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BALTIC CLUSTER REPORT

2014 CLUSTER CONSULTATION

May 2014

SELECTED ISSUES

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BALTIC CLUSTER REPORT

SELECTED ISSUES

April 16, 2014

Approved By
European Department

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CONTENTS

THE BALTIC MODEL, BALTIC-NORDIC LINKS, AND CONVERGENCE[1]

A. Introduction

1. The Baltic countries form a distinct group within a tightly integrated Nordic-Baltic region. However, they differ from the Nordics because of the challenges they faced upon regaining independence, with large differences in income, institutions, infrastructure, and other physical capital, notwithstanding the strong historical links with Nordics.

2. The Baltic countries also stand apart from their transition peers. Both groups came under central planning in the Soviet era. However, countries such as Poland, the Czech Republic, Hungary or Slovakia had a greater degree of autonomy and more institutional continuity before 1991. Because the Baltics reestablished independence much more abruptly, they entered the transition with the advantage of being able to create new institutions from scratch but also with the disadvantages of a more disruptive start to transition.

3. This chapter describes what sets the Baltics apart from others, while also drawing on links and similarities with other countries. The story has three parts:

- **The Baltic Model:** In contrast to the "Nordic Model", the "Baltic Model" described below is a set of revealed preferences rather than an articulated economic policy model. It is set out by comparing the Baltics to each other, peer countries, and selected higher-income countries.
- **Baltic links to the Nordics:** While the Baltics are generally integrated with the rest of Europe, they developed a special link to the Nordics through proximity, shared history, and strong and increasing economic ties. Links are particularly strong in the financial sector, but also in FDI and trade.
- **Convergence:** The Baltics are converging with advanced economies at a rapid pace in spite of the recent crisis. However, they face challenges of high unemployment, the structure of trade, and the ability of the financial sector to provide financing for growth. These topics are touched on here, but considered in depth in the other chapters of this Selected Issues Paper.

B. The Baltic Model

4. The Baltic countries are following similar approaches to economic policy, broadly in line with those of Northern European and the Anglo-Saxon countries. They are closer to the Anglo-Saxons than the Nordics in the structure of their public sectors, but they have a revealed

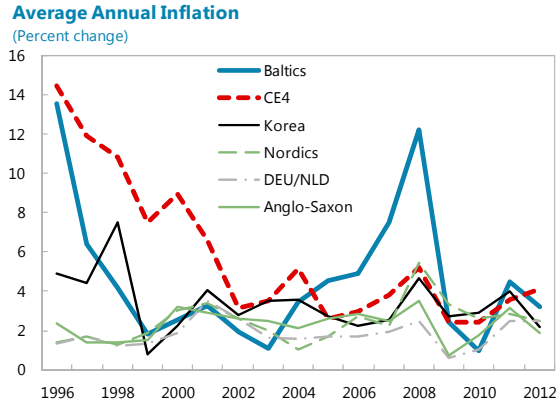
[1] Prepared by Greetje Everaert and Eugen Tereanu under the guidance of Tom Dorsey. Felix Winnekens provided excellent research assistance, and Solange de Moraes Rego and Fernando Morán Arce provided outstanding support.

preference for conservative and business-friendly fiscal policies, much in line with both the Anglo-Saxon and Nordic countries.[2]

The Macroeconomic Model

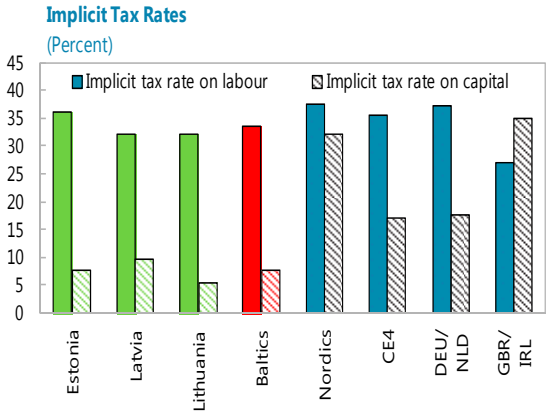
5. Their macroeconomic policies are generally robust (Figure 1).

- **Inflation**. The Baltic countries pursued exchange-rate based stabilization strategies in the 1990s which brought inflation down rapidly. However, the pegs in combination with positive confidence effects from European Union (EU) membership and improved credit ratings seem to have encouraged capital inflows that allowed overheating and a spike in inflation in the run-up to the global crisis.



Source: IMF WEO.

- **Prudent public finances**. These were kept in check more than in the CE4 peers, and public debt was low before the crisis.
- **Low public spending**. The Baltics have small governments, particularly with respect to transfer payments. Expenditure is lower than in CE4 peers or the Nordics, and the share of GDP devoted to social benefits is substantially lower. On both the overall size of government and social benefits, the Baltics are closer to the Anglo-Saxons than the Nordics.
- **High labor taxation; low profit taxation**. Profit tax ratios (as a percent of corporate pretax earnings) are less than half of the averages for the Nordics or the Anglo-Saxons. CE4 countries have similar labor tax rates (as a percent of corporate pretax earnings), but somewhat higher rates of profit taxation. Data on tax wedges on low income earners and on implicit taxation of labor and capital also point to relatively high incidence of labor taxes, especially when compared to the importance of profit taxation in the Baltics.



Source: Eurostat.

[2] The Nordics comprise Denmark, Finland, Iceland, Norway, and Sweden. The "Anglo-Saxons" are the majority-Anglophone OECD economies: Australia, Canada, Ireland, New Zealand, the United Kingdom, and the United States. The CE4 are the Czech Republic, Hungary, Poland, and the Slovak Republic. These and other comparator groups used in this paper are set out in Annex I.

- **Moderately high income inequality**. The Baltics' tax and expenditure policy mix entails less redistribution than in the Nordics. Gini coefficients are higher in the Baltics than in the Nordics although similar to the Anglo-Saxons and lower than those of the emerging OECD economies, such as Chile and Mexico.

Figure 1. The Baltic Macroeconomic Model

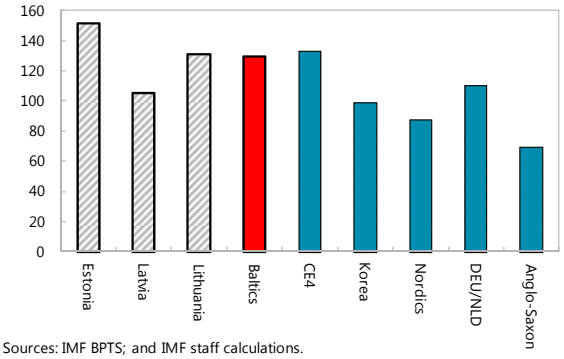
Sources: Eurostat; OECD; World Bank Doing Business; IMF GFS; WEO; and IMF staff calculations.
1/ Hungary data start in 2005.
2/ Chile data start in 2005, and Turkey data start in 2002.
3/ 1994-95 data for Baltics and Hungary.
4/ Without Canada.
5/ Without Mexico/Turkey: 2008-11.
6/ Without Slovenia/Switzerland: 2002-10.
7/ Data for Austria from 2011; for Israel, Korea, Canada, New Zealand, United States, Chile, Mexico and Turkey from 2010.

