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This research is supported by the  
UNDP Montenegro RFP 29/14  
Research on Informal  
Economy/Informal Employment Within  
"2015 National Human Development  
Report" ref. no. 16824.

# Shadow Economy - Is an Enterprise Survey a Preferable Approach?

**Summary:** The direct approaches to measuring the shadow economy have not been used extensively until very recently. A relatively simple method has been developed (Talis J. Putninš and Arnis Sauka 2015) using an income approach to measuring GDP and exploiting survey data on unreported employee wages and the business income generated by enterprises, which was provided by owners/managers of such enterprises. This paper illustrates the advantages of this approach over indirect ones through applying it to two EU candidate countries. This is first done by measuring the size of the shadow economy and then by providing estimates of the factors which cause enterprises to engage in shadow economic activity. Estimates of these factors suggest a number of policy approaches that could reduce the size of the shadow economy in countries similar to the ones we have used here.

**Key words:** Shadow economy, Unreported income, Enterprises and entrepreneurs.

**JEL:** E01, E25, E26.

In spite of decades of research, there is still no consensus among researchers on what are the most reliable approaches for measuring a shadow economy. A number of approaches have been applied. However, many appear unreliable for transition countries, as assumptions about the size and stability of parameters in estimating equations are often violated due to the unstable economic conditions that prevail in such countries. Edgar L. Feige and Ivica Urban (2008) found a huge lack of convergence between conventional macro methods for 25 transition countries. In response to these issues, a recent paper by Putninš and Sauka (2015) provides a new method for measuring the shadow economy using enterprise survey data on unreported personal and business income in three Baltic countries.

The current paper makes a contribution to the research on the shadow economy, applying this method for measuring the shadow economy to two EU candidate countries of south-east Europe (Montenegro and Serbia) and illustrate its advantages over more commonly used indirect approaches. It also analyses factors which influence enterprise participation in the shadow economy. In this research, the *shadow economy* is defined as the collection of all market-based legal production activities deliberately concealed from public authorities (Friedrich Schneider, Andreas Buehn, and Claudio E. Montenegro 2010). We estimate the shadow economy of registered enterprises and entrepreneurs.

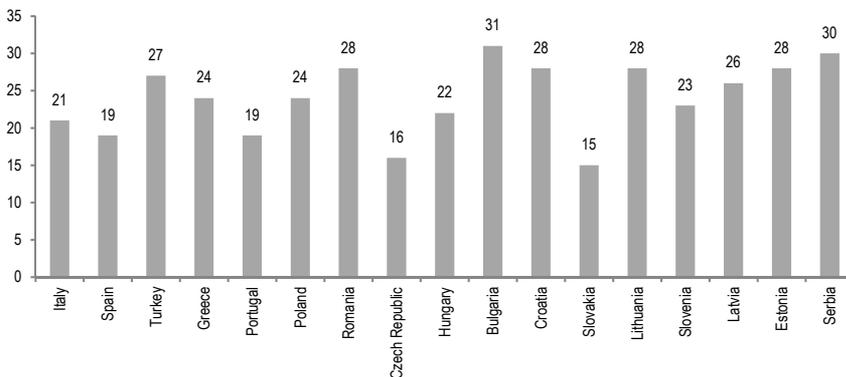
The paper is structured as follows: Section 1 reviews existing methods for estimating shadow economies in south-eastern Europe and the Baltic countries, primarily focusing on direct methods. Section 2 details the methodology. Section 3 presents the results relating to the size and determinants of the shadow economy providing comparisons between Baltic countries on the one hand, and Montenegro and Serbia on the other. A final section concludes with some policy implications.

## 1. Approaches to Measuring the Shadow Economic Activity and Understand Factors that Influence the Decision to Engage in It

### 1.1 Methods Used to Measure the Shadow Economies of South-Eastern European and Baltic Countries

Measuring the shadow economies of south-eastern European countries is, for the most part, based on *indirect methods* which are shaped by the knowledge that any participation in economic activity, whether recorded or unrecorded, leaves a visible trace in various areas such as: electricity consumption, the use of cash, the volume of transactions, and labour force participation rates. These methods are most often based on economic and other indicators that contain the effects of the shadow economy and relate to overall economic activity (recorded and unrecorded), so that the shadow economy is measured by subtracting recorded economic activity from overall economic activity.

Multiple Indicator Multiple Causes (MIMIC) method was widely used to estimate the shadow economies of central and eastern European countries (see Schneider, Buehn, and Montenegro 2010; Vesna Garvanlieva, Vlatko Andonov, and Marjan Nikolov 2012; Schneider et al. 2015). Figure 1 presents the shadow economies of southern and eastern Europe in relation to GDP estimated using this method (Schneider 2013). The highest shadow economy percentage is recorded in Bulgaria (31%) and Serbia (30%), while the lowest in the Czech Republic (16%) and Slovakia (15%).



Notes: For Serbia, estimates relate to 2010.

Source: Schneider (2013), for Serbia see Schneider et al. (2015).

**Figure 1** Shadow Economies in Southern and Eastern European Countries as a Percentage of GDP, 2013

*Direct approaches* have not been used extensively until very recently. They exploit the micro-level data obtained from the tax audits and surveys or they rely on other compliance methods (i.e., the discrepancy between income declared for tax purposes and that measured using other data sources). Since *tax audits* are usually non-random, estimates of the shadow economy can be biased if the estimation method does not account for this problem. Furthermore, estimates based on tax audits reflect only a part of the hidden income which is discovered by authorities, and which is reported by registered workers. Edward Christie and Mario Holzner (2004) analyse a range of south-eastern European, central and eastern European, and Baltic countries focusing on household tax compliance. They derive data on *true* household income (from final consumption data) and statutory tax rates and compare actual tax revenue with what it should be if everyone paid the right amount of tax. The gap gives an indication of the size of the shadow economy. Authors pointed out that the main limitations of their approach are that it only partially captures unreported business income and that not all data for producing a more reliable estimate of the statutory household tax rate is available. Using the same method, Schneider et al. (2015) estimated the shadow economy in Serbia at 23.6% of GDP for 2010.

