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Allocative Efficiency, Firm Dynamics, and Productivity in the Baltics

Bingjie Hu and Can Ugur

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Allocative Efficiency, Firm Dynamics, and Productivity in the Baltics

Prepared by Bingjie Hu and Can Ugur

Authorized for distribution by Vincenzo Guzzo
July 2025

ABSTRACT: 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.

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SELECTED ISSUES PAPERS

Allocative Efficiency,Firm Dynamics, and Productivity in the Baltics

Republic of Estonia

Prepared by Bingjie Hu and Can Ugur

INTERNATIONAL MONETARY FUND

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Prepared by Bingjie Hu, and Can Ugur

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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.

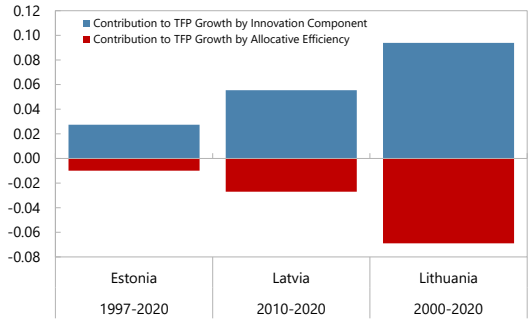
A. Introduction and Literature Review

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)



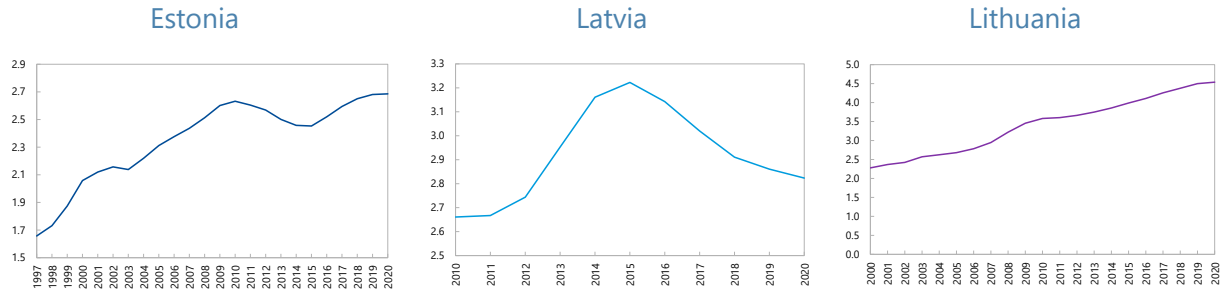
Sources: Orbis; Statistics Lithuania; EUKLEMS; AMECO database; and IMF staff calculations.

[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.

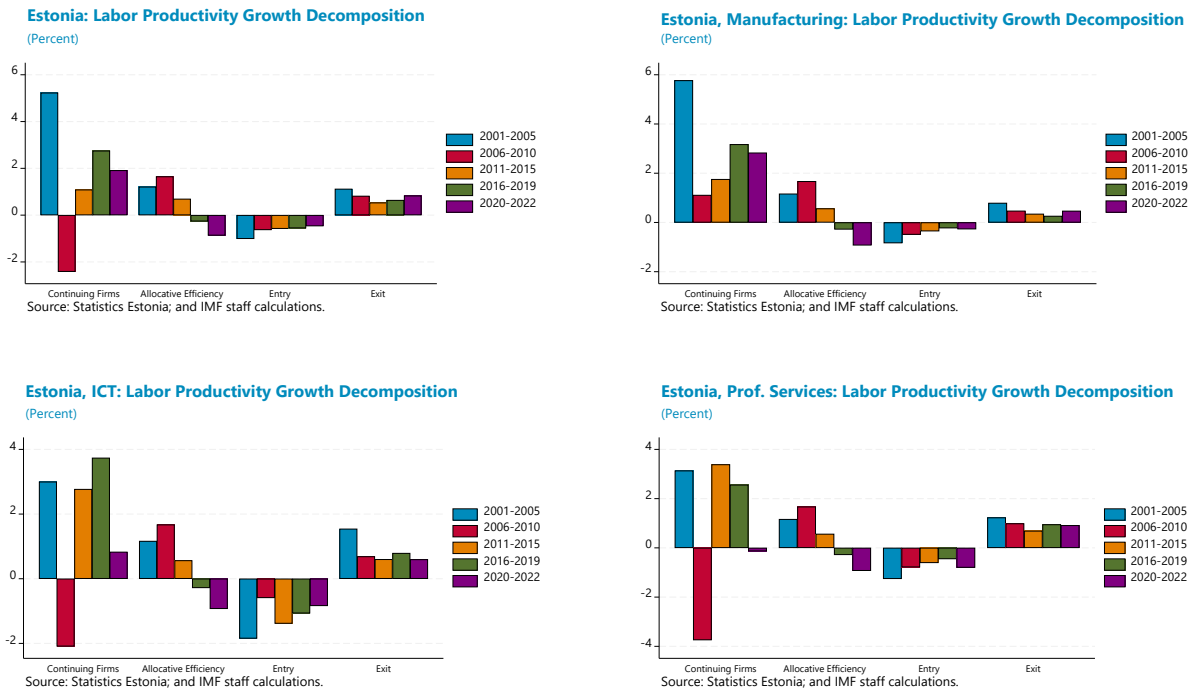
The first term in the expression represents within-firm average productivity growth for continuing firms; the second term represents the change in allocative efficiency among continuing firms; the remaining terms represent the aggregate contribution of net entry. We calculate the decomposition for each 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.