The Structural Model

6. The Baltics are very open economies, with favorable investment climates (Figure 2).

- Their bank-dominated financial sectors are among the most open, and they have high levels of FDI and trade in their economies.[3].
- The business environments of all three countries are ranked near the top**.** The World Bank's Doing Business indicators put them behind only the very-high-ranked Nordics, Anglo-Saxons, and Korea, and ahead of some other advanced economies. However, perceptions of corruption are not as favorable.

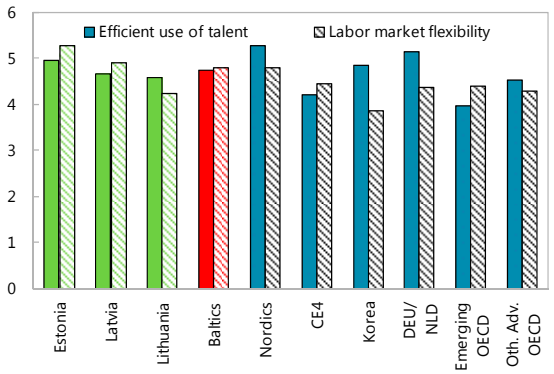
Exports and Imports of Goods and Services, 2005–2012
(in percent GDP)



Sources: IMF BPTS; and IMF staff calculations.

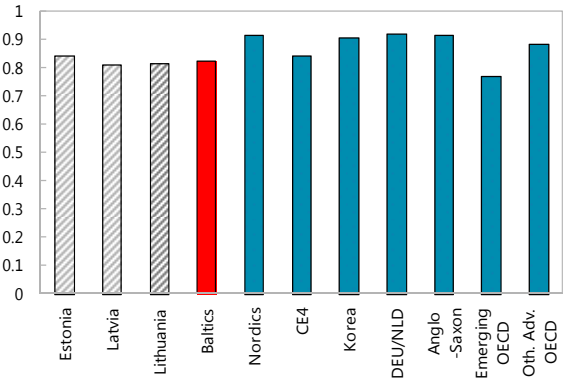
- They have also achieved high levels of labor force participation (particularly for women) and feature generally flexible labor market institutions.
- They have also achieved high levels of human development.

Structure of Labor Market
(1-7, 7=best)



Source: World Economic Forum.

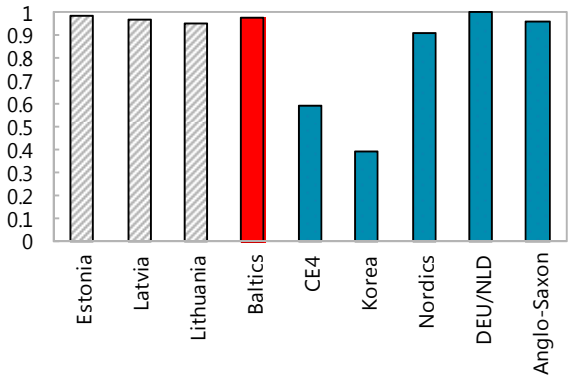
Human Development Index, 2012



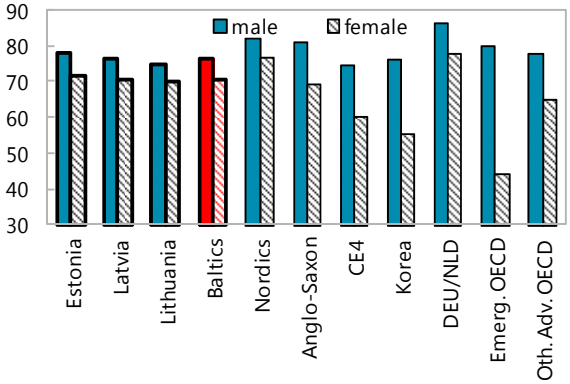
[3] Chinn, M. and Ito, H "A New Measure of Financial Openness", Journal of Comparative Policy Analysis, Volume 10, Issue 3 September 2008, p. 309–322.

Figure 2. The Baltic Structural Model

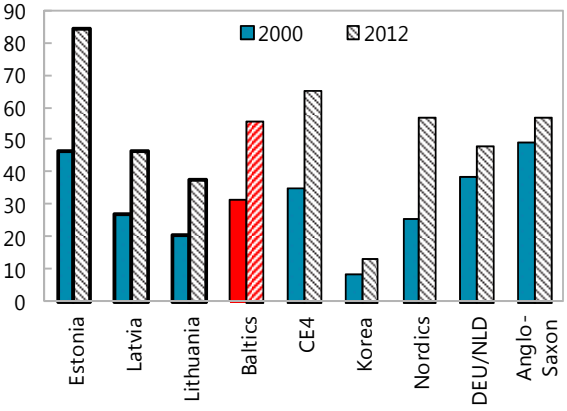
Chinn-Ito Financial Openess Index, 1996–2011
(Normalized, 0=min;1=max))



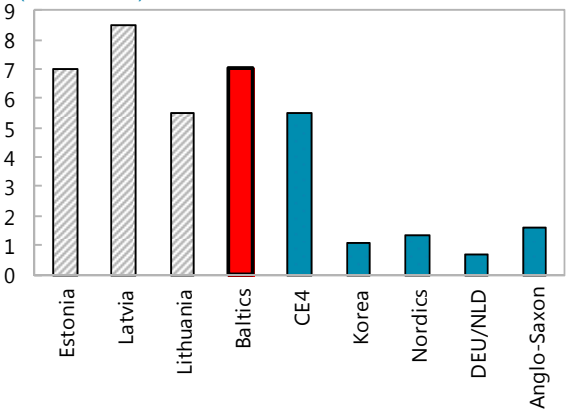
Labor force Participation Rate, 2011
(Percent of working age population)



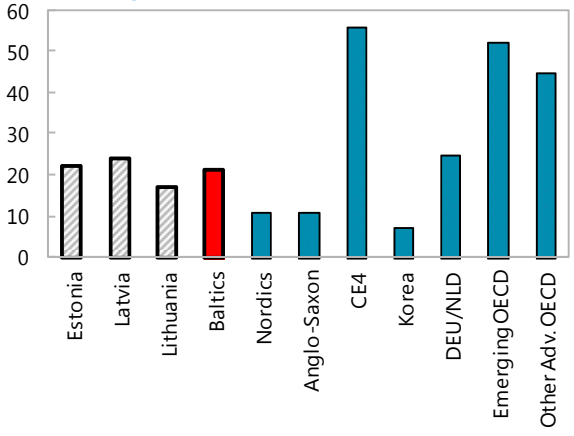
Inward FDI Stock
(Percent of GDP)



