



SSE RIGA

Shadow Economy Index for the Baltic Countries 2009–2022

Authors of the study



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Since 2009:

What is the size of the shadow economy in Latvia, Lithuania, and Estonia?

What are the main determinants of the shadow economy?

What can be done to reduce the shadow economy?

Observed and non-observed components of GDP



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Measuring the shadow economy using company managers

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Size of the shadow economy in different countries 2009–2022 Results

Shadow economy index (% of GDP)

	2018	2017	2016	2015
Russia	44,7 (42,4 46,9)	45,8 (43,4 48,1)	-	-
Ukraine	38,2 (35,3 41,2)	38,5 (35,51,5)	-	-
Kyrgyzstan	44,5 (40,9 48,1)	46,1 (42,4 49,6)	-	-
Latvia	24,2 (21,5 26,8)	22,0 (19,6 24,5)	20,7 (18,0 22,6)	21,3 (19,0 23,7)
Lithuania	18,7 (17,0 20,4)	18,2 (16,1 20,4)	16,5 (14,8 18,3)	15,0 (13,8 16,3)
Estonia	16,7 (14,5 18,8)	18,2 (16,1 20,3)	15,4 (13,1 17,8)	14,9 (12,4 17,4)
Moldova	27,5 (24,0 31,0)	29,4 (25,7 33,1)	29,7 (26,9 32,5)	29,8 (27,0 32,6)
Kosovo	39,5 (n/a, n/a)	-	-	-
Romania	-	-	33,3 (30,4 36,3)	35,6 (32,2 39,0)
Poland	-	-	25,0 (22,5 27,4)	24,4 (22,0 26,9)

Sources: Ukraine: Lysa et al (2019); Kyrgyzstan: SIAR (2019); Moldova and Romania: Putnins, Sauka and Davidescu (2020); Poland: Lechmann and Nikulin (2017); Kosovo: Mustafa et al (2019). For Russia, Ukraine, Kyrgyzstan data collection supported by *a Marie Curie Research and Innovation Staff Exchange scheme within the H2020 Programme (grant acronym: SHADOW, no: 778118).*

Study

- Direct survey method": interviews with company owners/managers in the Baltic countries
- Entrepreneurs as experts
- In 2023 about 2022 and 2021
- 503 telephone interviews in Latvia, 511 in Lithuania, 500 in Estonia (the 2023 survey)
- Random sampling, Orbis database
- Interviews performed by Norstat Latvija
- The Index is based on the income approach in measuring GDP

Key components of the shadow economy

- Underreporting of business income (profits)
- Underreporting of the number of employees
- Envelope wages
- % of revenue spent on payments `to get things done': bribery
- % of the contract value paid to secure a contract with the government: corruption

Size of the shadow economy in Latvia, Lithuania, and Estonia 2009–2022 Results

Shadow Economy Index for the Baltic countries (% of GDP), 2009–2022

	2022–2021	2022	2021	2020	2019	2018	2017
LV	-0,1	26,5	26,6	25,5	23,9	24,2	22,0
	(-1,7 1,4)	(24,5 28,5)	(24,9 28,3)	(23,6 27,4)	(21,4 26,3)	(21,5 26,8)	(19,6 24,5)
LT	+2,7	25,8	23,1	20,4	18,2	18,7	18,2
	(0,0 5,3)	(22,2 29,5)	(20,6 25,7)	(18,4 22,3)	(16,5 19,9)	(17,0 20,4)	(16,1 20,4)
EE	-1,0	18,0	19,0	16,5	14,3	16,7	18,2
	(-3,3 1,4)	(15,3 20,7)	(16,1 21,9)	(14,3 18,8)	(12,3 16,3)	(14,5 18,8)	(16,1 20,3)

	2016	2015	2014	2013	2012	2011	2010	2009
LV	20,7	21,3	23,5	23,8	21,1	30,2	38,1	36,6
	(18,0 22,6)	(19,0 23,7)	(20,5 26,6)	(20,7 26,9)	(18,5 23,6)	(27,6 32,7)	(35,9 40,3)	(34,3 38,9)
LT	16,5	15,0	12,5	15,3	18,2	17,1	18,8	17,7
	(14,8 18,3)	(13,8 16,3)	(11,0 13,9)	(13,6 17,1)	(16,4 20,1)	(15,2 19,0)	(16,9 20,6)	(15,8 19,7)
EE	15,4	14,9	13,2	15,7	19,2	18,9	19,4	20,2
	(13,1 17,8)	(12,4 17,4)	(11,3 15,1)	(13,5 17,9)	(16,6 21,9)	(16,8 20,9)	(18,0 20,8)	(18,7 21,7)