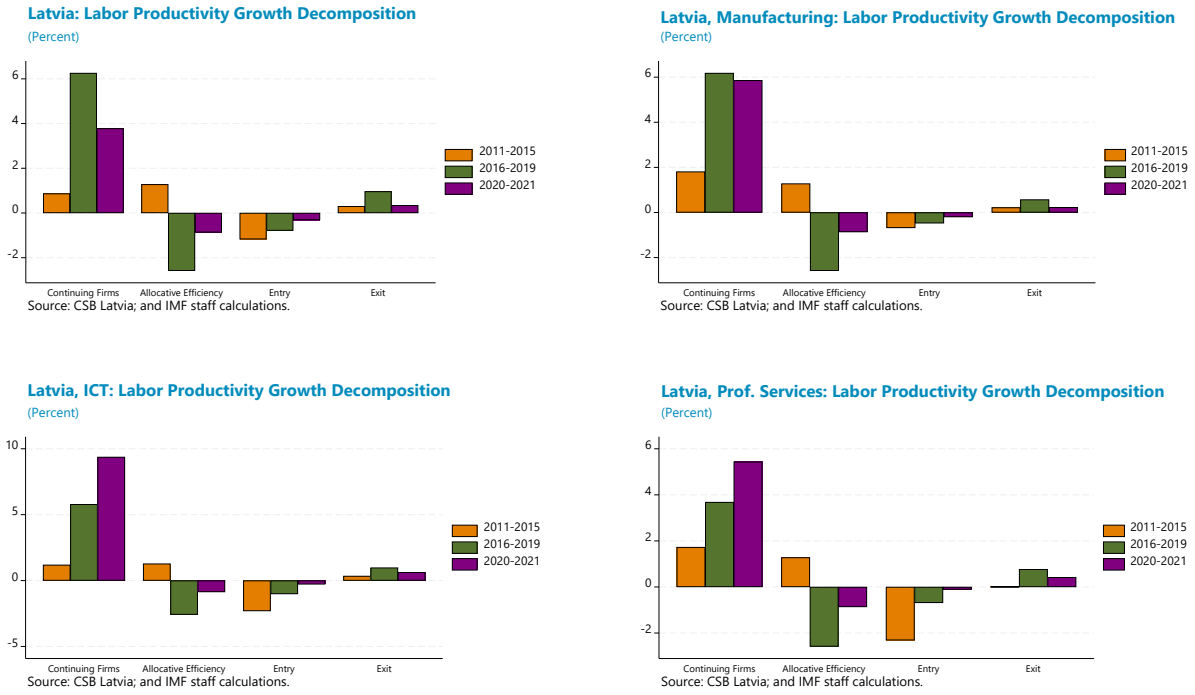
8. The contribution of firm entry is negative, suggesting that entrant firms have lower labor productivity on average than incumbent firms. The contribution by firm exit to labor productivity growth is positive throughout the sample period, and increasingly so after 2015. For productivity to grow, more 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.

