the shadow economy might not sum to the overall level of the shadow economy due to rounding.

Source: EY
Sectorial breakdown of the passive shadow economy

Additional insight into the passive shadow economy is provided by the sectorial breakdown of this component, based on the approach described in the Report and Appendix 1.

Chart 2.2. Sectorial breakdown of the passive shadow economy in Croatia (% of total passive shadow economy, long-term averages)

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. The high share of unregistered employment is often found in the construction sector, hotels and restaurants, as well as in the transport services (see Chapter 2.3 of the Report). 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. In fact, the sectorial breakdown of unregistered employment provides little, if any, information on the sectors where retail sales
are often not reported, and which should therefore be targeted with measures aimed at increasing the share of registered consumer transactions. By contrast, in our study 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. This seems to be the first such an attempt in the literature, which is described in greater detail in Appendix 1.

In our approach, the larger the sector and the more saturated with cash payments, the higher the share in the total passive shadow economy it has.4 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 2.2), which accounts for 35.9% of the total passive shadow economy in Croatia. This is mainly the result of its large share in the total consumption expenditure of Croatian households. The sector that ranks second, in terms of its contribution to the size of the passive shadow economy, is restaurants, bars and cafes, followed by the accommodation sector.

Passive shadow economy and lost government revenues

The passive shadow economy may entail serious consequences, many of which have been discussed in Chapter 1 of the Report. 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 in Croatia.

![Chart 2.3. Lost government revenues due to the existence of the passive shadow economy in Croatia (in 2014)](chart.png)

Source: EY

Details of how we calculated the VAT and CIT revenue shortage due to the passive shadow economy activities are presented in Appendix 6. Here we simply indicate that we do not apply the standard VAT or CIT rates in our calculations, since it would lead to 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.

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4 For more details on our methodology see Appendix 1.
The obtained results show that the game is worth the candle, since potential government revenues from eliminating the passive shadow economy in Croatia amount to 2.6% of GDP or HRK 8.5 bn (Chart 2.3). Consequently, even a partial success in dealing with this category of unregistered transactions can significantly improve the public finance situation. This, therefore, leads us to a question about the measures that could be adopted in Croatia in order to address the passive component of the shadow economy.
3 Limiting the passive shadow economy in Croatia
The high level of the shadow economy has significant economic and social implications. Its adverse consequences include: a reduced tax base, a 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, having estimated the size and structure of the shadow economy in Croatia, in this section we focus on the measures that could reduce the non-observed economy in this country.

The analysis conducted in the Report shows that an increase in the card payments to GDP ratio does reduce the passive shadow economy. Other factors contributing to the contraction of the shadow economy include: an increase in GDP per capita (in PPS), a decline in the ratio of taxes to GDP and institutional and tax morale, approximated by the World Bank's rule of law index (for more details see Chapter 3.1 of the Report and Appendix 1).

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 faced by 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.

Consequently, we conduct an impact assessment of various regulatory tools for Croatia that (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 (Chart 3.1). In our assessment, 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 (for methodological details, see Appendix 5 and Appendix 6).

Some of the presented solutions are based on obligation mechanisms, whereas others focus on providing incentives either to consumers or merchants. Some instruments promote the development of electronic payment infrastructure, while others promote changes in payment habits. On the one hand, Charts 3.2-3.4 illustrate that the number of cards and terminals, as well as the value of card transactions in Croatia are the highest among the eight analysed countries. On the other hand, there is still room to improve the payment infrastructure in Croatia and increase its utilisation through changes in consumers’ payment habits and/or merchants’ willingness to accept electronic payments. Appropriate measures addressing these issues are considered below.

Finally, we need to emphasise that the analysed regulations may 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 the 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 the regulators.
Chart 3.2. Number of cards per capita in Croatia and selected European countries

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

Chart 3.3. Number of terminals per 1000 people in Croatia and selected European countries

Source: ECB, MasterCard, National Bank of Serbia, Central Bank of Bosnia and Herzegovina, Eurostat
Chart 3.4. Card transaction value (% of GDP) in Croatia and selected European countries

Source: ECB, MasterCard, National Bank of Serbia, Central Bank of Bosnia and Herzegovina, Eurostat
3.1 Obligation to make an electronic payment of pensions

Mechanism of the regulation
This regulation obliges the government to provide pension benefits in the form of electronic payments, e.g. through bank transfers and/or prepaid cards. The mechanism of this measure is analogous to the obligation to make an electronic payment of wages and salaries (see above). The main difference is the targeted group and the fact that social security 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).

