12th ANNUAL SHADOW ECONOMY CONFERENCE

Shadow Economy Index for the Baltic Countries 2009–2021

Authors of the study

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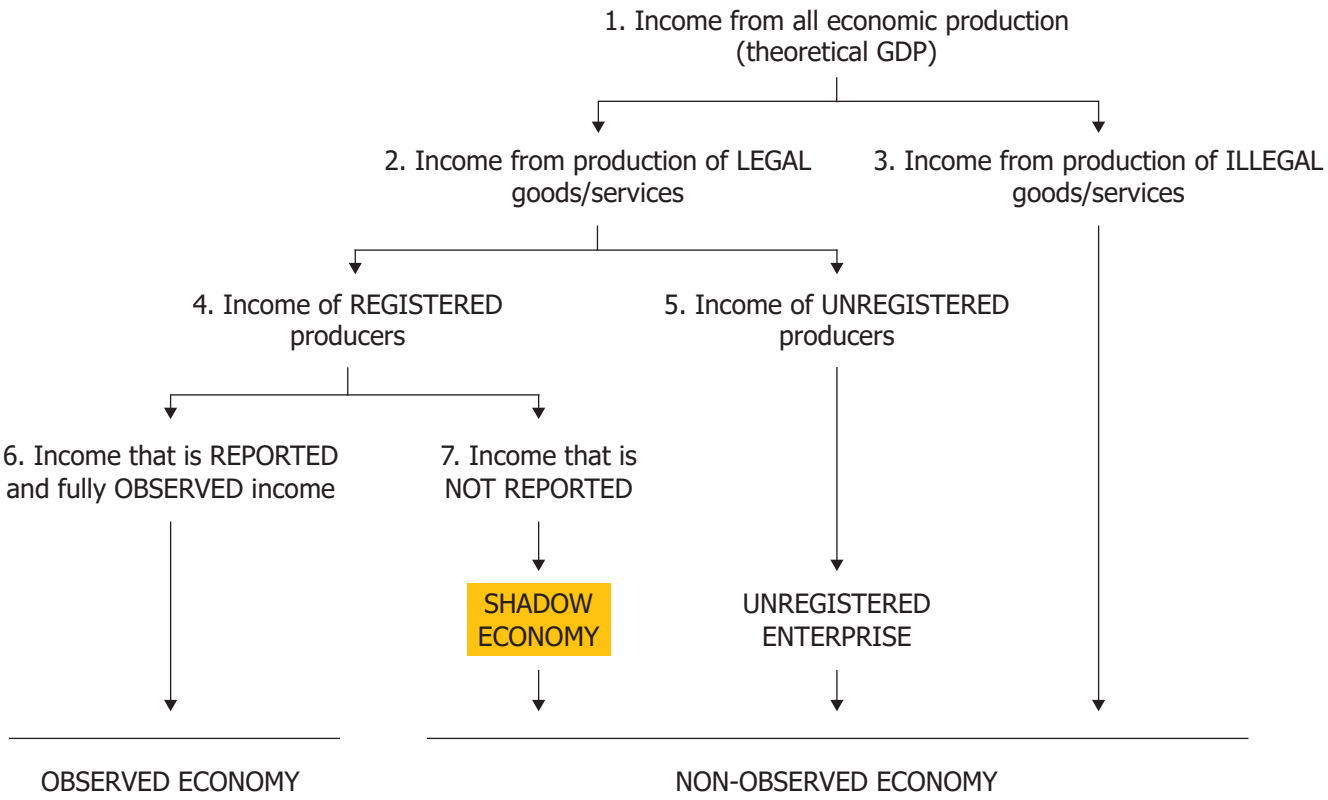
SSE RIGA

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 2009–2021 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 (35,5...1,5)	-	-
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 2022 about 2021 and 2020
- Approximately 841 telephone interviews in Latvia, 501 in Lithuania, 529 in Estonia (the 2022 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

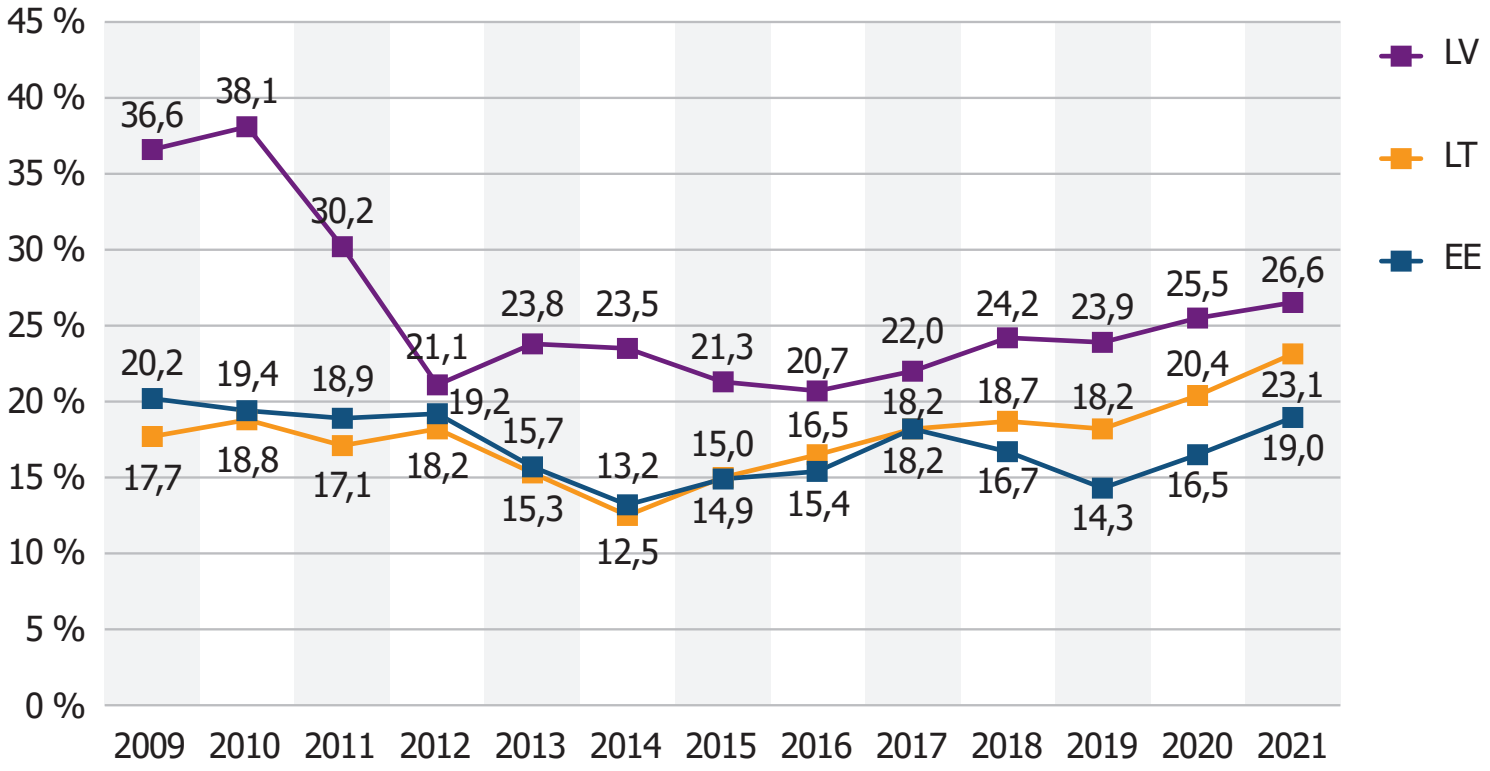
Size of the shadow economy in Latvia, Lithuania, and Estonia 2009–2021
Results

