INTERNATIONAL MONETARY FUND

IMF Country Report No. 20/13

REPUBLIC OF ESTONIA

SELECTED ISSUES

January 2020

This Selected Issues paper on Republic of Estonia was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed on January 2, 2020.

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International Monetary Fund
Washington, D.C.

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January 2, 2020

Approved By
European Department

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ASSESSING COMPETITIVENESS AND EXPOSURE TO SHOCKS INTEGRATING GLOBAL VALUE CHAINS: AN APPLICATION TO ESTONIA[1]

Standard real effective exchange rates (REER) indexes assume trade is only in final goods. But like most European economies, Estonia is highly integrated into global value chains (GVCs). This implies that assessments of competitiveness should take into account trade in value added. Based on a structural model, the paper assesses competitiveness and exposure to trade shocks accounting for the GVC participation in Estonia. The analysis using a REER index considering the GVC architecture suggests potential competitiveness problems in Estonia. The paper also estimates the impact of overvaluation (and appreciation) of the GVC related REER measure on value added export and real GDP growth and finds observable effects. Further, trade tension induced tariff hikes may have important costs for value added produced in Estonia.

A. Introduction

1. Competitiveness is an important component in a country's macroeconomic performance. Policy makers are typically interested in how their country's exports stack up against those of their competitors (Bayoumi, et al, 2018). Finding a loss of competitiveness is helpful in assessing a build-up of imbalances and to guide policies for a smooth adjustment path. This is particularly important for countries like Estonia that belongs to a monetary union. The adoption of the Euro in 2011 has been beneficial overall but it has eliminated the availability of independent exchange rate policy and monetary policy as a tool of addressing macroeconomic imbalances.

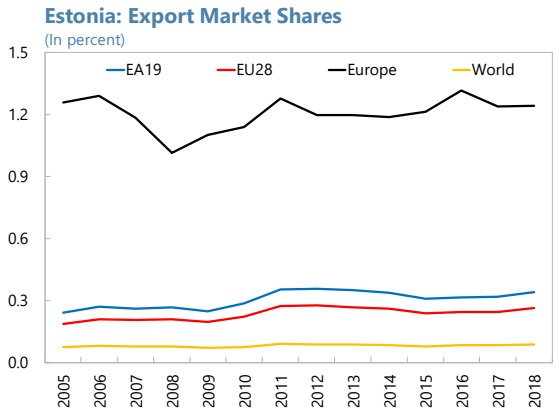
2. Gauging competitiveness routinely relies on a package of different exercises. The real effective exchange rate (REER), which provides an aggregate measure of relative changes in international prices by weighting exchange rates based on trade patterns, are the standard metric for measuring such competitiveness. However, empirical analysis of exchange rates presents a range of conceptual and methodological limitations. Thus, in addition non-RER approaches are used and take into account export sector performance, level of production costs, and the quality of the business environment.

3. In the case of Estonia, conventional methodologies are providing different results. Exports of goods to foreign markets as measured by the relative market share have been stable (Figure 1). Price competitiveness as measured by the nominal effective exchange rate (NEER) has been stable since 2015 despite fluctuating within years (Eesti Pank). REER shows signs of appreciation after low inflation during and are above global financial crisis levels. The rise in

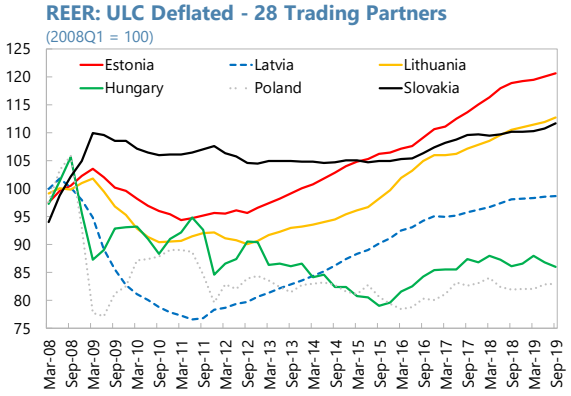
[1] Prepared by Rodgers Chawani and Kodjovi Eklou.

REER based on unit labor costs has been higher compared to peers (Figure 1) reflecting partly a tightening labor market. The current account surplus has been volatile, but constantly in surplus. Synthetic survey-based indices[2] of quality of business climate indicate a slight deterioration in competitiveness ranking. However, in assessing competitiveness, these indicators assume that only final products cross borders and do not take into account the global value chains (GVCs) effects, that is the impact of the production processes have become internationally fragmented and trade in intermediate goods and services has substantially increased. Thus, in assessing Estonia's competitiveness, global value chains (GVCs) should deserve more attention as it is more involved in GVCs compared to peers.

Figure 1. Evolution of Competitiveness



Sources: Direction of Trade Database and IMF staff calculations.



Sources: European Commission; Haver Analytics; and IMF staff calculations.

4. Estonia has participated extensively in GVCs. Its participation is about 75 percent compared to its Baltic peers Lithuania (64 percent) and Latvia (60 percent). Regionally, its participation exceeds that of the EU28 average. In terms of the sectoral dimension of production linkages, the increased participation has been mainly spurred, inter alia, by use of foreign intermediates in exports (backward participation)[3] especially in electrical and machinery, textiles and apparel, petroleum and chemicals, transport, metal products, and wood and paper (Figure 2). Estonia incorporates foreign value-added intermediate imports mainly from Finland, Russia, Germany and Sweden. Forward participation, as measured by the amount of value added exported as inputs, is predominantly with Finland and Sweden and is focused mainly in the business and financial services, transport, petroleum and chemicals, woods and paper, and agricultural sectors. The nature of GVCs participation is different for services and manufacturing

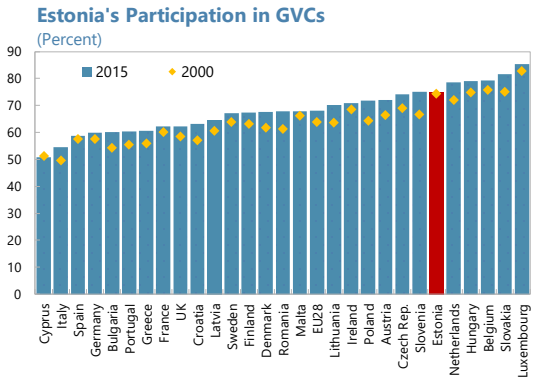
[2] "The Global Competitiveness Report, 2018, "World Economic Forum and "Ease of Doing Business," 2019 World Bank.

[3] Forward participation refers to the extent to which partner countries use Estonia's value-added exports as inputs in their own exports while backward participation refers to the extent which Estonia uses foreign intermediate value added to generate output for its own exports.

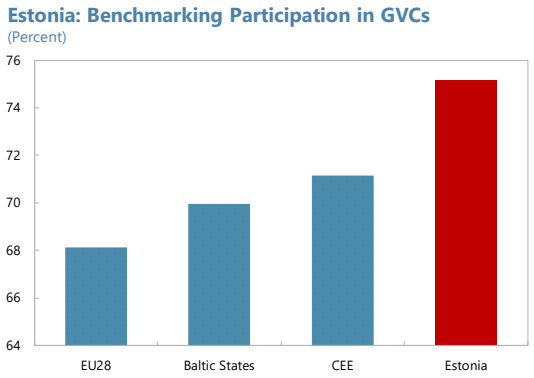
sectors with services exhibiting more forward linkages (Banh, Wingender and Gueye et al, 2019, forthcoming).

5. This Selected Issue Paper (SIP) strengthens the analytical underpinnings of competitiveness assessments and exposure to shocks by incorporating GVCs. In particular, we use the structural model developed by Bems and Johnson (2017) to derive REER based on value added (VA-REER) that accounts for supply chain linkages by mapping underlying trade in inputs and final goods. The VA-REER thus derived from the structural model is also used to investigate the implications of its over-valuation for value added exports and growth. The paper concludes by discussing the polices needed to foster competitiveness and resilience to external shocks, in the context of GVC.

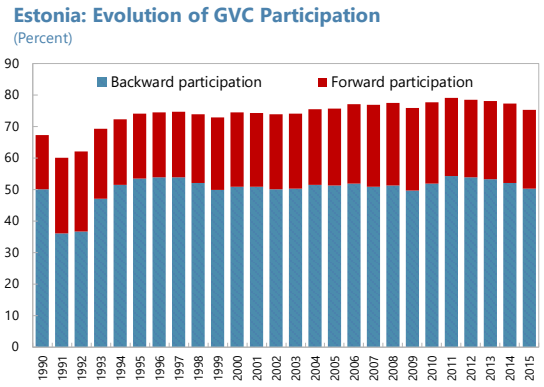
Figure 2. Global Value Chains Participation



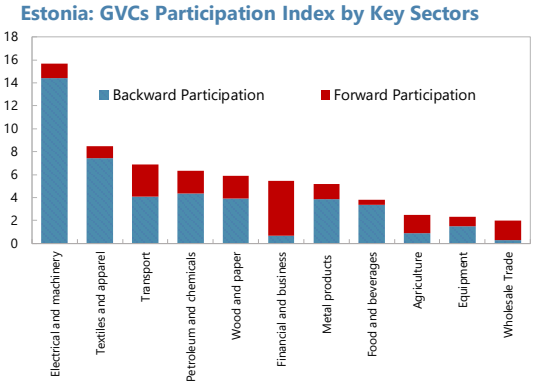
Sources: UNCTAD-Eora Global Value Chain Database.



Sources: UNCTAD-Eora Global Value Chain Database.



Sources: EORA Input-Output database and IMF Staff Calculations.



Sources: EORA Input-Output Database and IMF Staff Calculations

B. Assessment of Estonia's Competitiveness Based on Value Added REER

6. Using a structural model that accounts for supply chain linkages and trade in value added we assess Estonia's competitiveness. We employ a structural framework developed by Bems and Johnson (2017) with the objective to compute a REER index that replaces the weights of trading partners based on their gross trade flow shares with Estonia (conventional REER

weights) with weights based on trade in value added.[4] We use the 2016 vintage of the World Input-Output Database (WIOD, Timmer et al., 2015) to compute the value added REER of Estonia, taking into account bilateral trade in value added.[5]

7. The conventional REER is derived from a log-linearization of the standard Armington CES demand system as follows:[6]

$$Conv\ REER_i = \sum_{j \neq i} \left[\frac{1}{S_i} \sum_k \left(\frac{p_i D_{ik}}{p_i D_i} \right) \left(\frac{p_j D_{jk}}{P_k E_k} \right) \right] (\hat{p}_i - \hat{p}_j) \ (1),$$

$$\text{where} \qquad S_i = 1 - \sum_k \left(\frac{p_i D_{ik}}{p_i D_i} \right) \left(\frac{p_i D_{ik}}{P_k E_k} \right)$$

In this expression, D_{ik} denotes country k's demand for output from i, P_k is the price index for real expenditure by country k on output from all countries (E_k), and D_i is the total demand for country i's output. This conventional REER thus features the so-called double export weights for bilateral relative price changes, with a weighting scheme accounting for head-to-head competition between i and j in all destinations k (through $\frac{p_j D_{jk}}{P_k E_k}$) and the share of each destination in country i's total sales (through $\frac{p_i D_{ik}}{p_i D_i}$).

8. The value-added REER (VA-REER) is derived from a theoretical framework that explicitly distinguishes between gross output and value-added, by modeling production and trade in final goods and inputs. The general expression of the VA-REER is given by:

$$VAREER_i = \sum_{j \neq i} \left[\sum_k \left(\frac{-T^{ij}}{T^{ii}} \right) \right] (\hat{p}_i^v - \hat{p}_j^v) = \sum_{j \neq i} \left[\frac{1}{S_i} \sum_k \left(\frac{p_i^v V_{ik}}{p_i^v V_i} \right) \left(\frac{p_j^v V_{jk}}{p_k^f F_k} \right) \right] (\hat{p}_i^v - \hat{p}_j^v) \ (2) \ ,$$

$$\text{where} \qquad S_i = 1 - \sum_k \left(\frac{p_i^v V_{ik}}{p_i^v V_i} \right) \left(\frac{p_j^v V_{ik}}{p_k^f F_k} \right)$$

In this general formula, the REER index features weights $\frac{-T^{ij}}{T^{ii}}$ attached to bilateral relative value-added prices changes. The second part of the expression shows a version that assumes

[4] This value-added REER is obtained as an aggregation of bilateral value-added price changes into an index that measures the average multilateral price of domestic relative to foreign value added. In this index, the weight attached to bilateral price changes depends on the cross-price elasticity of demand, that is the elasticity of demand for value added from a given country with respect to another country's value-added price. In addition, this cross-price elasticity depends on the interaction of the global input-output structure with relative elasticities in production versus consumption.

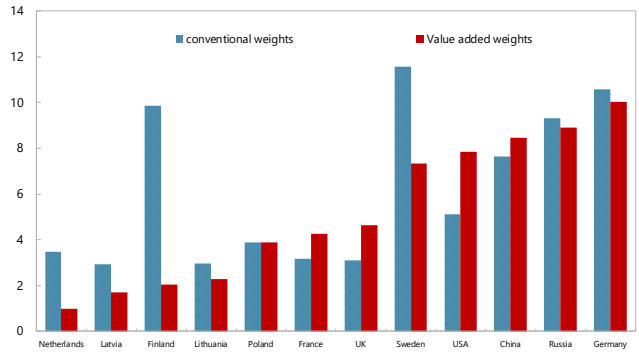
[5] Given high persistency in the weights, we assume that they remain constant from 2014 through 2018.

[6] See Bems and Johnson (2017) for details on the derivation. The terms $\hat{x}$ represent a first difference in logarithm of *x*.

equal elasticities (elasticity of substitution across final goods, across inputs, and between inputs and value added in production). Here, V_{ij} denotes the value added produced by country i that is ultimately absorbed in country j, $p_i^v V_{ij}$ is the value-added exports from country i to country j. This second part of the expression is similar to the conventional REER index as it features a double-weighting scheme, but focusing on value added (V_{ik} denotes country k's demand for value added from i) and final goods ($p_k^f F_k$ refers to expenditure on final goods).

