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Approved By
European Department

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CONTENTS

REVISITING FISCAL MULTIPLIERS FOR ESTONIA[1]

This Selected Issues Paper revisits fiscal multipliers for Estonia with a view to highlighting policy trade-offs and providing growth-friendly options for fiscal consolidation. The pandemic triggered a sharp and partly permanent increase in government spending. Demand for better quality and broader provision of public services has materialized, while climate and ageiong-related spending pressures are set to intensify over time and geopolitical risks have triggered a sharp increase in defense spending. Despite the 2022–2024 protracted recession, Estonian authorities have responded to these pressures with two rounds of wide-ranging tax changes affecting PIT, CIT, VAT, and excises, while spending cuts based on comprehensive spending reviews were enacted. Do these measures have significant short-term effects on growth? Granular estimates of fiscal multipliers by type of instrument—on both revenue and spending—can shed light on potential short-term output costs and underpin policy advice on specific instruments for fiscal consolidation. Our results indicate that multiplier effects in Estonia are not negligible. First-year multiplier estimates tend to fall in a 0.85–1.4 range for a general fiscal shock, 0.6–1.2 for aggregate spending, and about -0.2 for revenue. Granular multipliers suggest initially larger but less persistent output costs of spending cuts relative to tax increases.

A. Introduction: Fiscal Multipliers

1. Fiscal multipliers measure the short-term impact of *discretionary* fiscal policy on output. Usually defined as the ratio of a change in output to an exogenous change in a fiscal instrument, fiscal multipliers can play a critical role in macroeconomic forecasts and should be taken into consideration for police advice and design.[2] Misrepresentations of fiscal multipliers can critically undermine the credibility of fiscal consolidations.

2. Estimations of fiscal multipliers are plagued with unresolved analytical challenges, which create uncertainty about their size. The main challenge is to isolate the direct effect of changes in fiscal variables on GDP, because of the two-way causality between them. Both spending and taxes typically can react mechanically to the business cycle through so-called "automatic stabilizers" (i.e., higher tax buoyancy during economic booms or larger unemployment benefits paid during recessions) and can also respond in a discretionary way (i.e., policymakers deciding to engineer a countercyclical response to cushion the impact of certain shocks on output). Using a range of different methodologies, researchers have tried to address this issue by attempting to identify "exogenous shocks" to fiscal policy—changes in spending or revenue not induced by the macroeconomic environment. With no consensus on the ideal methodology to address the issue, the literature lacks consensus on the size of multipliers.

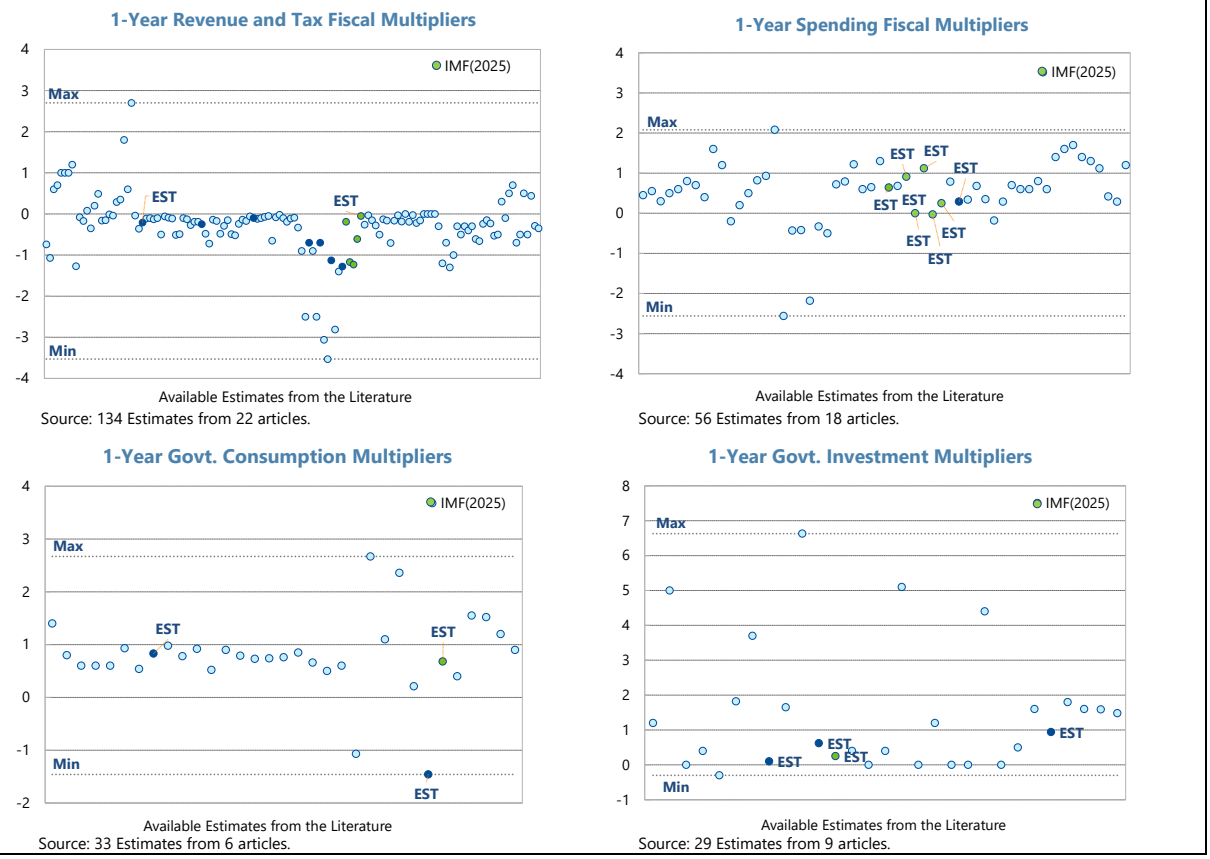
[1] Prepared by Carlos de Resende and Sadhna Naik (EUR).

[2] Fiscal multipliers only refer to short-term effects of changes in fiscal variables on GDP, offering little guidance on the effect on both other important variables—such as employment, social outcomes, and income distribution—and long-term (potential) GDP.

3. The literature about fiscal multipliers relies on two main approaches for identification of fiscal shocks. One identification strategy uses Structural Vector Autoregression (SVAR) techniques developed by Blanchard and Perotti (2002) and the other uses a narrative approach (Romer and Romer 2010, Devries et al. 2011).[3] This SIP, building on previous work by IMF (2021), focuses on an application of the SVAR approach to Estonia, while also examining other off-the-shelf methods developed by IMF staff.[4]

4. Estimates from the literature generally support the canonical Keynesian views. Figure 1 sums up estimates of one-year fiscal multipliers from 37 papers published between 2002 and 2025, using data from advanced economies, including this SIP (discussed later). Most estimates agree with conventional Keynesian theory: tax multipliers are negative, and spending multipliers are positive. For instance, 110 out of 134 estimates of one-year tax or fiscal revenue multipliers (Annex II) show negative values, 95 of which are between zero and -1. Considering 56 estimates of spending multipliers, 46 are positive (33 between zero and 1).

Figure 1. Advanced Economies: Estimates of Fiscal Multipliers



[3] For non-exhaustive reviews of the literature, including the different approaches used, see IMF (2013), Gechert (2015), and Deb et *al* (2021). Gechert (2015) and Hlaváček and Ismayilov (2022) provide systematic statistical meta-analysis of fiscal multiplier estimates.

[4] See Batini *et al* (2014) and IMF (2021).

5. Estimates of government consumption and investment multipliers are less common but are also in line with Keynesian tradition. All but 2 out of 33 estimates of government consumption multipliers are positive. Similarly, 22 out of 29 estimates of public investment multipliers are positive, although results are considerably more diverse than those in the other categories. Estimates for Estonia (marked dark blue and green in Figure 1) broadly align with the bulk of available estimates, except for one negative estimate of government consumption multiplier in Klyviene and Jakaitene (2022) and for government investment multipliers, which tend to be concentrated at the lower end.

B. The IMF's "Bucket Approach"

6. The IMF' "Bucket Approach" (BA) is a back-of-the-envelope method based on general findings from the literature relating the size of multipliers with countries' selected structural characteristics. The approach (see Batini et al, 2014) classifies countries into low, medium, or high multiplier groups (or "buckets") based on scores assigned to these characteristics. The resulting estimates based on this approach refer to first-year multipliers for a general fiscal shock, i.e., without a distinction between spending and tax multipliers.

7. Six structural characteristics are considered in the BA. A score of 1 is assigned to low trade openness, low labor market flexibility, weak automatic stabilizers, low exchange rate flexibility, "safe" levels of government debt, and highly effective public financial management. Otherwise, the score is zero.[5] These structural characteristics are associated with larger multipliers in "normal times" (i.e., GDP close to its potential level) and receive equal weight in the aggregate score, which is a sum of the individual scores for each factor. Countries are assigned multiplier values according to Table 1.

Table 1. Estonia: IMF's Bucket Approach: Ranges of First-Year "Normal Times" General Fiscal Multipliers

Score	Country Category	Multiplier Ranges
0 - 3	Low multiplier	0.1 – 0.3
3 - 4	Medium multiplier	0.4 – 0.6
4 - 6	High multiplier	0.7 – 1.0

8. Depending on the country's position on the business cycle and the prevailing monetary policy stance, the size of multipliers for normal times needs to be adjusted. For instance, if the economy is close to the lowest point in the cycle (largest negative output gap) by historical patterns, both the lower and upper bounds of multiplier ranges in Table 1 are increased by 60 percent, under this approach. Conversely, if the economy is close to the peak, both those bounds are reduced by 40 percent. Regarding the stance of monetary policy, if it is close to the effective

[5] See Batini et al (2014) for a more detailed discussion on how these factors affect the size of the fiscal multiplier.

zero-lower bound for the policy rate or constrained by some other reason, the multiplier range is increased by up to 30 percent.

9. The BA applied for Estonia implies a medium to high fiscal multiplier during normal times. Table 2 displays the scores assigned to each BA category for Estonia. The Estonian economy is very open, with average import-to-domestic demand ratios significantly above the 30 percent threshold assumed under the BA. In addition, labor markets are perceived as somewhat, but not highly, flexible. These two factors, especially the former, contribute to a lower estimate for the size of the fiscal multiplier. On all other structural criteria, Estonia scores high, indicating a larger fiscal multiplier. Automatic stabilizers (proxied by a public spending ratio to GDP below 40 percent) are thought to be weak, the exchange rate against most trading partners is fixed (as Estonia is part of a monetary union), public debt is the smallest in Europe in percent of GDP, and its public finance management is considered sound by international standards.[6] The resulting score of 4.5 suggests a value in the high-multiplier range of Table 1. The mid-rage estimate is 0.85.

Table 2. Estonia: IMF's Bucket Approach Applied to Estonia as of 2025Q1

Factor	Score (0 = no, 1 = yes)
Low trade openness	0
High Labor market rigidity	0.5
Weak automatic stabilizers	1
Quasi-fixed exchange rate	1
Low/safe public debt level	1
Effective PFM and Revenue Administration	1

10. Considering the protracted slowdown in economic activity in Estonia over the past three years, the estimated normal times multiplier needs to be adjusted upwards. Staff estimates the output gap in 2024 at -2 percent of potential GDP and expects it to remain broadly unchanged in 2025, starting to converge towards zero only after 2026. This is the largest negative output gap observed in Estonia since 2012, when the economy was still recovering from the Global Financial Crisis (GFC). By applying the suggested 60 percent adjustment for large negative output gaps, the estimate for Estonia becomes 0.85 x (1+0.6) = 1.36, with the adjusted lower bound (see Table 1) at 0.7 x 1.6 = 1.12.

C. Static Keynesian Fiscal Multipliers

11. Static spending multipliers can be derived from the canonical Keynesian aggregate demand equation determining short-run output. The textbook definition depends on the propensity to consume over the disposable income (which in turn depends on saving rate and net

[6] Estonia is ranked 86 out of 165 countries according to the labor flexibility component of the 2022 Frasier Institute's Economic Freedom Ranking, with a normalized score of 0.56 in the 0-1 interval. On government effectiveness, the country ranks 25 with a normalized score of 0.8.

tax rate), and the import contents of private consumption, public consumption, and public investment. For any exogenous expenditure A_i:

$$\kappa_i = \frac{\Delta Y}{\Delta A_i} = \frac{1 - m_i}{1 - c(1 - m_c)} = \frac{1 - m_i}{1 - (1 - t - s)(1 - m_c)},$$

where κ_i is the static fiscal multiplier for A_i, for i = public consumption or public investment; m_i is the import intensity of A_i; m_c is the import intensity of private consumption; and c, t, and s are the propensity to consume of private consumption, the average tax rate, and the savings rate, respectively. The import intensity of each type of expenditure represents the leakages through imports.[7]

12. Estimations of static multipliers for Estonia are consistent with the sizeable estimates obtained using the BA. Table 3 displays the relevant parameters and the resulting fiscal multipliers for public consumption and investment, estimated to be about 1.4 and 1, respectively. Due to lack of data specific to public investment, the multiplier for public investment assumes the same import intensity of total investment. Considering the combined import intensities of both categories of expenditure, the static multiplier is 1.16.

Table 3. Estonia: Average Static Fiscal Multipliers (2024-2030)

	Public Consumption (G)	Public Investment (I)	Combined G and I
Static Fiscal Multiplier	1.44	0.96	1.16
Import intensity (m_i)	0.12	0.41/1	0.29
direct	0.04	0.25	0.16
indirect	0.08	0.16	0.13
A. Tax Revenue (ratio to GDP)		0.357	
B. Transfers and Subsidies (ratio to GDP)		0.191	
A – B = Net Tax Rate (t)		0.166	
Private Savings Rate (s)		0.218	
Propensity to consume ($c = 1 - t - s$)		0.617	
Import intensity of private consumption (m_c)		0.372	

/1 Uses the import intensity of total investment as proxy for that of public investment.

D. Blanchard-Perotti SVAR Approach

13. Structural Vector Autoregressive (SVAR) models—e.g., Blanchard and Perotti (2002)—are widely used to estimate fiscal multipliers. To isolate exogenous changes in fiscal variables

[7] The coefficients t and s are obtained as total tax revenues (including social contributions) net of transfers and domestic private savings in percent of GDP, respectively. The import contents of private consumption, government consumption and public investment were constructed using the 2020 input-output matrix for Estonia and reflect the share of expenditure that is imported, directly or indirectly (i.e., through the consumption of domestically goods and services that are produced using imports). See Bussière *et al* (2013).

that are orthogonal to economic developments, the BP approach relies on the identification assumption that discretionary changes in government spending triggered by unexpected macroeconomic news are unlikely to be implemented within shorter time intervals (e.g., a quarter) due to implementation lags. That leaves two possible causes for changes in fiscal variables within, say, a quarter: (*i*) an automatic response to macroeconomic variables (i.e., automatic stabilizers) or (*ii*) truly exogenous shifts in fiscal policy (i.e., fiscal shocks). Independently estimated or calibrated elasticities of revenue and expenditure items with respect to output are then imposed as non-zero restrictions to an otherwise standard VAR and used to identify the effect of automatic stabilizers, leaving the fiscal shock identified.[8] For spending shocks, identification is achieved by assuming that government spending is pre-determined within the quarter, using a standard Cholesky decomposition with government spending ordered first. For tax shocks, taxes are ordered first (i.e., tax decisions are assumed to be taken first, with spending responding). A more detailed discussion of BP's identification strategy is presented in Annex I.

14. Our estimation of the reduced-form VAR includes several dummy variables and exogenous controls. The estimation uses Estonian quarterly data on real GDP, total government spending, and total fiscal revenues from 2001Q1 to 2024Q2. To account for unit roots and trends in underlying variables, we normalized all variables by the trend in GDP (HP-filtered) and included both linear and quadratic deterministic trends, when statistically significant, as exogenous regressors in the estimation of the reduced-form VAR equations. Following BP (2002), we also added both seasonal dummies and indicators of known tax reforms in Estonia.[9] The former are interacted with data on GDP, taxes, and spending to capture seasonal patterns in the response of taxes to economic activity. This allows for the coefficients in the VAR to be quarter-specific within the year.[10] To control for the effects of the monetary policy stance, commodity prices, and foreign demand on GDP, government revenues and spending, the estimation includes the ECB policy rate, a terms-of-trade index, and the trade-weighted foreign partners' GDP, as exogenous variables in the SVAR. The impulse response functions, however, are later computed without the quarterly dependence dummies (i.e., they capture the average dynamic response to fiscal shocks across quarters within the

[8] More specifically, the BP approach builds on the recursive VAR approach by Fatás and Mihov (2001)—which relies on a standard Cholesky factor decomposition based on the causal ordering of variables to rule out contemporaneous reactions of the fiscal variable to business cycle variations—by adding the non-zero restrictions containing the elasticities.

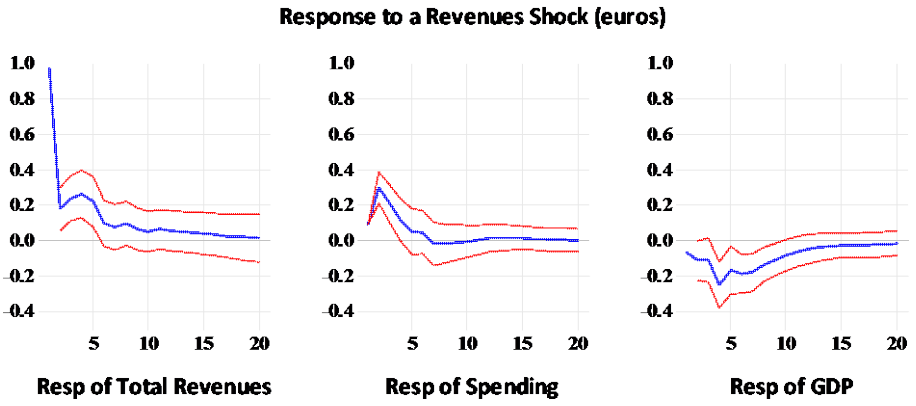
[9] We used information from the European Commissions' 2021 Taxation Trends Report complemented by our institutional knowledge about Estonia's tax system during 2022-2024, to construct the dummies for tax reforms. We considered all changes in tax rates for personal and corporate income taxes and VAT. See (https://taxation-customs.ec.europa.eu/taxation/economic-analysis/data-taxation-trends_en).

[10] This goes beyond simply seasonally adjusting quarterly data. The seasonal dummies are interacted with the underlying series of GDP, tax, and spending. Because the timing of tax collection may not be uniformly distributed within the year, shocks to GDP can have different effects on tax revenues depending on the quarter. For instance, a tax that is usually paid in the last quarter of the year may depend on GDP in the current and past three quarters, but tax collection will show as zero in the other three quarters.

year) and normalized to represent the response, in euros, to a one-euro shock in the selected fiscal instrument.[11]

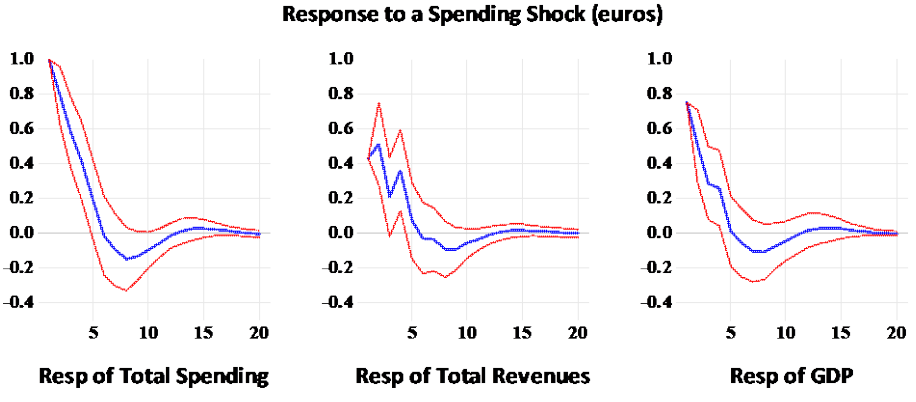
15. Multiplier estimates from Blanchard-Perotti's SVAR approach suggest negative and positive responses of real GDP to exogenous increases in total revenues and spending net of interest income and payments, respectively. Considering only statistically significant responses (at 5 percent) to a one-euro shock, Figures 2–3 show that real GDP *falls* for 10 quarters following exogenous increases in total net revenues—with a (non-cumulative) peak response of -0.25 euro after 4 quarters—and *increases* by about 0.7 euro immediately after a spending shock, with a non-cumulative response that gradually decreases but remains statistically significant up to 4 quarters.