Shadow Economy Index for the Baltic countries (% of GDP), 2009–2021

	2021–2020	2021	2020	2019	2018	2017	2016
LV	+1,1 (-0,4 2,6)	26,6 (24,9 28,3)	25,5 (23,6 27,4)	23,9 (21,4 26,3)	24,2 (21,5 26,8)	22,0 (19,6 24,5)	20,7 (18,0 22,6)
LT	+2,7 (0,9 4,7)	23,1 (20,6 25,7)	20,4 (18,4 22,3)	18,2 (16,5 19,9)	18,7 (17,0 20,4)	18,2 (16,1 20,4)	16,5 (14,8 18,3)
EE	+2,5 (0,3 4,6)	19,0 (16,1 21,9)	16,5 (14,3 18,8)	14,3 (12,3 16,3)	16,7 (14,5 18,8)	18,2 (16,1 20,3)	15,4 (13,1 17,8)

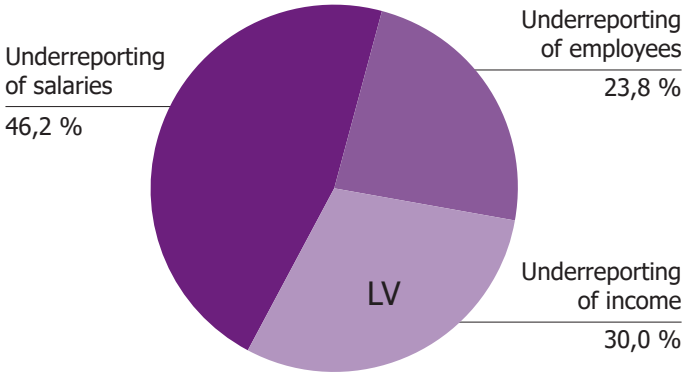
	2015	2014	2013	2012	2011	2010	2009
LV	21,3 (19,0 23,7)	23,5 (20,5 26,6)	23,8 (20,7 26,9)	21,1 (18,5 23,6)	30,2 (27,6 32,7)	38,1 (35,9 40,3)	36,6 (34,3 38,9)
LT	15,0 (13,8 16,3)	12,5 (11,0 13,9)	15,3 (13,6 17,1)	18,2 (16,4 20,1)	17,1 (15,2 19,0)	18,8 (16,9 20,6)	17,7 (15,8 19,7)
EE	14,9 (12,4 17,4)	13,2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

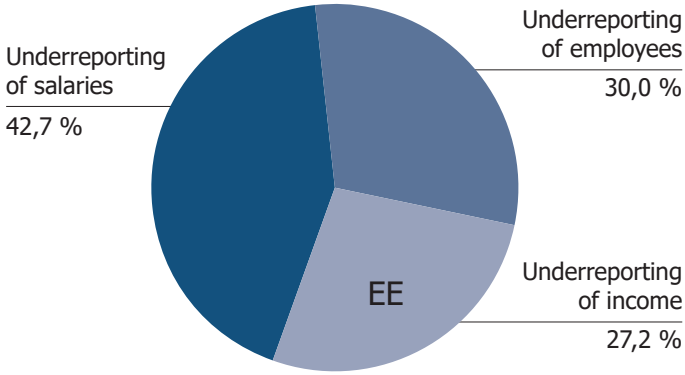
Dynamics of the shadow economy in the Baltic countries (% of GDP), 2009–2021