9. We use the VA-REER that accounts for the global input output linkages where weights are a complex function of trade flows and elasticities. In its version capturing the full global input-output linkages, it is assumed that the elasticity of substitution across inputs, and the elasticity of substitution between input and value added in production are zero (Leontief production function). This property captures the well-known view of inflexible or rigid production chains, which implies that it is difficult for producers to substitute across suppliers in the short run (see for instance Boehm, Flaaen, and Nayar, 2019; Bayoumi et al, 2019). This measure of VA-REER has also the property of putting more weight on final goods trade, and lower weights on country with strong bilateral input linkages as discussed further below.

Bilateral Conventional and Value-Added Weights (2013–15)
(In percent)

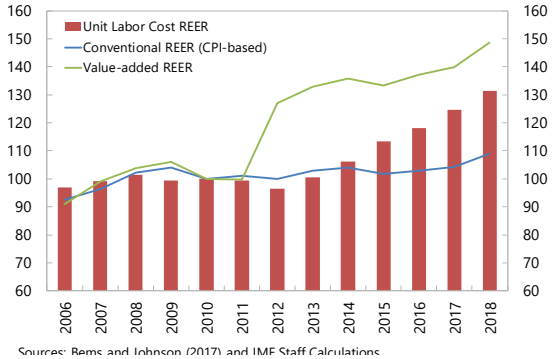


Sources: IMF, Timmer et al (2015) , Bems and Johnson (2017) and IMF staff calculations

10. The difference between value-added weights and gross weights are non-negligible for most trading partners. Overall, bilateral value-added weights are lower than conventional for all countries, but the difference is more pronounced for Finland and Sweden with the absolute percentage of deviation ranging from 36 percent to 79 percent, respectively. This represents a key feature of the GVC-based model that suggests that bilateral trading partners with stronger input linkages tend to have lower cross-price elasticities and hence lower value-added than conventional weights, in line with regional supply chains (Bems and Johnson, 2017 and Bayoumi et al, 2018). However, in some cases the absolute percentage deviation is lower for China, USA and averaging 5 percent, especially for Russia, Germany and negligible for Poland. These data show again how it is important to take into account GVC in assessing Estonia's competitiveness.

11. VA-REER shows larger changes in price competitiveness compared to conventional REER for Estonia. A comparison of the dynamics of the VA-REER with conventional REER post-adoption of the Euro shows a rising pattern of loss of competitiveness. Estonia's VA-REER has appreciated more rapidly than the conventional REER (see chart below). Interestingly, the peaks and troughs of the VA-REER seems to track consistently the path of unit labor costs and the correlation between the two is high at 0.8, suggesting competitiveness in supplying domestic value added might be highly dependent on the pickup of labor costs. This implies that VA-REER could offer a complementary assessment that enriches the interpretation of more traditional measures based on gross trade.

Price Competitiveness Developments
(Index 2010=100)



Sources: Bems and Johnson (2017) and IMF Staff Calculations

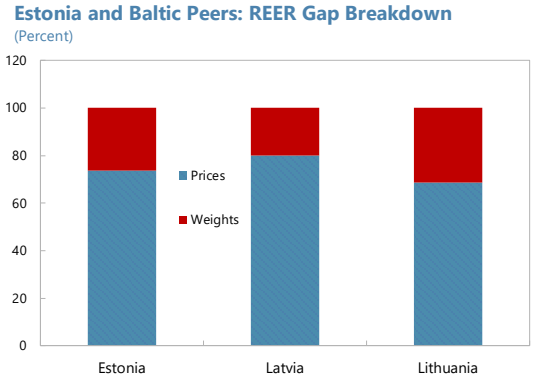
12. We examine factors that could explain the gap between the VA REER and the conventional REER to inform possible drivers of loss of competitiveness. The gap between the VA REER and the conventional REER contains a price and a weight component that can be modeled as follows:

$$VAREERi - Conv\ REERi$$
$$= \sum_{J \neq i} (\omega_{ij}^{v} - w_{ij}^{Armington})(\hat{p}_i^{v} - \hat{p}_j^{v})$$
$$+ \sum_{j \neq i} w_{ij}^{Armington} [(\hat{p}_i^{v} - \widehat{CPI}_i) - (\hat{p}_j^{v} - \hat{E}_{i/j} - \widehat{CPI}_j)]$$

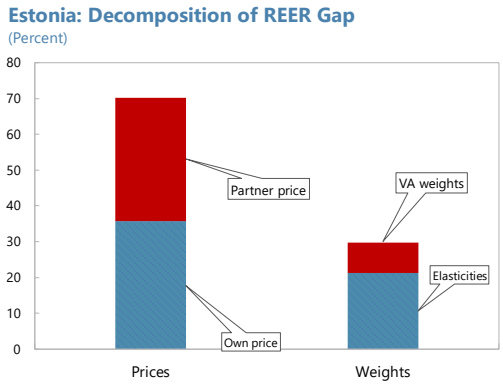
where, the first part captures the role of differences in weights between the value-added and the conventional REER. The second term rather captures the differences in prices used in constructing the two REER indexes. This price component has also two subcomponents which are the own-price component $(\hat{p}_i^{v} - \widehat{CPI}_i)$ showing the difference between the GDP deflator and the CPI, and the partner price component $(\hat{p}_j^{v} - \hat{E}_{i/j} - \widehat{CPI}_j)$. $\widehat{CPI}$ and $\hat{E}_{i/j}$ are respectively the log changes in the CPI index and the nominal exchange rate respectively.

13. The growing gap between the conventional and value-added REER is largely explained by price differentials. The decomposition reveals that the bulk of the gap—about 74 percent—is predominantly accounted by price differentials while the remaining part is explained by the weight component. A further analysis of the gap shows that half of the price gap is explained by Estonia's prices used in the VA REER (the GDP deflator) compared to the differential of partner prices. Further, value-added weights account for 29.7 percent of the gap, with a significant role for elasticities at 71.3 percent compared to the small role for weights.

Figure 3. REER Gap Breakdown



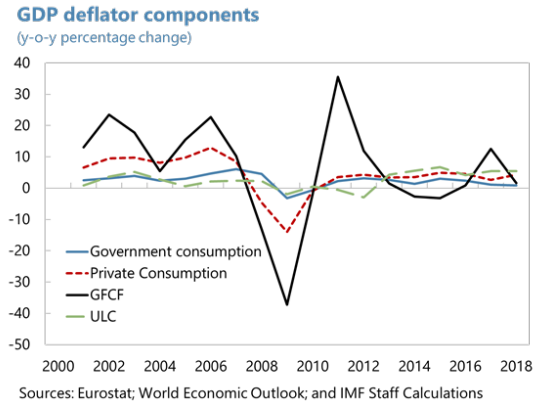
Sources: Bems and Johnson; and IMF Staff Calculations



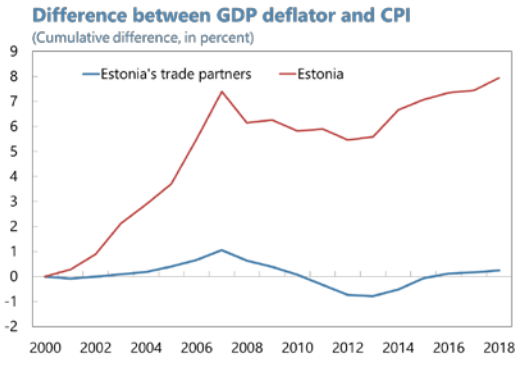
Sources: Bems and Johnson; Timmer et al; and IMF Staff Calculations

14. Estonia's price differential shows large discrepancies between the GDP deflator and the CPI. After stabilizing after crisis, the cumulative difference between the GDP deflator and the CPI has increased substantially since 2012. The GDP deflator has grown cumulatively by 16.8 percent since 2012, while the CPI has increased by 12.2 percent during the same period. A closer look at the rapid increase of the GDP deflator shows that a rise in prices of capital goods accounted mainly for the opening of the gap in the beginning of the period. However, prices of capital goods have largely decreased since 2012 (with a pickup in 2017). Decomposing the GDP deflator using the income definition of GDP reveals that unit labor costs have remained a steady driver of final output prices, increasing by about 5.3 percent annually since 2013. Furthermore, while some of Estonia's euro area trading partners may have also experienced a more rapid increase in the GDP deflator in recent years, the gap between the GDP deflator and CPI appears to be particularly large in Estonia.[7]

Figure 4. GDP Deflator Developments



Sources: Eurostat; World Economic Outlook; and IMF Staff Calculations



Sources: World Economic Outlook; IMF Staff calculation

[7] ECB (2016) discusses the decoupling of the GDP deflator and HICP in the euro area after 2014, attributing it largely to the increase in profit margins owing to an improvement in terms of trade (euro depreciation and decline in energy prices).

C. Estonia's Exposure to Shocks in a World of Global Value Chains

VA-REER Shocks, Value Added Export Performance, and Growth

15. The impact of VA-REER over-valuation shocks on value added export growth can be estimated empirically. A local projection approach à la Jordá (2005), could be used to estimate the dynamic effect of VA-REER misalignment (over-valuation) from shocks on real value-added export growth. This methodology has the advantage of being robust to misspecification as the impulse responses can be defined without knowing the data generating process, and even when its Wold decomposition does not exist (see for instance Koop et al., 1996; Potter, 2000; and Jordá, 2005).[8,9]

16. The model specification is as follows:[10]

$$\Delta Y_{c,t+h} = \delta_j \sum_{j=0}^{h} \Delta[\ln(VAREER) - \overline{\ln(VAREER)}]_{c,t-1+j} + \theta_h \, \mathrm{X}_{ct-1} + \alpha_c + \tau_t + \varepsilon_{c,t+h} \quad (3)$$

Where the dependent variable ($\Delta Y_{c,t+h}$) is the change in the logarithm of real value added exports at horizon *h;* $\Delta[\ln(VAREER) - \overline{\ln(VAREER)}]$ is the change in the VAR misalignment with $\overline{\ln(VAREER)}$ representing the long-term value of the VA-REER (obtained through Hodrick-Prescott filter), δ_j are the coefficients of interest for each horizon h=0,1,2,3; α_c is a country fixed effect; τ_t is a time fixed effect; X is a set of control variables including (inflation, real GDP per capita, net foreign direct investment inflows and external demand).

17. Overvaluations in VA-REER are estimated to have a negative and persistent effect on value added exports growth. Our estimates use panel data of 27 European countries over the 2003–13 period and the VA-REER index constructed using the structural framework above. The regressions results suggest that a 10-percentage point over-valuation (positive deviation relative to the long-term value) leads to a statistically significant reduction in value-added export growth by 0.8 percentage point the first year which cumulates to 1.5 percentage point the third year (Figure 3).

18. The impact of the VA-REER over-valuation depends on the degree of integration into GVCs. We estimate the same equation on the subsample of countries highly integrated into GVCs defined as having a GVC participation index higher than the sample median of 69.8 versus the subsample of countries with a low level of integration into GVCs with an index below this sample median. The results show that a 10 percentage point over-valuation in the VA-REER index leads to a reduction in VA export growth by 1 percentage point in the first year and

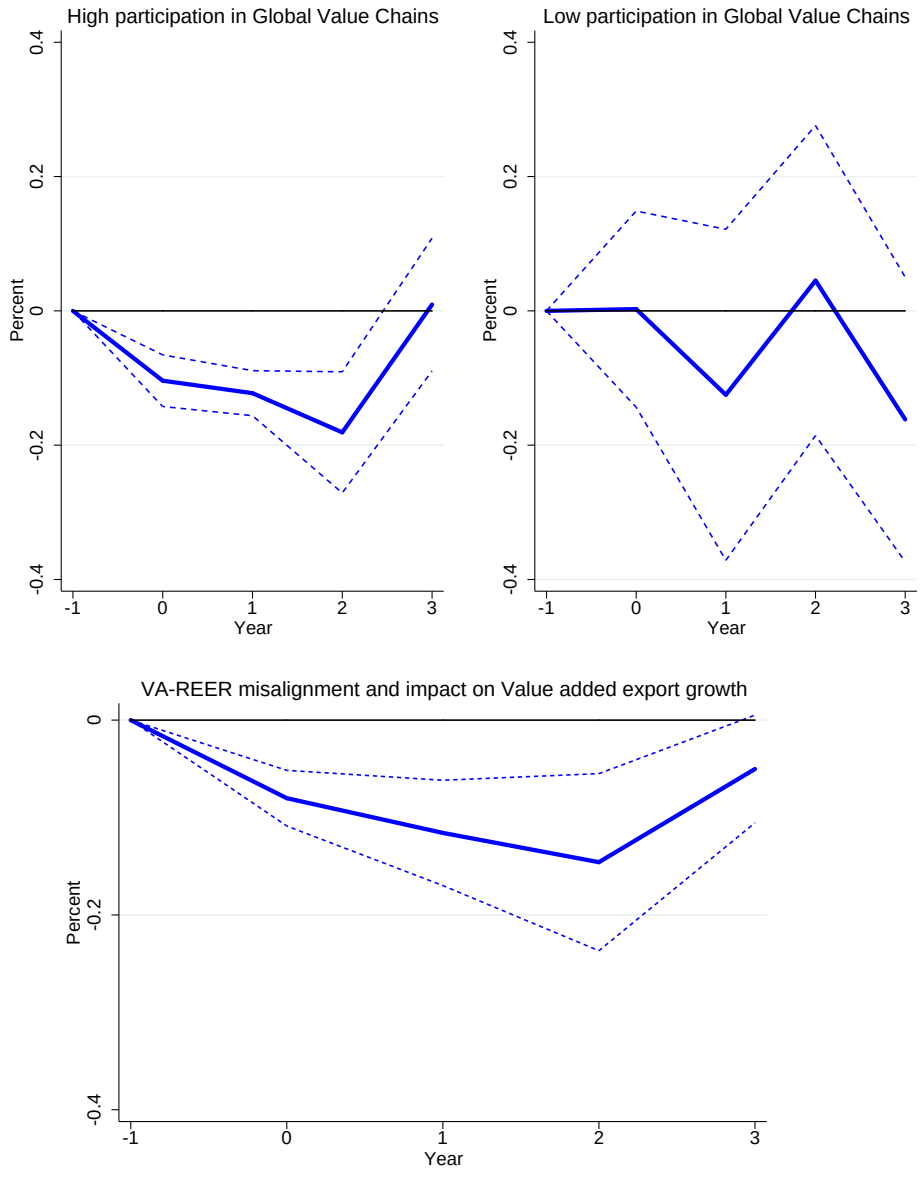
[8] See also Auerback and Gorodnichenko, 2013; Owyang, Ramey and Zubairy, 2013; Jordá and Taylor, 2016.