Figure 2. Fiscal Multipliers in Estonia: Total Revenues[1]



Source: IMF staff estimations. Red lines are 95% confidence bands.
1/ Excludes interest income.

Figure 3. Fiscal Multipliers in Estonia: Total Spending[1]



Source: IMF staff estimations. Red lines are 95% confidence bands.
1/ Excludes interest expenditures.

[11] The original impulse responses (*IRF*) are elasticities of GDP to autonomous changes in fiscal instrument i (i.e., $IRF = (\Delta GDP/GDP)/(\Delta A_i/A_i)$). The normalized impulse responses are calculated by dividing *IRF* by the average share of the fiscal instrument to GDP such that $IRF^* = \Delta GDP/\Delta A_i$.

16. To estimate granular fiscal multipliers for different categories of revenues and spending, we applied a slightly modified version of the BP approach. We included the fiscal instrument of interest (e.g., VAT revenues) as an endogenous variable in the VAR system and added its corresponding aggregated variable (e.g., total revenues) as part of the exogenous controls. Following Ramey and Zubairy (2018), the cumulative multiplier $k_i(h)$, for fiscal instrument i at horizon h is calculated as:[12]

$$k_i(h) = \frac{\sum_{t=1}^{h} response\ of\ GDP\ at\ quarter\ t}{\sum_{t=1}^{h} response\ of\ instrument\ i\ at\ quarter\ t}.$$

17. Table 4 shows that multipliers vary significantly by type of fiscal instrument. In addition to total revenue and total spending net of interest flows, we estimated multipliers for four types of revenues—i.e., direct taxes, its two subcategories of personal (PIT) and corporate income (CIT) taxes, and VAT—six categories of spending—i.e., government consumption, its two subcomponents (wages and salaries and intermediate consumption), subsidies, transfers, and public capital formation. To account for the possibility that the effects of fiscal policy build over time, Table 4 reports cumulative multipliers at one and two years after the shock.

18. The one-year aggregate spending multiplier is larger in absolute terms than the revenue multiplier. Results in Table 4 for first-year multipliers are consistent with results in Carnot and Castro (2015) for the European Union, which suggest that the average one-year aggregate spending multiplier is between two to three times as large (in absolute terms) as revenue multipliers, and with the meta-regression analysis of 104 studies by Gersher (2015), which reports spending multipliers exceeding tax multipliers by 0.3–0.4 unit. Our estimates are also broadly consistent with, albeit somewhat smaller than, the results from a survey of 41 VAR or DSGE studies by Mineshima *et al* (2014), which suggests that first-year multipliers amount on average to 0.75 for government spending and -0.25 for government revenues in advanced economies. This is in line with the Keynesian notion that the effect of tax changes is dampened by savings while changes in public spending have a direct impact on aggregate demand.[13] Focusing on aggregate spending, our result based on the BP approach is also consistent with the meta-analysis statistical study of 132 papers by Hlaváček and Ismayilov (2022), which finds spending multipliers in the range of 0.75–0.82.

19. Fiscal multipliers for tax shocks are consistently negative on impact (i.e., within a quarter) and tend to be more persistent than spending multipliers. Except for the VAT and CIT multipliers, which decline (in absolute terms)—to almost zero and by 40 percent, respectively—after one year and peak in one or two quarters, respectively, tax multipliers tend to remain negative and become stronger over a two-year horizon (Table 4). Multipliers for total net revenues, direct taxes taken as a whole, and PIT all build up over time, reflecting the lower persistence of the tax/revenue

[12] We only considered statistically significant responses at the 5 percent level.

[13] Papers that use the narrative approach to identify exogenous fiscal shocks, tend to find larger tax multipliers than conventional VAR models do and do not generally support the view that spending multipliers are larger than revenue ones. See Romer and Romer (2010), Ramey (2011), and Alesina et al (2019).

shock relative to that of its effect on GDP. For example, within two years after the shock, the negative multiplier effect of direct taxes on GDP doubles, driven by the effect of PIT which becomes three times as strong.

Table 4. Estonia: Impact and Cumulative Fiscal Multipliers of Selected Fiscal Instruments

Fiscal Instrument	1st quarter	After 4 quarters	After 8 quarters	Peak / Through
Total Revenues	-0.07	-0.19	-0.52	-0.52 (8th quarter)
Direct Taxes	-0.62	-1.17	-1.21	-1.32 (7th quarter)
PIT	-0.54	-1.23	-1.47	-1.59 (7th quarter)
CIT	-1.07	-0.61	-0.84	-1.07 (1st quarter)
VAT	-0.35	-0.05	0.19	-0.35 (2nd quarter)
Total Spending	0.75	0.64	0.64	0.75 (1st quarter)
Government Consumption	1.05	0.68	0.35	1.05 (1st quarter)
Wages and Salaries/1	1.89	0.91	0.38	1.89 (1st quarter)
Intermediate consumption	0.01	0.00	0.00	0.01 (1st quarter)
Subsidies	0.50	1.12	1.50	1.50 (8th quarter)
Transfers	0.69	-0.03	-0.10	0.69 (1st quarter)
Gross Fixed Capital Formation	-0.02	0.25	0.17	0.30 (2nd quarter)

Note: Only statistically significant responses at the 5 percent level are considered in the computation of multipliers.
/1 includes employers' social contributions

20. Spending shocks have a positive effect on output but, contrary to tax multipliers, tend to peak sooner after the shock and rapidly decay. All spending multipliers are positive on impact, except for that of public investment, which is nevertheless barely negative and becomes positive and peaks after two quarters. They all also decrease over time, peaking in the first or second quarter after the shock, possibly reflecting crowding out of private spending and Ricardian-equivalence channels. The exception is the multiplier of subsidies, which becomes three times stronger after two years, indicating that its positive effect on GDP builds up as subsidized programs mature.

21. Spending on wages and salaries has the largest immediate impact on GDP, but it fades by 80 percent in two years. When compounded with the almost null multiplier for intermediate consumption, the large multiplier for the public wage bill implies a still large (i.e., above one) multiplier for government consumption, in line with the static multipliers discussed on Table 3. The multiplier for transfers, the second highest on impact, shows a similar profile but, given the likely larger uncertainty of such flows, it may be associated with a larger propensity to save, which reduces its initial size and makes it fade more quickly.

22. Public investment multipliers are smaller than government consumption multipliers. This result from the BP approach confirms the findings with the static multipliers and the literature

(Klyviene and Jakaitene, 2022), likely reflecting the larger import content of investment relative to government consumption (which, on itself, is largely composed by spending with wages and salaries). A more useful comparison is with the fiscal multiplier of government intermediate consumption. In this case, Table 4 shows that the public capital formation has a generally larger positive and persistent effect on GDP than the purchase of consumption goods.

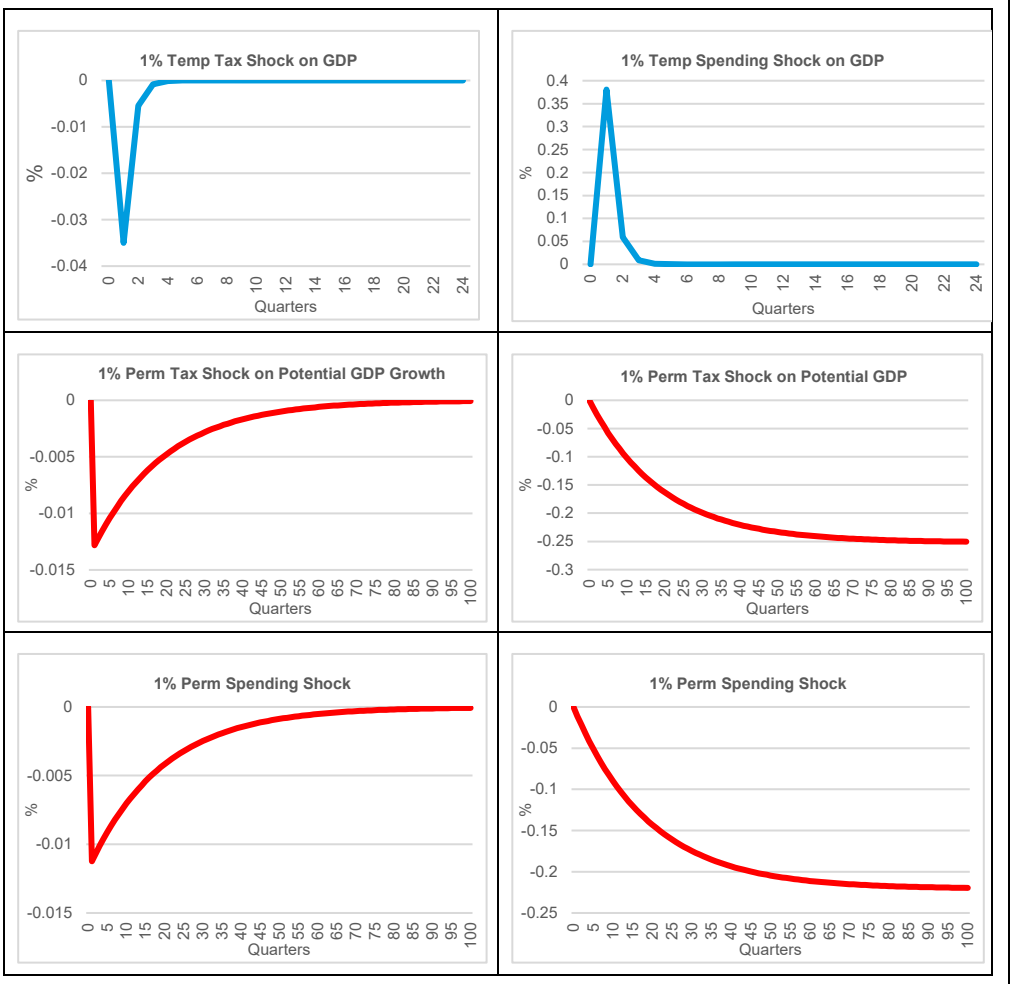
E. Estimating the Impact of Fiscal Shocks on Potential GDP

23. Traditional estimates of fiscal multipliers do not distinguish between temporary and permanent fiscal shocks and their effects on potential GDP. The standard methodologies used to estimate fiscal multipliers may capture cumulative or persistent output effects of fiscal shocks, but these effects potentially conflate cyclical and structural components. Even strands of the literature that take a longer-term perspective in analyzing effects of episodes of fiscal austerity on GDP (e.g., Alesina *et al*, 2019) do not explicitly disentangle the short-run and permanent effects of fiscal shocks.

24. For that purpose, we estimate a structural vector error correction model (SVECM). The model, estimated with Bayesian techniques using quarterly Estonian data on real GDP, total spending and total fiscal revenues from 2001Q1 to 2024Q2 (see Annex II), explicitly allows for permanent spending and tax shocks to affect both the business cycle (i.e., the output gap) and potential GDP growth, while restricting temporary fiscal shocks to only have effects on the cycle. The effects of permanent fiscal shocks are temporary on potential GDP *growth*, but permanent on its *level*. Figure 4 shows the effects of 1 percent fiscal shocks on GDP.

25. Both tax and spending permanent increases have a small but persistent *negative* effect on potential GDP growth, permanently *reducing* the level of GDP. The model was calibrated such that the immediate effects of temporary fiscal shocks match the results from the Blanchard-Perotti SVAR approach (when converted to euros). The prior distributions used accounted for a negative effect of permanent tax shock on GDP but were agnostic about the sign of the effect of permanent spending shocks. Figure 4 shows that the estimated impact of 1 percent permanent shocks to *both* revenues and spending leads to a little over 0.01 percentage points *decline* in (quarterly) potential GDP growth, which seems small at first glance. However, when compounded over 2 years, this amounts to about 0.1 percentage point lower GDP. Over 5 years, real GDP is about 0.2 and 0.15 percentage point lower following permanent increases in taxes and spending, respectively. In the long run, the cumulative effect on GDP is -0.25 and -0.22 percentage point, respectively. These results are in line with those in Alesina *et al* (2019) and suggest that fiscal austerity based upon spending cuts is much less costly (actually, not costly at all) in the long run than when based on tax increases.

Figure 4. Effects of Temporary and Permanent Fiscal Shocks on Output



Source: IMF staff estimations.

F. Conclusions

26. Estimated multipliers for Estonia consistently suggest non-negligible *negative* short-term effects of *both* exogenous government spending cuts and tax increases on output. Based on three different methods—(i) the IMF's BA, (ii) a static comparative approach given propensities to save and import, and (iii) the Blanchard-Perotti SVAR approach—the estimated first-year multipliers for general fiscal variables (1.1), aggregate spending (0.6–1.2) and net fiscal revenues (-0.2) fall well within results found in the literature and indicate important *short-term* costs of fiscal consolidation.

27. While multipliers for *aggregate* fiscal variables suggest larger but less persistent short-term output costs for spending cuts relative to revenue increases, the picture is more nuanced when considering more granular fiscal instruments. Our findings using the BP SVAR approach underscore the heterogeneity in the size and persistence of multipliers across different fiscal instruments. Notably, while one-year aggregate spending multipliers are larger than that for total

revenues (in absolute terms), multipliers of direct tax shocks, especially PIT, build up over time and become larger than multipliers for any category of spending within one year and, except for subsidies, after two years of the initial shock. This suggests that the negative effects of direct tax hikes are highly persistent. Except for VAT shocks, which no longer exert negative impact on GDP after four quarters, similar persistent profiles (albeit with smaller multipliers), are also estimated for other categories of taxes and total revenues (i.e., including non-tax revenues). On the spending side, except for subsidies and public investment, multipliers tend to peak immediately after the shock and quickly decay. Spending on wages and salaries demonstrates the most substantial immediate impact on GDP, although this effect diminishes significantly within two years.

28. Our results highlight important trade-offs of potential strategies for fiscal consolidation based on short-term effects of multipliers for different fiscal instruments. For instance, *abstracting from other important considerations*—such as buoyancy and administrative burden of individual tax categories, progressivity of the tax system, income distribution, risks of tax avoidance behavior—that may be subject to independent policy goals, fiscal consolidations based on spending cuts, especially if based on reductions in the wage bill, should produce larger immediate negative output effect, albeit short-lived. Revenue-based consolidations, especially via direct taxes, will have slightly lower immediate effects than general spending cuts but output costs build over time and last longer. Focusing on two-year multipliers, which Ramey and Zubairy (2018) argue to best capture fiscal effects on output that build over time, considering the high persistence of direct tax multipliers, and sizes of different multipliers, spending cuts unrelated to subsidies or VAT tax hikes, may be the most growth-friendly options.

29. The long-term effects of both revenues and spending permanent shocks are *negative*. Differently from the traditional fiscal multiplier, (short-run) output effects of spending increases, which materialize over business cycle frequencies, permanent spending shocks lead to a small temporary *decline* in the growth rate of potential GDP, which translates into a *permanent reduction* in the level of GDP. Moreover, the negative output effect of permanent revenues shocks is larger (in absolute terms) than that of spending increases, suggesting that short-run costs of fiscal consolidations based on spending cuts will be, at least partially, offset by permanent positive effects on potential GDP.

Annex I. Shock Identification in the BP (2002) SVAR Approach

1. The BP strategy maps a reduced-form vector autoregression into a structural model. First, the reduced-form VAR represented by equations (1)–(3) below is estimated using seasonally adjusted quarterly, per capita data on real GDP, taxes, and spending, all in natural logarithms.

GDP (Y_t): $$Y_t = a_{11}Y_{t-1} + a_{11}T_{t-1} + a_{11}S_{t-1} + e_t^y, \quad (1)$$

Tax / Revenues (T_t): $$T_t = a_{21}Y_{t-1} + a_{22}T_{t-1} + a_{23}S_{t-1} + e_t^T, \quad (2)$$

Spending (S_t): $$S_t = a_{31}Y_{t-1} + a_{32}T_{t-1} + a_{33}S_{t-1} + e_t^S, \quad (3)$$

where e_t^y, e_t^T, and e_t^S are reduced-form VAR residuals (or forecast errors), assumed to be linked to structural shocks μ_t^y, μ_t^T, and μ_t^S, for Y_t, T_t, and S_t, respectively.

2. The unobserved uncorrelated structural shocks are then assumed to be linearly linked to the reduced-form residuals according to equations (4)–(6):

$$e_t^y = a_1 e_t^T + a_2 e_t^S + \mu_t^y, \quad (4)$$

$$e_t^T = b_1 e_t^y + b_2 \mu_t^S + \mu_t^T, \quad (5)$$

$$e_t^S = c_1 e_t^y + c_2 \mu_t^T + \mu_t^S, \quad (6)$$

where GDP forecast errors (e_t^y) are assumed to depend on surprises in both taxes ($a_1 e_t^T$) and spending ($a_2 e_t^S$), and on structural shocks to GDP (μ_t^y); forecast errors in taxes (e_t^T) relate to surprises in GDP ($b_1 e_t^y$), structural spending shocks ($b_2 \mu_t^S$), and structural shocks to taxes (μ_t^T); and, finally, unexpected movements in spending (e_t^S) are assumed to derive from GDP forecast errors ($c_1 e_t^y$), structural shocks to taxes ($c_2 \mu_t^T$), and structural shocks to government spending (μ_t^S).

3. Economic restrictions and estimations made outside the system (1)–(3) inform the values of structural parameters in equations (4)–(6). Because SVAR models contain more unknown coefficients than information in the reduced-form VAR, restrictions are needed on some parameters for full identification. The key structural restriction is to impose $c_1 = 0$ (spending does not change in response to GDP within the quarter). Additionally, for tax shocks it is assumed that $b_2 = 0$ (tax decisions are taken first and spending responds) and for spending shocks, that $c_2 = 0$ (spending decisions come first). In either case, c_2 or b_2 are estimated, respectively. Parameters b_1 (elasticity of taxes to GDP), a_1 and a_2 are estimated separately.[1]

[1] We estimate the tax elasticity to GDP as b_1 = 0.8, using a simple OLS regression of taxes on GDP. For robustness, we also used b_1 = 1, which is the estimate for Estonia in Koster and Priestmeier (2017). As reported by Restrepo (2020), the identified structural shocks are not very sensitive to the value of b_1. Also following Restrepo (2020), we constructed cyclically-adjusted taxes $r_t^T = e_t^T - b_1 e_t^y$ to be used as instrument for e_t^T in the estimation of equation (4), from which we obtain estimates of a_1 and a_2.

Annex II. A Structural Vector Error Correction Model for Assessing the Impact of Fiscal Shocks on Potential GDP

1. The SVECM model contains 10 endogenous variables distributed in three blocks of trend and cycle (i.e., deviations from trends) for real GDP, fiscal revenues, and total spending. In each block, there are *iid* innovations that affect the cyclical component (i.e., temporary shocks) and the trend components (i.e., permanent shocks).