Dynamics of the shadow economy in the Baltic countries (% of GDP), 2009–2022



Components of the shadow economy in 2022



Underreporting of business income 2009–2022 (average share of revenue in % that companies conceal from the government)



Underreporting of the number of employees, 2009–2022 (average share of the employees in % working without a contract)



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Envelope wages, 2009–2022 (average share of salaries in % which is paid by the employers, but concealed from the government)



% of payments 'to get things done', 2009–2022 (average percentage of revenue paid as 'bribes')



% of the contract value paid to secure contracts with the government, 2010–2022



Proportion of unregistered enterprises in the Baltic countries (% of GDP), 2013–2022

	Latvia	Lithuania	Estonia
2022	8,5 (7,2 9,9)	9,5 (7,8 11,2)	6,3 (5,0 7,6)
2021	8,6 (7,5 9,7)	9,0 (7,5 10,6)	6,7 (5,4 8,0)
2020	8,4 (6,7 9,2)	6,2 (4,9 7,4)	4,0 (3,1 5,0)
2019	8,0 (6,7 9,2)	9,2 (7,8 10,6)	4,0 (3,0 5,1)
2018	8,6 (7,3 10,1)	10,0 (8,8 11,3)	6,4 (5,0 7,9)
2017	6 , 5 (5,3 7,8)	8,6 (7,5 9,8)	7,0 (5,7 8,5)
2016	5,3 (4,1 6,5)	8,4 (7,5 9,4)	6,1 (5,1 7,1)
2015	5,2 (4,1 6,3)	7,3 (6,5 8,1)	5,8 (4,5 7,1)
2014	5,6 (4,5 6,7)	5,2 (4,5 6,0)	6,3 (4,5 8,2)
2013	5,4 (4,2 6,6)	6,2 (5,3 7,1)	7,6 (5,4 9,9)

Size of the shadow economy in the regions, sectors, companies of different sizes

Size of the shadow economy (% of GDP) by region in Latvia (2022)



Size of the shadow economy in the regions, sectors, companies of different sizes |21

Size of the shadow economy (% of GDP) by sector **in Latvia (2022)**



Size of the shadow economy in the regions, sectors, companies of different sizes

Involvement in the shadow economy

- Smaller firms (e.g., those with fewer employees) engage in more shadow activity than larger firms
- Younger firms engage in more shadow activity than older firms

Main determinants of the shadow economy

Statistically significant determining factors (using regression analysis)

■ Greater probability of being caught not paying taxes and more serious consequences → fewer entrepreneurs getting involved in shadow economy activities

Statistically significant determining factors (using regression analysis)

- Involvement in shadow economy is greatly determined by dissatisfaction with:
 - Business legislation (greatest effect)
 - Performance of SRS

Tax policy

Government support (least effect)

Satisfaction with the performance of the State Revenue Service, 2010–2022

(Average. '1'- very low satisfaction, but '5'- very high satisfaction)



Satisfaction with the tax policy, 2010–2022

(Average. '1'- very low satisfaction, but '5'- very high satisfaction)



Satisfaction with the quality of business legislation, 2010–2022

(Average. '1'- very low satisfaction, but '5'- very high satisfaction)



Main determinants of the shadow economy

Satisfaction with the government's support to entrepreneurs, 2010–2022

(Average. '1'- very low satisfaction, but '5'- very high satisfaction)



Statistically significant determining factors (using regression analysis)

■ Greater tolerance towards involvement in shadow economy → greater involvement in shadow economy

Tax morale: Companies believe that tax evasion is always justified if given the chance, 2010–2022

(Average. '1' - completely disagree, but '5' - completely agree)



Main determinants of the shadow economy 32

The aim of the SSE Riga Shadow Economy Index for the Baltic countries is to measure the size of the shadow economies in Estonia, Latvia and Lithuania, as well as to explore the main factors that influence participation in the shadow economy. We use the term "shadow economy" to refer to all legal production of goods and services that is deliberately concealed from public authorities. The Index has been published annually since 2010 to provide policy makers with information for making justified policy decisions, as well as to foster a deeper understanding of entrepreneurship processes in the Baltic countries.

The SSE Riga Shadow Economy Index for the Baltic countries is determined annually based on a methodology developed by Putniņš and Sauka (published in the Journal of Comparative Economics in 2015) and using business surveys in the Baltic countries: Latvia, Lithuania and Estonia. Several survey and data collection techniques are used in surveys, which have been shown to be effective in eliciting relatively truthful responses. The Index combines estimates of misreported business income, unregistered or hidden employees, as well as unreported "envelope" wages to obtain estimates of the shadow economies as a proportion of GDP. This methodology has been also applied to estimate the size of the shadow economy in other countries such as Russia, Ukraine, Moldova, Romania, Poland, Kyrgyzstan and Kosovo.