All social security benefits (including pensions) are paid electronically, for example, in Denmark, while in Sweden they are paid electronically or on prepaid cards. A law on mandatory electronic payments of social security benefits has also recently been approved in Uruguay.

In Croatia, social security benefits and social assistance, such as unemployment and sickness benefits, must be paid via bank transfer. This obligation results from the Personal Income Tax Act. However, pension and welfare support are not covered by this regulation. In fact, still a non-negligible number of pensioners prefer to receive their pensions at the post office or to have them delivered by a postman.

The electronic payment of pensions would mean that people who previously received their pension benefits in cash would have to make an additional effort, e.g. through ATM withdrawals, if they would like to continue to use cash. Therefore, they should perform their transactions with payment cards more often and, consequently, make fewer cash payments. This, in turn, should contribute to the reduction of the passive shadow economy (see Chart 3.5).

This solution might be implemented via amendments to the Income Tax Ordinance related to payments in cash dated 1 January 2015 or amendments to the Personal Income Tax Act dated 1 January 2015 regarding payment of social security benefits.

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

We estimate the impact of this regulation on the value of cash payments replaced with card payments in a few steps. First, we obtain the data on the total net value of the pension benefits for Croatia using Eurostat datasets. Second, we use the World Bank’s survey data (Global Findex Database) on the percentage of government transfers recipients in Croatia who received these transfers in cash in 2014. We assume that this figure, equal to 14.9%, is also applicable to pensions’ recipients.

In the last step, we take into account the household saving rate and the payment behaviour of a typical card holder in Croatia to estimate the value of cash payments replaced with card transactions due to the introduction of the considered regulation. For more details on the applied approach and calculations see Appendix 5.

The potential decrease in the passive shadow economy in Croatia caused by the obligatory electronic payment of pensions has been estimated at 0.31% of GDP. The associated increase in government revenues has been estimated at 0.07% of GDP or HRK 229 m (Chart 3.6).
Potential costs of the regulation

The costs of this measure are analogous to those of an electronic payment of wages and salaries, and comprise mainly the costs of maintaining additional bank accounts (see above). However, as already 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. For example, according to the Polish Social Insurance Institution, the delivery cost of pensions by post is 10 times larger than in the case of electronic payments to bank accounts.\(^5\) 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.

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 pensioners - may take longer than in the case of employees.

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\(^5\) http://www.zus.pl/default.asp?id=1&p=1&ldk=1807 (accessed 17.11.2015)
3.2 Threshold for cash payments

Mechanism of the regulation

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 (Chart 3.7).

Chart 3.7. Mechanism of the regulation - Threshold for cash payments

Introduction of the threshold for cash payments

It is illegal to pay in cash above the defined value of transaction

Crowding out of consumer cash payments above the threshold by electronic transactions

Decrease in the size of the passive shadow economy

Increase in the government VAT and CIT revenues

Source: EY

Thresholds for cash payments are already present in some countries, including Bulgaria, 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 the merchant).

In Croatia, according to the Croatian Anti-Money Laundering and Financing of Terrorism Act, the maximum amount that can be paid in cash for all transactions, is limited to HRK 105,000. The exception from that regulation, in the case of B2B transactions, relates to persons whose operations are regulated by the Fiscal Cash Register Act. This Act allows those persons to make cash payments for goods and services received from other persons whose operations are also regulated by the Fiscal Cash Register Act up to a limit of HRK 5,000 per each transaction.

However, as we show below, the limits defined in the regulations discussed above cannot be very effective in terms of their impact on the passive component of the shadow economy in Croatia. In order to address this issue, additional thresholds for cash payments might be considered. They could be introduced through changes to the Anti-Money Laundering and Financing of Terrorism Act of 1 January 2009 and to the Fiscal Cash Register Act of 1 January 2013.