1. $\hat{y}_t = \rho^y \hat{y}_{t-1} + \lambda^y \Omega_t^y - \lambda^T \varepsilon_{t-1}^T + \lambda^G \varepsilon_{t-1}^G - \beta^T \Delta\Phi_{t-1}^T + \beta^G \Delta\Phi_{t-1}^G + \varepsilon_t^y$ — output gap
2. $\Delta\bar{y}_t = \rho^{\bar{y}} \Delta\bar{y}_{t-1} + (1-\rho^{\bar{y}})\Delta\bar{y} - \alpha^T \Phi_{t-1}^T + \alpha^G \Delta\Phi_{t-1}^G + \Delta\Phi_t^{\bar{y}}$ — potential GDP growth
3. $\Delta y_t = \Delta\bar{y}_t + \Delta\hat{y}_t.$ — actual GDP growth
4. $\Omega_t^y = \sum_{h=1}^{H} \mu_h^y HFI_t(h)$ — *H* exogenous HFIs

5. $\hat{\tau}_t = \epsilon^T \hat{y}_t + \varepsilon_t^T$ — cyclical revenues
6. $\Delta\bar{\tau}_t = \rho^T \Delta\bar{\tau}_{t-1} + \epsilon^T \Delta\bar{y}_t + (1-\rho^T-\epsilon^T)\Delta\bar{y} + \Delta\Phi_t^T$ — growth of cyclically adjusted revenues
7. $\Delta\tau_t = \Delta\bar{\tau}_t + \Delta\hat{\tau}_t$ — growth of revenues

8. $\hat{g}_t = \epsilon^G \hat{y}_t + \varepsilon_t^G$ — cyclical spending
9. $\Delta\bar{g}_t = \rho^G \Delta\bar{g}_{t-1} + \epsilon^{\bar{G}} \Delta\bar{y}_t + \left(1-\rho^G-\epsilon^{\bar{G}}\right)\Delta\bar{y} + \Delta\Phi_t^G$ — growth of cyclically adjusted spending
10. $\Delta g_t = \Delta\bar{g}_t + \Delta\hat{g}_t,$ — growth of spending

where the 10 endogenous variables are $\hat{y}_t$, $\Delta\bar{y}_t$, Δy_t, Ω_t^y, $\hat{\tau}_t$, $\Delta\bar{\tau}_t$, $\Delta\tau_t$, $\hat{g}_t$, $\Delta\bar{g}_t$, Δg_t; variables y_t, τ_t, and g_t represent (the natural log of CPI-deflated, per capita) real GDP, fiscal revenues, and total public spending, respectively; a hat ($\hat{x}$) and a bar ($\bar{x}_t$) indicate the cyclical and trend components of each variable x_t, respectively, while Δx_t represents its (log-) change (i.e., the growth rate); innovations ε_t^y, ε_t^T, and ε_t^G are the 3 iid temporary shocks to cyclical GDP, revenues, and spending, respectively; and $\Delta\Phi_t^{\bar{y}}$, $\Delta\Phi_t^T$, and $\Delta\Phi_t^G$ are iid shocks to their trend *growth* (i.e., permanent shocks to the trend *levels*).

2. The growth rates of the trends in GDP, revenues, and spending are modelled to converge to the historical average GDP growth, $\Delta\bar{y}$. That assumption ensures that ratios of both revenues and spending to GDP converge to a constant. Both cyclical components of revenues and spending embed automatic stabilizers (i.e., elasticities to the business cycle; see equations 5 and 8), while their trend growth are related to potential GDP growth (via equations 6 and 9, respectively). The basic identification strategy is to assume that temporary shocks do not affect trends (i.e., no temporary fiscal shocks affecting equations 2, 6, and 9), but permanent shocks affect both cycles and trends (see equations 1-2, 5-6, and 8-9). To help better identify the business cycle, a composite variable Ω_t^y, which includes detrended series of capacity utilization, unemployment rate, goods imports, industrial production, retail sales, and an economic confidence indicator, is included in the output gap equation.

3. The estimation results are displayed in Table 1.

Annex II. Table 1: Estonia: SVECM Estimation Results

Parameter	Prior Distribution	Prior Moments mean	std	Posterior mode	Description, equation
ρ^{y}	Beta	0.8	0.2	0.155	AR coeff., $\hat{y}_t$
λ^{y}	Gamma	1	0.5	0.114	Macro HFIs, $\hat{y}_t$
β^{T}	Normal	0.05	1	0.045	Perm tax shock, $\hat{y}_t$
β^{G}	Normal	-0.05	1	-0.933	Perm spending shock, $\hat{y}_t$
μ_1^{y}	Gamma	1	0.5	0.450	Capacity Utilization,
μ_2^{y}	Gamma	1	0.5	1.214	Unemployment rate, Ω_t^{y} (-)
μ_3^{y}	Gamma	1	0.5	0.454	Imports of Goods, Ω_t^{y}
μ_4^{y}	Gamma	1	0.5	1.182	Industrial Production, Ω_t^{y}
μ_5^{y}	Gamma	1	0.5	0.652	Retail Sales, Ω_t^{y}
μ_6^{y}	Gamma	1	0.5	0.393	Car Sales, Ω_t^{y}
μ_7^{y}	Gamma	1	0.5	0.269	Economic Confidence Indicator Sales, Ω_t^{y}
$\rho^{\bar{y}}$	Beta	0.8	0.2	0.949	AR coeff., $\Delta\bar{y}_t$
α^{T}	Normal	0.05	0.2	0.053	LT tax distortions, $\Delta\bar{y}_t$ (-)
α^{G}	Normal	0	0.2	-0.048	LT spending distortions/externalities, $\Delta\bar{y}_t$ (?)
ρ^{τ}	Beta	0.8	0.2	0.493	AR coeff., $\Delta\bar{\tau}_t$
ϵ^{T}	Gamma	1.2	0.5	0.491	Income elasticity, $\Delta\bar{\tau}_t$
ρ^{G}	Beta	0.8	0.2	0.469	AR coeff., $\Delta\bar{g}_t$
$\epsilon^{\bar{G}}$	Normal	0	1	0.733	Income elasticity, $\Delta\bar{g}_t$
ϵ^{G}	Normal	0	1	-0.386	Income elasticity, $\hat{g}_t$

Source: IMF staff estimates.

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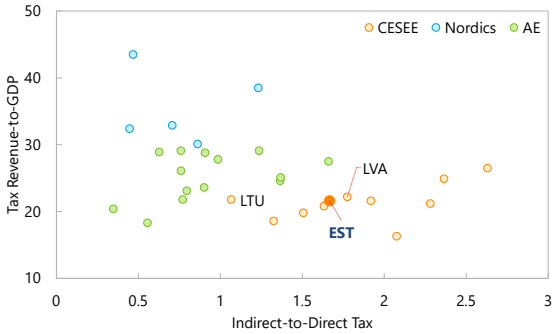
OPTIONS TO STRENGHTEN THE TAX SYSTEM IN ESTONIA[1]

Estonia's tax mix has been traditionally reliant on consumption taxes—especially VAT—whereas income taxes are a relatively small share of revenue. Recent and expected changes will further shift the tax burden in this direction. Consumption taxes are less distortive than income taxes, but higher spending needs may require a broader revenue base, reaching untapped potential. This Selected Issues Paper discusses alternative broad-based, growth-friendly options on how to strengthen income, VAT, as well as property taxes. Options to strengthen revenues include (i) addressing the personal income tax revenue (PIT) shortfall from the introduction of a uniform allowance by considering revenue neutral options, i.e., calibrate the basic allowance, the tax rates, and/or the tax brackets subject to the intended degree of progressivity; (ii) improving the capacity of the tax administration to analyze income statements and exploring alternative corporate income tax (CIT) regimes that would preserve the competitiveness of the current system while reaching a broader tax base; (iii) streamlining remaining VAT exemptions to broaden the tax base; and (iv) limiting exemptions on residential land and taking steps to introduce a modern tax on immovable property by developing a fiscal cadaster to ensure fair taxation based on value and use of property.

A. Introduction

1. The tax system in Estonia was revamped in the early 90s on the principles of simplicity, compliance, and competitiveness. The Baltics' tax systems were regarded as highly innovative and came into being at a time when many countries worldwide were moving away from high marginal rates toward lower, more uniform, and simpler tax structures. As one of the most digital governments in the world, Estonia has been successful at quickly adopting the modern VAT and a tax mix that emphasizes the neutrality of taxation. Estonia's tax system prioritizes competitiveness, having maintained the top position in the OECD for over a decade (Tax Foundation ICTI). Key features include a single-rate corporate income tax (CIT) on distributed profits, a flat personal income tax (PIT) which excludes personal dividends, limited wealth taxation with a property tax based solely on land value, and a territorial tax system exempting foreign profits. The Estonian tax system has remained simple, but over time it has started to show its limits in terms of revenue mobilization, given its reliance on a relatively narrow base. The indirect consumption-based tax share has increased, supported by fully automated filing that

Indirect-to-Direct Tax and Tax Revenue-to-GDP Ratios, 2023
(Percent of GDP)



Source: Eurostat.

[1] Prepared by Irina Bunda (EUR) and Tibor Hanappi (FAD), with assistance from Sadhna Naik (EUR).

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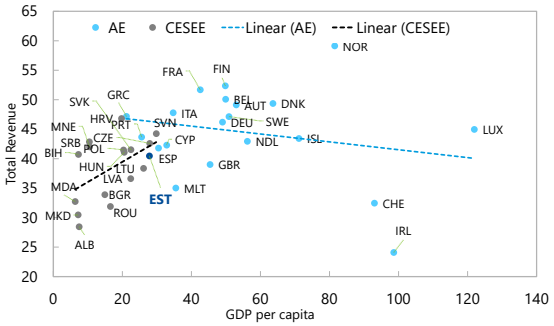
facilitates compliance. As a result, Estonia now has one of the highest indirect tax shares among advanced economies and the question is how much indirect taxes can achieve going forward.

2. Estonia is facing elevated near-term defense spending needs and, as other European countries, long-term pressures related to population aging and climate mitigation. Escalating defense spending needs in recent years have exacerbated imbalances and raised pressures to adjust. At 3.5 percent, Estonia features already one of the highest defense spending-to-GDP ratios in the EU, but the authorities recently announced a revised 5.4 percent target. Moreover, social outlays have gone up as a share of GDP relative to pre-pandemic, while pressure from an aging population are set to intensify over time. In a risk scenario (2024 Ageing Report), healthcare and long-term care could be 6 ppts higher in the long run than projected at current policies, among the highest increases in the EU. Tensions between retaining a competitive tax environment achieved at the expense of lower tax revenues than peers and moving towards broader provision of public services and a stronger social safety net have already resulted in policy uncertainty and a deterioration of Estonia's fiscal position. Recent and upcoming tax hikes try to address these imbalances, but excessive reliance on higher tax rates may ultimately narrow the tax base and undermine the objective of mobilizing higher revenue (Box 1).

3. Along with spending rationalization, Estonia should explore options to mobilize revenue. For the same level of development (as measured by GDP per capita), Estonia is about 6 ppts of GDP below European AEs and 1.7 percent below CESEE in terms of revenue, mainly reflecting different policy choices. A simplified but unbalanced tax system poses challenges. Faced with unexpected spending shocks, hiking rates can be a blunt instrument and pressures to loosen the sudden burden can build up. Financing additional spending needs with higher revenues would be better accepted (equitable) and less distortionary (less inefficient) if they come from an increased capacity of the tax system to redistribute. A comprehensive review of the tax system aimed at making the system more stable, diversified, and robust could be considered. The following sections offer options to durably strengthen tax revenues and build buffers to deal with current and future spending pressures.

Total Revenue, 2023

(X Axis: Thous. Euros; Y axis: percent of GDP)



Source: Eurostat and IMF staff calculations.

Box 1. Main Changes to Tax System Introduced in 2024-26

Income tax

- The income tax rate has increased from 20% to 22% in January 2025. For corporations, this is payable on distributed profits. The lower 14% rate on regular profit distribution was abolished.
- A quarterly advance CIT rate on overall profits payable by credit institutions and Estonian branches of foreign credit institutions has increased from 14% to 18%.
- The plan to replace the current phased-out income tax allowance with a flat €8,400 annual income tax allowance was postponed until 2026.
- Entrepreneur account: Tax rate cut from 40% to 20%.

Social contributions: Minimum obligation has increased from €239.25 to €270.60

Box 1. Main Changes to Tax System Introduced in 2024-26 (Concluded)

Value-added tax

- The VAT standard rate was increased from 20% to 22% in January 2024.
- Accommodation services are subject to a reduced 13% VAT, up from 9% for hotels, Airbnbs, and similar services previously.
- The lowest 5% rate was abolished. Hence, the VAT system has only three rates: 22%, 13%, and 9%.
- Special scheme for small businesses: €40,000/calendar year VAT registration threshold to include supply of real estate transactions and financial/insurance services.
- The definition of new buildings in the VAT Act was changed from the first day of use to "less than two-year-old." If a building is sold by then, VAT must be added to the price (sales of buildings older than two years remain VAT- and income-tax exempt).

Motor vehicle tax

- New tax applied to all motor vehicles registered in January 2025; first payment deadline in June.
- The tax consists of (i) a registration fee and (ii) an annual motor vehicle tax determined by the base amount (min. €50), a CO_2 component, and the total weight of the vehicle. Average tax amount /passenger vehicle: €157.

Excise taxes

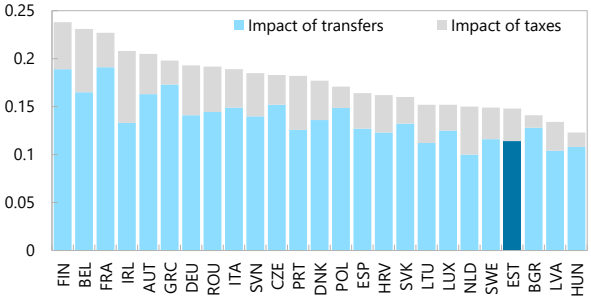
- Alcohol, tobacco: increase by 5% (Jan 2025), 5% (July 2025), and 10% (Jan 2026); Gasoline: increase by 5% (July 2025), and 5%/year (May 2026-28); Diesel: increase up to €493/kl May 2025-27.

National security tax

- The standard VAT rate will be further increased from 22% to 24%, starting from July 1, 2025.
- An additional 2% tax will be levied on personal incomes (including for the entrepreneur account) from January 1, 2026.
- An additional 2% tax will be levied on distributed profits from January 1, 2026.

4. A lean and efficiency-driven tax system has also come at the expense of lower revenue. Typically, as an economy advances, direct taxes (taxes on income and wealth) start to play a more significant role than indirect taxes (taxes on production and imports), as equity considerations progressively prevail over other guiding principles of tax policy such as efficiency and simplicity. More equitable tax reforms are more easily politically acceptable and reduce the need for compensation on the spending side through transfers. In advanced economies, the tax-benefit systems significantly reduce income inequality, as indicated by the Gini coefficient difference between market and disposable incomes—i.e., incomes before and after taxes. In Estonia, post-tax and transfers income inequality is reduced by almost one third, less than the euro area average of 38 percent. This is mainly achieved via transfers or social spending, as its tax system mainly relies on flat rates and offers only limited redistributive capacity. To note that in AEs income taxation can redistribute income more efficiently than untargeted measures on the spending side, while balancing equity and efficiency considerations.

EU: Redistributive Impact of Taxes and Transfers, 2022
(Measured as change between gini coefficients 1/)



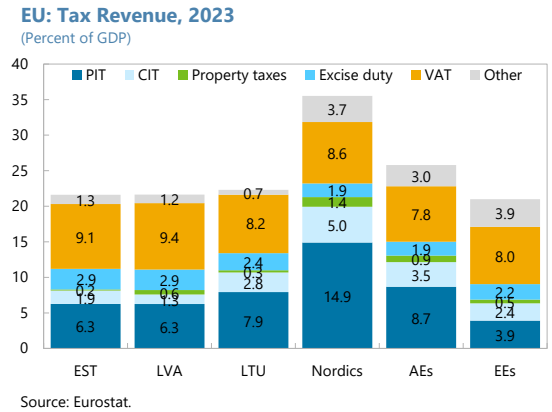
Sources: OECD Income Distribution Database; and IMF staff calculations.
Note: Data for Denmark and Germany is for 2019 and 2020 respectively.
1/ Total impact = gini (market income) - gini (disposable income); impact of transfers = gini (market income) - gini (gross income)

B. Tax Mix, Effort and Potential in Estonia

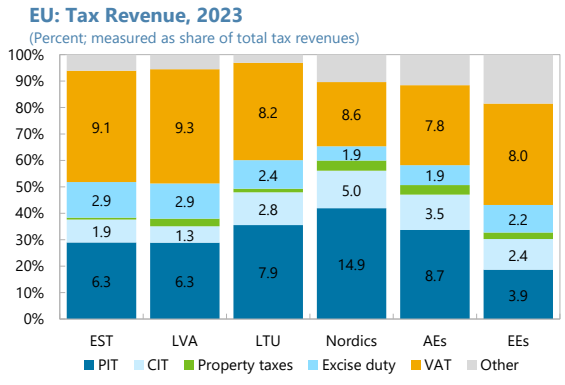
5. The overall tax mix is perhaps the most fundamental issue in the design of tax systems. In the last two decades, globalization has led to a general shift towards less mobile tax bases as trade and capital account liberalization has heightened tax competition between countries. Thus, statutory and average effective CIT rates were lowered in many countries, often offset by higher taxes on labor and consumption. Moreover, a trend toward reaping efficiency gains from the reform of tax systems has led to relatively lighter income taxation and a move towards more indirect forms of taxation. Tax progressivity—the degree to which the average tax rate rises with income—has been on a declining path (IMF, 2017) causing a shift of the tax burden toward the middle of the income distribution (Keen, Kim, and Varsano, 2008). In some CESEE countries (the Western Balkans), limited income tax progressivity and low rates have created twin equity and efficiency challenges and a high degree of informality. In others, shifts from social security contributions to VAT ('fiscal devaluation') were pursued to improve competitiveness; however, over time, higher VAT rates also had some adverse consequences (Jousten at al., 2022).

6. Estonia's tax structures and revenue levels resemble more those of European emerging market economies (EMEs) than European AEs and the Nordics (Text Figure 1). Relative to European AEs and Nordic countries, Estonia collects less tax revenue, 22 percent of GDP as of 2023; and only slightly more than European EMEs average. Indirect taxes, mainly VAT, are 42 percent of tax revenue. Direct taxes, mostly from PIT, account for 29 percent of tax revenues. In contrast, European AEs and Nordic countries collect higher tax revenue overall, reflecting different tax structures and social preferences. In the two groups, direct taxes, driven by income taxes, account for half of tax revenue for the European AEs and 60 percent for the Nordic countries, respectively. Revenue from other taxes (on wealth, but also, taxes not classified elsewhere) are three times lower in Estonia than in comparator countries, reflecting low diversified of revenue.

Text Figure 1. Tax Revenue Composition



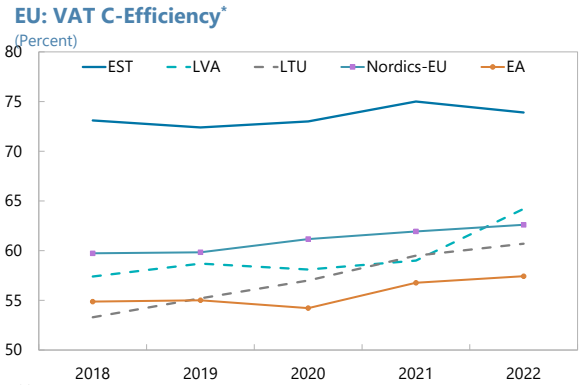
Source: Eurostat.



Source: Government Finance Statistics, IMF; and Eurostat.