[9] To reduce potential bias, we implement the correction suggested by Teulings and Zubanov (2014) to control for innovations in the regressors between periods *t* and *t+h* when estimating the impulse response at horizon *h*.

[10] See "Latvia's Participation In Global Value Chains: Implications For Competitiveness and Exposure to Shocks," Republic of Latvia, Selected Issues for a similar approach estimating the effect of VA-REER appreciations.

cumulates up to 1.8 percentage point in the third year in countries highly integrated into GVCs. We do not find any statistically significant effect for countries that are weakly integrated in GVCs.

Figure 5. The Effect of VA-REER Shocks on Real Value-added Export Growth



Sources: IMF Staff estimates

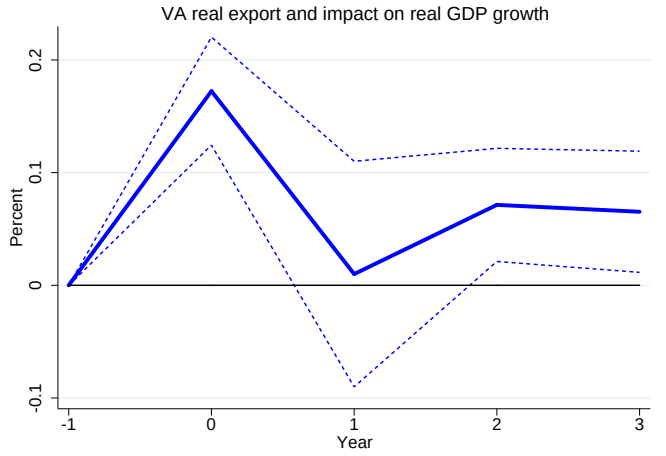
Notes: These figures show the impulse response functions (for a 1 percentage point over-valuation). The dependent variable is the real value-added export growth. Regressions include the full list of control variables, as well as country fixed effects and year fixed effects. Year 0 is the year of the shock. We corrected the Local Projection method following Teulings and Zubanov (2014). 95 percent confidence interval level in dashed lines.

19. VA-REER over-valuation thus has an impact on real GDP growth through trade channels.[11] Using the Local projection specification, we estimate the impact of VA export growth on real GDP growth. The empirical results suggest that a 1 percentage point increase in real value-added export is associated with a 0.3 percentage point increase in real GDP growth cumulatively over the 4 years (Figure 6). These estimates are used to calculate the impact of a 10 percent over-valuation in VA-REER on growth as follows:

$$\frac{\Delta\, Real\ GDP\ growth}{\Delta[ln(VAREER)-\overline{ln(VAREER)}]} = \frac{\Delta\, Real\ GDP\ growth}{\Delta\, VA\ export\ growth} * \frac{\Delta\, VA\ export\ growth}{\Delta[ln(VAREER)-\overline{ln(VAREER)}]} \quad (2)$$

A 10 percent over-valuation in the VA-REER could reduce growth rate by 0.5 percentage point.[12] These findings suggest that VA-REER over-valuations could be associated with a significant loss in competitiveness and growth.

Figure 6. The Impact of Value-added Export Growth on Real GDP Growth



Sources: IMF Staff estimates

Notes: These figures show the impulse response functions (for a 1 percentage point increase). The dependent variable is the real GDP growth. Regressions include the full list of control variables, as well as country fixed effects and year fixed effects. Year 0 is the year of the shock. We corrected the Local Projection method following Teulings and Zubanov (2014). 95 percent confidence interval level in dashed lines.

[11] We also estimate the effect of conventional CPI-based REER misalignment on value added export growth and found no statistically significant effect. Further, we estimated the effect of appreciations in VA-REER and found similar results. Also, we tested for asymmetric effects and found that VA-REER under-valuation have a strong, positive and temporary effect on value added export growth while over-valuations have a persistent negative effect.

[12] Using the formula, we calculate the impact by 0.3*(-1.5).

20. The implied estimates of the impact of VA-REER over-valuation for Estonia are expected to be large given its high integration into GVCs. Estonia is among countries that are highly integrated into GVCs, and our estimates imply a reduction in growth by 0.2 percentage point given the average over-valuation of 4 percent in the VA-REER over the period. Growth would have been higher by 0.2 percentage point on average over the period in Estonia if there were no over-valuation, and thus, if there was no such as rise in ULC, given the aforementioned strong pass-through.

Transmission of a Tariff Shock Through Global Value Chains

21. Tariff hikes would propagate through global value chains and thus affecting indirectly countries and sectors beyond those directly targeted. A tariff can affect the competitiveness of an entire value chain by amplifying trade costs as it penalizes not only the assembler of the product but also the supplier. (Yi, 2003 and Miroudot et al, 2013). Moreover, tariffs on goods can also spillover to the service sector as international trade in goods is increasingly integrated with services (OECD, 2013). Finally, escalating trade tensions could impact global economic growth directly through higher trade costs and indirectly via lower business confidence, weaker private sector investment, and tighter financial conditions (IMF, *World Economic Outlook,* October 2018).

22. Europe is vulnerable to escalated trade tensions given its trade openness and deep integration into GVCs. The exposure of European countries to US tariff shocks in value-added terms has been shown to be larger than in gross trade terms (See Huidrom et al, forthcoming).[13] Trade tensions could lead to lower investment by fueling uncertainties, (See IMF,2018b and Ebeke and Siminitz, 2018) and thus could negatively affect competitiveness. In particular, countries using foreign value added in their exports such as Estonia may become less competitive as their cost increases due to a tariff hike in the US and China.

23. We use the structural model developed by Bems and Johnson (2017) to estimate the short-run impact of changes in relative international prices induced by tariffs on demand for gross trade and value-added produced in Estonia.[14] Guided by the October 2018 World Economic Outlook, we provide estimates of the impact of trade tension on both gross trade and value-added. We thus analyze the effect of tariff imposed by the United States on its

[13] Huidrom et al (forthcoming) estimate the effect of a 5 percent tariff on all US' imports for Europe and find that it would lead to a decrease in total value-added by 0.2 percent while in gross output term it would be only 0.1 percent. In addition, they also find that most European countries are less competitive in value added terms than in gross trade flow terms.

[14] We use MATLAB code provided in the online Additional Materials of Bems and Johnson (2017) to calculate gross and value-added trade flows, partner weights, effective elasticities of substitution and demand spillovers https://www.aeaweb.org/articles?id=10.1257/mac.20150216). We use the 2016 vintage of the World Input-Output Database (http://www.wiod.org/database/wiots16) to estimate the effect of tariff for 43 countries, from 2000 to 2018. Bilateral exchange rates, CPI and GDP deflator are taken from the World Economic Outlook.

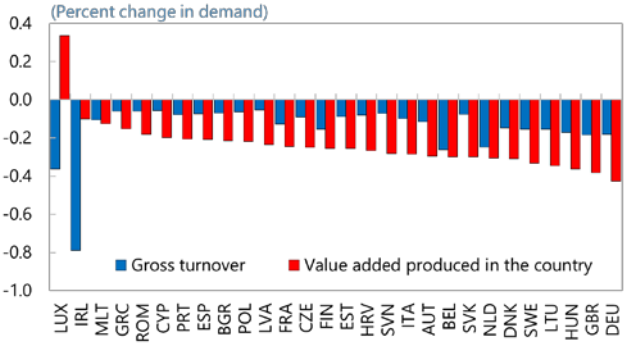
imports, with retaliation by all countries using the same tariff.[15] Because the structural model features demand functions for value added that are obtained holding countries' real expenditure levels constant, the impact of price changes on the reallocation of production across countries should be viewed as a short-run partial equilibrium effect. Further, it does not account for potential realignment of supply chains that is likely in the long-run.

24. Estonia's exposure to trade shocks from China, US, and the UK are significant. The bilateral weights implied based on trade in value added are however higher than those based on gross trade flows for China, US and UK. This suggests that Estonia has a weaker input linkage with China, US and UK and, competition with these countries is mainly on final goods (rather than on inputs). Again, because the value added embodied in each production step between countries with strong input linkages is often much lower than the gross trade flow, the VA weights are lower for these countries. Higher VA weights imply therefore a weaker input linkage. Also, it follows that China, US and UK are more important to determine Estonia's competitiveness once we account for supply chain linkages as compared to gross trade.[16] Overall, accounting for trade in value-added, Estonia would be more exposed to external trade shock (related to tariff hikes) originating in these countries than currently captured by gross trade (Figure 7). Our estimates show that, a 5.9 percent tariff imposed by the US on its imports (Layer 1), with retaliation from all countries using the same tariff, would lead to a reduction of 0.3 percent in Estonia's value added (three times larger than the reduction in gross turnover flows). A cumulated tariff shock (of all three layers equivalent to a 14.7 percent tariff) would reduce value added produced in Estonia by 0.6 percent.

25. Estonia's exposure is relatively moderate compared to most European (EU28) countries. Our estimate of the impact of the US tariff hike (under the Layer 1) yield similar effects for most European countries (except for Luxembourg and Ireland). The largest exposure to trade tensions is found in Germany (owing to the vulnerability of the car industry supply chains) where the reduction in domestically produced value-added reaches 0.43 percent.

US Tariffs (Under Layer 1) and Change in Europe's Demand by Country

(Percent change in demand)



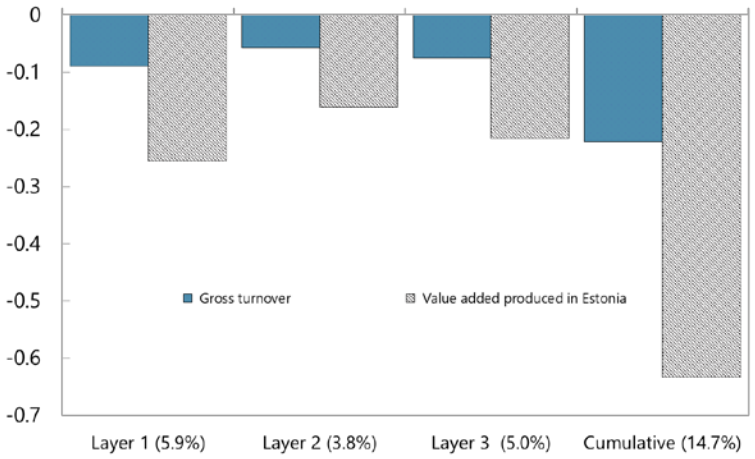
Note: Gross turnover is the sum of all intermediate and final goods transactions that occur across sectors in an economy, including gross exports.
Sources: Bems and Johnson 2017; Timmer and others 2015, IMF staff calculations.

[15] We use the equivalent of a tariff on all US imports implied by the tariffs in each layer. See chapter one of October 2018 WEO. Given the single output price assumption in the structural model, we proceed sequentially. First, we estimate the implied US demand of a tariff induced price change for all goods (except for the US). Second, we estimate the response of demand in other countries to the tariff induced change in the prices of US goods. Our estimations of the tariff impact in both steps are based on the elasticities built in the structural model.

[16] Germany has the largest weight with both concepts, but the value-added weight is lower than the conventional one.

Figure 7. Implications of Trade Tensions

Impact of Tariff Shocks Related to Trade Tension
(In percent)



Sources: IMF, Timmer et al (2015), Bems and Johnson (2017) and IMF staff calculations

Note:

Layer 1: United States imposing a 10 percent tariff on all aluminum imports, a 25 percent tariff on all steel imports, a 25 percent tariff on $50 billion of imports from China, and a 10 percent tariff on an additional $200 billion of imports from China that subsequently increases to 25 percent.

Layer 2: United States imposing a 25 percent tariff on a further $267 billion of imports from China and China responding by raising both the base that tariffs apply to and the tariff rates such that all goods imports from the United States also face a 25 percent tariff (roughly $130 billion in imports from the United States).

Layer 3: United States following through on the proposal to impose a 25 percent tariff on all imported cars and car parts (worth about $350 billion).

Cumulative: A cumulated tariff shock from the three layers

Gross turnover is the sum of all intermediate and final goods transactions that occurs across sector in Estonia.

D. Conclusions and Policy Implications

26. The value-added REER (VA-REER) index accounting for input-output linkages suggests that there could be more competitive problems for Estonia than would imply a standard REER index based on gross trade. The recent rise in unit labor cost may have been a drag on Estonia's ability to supply its domestic value added on world markets reflecting the rising labor cost and wage growth. Preventing a long-term misalignment between wage growth and productivity would help preserve Estonia's competitiveness.

27. There is significant scope to improve Estonia's competitiveness in the context of GVCs.

- Backward GVC Participation. Estonia's involvement in GVCs has mainly been toward backward participation, that is the country incorporates significant foreign value added into its own exports. Estonia's competitiveness could be enhanced by improving the degree of sophistication of its production, which would require greater use of imported intermediate goods with high-technological content. Indeed, using imported inputs allows countries to benefit from knowledge transfers, diversify their export and improve product quality (Amiti and Konings, 2017).

- Forward GVC Participation. The participation in activities such as non-transport services have been found to generate substantial productivity gains in Estonia (Benkovskis et al., 2017). Improving allocation and incentives for innovation—through better access to credit and skilled labor with knowledge of foreign markets—could yield significant productivity gains particularly for firms operating in upstream GVCs.