The other set of direct approaches are based on *surveys*. Most research so far has been based on household surveys (Brugt Kazemier and Rob van Eck 1992; Barry Reilly and Gorana Krstić 2003; Jan Hanousek and Filip Palda 2004; European Commission 2007, 2014; Klarita Gerxhani 2007; Southeast European Leadership for Development and Integrity 2016). Fewer studies still have used enterprise surveys to analyze the characteristics and determinants of businesses engaged in the shadow economy. There has been research in Bulgaria, the Baltic countries and a study on the impact of the shadow economy on the operation and competitiveness of businesses in South Eastern Europe (Collin C. Williams 2006; Lindsay M. Tedds 2010; John Hudson et al. 2012; Putninš and Sauka 2012, 2015). However, to our knowledge, only a few studies have used enterprise surveys in order to estimate the shadow economy.

Putninš and Sauka (2012, 2015, 2016) developed simple method to measure the shadow economy in Baltic countries, which is based on the income approach to measuring the GDP and the survey data on unreported employee wages and the business income provided by owners/managers of surveyed enterprises. The authors estimated that the shadow economy was largest in Latvia (21.3% of GDP in 2015), while in Estonia and Lithuania shadow economies were around 15% of GDP. All three countries have experienced a contraction in the relative size of their shadow economies since 2009, with the most dramatic decline being experienced by Latvia. This method will be further explained in the methodology section below.

A broadly similar approach was used to obtain macro-level estimate of Serbia's shadow economy (Schneider et al. 2015). Using the data derived from the enterprises and entrepreneurs survey, two most significant forms of the shadow economy (i.e., unreported employee wages and unreported sales) are estimated. A study for Kosovo (Reinvest Institute 2013) shows that business owners and managers believe that, on average, businesses in their industry do not report around 39 percent of sales, while 37% of total employed in their actual business is unreported based on the data obtained from the survey of registered businesses in Kosovo. The Center for the Study of

Democracy (2016) in Bulgaria, using data derived from the enterprises survey, developed a Business Hidden Economy Index which includes several components: hidden economy size (subjective perceptions of business representatives about the size of the hidden economy in the country as a whole, and in their sector), hidden employment, hidden turnover, and hidden redistribution.

Although the application of the enterprise survey approach is very costly and are more time consuming than indirect methods, they eliminate many of the drawbacks of indirect methods. First, it can easily be applied to transition countries where most indirect methods do not provide reliable estimates of the shadow economy, given that they rely on many assumptions which appear unrealistic. Second, the comparability of shadow economy between countries and over time can be achieved using a set of standardized survey questions for measuring the shadow economic activity as our empirical results reveal. This can be very useful for the design and evaluation of policy measures to reduce the shadow economy over time. Third, this method provides data on the structure of the shadow economy (across sectors, regions and other characteristics of the entities that perform them) and the determinants of an enterprise's involvement in the shadow economy, which can be useful for policy-makers. Fourth, estimates of the shadow economy can be available even prior to the calculation of GDP for the year the survey was conducted. We illustrate these advantages applying this method to two European Union (EU) candidate countries.

It is argued that the greatest limitation of these direct methods is that they may underestimate the shadow economy as a result of partial or complete concealment of these activities by respondents. We use responses from the owners/managers of surveyed enterprises, as they are "in the unique position of simultaneously knowing about both shadow economy components – unreported wages and unreported business profits" (Putninš and Sauka 2015). To obtain more truthful responses, we use the "indirect" approach for questions about these components of shadow economy, asking owners/managers about "enterprises in their industry" rather than "their enterprise". This is because the need to conceal data associated with other enterprises is much smaller compared to the need to conceal data on one's own enterprise activity, which is further described in Section 1.2 and in Section 2.2.

We do not estimate income from production of illegal goods and services as it is not covered by our definition of the shadow economy. Shadow economic activities related to households are partly captured, since the survey covered registered entrepreneurs who belong to the household sector.

A critical evaluation of the various estimates and calibration methods can be found in the studies conducted by Schneider (2005, 2010, 2011), Lars P. Feld and Schneider (2010), Putninš and Sauka (2015) and Schneider and Buehn (2016).

## 1.2 Approaches to Understand Factors that Influence the Decision to Engage in Shadow Economic Activity

The literature germane to tax evasion commonly identifies two groups of factors that influence the decision to engage in shadow economic activity. The first group of factors is based on rational choice models (e.g., Michael G. Allingham and Agnar Sandmo 1972; Shlomo Yitzhaki 1974). Entrepreneurs weigh the expected benefits and costs

associated with tax evasion and involvement in the shadow economy (i.e., they compare the actual benefits from tax evasion and the corresponding costs, should they be caught). The expected costs depend on the probability of detection, the rate and type of penalty, the probability of enforcement, and their propensity to take risks.

However, empirical studies reveal that the real level of tax evasion is considerably lower in comparison to the predictions of rational choice theory. This is due to the existence of other psychological and social groups of factors relating to attitudes towards tax evasion, the shadow economy and social norms (e.g., Alan Lewis 1982). These include the perceived fairness of the taxation system, that is, attitudes on whether or not the tax burden and tax processes are just.

In our econometric analysis, we examine the probability that those caught will be penalised and also to what extent involvement in the shadow economy is dependent upon social norms (i.e., moral values).