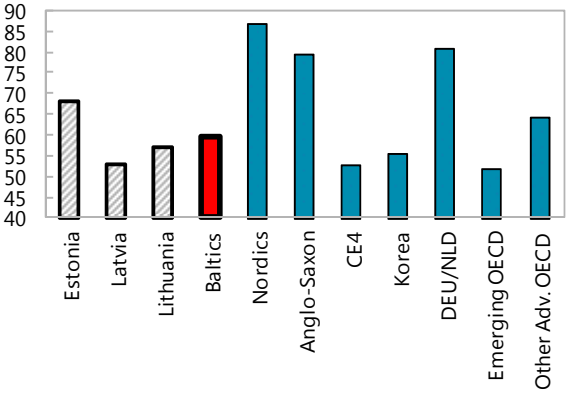
Value of Greenfield Projects, 2003–12
(Percent GDP)



Ease of Doing Business Rank



Transparency International Perception Index, 2013
(Percent, 100= least corrupt)



Sources: Chinn, Menzie D and Hiro Ito (2008). "A New Measure of Financial Openess"; WDI; UNCTAD; World Bank Doing Business; Transparency International ; and IMF staff calculations.

C. Baltic Links to the Nordics

7. The Baltic countries have strong ties to the Nordic states and other countries bordering on the Baltic Sea stretching back to the Middle Ages. Danish and Swedish rule in medieval and early modern times in Estonia and Latvia, trade links to all three Baltic countries through the Hanseatic League, and other influences tied the Baltic countries to the Nordic powers as well as Germany, Poland, and England. Lithuania was also strongly tied to Poland through the Polish-Lithuanian Commonwealth.[4]

8. A new period of integration between the Nordic and Baltic countries began after the Baltic countries re-established independence in 1991. The Baltic countries began establishing common institutions among themselves even before the break-up of the former Soviet Union, including the creation of a Baltic Assembly (analogous to the Nordic Council) in 1990. Cooperation between Nordic and Baltic institutions also developed quickly, including the umbrella NB8 framework incorporating all eight Nordic and Baltic countries, full membership in the Nordic Development Bank by the Baltic countries from 2005, and joint representation in international organizations such as the IMF and World Bank. The integration of the Nordic and Baltic countries at the official level is also paralleled by private economic ties. Membership in the EU also accelerated the process of integration and convergence.

Current Economic Ties

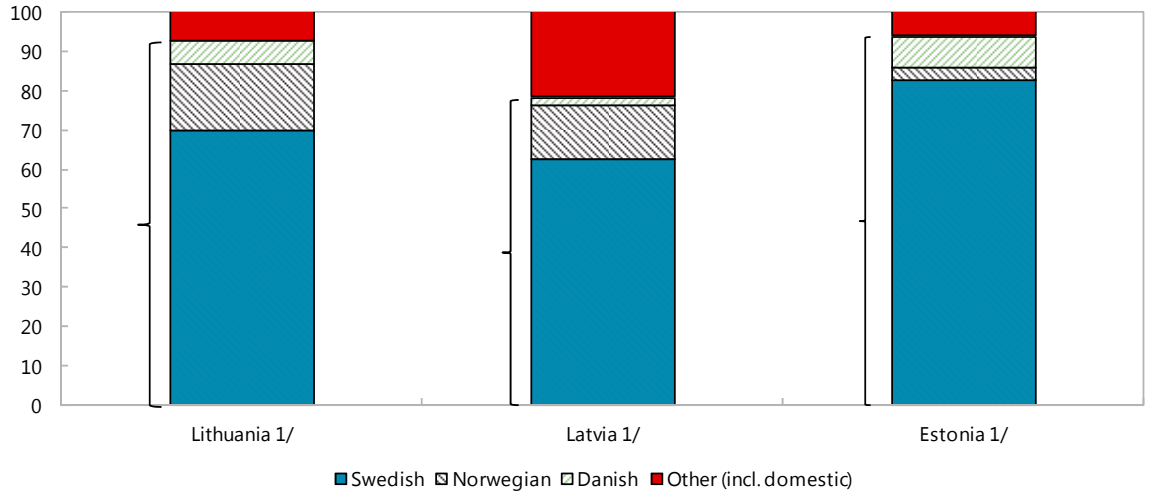
9. There are now strong economic links between the Nordic and Baltic countries, including in the financial sector, trade, and FDI (Figure 3). The Baltic countries all have financial sectors dominated by Nordic-headquartered banking groups. Nordic countries are also large direct investors in the Baltic countries, particularly in the case of Estonia, where Nordic investors account for more than half of total FDI. Trade links are also strong, although the shares are lower than for banking and FDI.

10. These strong links are not just the result of proximity. While the financial sector links are obviously very strong, it could be argued that the investment and especially the trade links could be explained simply by proximity and the larger sizes of the Nordic economies. However, gravity model analysis that controls for the size of the partner country, the size of its economy, and geographic distance shows that the additional effect of being part of the Nordic-Baltic group is statistically significant for trade and inward FDI to the Baltics, and these results are robust over different time periods (Box 1).

[4] A recent general history of the Baltic countries is Andres Kasekamp's A History of the Baltic States, (2010, London, Palgrave Macmillan).

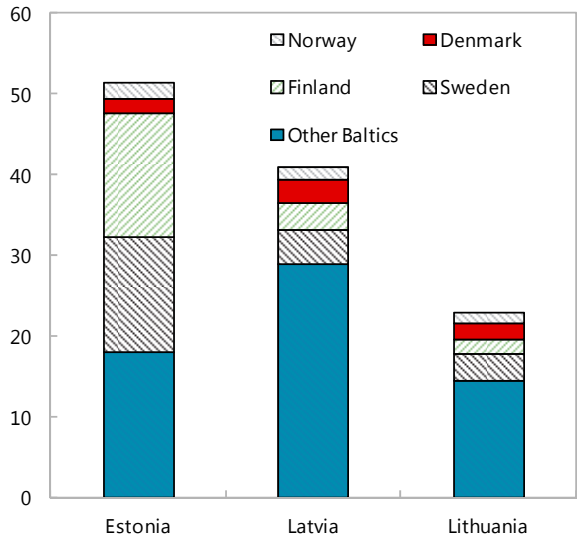
Figure 3. Economic Ties of the Baltics

Ownership Structure of the Baltic Banking System
(Percent)