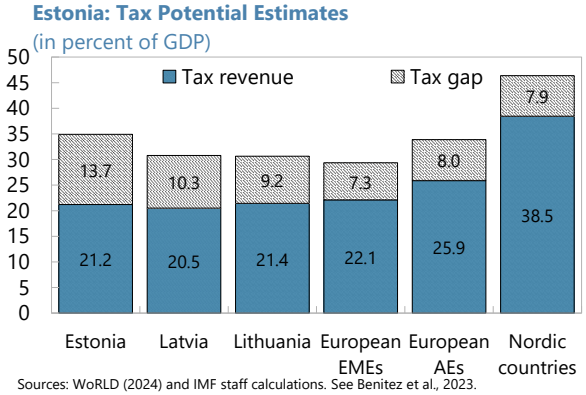
7. While consumption tax revenue—VAT and excises—is relatively high in Estonia/Baltic countries compared to European AEs, income taxes raise relatively less, suggesting narrow bases and untapped revenue potential. Estonia collects less CIT revenue (1.9 percent of GDP) than

all other country groups—5 percent of GDP for the Nordics, and 3.5 and 2.4 percent of GDP for European AEs and EMEs as of 2023, respectively. Estonia and Latvia are the only OECD/EU countries operating Distributed Profit Taxes (DPTs), which have narrower tax bases compared to a standard CIT (-reinvested profits being basically tax exempt), thus collecting less, notwithstanding the relatively high 22 percent statutory tax rate. Estonia outperforms European EMEs in PIT revenue collection but lags the Nordic and AEs countries. Turning to VAT, Estonia's efficiency per unit of final consumption (74 percent in 2022) is the highest in EU/OECD, implying that only 26 percent of theoretical revenue is lost via policy decision and/or noncompliance. At almost 3 percent of GDP, revenue from excises in Estonia is higher than comparator countries. Finally, property tax revenue in Estonia is less than 0.2 percent of GDP, as only land is taxed. This contrasts with an average 1.0-1.4 percent for the Nordic and European AEs, reflecting widespread land tax exemptions and the absence of a modern recurrent tax on immovable property in Estonia.



*/VAT C-efficiency is defined as the ratio of actual VAT revenue to theoretical VAT revenue, i.e., the product of VAT statutory rate to final consumption, another way to express the VAT gap.
Source: European Commission.

8. Estonia's tax potential is estimated at around 35 percent of GDP using stochastic frontier analysis (Benitez et al., 2023). The approach estimates the maximum possible tax revenue that countries could collect (or tax potential), given their economic structure and other prevailing conditions and interprets the shortfall in actual revenue (or tax gap) as an inefficiency. The gap evolves over time and can be related to policies (i.e., reduced rates and exemptions) and/or compliance. It should be noted that the estimated tax potential does not necessarily represent the ideal level of tax revenue. Rather, it represents the maximum revenue achievable under the current structure. Societies have different preferences regarding the role and size of government, which affect the level of resources allocated to public services. These preferences, in turn, affect policymaking decisions. The optimal level of tax collection may thus be lower or higher than the theoretical tax potential.

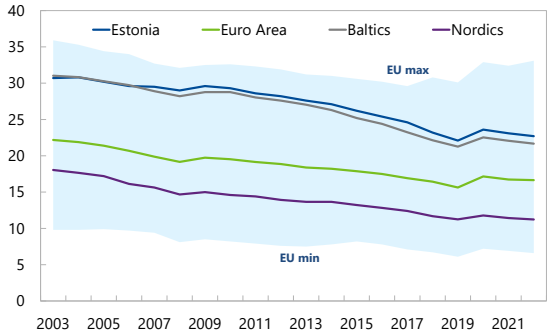


Sources: WoRLD (2024) and IMF staff calculations. See Benitez et al., 2023.
Note: Nordic countries include Denmark, Finland, Norway, and Swedden. The values for Denmark and Sweden refer to 2021. The latest year for the other countries is 2022.

9. Estonia exhibits a higher tax potential than European AEs as well as a wider tax gap, reflecting a lower tax effort (i.e., ratio of actual tax collection to potential tax revenue). The tax gap is estimated at about 14 percent of GDP, that is, actual revenues could be up to 14 percent of GDP higher, at the current level of development and structural characteristics. The tax gap is significantly larger than in peer countries: about 8 percent of GDP in European AEs and Nordic countries, and 7.3 percent in European EMEs. This divergence is driven not only by lower tax-to-GDP levels, but also by

structural factors related to untaxed sectors and activities. Estonia and the Baltics not only have a relatively higher share of informality than European AEs (especially affecting the collection of income taxes[2]), but also, some activities/sectors are untaxed (e.g., real estate, construction, corporate retained profits, wealth, social services, gambling) sometimes by design (e.g., with generous minimum thresholds) and could be brought into the tax net. Structural reforms in Estonia could therefore focus on strengthening the core of the tax system to mobilize higher revenues, including by enhancing the ability of the revenue administration to deal with the complexities arising from the various transactions generating income, as well as from broadening the tax base.

EU: Size of Shadow Economy, 2003-2022
(Percent of GDP)



Sources: European Parliament; and IMF staff calculations.

C. Benchmarking the Estonian Tax System against Best Practices

10. The role of the tax system is to generate the necessary revenues as efficiently, equitably, and manageably as possible, within the government's inter-temporal budget constraint. Taxation should minimize disincentives to work, invest, and save; equity considerations should be contemplated; and tax laws and regulations should be simple and easy to enforce. Beyond these first principles, there are many trade-offs to be considered in practice. Societal preferences and tax administration capacity are also decisive in the design of the tax system.

11. Estonia has the highest ratios of indirect to direct taxes among AEs. The ratio will increase further as VAT rate hikes are phased in and the PIT uniform allowance is launched. Empirical evidence has found that income taxes are generally more harmful for growth than consumption and property taxes (Johansson et al., 2008, Gemmell et al., 2014, IMF, 2017). VAT, unlike income taxes, does not distort consumer choice, as savings remain untaxed (thus encouraging saving and re-investing revenue) making it a more economically efficient tax than income taxes, although it is often considered a regressive tax. However, potential distortions depend on the tax design. For OECD countries, for instance, broadening the VAT base through fewer reduced rates and exemptions was found to be more conducive to higher long-run growth than higher rates. Raising rates coupled with a proliferation of reduced rates and exemptions create inefficiencies that are harmful to growth (Acosta-Ormaechea and Morozum, 2019). Exemptions of intermediate goods are especially inefficient because they disrupt VAT input tax crediting by businesses, causing taxes to be embedded in the final price. Opposite results are found in terms of inequality, i.e. income taxes tend

[2] Challenges for the Estonia revenue administration includes the construction and hospitality sectors, partially unofficial salaries (for PIT), hidden profit allocations: tax avoidance through structuring transactions, transfer pricing, taxation of profits attributed to a permanent establishment (PEs) (for CIT). Estonia's DPT system complicates the treatment of corporate restructuring, mergers and divisions, tax exemptions rights as well as the tax compliance assessments, with potential tax revenue and tax gap difficult to estimate.

to reduce inequality more than consumption taxes (IMF, 2017), as progressive income tax systems are predominant, especially in advanced economies.

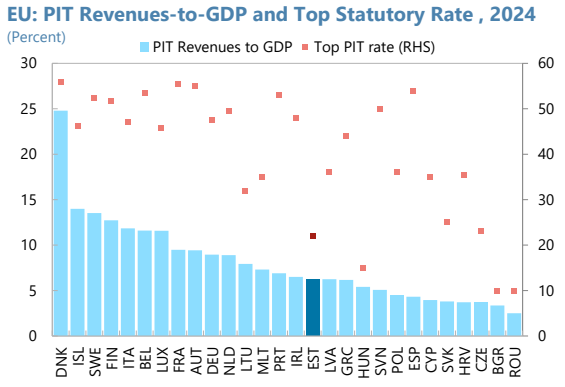
Box 2. Income Taxation: Efficiency-Equity Trade-Off

Tax **efficiency** refers to the impact of taxation on wellbeing, assuming economies are populated by identical representative agents. By transferring resources from the private to the public sector, taxes impose a loss on society that is generally higher than the generated revenue. The labor-tax wedge reflects the gap between the cost to an employer of hiring someone and the benefit that the employee receives from that employment. The deadweight loss is an indicator of this tax distortion. An efficient tax design aims to minimize the total deadweight loss of taxes, hence it is efficient (i) to impose taxes at a higher rate if demand or supply is inelastic; and (ii) to keep tax bases broad and rates low (since the loss increases more than proportionately with the tax rate)—justifying policy recommendations such as base broadening and rate reductions (Abdel-Kader and de Mooij, 2020).

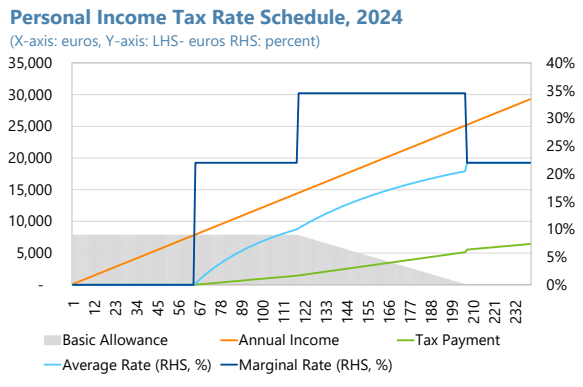
Tax **equity**, or the fair distribution of the tax burden, requires a theory that departs from the representative agent assumption to allow for heterogeneity. The impact of a tax system on income distribution depends on the progressivity of the tax-benefit system, i.e., how rapidly the share of income paid as tax increases with the level of income. Redistribution is desirable because the declining marginal utility of income implies that transferring one euro from a rich to a poor person increases the joint utilities, and because of social aversion to inequality. A progressive system is warranted in the presence of imperfections in labor, capital, and insurance markets, thereby changing behaviors (e.g., reduce trade unions' wage demands, encourage investment in knowledge, etc.), hence improving efficiency from a societal perspective. Together with addressing externalities, redistribution is one of the rationales of government policy gaining prominence for policymaking in the recent decades.

Optimal tax theory (Mirrlees, 1971, Diamond, 1998, Saez, 2001) emphasizes the **equity-efficiency trade-off in income taxation**. Ideally, progressive tax-benefit system should reflect the exogenous innate ability of people. By setting a tax based on income, however, the system discourages effort, thus creating a distortion (welfare loss). The tax-benefit system can strike an optimal balance between equity and efficiency, with the marginal income tax rate optimally featuring a U-shaped form. The high marginal tax rate at the bottom accounts for the transfers being given to the lowest income (on the spending side) that are phased out for middle incomes to minimize costs. The low marginal tax rate for the large middle-income group avoids aggregate distortions in labor effort. A progressive tax rate structure from the middle to the top of the distribution increases progressivity and has revenue raising potential (Diamond and Saez, 2011). Most systems of means-tested benefits and PIT schedules nowadays follow these principles.

Text Figure 2. Personal Income Tax (PIT) Main Features



Sources: Tax Foundation, GFSR, Eurostat.



Sources: Statistics Estonia; Ministry of Finance; and IMF staff calculations.

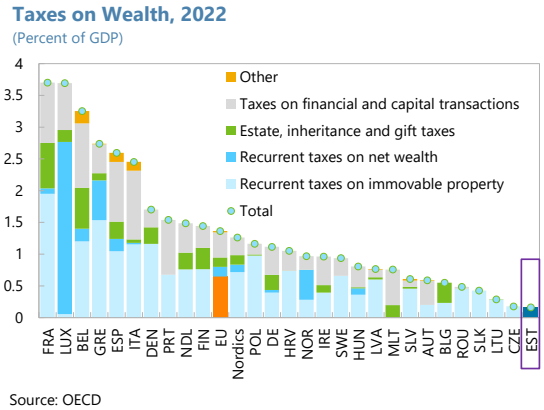
12. The design of income taxes in Estonia tries to strike a balance between efficiency, simplicity, and equity (Text Figure 2). However, the combination of a generous threshold for the basic allowance (to stimulate labor force participation and provide income support to low-income groups), an overall lower statutory rate than peer countries, and a shift of the tax burden toward the middle of the income distribution leads to lower revenues. A steep phasing out of benefits as income increases implies high marginal tax rates and creates adverse labor supply effects, thus affecting efficiency. At the same time, marginal rates for top income earners are significantly lower, thus reducing the redistributive capacity of the PIT system.

13. Estonia's consumption tax is efficiently collected and aligned with best practices. Estonia's high-quality e-services coupled with simple and transparent tax regulations speed up VAT registration and refund processing. Companies can register online through the Estonian Tax and Customs Board and use electronic filing and payment options. As of 2023, 99 percent of declarations were submitted digitally, reducing physical contact in traditional offices. Automated analytics facilitate compliance risk management. The system is relatively broad-based with only few reduced rates. Estonia has abolished the super-reduced rate of 5 percent, now having only two reduced rates, in line with other EU countries. It still features a higher than EU average registration threshold to minimize compliance costs for small traders (with turnover in calendar year less than €40,000, i.e., for 60 percent of total Estonian businesses) by lowering the tax burden (and final prices) in rural areas where they would typically operate. Exemptions are more widespread, raising inefficiencies (by distorting firms' decisions and competition) and hindering a more equitable outcome.

14. Although direct taxes on income and indirect taxes on consumption may seem theoretically equivalent, income taxes are preferable from an administrative perspective. In a theoretical setting, and based on certain standard assumptions, a uniform tax on consumption is broadly equivalent to a uniform tax on labor income and economic rents. This result holds if both taxes are designed to have the same impact on lifetime budget constraints while also keeping the relative price of consumption and saving unchanged, which is generally the case for consumption taxes that do not tax normal returns to capital. However, a comprehensive income tax would affect the relative price of consumption and saving because capital income, including normal returns, is part of the tax base. Therefore, the equivalence only holds if the income tax base captures only labor income and economic rents. However, individual incomes are easier to observe, compared to individual consumption, which makes income taxes preferrable from an administrative perspective. In addition, consumption taxes have little benefit when it comes to redistribution (e.g., via multiple rates and exemptions), since these measures create inefficiencies and will always be less effective in terms of redistribution compared to a non-linear progressive income tax (Atkinson and Stiglitz, 1976, Abdel-Kader and de Mooij, 2020).

15. Capital income is relatively less taxed in Estonia. Estonia has a higher Gini coefficient for wealth than income, suggesting that wealth is more unevenly distributed than income. Various equity and efficiency-based arguments can be invoked to justify specific taxes aimed at reducing wealth inequality. However, three conceptually different approaches need to be distinguished: (i) taxing returns with capital gains taxes, (ii) taxing wealth stocks and (iii) taxing wealth transfers with

inheritance and estate taxes. Amongst these three options, capital income taxes as well as inheritance and estate taxes are generally less distortive and more equitable than wealth taxes (Hebous et al., 2024). In Estonia, capital gains from the sale or exchange of assets are generally taxed on a net basis as part of ordinary income, with capital losses being deductible only against capital gains. Certain qualifying capital gains are exempt from income tax, such as the gain from the sale of a personal residence. Also, capital gains derived by non-residents on the sale of shares in resident companies are generally not taxable. Finally, the DPT system leads to systematically higher capitalization and a high level of non-distributed profits.



Source: OECD

16. Real property taxes are lacking in Estonia. Given that they are paid mainly by residents, and property values likely reflect the value of local public services, property taxes resemble a benefit tax which can support the accountability of local authorities. However, Estonia lacks a property tax based on capital improved value. Steps towards taxing real property more significantly were taken in 2022 with the update of land values based on an automated mass appraisal.

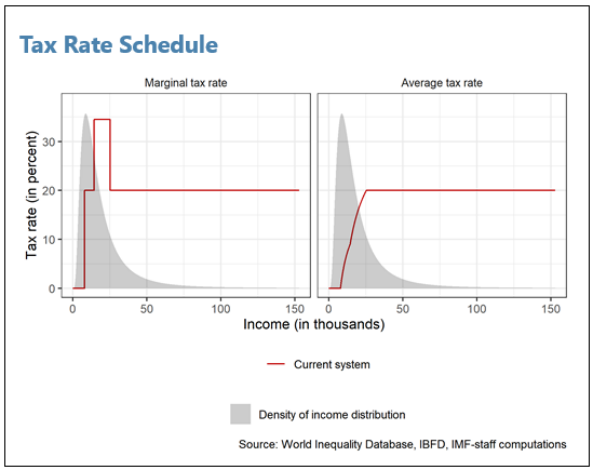
D. Labor Income Taxation

17. Estonia has adopted a relatively simple PIT structure combining one statutory rate with a basic allowance phased out at higher income levels. Estonia applies a single statutory tax rate of 22 percent on income above the basic allowance (or 'basic tax exemption') valued annually at €7,848 in 2024. The allowance is phased out linearly over the annual income range from €14,400 to €25,200. However, the marginal rate structure is more complex due to the phase out of the basic allowance and interactions with the statutory rate. The current phasing-out rule for the basic allowance implies that individuals face higher marginal rates in the middle-income segment (i.e., a 'hump'). Increasing labor supply, i.e., working more hours per year, implies not only higher (pre-tax) income but also a loss of a share of the basic allowance. The table below indicates the annual income range and the phase-out rate, i.e., how quickly the basic allowance is withdrawn. A phase-out rate of around 73 percent means that for an additional euro earned, 73 cents of the previously available allowance will be withdrawn. Hence the marginal rate increases in this income range by 72%*22%=15.8%. Under the 'Status Quo' the tax structure therefore involves four tax brackets (Text Table 1).

Estonia	
Basic Allowance	7,848
Phase-out Range #1	14,400 to 25,200
Phase-out Rate #1	72.67%

18. The current PIT system, featuring an inverted U-shape of the marginal rate, has several drawbacks, leading to relatively lower revenues than in peer countries and creating disincentives to work for a relatively large share of the population. Using the PITA tool (IMF,

2024)[3], we show that marginal tax rates reach relatively high levels at average annual income levels, about 35 percent, before declining to 22 percent for higher income levels. Fulltime workers earning a median wage are more likely than others to face higher marginal tax rates and thus are adversely impacted. The flat and lower marginal rate for top income earners hinders overall revenue mobilization. Redistributive and progressive capacity[4] are also reduced. At 6.9 percent of GDP, PIT revenue is considerably lower than the European AEs average and less than half of Nordic countries. The Gini coefficient improves only by 3.2 ppts relative to pre-tax income. This is mainly due to a generous basic allowance (covering one third of incomes) and a shift in the tax burden for middle incomes. The combined effect of these two features results in disincentives to work and low marginal rates at the top –by EU standards, but also relative to middle incomes–which weigh adversely on revenue mobilization.



Text Table 1. Estonia: Summary of Personal Income Tax Reform Scenarios
(Euros, percent)

	Status Quo		Reform		Revenue Neutral (Lower Allowance)		Revenue Neutral (Higher Rate)		Revenue Neutral (Two Rates)		Two-Rates		More Progressive	
	TA (€)	MR (%)	TA (€)	MR (%)	TA (€)	MR (%)	TA (€)	MR (%)	TA (€)	MR (%)	TA (€)	MR (%)	TA (€)	MR (%)
Bracket #1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bracket #2	7,848	22	8,400	24	6,750	24	8,400	26	7,848	15	7,848	22	6,000	10
Bracket #3	14,400	34.5	-	-	-	-	-	-	14,400	29	14,400	30	7,848	15
Bracket #4	25,200	22	-	-	-	-	-	-	-	-	-	-	14,400	25
Bracket #5	-	-	-	-	-	-	-	-	-	-	-	-	25,200	40

Source: IMF staff calculations.
Note: TA refers to taxable amount and MR refers to marginal rate.

19. The newly announced system will remove the hump in the marginal rate but may result in even lower tax revenue in the absence of significant design changes. The announced reform for 2026 tackles the 'hump' and improves progressivity to some extent but may further lower revenue. It introduces a universal basic exemption of €700/month or €8,400/year, while the flat rate increases to 24 percent ('Reform' in Text Table 1). A lower allowance was considered but was finally rejected for political reasons. Despite 2 ppts increase in the statutory rate, the new system is estimated to collect 0.5 percent of GDP less, while the share of people paying the tax is reduced due to the higher basic allowance. Several scenarios are presented below. We compute the parameters

[3] PITA combines information on countries' income distributions from World Inequality Database (WID) with current PIT rate structures to facilitate the analysis of revenue and distributional impacts of PIT reforms.