Should the considered regulatory measure be difficult to implement for all the sectors in the economy, alternatively such thresholds might be established for B2B and consumer cash payments in selected sectors/areas only, not least those accounting for a large share of the passive shadow economy in Croatia.

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

In order to estimate the effect of a given threshold for consumer cash payments in Croatia, we need to know the distribution of consumer cash transactions in this country. Such data, however, is not available. Instead, we benefited from the research conducted by the Polish central bank on the distribution of consumer cash payments in Poland. The obtained data has been adjusted accordingly to estimate such a distribution for Croatia (for more details see Appendix 5).

In the next step, we consider two scenarios: (1) a “conservative” scenario, with four different cash payment thresholds: HRK 200, 300, 400, and 500 and (2) a “non-conservative” scenario, with an additional threshold of HRK 759 (equivalent of EUR 100 at the time of conducting this study).

In the conservative scenario we account for the fact that, 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 considered regulation, as both parties benefiting from this kind of activity would continue to use cash in order to avoid reporting the transaction. Consequently, in this scenario we assume that there is no passive shadow economy among the top 7% of consumer...
cash transactions (in terms of their value), i.e. for transactions above HRK 510. In the non-conservative scenario, the above assumption no longer holds.

It should be emphasised that the thresholds considered are presented as nothing more than examples of different maximum levels of allowed consumer cash payments. We do agree that the presented limits, especially the lowest ones, may seem unacceptable and hardly possible to implement. Nevertheless, these thresholds have largely been determined by the availability of data from research conducted by the National Bank of Poland. Moreover, above the higher transaction levels, the value of consumer cash payments is marginal. For example, above EUR 100 (or HRK 759), it accounts for only 3.2% of all consumer cash transactions (in terms of their value). This share would further decline with an increase in the threshold level.

Therefore, the arguments outlined above strongly suggest that establishing high thresholds for consumer cash payments would have little, if any, impact on the passive shadow economy in Croatia.

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 and government revenues is presented in Chart 3.8 and Chart 3.9.

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 obtained results show that the contraction of the non-observed economy in response to a drop in the level of the threshold is more than proportionate, which reflects the distribution of consumer cash payments cumulating around the lower value transactions. The impact of the considered regulatory measure on government revenues corresponds to the estimated changes in the size of the passive shadow economy (see Chart 3.8 and Chart 3.9).

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**Chart 3.8. Thresholds for consumer cash payments – impact on the passive shadow economy in Croatia (% of GDP)**

<table>
<thead>
<tr>
<th>Threshold value in EUR</th>
<th>Conservative approach</th>
<th>Non-conservative approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>759</td>
<td>-3.0</td>
<td>-2.4</td>
</tr>
<tr>
<td>500</td>
<td>-1.9</td>
<td>-1.2</td>
</tr>
<tr>
<td>400</td>
<td>-0.9</td>
<td>-0.6</td>
</tr>
<tr>
<td>300</td>
<td>-0.4</td>
<td>-0.1</td>
</tr>
<tr>
<td>200</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: EY

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6 This corresponds to the percentage of consumer cash transactions value being recorded above the highest threshold considered in the Polish central bank’s research that we draw on.
In addition, this regulation may 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.

**Potential costs of the regulation**

The likely costs of this regulatory measure 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 also below the threshold.
3.3 Obligation to operate POS terminals

Mechanism of the regulation

This regulation obliges certain types of businesses to operate POS (point of sale) terminals. 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 operate POS terminals in selected sectors. This would be most effective in the sectors accounting for a high share of the total passive shadow economy, and for business activities where the prevalence of POS terminals is currently relatively low. An increase in the popularity of card payments would lead to crowding out consumer cash transactions. This, in turn, would reduce the size of the passive shadow economy and increase government revenues (Chart 3.10).