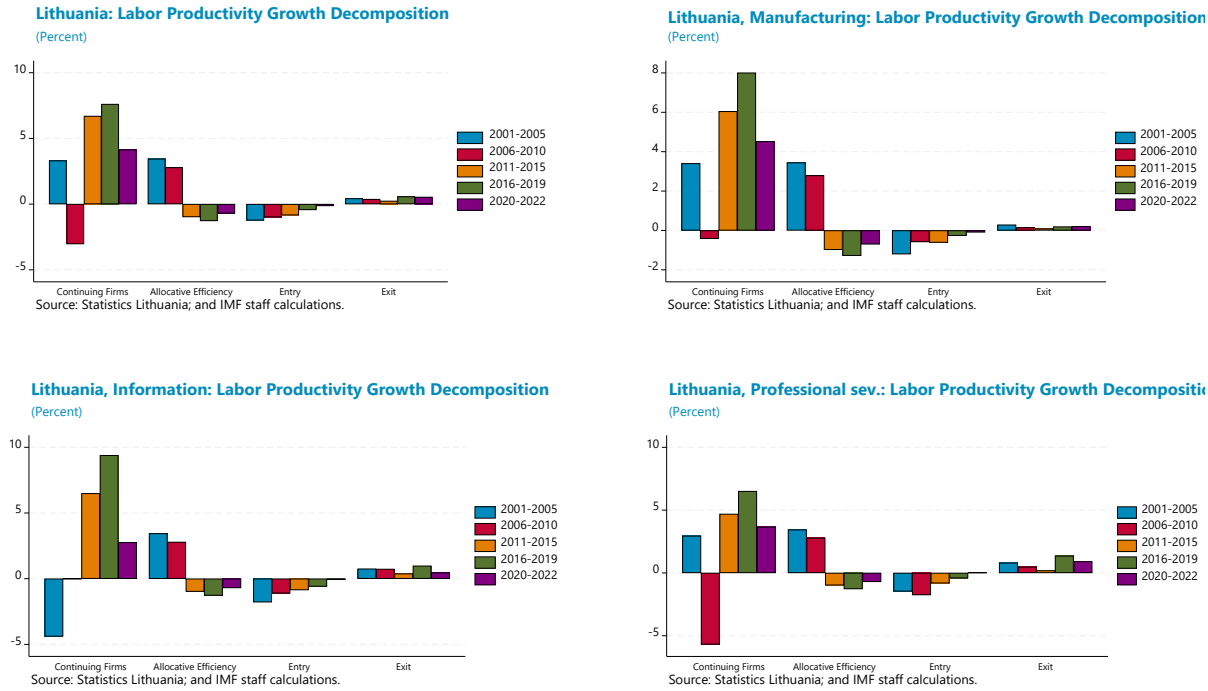
9. The results obtained using administrative data for the industry level are consistent with the aggregate ones. For instance, the contribution by allocative efficiency to labor productivity growth is negative for industries such as agriculture, manufacturing, construction, wholesale, and retail trade. 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



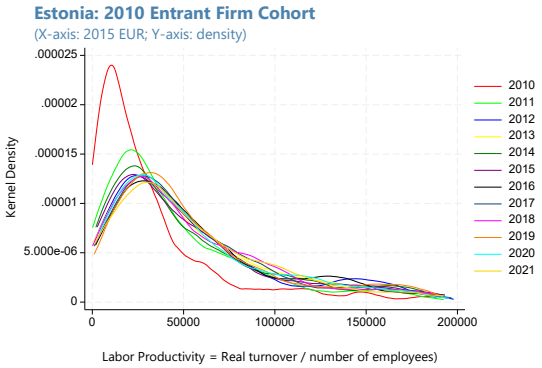
Note: Firms with only one employee are dropped from the sample.

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.

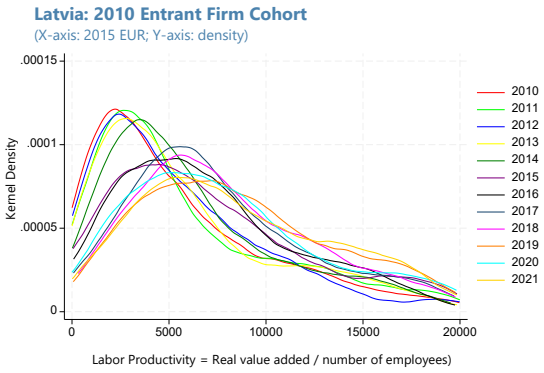
Discussion of the Results

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.