## 2. Methodology

### 2.1 Enterprise Survey Approach

We have followed the methodology suggested by Putninš and Sauka (2015). This is based on an income approach to measuring GDP and exploits data from the enterprise survey regarding both unreported personal incomes and business incomes. According to the income method, GDP is defined as the sum of gross remuneration of employees and the gross business income of enterprises (profits). Thus, the shadow economy can be estimated as the sum of unreported remuneration of employees and unreported business incomes.

The underreporting of employee remuneration includes underreporting salaries, or “envelope wages” ( $URs_i$ ) and unregistered employees ( $URe_i$ ) whose total salaries are paid in cash. It is assumed that the wages of the unregistered employees are, on average, equal to the wages of registered employees. By taking both components into consideration, the total unreported proportion of employee remuneration of enterprise  $i$  ( $URer_i$ ) is:

$$URer_i = 1 - (1 - URs_i)(1 - URe_i). \quad (1)$$

The weighted average of underreported personal incomes and underreported business income ( $URbi$ ) for each enterprise represents an estimate of the unreported or shadow proportion of an enterprise’s production (income):

$$ShadowProportion_i = \alpha URer_i + (1 - \alpha) URbi_i, \quad (2)$$

where  $\alpha$  is the ratio of employee remuneration to the sum of employees’ remuneration and gross business income of enterprises, based on the income approach to measuring GDP. We applied the weighted average of the underreporting values instead of a simple average in order to interpret the index of the shadow economy as a proportion of GDP.

Finally, the index of the shadow economy for a country is defined as a weighted average of the underreported production ( $ShadowProportion_i$ ) of enterprises in the representative sample of enterprises.

$$INDEXse = \sum_{i=1}^N w_i ShadowProportion_i \quad (3)$$

The weights  $w_i$  represent the relative contribution of each enterprise to GDP in the country, which is approximated by the proportion of total wages paid by the enterprise to the total wages of all enterprises in the representative sample. This weighting procedure ensures the index of the shadow economy reflects a proportion of GDP. For example, suppose only two enterprises exist in an economy: a large one which produces income of 70 and a smaller one that produces income of 30, comprising true GDP of 100. Suppose that income of a large enterprise is underreported by 10% and of a smaller one by 40%, giving the official GDP of 81 and the shadow economy of 19%. In order to obtain correct estimate of the shadow economy, we used the weighted average of underreported production of the two firms:  $0.7*(10\%) + (1 - 0.7)*(40\%) = 19\%$ . Weights are approximated by the relative amount of total wages paid by each enterprise. Using unweighted average of the unreported production of all enterprises would not provide accurate results (i.e., in this example it would give a shadow economy figure of 25% of GDP). In this way, we take into account both the size of the shadow economy in each enterprise as enterprises in some sectors (for example construction and services) may have large underreported incomes relative to other enterprises (for example, building machineries), and the relative contribution of each enterprise to GDP.

## 2.2 Survey Design

The shadow economy is estimated using the data drawn from enterprise and entrepreneur survey, given that the managers or owners of those enterprises surveyed are most familiar with these activities. The survey allows us to explore the shadow economy from a business perspective, as almost all previous research in these countries has been based on household-level surveys. The survey was designed to elicit information necessary to measure the shadow economy by assessing the main types of shadow activities undertaken based on owners/managers' responses.

The survey was conducted on a representative sample of 409 business entities (enterprises and entrepreneurs) in Montenegro covering the period November-December 2014, and 1,251 business entities in Serbia between 16 and 22 October 2012. Most of the respondents were either owners or managers of business entities or entrepreneurs. The data were collected using face-to-face interviews.

The surveys were conducted using a single-stage stratified sample of business entities. The sampling frame was based on the list of all active business entities (enterprises and entrepreneurs) registered with the Central Registry of Business Entities. The stratification was based on regions, sectors of economic activity and the size of the entity based on the number of employees. The total sample was allocated by stratum in proportion to the size of each stratum in the initial sample. A simple random sample was used with replacement by stratum. The data are representative at the national level and by region, sector of economic activity and entity size (*viz.*, micro, small, medium and large comprising one group).

In order to reduce the effects on the survey findings of concealing irregular business activities, the contents of the survey questions, their sequencing and

formulation as well as the approach of the survey have been tested in a pilot study and subsequently adjusted so as to exert minimum influence on respondent bias. Various techniques have been used in previous studies and have proven to be useful in delivering the most honest responses possible (e.g., Kazemier and van Eck 1992; Reilly and Krstić 2003; Hanousek and Palda 2004; Gerxhani 2007). This implies, among other things, that the respondents are gradually led towards questions of a more sensitive nature, where the preceding question is usually less sensitive than subsequent ones.

In addition to questions relating to the involvement of the surveyed enterprise in various forms of the shadow economy, there are questions on the subjective attitude of the enterprise owner/manager on the involvement of other enterprises operating in the same industry in such activities. This approach is described as a method used to obtain truthful responses (Gerxhani 2007) and is used in the research undertaken by Hanousek and Palda (2004), Sauka (2008), Putninš and Sauka (2012) and Krstić (2015). For the most important forms of the shadow economy, the same subjective questions were asked of enterprise owners/managers regarding their involvement in the shadow economy as well as the involvement of other enterprises in the same industry in such activities. The research conducted by Sauka (2008) and Krstić (2015) revealed that even when the questions are posed indirectly, the answers of the owners/managers still relate to the enterprises they represent.

The survey questionnaire consists of four modules. The first is devoted to general information about the enterprise such as, for example, its type, employment size, ownership structure, date of establishment, sector of economic activity, sales turnover, and position relative to its competitors. The second module is designed to capture data on the activities of each enterprise in various types of shadow economic activity. In addition, the enterprise owners/managers are expected to present their subjective views on the involvement of other enterprises from the same industry in the shadow economy. They are asked to estimate the amount of underreporting of employees, employee wages and business income (profits) that their own enterprise is involved in, as well as to make those estimates for other enterprises in the same industry. The third module relates to owner/manager perceptions regarding the main causes and incentives for various types of informal activities, their attitudes regarding the performance of tax and inspection authorities, and the ability of inspections to tackle the shadow economy. This section also elicits perceptions of the likelihood of being caught if engaged in informal activities and of being penalised, if caught. The final module of the survey covers policy proposals for the reduction of the shadow economy.