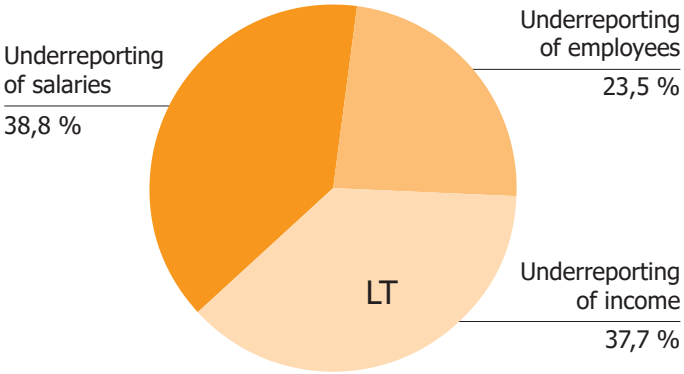


Size of the shadow economy in Latvia, Lithuania, and Estonia 2009–2021

Components of the shadow economy in 2021

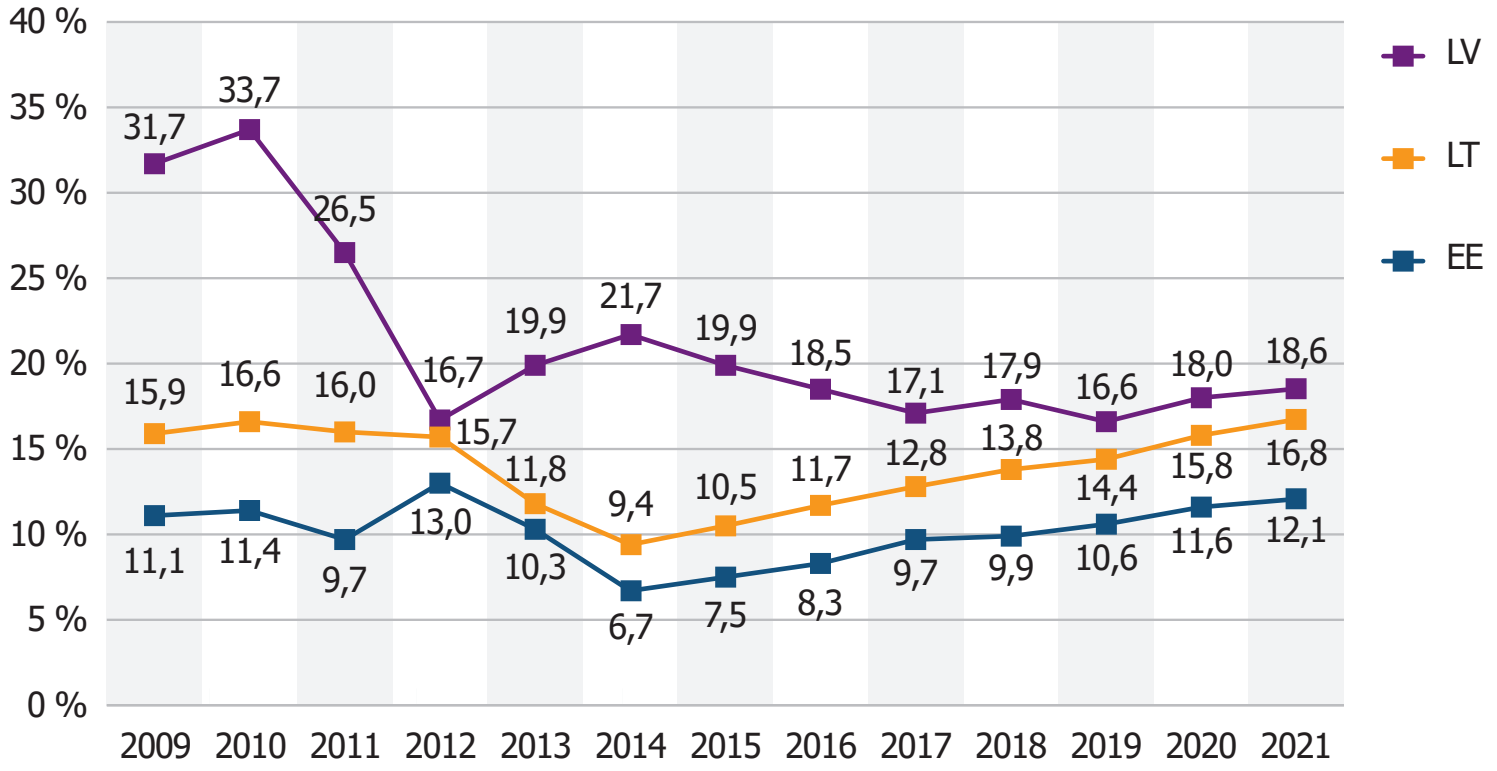




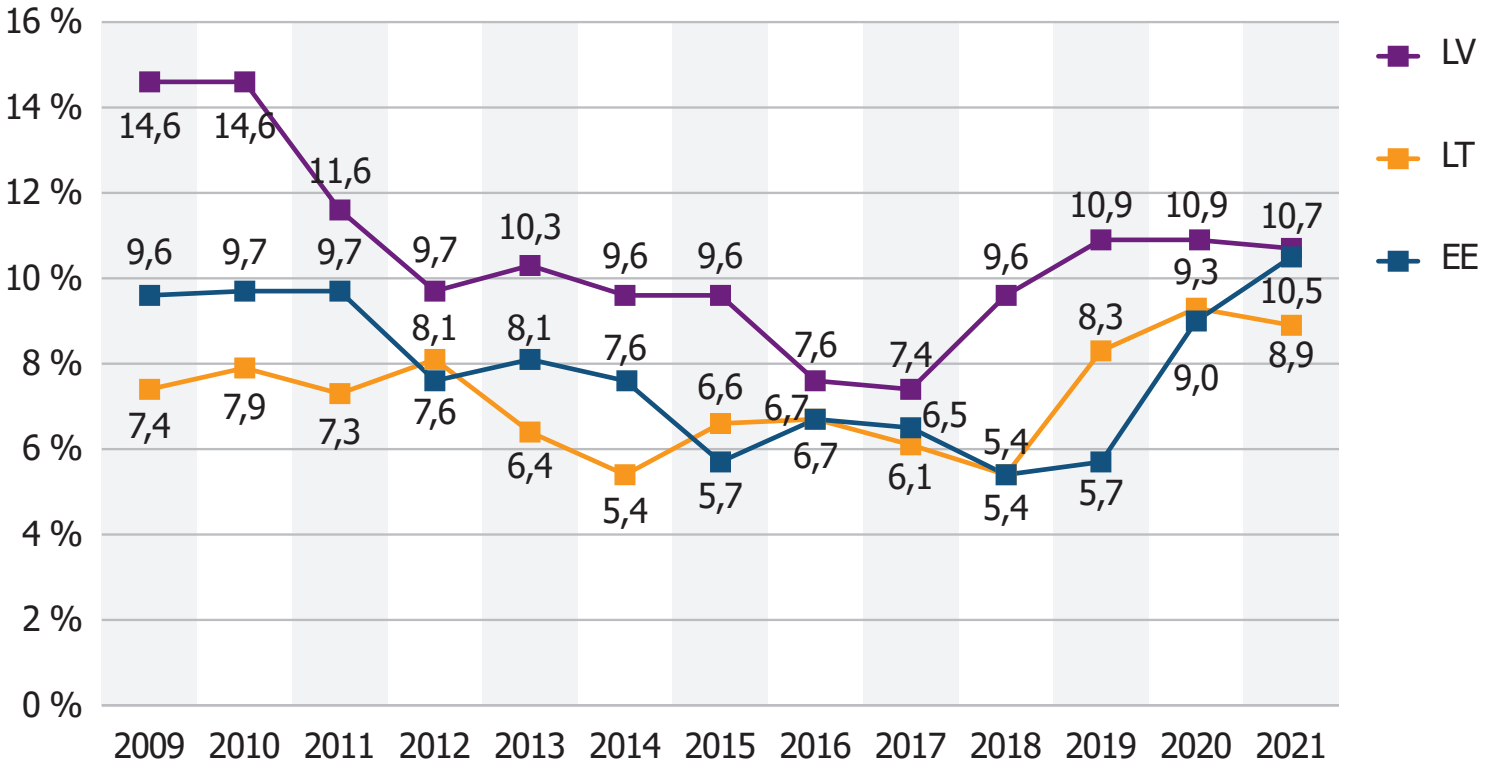


Size of the shadow economy in Latvia, Lithuania, and Estonia 2009–2021

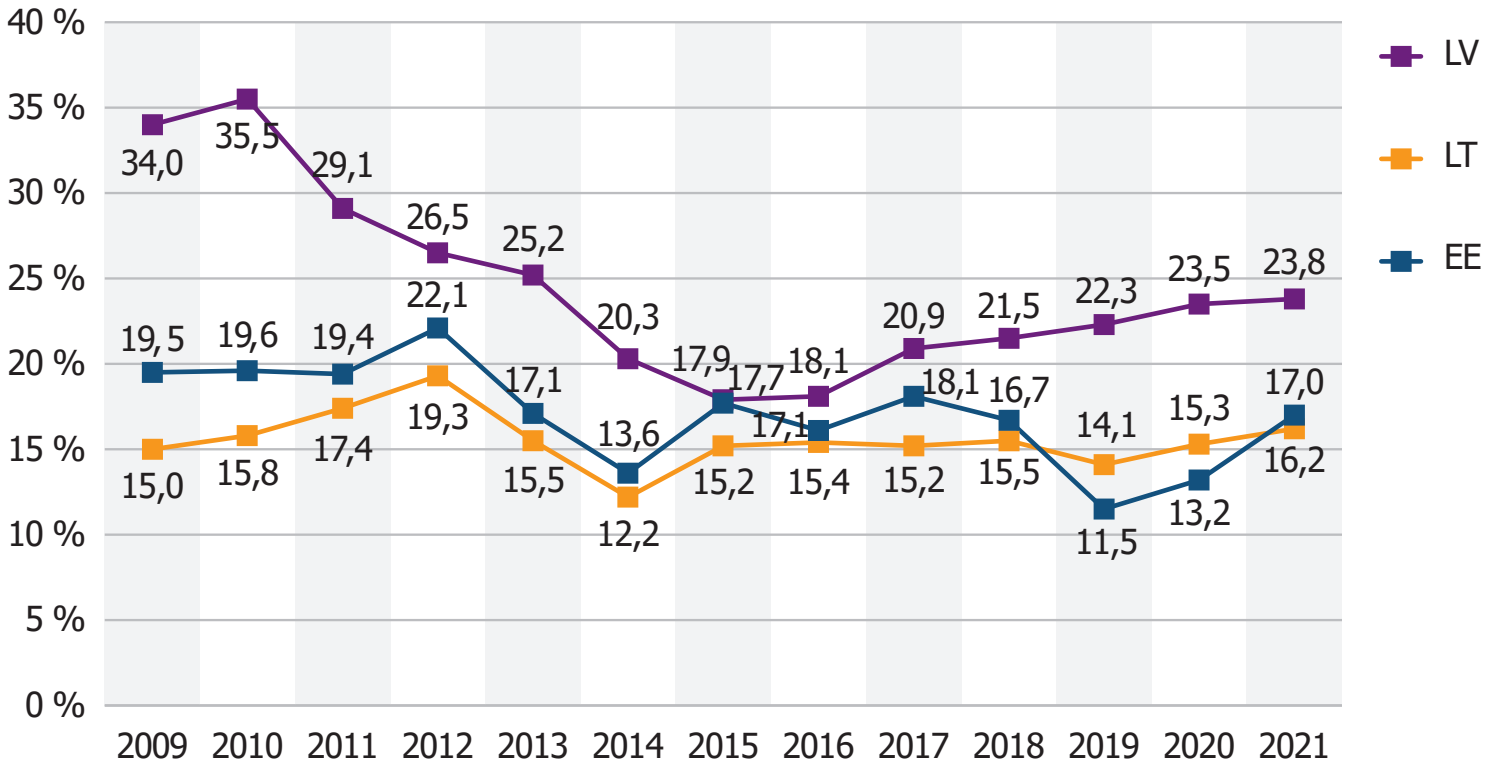
Underreporting of business income 2009–2021 (average share of revenue in % that companies conceal from the government)