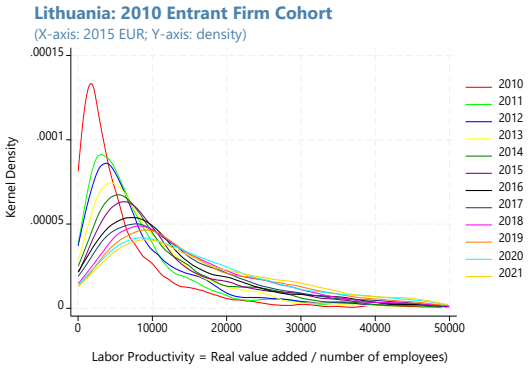
Figure 6. Labor Productivity Distribution of Entrant Firms



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.

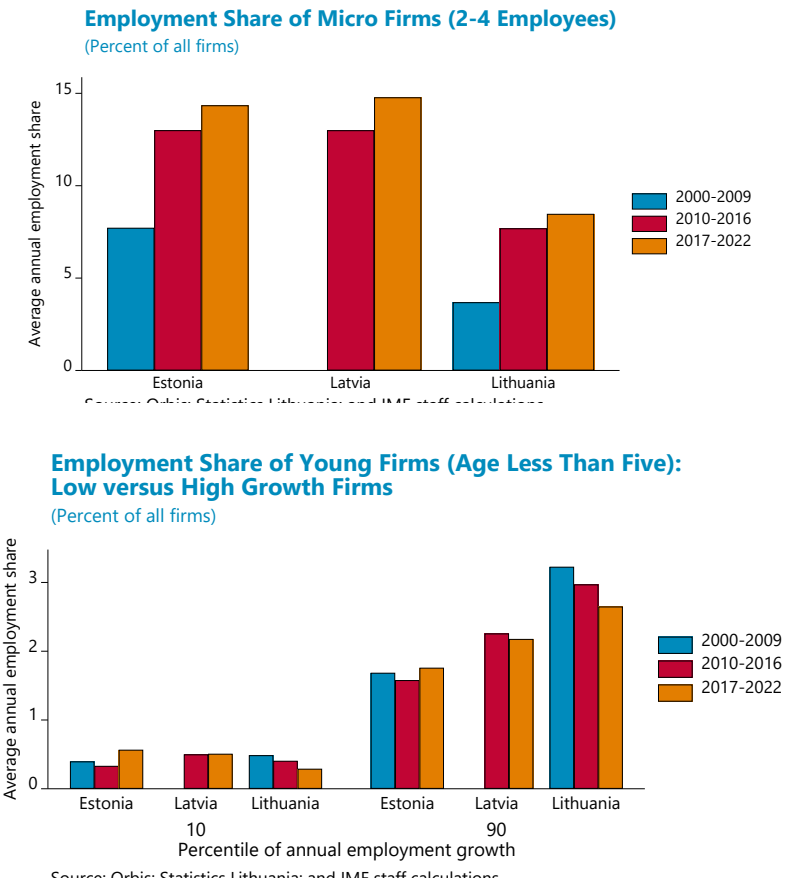
Note: Firms with only one employee are dropped from the sample.

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.

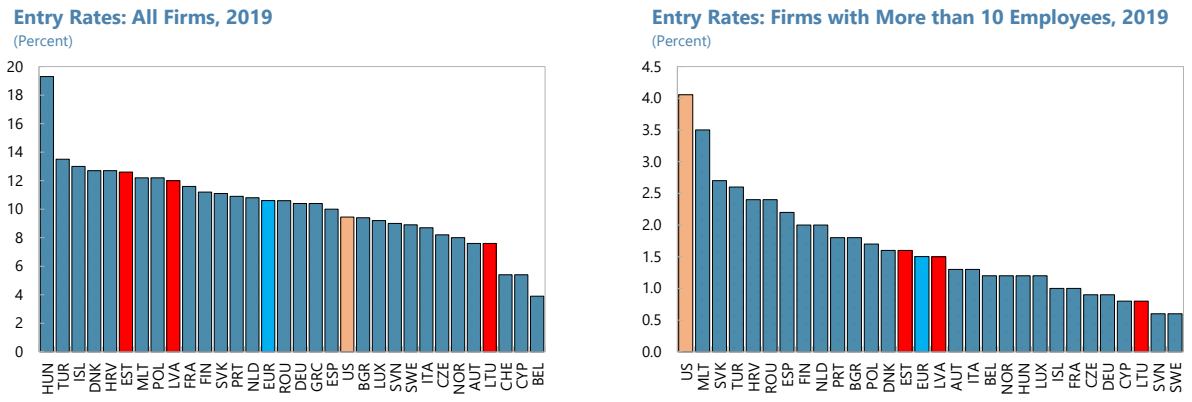
Policy Implications

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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