[4] The progressive capacity is measured as the difference in the Gini coefficients after- and pre-tax income; the overall average tax rate is measured as total PIT collections to total tax base (Kakwani, 1977; Beer and Velutini, 2024).

that would keep the new system aligned with the status quo in terms of revenues by either (i) increasing the single statutory rate from 22 to 26 percent, or (ii) lowering the universal allowance from €8,400 to €6,750 to increase the tax base. The redistributive capacity is higher in (i) and lower in (ii) relative to the status quo. This suggests that higher rates for above median incomes would not only raise revenues but also improve upon PIT progressivity and efficiency. Alternatively, a two-rate scenario—with rates set at 22 and 30 percent—would yield 0.9 ppts of GDP additional revenue relative to the status quo and 1.4 percent relative to the announced reform by slightly shifting the burden of taxation to the right of the wage income distribution, from the middle (6-8th deciles) to the top 2 deciles. The redistributive capacity would improve, while the average rate increases by 2 ppts relative to the status quo, and by 3.5 ppts relative to the announced reform. Such type of design would improve efficiency and equity while also mobilizing additional tax revenue. If combined with a lower standard CIT rate on overall profits (e.g., 15 percent), a two-rate scenario (15 percent in bracket #2, and 29 percent in bracket #3) should be considered for the PIT to achieve revenue neutrality while preventing arbitrage. Such changes would imply lower rates for the bottom 90 percent of the taxpayers. The last scenario presents a more progressive PIT structure with four rates (10-15-25-40) and a lower universal allowance of €6,000. It would bring in 1.4 percent of GDP in extra revenues relative to the status quo and almost 2 ppts relative to the announced reform while reaching 85 percent of wage earners, with an average rate of 21.6 percent (Text Table 2).

Text Table 2. Estonia: Comparison of Personal Income Tax Simulations, 2025
(Percent)

Scenario	PIT/GDP	ΔPIT/GDP	Gini coeff.	Average Rate	Redistributive Capacity	Progressive Capacity	Share Paying Tax
Before tax	0	0	50.8	0	0	0	0
Status Quo	6.9	0.0	47.6	17.9	3.2	14.8	79.2
Reform	6.4	-0.5	47.4	16.6	3.4	17.1	77.2
Revenue Neutral (Lower Allowance)	6.9	0.0	47.9	17.9	2.9	13.5	82.8
Revenue Neutral (Higher Rate)	6.9	0.0	47.1	18.0	3.7	17.1	77.2
Revenue Neutral (Two Rates)	6.9	0.0	46.2	18.0	4.6	20.9	79.2
Two-Rates	7.8	0.9	45.4	20.2	5.4	21.4	79.2
More Progressive	8.3	1.4	44.5	21.6	6.3	22.9	85.0

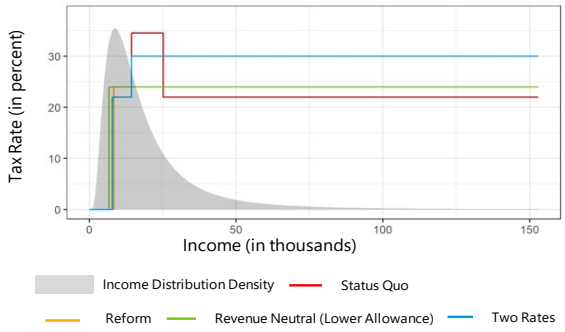
Source: IMF staff calculations.

20. Considering a slightly more progressive tax structure (e.g., two rates) would bring significant advantages in terms of work incentives and revenue mobilization (Text Figure 3). Adjusting the marginal rate could improve efficiency and equity while also mobilizing additional revenue. Efficiency gains might be achieved as a reduction of marginal tax rates for median wage workers could incentivize positive labor supply responses. While tax reductions are generally expected to have such effects, tax elasticities of labor supply vary across workers and households, and other benefits such as availability of childcare have also been found to be important drivers of labor supply decisions. Decomposing redistributive capacities shows that the two scenarios ('Two Rates' and 'More Progressive') achieve higher redistributive capacity with higher average tax rates.

Figure 1. Discussion of Personal Income Tax Reform Scenarios

Various PIT design scenarios could correct the marginal tax rate spike and low redistribution of the status quo…

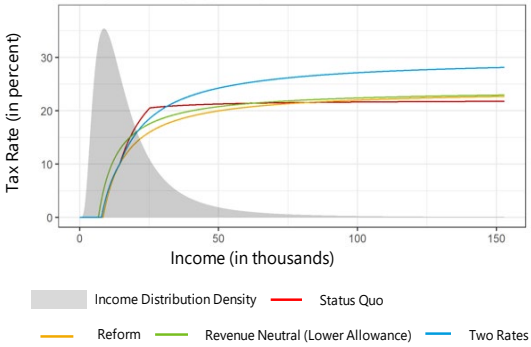
Marginal Tax Rate Schedule
(X-axis: thousand euros; Y-axis: percent)



Source: World Inequality Database; IBFD; and IMF staff calculations.

…at slightly higher average tax rates and thus, also generating higher revenue mobilization.

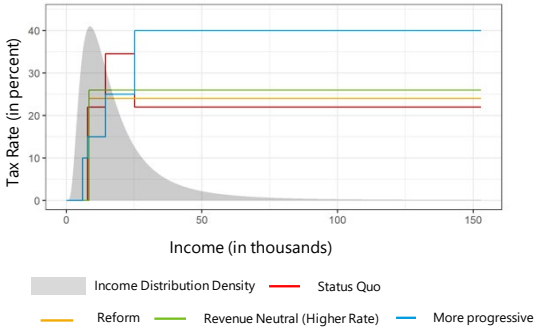
Average Tax Rate Schedule
(X-axis: thousand euros; Y-axis: percent)



Source: World Inequality Database; IBFD; and IMF staff calculations.

Several revenue neutral options would involve either a lower allowance or a higher rate…

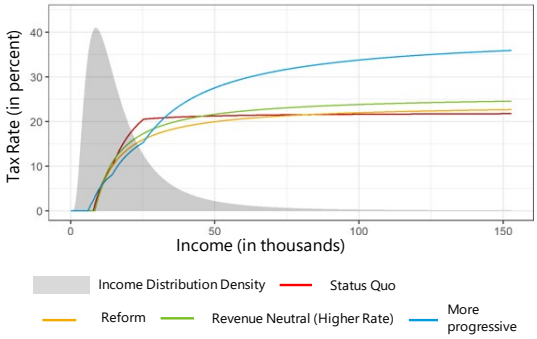
Marginal Tax Rate Schedule
(X-axis: thousand euros; Y-axis: percent)



Source: World Inequality Database; IBFD; and IMF staff calculations.

…while slightly more progressive systems would improve work incentives and revenue mobilization even more.

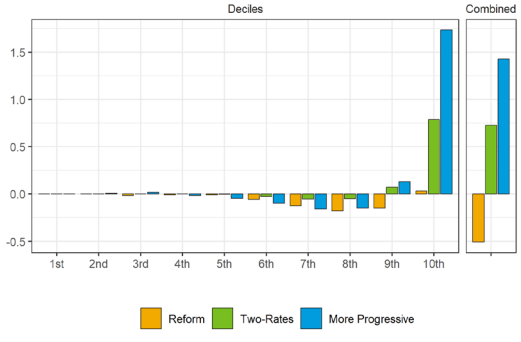
Average Tax Rate Schedule
(X-axis: thousand euros; Y-axis: percent)



Source: World Inequality Database; IBFD; and IMF staff calculations.

The revenue neutral options would involve either a lower allowance or a higher rate…

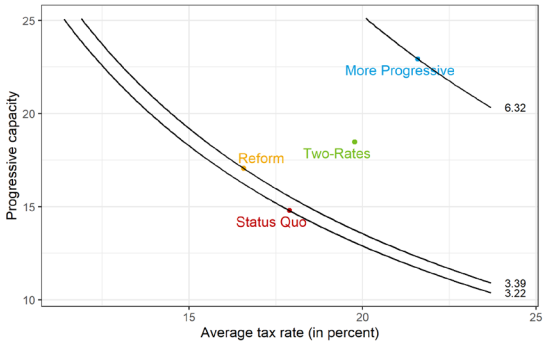
Revenue change (in percent of GDP)
by income group



Source: World Inequality Database, IBFD, IMF-staff computations

…while slightly more progressive systems would improve work incentives and revenue mobilization even more.

Decomposition of redistributive capacity
higher values toward the upper right corner



Source: World Inequality Database, IBFD, IMF-staff computations

E. Business Income Taxation

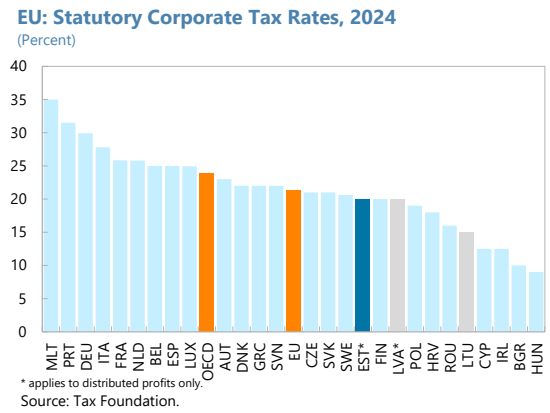
21. Most countries tax corporate income for pragmatic reasons. Income generally arises from labor effort—wages or entrepreneurial activity—and capital returns—interest, dividends, or capital gains. Corporate income is a subset of capital income. Although there are no fundamental reasons why capital income should be taxed through corporations (and not only at the individual level), at least two important pragmatic reasons exist why such an approach is in countries' interest. First, corporations are convenient collection agents, making the CIT a way for the government to reduce tax administration costs. Second, levying a (source-based, i.e., where capital owners reside) CIT allows countries to tax foreign capital owners on capital income earned locally. However, to the extent that CIT falls on the normal return to capital, as opposed to pure economic rents[5], it is expected to adversely impact FDIs[6] as well as to create distortions in the pattern of savings and investment. Taxing rents and thus fully exempting investments is the economic rationale that justified the simplified CIT system adopted by Estonia in early 2000s.

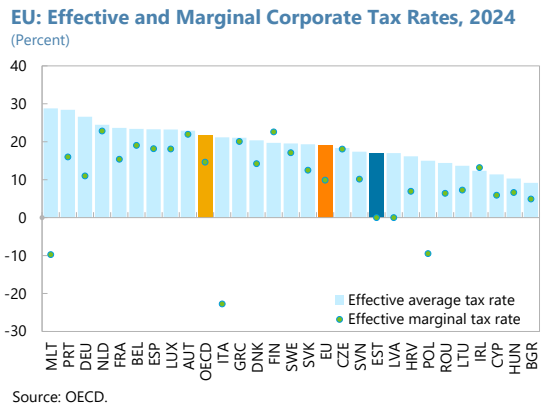
22. Corporate income taxes are part of a broader income tax system. Countries have adopted several alternative approaches to taxing income. One theoretically appealing approach would be to tax the sum of labor and capital income at a progressive rate structure. This is typically called a 'global income tax' or 'comprehensive progressive income tax'. However, an important concern with this approach is that it could lead to significant distortions of intertemporal savings decisions, thus being clearly suboptimal in the long term compared to other taxes. This is because it would imply that capital income taxes on the normal return to capital would be non-zero (as it is also the case with standard CIT). Different approaches have been developed to address this (and other) concerns. For example, full deductibility of capital expenditures has been proposed to eliminate taxes on the normal return to capital; 'flat taxes' have been conceived to simplify taxation by applying a single marginal tax rate to limit arbitrage opportunities between labor and capital income; and 'dual income taxes' stipulate that the progressive rate structure should only apply to labor income while capital income should be taxed at a (lower) flat rate. In practice, most tax systems apply a hybrid approach combining different elements of these stylized approaches. In the EU, for instance, most countries adopt dual income taxes with a more progressive PIT and a lower, single rate on overall profits. The average CIT rate in the EU is lower than the OECD average with some countries applying reduced CIT rates and other tax incentives, e.g., R&D tax relief provisions (Text Figure 4).

[5] The normal return on capital is generally defined as the minimum return required to make investors equally well off (with an adjustment for risk) compared to some benchmark investment, such as a government bond. The remaining profit, over and above the normal return, is called 'rents.' While the normal return is clearly capital income, rents might in fact be subject to bargaining between workers and capital owners— and thus can be reflected either as capital income or as labor income (in the form of higher wages).

[6] A CIT falling solely on pure economic rents would not be expected to have adverse investment impacts. However, if the CIT falls on quasi-rents, arising in the case of specific investments with fixed costs, adverse impacts on FDI could still materialize, perhaps to a lesser extent, e.g., if an alternative (and mutually exclusive) investment exist that is expected to earn higher quasi-rents.

Text Figure 3. Estonia: Corporate Income Tax (CIT)

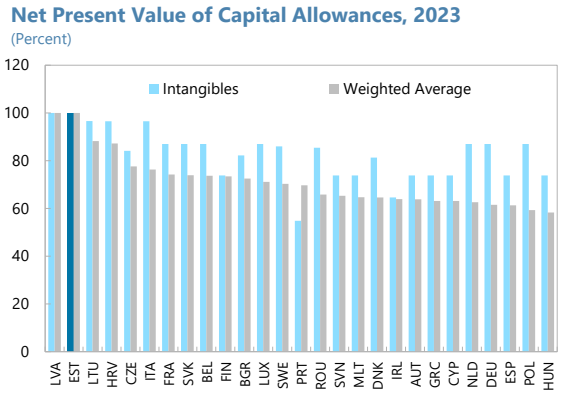




23. The total tax burden on capital income is determined by taxation at the corporate level (through the CIT) and at the individual level (through the PIT). In classical income tax systems, corporations are considered separate entities from their shareholders, and the CIT is thus levied separately as a withholding tax on equity returns.[7] Since in such systems equity returns may also be subject to PIT—e.g., on dividends and capital gains—levied at the shareholder level, capital income is double taxed in the sense of being subjected to two separate layers of capital income taxes.

24. CIT systems can be classified based on the definition of the corporate tax base. Typically, three general approaches are distinguished (King, 1987, Auerbach et al., 2010, IMF, 2021).

- **Full return to equity**. This approach corresponds to standard CIT systems levying tax on corporate profit as defined by accounting rules, with some adjustments. Capital expenditure is not a deductible expense. Instead, depreciation of capital assets is deductible based on a pre-defined depreciation schedule (Figure). Interest is a cost and, therefore, deductible while profit is taxed irrespective of whether it is retained or distributed—thus giving rise to a different treatment of debt- and equity-financed investment at the level of the corporation[8] (i.e., a 'debt bias'). As a result, standard CIT systems tax the normal return to capital income[9] if investment is equity-financed (but not if it is debt-financed), implying that taxation might discourage marginal investments not earning any economic rents due to the resulting increase in the cost of capital.



[7] Wages and interest are generally deductible in classical corporate income tax systems.

[8] If interest income is taxed higher than dividends at the individual level (through the PIT) it is possible that the debt bias is mitigated when taking both levels into account.

[9] The full return includes the normal return as well as any economic rent.

When combined with other tax advantages, such as e.g. accelerated depreciation, interest deductibility is equivalent to a net subsidy to the borrower, which can have significant effects on financial markets by encouraging excessive leverage.

- **Full return to capital**. Several alternative approaches have been proposed to avoid the debt bias at the corporate level. One such approach, the comprehensive business income tax (CBIT) aims to achieve this by disallowing interest deductibility, thus effectively bringing the entire return on capital income into the corporate tax base (of the source country), irrespective of the source of finance. To avoid double taxation, interest income received by corporations would be excluded from the tax base. Due to the larger tax base, compared to a standard CIT, the rate could be set at a lower level without revenue loss; in addition, the PIT treatment of interest income should be aligned with the treatment of dividends and capital gains. The CBIT was developed by the US Treasury Department in 1992 (Hasen, 2013). In 2014 the Swedish Committee on Corporate Taxation proposed that Sweden adopts a CBIT system of taxation, although this proposal was finally not implemented (Lodin, 2014).
- **Economic rents/cash flow corporate taxes**. Alternatively, the debt bias could also be removed by defining the CIT base such that only economic rents, but not the normal return, are subject to tax. Such taxes are typically referred to as 'rent taxes' and generally seen as more efficient from an economic perspective due to a lower propensity for distortions. Because economic rents are excess profits over the required (normal) return, the corporate tax would not create any efficiency losses. At the corporate level, these 'cash-flow taxes' are based on the Sources & Uses of Funds, rather than the Profit & Loss statement. They are also preferred on equity grounds, because they do not distort the pattern of savings and investment over time. Evidence suggests that cash-flow taxes have several preferrable qualities compared to a standard CIT. Using IMF's multi-region GIMF model, Carton et al., 2019 analyze the implications of replacing a standard CIT by cash flow taxes. They show that this type of reform boosts output in the country undertaking the reform and results in positive long-run spillovers to the rest of the world. Estonia's CIT comes close to a type of cash flow tax (share- or 'S-base') on pure economic rents, with some caveats, given that it is not based on net profit distributions. Some EU countries have considered moving from standard CIT to cash flow corporate taxes to ensure tax neutrality with respect to both financial and investment decisions and encourage investment. However, such a structural reform of the CIT base carries significant revenue risks, especially in a transition phase, as the statutory rate would need to go up to keep revenue levels constant (with a narrower base).

25. Three main approaches for cash flow corporate taxes design exist. First, a rent tax on real cash flows ('**R-base'** cash flow tax) can be achieved by making two adjustments to a standard CIT base: (i) allowing capital expenditures to be fully deductible from the corporate tax base; and (ii) disallowing interest and dividends deductions. The idea is that the tax is a levy on the sum of firm's net cash flows resulting from its real economic activities. Investment expensing implies rent

taxation.[10] Second, a rent tax on real and financial cash flows ('**R+F-base'** cash flow tax) can be obtained by introducing full expensing of capital expenditures while retaining interest deductibility and adding net debt (hence 'F') to the tax base. Third (a less prominent case), a cash flow tax on share transactions ('**S-base'** cash flow tax). Under this approach only the ***net*** distributions of corporations are taxed, i.e., in broad terms the tax base is defined as dividends plus share buybacks **minus** capital increases.

26. Another possible approach to ensure tax neutrality would be the introduction of an Allowance for Corporate Equity (ACE). Under a standard CIT system, this option would maintain interest deductibility and add an (mostly) equivalent notional interest deduction for equity capital such that the debt bias is at least reduced. The ACE was elaborated by the IFS Capital Taxes Group in the UK (Institute for Fiscal Studies, 1991). Belgium and Italy have recently implemented variants of the ACE tax in their tax systems.

27. Estonia and Latvia tax distributed profits. Estonia and Latvia operate distributed tax profits (DPTs) since 2000 and 2018, respectively. Upon declaration of a dividend, the DPT is levied at a rate of 22/78 of the net amount of the profit distribution, corresponding to 28 percent on the gross amount distributed.[11] In both countries, undistributed corporate profits are tax exempt. This exemption covers active and passive income—i.e., received dividends, interest, royalties—as well as capital gains arising from the sale of shares or securities; in Latvia, but not in Estonia, immovable property owned by non-residents are excluded from this exemption. In both countries, resident companies and PEs of non-resident companies can benefit from this exemption.

28. The tax base is the directly distributed dividends, making revenues hard to predict. In Estonia, the tax is charged on selected transactions rather than on financial results for the period. There are neither carry forward nor depreciation rules for tax purposes. Corporate taxpayers would still compute economic depreciation according to an acceptable accounting rule. Standardized accounting rules must still be followed to determine net earnings from which the dividends are declared. The tax administration monitors the correctness of the net earnings calculations. However, over time, DPT revenues have been volatile and, various amendments were introduced to raise revenues, making them more predictable, while keeping the current system in place. To raise more revenue from CIT, the reduced 14 percent CIT rate on regular profit distributions (also taxed at 7 percent with a withholding tax) has been abolished from 2025. The advance CIT for credit

[10] In the standard CIT system, the tax (t) directly increases the cost of capital. To be undertaken, an investment needs to yield a higher return, i.e., the cost of capital increases from r to $r/(1-t)$. Under the R-base cash flow approach, rent-earning investments would be taxed $R(1-t)$, but tax would never turn a profitable investment into a loss-making one. Similarly, an S-base cash flow tax levied on net distributions would achieve the same result since new equity injections would reduce tax liabilities in present value terms. To achieve neutrality in practice under the standard CIT, tax authorities need to refund (or carry forward with interest) negative tax liabilities when investment is undertaken.