In this study, the main focus is on estimates of the shadow economy in 2022 and trends covering the period 2009–2022. It also provides evidence about the main factors that influence entrepreneurial involvement in the shadow economy as well as some policy recommendations.

According to our calculations, the size of the shadow economy in Latvia has had an increasing trend since 2016, with a small exception in 2019: 20.7% of GDP in 2016, 22.0% in 2017 and 24.2% of GDP in 2018, 23.9% of GDP in 2019. In 2020, the shadow economy in Latvia grew to 25.5% of GDP, and in 2021 it reached 26.6% of GDP. In 2022, the size of the shadow economy in Latvia remains at the level of 2021: 26.5% of GDP, down by just -0.1%. According to the latest study, the size of the shadow economy in Estonia in 2022 is significantly smaller than in Latvia: 18.5% of GDP, a 1.0% reduction compared to the size of the shadow economy in Estonia in 2021. However in Lithuania, in 2022 the size of the shadow economy was 25.8% of GDP, a +2.7% increase compared to 2021. In Lithuania, this is the highest level of the shadow economy since 2009, when we started measuring the shadow economy in Lithuania.

Our calculations show that in Latvia and Estonia the most important component of the shadow economy in 2022 was "envelope" wages, which account for 46.7% of the total shadow economy in Latvia and in Estonia: 44.5%. In 2022, undeclared income made up 29.0% of the shadow economy in Latvia, and undeclared employees accounted for 24.3%. Unreported employees in Estonia, in 2022, account for 28.0% of the total shadow economy, but unreported earnings: 27.5%. In Lithuania, in 2022, the most significant component of the shadow economy was undeclared income (36.5% of the total shadow economy), followed by "envelope" wages (34.0%) and unreported employees (29.5%).

In 2022 compared to 2021 in Latvia the average share of wages (%) that companies hide from the state, or "envelope wages", increased by 1.2% to 25.0%. This is the highest level of "envelope" wages in the country since 2013. An even higher increase in envelope wages in 2022 is expected in Lithuania, where "envelope" wages have increased by 3.8% to 20.0% compared to 2021. While in Estonia, the level of "envelope" wages has declined slightly in 2022 (-0.2%): 16.8%. Thus, the amount of "envelope" wages is still significantly larger in Latvia, largely explaining the differences in the overall size of the shadow economy, especially between Latvia and Estonia.

In the area of undeclared income (profits), there is a decrease in both Latvia and Estonia in 2022 compared to 2021. Specifically, the average share of income (%) that companies hide from the state was 16.3% in Latvia in 2022 (-2.3% compared to 2021), while in Estonia: 11.1% (-1.0%). In Lithuania, undeclared income has increased by +2.9% compared to 2021, reaching 19.7% in 2022. In Lithuania, there is also an increase in the rate of undeclared employees (average % of total employees employed without a contract): +5.5% in 2022 compared to 2021, reaching 14.4%. Thus, across the three main components of the shadow economy, these are the highest rates in Lithuania since we have been measuring the size of the shadow economy from 2009. The level of undeclared employees in 2022 compared to 2021 has also slightly increased in Latvia to 11.1% (+0.4%), but decreased in Estonia: 9.5% (-1.0%).

In addition to measuring the involvement of registered companies in the shadow economy, we also calculate the share of unregistered companies in the Baltic countries. According to our estimates, the share of goods or services provided by unregistered entrepreneurs in Latvia, Lithuania and Estonia in 2022 was 8.5%, 9.5% and 6.3% respectively.

According to our results, the general level of bribery (the percentage of income paid by companies in informal payments to "settle things") in 2022 compared to 2021 has decreased in Lithuania (-1.9%) and Estonia (-0.6%), and was 10.4% and 6.4% respectively. In Latvia, the overall level of bribery in 2022 was 9.4%, an increase of +0.2% compared to 2021. The results of our study also show that the average % of the contract amount to secure a public contract in 2022 in all Baltic countries has slightly decreased compared to 2021. In particular, Latvia saw a decrease of -0.1% to 7.9%, Lithuania -1.1% to 6.6% and Estonia -1.9%, bringing the shadow economy component down to 2.1%.