Chart 3.10. Mechanism of the regulation - Obligation to operate POS terminals

This type of regulation was implemented, for example, in South Korea, where in 2001 card acceptance was mandated for all VAT paying businesses. Moreover, in this country a financial penalty for card refusal was imposed in 2002. On the one hand, in Croatia, there is no obligation to operate POS terminals. On the other hand, in practice dual POS terminals that are simultaneously used as cash registers are already available for most of the Croatian businesses. However, there are still places where no POS terminal is available.

The analysed solution assumes that businesses are obliged not only to have a POS terminal, but also to use it in retail transactions, if requested by a customer. This regulation should be addressed to all sectors of the Croatian economy. However, we considered situations where the regulation is binding either for a group of sectors or for individual branches that are responsible for contributing to the passive shadow economy in Croatia.

The considered regulation may also be supported by incentives provided to merchants in the form of tax allowances, granted EU Funds or government (co)financing for the purchase of POS terminals (for example, in Poland the cost of purchasing cash registers can partially be deducted from the company’s VAT liability).
Impact of the regulation on the passive shadow economy and government revenues

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 the current number of POS terminals in Croatia. Importantly, we estimate this gap and the resulting increase in the number of terminals taking into account the sectorial breakdown of the economy (see Table 3.1; for details on the methodological approach see Appendix 5).

### Table 3.1. Number of terminals per 1000 inhabitants in Bulgaria before and after introducing the regulation

<table>
<thead>
<tr>
<th>Sector</th>
<th>Current situation (1)</th>
<th>After regulation (2)</th>
<th>Existing gap (2)-(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreation and culture</td>
<td>0.016</td>
<td>0.595</td>
<td>0.579</td>
</tr>
<tr>
<td>Accommodation</td>
<td>0.056</td>
<td>3.918</td>
<td>3.862</td>
</tr>
<tr>
<td>Transport (private and public)</td>
<td>0.375</td>
<td>1.421</td>
<td>1.046</td>
</tr>
<tr>
<td>Fuels for vehicles</td>
<td>3.166</td>
<td>3.484</td>
<td>0.318</td>
</tr>
<tr>
<td>Restaurants, bars and cafes</td>
<td>0.349</td>
<td>5.302</td>
<td>4.954</td>
</tr>
<tr>
<td>Food, beverages and tobacco (grocery stores, markets etc.)</td>
<td>11.331</td>
<td>16.255</td>
<td>4.924</td>
</tr>
<tr>
<td>All passive shadow economy sectors</td>
<td><strong>19.623</strong></td>
<td><strong>35.110</strong></td>
<td><strong>15.487</strong></td>
</tr>
</tbody>
</table>

Source: EY.

In the next 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.7

The estimated impact of the regulation on the size of the passive shadow economy in Croatia is presented in Chart 3.11. It is the highest for (1) the relatively large sectors (in which an increase in the growth in the total number of POS terminals in the economy) and (2) the sectors in which “saturation” with POS terminals is relatively low. The estimated effect is the highest for the sector of restaurants, bars and cafes (a contraction of the passive shadow economy by 0.14% of GDP) and the food, beverages and tobacco sector (0.14% of GDP), followed by the accommodation sector (0.11% of GDP). If the regulation applied to all the passive shadow economy sectors in Croatia, the resulting increase in the registered activities should amount to 0.47% of GDP.

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7 For more details on the applied approach and obtained results see Appendix 5.
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.

The estimated impact of this measure on government revenues is presented in Chart 3.12. In the variant in which the cost of the regulation is incurred by the government, the results are illustrated by changes in net government revenues.

The results show that even if the government were to cover the cost of the regulation, the net impact on government balance would remain positive for all the analysed sectors. If the regulation applied to all the sectors considered, government revenues should increase by HRK 338 m. However, if the government was to incur the cost of installing new POS terminals, the net effect on its revenues would be somewhat smaller and amount to HRK 283 m.
Chart 3.12. Obligation to operate POS terminals for selected types of businesses – impact on government revenues in Croatia (m HRK)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Change in government revenues (m HRK)</th>
<th>Change in net government revenues (m HRK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuels for vehicles</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Recreation and culture</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Transport (private and public)</td>
<td>27</td>
<td>23</td>
</tr>
<tr>
<td>Accommodation</td>
<td>75</td>
<td>62</td>
</tr>
<tr>
<td>Food, beverages and tobacco (grocery stores, markets, etc.)</td>
<td>95</td>
<td>79</td>
</tr>
<tr>
<td>Restaurants, bars and cafes</td>
<td>96</td>
<td>80</td>
</tr>
<tr>
<td>All passive shadow economy sectors</td>
<td>338</td>
<td>283</td>
</tr>
</tbody>
</table>