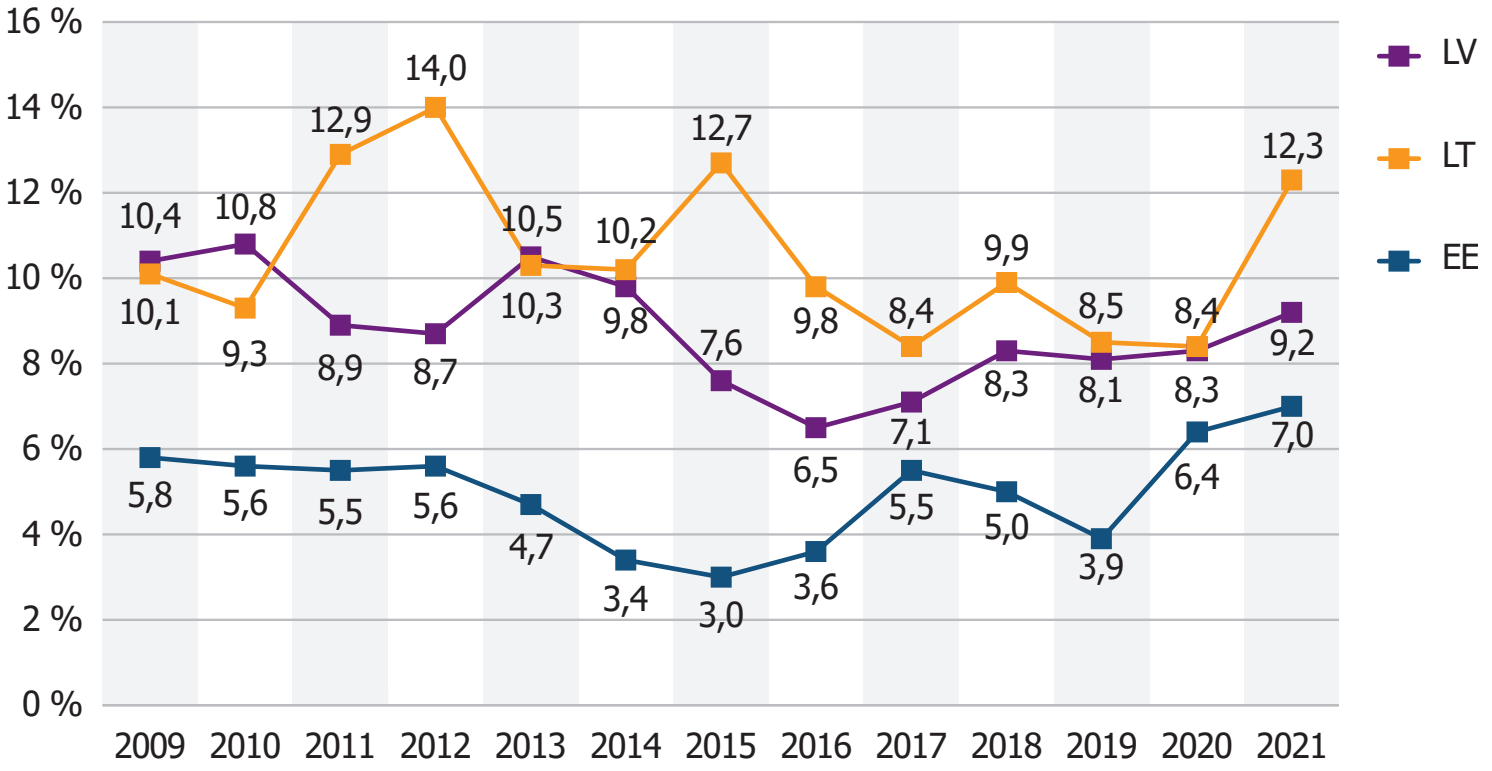
Underreporting of the number of employees, 2009–2021 (average share of the employees in % working without a contract)



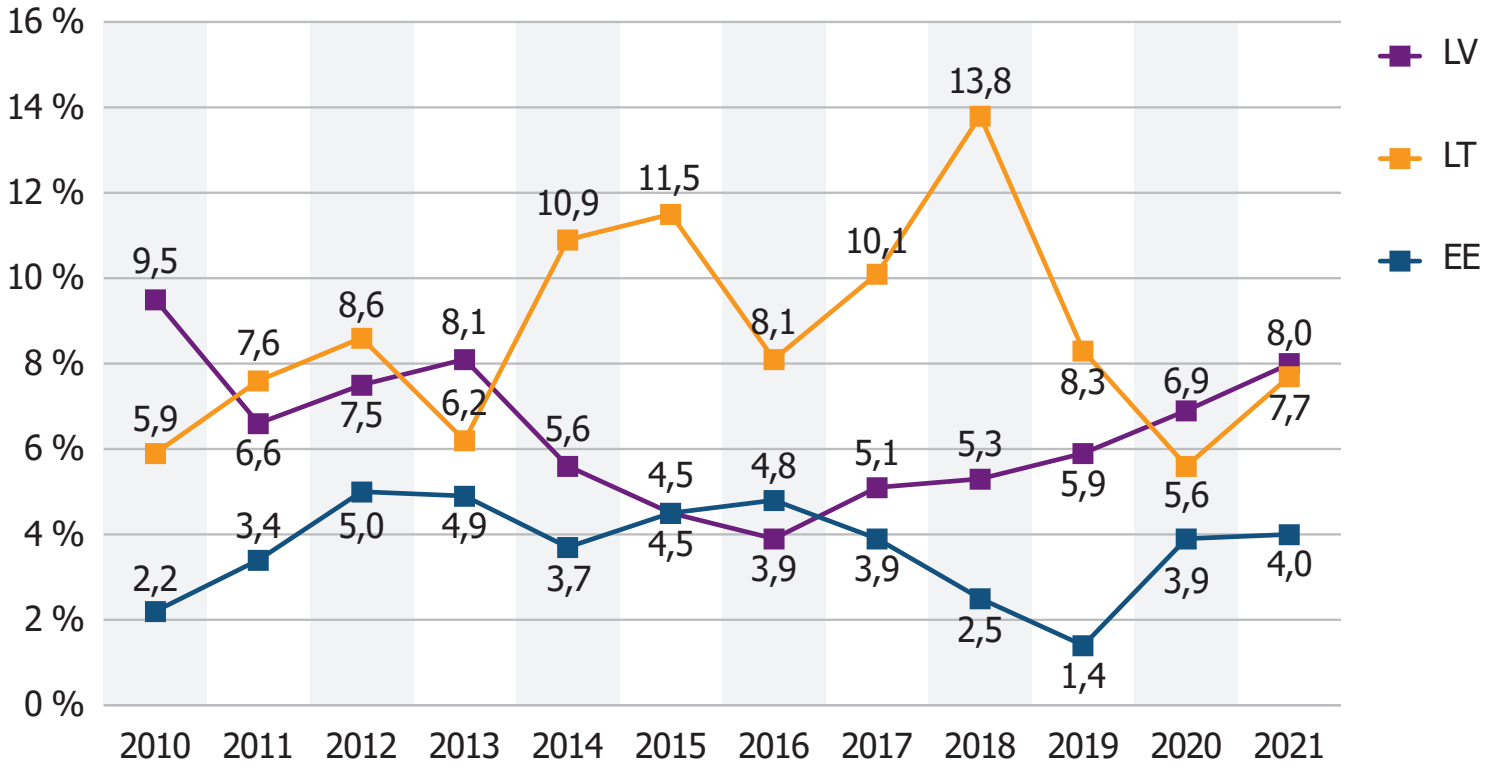
Envelope wages, 2009–2021 (average share of salaries in % which is paid by the employers, but concealed from the government)