[11] In Estonia, CIT is computed based on the grossed-up amount. Since January 2025, the tax rate on the net profit distribution is 22/78, i.e., about 28.2%. The amount of tax is equal to (Net Dividend x 22)/78. From January 2026 the nominal rate goes up to 24%. The fractional rate will be 24/76, bringing the gross-up rate up to 31.6%. This is because at least in theory, Estonia is still taxing the profit not the dividend ('profits upon distribution').

institutions ('bank levy') has been increased from 14 percent to 18 percent. Compliance under DPT is hard to assess but the observed spikes in revenues before the recent tax hike announcements point to significant untapped revenue.

29. The DPT is likely less distortive than a standard CIT, because it falls mostly on rents. Over time, the DPT has served Estonia well, by providing impulse to much-needed corporate investment. The system addresses the neutrality between debt and equity, thus reducing the need for debt financing. It is simple: there is no need to track revenues and deductible expenses, although this is not an exclusive feature of DPT. Other approaches can be used to achieve similar degrees of simplicity. It also works well in a digitalized environment, where it is easy to set up a company and file taxes online, compliance and enforcement are high, and institutions are strong. All these factors have led to limited costs relative to the size of tax administration. DPT's main drawbacks include the potential for sizeable loss in tax revenues, especially if statutory rates are not increased commensurately to make up for the narrower base. Several potential arbitrages can erode DPT's narrow tax base: e.g., high wealth individuals or service sector employees can incorporate and collect dividends rather than a remuneration subject to PIT; transactions tend to take place between corporates; and shareholders may defer profit distribution.

30. The Baltic DPTs levy taxes on gross distributions—distributed dividends and share buybacks without accounting for capital increases—thus failing to fully align with the canonical definition of a cash flow tax on share transactions ('S-base'). Being defined as gross distributions, the DPT captures more than just economic rents. Hence, the efficiency gains associated with rent taxes may not fully materialize. However, taxing gross distributions prevents the types of concerns, discussed above about debt being the preferred instrument to finance a company.

31. In the present context, the question arises whether the DPT system is still the main factor in attracting investment to Estonia. Attracting FDIs depends on features like the institutional framework, skilled workforce, infrastructure quality, and connectivity. Like for any other tax policy, there is a cost-benefit analysis to be made. The costs of such tax policies arise through forgone revenues, or the opportunity cost of public expenditures not being made due to these lost revenues. Another issue to consider is that over time companies may retain large profits that are taxed only upon realization as capital gains. Reforming CIT can thus be a way to ensure that capital income earned by corporations is taxed as it accrues. Against this background, various tax policy options could be pursued to strengthen revenue mobilization.

- **Improving current design of the DPT, including a higher statutory rate**. One option would be to continue improving the design of the current DPT and adapting it such that higher revenue yields can be mobilized. Estonia currently raises less CIT revenue than European AEs and the Nordics, notwithstanding relatively high statutory CIT rates. Increasing the rates may be attractive, especially if the tax base is aligned more closely with economic rents by moving from *gross* to *net* distributions. However, higher rates also imply stronger incentives for tax arbitrage across income types, sources of finance, organizational forms, and other margins; and it may

increase tax avoidance and evasion more generally. Since there is only limited experience with DPTs at higher statutory rates, this approach could be subject to considerable risks.

- **Moving towards a standard CIT.** A less risky option could be to transition the current DPT, through a well-sequenced incremental reform, towards a standard CIT. The standard system already applies to banks in Estonia. Although not without flaws, the standard CIT could be a credible option to achieve significant increases in the tax to GDP ratio. To mitigate the adverse investment effects stemming from the taxation of the normal return, additional provisions could be implemented, including an Allowance for Corporate Equity (ACE) or immediate expensing for specific asset types (as in the US and in the UK). Both approaches can help keeping the taxation of the normal return relatively close to zero, and thus the competitiveness of the CIT. ACE, for instance, would not only be more efficient than the current DPT system by not interfering with companies' internal decisions, but would also enable generating the same revenue at a lower rate. The standard CIT system is more complex as companies need to have accounts and calculate taxable income. and the capacity of the tax administration would need to be enhanced. However, ACE would provide the benefits of rent taxation while making the system more robust and less prone to tax avoidance.

- **Exploring other rent taxes, on efficiency grounds**. Rent taxes can be achieved through several different CIT designs, including cash flow taxes (on R- or R+F-base). Although, the current CIT design, relatively low CIT revenue levels and the existing experience with the DPT in Estonia (and Latvia) may provide a more amendable starting point for such a reform than is usually the case in other countries. That said, a switch towards another rent tax would also come with considerable risks, including the fact that such options have rarely been implemented on a broad basis despite their theoretical appeal.

F. Value-Added Tax

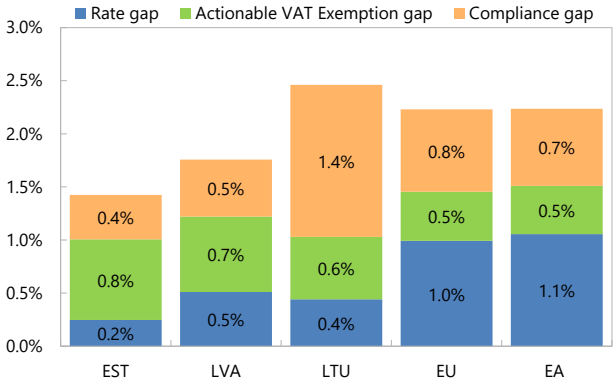
32. VAT C-efficiency has been high in Estonia since 2005. This reflects strong revenue performance achieved via a broad coverage, with fewer reduced rates compared to EU/EA averages (e.g., pharmaceuticals, hotel accommodation, periodicals, books), high reliance on automated, transparent, and efficient tax administration processes enabling very quick VAT returns, and a low compliance gap, despite some variability over time. Challenges for the tax administration may include turnover concealment, fraudulent tax returns and input VAT, and real estate-related tax frauds.

33. Higher revenue could be mobilized by further reducing the policy gap, while maintaining high levels of tax compliance. According to the 2024 European Commission's VAT Gap Report, the VAT policy gap is about one third of the theoretically collectable VAT revenue for Estonia. However, part of it is not actionable, since it is related to public services and healthcare. The actionable areas are related to exemptions that are largely not justified on social grounds (public goods) or can be identified (actionable exemption gap) as multiple, reduced and super reduced rates (rate gap). It is estimated that closing the actionable exemption gap would yield 1.1 percent of

GDP, while closing the rate gap would yield slightly less, 0.3 percent of GDP (based on 2022 data). Strengthening tax compliance could generate up to 0.4 percent of GDP.

34. More can be done to reduce the exemption gap and further strengthen compliance in the face of heightened uncertainty and statutory rates hikes (Figure). The main exemptions are related to the small enterprises scheme (registration threshold) to reduce tax complexity and facilitate market entry, real estate exemptions (e.g., rental real estate income, sale of immovable property), non-profit activities (e.g., use of sports facilities or sports equipment), online education, online gambling, and some medical procedures not covered under the EU's VAT Directive (2006). Higher statutory rates are typically associated with greater incentives for noncompliance—in the EU, on average noncompliance is estimated to worsen by about 0.5 ppts of theoretical revenues for each 1 ppts VAT rate increase (EC, 2024) —and in presence of higher uncertainty. Requiring that all invoices be declared in the VAT return annex (currently only transactions above $1,000 are included) and expanding e-invoice for all VAT payers (from the current 7 percent coverage) would also improve collection, while reducing discrepancies and administrative burden (MoF, 2024).

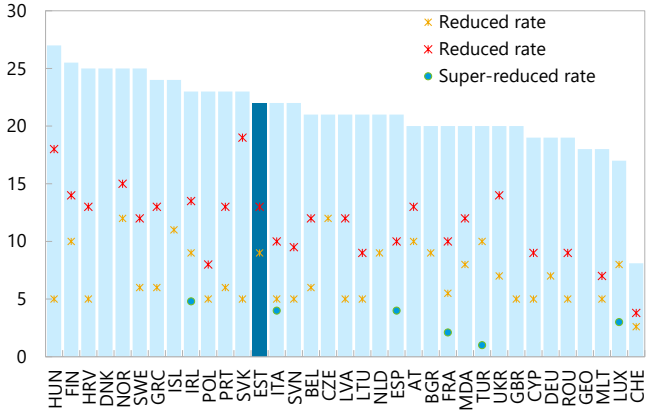
EU: Actionable VAT Gaps
(percent of GDP)



Sources: European Commission and IMF staff calculations

35. A proliferation of reduced rates and exemptions as statutory rates go up should be resisted. There have been proposals to tax food at a lower 5 percent VAT rate (for an estimated cost of around €400 million) or even introduce exemptions to improve distributional effects. This would be a costly way to pursue equity. While low-income households spend a larger proportion of their income on necessities, high-income households spend a larger absolute amount and thus would also benefit most from a low rate. Instruments better suited to pursuing fairness objectives can be designed, including income-based targeted transfers or other forms of cash support to the neediest. There is broad consensus that a uniform, broad-based consumption tax, with very few, well-specified exemptions and limited rate differentiation is a preferrable benchmark. Increasing VAT revenue through a broader base and fewer reduced rates and exemptions, would be a more growth friendly option relative to standard rate increases. Exemptions create cascading effects through denied input tax credits,

2025 VAT Rates in Europe
(Percent)

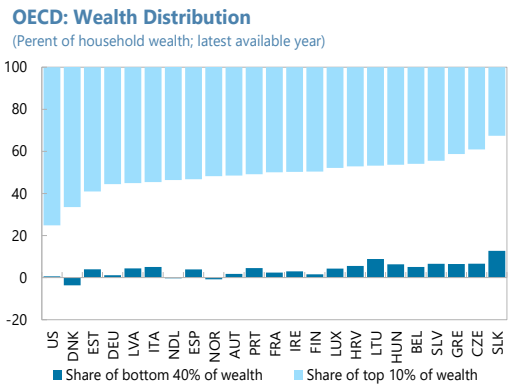


Source: Tax Foundation.

distortions in production decisions on inputs and outputs, as well as increased administrative burden and lowered compliance. A non-linear progressive income tax is typically seen as a more efficient way to achieve redistribution.

G. Property Taxes

36. In Estonia, wealth is more unevenly distributed than income. In the OECD, the average share of wealth held by the top 10 percent of households is 50 percent, largely exceeding the average share of income (24 percent) held by the top 10 percent. Estonia has one of the largest differences, with the top 10 percent of households holding about 1/3and the bottom 40 percent holding less than 5 percent of total wealth.



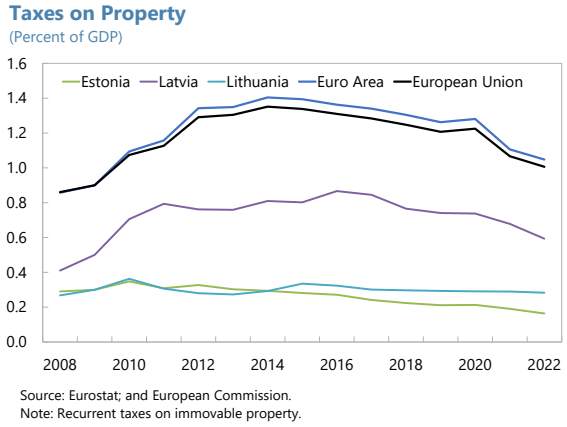
Source: OECD Wealth Distribution Database.

37. Taxes on property comprise a broad category of taxes that are payable on the use, ownership, or transfer of wealth, in return for benefits the taxpayer receives. They may be levied at regular intervals, one time only, or on a change of ownership (IMF, 2014, Grote and Wen, 2024). The most common type of property taxes is the recurrent tax on immoveable property (paid annually on an assessed value of buildings and land, that is, real estate) and the real property transfer tax (levied as a tax or a stamp duty when there is a change in real estate ownership). Real property taxes are imposed on gross values. They are among the least distortive for economic growth as their base is immobile. Property taxes are also progressive because land and capital are owned predominantly by higher-income individuals.

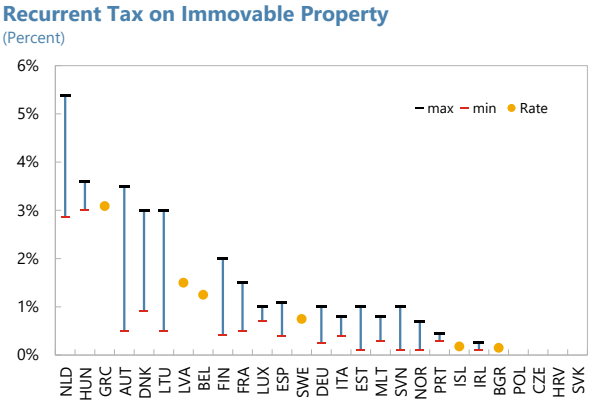
38. Property taxes raise on average around 1 percent of GDP in advanced economies. Their yield goes up to 3 percent of GDP in the UK and Canada, while EMDEs generally raise less than ½ percent of GDP. In Estonia, where only land is taxed, there could be scope to move toward a modern property tax. Where market-based valuation is hard, simplified approaches based on property areas can produce reasonable outcomes at lower administrative costs. A shift toward a recurrent property taxation could also mitigate distortions in housing markets.

39. Estonia collects limited property tax revenue in the form of a land tax, while residential land is exempt up to a generous threshold. Despite the relative importance of real estate activities in Estonia (about 5.5 percent of value-added and 3.5 of total employment, higher than EU average), taxes on property, that is, solely from the taxation of land, collects less than 0.2 percent of GDP and its share has been on a downward trend in the last decade. There is no assessment of buildings' value for taxation purposes and there is no real property transfer tax (Text Figure 5 and Box 3). The Land Tax Act provides for several preferential tax treatments. For example, a land tax exemption exists, whereby landowners are exempt from the obligation to pay land tax on residential land of up to 1,500 m^2 in cities and other densely populated areas and up to 2 hectares elsewhere. Local authorities may additionally exempt pensioners and other categories.

Text Figure 4. Real Property Taxation



Source: Eurostat; and European Commission.
Note: Recurrent taxes on immovable property.



Sources: Taxes in Europe (EC), Global Property Guide, and IMF staff calculations.

Box 3. Property Taxation in Estonia

Acquisition:

Transaction tax. Purchases of new properties are taxed at the standard VAT rate. From 2025, the definition of new buildings will encompass buildings of up to 2 years of age. There is no real estate transaction tax.

Holding:

Rental Income Tax: There is a flat income tax rate of 20 percent. Deductions of up to 20 percent are allowed based on proof of real expenses related to the property.

Profit Distribution Tax: An exemption from withholding tax on outbound dividends benefits real estate holding companies with international ties.

Property Holding Tax: Land in Estonia is subject to an annual tax, levied on the market value of the land. The rate is established by the municipal council and varies between 0.1 percent and 1.0 percent. Local government units have discretion in setting tax exemptions (up to €1,000 for residential land) and reduced rates to attract specific types of investments.

Disposal:

Capital Gains Tax: Capital gains are included in the computation of taxable income and taxed at the standard 20 percent rate. Income of nonresidents from sales of properties is subject to income tax by way of assessment and may be tax exempt. Taxable capital gain is generally computed as gross selling price less acquisition costs. Gains from the sale of a summer cottage or garden house are exempt if owned for more than 2 years.

40. Despite a very effective land survey and valuation systems, using a land tax to raise revenues has proven challenging and exemptions are widespread. Estonia has an effective central property tax administration, modern land valuation performed by the National Land Board and private valuers, and an efficient Cadaster Administration with only 1 percent of all land parcels not yet completely adjudicated in terms of registered property rights. However, no property tax revaluation was conducted in Estonia for over 20 years.[12] Prior to the 2022 comprehensive land revaluation, the maximum land tax rate was 2.5 percent of the taxable value of the land. With the 2022 revaluation implemented from 2024, property values have increased 8 times, requiring a lowering of the maximum tax rate. The upper bounds of the new tax rate for 2025 range from 0.1 to

[12] The amendments to the Land Tax Act provide now for periodic revaluations every four years starting in 2022.

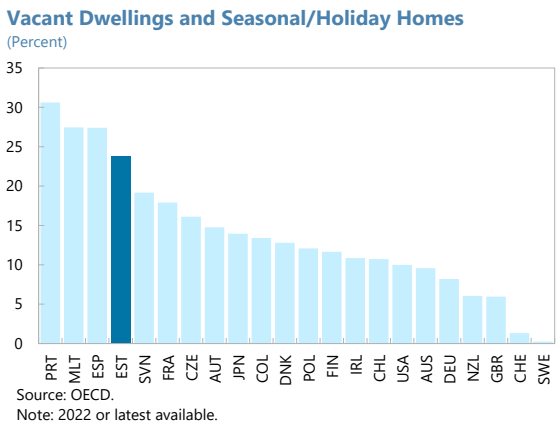
1 percent of market value for residential and agricultural land, from 0.1 to 0.5 percent for profit-yielding land, and from 0.1 to 2 percent for land with other intended use. To promote local fiscal autonomy, local governments are allowed to fix rates and exemptions by October 1st, annually.[13] The 2022 values are applied progressively by municipalities, even though, in 2025, the cap on the value increase was increased significantly to 50 percent/€20 from 10 percent/€5 previously. From 2026, the homeowner's exemption will be decided by local governments and capped at €1,000. Homeowners will remain exempt from land tax for up to 1,500 m^2 of domestic land. The homeowner's tax exemption is also applicable to homeowners living on land with joint intended use. For instance, in 2025, the City of Tallinn exempted 172,500 homeowners from paying taxes on domestic land, accounting for about 80 percent of total taxpayers. Despite the recent changes, the estimated revenue collected in 2025 is still less than 0.2 percent of GDP.

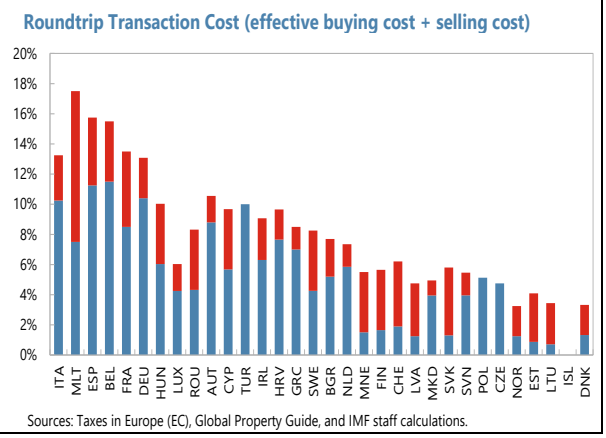
41. There is no fully-fledged fiscal cadaster, and the various underlying registries are not synchronized. For the imposition of a property tax a fiscal cadaster to ensure fair taxation based on value and use of property is needed. Such cadaster would handle records of property values, tax information, and land use. The primary purpose of a fiscal cadaster would be to support the administration of property taxes and to ensure that landowners are taxed fairly based on the value and use of their property. The cadaster would state the coordinates and physical addresses of taxable properties, and the owners/occupiers. Synchronization of various registries would need to be improved, with due consideration to processing of personal data. Currently, legal ownership, including areas, are recorded in a land registry; buildings, including permits are entered into a building register; transaction data are forwarded to the Land Board, while the population registry is kept at the Ministry of Interior.