28. Trade tensions induced tariff hikes may have important cost for Estonia especially in term of value added produced in the country. In this regard, policies aimed at enhancing product sophistication or quality and export market diversification could mitigate Estonia's exposure to trade shocks in GVCs.

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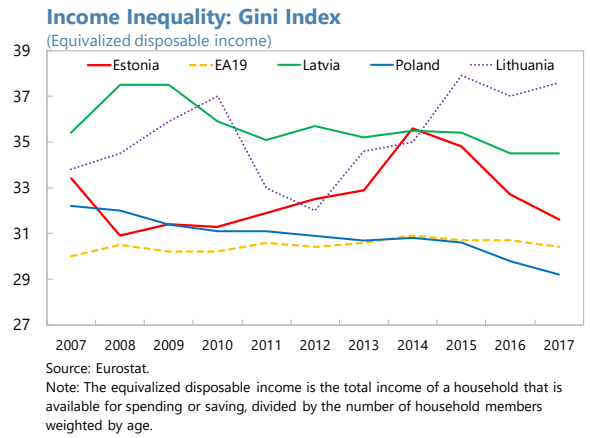
DIMENSIONS OF INEQUALITY IN ESTONIA[1]

This paper examines the different dimensions of income inequality in Estonia for a basis of policy discussions. While income inequality in Estonia has decreased over recent years, it remains high compared to the Euro area average and close to those of other Baltic countries. Using mainly quantitative approaches applied to household survey data and other sources, the paper assesses the main factors behind overall inequality and the gender pay gap (GPG). The paper also explores the potential role of institutions in explaining the large unexplained part of the GPG in Estonia. Then, the paper discusses policy options to address inequality based on an empirical analysis.

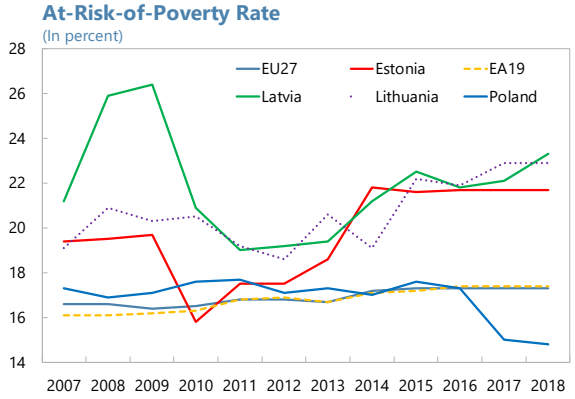
A. Income Inequality in Estonia: Current State and Recent Trend

1. Despite progress over the last decade, income inequality and relative poverty remain elevated in Estonia. After a surge over the period 2008 to 2014, income inequality has come to a declining trend, albeit close to other Baltic countries but above the EU average (Figure 1).[2] Indeed, income inequality, as measured by the Gini coefficient was among the highest in Europe in 2017. Eurostat estimates the Gini index for disposable income at 31.6 points in 2017, slightly above the EA19 average of 30.6 points.[3] Relative poverty rate, defined as the proportion of the population with a disposable income lower than 60 percent of the median disposable equivalized income, despite a small decline since 2016, was also among the highest in Europe. 2017.[4]

Figure 1. Income Inequality vs. Peers



Source: Eurostat.
Note: The equivalized disposable income is the total income of a household that is available for spending or saving, divided by the number of household members weighted by age.



Source: Eurostat.

[1] Prepared by Kodjovi Eklou.

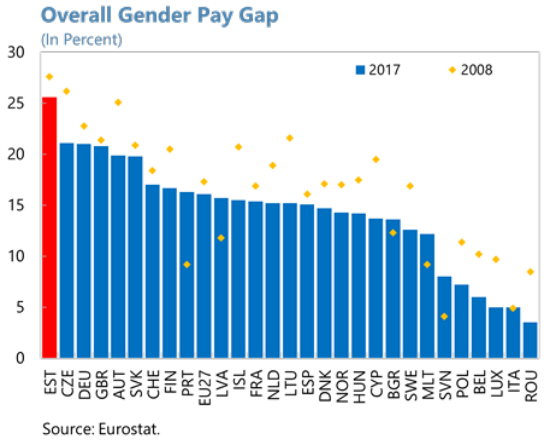
[2] The acceleration of inequality around the year 2013 and 2014 could be due to a slow-down in GDP and wage growth respectively. Real GDP growth was 1.3 percent in 2013 and wage growth has slowed down to 5.9 in 2014 (from 7 percent a year earlier).

[3] The Gini index ranges from 0 (perfect equality meaning everyone has the same income) to 100 (maximal inequality, a single person or household has all the income).

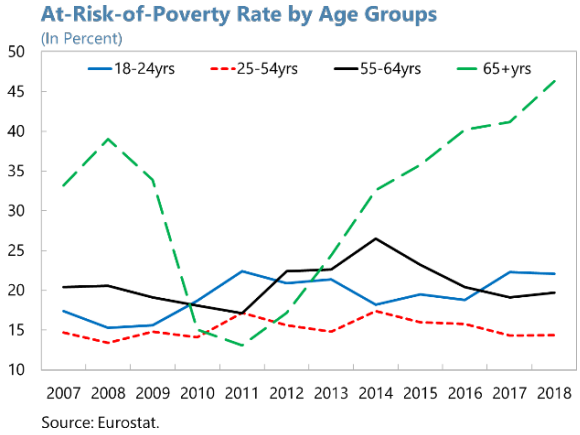
[4] The Gini index decreased further by 1 unit in 2018. The median equivalized disposable income is the total income of a household that is available for spending or saving, divided by the number of household members weighted by age.

This is the at-risk-of-poverty rate which Eurostat estimates in 2017 at 21 percent (higher than the EU27 average of 17 percent). Over the last decade, the at-risk-of-poverty rate has significantly been above EU average except in 2010 mainly because of a decline in income.

2. Inequality has been particularly elevated on gender terms. First, the gender pay gap has decreased since 2008 but remains elevated across most sectors in the economy, especially in sectors with high female concentration.[5] Sectors such as human health and social work activities, manufacturing and wholesale and retail trade have high gender pay gap and employ largely women in 2016.[6] This pervasive gender pay gap seems to put women at a high degree of vulnerability to poverty**.** The persistent at-risk-of-poverty has increased over the last decade in Estonia.[7] In 2017, the proportion of the population that was persistently at risk of poverty was 16 percent compared to the EU28 average of 11 percent. However, this proportion is higher for women: in 2017 this proportion represents 18 percent, well above the EU27 women average of 11.6 percent.[8]



3. Old-age population has been also vulnerable to poverty. Despite the rise in income across generations, the elderly has become particularly vulnerable. Real median equivalized disposable income has increased over the last decade for all age groups but the proportion of the elderly that are at-risk of poverty, has reached an historical high of 41 percent. In addition, elderly poverty has diverged from other groups particularly since 2013.



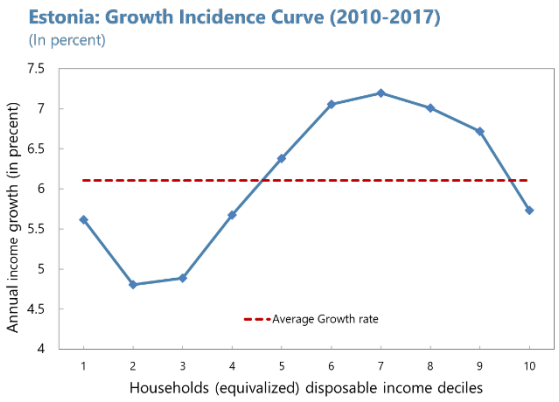
[5] Only accommodation and food service activities, and, professional, scientific and technical activities are exceptions as they have a relatively high gender pay gap.

[6] A few exceptions exist in sectors such as mining and quarrying, financial and insurance activities with also the highest gender pay gap and the lowest female employment.

[7] The persistent at-risk-of poverty rate is the share of the population living in households in which the equivalized disposable income was below the at-risk-of-poverty threshold (60 percent of the national median equivalized disposable income) for the current year and for at least two out of the three preceding years.

[8] This situation could be explained by the relatively high life expectancy of women relative to men (82.4 compared to 72.9 years for men) as the at-risk of poverty is particularly high for persons living alone in this age group.

4. Despite the level of inequality, a large part of the Estonians has experienced real income growth over the last two decades. Real GDP per capita almost doubled between 2000 and 2018 (from euros 7,600 to euros 15,100). In addition, average monthly wages have grown on average by 5.9 percent over the period 2010–18. Also, the population in poverty as measured by the headcount ratio decreased from 2.5 percent to only 0.5 percent in 2015, equivalent to 80 percent reduction.[9] However an analysis of household income distribution shows that the largest gains accrued to the upper shares as shown in the growth incidence curve. Households' incomes have grown on average by 6.1 percent over the period 2010–17. But, this overall average growth rate hides some disparities. Income has grown by 5.6 percent for the bottom 10 percent (below the average), while the seventh decile has registered the highest growth (7.2 percent).



Sources: Statistics Estonia and IMF Staff calaculations

5. Against this backdrop, we will now look into the drivers shaping the trend and dimensions of inequality.

B. Drivers of the Trend in Inequality in Estonia

6. Using household level data over 2010–17, we analyze the dimensions of income inequality in Estonia. First, we calculate the Theil index, which is primarily used to measure economic inequality and other economic phenomena, to examine the contribution of education, age cohort, economic status, the geographical gap (rural/ urban and county of residence) and gender. The Theil index is an index calculated as follows:

$$T = \frac{1}{N}\sum_{I=1}^{n}\frac{y_i}{\bar{y}} ln\left(\frac{y_i}{\bar{y}}\right) \quad (1)$$

Where y_i and $\bar{y}$ are respectively the equivalized disposable income of household i and the sample mean of equivalized disposable income. *N* is the number of households in the sample.

7. We then decompose income inequality by different subgroups. We exploit the desirable property of the Theil index to separate total inequality into a component that is due to within group inequality and the component related to differences between groups. If the sample of households consist of *G* subgroups and that the Theil index of each group is T_g , the index for the sample can be formulated as:

$$T = \sum_{g=1}^{G} s_g T_g + \sum_{g=1}^{G} s_g ln\left(\frac{s_g}{p_g}\right) \quad (2)$$

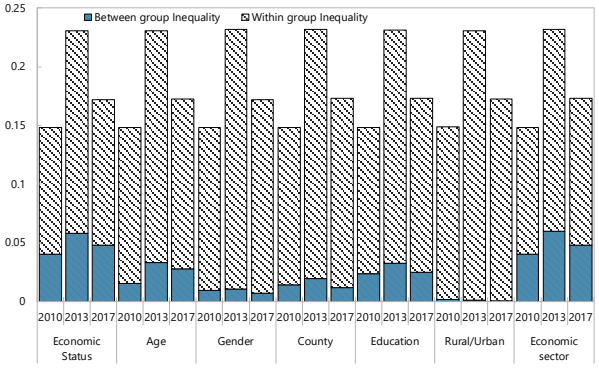
[9] The headcount ratio from the World Bank is defined as the percentage of the population living in households with consumption per capita below $1.90 a day (2011 PPP).

with s_g and p_g are respectively the income share and the share in total number of households in the sample of subgroup g. The first summation term is the average of the Theil indexes of all subgroups weighted by their respective income shares s_g and captures the component of the overall inequality that stems from within group inequality. The second summation term represents the calculation of the Theil index on the mean income of each subgroup and captures the part of overall inequality that is due to between groups inequality.

8. We consider seven types of decomposition over 2010–17. We split the sample into different subgroups according to residence of the household (the county and rural-urban location), the gender, the educational attainment, the age cohort, the economic status and the economic sector of the head of the household. Sixteen counties are considered while educational attainment is classified into six subcategories (no formal education or below ISCED1,[10] primary education -ISCED1, lower secondary- ISCED2, upper secondary- ISCED3, post-secondary but not tertiary-ISCED4, tertiary education first stage-ISCED5 and tertiary education second stage-ISCED6). We consider four age groups (15–24 years old, 25–54 years old, 55–64 years old and over 65 years old). Next, four economic status are examined (employee, self-employed, retired and other nonactive). Finally, we account for the economic sector of the head of the household through six categories.

9. Differences in economic sector, economic status, age cohorts, education, the county of residence and gender have been important drivers of income inequality in Estonia. The rise in inequality between 2010 and 2013/2014, and the modest decline in 2017 are captured by these five dimensions with a prominent role for the economic status, the economic sector, the level of education and the age cohort.

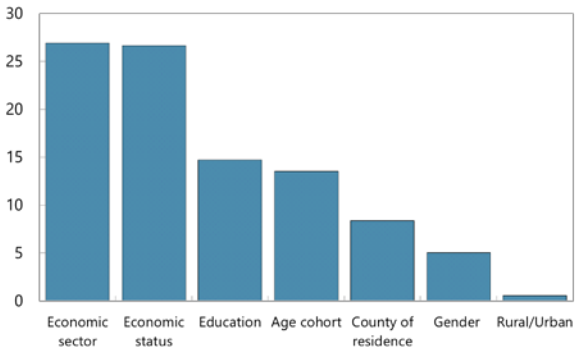
Estonia: Theil Index - Income Inequality Decomposition
(2010-2017)



Sources: Statistics Estonia and IMF staff calculations

- *Economic sector and the economic status of the head of the household.* Difference in earnings between the six groups of economic sectors (agriculture, forestry and fishing, industry including energy, construction, wholesale and retail trade, financial and real-estate, and, public sector and other services) accounts for 26.7 percent of the recent trend in inequality. Between-group inequality as captured by the economic status has grown by 43 percent between 2013 and 2010 while the pace was down to 19 percent between

Contribution to the Trend in Inequality
(In percent)



Sources: Statistics Estonia and IMF Staff calculations

[10] ISCED is the International Standard Classification of Education.