% of payments 'to get things done', 2009–2021 (average percentage of revenue paid as 'bribes')



% of the contract value paid to secure contracts with the government, 2010–2021

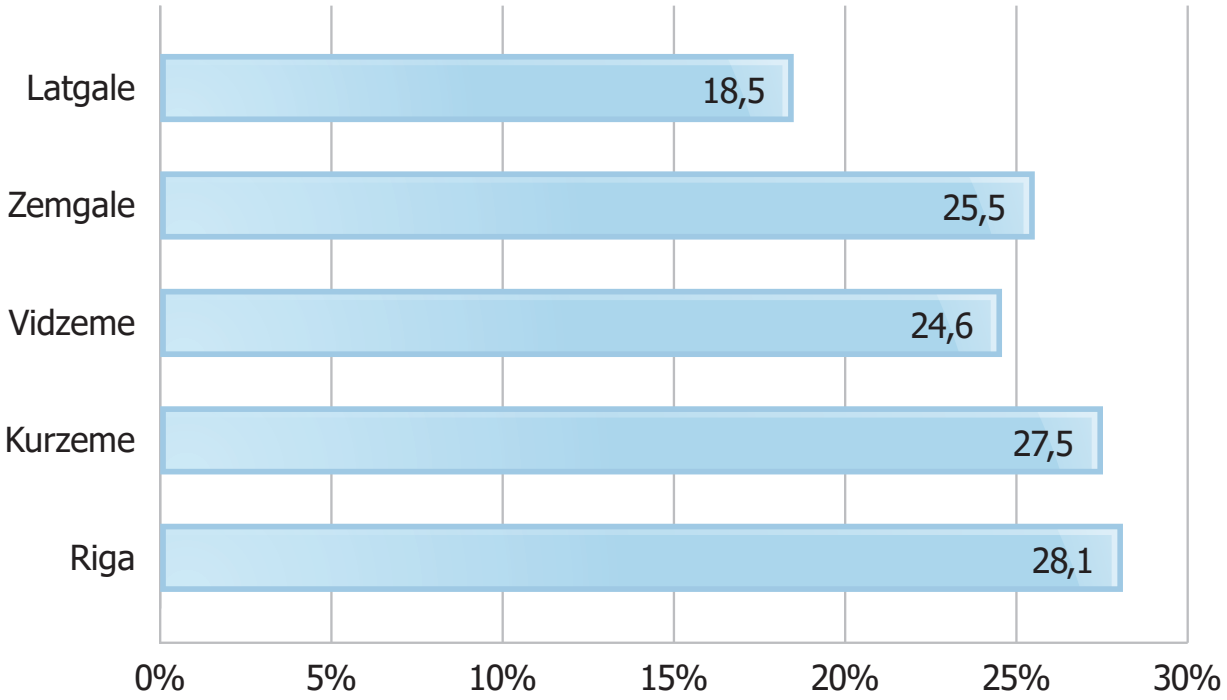


Proportion of unregistered enterprises in the Baltic countries (% of GDP), 2013–2021

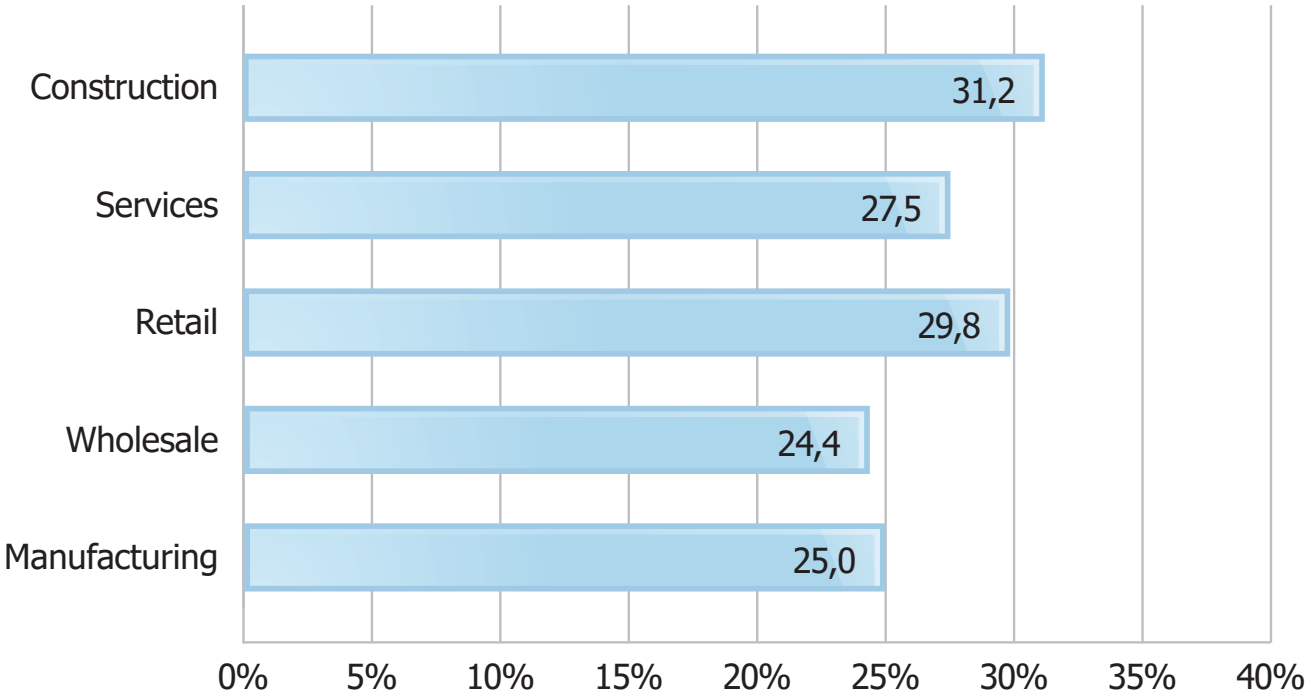
	Latvia	Lithuania	Estonia
2021	8,6 (7,5 9,7)	9,0 (7,5 10,6)	6,7 (5,4 8,0)
2020	8,4 (6,7 9,2)	6,2 (4,9 7,4)	4,0 (3,1 5,0)
2019	8,0 (6,7 9,2)	9,2 (7,8 10,6)	4,0 (3,0 5,1)
2018	8,6 (7,3 10,1)	10,0 (8,8 11,3)	6,4 (5,0 7,9)
2017	6,5 (5,3 7,8)	8,6 (7,5 9,8)	7,0 (5,7 8,5)
2016	5,3 (4,1 6,5)	8,4 (7,5 9,4)	6,1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



Size of the shadow economy (% of GDP) by sector in Latvia (average, 2016–2021)



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)