The highest level of the shadow economy in Latvia in 2022 is observed in the Riga region and Vidzeme. In terms of sectors, the highest share of shadow economy in Latvia still comes from the construction sector. While since 2015, the shadow economy in the construction sector in Latvia has been decreasing (40.0% in 2015, 38.5% in 2016, 35.2% in 2017, 34.1% in 2018, 30.7% in 2019 and 28.7% in 2020), in 2021, the shadow economy in the sector increased: up to 31.2%. In 2022, the size of the shadow economy in construction increased by 3.3% compared to 2021, rising to 34.5%. The size of the shadow economy in Latvia's retail sector reached 30.5% in 2022 (29.8% in 2021), in the service sector: 28.6% (27.5% in 2021) in manufacturing: 23.9% (25.0% in 2021), and in wholesale trade: 20.5% (24.4% in 2021).

In terms of attitudes, companies in the Baltic states are still relatively satisfied with the performance of the State Revenue Service (SRS). On a scale of 1-5, where 5 means very high satisfaction, satisfaction with the SRS reached 3.60 in Latvia in 2022 (3.60 also in 2021), while in Lithuania: 3.61 (3.56 in 2021) and 3.81 (3.74 in 2021) in Estonia. The results show that in 2022, compared to 2021, the satisfaction of entrepreneurs with government tax policy has increased in all Baltic countries: from 2.70 to 2.76 in Latvia; from 2.81 to 2.99 in Lithuania; from 3.02 to 3.13 in Estonia. Satisfaction of entrepreneurs with the quality of business legislation has also increased: in Latvia: from 2.98 in 2021 to 3.11 in 2022; in Lithuania: from 2.89 to 2.97; and in Estonia: from 3.25 to 3.44. Satisfaction with government support for entrepreneurs in Latvia in 2022 remained at the 2021 level: 2.89. In Estonia, it rose from 2.51 to 2.70, while in Lithuania it fell from 2.91 to 2.86.

Since 2016, we have also been measuring the so-called "tax morale" of entrepreneurs in the Baltic states, asking them whether they think tax evasion is always justified when the opportunity arises. The survey data show that in 2022, tax morale is relatively higher in Estonia, where, on a scale of 1-5, with 1 meaning strongly disagreeing with the above statement, the average score in 2022 was 1.7. In Latvia, the score is 1.9, and in Lithuania: 2.2, following a similar trend since 2016.

We use regression analysis to identify the statistically significant determinants of firms' involvement in the shadow economy. For the regressions, we use pooled data from the past 12 survey rounds (years), which gives a panel that spans the years 2010-2022 and has a cross-section of approximately 1,500 firms per year. The dependent variable in all regressions is the level of the firm's involvement in the shadow economy. The independent variables are various firm-level characteristics, attitudes, sector dummy variables, region and year fixed effects.

The country dummy variables suggest that during the sample period, the size of the shadow economy is smaller in Estonia and Lithuania relative to Latvia after controlling for a range of explanatory factors, and the differences are statistically significant. Tolerance towards tax evasion is positively associated with the firm's stated level of income/wage underreporting, i.e., entrepreneurs that view tax evasion as a tolerated behaviour tend to engage in more informal activity. The measures of tolerance also serve the important role of controlling for possible understating of the extent of shadow activity (untruthful responses) due to the sensitivity of the topic.

The regression coefficients indicate that the effect of perceived detection probabilities and penalties on the tendency for firms to engage in deliberate misreporting is consistent with the predictions of rational choice models, i.e., the higher the perceived probability of detection and the larger the penalties, the lower the amount of tax evasion and misreporting. The effect of detection probability in particular stands out as being a particularly strong deterrent of shadow activity. This evidence suggests a possible policy tool for reducing the size of the shadow economies, namely increasing the probability of detection of misreporting. This could be done via an increased number of tax audits, whistle-blower schemes that provide incentives to report information to authorities about non-compliant companies, and investment in tax evasion detection technology.

The regression results also indicate that a firm's satisfaction with the tax system and the government is negatively associated with the firm's involvement in the shadow economy, i.e., dissatisfied firms engage in more shadow activity, satisfied firms engage in less. Analysing each of the four measures of satisfaction separately we find that shadow activity is most strongly related to dissatisfaction with business legislation and the State Revenue Service, followed by the government's tax policy and support for entrepreneurs.

Another strong (and statistically significant) determinant of involvement in the shadow economy is firm size, with smaller firms (e.g., those with fewer employees) engaging in more shadow activity than larger firms, although the descriptive statistics suggest the relation may be non-monotonic. The statistically significant coefficient on firm age suggests that younger firms engage in more shadow activity than older firms. A possible explanation for these two relations is that small, young firms use tax evasion as a means of being competitive against larger and more established competitors. The sector dummy variables suggest that firms in the construction sector tend to engage in more shadow activity than firms in other sectors.