42. The share of vacant dwellings and seasonal homes is significant in Estonia, pointing to untapped tax revenue potential. Estonia has among the highest number of dwellings per inhabitant in the EU and real estate roundtrip transaction costs are low (Text Figure 6). Based on the 2021 census, the number of residential buildings in Estonia is 266,475. Of these, about ¾ are one-family dwellings, 18 percent are blocks of flats, and the rest are semi-detached houses and non-residential buildings, with at least one living space. About ¾ of all these dwellings are occupied, i.e. have at least one permanent resident, while ¼ are without permanent residents, and their share has been rising. There are nearly 39 million square meters of residential space, an average of 30.1 m^2 per person. Assuming a tax based on property value and allowing for some differentiation between primary and secondary residence (e.g., 0.05 percent and 0.1 percent, respectively), up to 5 times higher depending on the municipality, and assuming an exemption threshold of 10 percent, a new tax could generate as much as 1.7 percent of GDP.

[13] For instance, Tallinn, the capital city and at the same time the largest municipality, adopted a tax rate of 0.5% for both residential and profit-yielding land, and a rate of 1% for land with other intended use.

Text Figure 5. Real Estate Market





43. A modern value-based property tax would help rebalance the existing tax structure. In the near term, municipalities should be encouraged to limit residential primary owner exemption. The mandatory residence registration system at the local level should be tightened and the information in the population registry with the land registry, real estate transactions, and income statements synchronized. The tax should be as broad as possible, with means-tested compensation mechanisms in place to offset the impact on low-income households. At the same time, preparation could start for a property registry of house valuations that could be used for taxation purposes ('fiscal cadaster'). A fiscal cadaster can be improved by using for example drones and satellite imagery to create property maps. Advances in digital mapping technologies offer possible solutions for identifying property parcels and buildings, registering their ownership, and mapping their geographic location in a central fiscal cadaster (IMF, 2018).

44. Measures to shield low-income households from the adverse impact of the reform can also be prepared. Tax deferment schemes for "asset-rich but cash-poor" taxpayers could lessen the cash impact on certain households, especially the elderly. Under a deferment scheme, it should be ensured that property tax arrears become due in full when the property is alienated through a sale or inheritance. Currently, the compensation mechanism during the application of the new land values is rather broad, with the increase in land tax in 2025 compared to land tax paid in 2024 compensated in the form of a grant transferred to the applicant's bank account, with no aid ceiling (for resident natural persons).

45. Local governments must be incentivized for maximum property tax effort. For instance, this could be done by reducing allocations of shared taxes over time or designing inter-governmental grants to reward greater municipal tax collection. To promote local fiscal autonomy, local governments should have some flexibility to select a property tax rate within a centrally determined narrow range.

46. Over the medium term, a full-fledged value-based property tax should be considered. This would follow completion of the necessary technical and legal preparations, including the fiscal cadaster. Best international practices show that a flat rate should be applied to a base with a

minimum of exemptions and a uniform treatment of business and residential property. Tax provisions could be considered in cases where individuals or companies own multiple properties, possibly located in different municipalities.

H. Conclusion

47. Given Estonia's low tax effort relative to peers along with imminent and longer-term spending pressures, options to support revenue mobilization could be considered. Estonia's tax mix is reliant on consumption taxes—especially VAT. Consumption taxes are less distortive than income taxes, but immediate spending pressures require reaching untapped potential. Staff recommends a review of Estonia's tax system to make it more robust and growth friendly, while strengthening revenue. Options highlighted in this SIP include (i) addressing the PIT revenue shortfall by considering revenue neutral options, i.e., calibrate the basic allowance, the tax rates, and/or the tax brackets subject to the intended degree of progressivity; (ii) improving the capacity of the tax administration to analyze income statements and exploring alternative CIT regimes that would preserve Estonia's tax competitiveness while reaching a broader tax base; (iii) streamlining remaining VAT exemptions to broaden the tax base; and (iv) limiting exemptions on residential land and taking steps to introduce a modern tax on immovable property by developing a fiscal cadaster.

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ALLOCATIVE EFFICIENCY, FIRM DYNAMICS, AND PRODUCTIVITY IN THE BALTICS[1]

Labor productivity growth has decelerated in the Baltic economies during the past two decades, with the downturn accelerating in recent years. This Selected Issues Paper analyzes the roles of allocative efficiency and firm dynamics in productivity growth. Our results suggest that the lack of allocative efficiency has hindered productivity growth, while the contribution of firm entry and exit has been limited. The findings underpin the need for structural reforms to improve allocation of capital and labor, ease the bottlenecks faced by young innovative firms, and facilitate the exit of unviable firms.

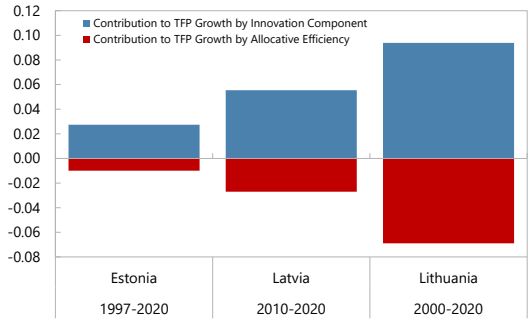
A. Introduction and Literature Review

1. The Baltic economies have faced remarkable challenges in recent years. Russia's war in Ukraine led to supply disruptions and a sharp increase in input costs for firms. Despite some moderation in inflation after the initial shock, the level of input costs has remained high for the region and, in conjunction with slow productivity growth, has led to erosion of competitiveness (Armendariz and others 2024). Therefore, improving productivity growth is critical to restore competitiveness.

2. In the Baltic economies, labor productivity growth has decelerated during the past two decades. In this Selected Issues Paper, we focus on the roles of allocative efficiency and firm dynamics in labor productivity growth. We find that diminishing allocative efficiency has contributed to the decline in labor productivity growth over time, while the net effect of firm entry and exit has been generally limited. One possible reason why the Baltics and Europe in general lack fast-growing, high-productivity firms is that capital and labor may not be allocated in an optimal manner. With frictions in capital, labor, and product markets, resources may be misallocated, resulting in a large dispersion of productivity across firms (Hsieh and Klenow 2009, IMF 2024). Previous IMF studies have investigated the role of allocative efficiency using firm-level data (Armendariz and others 2024) and found that resource misallocation hindered productivity growth in the last two decades (Figure 1).

Figure 1. TFP Growth Decomposition

(Change in natural log of TFP, annual average)



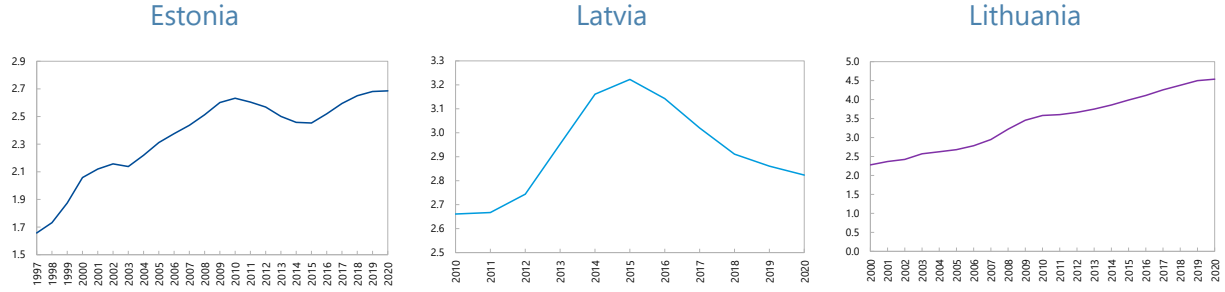
Sources: Orbis; Statistics Lithuania; EUKLEMS; AMECO database; and IMF staff calculations.

[1] Prepared by Bingjie Hu and Can Ugur.

In addition, the same studies find evidence of rising dispersion in the marginal revenue product of capital, especially for Estonia and Lithuania, indicating capital misallocation (Figure 2).

Figure 2. Variance of Marginal Revenue Product of Capital (MRPK)

(Natural log, 3-year moving average)



Sources: Orbis; Statistics Lithuania; EUKLEMS; and IMF staff calculations.

3. One main strand of literature investigates the role of allocative efficiency in productivity growth focusing on business dynamism.

- A seminal study by Olley and Pakes (1996) highlights the importance of dynamic firm behavior and selection mechanisms in affecting productivity. The authors find that surviving firms are systematically more productive than exiting firms and that productivity growth in the telecommunications industry in the United States is driven by within-firm efficiency improvements such as innovation and management as well as reallocation of resources toward more productive firms.

- With modifications to the framework by Olley and Pakes (1996), Hsieh and Klenow (2009) quantify the impact of resource misallocation due to policy distortions on aggregate productivity. One of their key insights is that reducing misallocation and equalizing marginal products of capital and labor across firms could dramatically boost productivity in China and India. The authors diverge from the study by Olley and Pakes (1996) in that they use productivity estimates to model counterfactuals in which capital and labor are allocated optimally.

- Melitz and Polanec (2015) extend the study by Olley and Pakes (1996) by accounting for the contributions of surviving, entering, and exiting firms to aggregate productivity changes and addressing biases in the measurement of contributions of entry and exit. Using data on Slovenian firms during 1995-2000, Melitz and Polanec (2015) find that market share reallocation among surviving firms played an important role in driving aggregate productivity changes, accounting for about half of productivity growth. The authors also find that firm entry and exit contributed to about 30 to 40 percent of productivity growth.

- When it comes to business dynamism in advanced economies such as the United States, there is evidence of declining entrepreneurship and labor market reallocation, with a slowdown in high-growth young firms' activity since 2000. Decker and others (2017) highlight an omission in much

of the literature on productivity, whereby aggregate productivity growth depends not only on technology advancement, but also on allocative efficiency—the movement of resources towards their most productive uses. Using firm-level data on labor productivity, the authors show that worsening allocative efficiency accounted for much of the aggregate productivity growth decline between the late 1990s and the mid-2000s.

- Another point raised by Decker and others (2017) is that business dynamism in the United States has declined since the 1980s, as reflected in the decline in firm entry and exit rates, slower job reallocation, and declining role of young firms in terms of job creation. The authors find that 30 to 50 percent of the post-2000 US productivity slowdown can be attributed to declining dynamism Reduced entry and exit rates, along with slower reallocation among continuing firms, have led to resources being trapped in less productive firms.

- Decker and others (2020) examine the forces underlying the decline in the pace of job reallocation in the United States in recent decades. The authors test the hypotheses of a decline in job dynamics due to (i) lower dispersion of idiosyncratic shocks faced by businesses, and (ii) weaker marginal responsiveness of businesses to shocks. They show that shock dispersion has increased, while the firm-level responsiveness of employment to productivity has weakened. Their results suggest that this has made a negative contribution to aggregate productivity growth.

- Masso and Tiwari (2021) investigate the impact of R&D investment on labor productivity for entrants and incumbent firms in Estonia. Using firm-level panel data from Estonia covering 2000-2017, the paper finds that new firms exhibit higher productivity gains from R&D and innovation compared to incumbents, especially in high-tech sectors. Another finding is that entrants face high exit rates, but survivors rapidly close the productivity gap with incumbents. The authors suggest that policymakers should provide targeted R&D support for startups in high-tech sectors and ensure new firms can access financing for scaling up.

4. There is also a growing literature on the role of government policies in resource allocation during economic recessions. Crisis shocks to firms and policy responses may be sector specific. For instance, asymmetric effects across sectors are the distinctive features of the pandemic crisis. A recent study by Ascari and others (2023) analyzes the heterogeneous crisis impact on sectors with various exposure, the reallocation of entry and exit opportunities across sectors, and the dynamics of aggregate productivity during the pandemic. The cleansing effect induced by the Covid-19 crisis is sector-specific, as declining sectors such as hospitality and retail faced severe contractions due to lockdowns and reduced demand. By contrast, healthcare and remote-work infrastructure companies experienced expansion. Supportive fiscal policy measures such as wage subsidies may have delayed necessary reallocation and preserved unviable firms. Ascari and others (2023) suggest that targeted support for displaced workers and incentives for high-growth sectors are crucial and that avoiding prolonged subsidies to unviable firms can prevent productivity stagnation.

5. Specific policies aiming to protect vulnerable businesses and households from the impact of the crisis may delay resource reallocation and hamper productivity growth. For

instance, Merikull and Paulus (2024) study the linkage between productivity and reallocation and investigate the role of job retention schemes using administrative data for Estonia covering the entire population of firms from 2004 to 2020. The authors find evidence of labor reallocation towards more productive sectors and firms. However, the within-sector reallocation was surprisingly unresponsive to productivity in the COVID-19 crisis, in sharp contrast to the experience during the Global Financial Crisis. The results show that generous job retention schemes slowed the within-industry reallocation towards more productive firms, with negative consequences for aggregate productivity during the crisis. The positive employment effect offsets the negative impact on productivity, but the net gains from the job retention scheme are found to be limited.

6. In this paper, we present evidence on the contribution of allocative efficiency, and firm entry and exit to labor productivity growth using firm-level data from the Baltic economies. Our results suggest that the diminishing allocative efficiency has contributed to the decline in productivity growth in Estonia and the rest of the Baltic region, while the net effect of firm entry and exit has been generally limited.

B. The Labor Productivity Growth Decomposition Exercise

7. Following Decker and others (2017), we decompose labor productivity growth into four components: 1) sector-level average productivity growth for all continuing firms; 2) an allocative efficiency term, represented by the covariance of firm-level labor productivity and the share of industry employment for the same set of firms; 3) the contribution of firms entering the economy, represented by the product of the employment share of entrants and the difference between the productivity of entrants and that of continuing firms in a given year; 4) the contribution of firms exiting, represented by the product of the employment share of exiting firms and the difference between the productivity of continuing and that of exiting firms. The change in industry aggregate labor productivity is thus given by:

$$\Delta P_i = \Delta \bar{p}_{i,c} + \Delta cov_c(\theta_f, p_f) + \theta_{E2}(P_{E2} - P_{C2}) + \theta_{X1}(P_{C1} - P_{X1})$$

where P_i is industry aggregate labor productivity, $\bar{p}_i$ is the unweighted average of log firm-level labor productivity for firms in industry i, θ_f is the share of industry employment accounted for by firm f, p_f is the log labor productivity for firm f. The covariance term can be interpreted as a measure of allocative efficiency, or the degree to which higher-productivity firms have access to more resources (Decker and others 2017). Δ indicates year-over-year log differences, C denotes continuing firms which have employment over two years, $E2$ denotes entrants in the second year of the calculation, $X1$ denotes firms that exit after the first year. $C1$ and $C2$ denote continuers in the first and second years, respectively.

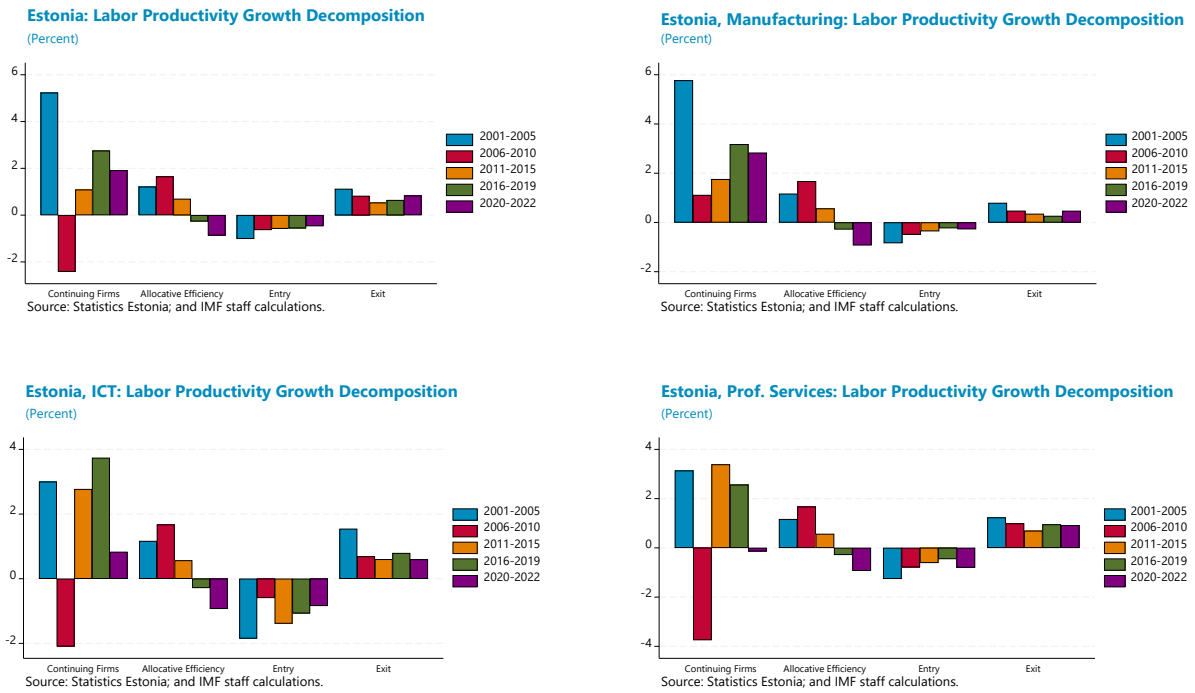
The first term in the expression represents within-firm average productivity growth for continuing firms; the second term represents the change in allocative efficiency among continuing firms; the remaining terms represent the aggregate contribution of net entry. We calculate the decomposition for each industry in each year and aggregate the annual components at the country level using sector-level employment shares in the initial year. Then, we present results on the evolution of the

contribution of average productivity growth, allocative efficiency, and the contribution of firm entry and exit to labor productivity growth over time.

Results for Estonian Firms

Our analysis of Estonian firms using statistical register data shows that at the aggregate level, the contribution of allocative efficiency to labor productivity growth declined over time during 2006-2022 and turned negative after 2016 (Figure 3). Firms with higher productivity have been growing in terms of employment during 2001-2015. However, allocative efficiency worsened over time after 2006 and the contribution to labor productivity growth turned negative after 2016.

Figure 3. Decomposition of Labor Productivity Growth for Estonian Firms



Note: Firms with only one employee are dropped from the sample.