2010 and 2017. Earnings difference between employee, self-employed, retired and other nonactive contributed to the recent trend at the same magnitude as the components of the economic sector. *Education and age cohort of the head of the household.* Education accounts for the second largest factor by explaining about 14.7 percent of the recent trend in inequality in Estonia. Income difference across age cohorts (15 to 24, 25 to 54, 55 to 64 an over 65 years old) accounts for 13.5 percent of this trend.

- *County of residence, gender of the head of the household.* They respectively account for the recent trend in inequality by 8.4 percent and 5 percent on average. The difference in income, based on the residency in rural versus urban areas is very insignificant while it has slightly declined below its 2010 level regarding the county of residence.

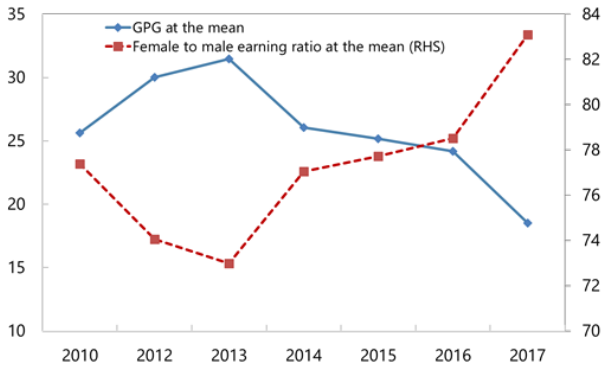
C. The Analysis of the Gender Pay Gap in Estonia: Recent Trend and Explanation

How Large is the GPG in Estonia?

10. We investigate the gender pay gap (GPG) dynamics using household level data from Estonia Social Survey.[11] Our approach follows Blau and Kahn (2017). Table 1 shows both the evolution of the female to male ratio of net average monthly wage and the unadjusted GPG at the mean but also at the tenth, the fiftieth and the ninetieth percentiles over the period 2010–17.

11. The unadjusted GPG (at the mean) has decreased over the recent years. The GPG has decreased by 28 percent between 2010 and 2017 at the mean. After the GPG has reached its pic, rising by 23 percent in 2010, it started to decline. This declining trend translates into a rapid increase in female to male wage ratio from 77 percent to 83 percent. In 2017, thus, women earned a net monthly wage representing 83 percent of the earning of men while this ratio was 77 percent in 2010. Further, the GPG is on average lower at the bottom of the distribution compared to its top.[12] The rise in the minimum income by 9 percent on average since 2012 might have contributed to the reduction in the GPG at the bottom.[13]

The Gender Pay Gap and Female to Male Earning Ratio, Full time workers
(In percent)



Sources: Statistics Estonia and IMF staff calculations.

[11] We use household level data from Statistics Estonia that yields a GPG slightly different from the headline figures published in Eurostat that aims at cross-country comparison.

[12] Meriküll et al (2019) find similar result in Estonia with the GPG in wealth at the mean being driven by the top of the wealth distribution.

[13] See for instance Ferraro et al. (2018) who show that minimum wages have contributed to lower the GPG in Estonia. See also Majchrowska and Strawiński (2018).

Table 1. Estonia: Unadjusted GPG and Female to Male Log Net Monthly Wage Ratio, Full-time Workers

	Sample size					
Year	Men	Women	Mean	10th percentile	50th percentile	90th percentile
Panel A: Unadjusted Raw GPG						
2010	1582	1603	25.6%	11.3%	28.8%	28.8%
2012	1717	1686	30.0%	22.3%	33.6%	40.5%
2013	1870	1749	31.5%	21.2%	31.0%	43.8%
2014	1939	1788	26.1%	22.3%	28.8%	37.5%
2015	1838	1735	25.2%	17.4%	19.4%	33.2%
2016	1876	1711	24.2%	9.5%	28.8%	37.9%
2017	1969	1887	18.5%	18.2%	22.3%	26.0%
Panel B: Unadjusted Female/Male log net Monthly Wage						
2010	1582	1603	77.4%	89.3%	75.0%	75.0%
2012	1717	1686	74.1%	80.0%	71.4%	66.7%
2013	1870	1749	73.0%	80.9%	73.3%	64.5%
2014	1939	1788	77.1%	80.0%	75.0%	68.8%
2015	1838	1735	77.7%	84.0%	82.4%	71.8%
2016	1876	1711	78.5%	90.9%	75.0%	68.4%
2017	1969	1887	83.1%	83.3%	80.0%	77.1%

Notes: The sample includes all full-time workers.[1] Panel A: The unadjusted raw GPG is calculated as the difference between male and female monthly net wage at the mean and a given percentile. Panel B: Ratio are obtained as exp (X) where X is the female mean log wage, tenth, fiftieth or ninetieth percentile log wage minus the corresponding male log wage.

1\ We exclude from the sample households reporting average net monthly wage below the minimum wage for a given year. With this restriction, we lose the year 2011 which features very low-income levels.

What Drives the Pay Gap between Men and Women in Estonia?

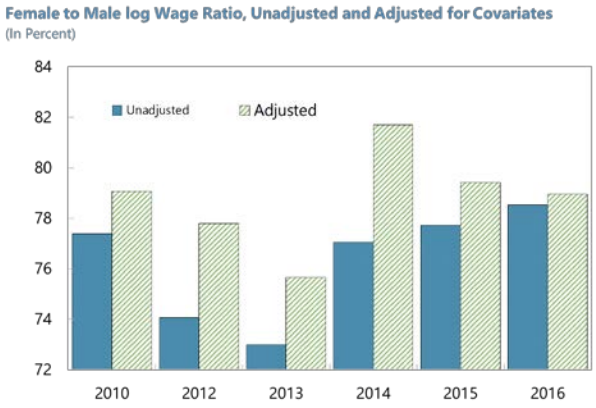
12. Estonia Social Survey data shed some light on the GPG level. Using the survey, we look into the impact of differences in human capital, employment location, industry or sector and occupation in employment on the evolution of the gender pay gap over the period 2010–16 following Blau and Kahn (2017).[14] We estimate Mincer-type wage equation for male and females separately where human capital is measured by the level of education, experience and health. We also control for employment location by accounting for the county and rural/urban location,

[14] While the GPG is important for all sectors it stands out particularly in sectors such as wholesale and retail trade, in financial and real estate and Public sector and other services (See also, Estonia 2018 Staff Report).

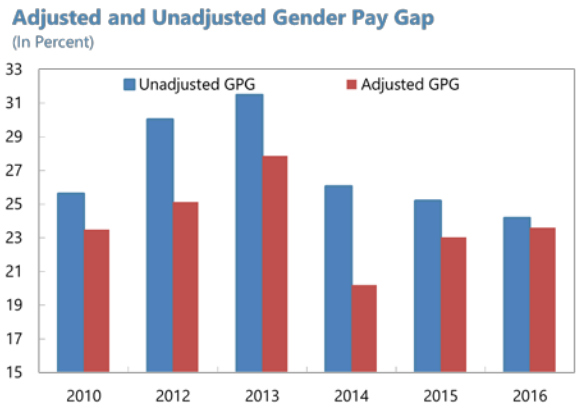
whether the individual has a managerial or supervisory position. Control variables also include disability status to account for any potential discrimination.[15]

13. The adjusted GPG and the female to male log wage ratio are respectively lower and higher than the unadjusted metrics. We use the standard Oaxaca-Blinder decomposition of males/female differences in characteristics and an unexplained component which can be used as a proxy of the extent of biased practices. This unexplained component could also be interpreted as capturing the extent to which females and men are unequally paid while they are equally qualified; it could be viewed as including also compensation scheme differentials or unmeasured productivity. However, including the assessment of health condition may help reduce the portion of unmeasured productivity in the unexplained portion. Once adjusted, the female to male earnings ratio increased by 3 percent while the GGP decreased by 11 percent on average over 2010–16.

Figure 2. Gender Pay Gap

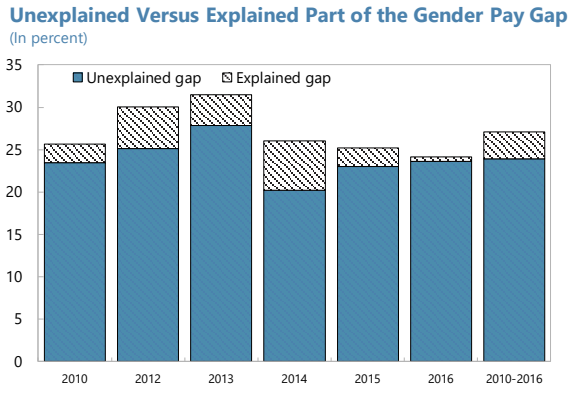


Sources: Statistics Estonia and IMF staff calculations.



Sources: Statistics Estonia and IMF Staff calculations

14. The unexplained part of the GPG remain large in Estonia. Consistently with previous studies, the unexplained part of the GPG is high.[16] On average, about 86 percent of the GPG cannot be explained over the period.[17] Accounting for more structural factors such as biased practices against women and/or a better measurement of productivity differences would contribute to better understand the GPG in Estonia. [18]



Sources: Statistics Estonia and IMF Staff estimates.

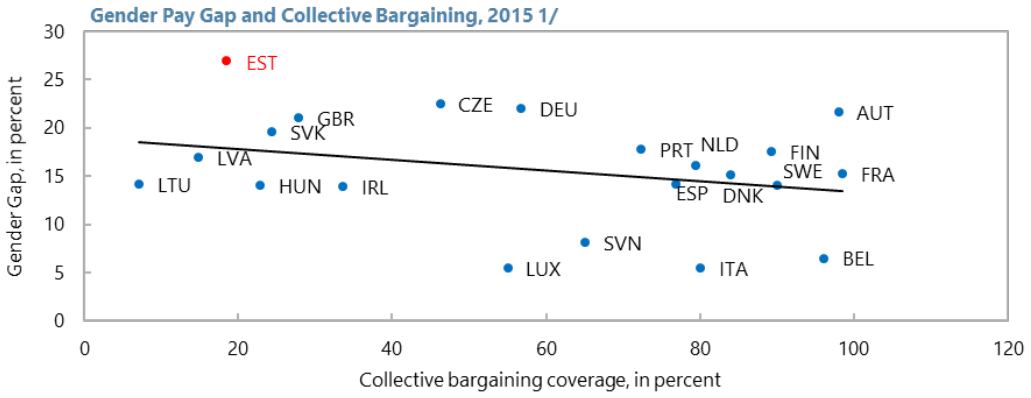
[15] We do not control for the number of children and the marital status as they are potentially endogenous to female labor force participation decision (see Blau and Kahn, 2017).

[16] See for instance Anspal et al (2011) and Anspal (2015).

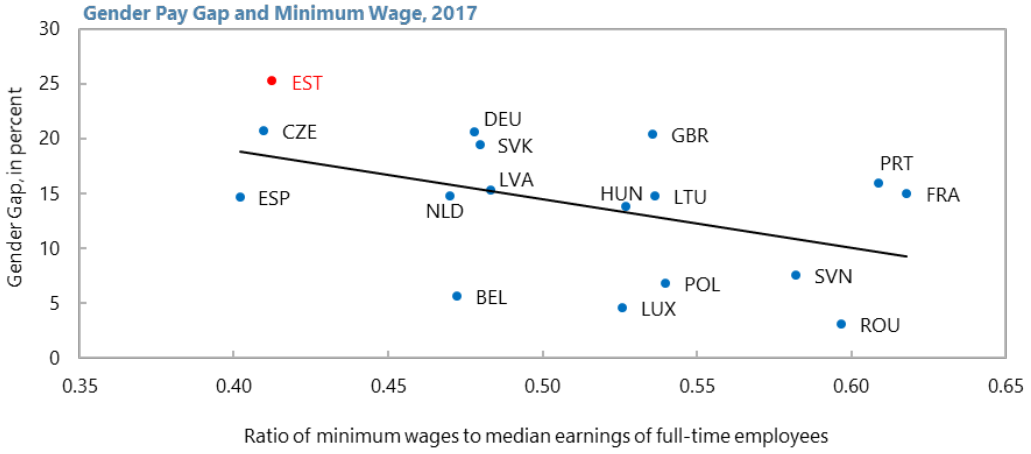
[17] A non-parametric approach following Ñopo (2008) also yield similar results, suggesting that the large unexplained part of the GPG is not related to the method of estimation.

[18] In this regard, we welcome the project of the Ministry of Finance aiming at collecting new data and better understanding GPG, more specifically the unexplained component.

Figure 3. Labor Market Institutions and the Gender Pay Gap in Europe
(most recent data)



Note: Collective bargaining coverage rate corresponds to the ratio of employees covered by collective agreements, divided by all wage earners with right to bargaining.



Sources: Eurostat; OECD; and Employment Protection Legislation: Strictness of employment protection legislation: regular employment", *OECD Employment and Labour Market Statistics* (database), https://doi.org/10.1787/data-00318-en (accessed on 25 July 2019).

1/ 2014 data is used for Croatia, Ireland, Greece, and Hungary.