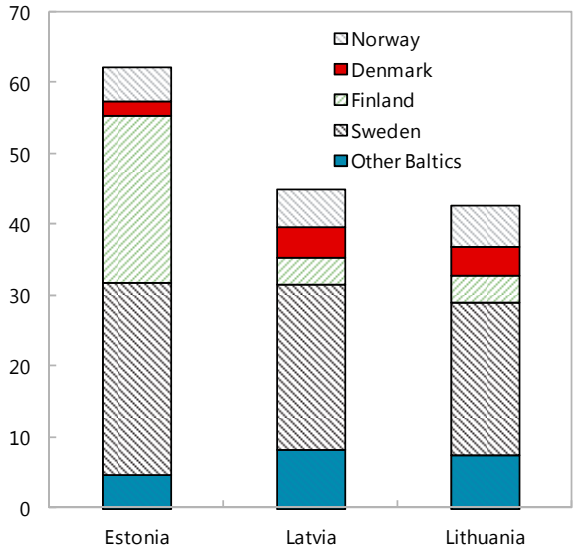
1/ Measured by total domestic lending (rather than total assets).

Partner Shares in Total Trade, 2013
(Percent)



Source: Direction of Trade Statistics.

Partner Shares in Total Inward FDI, end 2012
(Percent)



Source: Coordinated Direct Investment Survey.

Box 1. Nordic-Baltic Trade and Investment Linkages

We test the strength of regional integration in the Nordic Baltic region by estimating a standard gravity model. The standard gravity model relates cross border flows to population, economic size and geographical distance. In its basic form, the gravity model assumes that trade between two countries increases with their economic size and decreases with the distance between them. It is also common to add population as an additional variable related to market size. In addition, per capita income is often employed because it could reasonably proxy per capita expenditure and the propensity for imports (Paas and Tafenau, 2005).[1] We expand this model to test whether relations are more intense within the Nordic-Baltic region, after controlling for the standard elements of a gravity equation. We do so by introducing a dummy that identifies the country pairs where both members are either a Nordic or Baltic economy. A significant coefficient on the dummy suggests that Nordic-Baltic regional links are stronger than can be explained by the standard gravity variables.

We estimate a gravity model for both bilateral trade flows as well as inward FDI positions. In particular, we follow (Paas and Tafenau, 2005) and test whether the dummy that takes the value 1 when the country pair belongs to the Nordic-Baltic group of countries is significant.[2] For the trade regressions, we use bilateral real imports as their coverage is generally better than that of exports. For the FDI regressions, we use bilateral nominal stock exposures, controlling for the downward bias of the very small size of FDI *from* the Baltics *into* the Nordic economies. The model estimated is represented as follows:

$$T_{ijt} = \alpha + \beta_1 GDPpc_{it} + \beta_2 GDPpc_{jt} + \beta_3 POP_{it} + \beta_4 POP_{jt} + \beta_5 dist_{ij} + \beta_6 I(NB)_{ij} + \epsilon_{ijt}, \qquad [1]$$

where *T* denotes bilateral imports (or, alternatively, inward FDI positions), *GDPpc* real GDP per capita (or nominal GDP for the FDI regressions), *POP* populations, *dist* distance between capitals and *I(NB)* is the Nordic Baltic dummy. All variables are in log form. Because the distance between countries does not vary within the panel unit, we use the between estimator for our baseline model. However we also allow for country pair (random) effects in an alternative estimation.

Our analysis indicates that trade and FDI links within the Nordic-Baltic region go beyond those explained by standard gravity factors. In particular, econometric estimates do not reject the hypothesis that the particular strength of linkages between the Baltic and Nordic economies is an additional explanation for the size of regional cross border trade and investment flows. The Nordic Baltic dummy is significant and robust across specifications, in particular in the case of bilateral trade regressions.

[1/] Paas, T., and Tafenau, E., 2005, "European Trade Integration in the Baltic Sea Region—a Gravity Model Based Analysis", Hamburg Institute of International Economics Discussion Paper #331.

[2/] Data are taken from various sources: UNCOMTRADE, CEPII and IMF CDIS, and WEO; the coverage includes EU27 and selected CIS countries and a time span of 2000–12 (trade data) and 2009–12 (FDI data).

Box 1. Nordic-Baltic Trade and Investment Linkages (concluded)

Dependant variable : Real bilateral trade (imports)

	Fixed effects, between estimator				Random effects			
	Coef	p-value	Coef	p-value	Coef	p-value	Coef	p-value
Population_country	1.0	0.00	1.0	0.00	1.0	0.00	1.0	0.00
Population_partner	1.0	0.00	1.0	0.00	1.0	0.00	1.0	0.00
Real GDP per capita_country	0.4	0.00	0.4	0.00	0.6	0.00	0.6	0.00
Real GDP per capita_partner	0.7	0.00	0.7	0.00	0.8	0.00	0.8	0.00
Distance between capitals	-1.5	0.00	-1.5	0.00	-1.3	0.00	-1.2	0.00
D (Nordic-Baltic)	1.2	0.00	1.2	0.00	1.1	0.00	1.2	0.00
D (shared border)			0.1	0.68			0.5	0.01
Constant	8.3	0.00	8.2	0.00	4.1	0.00	3.2	0.00
Nobs	15,635		15,635		15,635		15,635	
Adjusted R2	0.82		0.82		0.81		0.81	