In Montenegro, underreporting of business income (or profits) of enterprise  $i$  ( $URoi_i$ ) is estimated using the survey question regarding the business income of enterprises in the same industry (see question Q1 in the Appendix). The underreporting of employee remuneration from Equation (1) is estimated using the survey question regarding the underreporting of salaries in the same industry, or “envelope wages” (question Q2 in the Appendix) and unregistered employees ( $URei_i$ ) whose total salaries are paid in cash (question Q3 in the Appendix). In Serbia, the survey did not collect information on unreported business income, so that shadow economy is estimated based on unreported employee remuneration for the enterprises in the same industry (see question Q7 in the Appendix).

## 2.3 Factors that Influence the Level of Involvement in the Shadow Economy

In order to examine the factors that influence an enterprise's involvement in the shadow economy, we specify the following linear regression model:

$$Y_i = \alpha + \beta'X_i + e_i, \quad (4)$$

where  $Y_i$  is the unreported proportion of production of enterprise  $i$  for Montenegro (or unreported proportion of employee remuneration for Serbia);  $X_i$  is a  $k \times 1$  vector of characteristics of enterprise  $i$  (e.g., legal form, employment size, age of the enterprise, turnover, the average wage paid by the enterprise, sector of economic activity, region, perceptions and attitudes of the owners/managers regarding involvement in the shadow economy etc.);  $\beta$  is a  $k \times 1$  vector of unknown equation parameters to be estimated;  $\alpha$  is a constant term;  $e_i$  is an error term for which standard assumptions are made. The model (4) is estimated by OLS. Given the presence of heteroscedasticity, robust standard errors are used for purposes of inference.

## 3. Empirical Results: Baltic Countries vs Montenegro and Serbia

### 3.1 Estimate of the Shadow Economy

We applied the method described above to Montenegro and Serbia and compared the results with the Baltic countries. For Montenegro, the coefficient  $\alpha$  from Equation (2), which represents the ratio of employee remuneration and the sum of employee remuneration and the gross business income of enterprises is calculated as the average for eastern European countries for 2013 (Eurostat 2016)<sup>1</sup>, given Montenegro's GDP is not calculated using the income approach, but rather using the production and expenditure approaches<sup>2</sup>. The shadow economy index obtained from Equation (3) relates to the economic activity of three sectors included in the enterprises survey. In addition to non-financial and financial enterprises, the survey covered entrepreneurs who belong to the household sector. The general government sector was not included. As a result, the size of the shadow economy in Montenegro, as a percentage of GDP, is calculated by multiplying the index (i.e., rates) of the shadow economy (from Equation (3)), which is 30.1 percent by the share of gross value added of these three sectors in total gross value added, amounting to 81.4 percent (Statistical Office of Montenegro 2013). Therefore, Montenegro's shadow economy was estimated to be about 24.5 percent of GDP in 2014.

For Serbia, we estimate one component of the shadow economy (i.e., the unreported proportion of employee remuneration, based on underreporting of salaries and unregistered employees). Since the survey covered the three institutional sectors, as in the case of Montenegro, the unreported proportion of employee remuneration (amounting for a share of 0.438) is first multiplied by the share of employee remuneration of the three sectors in the total employee remuneration (0.70). Finally, in order to estimate shadow economy as a proportion of GDP, the overall unreported proportion of employee remuneration is multiplied by the ratio of employee remuneration and the sum

<sup>1</sup> Eurostat. 2016. Database. <http://ec.europa.eu/eurostat/data/database> (accessed May 18, 2016).

<sup>2</sup> Data obtained for Serbia and Macedonia is for 2012. Ukraine was not included.

of employee remuneration and the gross business income in Serbia (0.516). Thus, the Serbian shadow economy, based on unreported employee remuneration, is estimated at 15.8 percent of GDP in 2012.

Table 1 reports the size of the shadow economies for Estonia, Latvia, Lithuania, Montenegro in 2014 and Serbia in 2012 using the shadow economy index method. The shadow economy of Montenegro (as a percentage of GDP) is slightly higher than that of Latvia which has the highest shadow economy among Baltic countries. It should be borne in mind that estimates of the shadow economies of Montenegro (and Serbia) relate to all sectors, while the shadow economy estimates for the Baltic countries are based on the private sector alone. Table 1 also reveals that the Serbian shadow economy based on its one component (unreported proportion of employee remuneration) is even higher than the overall shadow economy of Estonia and Lithuania. In addition to unreported employee remuneration, if unreported sales is estimated (as a percent of GDP) based on the same enterprise survey from 2012 (Schneider et al. 2015), the shadow economy in Serbia appears to be 27.4 percent. This estimate is slightly higher as compared to estimate from other direct method applied for Serbia (i.e., Household Tax Compliance Approach - HTC). According to HTC approach, the shadow economy in Serbia was 23.6 percent in 2010 (Schneider et al. 2015). Our estimate for Montenegro cannot be compared with other studies, given that the last estimate for the shadow economy was conducted in 2005 (United Nations Development Programme 2016).