15. The large GPG may reflect labor market institutions in Estonia. Given the large unexplained part of the GPG, we explore a potential role for labor market institutions in Estonia in line with previous studies (Kahn, 2015). High minimum wages may contribute to reduce the GPG as women are often disproportionately represented in the bottom of the wage distribution.[19] Collective wage bargaining agreement could also contribute to reduce the GPG by allowing to set wage floors and thus raising the wages of the low-paid workers (thus female wages). Using the most recent data

[19] The share of women low wage earners was 29.4 percent in 2014 compared to 13.9 for men. The EU28 average were respectively 21.2 and 13.5.

available, Figure 3 above shows that Estonia labor market is characterized by relatively low minimum wage and collective bargaining coverage which may have contributed to the large GPG. In addition to these labor market institutions, social protection institutions such as long parental leave for may also have an influence on the GPG by keeping women a long time away from work.[20]

D. Policies to Reduce Inequality in Estonia

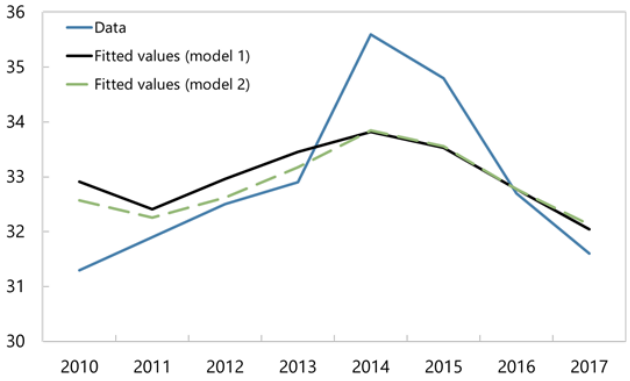
16. The role of fiscal policy to reduce inequality can be explored using an empirical approach. We estimate a cross-country fixed effect model using an approach similar to Jain-Chandra et al (2018) and Chen et al (2018). The model specification is as follows:

$$Gini_{ct} = \delta Policy_{ct-1} + \beta X_{ct} + \alpha_c + \tau_t + \varepsilon_{ct} \quad (3)$$

Where the dependent variable ($Gini_{ct}$) is the Gini index of equivalized disposable income of country c in year t, $Policy_{ct-1}$ is a vector of lagged policy variables focused on the role of fiscal policy (public social protection expenditure as share of GDP and property tax revenues as share of GDP), X_{ct} is a set of control variables capturing some structural characteristics and their nonlinear forms, α_c is a country fixed effect and τ_t is a time fixed effect.[21] We use data on 21 European countries over the period 2004–17. [22]

17. We estimate the impact of policies on inequality in Estonia using the specification including nonlinear forms of structural variables which capture well the trend of inequality in Estonia. We estimate two versions of equation (3) (See Appendix II) and select the model that captures better the trend in the Gini index (model 2).[23] Model 2 accounts for nonlinearities of control variables.

Gini Index, Data and Fitted Values



Sources: IMF staff estimates

[20] See Meriküll and Mõtsmees (2017) who show that longer breaks between jobs can explain an additional part of the GPG when considering wages asked by the employee, albeit small.

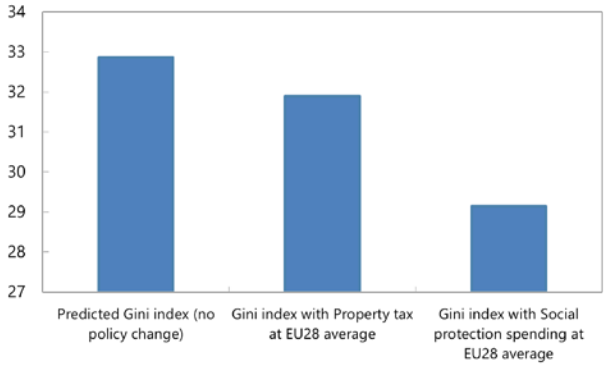
[21] We include the lagged policy variables to mitigate potential endogeneity issues. There might be evidently role for other policy variables such as the progressivity of the tax system, we focus here on variables for which we have a large data coverage for most countries. Also, while we have few control variables, our specification is also constrained by data availability and follows the related literature (Jain-Chandra et al (2018) and Chen et al (2018)). In addition, our model allows to replicate the recent trend in inequality in the data while also having a relatively high explanatory power.

[22] The sample size is only determined by data availability.

[23] We estimate also dynamic panel models and models including lagged control variables, but the models shown here performed better.

18. Our estimates suggest large gains from increasing social protection spending. We use the previous econometric model to predict the Gini index and estimate the impact of desirable level of the policy variables, keeping all the other variables constant. We define desirables policies as the values of the policy variables at the EU28 average. The results show that increasing the property tax revenues and social protection spending at the EU28 average over the period would have led to Gini index lower by 3 percent and 11.3 percent respectively.[24]

Policy Impact on Gini Index (2010–17)
(Average, in points)



Sources: IMF Staff estimates

E. Conclusions and Policy Discussion

19. Over the last years Estonian households have experienced a considerable income growth especially at the upper part of the income distribution. Income inequality remains elevated with two main aspects related to the gender pay gap and old age poverty.

20. Income difference between the economic sector of activity, the economic status, age cohort and the level of education account mainly for the recent trend in inequality. At the same time, income inequality between rural and urban areas appear to have reduced recently.

21. The gender pay gap remains elevated and is mainly driven by the top of the wage distribution, while a significant portion cannot be explained by the data. The large GPG may also reflect some institutional characteristics of Estonia's labor market such as the low collective bargaining power and the low relatively minimum wage but also long parental leave that may keep women durably from the labor market. Policies for more transparency and for stronger reduction of biases should be enhanced: (i) a transparent reporting policy of gender pay gap, as already applied by the authorities in some public entities, extended to other sectors would be a significant step; and (ii) less occupational gender biases and career interruptions by women may help reduce the GPG without raising female unemployment.

22. Other policies could be seen to contrast with the conservative optional policies prevailing in Estonia, however they could be given some considerations as increasing social protection spending and broadening the tax base through an intelligent system of property tax could contribute to reduce income inequality. Given its relatively low level with peers, increasing social protection spending bears the potential of reducing income inequality. More specifically, social protection spending (including pensions) on old age population would help to widen the social safety net.

[24] Property tax revenues and social protection spending as share of GDP were respectively 0.3 and 16 percent in Estonia while the same figures were 1.7 and 23.9 percent at the EU level. Property tax revenues are taken from the Global Revenue Statistics of the OECD and include components such as recurrent taxes on immovable property, on net wealth, estate inheritance and gift taxes. Social protection spending data are from Eurostat.

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Appendix I. Theil Index Calculation

Education	2010	2011	2012	2013	2014	2015	2016	2017
	Group Specific Theil's Index							
No formal education	0.0874	0.0567	0.0445	0.0374	0.0265	0.0178	0.0172	0.0146
Primary	0.0494	0.0451	0.0540	0.0535	0.0658	0.0541	0.0596	0.0386
Lower secondary	0.1186	0.1220	0.1339	0.1495	0.1919	0.1499	0.1385	0.1291
Upper secondary	0.1366	0.1397	0.1843	0.1967	0.1873	0.1756	0.1761	0.1514
Post-secondary	0.1161	0.1182	0.1275	0.1731	0.2124	0.1665	0.1667	0.1459
Tertiary education (1)	0.1203	0.1292	0.1668	0.2171	0.2049	0.1949	0.1645	0.1510
Tertiary education (2)	0.0665	0.0302	0.0884	0.1459	0.1785	0.1618	0.1236	0.1086
Within	0.1250	0.1300	0.1680	0.1990	0.1950	0.1810	0.1650	0.1480
Between	0.0234	0.0240	0.0247	0.0325	0.0284	0.0349	0.0264	0.0249
Total	0.1490	0.1540	0.1920	0.2310	0.2230	0.2160	0.1920	0.1730

Economic status	2010	2011	2012	2013	2014	2015	2016	2017
	Group Specific Theil's Index							
Employee	0.1095	0.1137	0.1556	0.1843	0.1773	0.1646	0.1425	0.1188
Self employed	0.2282	0.3866	0.2927	0.3258	0.3595	0.3725	0.3309	0.3504
Retired	0.0460	0.0418	0.0463	0.0700	0.0900	0.0821	0.0756	0.0896
Other nonactive	0.2189	0.2125	0.2302	0.3248	0.3098	0.3191	0.2878	0.3013
Within	0.1080	0.1100	0.1430	0.1730	0.1720	0.1610	0.1410	0.1240
Between	0.0404	0.0440	0.0493	0.0579	0.0510	0.0545	0.0510	0.0481
Total	0.1490	0.1540	0.1920	0.2310	0.2230	0.2160	0.1920	0.1730

Urban/Rural	2010	2011	2012	2013	2014	2015	2016	2017
	Group Specific Theil's Index							
Urban	0.1422	0.1496	0.1804	0.2292	0.2208	0.2108	0.1898	0.1705
Rural	0.1597	0.1633	0.2217	0.2340	0.2284	0.2260	0.1958	0.1765
Within	0.1470	0.1530	0.1920	0.2300	0.2230	0.2150	0.1910	0.1720
Between	0.0018	0.0010	0.0005	0.0008	0.0003	0.0005	0.0004	0.0004
Total	0.1490	0.1540	0.1920	0.2310	0.2230	0.2160	0.1920	0.1730

County of residence	2010	2011	2012	2013	2014	2015	2016	2017
	Group Specific Theil's Index							
Tallinn	0.1360	0.1340	0.1748	0.2142	0.2316	0.2161	0.1822	0.1622
Harjumaa	0.1326	0.1319	0.2295	0.2693	0.1998	0.2211	0.1823	0.1640
Hiiumaa	0.1347	0.1736	0.1622	0.1842	0.1857	0.1802	0.2016	0.1485
Ida-Virumaa	0.1284	0.1461	0.1405	0.1847	0.1756	0.1949	0.1657	0.1511
Jogevamaa	0.1587	0.1382	0.1561	0.1483	0.1853	0.1733	0.1584	0.1441
Jarvamaa	0.1485	0.1493	0.1379	0.1862	0.1901	0.1689	0.1505	0.1550
Laanemaa	0.1208	0.1247	0.1643	0.1978	0.2169	0.1904	0.1461	0.1689
Laane-Virumaa	0.1208	0.1516	0.1786	0.1985	0.1766	0.1559	0.1778	0.1681
Polvamaa	0.1145	0.1362	0.1383	0.2067	0.2092	0.1847	0.1236	0.1466
Parnumaa	0.1373	0.1350	0.1529	0.1611	0.1662	0.1811	0.1673	0.1457
Raplamaa	0.1562	0.1715	0.2032	0.1983	0.1858	0.1893	0.1649	0.1435
Saaremaa	0.1081	0.1262	0.1403	0.1608	0.1441	0.1644	0.1648	0.1452
Tartumaa	0.1414	0.1562	0.1952	0.2531	0.2210	0.1988	0.1929	0.1781
Valgamaa	0.1398	0.1420	0.1216	0.1529	0.1858	0.1674	0.1556	0.1442
Viljandimaa	0.1067	0.1329	0.1508	0.1926	0.1800	0.1718	0.1549	0.1525
Vorumaa	0.1379	0.1359	0.1091	0.1598	0.2163	0.1789	0.2101	0.1690
Within	0.1340	0.1400	0.1740	0.2120	0.2080	0.2010	0.1770	0.1610
Between	0.0144	0.0144	0.0187	0.0198	0.0157	0.0148	0.0150	0.0121
Total	0.1490	0.1540	0.1920	0.2310	0.2230	0.2160	0.1920	0.1730

Gender	2010	2011	2012	2013	2014	2015	2016	2017
	Group Specific Theil's Index							
Male	0.138181	0.14787	0.181055	0.23483	0.210411	0.204671	0.184357	0.160909
Female	0.140235	0.147322	0.183589	0.200648	0.214667	0.212765	0.183991	0.171243
Within	0.1390	0.1480	0.1820	0.2210	0.2120	0.2080	0.1840	0.1650
Between	0.0095	0.0067	0.0101	0.0107	0.0110	0.0073	0.0077	0.0072
Total	0.1490	0.1540	0.1920	0.2310	0.2230	0.2160	0.1920	0.1730

Age groups	2010	2011	2012	2013	2014	2015	2016	2017
	Group Specific Theil's Index							
15–24	0.1773	0.2251	0.2333	0.2436	0.2223	0.1834	0.2188	0.2217
25–54	0.1385	0.1517	0.1810	0.2144	0.1973	0.1898	0.1684	0.1401
55–64	0.1609	0.1514	0.2082	0.2216	0.2523	0.2309	0.1709	0.1629
>65	0.0838	0.0728	0.0756	0.1097	0.1131	0.1304	0.1198	0.1333
Within	0.1330	0.1390	0.1690	0.1980	0.1920	0.1860	0.1610	0.1450
Between	0.0154	0.0155	0.0235	0.0329	0.0314	0.0295	0.0306	0.0277
Total	0.1490	0.1540	0.1920	0.2310	0.2230	0.2160	0.1920	0.1730

Economic Sector	2010	2011	2012	2013	2014	2015	2016	2017
	Group Specific Theil's Index							
Agriculture, Forestry and Fishing (A)	0.1344	0.1352	0.1246	0.2148	0.2116	0.1660	0.1475	0.1348
Industry including energy	0.0994	0.1040	0.1332	0.1633	0.1370	0.1360	0.1063	0.0891
Construction (F)	0.1007	0.1058	0.1906	0.2108	0.1848	0.1518	0.1753	0.1300
Wholesale and retail trade (G,H, J)	0.1212	0.1245	0.1697	0.2160	0.1904	0.1909	0.1554	0.1346
Financial, real-estate (K,L)	0.0966	0.0973	0.1584	0.1938	0.2102	0.1902	0.1729	0.1407
Public sector and other services(O,P,Q,T)	0.1021	0.1070	0.1358	0.1530	0.1758	0.1472	0.1261	0.1098
Within	0.1080	0.1090	0.1390	0.1720	0.1700	0.1600	0.1390	0.1250
Between	0.0405	0.0448	0.0530	0.0596	0.0537	0.0561	0.0526	0.0480
Total	0.1480	0.1530	0.1920	0.2320	0.2230	0.2160	0.1920	0.1730

Note:

(1) Agriculture, hunting and forestry; fishing and operation of fish hatcheries and fish farms;

(2) Industry, including energy;

(3) Constructions;

(4) Wholesale and retail trade, repair of motor vehicles and household goods, hotels and restaurants, transport and communications;

(5) Financial, real-estate, renting and business activities;

(6) Public administration and defense, education, health and social work, other community, social and personal service activities, private households with employed workers and households in their undifferentiated production.