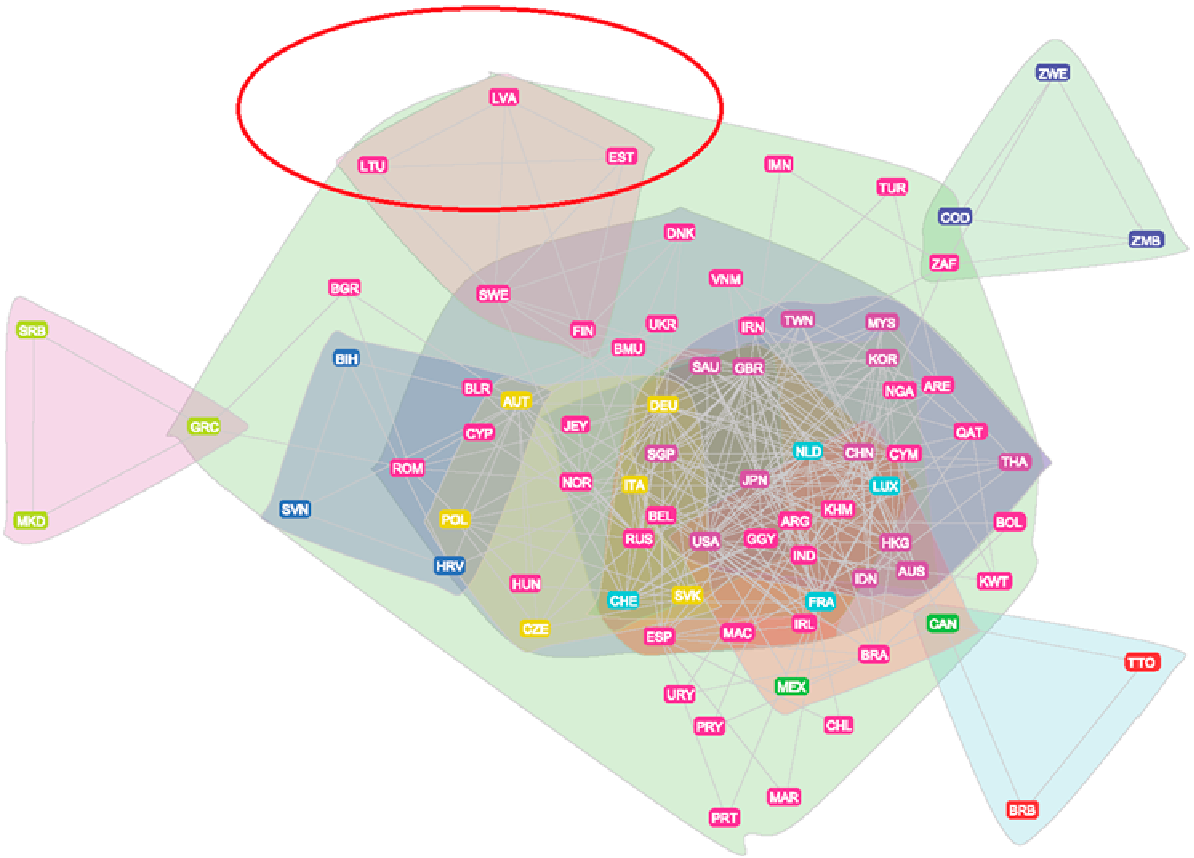
Dependant variable : inward FDI stocks (nominal) 1/

	Fixed effects, between estimator				Random effects			
	Coef	p-value	Coef	p-value	Coef	p-value	Coef	p-value
Population_country	0.6	0.00	0.6	0.00	0.7	0.00	0.6	0.00
Population_partner	0.6	0.00	0.5	0.00	0.6	0.00	0.6	0.00
Nominal GDP per capita_country	1.1	0.00	1.2	0.00	0.9	0.00	0.9	0.00
Nominal GDP per capita_partner	2.0	0.00	2.0	0.00	1.6	0.00	1.6	0.00
Distance between capitals	-1.3	0.00	-1.1	0.00	-1.4	0.00	-1.3	0.00
D (Nordic-Baltic)	1.1	0.11	1.1	0.08	1.1	0.00	1.1	0.00
D (shared border)			0.8	0.02			0.4	0.09
Constant	-19.2	0.00	-21.2	0.00	-12.3	0.00	-13.3	0.00
Nobs	3,243		3,243		3,243		3,243	
Adjusted R2	0.62		0.62		0.61		0.61	

1/ Nordics excluded as recipient countries as they receive little FDI from Baltics and would bias the results

11. Cluster analysis from the IMF's Strategy and Policy Review Department visually summarizes trade, FDI, portfolio investment, and banking links.[5] This analysis shows that the Baltic countries form a cluster with each other, Sweden, and Finland. Denmark and Norway are also closely tied to the Baltics through their common Nordic links.

[5] The cluster analysis is described in IMF, 2012, "Enhancing Surveillance—Interconnectedness and Clusters" http://www.imf.org/external/pp/longres.aspx?id=4719. The analysis of cluster linkages for the Baltics was provided by Sophia Zhang and Franziska Ohnsorge.



D. Convergence

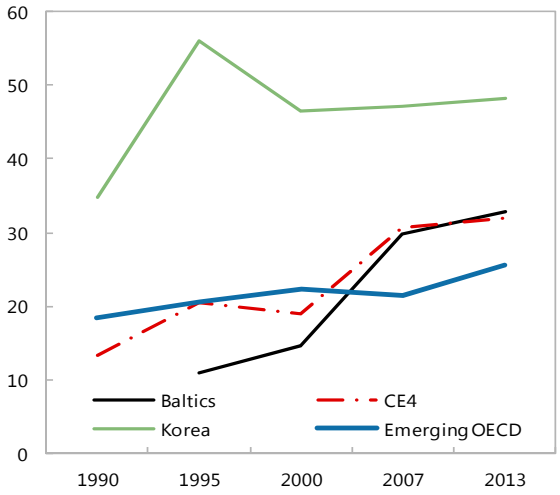
12. The Baltic countries have made a strong start on convergence in income toward the higher-income, more market-oriented economies. Whether because of the Baltic Model, the links to the Nordics, membership in the EU, or other factors, they have made substantial progress in reducing the gap over the last two decades. In this, they are a counter-example to the "stuck in transition" phenomenon explored in the recent European Bank for Reconstruction and Development (EBRD) Transition Report.[6] Starting from income levels around ten percent of the Nordic or Anglo-Saxon countries in 1995, and about half those of the CE4 and the emerging OECD economies, they have tripled their income levels as a share of Nordic and Anglo-Saxon per capita GDP. Moreover, they have closed the gap and even surpassed the income levels of the CE4 and emerging OECD economies; notwithstanding the generally good performance of these peer groups.

[6] European Bank for Reconstruction and Development, 2013 "Transition Report 2013: Stuck in Transition?" London.

13. Korea provides a more attainable reference point for Baltic income growth. The Baltic countries are still well below the Nordic or Anglo-Saxon countries in per capita GDP, but much closer to Korea (Figure 4). Their growth path over the last decade or so is quite similar to that of Korea roughly a decade earlier.