Survey of entrepreneurs

The SSE Riga Shadow Economy Index is based on an annual survey of company owners/ managers in Estonia, Latvia, and Lithuania, following the method of Putnins and Sauka (2015). The surveys are conducted between February and April of each year and contain questions about shadow activity during the previous two years. For example, the survey conducted in January – February 2023 collects information about shadow activity during 2022 and 2021. The overlap of one year in consecutive survey rounds (e.g., collecting information about 2021 shadow activity in both the 2022 and 2023 survey rounds) is used to validate the consistency of responses.

We use random stratified sampling to construct samples that are representative of the population of firms in each country. Starting with all active firms in each of the three Baltic countries (obtained from the Orbis database maintained by Bureau Van Dijk), for each country we form size quintiles (using book value of assets) and take equal sized random samples from each size quintile. In total a minimum of 500 phone interviews are conducted in each of the three Baltic countries in each survey round. More specifically, in 2023 survey we interviewed 511 respondents in Lithuania, 500 respondents in Estonia and 503 respondents in Latvia 2023 survey was implemented in cooperation with Norstat Latvija.

Calculation of the Index

The Index measures the size of the shadow economy as a percentage of GDP. There are three common methods of measuring GDP: the output, expenditure, and income approaches. Our Index is based on the income approach, which calculates GDP as the sum of gross remuneration of employees (gross personal income) and gross operating income of firms (gross corporate income). Computation of the Index proceeds in three steps:

(i) estimate the degree of underreporting of employee remuneration and underreporting of firms' operating income using the survey responses;

(ii) estimate each firm's shadow production as a weighted average of its underreported employee remuneration and underreported operating income, with the weights reflecting the proportions of employee remuneration and firms' operating income in the composition of GDP;

(iii) calculate a production-weighted average of shadow production across firms.

In the first step, underreporting of firm *i*'s operating income $UR_i^{Operating Income}$, is estimated directly from the corresponding survey question. Underreporting of employee remuneration, however, consists of two components: (i) underreporting of salaries, or 'envelope wages' (question 11); and (ii) unreported employees. Combining the two components, firm *i*'s total unreported proportion of employee remuneration is:

$$UR_{i}^{EmployeeRemuneration} = 1 - (1 - UR_{i}^{Salaries})(1 - UR_{i}^{Employees})$$

In the second step, for each firm we construct a weighted average of underreported personal and underreported corporate income, producing an estimate of the unreported (shadow) proportion of the firm's production (income):

ShadowProportion_i=
$$\alpha_{c}UR_{i}^{EmployeeRemuneration}$$
+(1- α_{c}) $UR_{i}^{OperatingIncome}$

where α_c is the ratio of employees' remuneration (*Eurostat* item D.1)) to the sum of employees' remuneration and gross operating income of firms (*Eurostat* items B.2g and B.3g). We calculate α_c for each country, *c*, in each year using data from *Eurostat*. Taking a weighted average of the underreporting measures rather than a simple average is important to allow the Shadow Economy Index to be interpreted as a proportion of GDP.

In the third step we take a weighted average of underreported production, *ShadowProportion*, across firms in country *c* to arrive at the Shadow Economy Index for that country:

$$INDEX_{c}^{Shadow \ Economy} = \sum_{i=1}^{N_{c}} w_{i} Shadow Proportion_{i}$$

The weights, w_i , are the relative contribution of each firm to the country's GDP, which we approximate by the relative amount of wages paid by the firm. Similar to the second step, the weighting in this final average is important to allow the Shadow Economy Index to reflect a proportion of GDP.

As a final step, we follow the methodology of the *World Economic Forum* in their *Global Competitiveness Report*, and apply a weighted moving average of *INDEX*^{*Shadow Economy*} calculated from the most recent two survey rounds. There are several reasons for doing this, including: (i) it increases the amount of available information and hence precision of the Index by providing a larger sample size; and (ii) it makes the results less sensitive to the specific point in time when the survey is administered.

The weighting scheme comprises two overlapping elements:

(i) more weight is given to the more recent survey round as that contains more recent information (past information is "discounted");

(ii) more weight is placed on larger sample sizes as they contain more information.

Following the approach of the *World Economic Forum*, for years in which there are no previous surveys (the 2009 and 2010 results, which are based on the first survey round conducted in 2011) the Index is simply based on the one survey round. Consequently, the first two annual Index estimates (2009 and 2010) are more prone to sampling error than subsequent annual estimates, which benefit from larger samples via the moving average. To allow comparisons across countries we apply consistent methodology in calculating the Shadow Economy Index for each of the Baltic countries.

References

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