**Table 1** Estimates of the Shadow Economies in Baltic Countries, Montenegro and Serbia by Enterprises Survey Approach

	Method	Coverage	Year	Shadow economy in % of GDP
Estonia	Shadow economy index	Private sector	2014	13.2
Latvia	Shadow economy index	Private sector	2014	23.5
Lithuania	Shadow economy index	Private sector	2014	12.5
Montenegro	Shadow economy index	All sectors	2014	24.5
Serbia	Shadow economy index	Unreported personal income	2012	15.8
	Direct method	Unreported personal income + unreported sales	2012	27.4

Source: Own estimates for Montenegro based on 2014 enterprise survey; estimates for Serbia based on 2012 enterprise survey according to Schneider et al. (2015); for Estonia, Latvia and Lithuania according to Putninš and Sauka (2016).

In addition, it is important to emphasize that the estimate does not show by what percentage it is necessary to increase GDP in order to include the shadow economy, because a certain part of the shadow economy is already included in the calculation of GDP (Statistical Office of Montenegro 2013). However, the advantage of this approach is in the fact that the shadow economy which is included in the estimate, is known and is the unreported incomes of registered enterprises and entrepreneurs. Therefore, this method may be used to adjust GDP for the part of the shadow economy not included in its calculation (Putninš and Sauka 2015) under the assumption that the part of the non-observed economy included in the registered GDP is actually known.

### 3.2 Components of the Shadow Economy

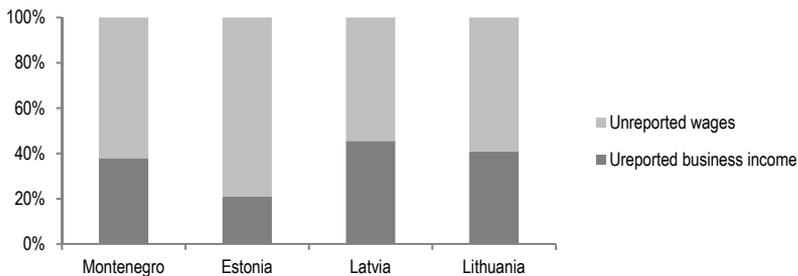
We believe that our estimates of the shadow economy, do not represent a lower bound of the phenomenon, as we use questions relating to other enterprises operating in the same sector, instead of questions relating to the enterprises of the owners/managers. This is because the need to conceal data associated with other enterprises is negligible compared to the need to conceal data on one's own enterprise activity (as Table 2 reports). It is evident that all forms of the shadow economy are significantly higher when it comes to other enterprises operating in the same sector. The proportion of unregistered employees ranges from 4.7 to 16.4 percent in Montenegro and from 1.9 to 23.9 percent in Serbia. The unreported proportion of wages ranges from 34.1 to 42.7 percent in Montenegro, while the upper bound is 26.2 percent in Serbia. Based on the questions relating to other enterprises in the same sector, it appears that the total unreported proportion of employee remuneration ( $URer_i$ ) is higher in Montenegro than in Serbia. Regarding the second component of the shadow economy, in both countries the respondents were not asked the question on the percentage of unreported business income in their own enterprise, since this indicator is highly sensitive, and only in Montenegro is it asked about other enterprises within the same sector.

**Table 2** Components of the Shadow Economy of Owners/Managers' Own Enterprises and those Operating in the same Sector Based on Enterprise Surveys, Montenegro and Serbia

	Montenegro, 2014		Serbia, 2012	
	Own enterprise	Enterprises in the same sector	Own enterprise	Enterprises in the same sector
% of unregistered employees	4.7	16.4	1.9	23.9
% of employees with envelope wages	10.7	22.8	3.8	24.7
% of unreported wages	34.1	42.7	...	26.2

Notes: Only a third of the respondents answered the question on unreported wages relating to their respective enterprise, and this question was not asked in Serbia due to its sensitivity.

Source: Own calculations based on the enterprises and entrepreneurs surveys in Montenegro and Serbia.



Source: For Montenegro own calculations based on 2014 survey of enterprises and entrepreneurs; for Baltic countries according to Putniņš and Sauka (2015).

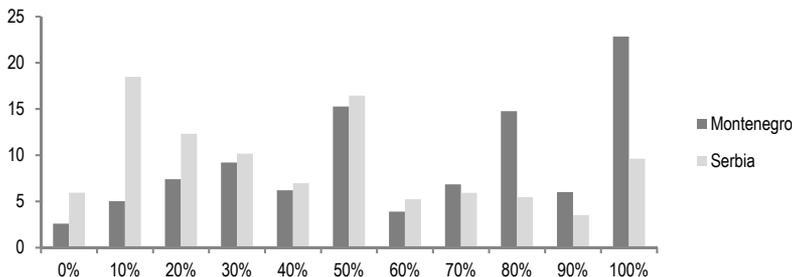
**Figure 2** Components of the Shadow Economy, Baltic Countries and Montenegro, 2014

Figure 2 presents the relative size of components of the shadow economy in the Baltic countries and in Montenegro. Unreported employee wages, or the partial or total payment of wages in cash (in the case of unregistered employees), comprise a larger proportion of the shadow economy than the unreported income of enterprises. In Montenegro, unreported employee wages account for 62.1 percent, while in the Baltic countries they range from 54.5 percent in Latvia to 78.9 percent in Estonia.

### 3.3 Attitudes Towards Tax Evasion and Shadow Economic Activity

The factors influencing the degree of involvement in the shadow economy will be analysed in the next section, and we now discuss the characteristics of certain variables to be used in the empirical model.

Empirical research suggests that the probability of detection plays a very important role in explaining the causes of tax evasion. According to the results of the enterprises survey, the estimated probability of detecting enterprises involved in informal activities is not very high in Montenegro. Only 17 percent of the respondents reported that the probability of detection is between 80 and 100 percent. However, the probability of being penalised if caught is much higher, given that 44 percent of respondents perceived an 80-100 percent probability of being penalized (Figure 3). Finally, 47 percent of the respondents perceived an 80-100 percent probability that the penalty would be paid. Therefore, the expectation that those caught will be penalised and that this penalty will be paid has resulted in a small overall probability.