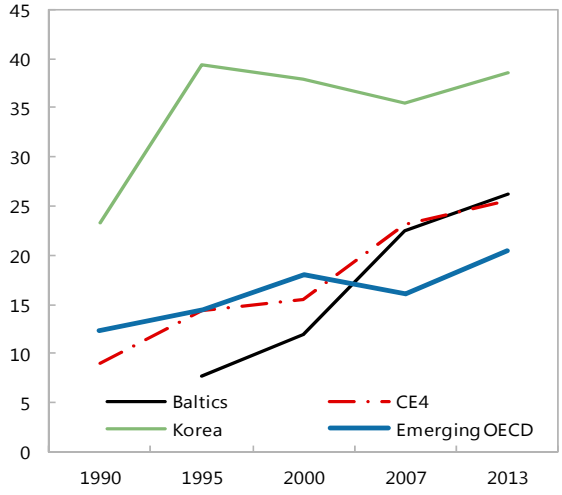
Figure 4. Convergence of the Baltics

GDP per Capita
(in percent of AngloSaxon US$ GDP per capita)



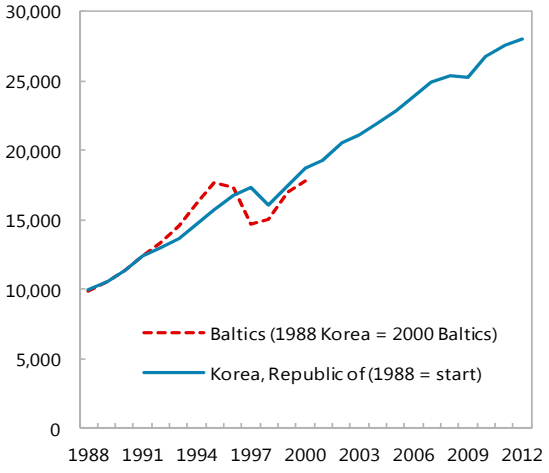
Sources: IMF WEO; and IMF staff calculations.

GDP per Capita
(in percent of Nordic US$ GDP per capita)



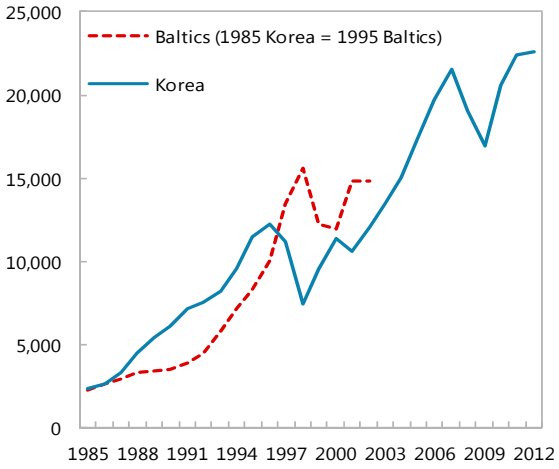
Sources: IMF WEO; and IMF staff calculations.

GDP per Capita
(PPP US$, constant 2005 prices)



Sources: World Bank World Development Indiciators; and IMF staff calculations.

GDP per capita
(Current US$)



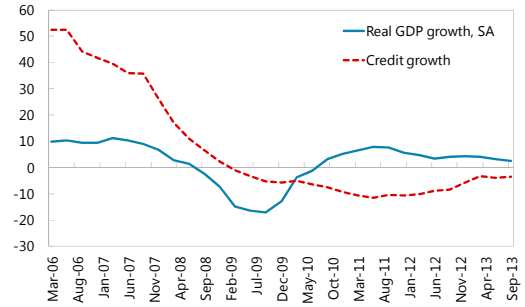
Sources: World Bank World Development Indiciators; and IMF staff calculations.

E. Common Challenges

14. Notwithstanding their success thus far, the Baltics face some common challenges. These are explored in detail in the subsequent chapters of this paper.

15. The financial systems are stable and well-capitalized, but they aren't yet providing credit to support the ongoing recovery. Credit is still declining on average in spite of the recovery, except in Estonia. Reviving credit will be necessary to sustain growth and in the longer term, convergence. The relative importance of demand and supply factors in these creditless recoveries, policy responses, and the possible role of non-bank financing are considered in Chapter II of this Selected Issues Paper.

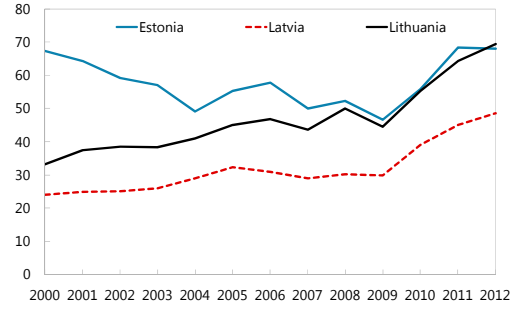
Baltics: Real GDP and Credit Growth
(year-on-year percent change)



Sources: Haver; and IFS.

16. Export growth may be difficult to maintain. Export-to-GDP ratios have grown rapidly in Latvia and Lithuania and have remained very high in Estonia. However, the structure of exports is not well-oriented toward fast growing countries or products. This calls into question whether they are well positioned to continue their good export performance. This will be explored in greater detail in Chapter III.

Share of Exports
(Percent of GDP)

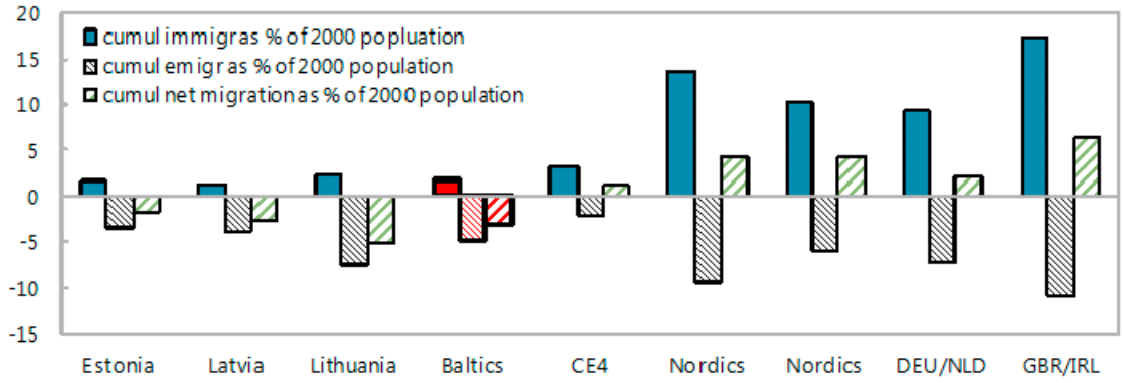


Sources: WEO; and DOTS.

17. Unemployment has remained high even though the labor force has been declining (Figure 5). Population fell on average by over 10 percent in the Baltics in the last decade and by close to 14 percent in Lithuania and Latvia. Both low fertility rates, relatively low life expectancy (especially for males) and high rates of net emigration are contributing to this, and old age dependency ratios are high and rising. In spite of this, estimated structural unemployment remains high. The explanations for the apparently high rates of structural unemployment do not seem to be legal or contractual impediments to labor market flexibility. Instead, they may be partly the result of high taxation of labor income and skills and education mismatches. These issues are considered in Chapter IV.