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.
3.4 Tax incentives for consumers

Mechanism of the regulation

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 data. By analogy, such financial motivation may be provided by the government, for example through appropriately designed tax incentives that reduce the tax component of retail prices such as VAT, provided that a consumer makes a card payment at the point of sale. 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 the resulting increase in government revenues (Chart 3.13). It should be stressed that such incentives for consumers may be introduced through various mechanisms, many of which allow the government to reduce incurred costs, but at the same time lower potential benefits in terms of crowded out cash payments.

Chart 3.13. Mechanism of the regulation – Tax incentives for consumers

Source: EY

An example of such a regulation is the programme introduced in South Korea in 1999, allowing the consumers to deduct from their income tax base 10% of the value of card transactions in excess of 10% of their total salary. At the same time, the deduction cap was set at the lower of KRW 3m or 10% of total annual salary. In the years that followed, both the deduction ratio and the annual income threshold were significantly raised. This mechanism allows the government to react (relatively) flexibly to the changing environment, and to control the level of 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-back 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. In Croatia, the only refunds of expenses are provided by business entities within their standard business offer to the customers, e.g. one of the most well-known programmes in Croatia is related to MultiPlusCard that is offered to customers by Zagrebačka banka (UniCredit group) and Croatian retail chain Konzum for MasterCard and Maestro payment cards.

An interesting variant of the tax deduction solution could be providing taxpayers with the ability to deduct a certain percentage of their card expenses on specific types of expenditure, up to a pre-defined limit set for a given tax year. These expenses could be deducted from the taxpayer’s income. In order to use such a PIT allowance, the taxpayer would need to document expenditures incurred by submitting card transaction receipts/
bank statements. Alternatively, an appropriate electronic system might allow the automatic verification of such transactions. For example, in South Korea the confirmation of a taxpayer’s expenditure is available through the Simplified Year-end Tax Settlement website. This is an Internet-based service that shows the allowable amount of deduction that each taxpayer is allowed. A print-out of the screen displaying the records is a valid support document.

To combine the high efficiency of the considered solution, in terms of the shadow economy contraction, with limiting the costs of the tax relief incurred by the government, the regulation may focus on the selected sectors that account for the largest share of the passive shadow economy. Therefore, expenditure qualifying for the PIT allowance may be limited to certain sectors or predefined goods or services. In contrast, if the solution were implemented at a national level (covering all the sectors), this might be less effective in terms of reducing the shadow economy. The reason is that card payments made in non-shadow economy sectors may allow taxpayers to exploit the tax relief. Consequently, many consumers could fully benefit from this tax allowance without the need to replace their cash transactions in the shadow economy sectors with electronic payments. In such a situation, the regulation would entail only costs with no benefits for the government.

One of many examples of the regulation focusing on a selected sector is the construction/repairs allowance implemented in Poland. It allowed taxpayers to deduct 19% of their expenses incurred in 1992–2003 relating to house purchase, building and repairs. From 1997 onwards, a limit on this kind of expense was established.

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

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 available. 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. Based on these results, we run 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.

We therefore analyse the impact of the tax relief, which is provided in the form of a cash-back equal to a given percentage of the card transaction value, on the increase in electronic payments and the respective decline in consumer cash transactions. The quicker the tax relief works and the simpler construction it has, the higher is the chance that this condition will be satisfied. It is likely that, for example, an immediate benefit for the consumer in the form of a VAT deduction (corresponding to the predefined percentage value of a card transaction) would be more effective in stimulating card payments than complicated mechanisms of the tax refund based on the collection of payment card receipts, or the South Korean example of an 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.

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 illustration of the relationship between the tax relief level and the associated costs and benefits is demonstrated in Chart 3.14.