Source: Own calculations based on the survey of enterprises and entrepreneurs in Montenegro.

**Figure 3** Probability of Being Penalised, Montenegro 2014 and Serbia 2012

In the case of Serbia, these probabilities are even lower. While the same proportion of respondents as in Montenegro reported that the probability of detection is between 80 and 100 percent (16.5 percent), the probability of being penalised if caught and the probability that the penalty would be paid is significantly lower (19 and 18 percent, respectively). This is why a significant share of enterprises continue to engage in informal business activities, even after being penalised (58 percent in Montenegro and around two-thirds in Serbia).

These expectations encourage an enterprise to become involved in the shadow economy because they significantly reduce expected costs. However, in our

econometric analysis, we focus only on the concept of expectation such that those caught will be penalised (see question Q4 in the Appendix).

The analysis also examines attitudes towards the shadow economy alone according to the beliefs of the enterprises' owners/managers alone (see question Q5 in the Appendix). This factor may correlate with untruthful responses. However, it is our belief that it is still a relevant indicator of the readiness of enterprises operating in an environment where sanctions are implausible, to choose whether to become involved (or not) in the shadow economy. According to the results of the survey, 81 percent of enterprises in Montenegro and 71 percent in Serbia believe that there is no excuse for this kind of behaviour, while 16 percent in Montenegro feel that it is justified and 9 percent in Serbia. This indicates that a number of enterprises involved in the shadow economy specifically claim that this type of business is unjustified, suggesting they were not entirely truthful in the survey responses provided.

### 3.4 Determinants of the Level of Involvement in the Shadow Economy

We now investigate the role of some key factors that influence an enterprise's involvement in the shadow economy. Table 3 reports OLS estimates for the unreported proportion of an enterprise's production, defined above, on various determinants of shadow activity using data drawn from the sample of Montenegrin enterprises. We also estimated an unreported proportion of employee remuneration for Serbia, since the Serbian enterprises survey, as already noted, did not collect information on the unreported proportion of business profits.

The explanatory variables are divided into five groups. The first consists of enterprise characteristics – whether they be enterprises or entrepreneurs, VAT payers or non-VAT payers, foreign or domestic equity, a business entity registered from the very start of the business or not (dummy variables), as well as the size of the enterprise in terms of the number of employees, the age of the enterprise and the average wage (all in natural log values). The variable relating to ownership sector was not included given that 99 percent of the surveyed enterprises are privately owned in Montenegro, while the figure is 97 percent in Serbia. The second group comprises dummy variables for the sector of economic activity. The third group is comprised of variables relating to the operations of the enterprise – annual turnover (interval values in € for Montenegro; a continuous variable for Serbia expressed in natural log values), changes in the total sales income in the reference year as compared to the previous year (stable, increased or decreased), so that we can determine whether or not the economic deterioration of the enterprise's position exerts an impact on the scale of its involvement in the shadow economy (dummy variable). The fourth group consists of dummy variables for the expectations/attitudes of the surveyed enterprises regarding the probability of facing sanctions, as defined in the previous section (response to question Q4 with higher scores indicating higher probability that those caught will be penalised), and social norms measured by the extent to which shadow activity is justified behaviour (response to question Q5, with higher scores indicating more justified behaviour). The fifth and final group consists of regional dummy variables.

**Table 3** Determinants of Enterprises' Level of Involvement in Shadow Economy in Montenegro and Serbia

	Montenegro		Serbia	
	(1)	(2)	(1)	(2)
Entrepreneur	-0.035 (0.042)	-0.032 (0.041)	-0.050 (0.035)	-0.047 (0.035)
Non-VAT payer	0.120* (0.061)	0.112* (0.061)	0.120*** (0.039)	0.117*** (0.039)
Foreign	-0.063 (0.059)	-0.068 (0.059)	-0.134** (0.061)	-0.133** (0.060)
Ln(employees)	0.013 (0.012)	0.015 (0.012)	-0.005 (0.015)	-0.003 (0.015)
Ln(age)	0.038** (0.016)	0.037** (0.016)	-0.012 (0.019)	-0.012 (0.019)
Registered when established	-0.074 (0.049)	-0.089* (0.046)	-0.087 (0.057)	-0.090 (0.057)
Ln(wage)	0.003 (0.040)	0.004 (0.039)	-0.038 (0.025)	-0.039 (0.025)
<b>Sector of economic activity</b>				
Agriculture	0.025 (0.060)	0.020 (0.059)	0.129 (0.098)	0.119 (0.096)
Construction	0.047 (0.046)	0.048 (0.045)	0.185*** (0.053)	0.181*** (0.053)
Trade	0.050 (0.044)	0.053 (0.044)	-0.015 (0.043)	-0.016 (0.042)
Tourism	0.002 (0.047)	0.009 (0.047)	0.038 (0.056)	0.035 (0.057)
Other services	-0.015 (0.050)	-0.007 (0.050)	0.093 (0.065)	0.092 (0.065)
<b>Turnover, in €</b>				
50,001-100,000	-0.053 (0.034)	-0.051 (0.034)	-0.007 (0.011)	-0.008 (0.011)
100,001-500,000	-0.108*** (0.039)	-0.105*** (0.039)		
500,001 & over	-0.131*** (0.050)	-0.122** (0.048)		
<b>Sales revenue change</b>				
Stable	0.008 (0.028)	0.010 (0.028)	0.057 (0.037)	0.055 (0.037)
Increased	0.046 (0.031)	0.043 (0.031)	0.015 (0.040)	0.011 (0.039)
<b>Attitudes</b>				
Penalty for detection	-0.036 (0.045)	-0.037 (0.045)	-0.122*** (0.045)	-0.131*** (0.045)
Justification for shadow act.	0.031** (0.016)	0.030** (0.015)	0.041*** (0.013)	0.042*** (0.013)
<b>Region</b>				
Region 1	0.044 (0.050)		0.031 (0.046)	
Region 2	0.028 (0.048)		0.036 (0.031)	
Constant	0.248 (0.229)	0.285 (0.219)	0.883*** (0.287)	0.942*** (0.289)
<i>N</i>	298	298	446	446
Adjusted <i>R</i> <sup>2</sup>	0.119	0.121	0.136	0.137
<i>F</i> test	2.99	3.17	6.45	7.31
Prob. > <i>F</i>	0.000	0.000	0.000	0.000