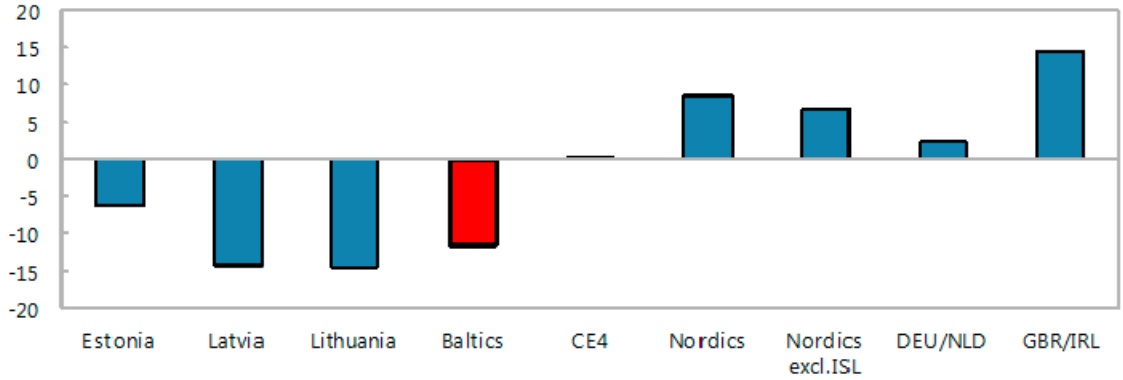
Figure 5. Social Indicators in the Baltics

Net Migration
(cumulative 2000–11, percent of end-2000 population)



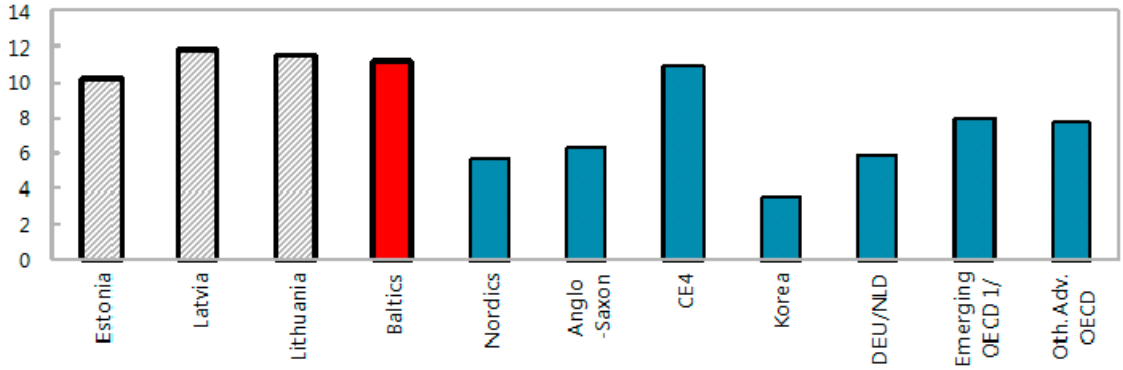
Sources: Eurostat; and IMF staff calculations.

Population Change
(in percent of 2000 population, end-2011 versus end 2000)



Sources: Eurostat; and IMF staff calculations.

Unemployment, Average 2000Q1-2013Q3
(Percent)



Source: Haver; and IMF staff calculations.
1/ Data for Turkey starts in 2005 Q1, data for Chile ends in 2009 Q4.

F. Conclusions

18. There is a "Baltic Model" and it has worked so far. The Baltics are charting a course of economic convergence with higher-income advanced economies—with clear commonalities among the three countries and differences from their transition and non-transition peer countries. While they are more closely linked to the Nordics, their policies are more laissez-faire and resemble those of the Anglo-Saxons in some ways. Their particular policy mix has been successful thus far with impressive income growth.

19. The revealed preferences of the Baltics resemble a mix of Nordic and Anglo-Saxon policies.

- This model is a market-friendly and fiscally conservative approach similar to that of the Nordics and Anglo-Saxons.
- The Baltics are closer to the Anglo-Saxons than the Nordic in terms of size of government and social benefits.
- The business environment is close to that of the Nordics and Anglo-Saxons and comparable to or higher-ranked than that of other advanced economies and transition and non-transition peer countries.
- However, high labor taxes are not a feature of Nordic or Anglo-Saxon policies, and this may be contributing to high structural unemployment rates, an area in which they stand apart from the Nordics and the Anglo-Saxons.

20. The Baltics are closely linked to the Nordics in many ways. Trade, investment, and financial links among the Nordic and Baltic countries are close, particularly for banking and particularly for Estonia across the range of economic links. The Nordic and Baltic countries are tending toward increasingly close linkages, particularly in banking. These linkages reinforce the need for policy coordination and collaboration that is already a feature of Nordic-Baltic cooperation.

21. The Baltics are converging rapidly toward their higher-income comparators. The Baltic Model has produced high growth even compared to their very successful transition and non-transition economic peers. However, new challenges in increasing exports, providing adequate finance for economic growth, and reducing unemployment need to be addressed to sustain growth and convergence going forward.

Annex I. Comparators Groups

Nordics

Denmark
Finland
Iceland
Norway
Sweden

Anglo-Saxons (majority-Anglophone advanced economies)

Australia
Canada
Ireland
New Zealand
United Kingdom
United States

DEU/NLD

Germany
Netherlands

Korea

South Korea

CE4 (transition peers)

Czech Republic
Hungary
Poland
Slovak Republic

Other Advanced OECD

Austria
Belgium
France
Greece
Israel
Italy
Japan
Luxembourg
Portugal
Slovenia
Spain
Switzerland

Emerging OECD

Chile
Mexico
Turkey

CREDITLESS RECOVERY IN THE BALTICS COUNTRIES[1]

A. Introduction

1. The 2008–09 global financial crisis brought the rapid economic expansion in the Baltic region to a halt and triggered a sharp correction. The credit-fueled domestic demand boom prior to the crisis ended in severe recessions in all three countries and a collapse in domestic demand and credit expansion. Vigorous adjustment measures and rebalancing of the economies permitted a recovery beginning in 2010 (Figure 1). Yet despite the strong turnaround, four years after the crisis, credit continues to decline, raising concerns that it might curtail the recovery. In short, the Baltic countries appear to be experiencing a creditless recovery.[2]

2. Creditless recoveries are not uncommon following financial crises. On the contrary, they have been well documented in the literature and can arise for a variety of reasons.[3] They could be the result of lower financing needs due to excess capacity at the end of a deep recession, suggesting that a creditless recovery may not necessarily be an impediment to growth. On the other hand, an extended period of meager credit growth could indicate tighter lending standards, impaired bank balance sheets or other credit (supply) constraints. Understanding what is driving a creditless recovery is essential for elaborating appropriate policies.