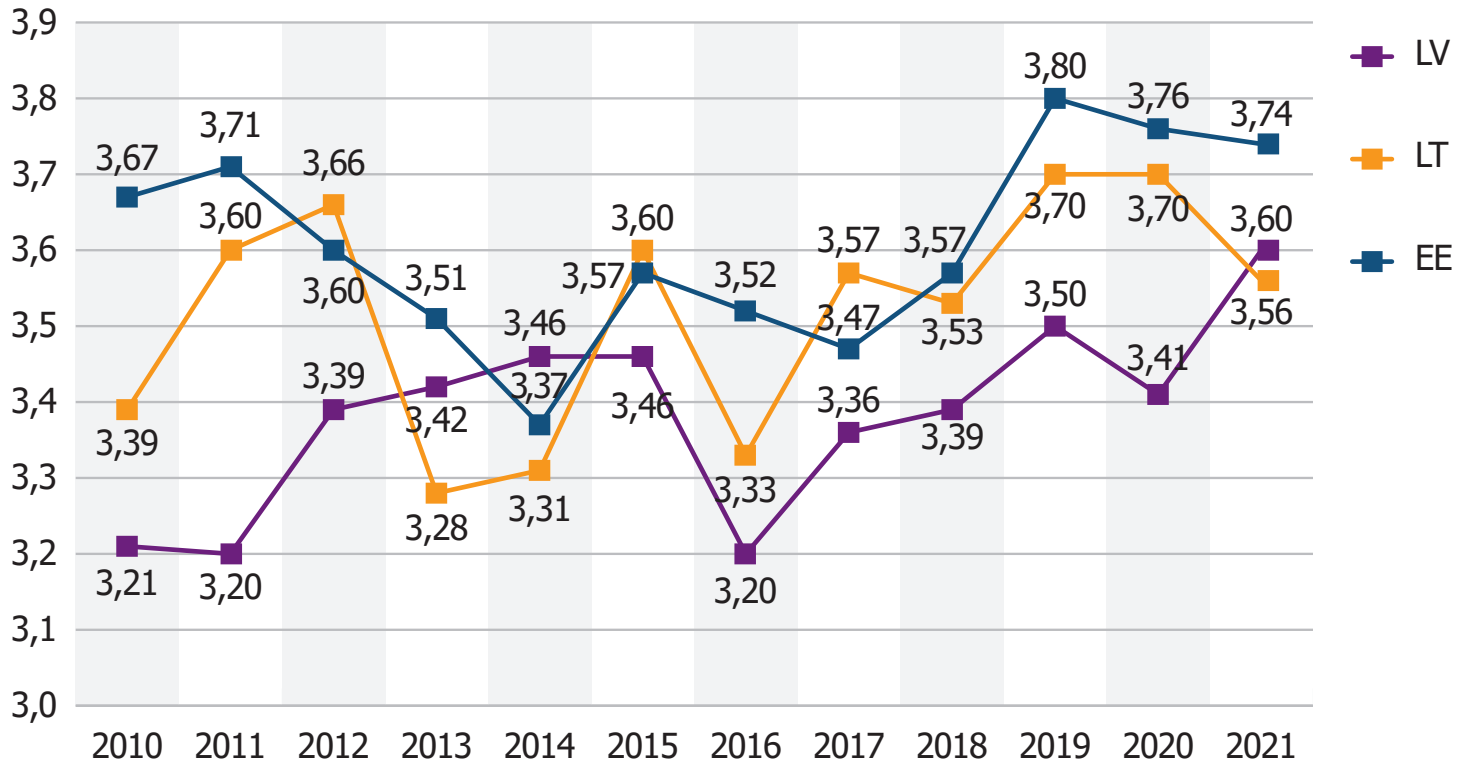
- Greater probability of being caught not paying taxes and more serious consequences ➔ fewer entrepreneurs getting involved in shadow economy activities

Statistically significant determining factors (using regression analysis)

- Dissatisfaction ➔ more shadow activity
- Involvement in shadow economy is greatly determined by dissatisfaction with:
  - Business legislation (greatest effect)
  - Performance of SRS
  - Tax policy
  - Government support (least effect)

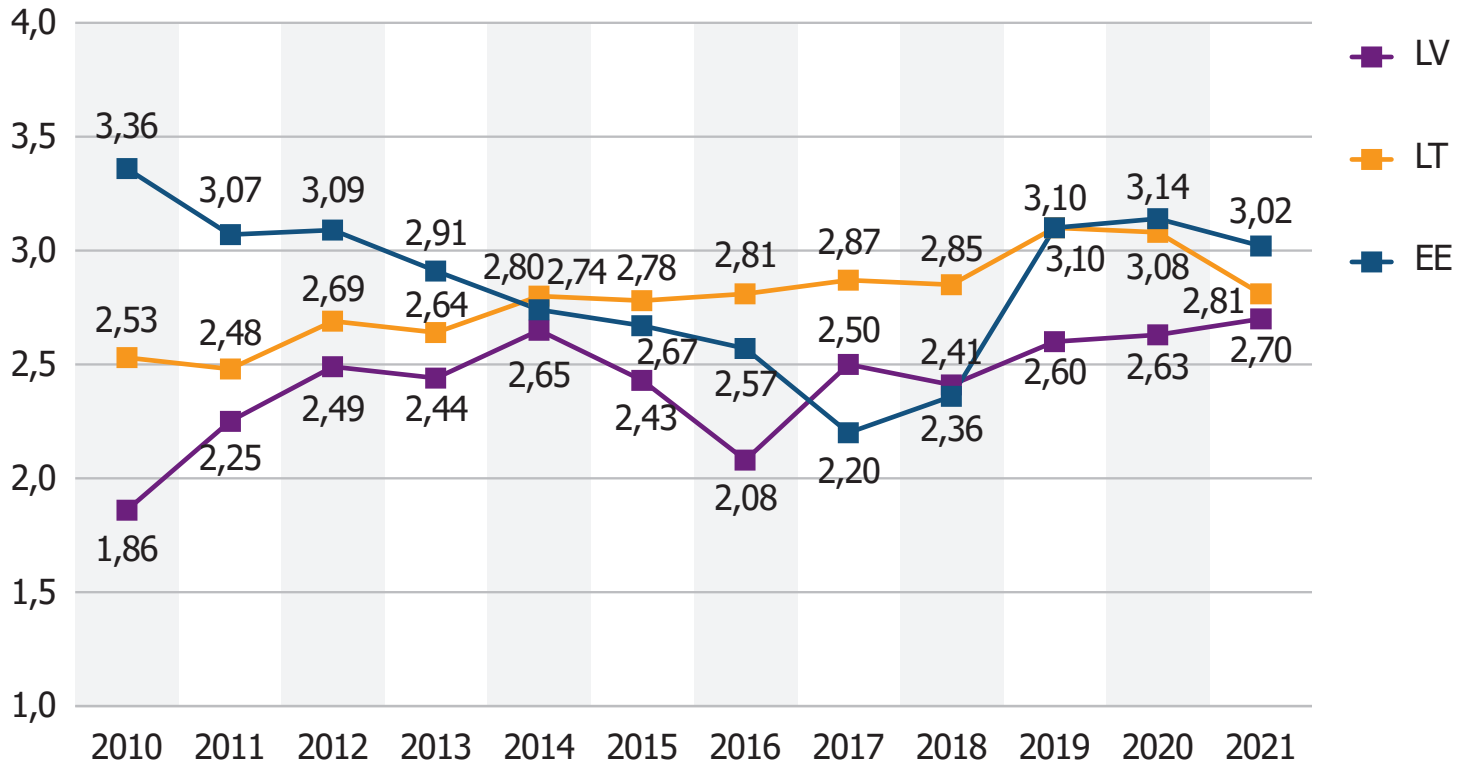
Satisfaction with the performance of the State Revenue Service, 2010–2021

(Average, in scale from 1-5, where '1': very low satisfaction, but '5'- very high satisfaction)