Note that the potential benefits of the regulation for government revenues are proportional to the fall in the value of shadow economy transactions, which in turn is proportional to a 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 a percentage 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 the optimum level of the tax incentive for consumers that maximises the difference between the benefits and costs of the regulation in Croatia. It has been estimated at the level of 1.9% of the card payment value. The results are presented in Chart 3.15, which shows that this regulation seems to have a significant potential to reduce the shadow economy (by 4.1% of GDP) and increase government revenues in Croatia (with the net effect of HRK 1,047 m).
Chart 3.14. The impact of the tax relief for consumer card payments on the government balance - an illustrative example

From this moment on, there is no crowding out of the passive shadow economy.

Additional VAT and CIT revenues
Costs for the government

The break-even scale of intervention
The optimum scale of intervention

Source: EY
While the effects of this regulation seem to be very promising for Croatia, 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 the Croatian economy, 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 many ways.

**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). 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. It might be assumed 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 withdraws from the regulation completely, 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, net effects of the regulation on the government balance may increase over time.
3.5 Tax incentives for merchants

**Mechanism of the regulation**

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 network can be a result of the high costs of accepting 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 transactions. This, in turn, would translate into a contraction of the passive shadow economy and a subsequent increase in government revenues (Chart 3.16).

**Chart 3.18. Mechanism of the regulation - Tax incentives for merchants**

![Mechanism of the regulation - Tax incentives for merchants](image)

An example of merchant-targeted policies is the experience of South Korea, which introduced 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 two percentage point VAT deduction on electronic payments accepted by merchants has recently been introduced. In Croatia, no such regulation is in force.

In order to reinforce the effects of the considered regulation, other incentives provided for merchants might be considered. They may take the form of tax allowances, granted EU Funds or government (co)financing for the purchase of POS terminals (for example, in Poland the cost of purchasing cash registers could partially be deducted from the company’s VAT liability).

Moreover, merchants accepting card payments could be exempted from the obligation to issue a fiscal receipt for such transactions. Taking into account the current level of payment infrastructure.
development in Croatia, only slight adjustments would be required to enable such an exemption if the payment was made electronically.

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

Using the econometric model described in Appendix 5, we have estimated how changes in merchant costs affect the value of card transactions. 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 Croatian passive shadow economy. The reduction in the passive shadow economy is associated with a growth in government revenues. However, similarly to the tax incentive for consumers, the regulation considered here 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 relationship between the tax relief level and the associated costs and benefits is illustrated in Chart 3.19. The reasons for the constant slope of the benefits curve and the increasing slope of the costs curve are the same as described in the section on tax incentives for consumers.

![Chart 3.17. The impact of the tax relief (as % of card payments value) for merchants on the government balance - an illustrative example](chart)

We therefore seek the optimum level of the tax relief for merchants that maximises the difference between the benefits and costs of the regulation in Croatia. It has been estimated at the level of 0.8% of the card payment value. The results, presented in Chart 3.18, show that the reduction of the shadow economy (by 0.7% of GDP) and the increase in government revenues generated by this regulation are significantly lower than in the case of the previously discussed tax incentives for consumers.

While we opt for a conservative approach in every 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 level of the tax relief seems 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 into 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.

Chart 3.18. The impact of the optimum tax relief for merchants (0.8% of card payment value) on government revenues in Croatia

On the other hand, it can be claimed that this regulation should contribute to the development of card payment infrastructure and stimulate electronic transactions. When the card network is sufficiently developed, the maintenance costs (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 in 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 the Croatian economy, 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 concerning 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. 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 it might be assumed 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, the net effects of the regulation on the government balance may increase over time.
3.6 Receipt lotteries

Mechanism of the regulation

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 receipt lotteries, therefore giving its holder a chance to win attractive prizes. In the longer perspective, this measure is aimed at getting 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 thus will continue to demand fiscal receipts even without such an additional monetary incentive.

National receipt lotteries have been introduced in several countries (starting from Taiwan in the early 1950s) in order to increase the issue of receipts in consumer transactions. In Slovakia, Malta and Portugal, the lottery is considered 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 has been 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.