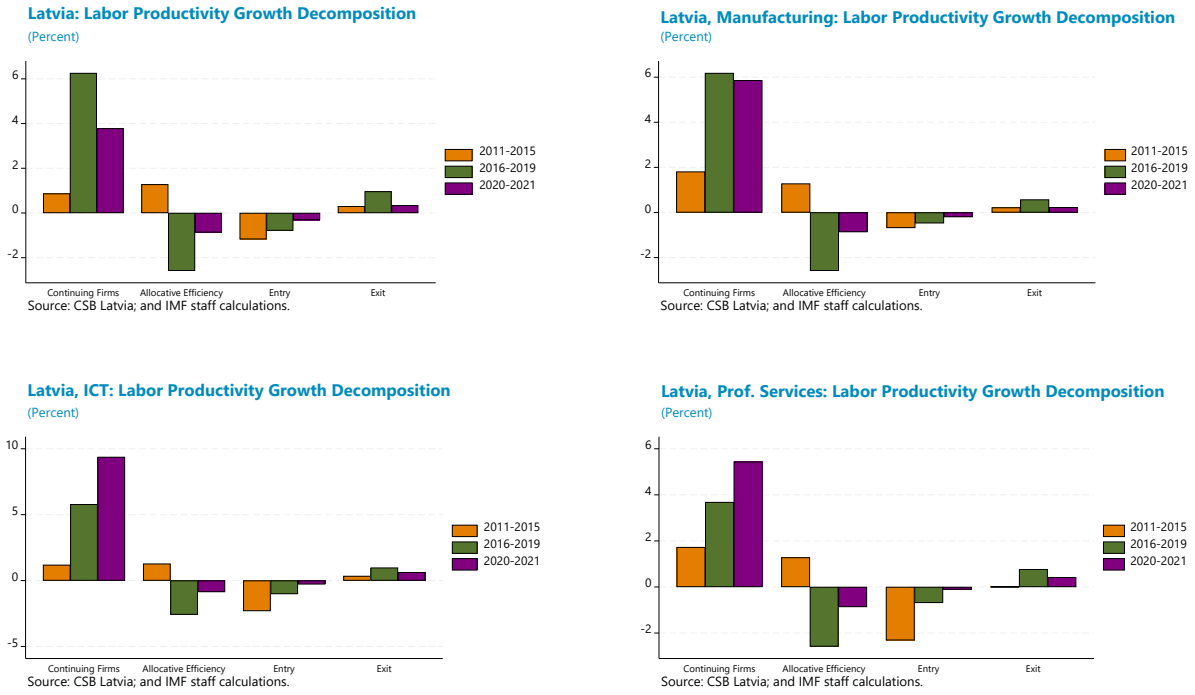
8. The contribution of firm entry is negative, suggesting that entrant firms have lower labor productivity on average than incumbent firms. The contribution by firm exit to labor productivity growth is positive throughout the sample period, and increasingly so after 2015. For productivity to grow, more productive firms would need to enter the market and unproductive firms to exit. Nevertheless, in the case of Estonia, the labor productivity growth contribution by net entry has been very small. The observed pattern is generally consistent across industries and services: the contribution of allocative efficiency to productivity growth declined over time; firm entry dragged labor productivity growth; and firm exit made a positive contribution. (Figure 3). Given limited data availability through Estonia's statistical register data, value added was proxied by firms' turnover per

employee. The same exercise was repeated using Orbis data on Estonian firms and results show a similar pattern: the contribution of allocative efficiency declines over most of the sample period and turns negative in recent years; the contribution by firm entry to labor productivity growth is negative and is marginally offset by a positive contribution by firm exit. Our findings using Orbis data for Estonia at the industry level are also broadly consistent with those based on statistical register data.

Results for Latvian Firms

Our analysis using the Latvian firm-level administrative data shows that the contribution of allocative efficiency turned negative during 2016-20 (Figure 4). The contribution of firm entry to labor productivity growth is negative, though it narrows over time. The contribution of firm exit to labor productivity growth is positive and outweighs that of firm entry for the period 2016-19. Such results at the aggregate level are broadly consistent with our results using the Latvia Orbis data.

Figure 4. Decomposition of Labor Productivity Growth for Latvian Firms



Note: Firms with only one employee are dropped from the sample.

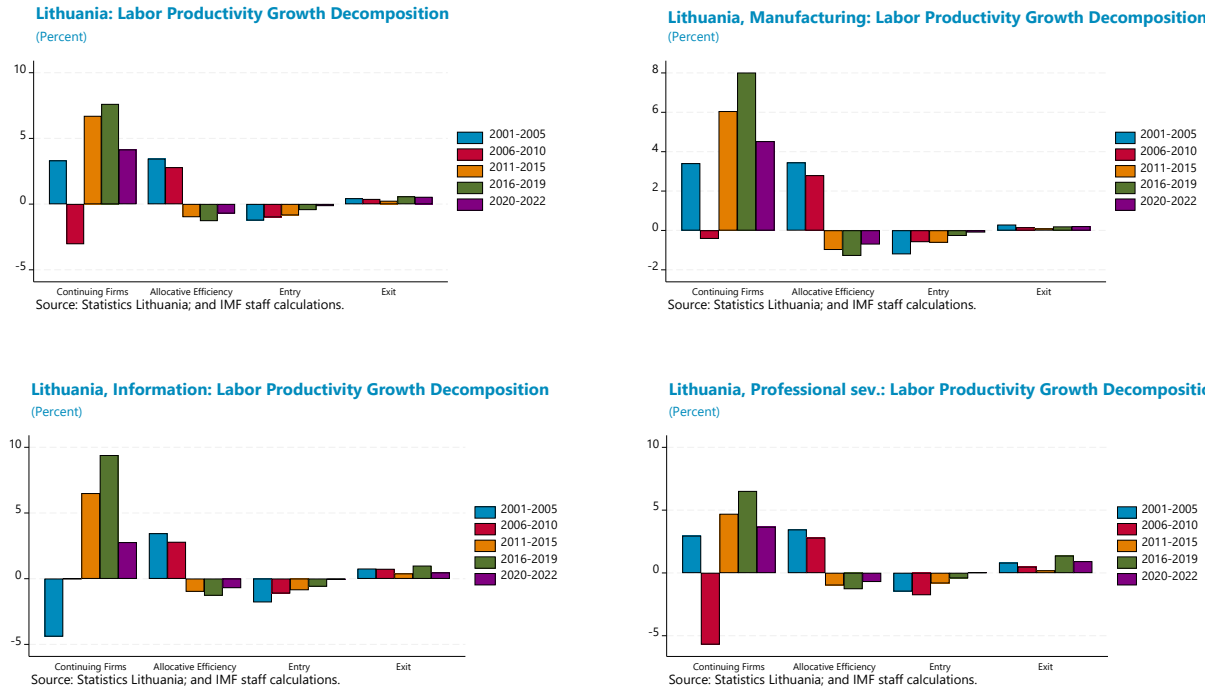
9. The results obtained using administrative data for the industry level are consistent with the aggregate ones. For instance, the contribution by allocative efficiency to labor productivity growth is negative for industries such as agriculture, manufacturing, construction, wholesale, and retail trade. The contribution by firm entry is negative throughout the sample period, and that by firm exit is positive and more than compensates the negative contribution by firm entry during 2016-19 (See Figure 4 for example).

10. In summary, we find that the contribution by firm entry to labor productivity growth is consistently negative throughout the sample periods and that firm exit makes a positive contribution to labor productivity growth, which outweighs the negative contribution by firm entry throughout the sample periods in the case of Estonia and during 2016-19 in the case of Latvia. Our results on allocative efficiency differ for Estonia and Latvia. We find that it makes a positive but declining contribution to labor productivity growth over most of the sample period 1999-2021 for Estonia. However, its contribution to labor productivity growth is negative for Latvia during 2016-20, based on our analysis using administrative data from Latvia.

Results for Lithuanian Firms

11. Figure 5 presents the results of the same exercise using administrative data on Lithuanian firms. We find that the contribution by allocative efficiency to labor productivity growth

Figure 5. Decomposition of Labor Productivity Growth for Lithuanian Firms



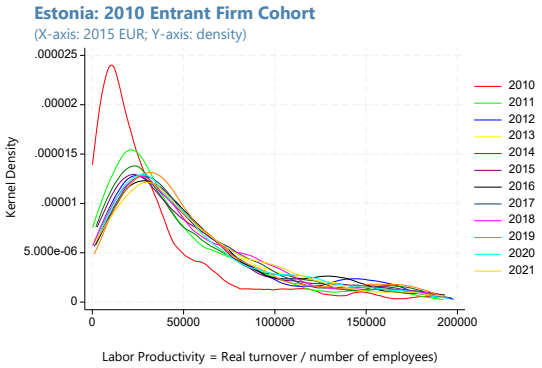
Note: Firms with only one employee are dropped from the sample.

declined and turned negative during 2011-15. The contribution by firm exit failed to compensate the negative contribution by firm entry during 2001-15. Our observation is that for all three cases of the Baltic economies, the industry-level average labor productivity growth plays an important role in aggregate growth. However, both allocative efficiency and firm dynamics also matter. Overall, allocative efficiency contribution to productivity growth has declined over time. The net contribution by firm dynamics is close to zero.

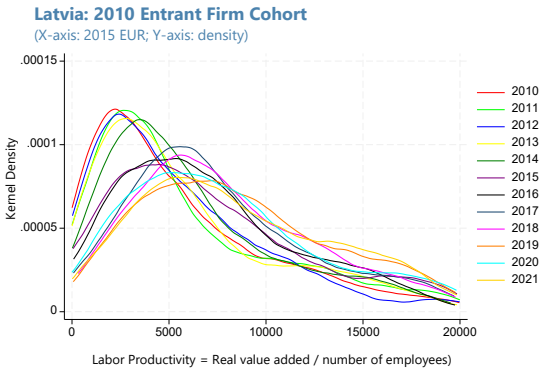
Discussion of the Results

The effect of net firm entry on productivity growth is small in the case of all three Baltic economies, suggesting that young firms need to overcome barriers to make a positive contribution to aggregate growth. However, we do find that the productivity level of entrant firms improves over time. Figure 6 illustrates the distribution of labor productivity over time and across all firms that entered the market in year 2010 in Estonia and the other two Baltic economies. The distribution is skewed towards the low end at the time of entry but gradually shifts towards the center over time, suggesting higher labor productivity growth across the distribution of all firms which entered in 2010. Within ten years, the average labor productivity increased significantly, and productivity levels became more evenly distributed.

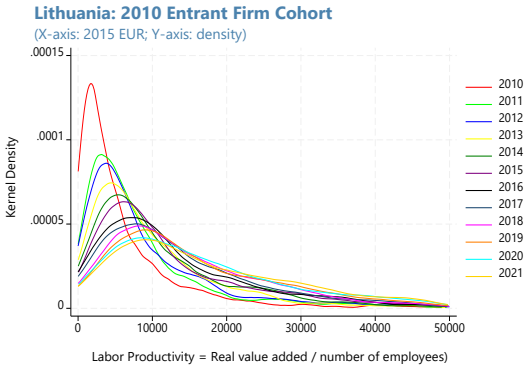
Figure 6. Labor Productivity Distribution of Entrant Firms



Sources: Statistics Estonia; and IMF staff calculations.



Sources: CSB Latvia; and IMF staff calculations.



Sources: Statistics Lithuania; and IMF staff calculations.

Source: Statistics Estonia, CSB Latvia, Statistics Lithuania, and IMF staff calculations.

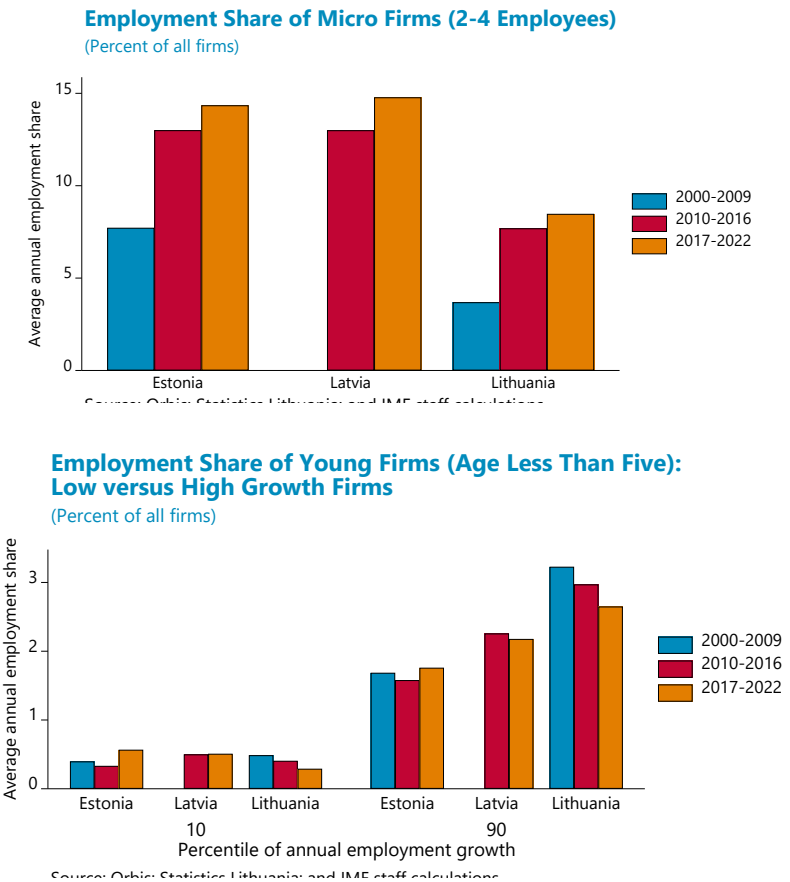
Note: Firms with only one employee are dropped from the sample.

Entrant firms are smaller, have less experience, and may lack the resources and established networks of incumbents. However, our conjecture is that their average productivity level may have remained lower than incumbent firms for longer due to barriers to growth. For instance, they may have limited

access to finance due to the lack of tangible assets as collateral. Young firms may also lack access to skilled labor.

12. We find that the employment share of micro firms increased over time in Estonia and the other two Baltic economies over the past few decades (Figure 7). Labor productivity growth slowed down during the same period. With labor trapped in stagnant micro firms, aggregate growth may have also slowed. Our results suggest that fast-growing young firms take up a bigger share of employment (2-3 percent in the case of Estonia) than slow-growing young firms.

Figure 7. Employment Share of Micro Firms and That of Young Firms



Sources: Orbis, Statistics Lithuania, and IMF staff calculations.

Note: Firms with only one employees are dropped from the sample.

However, their footprint in the aggregate economy remains small compared to more advanced economies and especially the United States, where the corresponding employment share is about 6 percent.

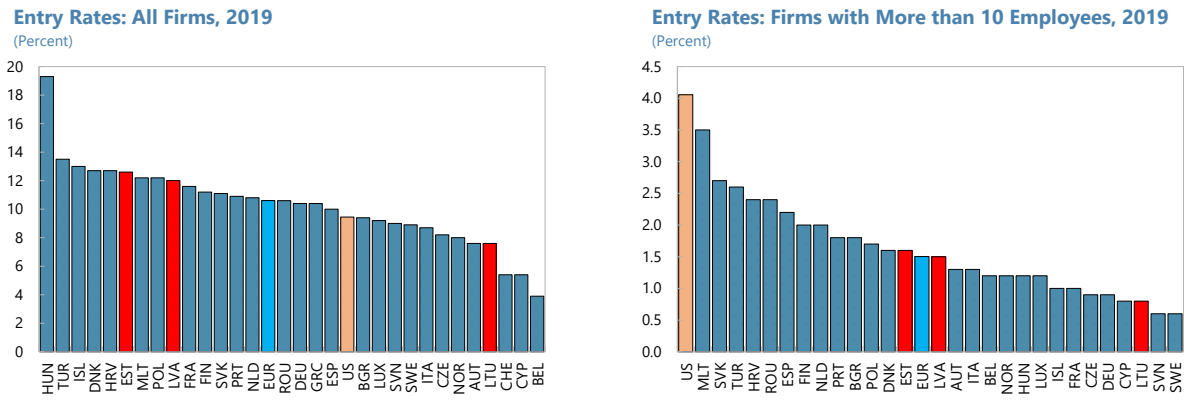
Policy Implications

13. Policy makers need to address the constraints faced by young firms to promote productivity growth. Firm-level data on productivity may help distinguish between temporary low productivity of startups from persistently low productivity of nonviable firms. Government programs should target innovative young firms which support long-term economic growth, while implementing measures to improve the allocation of capital and labor.

Supporting High-Quality Entry

14. Firm entry rates in Estonia are higher than the EU average even though entry rates for firms with more than 10 employees are lower (Figure 8). This suggests that barriers to entry are not a major obstacle to productivity growth. However, responding to the persistently low productivity growth of young firms, policy makers may implement targeted policies supporting high-quality entry. For instance, targeted subsidies funding R&D intensive startups with high growth potential may help foster productive new firms. Moreover, high-potential new firms may benefit from policies addressing learning processes. This may include support for skilled workforce training, and programs facilitating the adoption of new technologies.

Figure 8. Firm Entry Rates



Sources: OECD DynEmp; Business Dynamics Statistics; IMF staff calculations (2024 October Europe Regional Economic Outlook).

Facilitating Efficient Exit

15. Policy makers may also streamline insolvency procedures to allow unviable firms to exit quickly and free up resources for productive uses. The authorities should limit subsidies or bailouts for those firms with no viable path to profitability, carefully distinguishing unviable firms from startups with equity gaps in their early growth phase due to R&D or other investments. Policy makers should target their support towards innovative firms and focus their efforts on the adoption

of new technologies in traditional sectors, which may help facilitate the transition towards higher-value-added economic activities.

16. Asset recovery rates during insolvency processes are relatively low for Estonia and the rest of the Baltic region, as compared to other OECD economies. Lenders often require substantial collateral to mitigate risks, which can limit access to finance for small and medium-sized enterprises (SMEs) and startups that may lack sufficient assets. Authorities could consider introducing more standardized valuation of collateral and allow the use of movable properties as collateral.

Reducing Regulatory Burdens

17. Estonia features more flexibility than the OECD average[2] in economy-wide product market regulation indicators, reflecting a relatively competition-friendly regulatory framework. However, there are some areas for improvement. The authorities could reduce sector-specific barriers to entry in road and air transport, and mobile e-communications. For instance, policy makers could simplify licensing processes for new transport operators and reduce the regulatory burdens that disproportionately affect small operators. For mobile e-communications, policy makers could expand spectrum availability and encourage existing operators to share infrastructure, to allow new operators to enter the market. Policymakers could also simplify licensing processes and strengthen lobbying transparency.

Improving Allocative Efficiency of Capital and Labor

18. There is both anecdotal and empirical evidence that firms in the Baltic region are constrained by lack of access to finance and skilled labor and that the easing such constraints may help boost productivity growth (for instance, see Foda and others 2024). For example, in the case of Estonia, about 70 percent of the firms surveyed by the 2024 European Investment Bank reported dissatisfaction with external finance received in the last financial year[3]. Policymakers could provide targeted grants or subsidies to innovative firms expected to become more productive than incumbent firms, or for activities that enhance productivity, such as investment in R&D.

19. Authorities should endorse EU-wide reforms to deepen and integrate capital markets, which will help innovative firms have access to more diversified sources of funding. Domestic capital markets reforms can also alleviate financial constraints for productive firms which have a high share of intangible assets and lack collateral. Expanding the availability of venture capital and equity financing, including by facilitating investments by second-pillar pension funds, would improve access to finance and promote capital market deepening, while alleviating pressure on public finance.

[2] See OECD country reports on product market regulations at Product market regulation | OECD

[3] The 2024 European Investment Bank Investment Survey shows that 70 percent of surveyed firms report dissatisfaction with external finance received in the last financial year. The previous 2023 survey reports that 30 percent of firms report such dissatisfaction.

20. When it comes to constraints in terms of access to talent, the authorities could consider measures to accelerate the integration of high-skill migrants. Another area of consideration relates to higher-education policy. The authorities could consider making higher-education programs more relevant to market demand, such as those with a focus on STEM areas. Universities could consider charging a reasonable tuition fee and provide scholarships for students from low-income families and in STEM programs.

21. In summary, policies should aim to lower barriers to scale-up for high-potential startups and allow more competition in product markets, speed up the learning curve for young firms, and facilitate the exit of unviable firms under an efficient framework. They should also reduce distortions in capital and labor markets to facilitate more efficient resource allocation towards high-productivity firms. For instance, policies should ensure that productive new firms can access financing for scaling up, including via venture capital or public-private partnerships. Deepening the EU single market would also offer more opportunities for small companies to scale up and become more productive, including through leveraging the Savings and Investment Union.

C. Conclusion

22. Our findings highlight the crucial roles of allocative efficiency and firm dynamics in influencing productivity growth in Estonia. Policies should aim at facilitating access to finance and skilled talent for high-productivity firms. Innovative firms lacking tangible assets as collateral can benefit from a more developed domestic capital market and a potential Savings and Investment Union in Europe. Migration and active labor market policies may be enhanced to allow faster integration of high-skilled migrant workers. Education policies could also be adopted to improve availability of STEM programs and provide more incentives for local talents to stay in the domestic economy.

23. Regulatory policies should facilitate the exit of unviable firms, freeing up resources for productive and innovative firms. Product market regulations could be made even more flexible to allow more competition and provide more incentives for firms to innovate. For further investigation, it would be interesting to explore specific case studies of successful high-quality entrants in Estonia and assess the effectiveness of different policies aimed at promoting competition. By strategically focusing on these areas, the Estonian economy can potentially enhance its productivity and global competitiveness.

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