Notes: For Montenegro, dependent variable is enterprises' unreported proportion of production; for Serbia it is enterprises' unreported proportion of employee remuneration. \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Robust standard errors are in brackets. For Montenegro: Region 1 is Center; Region 2 is South; for Serbia: Region 1 is Belgrade; Region 2 is Central Serbia. Reference categories: enterprise, VAT payer, domestically owned, business entity not registered when started to work, industry, turnover lower than €50,000 for Montenegro (for Serbia it is continuous variable), sales revenue decreased, increase penalties, Northern region for Montenegro, Vojvodina for Serbia.

Source: Own estimates based on the enterprises surveys in Montenegro and in Serbia.

We started with Model 1 which includes all of the factors described above testing their significance. Model 2 excludes regional dummies which are not statistically significant but retains sector dummies and the variable relating to the penalty for detection which are viewed as important control variables. We will now focus our attention on Model 2 for each country (without regional dummies) given that it explains most of the variation in the dependent variable.

On the basis of the main characteristics of enterprises, the estimated coefficient of the non-VAT payers is statistically significant at the 10% significance level in Montenegro and at the 1% level in Serbia and both have the expected positive sign. Non-VAT payers appear to be more involved in shadow activities in Montenegro and Serbia, controlling for other explanatory factors. The estimated effect for enterprises with foreign equity is statistically significant at the 5% significance level in Serbia and has the expected negative sign, while this effect is not found to be statistically significant in Montenegro. Enterprises with foreign equity in Serbia are less likely to be engaged in the underreporting of wages. The estimated coefficient corresponding to older enterprises is statistically significant at the 5% significance level in Montenegro and again both have unexpected positive sign, while it is insignificant in Serbia. The results for Montenegro suggest that older enterprises increase their competitiveness against younger enterprises using unregistered employees, providing “envelope wages” or underreporting their profits. This unexpected result may be explained by the fact that the shadow economy was largely tolerated by the state, especially during the 1990s, and subsequently became deeply rooted in enterprise behaviour both in Montenegro and in Serbia.

The estimated effect corresponding to the registration of enterprises at the very start of their business is statistically significant at the 10% significance level in Montenegro and has the expected negative sign, while it is statistically insignificant in Serbia. Montenegrin enterprises that formally registered at the very start of their business are less likely to become involved in the shadow economy by 8.9 percentage points relative to those that failed to register. This suggests that this variable can be used as a proxy for the formal business practices of enterprises. Thus, reforms may focus on removing such barriers to entry. This finding indicates the existence of a cycle in which informal employees find themselves, and one that is difficult to escape from, due to the fact that their knowledge and skills become obsolete. In the long-term, this has a negative effect on the probability of finding better employment in the formal sector.

Other characteristics of enterprises, such as their legal form (entrepreneur or enterprise), employment size, the average wage paid by the enterprise and changes in sales revenues are not found to be statistically significant in both countries.

The estimated effects corresponding to the set of industry sector dummy variables are also not found to be statistically significant (except for the construction sector in the regression model for Serbia, which is significant at the 1% level). In other words, sectoral differences in participating in the shadow economy are neutralised when the impact of the other characteristics of the enterprises are included in the model, such as their employment size, age, and enterprise type. This finding is consistent with the results of the determinants of participation in shadow economic activity in Serbia (Krstić and Branko Radulović 2015) and may indicate a need to formulate specific

measures in order to formalise the shadow economy, which should be largely sector-neutral.

Among the third group of factors relating to business practices, the estimated coefficients of the turnover dummy is highly statistically significant (at the 1% level) in Montenegro and have the expected negative signs, while the estimated effect corresponding to the continuous variable in Serbia is found to be statistically insignificant. Montenegrin enterprises with a higher turnover are less involved in underreporting the number of employees, wages and profits. Enterprises with a turnover between €100,001-€500,000 and €500,001 or more, were *ceteris paribus* less involved in the shadow economy by 10 and 12 percentage points respectively, relative to those enterprises with turnovers lower than €50,000. This indicates that an enterprise's economic performance is a significant determinant of its level of involvement in the shadow economy in Montenegro.

Finally, we analyse the estimated effects for the fourth group of variables in more depth (i.e., the perceptions and attitudes of the owners/managers regarding involvement in the shadow economy). We acknowledge that there is a potential endogeneity problem in regard to the attitude/perception variables included in the reported specifications. This follows from the fact that the unobservables determining these attitudes/perceptions may be correlated with the unobservables determining the extent of informal activity. If they are positively correlated, this may induce an upward bias in the estimated OLS effect, so some degree of caution is required in the interpretation of these effects. However, the absence of any instruments in the current dataset prevents a meaningful interrogation of this issue in the current application.

The probability of being penalised if caught yield a highly statistically significant effect for Serbia (but not Montenegro) and suggests that the higher the perceived probability of being penalised if detected, the lower the level of tax evasion and underreporting of wages, which is in line with the predictions of rational choice models and may also reflect the relative strength of governance and enforcement in Serbia compared to Montenegro. This result is consistent with findings for the Baltic countries (Putninš and Sauka 2015), which suggest that one policy option in reducing the shadow economy is to increase the probability of detection, and being penalised if detected, through increasing tax audits and other similar measures.