In Croatia, since 2013 several rounds of VAT lotteries have already 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). The most recent receipt lottery was organised as part of the national campaign “It does not count without a receipt”, with the aim to limit the shadow economy and increase the awareness of the customers who should insist or pay attention to receiving the payment confirmation from cash registers.

It must be emphasised that the impact of receipt lotteries on the shadow economy 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, and 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 3.19).

![Chart 3.19. Mechanism of the regulation - receipt lotteries](source: EY)
Impact of the regulation on the passive shadow economy and government revenues

In order to assess the impact of the considered regulation, we use an econometric model as described in Appendix 5. While receipt lotteries turn out to have some positive impact on electronic 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.

It is very likely that receipt 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 requested to issue receipts. However, the scarcity of historical experience, and thus insufficient data do not allow us to provide a 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.). Consequently, receipt lotteries is the only measure in this study whose economic impact could not be estimated.

Potential costs of the regulation

The main costs of this measure are linked to prizes and the expenditures related to the organisation of the lottery, such as setting up a website etc. However, 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 newly registered transactions. Moreover, 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 the introduction of the regulation. However, the assessment of how many receipts have been recorded only due to the lottery remains hard to estimate.
Conclusions

According to EY’s estimates, the level of the shadow economy in Croatia, approximated by unreported cash transactions, amounted to 17.0% of GDP in 2014. The passive component of the shadow economy was estimated at 11.5% of GDP, and thus accounted for the majority of unregistered activities in Croatia. Potential government revenues from eliminating the passive shadow economy in Croatia amount to 2.6% of GDP or HRK 8.5 bn. Consequently, even a partial success in dealing with this category of unreported transactions can significantly improve the public finance situation.

The passive shadow economy can be addressed through: (1) the promotion of electronic payments, which replace consumer cash transactions, or (2) control and execution measures increasing the share of reported consumer cash payments. There is a wide range of potential regulatory measures that may be considered in order to reduce the passive shadow economy in Croatia. Many of such solutions have already been implemented in other countries.

The impact of the considered measures 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 in Croatia by 4.1% of GDP. This regulation is also the most beneficial (excluding limits on maximum consumer cash payments) in terms of its impact on government net revenues, which amounts to HRK 1,047 m.

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 limits, 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, presented in Chart C1 and Chart C2, show that an increase in the popularity of electronic payments may play an important role in addressing the problem of unreported activities in Croatia. At the same time, the considered measures differ in terms of their efficiency and the difficulty of their implementation. In general, the more efficient instruments – in terms of their impact on the shadow economy contraction and
increase in government revenues – seem to be more difficult to implement (Chart C3).

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 Croatian 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 in Croatia.

Chart C1. Summary of the impact of the analysed regulations on the passive shadow economy in Croatia (as a percentage of GDP)

Source: EY
Chart C2. Summary of the impact of the analysed regulations on the net government revenues in Croatia (m HRK)

- Threshold for consumer cash payments - 200 HRK: 1,757
- Threshold for consumer cash payments - 300 HRK: 908
- Threshold for consumer cash payments - 400 HRK: 477
- Threshold for consumer cash payments - 500 HRK: 45
- Tax incentive for consumers - optimal tax relief: 1.9% of card payment value: 3,092
- Tax incentive for consumers - 0.5% of card payment value: 818
- Tax incentive for merchants - optimal tax relief: 0.8% of card payment value: 527
- Tax incentive for merchants - 0.5% of card payment value: 351
- Obligation to operate POS terminals: all passive shadow economy sectors: 338
- Obligation to operate POS terminals: restaurants, bars and cafes: 283
- Obligation to operate POS terminals: food, beverages and tobacco (grocery stores, markets, etc.): 23
- Obligation to operate POS terminals: accommodation: 10
- Obligation to operate POS terminals: transport (private and public): 8
- Obligation to operate POS terminals: recreation and culture: 7
- Obligation to operate POS terminals: fuels for vehicles: 229

Source: EY
Chart C3. Effectiveness vs. difficulty of implementation of the analysed regulations in Croatia

Notes: The size of the circle reflects the net impact of a given regulation on government revenues.
Source: EY
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