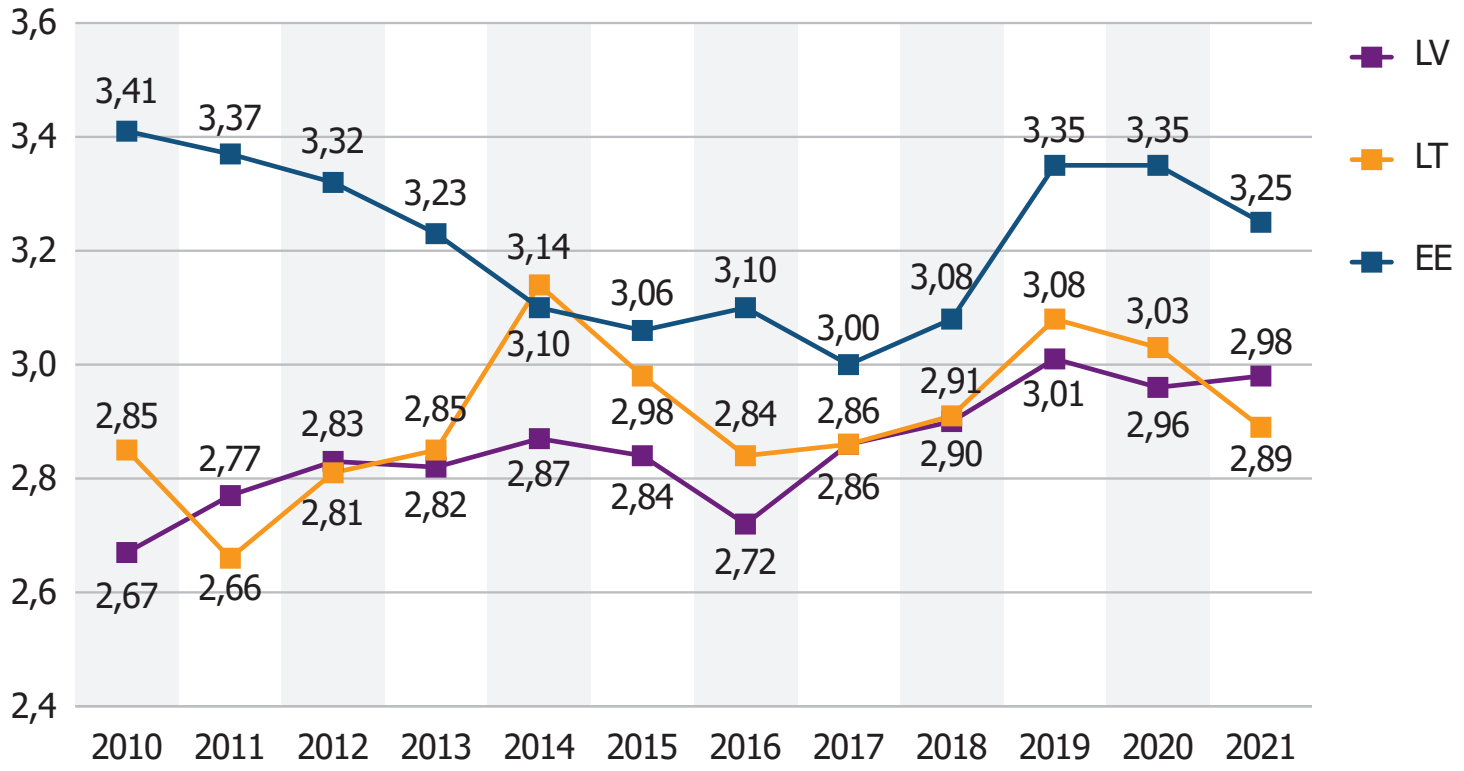
Satisfaction with the tax policy, 2010–2021

(Average, in scale from 1-5, where '1': very low satisfaction, but '5'- very high satisfaction)



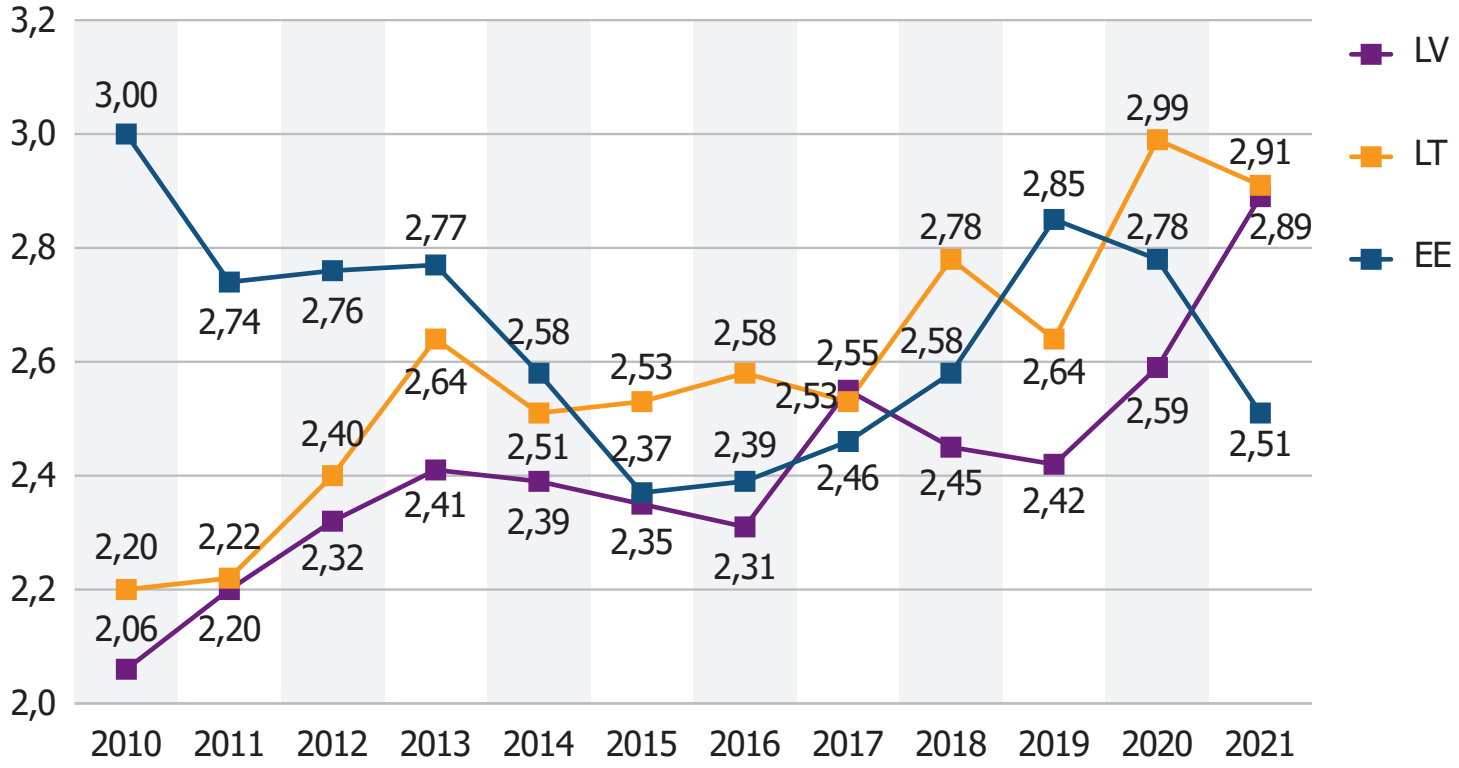
Satisfaction with the quality of business legislation, 2010–2021

(Average, in scale from 1-5, where '1': very low satisfaction, but '5'- very high satisfaction)



Satisfaction with the government's support to entrepreneurs, 2010–2021

(Average, in scale from 1-5, where '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

Summary and conclusions

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.

Summary and conclusions

In this study, the main focus is on estimates of the shadow economy in 2021 and trends covering the period 2009–2021. 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 from 2016 to 2018 has had an increasing trend: 20.7% of GDP in 2016, 22.0% in 2017 and 24.2% of GDP in 2018. In 2019, there was a slight decrease in the shadow economy in Latvia (23.9% of GDP), while in 2020 the shadow economy grew again to 25.5% of GDP. The data of the latest study show that the size of the shadow economy in Latvia has also increased in 2021, reaching 26.6% of GDP (+1.1% compared to 2020). This is the highest indicator of the size of the shadow economy in the country since 2011, when the shadow economy in Latvia reached 30.2% of GDP.