The estimated effects corresponding to the attitudes of Montenegrin and Serbian owners/managers regarding their justification for involvement in the shadow economy are statistically significant (at the 5% significance level in Montenegro and at the 1% level in Serbia). In addition, they both have a theoretically expected positive sign. They indicate that those that think that engagement in the shadow economy is more justified tend to be more often involved in it, which is consistent with theory. Low tax morality is usually animated by a low level of trust in governmental institutions, their fairness and efficiency, as well as by the government's high degree of tolerance of the shadow economy. This result is redolent of findings for the shadow economy reported for Serbia (Krstić and Radulović 2015) and the Baltic countries (Putninš and Sauka 2015).

## 4. Conclusions

This paper has attempted to identify the importance of the shadow economy in two non-EU countries by measuring its size and providing evidence on the main factors that influence an enterprise's level of involvement in the shadow economy. The availability high-quality survey data from enterprises and entrepreneurs in conjunction with a new method of measuring the shadow economy (see Putninš and Sauka 2015) permits us to draw a number of important conclusions regarding the nature of the shadow economy in these countries. We also illustrated some advantages of this method for measuring the shadow economy over more commonly used indirect approaches.

Our results revealed that a significant share of the overall economy in Montenegro and in Serbia was generated in the shadow economy and was estimated to be equivalent to around a quarter of their official GDP. As compared to Baltic countries, the shadow economy of Montenegro and Serbia based on their one component (i.e., unreported proportion of employee remuneration) is even higher than the overall shadow economy of Estonia and Lithuania. In terms of structure, almost two-thirds of the Montenegrin shadow economy referred to unreported wages and around one-third to unreported business income (or profits). This result emphasizes the key priorities for policymakers, as the majority of the shadow economy appears related to unreported employees and their wages (either unreported in full or partially).

Furthermore, our results reveal that the estimates of the shadow economy based on this approach do not understate the level of shadow economic activity, as they would have if we had used questions on the shadow economy about the enterprises of the owners/managers. We find that all forms of the shadow economy are significantly higher when it comes to other enterprises operating in the same sector.

Our estimates for the determinants of an enterprise's involvement in the shadow economy indicate a number of policy approaches that may reduce the size of the shadow economy in two non-EU member states and countries similar to these ones. The findings revealed that enterprises that registered right from their inception as a business are less likely to subsequently become involved in the shadow economy. Thus, reforms may focus on removing barriers to entry. A second result of interest is that the estimated effects for the industry sectoral dummy variables are not statistically significant. This may indicate a need to develop specific measures for the formalisation of the shadow economy which need to be, for the most part, sector-neutral. Thirdly, an enterprise's economic performance is a significant determinant of its level of involvement in the shadow economy, indicating that enterprises with higher turnover are less involved in underreporting of employees, wages and profits. This suggests that as the economy becomes more buoyant, the level of shadow economic activity will decline. Fourth, the results also suggests that the higher the perceived probability of being penalised if detected, the lower is the level of tax evasion and underreporting of wages, which indicate that one policy option in reducing the shadow economy is to increase the probability of being penalised through increasing tax audits and other similar surveillance measures.

Finally, our analysis identifies those owners/managers who are able to provide more reasons to justify informal business to be more involved in the shadow economy. This result suggests that one of the priorities in reducing the shadow economy is to

focus on increasing the extent of tax morality (i.e., the civic sense that paying taxes is the moral thing to do) and institutional quality. This could be addressed by outreach campaigns with the objective of increasing the awareness of the public on the negative effects of the shadow economy, to inform the public of the value of public services, and also by improving the quality of these services. If the government is consistent and unselective in tackling tax evasion, taxpayers will be more certain that other taxpayers will pay and, therefore, they themselves will be more willing to pay.

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## Appendix

### Some Questions Used from Enterprises and Entrepreneurs Survey:

#### Montenegro

- Q1: Can you please provide a close estimate of the amount of underreported business income (profits) earned by enterprises/entrepreneurs in your sector?
- Q2: Some say that a percentage of employees working for enterprises such as yours, in the same sector, receive social security only on a portion of their wages and that the other portion on which the corresponding social security is not paid, is received as an envelope wage. In your opinion, on which portion of the total salary, on average, are the corresponding taxes and social security not paid in enterprises such as yours?
- Q3: Your estimates are extremely important to us. In your opinion, of the total number of employees working in enterprises in the same sector as yours (organisations, institutions), what percentage of employees receive full social security, what percentage receive a fraction of these benefits, and what percent do not receive any social security.
- Q4: Should the enterprise be found guilty, what do you think is the probability that the manager/entrepreneur will be penalised? The question includes a scale from 1 to 11 where 1 represents a probability of 0 and 11 represents a probability of 100%.
- Q5: What is your view regarding the justification of informal business in Montenegro? Please use the scale from 1 to 4, where 1 represents that this kind of business is never justified, and 4 represents that it is completely justified.

#### Serbia

- Q6: In your opinion, what percentage of employees in your sector of economic activity are completely without contract, that is are unregistered?
- Q7: In your opinion, what percentage of overall salaries in your sector of economic activity are not paid through bank accounts (paid in cash)?
- Q8: In your opinion, what percentage of turnover in your sector of economic activity is informal (taxes not paid)?

- Q9: If caught, what do you think the probability is that this company, that is its CEO/entrepreneur will be fined? The question includes a scale from 1 to 11 where 1 represents a probability of 0 and 11 represents a probability of 100%.
- Q10: What is your stand on the justification of informal activity in Serbia? Please use a scale of 1 to 5 where 1 means that kind of activity is not at all justified and 5 that it is entirely justified.