Appendix II. Estimation Results

	(1)	(2)
Property Tax Revenues/GDP (t-1)	-0.7709***	-0.5653**
	(0.2683)	(0.2480)
Social Protection Spending/GDP (t-1)	-0.3829***	-0.4574***
	(0.0789)	(0.0773)
Share of Employment in the Service Sector	-0.2980**	0.7099
	(0.1235)	(1.0683)
Share of Employment in Industry	-0.3834**	-1.4193***
	(0.1520)	(0.4847)
Share of Urban Population	-0.2312**	-1.3987***
	(0.1060)	(0.5219)
Share of the Population with Tertiary Education	-0.1202***	-0.2172
	(0.0380)	(0.1441)
Log Real GDP per Capita	-6.6083***	-7.6205***
	(2.3794)	(2.1407)
Unemployment Rate	0.1242**	0.0432
	(0.0533)	(0.0603)
Output gap	0.0526	-0.0148
	(0.0576)	(0.0609)
Share of Employment in the Service Sector^2		-0.0119
		(0.0165)
Share of Employment in Industry^2		0.0274**
		(0.0121)
Share of Urban Population ^2		0.0074**
		(0.0033)
Share of the Population with Tertiary Education^2		0.0016
		(0.0026)
Observations	285	285
Adjusted R-squared	0.904	0.913
Country Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
The dependent variable is the Gini index in equivalized disposable income. Robust standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01		

AML/CFT SUPERVISION OF FINANCIAL SECTOR IN ESTONIA[1]

Recently revealed money laundering cases involving banks operating in Estonia have attracted international scrutiny and affected the reputation of the Estonian financial sector. This paper describes Estonia's progress in strengthening AML/CFT supervision of the banking sector and provides recommendations for its further enhancement in the areas of (i) implementation of the risk-based approach to AML/CFT supervision; (ii) related domestic and international cooperation; and (iii) supervisory resources, procedures, and powers.

A. Introduction

1. Non-resident and cross-border activities pose elevated ML/TF risks to many countries, including Estonia, which continues to grapple with recently revealed ML cases. Estonia's EU and Nordic integrated financial sector faces the risk of serving as a conduit for the transfer and eventual laundering of foreign proceeds of crime from higher-risk countries. Historic cases, such as the misuse of the Estonian branch of Danske Bank to conduct around EUR 200 billion of suspicious transactions by non-residents between 2007–15, as well as more recent cases such as shortcomings in customer due diligence and risk assessment in the Estonian subsidiary of Swedbank have attracted scrutiny by the Estonian and foreign authorities.

2. However, several financial sector indicators suggest that these risks have decreased in recent years. The primary ML/TF risks to the Estonian financial sector stem from pass-through payments, and the Eesti Pank's data indicate a reduction in cross-border financial flows through Estonia in recent years. EFSA's[2] data show that non-resident deposits in the Estonian banking sector have declined from 19.1 percent of all deposits at the end of 2014, including 8.5 percent from offshore jurisdictions,[3] to 7.9 percent at the end of 2018, including 0.5 percent from offshore jurisdictions. According to the EFSA, the remaining non-resident activity is mostly within the Nordic-Baltic region or other EU countries. At the end of 2018, the EFSA conducted a review of the risk profiles of all banks operating in Estonia. The review included the level of ML/TF risks in their customer bases, the services they offer, and the quality of their AML/CFT systems and controls. It benefitted from meetings with the management and AML officers of the higher-risk banks. The EFSA has concluded that the risks to the Estonian banking system from serving non-residents have been substantially reduced compared to the past, and that the banks are mostly focused on serving Estonian or related businesses and households.

[1] Prepared by Maksym Markevych and Jay Purcell.

[2] EFSA is a supervisor, including for AML/CFT, of banks, insurance companies, insurance intermediaries, investment firms, fund managers, investment and pension funds, payment institutions, e-money institutions, creditors and credit intermediaries, and the securities market.

[3] The EFSA has developed a definition of an offshore financial center.

3. The EFSA has pursued a reduction of ML/TF risks from non-residents activities in the Estonian financial sector and made consistent progress in strengthening its AML/CFT supervision. AML/CFT supervision is one of the strategic priorities of the EFSA since 2016, as reflected in the establishment of a AML/CFT division, a notable increase in the number of AML/CFT-dedicated staff, the use of specific supervisory powers (including, where necessary, license withdrawal) to enforce financial institutions' (FIs') compliance with their AML/CFT-related obligations, and the intensification of its engagement with public and private sector stakeholders. The EFSA was an early adopter of the principles of risk-based supervision, developing the tools and procedures for risk-based approach to supervision, such as an offsite monitoring tool, institutional risk profiles, and focusing attention on FIs it perceives as higher ML/TF risk. The Estonian authorities have also strengthened elements of the AML/CFT regime more broadly. They conducted a national ML/TF risk assessment (NRA) in 2015 and adopted an action plan to address identified weaknesses, subsequently amending the AML/CFT legal and regulatory frameworks. Estonia has increased the maximum fine for AML/CFT violations, as well as the financial resources and the number of AML/CFT staff in various authorities involved in AML/CFT, notably in the EFSA, EFIU[4] and law enforcement.

4. This annex focuses on the effectiveness of the AML/CFT supervisory framework at mitigating cross-border ML risks. The annex does not aim at assessing the compliance of the overall AML/CFT regime with the FATF standard, which will be done by MONEYVAL[5] in 2021. The previous 2014 MONEYVAL assessment report identified a number of deficiencies in Estonia's AML/CFT legal framework, the large majority of which were subsequently addressed. This progress and demonstrated practical improvements in the AML/CFT system led to removal of Estonia from the 2014 assessment follow-up process in 2019.

B. Enhancing Implementation of the Risk-Based Approach to AML/CFT Supervision

5. Estonia has not formally assessed its ML/TF risks at the national or sectoral levels since 2015, but intends to issue a new ML/TF NRA by end-2020. The 2015 NRA was conducted based on the analysis of information and data covering 2010–12. As a result, the EFSA has had to rely almost entirely on its own analysis, which is primarily drawn from the data and information it collects from its supervised entities, to understand the ML/TF risks in the Estonian financial sector. The government updated the NRA methodology in April 2019, to tailor it to the Estonian context and strengthen the cooperation on the NRA between the different stakeholders. An NRA Steering Committee will be created to facilitate the workshops, gather the data and draft the NRA report, which will require a whole-of-government effort and is scheduled to be completed and published by the end of 2020. A recent and comprehensive sectoral risk assessment would support the EFSA's off-

[4] Financial Intelligence Units are national centers for the receipt and analysis of suspicious transaction reports, and other information relevant to money laundering, associated predicate offences and financing of terrorism; and for the dissemination of the results of that analysis.

[5] The Council of Europe's Committee of Experts on the Evaluation of Anti-Money Laundering Measures and the Financing of Terrorism.

site monitoring (e.g. by providing sector-specific risk factors), assist the EFSA in comparing institution-level risks across sectors, and help to refine the design of its annual on-site inspection schedules. The NRA would also assist the private sector in better understanding and mitigating ML/TF risks.

6. The EFSA's understanding of the main ML/TF risks facing Estonia's financial sector is based largely on the information provided by its supervised entities. Using its annual questionnaire, the EFSA collects hundreds of data points relevant to understanding the ML/TF threats facing each FI as well as information on each FI's AML/CFT systems and controls. The wide range of data collected primarily covers the nature and extent of FIs' engagement with countries and customers viewed as higher-risk, with a focus on non-residents and cross-border payments. The data on high risk customers is based on FIs' own classification of risk, and EFSA's understanding of ML/TF risk can be refined by additionally collecting data on the types of customers that the EFSA perceives as higher risk (e.g. virtual asset service providers, payment service providers, Estonian e-residents). This annual reporting is supplemented with a monthly analysis of AML/CFT-relevant data provided from the EFSA's Prudential Division, mostly on the composition of deposits of non-resident and offshore customers.

7. The EFSA conducts detailed off-site monitoring of ML/TF risks in the financial sector and supervised entities' compliance with AML/CFT requirements. Since 2016, the EFSA has employed a tool to assess and quantify FI-specific ML/TF threats and vulnerabilities and to generate risk profiles of supervised entities, using the information provided in response to an annual questionnaire. On the ML/TF vulnerability side, the tool incorporates the results of a desk-based assessment of the AML/CFT systems and controls of each FI, including the strength of its corporate governance, risk management measures, internal controls, and procedures for reporting suspicious transactions. On the ML/TF threat side, the focus is on cross-border payments as well as deposits by offshore, politically exposed and other potentially higher-risk clients. As a result, the EFSA has a risk profile and quantification of total ML/TF risk for each FI it supervises, which are used, to a certain extent, in the design of its inspection plan. Based on the off-site monitoring, the EFSA can request additional information from an FI regarding the trends it observes or any particular customer. The EFSA has submitted 84 such inquiries to its supervised entities over the last 4 years.

8. However, the EFSA currently conducts only comprehensive/" full-scope" AML/CFT on-site inspections, focusing almost exclusively on the FIs it considers higher risk. The EFSA's inspections are noteworthy for their scope, which includes, *inter alia*, an analysis of FIs' risk appetites and understanding of ML/TF risks, a review of the structure and functioning of their AML/CFT systems and controls, the sampling of customer files and testing of customer due diligence and other AML/CFT measures, suspicious transaction or activity reporting to the FIU, and interviews with staff at various levels. The EFSA usually spends from one to two months on-site, involving, on average, around 3 full-time employees (FTEs), and the final report is available at the latest six months after the start of a full-scope on-site inspection. These inspections generate useful information and analysis and have successfully uncovered violations of AML/CFT-related requirements, thereby allowing the EFSA to take actions with regard to cases such as the Estonian

branch of Danske Bank and Versobank. At the same time, full-scope inspections are so resource-intensive that, at the current staffing level, they effectively limit the number of FIs that may be inspected to a maximum of five each year.

9. The annual number of on-site inspections of financial institutions is low. The practical effect of the EFSA's exclusive reliance on full-scope AML/CFT inspections is that lower-risk FIs are rarely if ever subject to on-site inspection, while even medium-risk FIs, including large banks, may have years-long supervisory cycles. The EFSA rules of procedure*, inter alia,* list the following considerations for determining which FIs to receive a full-scope on-site inspection: a supervised entity has an extended time gap since the last on-site inspection or significant AML/CFT breaches were identified previously and emphasize inter-connectedness of all aspects in the institution's AML/CFT framework. Thus, the EFSA's preference for full-scope inspections is partly driven by the large gaps between inspections of individual FIs, but these gaps themselves result from conducting only full-scope inspections of which a limited number can be conducted in practice. Given the EFSA's current approach, increased coverage of FIs could, in principle, be achieved in two ways: via a substantial increase in the AML/CFT Division's staff and/or the development of risk-based targeted and thematic inspections. The latter would allow the EFSA to conduct shorter, more focused inspections targeting the aspects that pose elevated risks within an individual FI, such as particular customers, transactions, services, or compliance gaps, or else categories of, for example, customers, transactions, or services that pose elevated risks to the entire sector. It would also enable the EFSA to respond more dynamically to uncovered or rapidly evolving ML/TF risks, trends and methods. The EFSA's well-developed off-site monitoring and understanding of supervised entities due to the comprehensive full-scope inspections conducted to date would facilitate the EFSA's potential future conduct of strategic and efficient targeted and thematic inspections.

Recommendations

10. To enhance implementation of the risk-based approach to AML/CFT supervision, staff recommends that the Estonian authorities:

- Increase the number and range of financial institutions subject to on-site inspections each year by developing risk-based targeted and thematic on-site inspections or considering an increase in the number of dedicated AML/CFT staff in the EFSA. Review the current on-site inspection model to ensure an appropriate distribution of resources across all sectors, commensurate with the associated levels of ML/TF risk.

- Under the leadership of the EFIU, conduct comprehensive sectoral risk assessments on a regular basis and incorporate the results of those assessments into both on-site inspection schedules and existing dialogues with the private sector.

C. Supervisory Resources, Procedures, and Powers

11. The EFSA has established a dedicated Department for AML/CFT supervision, which became operational in 2019. The AML/CFT Department currently consists of 7 persons (7.5 percent

of the total staff), representing a mix of lawyers and analysts, a significant increase from 4 persons in 2018. The EFSA's AML/CFT work is also supported by other Departments, notably the Legal Department (which contributes to fit and proper checks as well as the application of legal instruments), the Prudential Division (market entry, governance supervision) and the Enforcement Division (enforcement actions). On the other hand, the AML/CFT Department is also responsible for the non-AML/CFT supervision of payment services providers, with an EFSA-estimated workload of 0.5 FTE.

12. An increase in the coverage of FIs receiving some form of AML/CFT on-site inspection each year can be also achieved by increasing the number of AML/CFT supervisors. The EFSA supervises 110 entities for compliance with AML/CFT obligations, including 17 credit institutions (9 banks and 8 branches of foreign banks), 15 fund management companies, 11 payment service providers, 5 life insurance companies, 5 investment firms and 57 consumer credit loan providers. The latter are considered by the EFSA to pose lower ML/TF risk. The total assets held by financial institutions are EUR 45 billion out of which 83 percent are held by the banking sector. In the banking sector, three largest banks account for more than 84 percent of the assets. The EFSA conducted 29 on-site inspections from 2014 to 2018, including 7 on-site inspections of banks over the last 3 years. The AML Division would need additional human resources if it is to continue prioritizing full-scope inspections while also shortening the concerningly long supervisory cycles for low- and medium-risk institutions and retaining the capacity to respond to emerging risks. The EFSA noted that the scrutiny of recently revealed ML cases has taxed its resources, but is confident in its ability to conduct robust AML/CFT supervision with its current staff going forward, as, in its view, ML/TF risks are decreasing while "legacy" cases are getting resolved.