Summary and conclusions

According to the results of the latest research, growth of the shadow economy in 2021 is also observed in Lithuania and Estonia. Compared to 2020, the shadow economy in Estonia has grown by 2.5%, reaching 19.0% of GDP. In Estonia this is the highest indicator of the size of the shadow economy in the country since 2012, when the size of the shadow economy reached 19.2% of GDP. While in Lithuania the size of the shadow economy increased by as much as 2.8% in 2021, reaching 23.1% of GDP. In Lithuania, this is the highest indicator of the size of the shadow economy since 2009, when we started measuring the shadow economy in Lithuania. Thus, most likely due to the Covid-19 pandemic, the shadow economy has increased in all three Baltic states in 2021. Although the difference between the size of the shadow economy in Latvia and Lithuania is relatively smaller than in previous years, it is still highest in Latvia.

Our calculations also show that the most important component of the shadow economy in Latvia, Estonia and Lithuania in 2021 was "envelope" wages, which in Latvia comprise 46.2% of the total shadow economy (in 2020: 46.9%, in 2019: 44.1%), in Estonia: 42.7% (in 2020: 40.3%, in 2019: 43.0%), but in Lithuania 38.8% (in 2020: 37.7%, in 2019: 36.3%). In 2021, unreported revenues in Latvia comprise 30.0% (in 2020: 29.9%) of the total shadow economy, but the component of unreported employees: 23.8% (in 2020: 23.2%). Unreported employees, in Estonia and Lithuania, respectively, account for 30.0% and 23.5% of the total shadow economy in 2021, while unreported income: 27.2% and 37.7% of the total shadow economy.

Summary and conclusions

Similar to the total size of the shadow economy, in 2021, compared to 2020, the share of the average wage (%) hidden by entrepreneurs from the state, or envelope wages, also increased in all three Baltic states. In Latvia, however, this increase is relatively small, only by 0.3%, with envelope wages increasing to 23.8% in 2021. In Estonia, the amount of envelope wages increased by 3.8%, reaching 17.0%, but in Lithuania by 0.9%, increasing to 16.2%. Thus, the amount of envelope wages is still significantly higher in Latvia, which largely explains the differences in the overall shadow economy between the Baltic states.

An increase in all Baltic countries is also observed in the area of unreported income (profit): In Latvia, the average share of income (%) that entrepreneurs hide from the state in 2021 increased by 0.6%, reaching 18.6%; in Estonia: by 0.5%, reaching 12.1%, but in Lithuania by 1.0%, reaching 16.8%. While in 2021, compared to 2020 the amount of non-disclosure of employees (average % of the total number of employees employed without a contract), slightly decreased in Latvia and Lithuania, respectively, by -0.2%, to 10.7% and by -0.4% to 8.9%. In Estonia, on the other hand, the non-disclosure rate has increased by 1.5% in 2021, reaching 10.5%, the highest level since we started measuring the shadow economy in Estonia.

Summary and conclusions

In addition to measuring the involvement of registered companies in the shadow economy, we also calculate the proportion of unregistered companies in the Baltic states. According to our estimates, unregistered companies in Latvia in 2021 accounted for 8.6% of all companies, while in Lithuania and Estonia, respectively, 9.0% and 6.7% of all companies.

According to our results, the general level of bribery (the percentage of income paid by companies in informal payments to "settle things") in 2021, compared to 2020, has increased in all Baltic states. The largest increase is observed in Lithuania, where this indicator has increased by 3.9%, reaching 12.3%. In Estonia, general bribery has increased by 0.6%, reaching 7.0% in 2021, and in Latvia - by 0.9%, rising to 9.2%. The level of general bribery in Latvia has not been this high since 2014, in Lithuania since 2015, but in Estonia this is the highest indicator since we have been measuring the size of the shadow economy in Estonia. The results of our study also show that in all of the Baltic states, in 2021, compared to 2020, the average % of the contract amount to ensure public procurement has increased. Namely, in Latvia there is an increase of 1.1%, reaching 8.0%, in Lithuania - 2.1%, reaching 7.7%, but in Estonia - 0.1%, with this component of the shadow economy increasing to 4%.

Summary and conclusions

The highest level of shadow economy in Latvia is observed in the Riga Region, Kurzeme and Zemgale. In terms of sectors, the highest share of the shadow economy in Latvia is still in the construction sector. If since 2015, the shadow economy in the construction sector in Latvia has decreased (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), then in 2021 the shadow economy has grown in the sector: to 31.2%. In 2021, the volume of the shadow economy in retail trade in Latvia reached 29.8%, in the service sector: 27.5%, in manufacturing: 25.0%, but in wholesale trade: 24.4%.

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, in 2021, satisfaction with the SRS in Latvia will reach 3.60, but in Lithuania: 3.56. Thus, for the first time since measuring the factor influencing the shadow economy in the Baltic states (since 2010), the level of satisfaction with the SRS in Latvia is higher than in Lithuania. In 2021, satisfaction with the SRS is still the highest in Estonia (3.74), which is a decrease compared to 2019 (3.80) and 2020 (3.76). The results of the research show that in 2021, in Latvia, compared to 2020, the satisfaction of entrepreneurs with the state tax policy has increased: from 2.63 to 2.70. While in Lithuania and Estonia, satisfaction with tax policy decreased from 3.08 to 2.81 and from 3.14 to 3.02, respectively.

Summary and conclusions

The satisfaction of entrepreneurs with the quality of business legislation has slightly increased in Latvia (from 2.96 in 2020 to 2.98 in 2021), but has decreased in Lithuania and Estonia, from 3.03 to 2.89 and from 3.35 to 3.25, respectively. Satisfaction with government support for entrepreneurs in Latvia in 2021 has increased to 2.89 (2.42 in 2019, 2.59 in 2020), while it has decreased in the other two Baltic states: to 2.91 in Lithuania (2.64 in 2019, 2.99 in 2020) and up to 2.51 in Estonia (2.85 in 2019, 2.78 in 2020).

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 11 survey rounds (years), which gives a panel that spans the years 2010-2021 and has a cross-section of approximately 1,500 firms per year.

Summary and conclusions

The regression analysis suggests 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 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.

Summary and conclusions

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. 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.

Summary and conclusions

Our results suggest that policy makers should reconsider an approach to decrease the shadow economy both in Latvia, Lithuania and Estonia. This is especially important in the context of the current and potential economic development tendencies as affected by the Covid-19 pandemic and Russia war in Ukraine.

Methods used in constructing the Index

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 Putniņš 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 2022 collects information about shadow activity during 2021 and 2020. The overlap of one year in consecutive survey rounds (e.g., collecting information about 2020 shadow activity in both the 2021 and 2022 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 2022. survey we interviewed 501 respondents in Lithuania and 529 respondents in Estonia. In Latvia, however, 841 respondents were interviewed: at least 100 company managers in construction, wholesale, retail, manufacturing and service industries. This was done in order to get more representative data for each of the aforementioned industries. 2022. survey was implemented in cooperation with Norstat Latvija.

Methods used in constructing the Index

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.

Methods used in constructing the Index

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):

$$ShadowProportion_i = \alpha_c UR_i^{EmployeeRemuneration} + (1- \alpha_c) UR_i^{OperatingIncome}$$

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.

Methods used in constructing the Index

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

$$INDEX_C^{Shadow\ Economy} = \sum_{i=1}^{N_c} w_i\, ShadowProportion_i$$

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 $INDEX_C^{Shadow\ Economy}$ 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.

Methods used in constructing the Index

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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