13. The EFSA has a well-developed set of routines and procedures for conducting both off-site monitoring and on-site AML/CFT inspections. Routines for off-site monitoring are established, notably for the processing and analysis of data from the annual questionnaires, the subsequent classification of FIs by the level of risk and the generation of institutional risk profiles. The AML/CFT inspection manual guides inspectors with respect to, inter alia, preparation for an on-site inspection, identifying FI staff to interview, selecting customer files to sample, and the grounds for additional scrutiny. Staff are assigned to participate in on-site inspections in such a way as to ensure that a range of experience levels and professional competencies are represented on each on-site team. The EFSA can also conduct unannounced inspections, and has done so in cases where there were grounds to believe that a supervised entity might otherwise seek to obscure or hamper the collection of critical information.

14. By contrast, the EFSA does not have standardized procedures for responding to observed violations of AML/CFT-related obligations. The EFSA approaches enforcement actions primarily on a case-by-case basis. This approach to enforcement affords it maximum flexibility, particularly in complex cases, but is not conducive to promoting consistency and predictability. The EFSA may therefore wish to consider elaborating and formalizing standard procedures or issuing internal guidelines for addressing violations and following up on previous enforcement actions.

15. The AML/CFT Department tests implementation of AML/CFT measures by FIs by sampling customer files, both prior to and during on-site inspections. The EFSA requests samples of customer files before the on-site inspection and examines the AML/CFT measures applied by FIs in that context. This includes scrutiny of customer due diligence measures during the establishment of business relations as well as the implementation of ongoing monitoring, such as the examination of the relationship between the value and details of sampled customers' transactions, such as their counterparts, to the nature of their business. The EFSA will request additional customer files, including during on-site inspections, if it detects unusual transactions or transactions with no economic or legal justification. This review of customer files is complemented by additional research, beyond the documents provided by an FI, e.g., into the nature of certain customers' business and risk profiles. The EFSA's methodology would benefit from introducing risk-based random transaction sampling, such that the transactions of customers not already sampled would also be analyzed, as well as suspicious transaction reporting sample testing.

16. The AML/CFT Department's sampling methodology could be further refined. The AML/CFT Division's current sampling procedures focus only on customers presenting certain, specific risk factors. They would benefit from the introduction of an element of random selection (i.e., the sampling of additional, randomly selected customer files). Moreover, the EFSA currently samples a similar number of customer files regardless of the size of population in a particular risk category. Going forward, it should adjust the number of files sampled depending on the total number of files in the category in order to achieve consistent confidence levels across institutions and the risk categories. Finally, as necessary, the EFSA should collect additional customer and/or transaction samples during on-site inspections, to probe any (potential) gaps during the inspection, including with respect to internal systems or controls of an FI.

17. The EFSA actively uses the tools available to promote and enforce compliance with financial institutions' AML/CFT-related obligations. The range of sanctions available to the EFSA to address violations of AML/CFT-related requirements include: informal warnings, letters, administrative precepts, fines (via the misdemeanor process), and license withdrawals. In addition, the EFSA's prudential supervisors incorporate consideration of ML/TF risks, such as higher risk of bank's customer base, services offered or previously detected violations, in its Supervisory Review and Evaluation Process. The EFSA has used administrative precepts to restrict certain business activities of supervised entities or to force them to address AML/CFT deficiencies, mostly identified during an on-site inspection, by a certain date. The EFSA can levy penalty payments for failures to comply with precepts - up to EUR 32 000 for the first specified time increment (e.g. a day) past the due date, up to EUR 100 000 for each consecutive time increment, and up to a total of 5 000 000. For example, the EFSA issued a precept to the Estonian branch of Danske bank to prohibit its non-resident business activity following the 2014 on-site inspection that identified significant AML/CFT breaches. In February 2019, the EFSA issued a precept requiring Danske bank to terminate its activities in Estonia, following the internal investigation reports commissioned by Danske Bank and collection of additional information received. In October 2019, the EFSA opened a misdemeanor case following an on-site inspection of the Estonian subsidiary of Swedbank. In March 2018, the European Central Bank, on request of the EFSA, withdrew the banking license of Versobank due to

longstanding and serious AML/CFT breaches. The EFSA withdrew the licenses of three payment service providers for AML/CFT breaches in 2019.

18. The range of sanctions available to the EFSA is narrower in practice, as the framework for levying fines all, but precludes their timely and effective implementation. Fines, as a sanction for AML/CFT violations, are available in Estonia only under the misdemeanor framework, which is regulated by the Penal and Criminal Procedure Codes. The design of Penal Code defines the structure of the violations and procedures, establishing a high level of burden of proof, along with procedural safeguards, which are not necessarily well-suited to deal with violations by legal persons. To impose a fine on an FI requires that the EFSA first establish the culpability of a specific natural person-employee for the act that constitutes the violation and then to prove that the act was committed in the interest of the legal person. In addition, the Penal Code includes a two-year limitations period between the violation itself and the entry of a final judgement, after which a misdemeanor expires. Whereas, in other jurisdictions, that period would end with the filing of a case. This represents a nearly insurmountable barrier to impose fines using the misdemeanor process, as violations may be uncovered with a delay, and as the EFSA investigation, subsequent court trial, and possible appeals process, may take much more than 2 years, particularly for complex cases. Moreover, courts in a misdemeanor process conduct a full trial of the case, including determination of the sanction, as opposed to an administrative appeal, in which courts could focus on the adherence to procedural requirements in an administrative case. Estonia should streamline and simplify the process of imposing fines on financial institutions by reintroducing an administrative sanctions regime for AML/CFT violations and/or establishing the direct criminal liability of legal persons while extending the applicable statute of limitations.

19. Moreover, the maximum fine currently available under the misdemeanor process is unlikely to prove sufficiently dissuasive in many cases. The maximum fine per misdemeanor was increased in November 2017 from EUR 32 000 to EUR 400 000 euros. An effective framework for monetary penalties would require further increasing the maximum fines that may be imposed for AML/CFT violations. Legislation that would increase the maximum fine to EUR 5 million or up to a certain percentage of revenue is being drafted.

Recommendations

20. To strengthen the powers and procedures for effective AML/CFT supervision, staff recommends that the Estonian authorities:

- Develop baseline internal procedures for addressing identified violations and following up on previous enforcement actions.
- Develop suspicious transaction reporting sample testing.
- Refine the EFSA's customer due diligence sampling methodology by: (i) developing independent transaction sampling; (ii) introducing an element of randomness (sampling of additional, randomly selected customer files); (iii) varying the number of records requested

in accordance with relative risk and the number of total records in the relevant category; and (iv) requesting, as necessary and appropriate, additional samples during the inspection.

- Streamline and simplify the process of imposing monetary penalties on financial institutions.
- Increase the maximum monetary penalty that may be imposed for violations of AML/CFT-related requirements.

D. Domestic and International Cooperation

21. The AML/CFT Committee plays a key role in domestic AML/CFT policy cooperation. MLTFPA has established a governmental AML/CFT Committee, chaired by the Minister of Finance and consisting of 14 other high-level members. Its core functions are coordination of the NRA, preparation and monitoring of implementation of an action plan to address findings of the NRA as well as developing AML/CFT policies. The AML/CFT Committee usually holds high-level quarterly meetings and plays an important role in AML/CFT-related legislative initiatives. In addition, two ad hoc committees were created on the expert level to analyze the AML/CFT institutional framework and the supervisory and sanctioning powers and were dissolved in June 2019 after completion of their work.

22. Domestic cooperation regarding AML/CFT should be intensified and made more continuous, particularly on operational issues. Little infrastructure is in place for continuous cooperation between the EFIU, the EFSA, Eesti Pank, Estonian Internal Security Service, Prosecutor General and other law enforcement agencies on issues relevant to AML/CFT supervision of banking sector, including on operational issues and on generation of information on new and evolving ML/TF risks. This is also relevant as EFIU also has responsibilities in AML/CFT supervision of financial sector – licensing and supervision of virtual asset service providers as well as supervision of currency exchange services and of implementation of targeted financial sanctions. Successfully completing the new NRA will require close cooperation among the relevant authorities – cooperation that should continue once that assessment is completed and be extended to the operational level.

23. The EFSA and Estonian Financial Intelligence Unit (EFIU) have established bilateral lines of communication but generally ad hoc interactions. There seems to be space for closer cooperation, notably in advance of on-site inspections, as the EFSA works to analyze a supervised entity's risk profile and so could benefit from the EFIU's input as to the nature, relevance and quality of suspicious transaction reports submitted by that entity. The EFSA could also benefit from EFIU notifications regarding a supervised entity that may be increasing its risk appetite or other changes in a supervised entity's pattern of suspicious transaction reporting. Currently, the EFIU responds to EFSA requests, providing relevant information. On a few occasions, the EFIU has also proactively communicated concerns regarding an FI's activities or level of compliance with AML/CFT-related requirements. The Government's initiative to create a Center for Strategic Analysis within the EFIU, which was adopted in October 2019 and not yet operational, is a welcome development that has the potential to produce useful risk analysis on evolving ML/TF trends, methods and risks for key authorities, including the EFSA, as well as for the private sector.

24. The EFSA has intensified its outreach and provision of guidance to the private sector. The EFSA issued detailed guidelines to its supervised entities in November 2018 that cover, *inter alia*, risk management, due diligence measures, record-keeping, the refusal to establish (and the termination of) business relationships, the reporting of suspicious transactions. At the same time, it provided information on ML/TF risk factors and methods relevant to Estonia. Banks have reported that supervisory expectations, notably regarding non-resident customers, which are expected to have a valid connection to Estonia, are clearly communicated. FIs have noted the proactive role played by the EFSA and its contribution to the private sector's AML/CFT discussions. The EFSA holds regular bilateral meetings with the private sector, organizes trainings and is actively involved in the work of the Estonian Banking Association, particularly in the meetings for compliance personnel. The EFSA also contributes to the private sector's understanding of ML/TF risks, including by informing supervised entities of the conclusions of its off-site monitoring, for example regarding the main risks and trends that it observes.

25. The EFSA has a sufficient framework to cooperate with other AML/CFT supervisors regarding the banks that operate in Estonia. All the foreign banks operating in Estonia are EU-based and all the branches and subsidiaries of Estonian banks are currently located within the EU. As such, the EFSA has a sufficient legal and institutional framework to cooperate and exchange information with its primary foreign counterparts. In addition, the EFSA has concluded AML/CFT-specific memoranda of understanding (MOUs) with two non-EU supervisory authorities – in Russia and Switzerland – thereby indicating that the EFSA is also prepared to work closely with key secondary foreign counterparts. While it could potentially be useful for the EFSA to conclude additional AML/CFT MOUs with non-EU financial sector supervisors, there is no indication that the extent of its formal cooperative arrangements is currently insufficient.

26. The EFSA's closest cooperative arrangements are with its Nordic-Baltic counterparts. Together with the financial supervisory authorities of Denmark, Finland, Iceland, Latvia, Lithuania, Norway, and Sweden, the EFSA was a founding member of the permanent working group of Nordic-Baltic financial sector supervisors, which was created in May 2019 with the goal of strengthening the exchange of information and general coordination of AML/CFT supervisory activities. Moreover, the EFSA is a member of the multinational supervisory colleges for four banks with significant presence in Estonia and operating throughout the Nordic-Baltic region. Ad hoc cooperation and coordination between the EFSA and its counterparts is also possible and is pursued as and when it is considered appropriate and necessary.

27. There is scope for greater international cooperation with respect to AML/CFT supervision, including consolidation at the EU or Nordic-Baltic levels. EFSA and Swedish FSA already share information regarding their inspections of banks that operate in both countries, but EFSA participation in foreign authorities' on-site inspections of parent banks with branches or subsidiaries in Estonia (e.g., Finland, Latvia, and Sweden) could generate useful additional insights into the corporate compliance culture, level of management awareness, and lines of reporting regarding ML/TF risk and potential compliance shortfalls. Foreign inspector participation in key EFSA on-site inspections could provide similar value. Options for the formal integration of AML/CFT

supervision at either the EU or Nordic-Baltic levels, such as consolidation of off-site supervision, integration under the EU's Enhanced Cooperation procedure or full integration within the EU, tend to be met with ambivalence on the part of the Estonian authorities. That ambivalence is not a reflection of any principled resistance to cooperation or any failure to recognize the potential benefits relevant to Estonia, including facilitation of consistent and comprehensive approach to cross-border ML/TF risks on a European level. Rather, it appears to be driven by a widespread perception within Estonia that the EFSA's AML/CFT supervision is increasingly sophisticated and effective, and a concern that a European-level AML/CFT supervisor might not be as attuned as the EFSA to Estonia's specific risk and context, adding a potentially burdensome bureaucratic structure.

Recommendations

28. To promote effective international and domestic cooperation on AML/CFT supervision of the banking sector, staff recommends that the Estonian authorities:

- Upon request of the EFSA, the EFIU should provide assessments of the nature, quantity, quality, and pertinence of financial institutions' suspicious transaction reporting.
- Fully operationalize and staff the recently approved Center for Strategic Analysis within the EFIU, ensuring that it has the range of expertise and information necessary to produce risk analysis for key authorities and the private sector
- When helpful and feasible, participate in foreign authorities' on-site inspections of parent banks with branches or subsidiaries in Estonia. As appropriate, enable foreign inspectors to join EFSA on-site inspections of their banks' local branches or subsidiaries.
- Consider supporting further integration/consolidation of AML/CFT supervision at the EU or Nordic-Baltic levels.

E. Conclusion

29. Important progress achieved in recent years lays the foundation for further enhancement of AML/CFT supervision of financial sector. While Estonia has taken several significant steps to bolster its AML/CFT supervision– and to strengthen its AML/CFT regime more generally – over the last 5 years, there remain important ways in which it could usefully build on that momentum, in the interest of continuing to foster international confidence in the integrity of the Estonian financial sector. Going forward, the authorities should prioritize: (i) streamlining and simplifying the process of imposing fines on financial institutions; (ii) increasing the number and range of financial institutions subject to on-site inspections each year by increasing the number of dedicated AML/CFT staff in the EFSA and/or developing risk-based targeted and thematic on-site inspections; and (iii) consider supporting further integration/consolidation of AML/CFT supervision at the EU or Nordic-Baltic levels.