3. This chapter examines the possible causes of the creditless recoveries in the Baltic countries. It characterizes their experience in comparison with other episodes of creditless recoveries in both advanced and emerging market (EM) economies. It also investigates demand and supply constraints to credit expansion in the Baltics.

- The analysis finds that the creditless recoveries in the Baltics are in line with past cross-country episodes. Notably, they were preceded by rapid credit expansion followed by a sharp correction—features that are found to significantly increase the likelihood of a creditless recovery.[4] But the rebound in credit in the Baltics appears to be lagging behind what would have been expected at this stage of the recovery based on past observations. It should be noted, however, that the Baltic recoveries are heterogeneous in terms of credit growth, with Latvia and Lithuania lagging further behind Estonia.
- The analysis also suggests that the Baltics' credit expansion during the boom was driven primarily by domestic demand, but its contraction during the recession was largely explained

[1] Prepared by Weicheng Lian, Sergejs Saksonovs, and Gabriel Srour under the guidance of Shekhar Aiyar. Bartek Augustyniak and Felix Winnekens provided excellent research assistance, and Solange de Moraes Rego and Fernando Morán Arce provided outstanding support.

[2] Throughout the paper credit refers to the stock of credit. See Annex 1 for some motivation.

[3] Abiad et al. (2011), Dalvas (2013), Sugawara and Zalduendo (2013).

[4] And a banking crisis in the case of Latvia.

by worsening bank asset quality (a credit supply factor). Subsequently, during the recovery, both demand and supply constraints appear to be at play, albeit to different degrees in different countries. Financial conditions at parent banks are found to matter for credit, with greater financial stress in parent banks associated with lower credit growth in Baltic subsidiaries.

4. These findings have important policy implications. While a creditless recovery was to be expected in light of the pace of the credit expansion and severity of the recession, credit growth needs to pick up at about this stage of the cycle to sustain the recovery. A lengthy process of deleveraging may have been necessary to repair balance sheets but credit will be needed to fund investment as available excess capacity is fully utilized and financing needs increase. Therefore, efforts are needed to reduce credit constraints. This could prove more difficult in the Baltic countries, since the major banks are all foreign subsidiaries. Nonetheless, steps to improve the administration of insolvency and debt restructuring regimes could help to strengthen bank asset quality, reduce perceptions of credit risk and, ultimately, promote new lending.

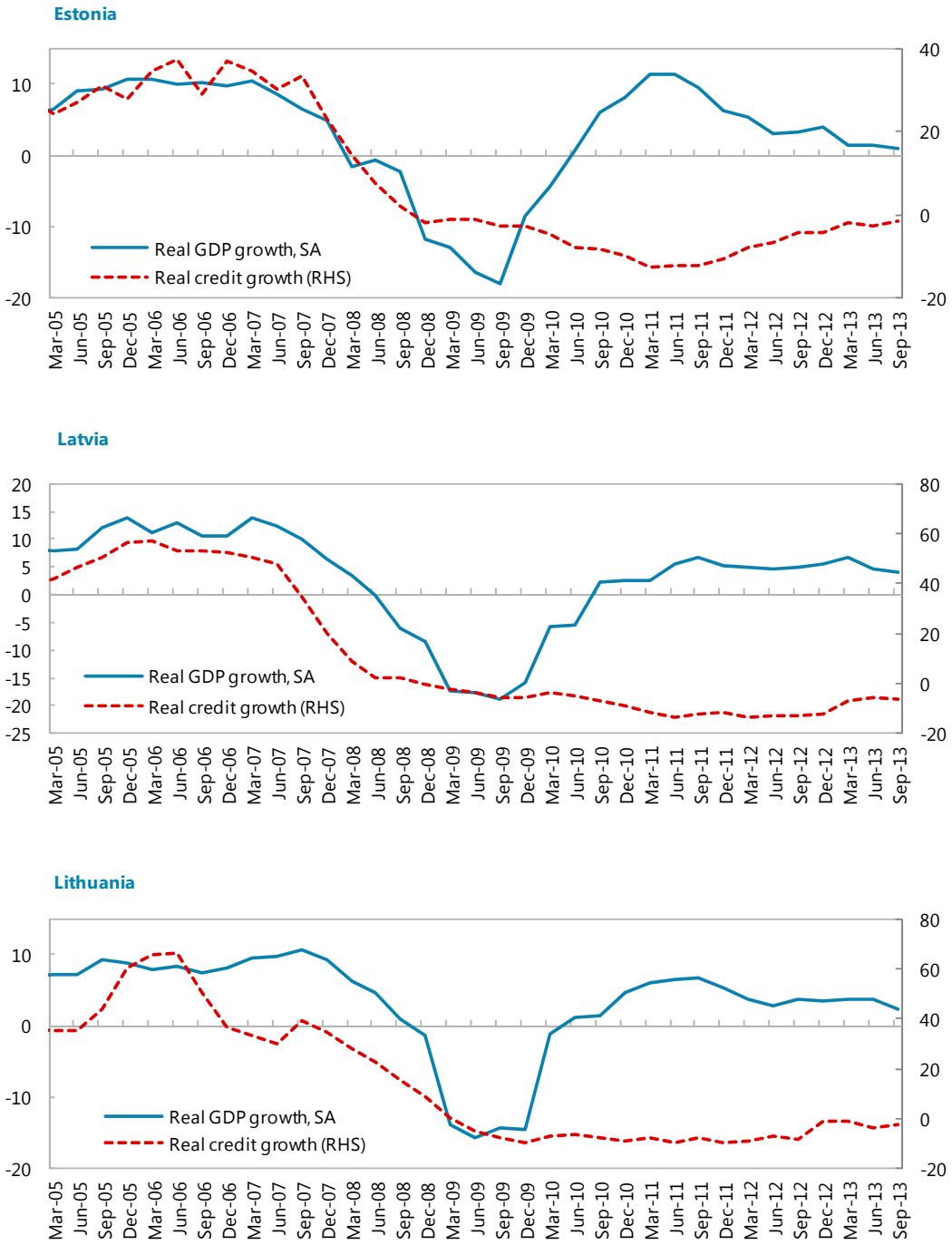
5. The Baltic countries' experience with creditless recoveries also raises the question of whether non-bank financing could offset declines in bank credit. A number of empirical studies have indeed found that better access to non-bank financing can help offset a credit crunch.[5] Not surprisingly, given their stage of economic development and the size of markets, financial sectors in the Baltic countries are dominated by banks. However, continued efforts toward regional (financial) integration could, in the medium term, expand funding opportunities.

6. This chapter is organized as follows. Section B briefly reviews the structure of the banking sector in these countries; Section C examines past creditless recoveries across a wide range of countries and cycles, and draws stylized facts; Section D uses bank-level panel data to assess the role of specific macroeconomic and financial conditions in driving credit movements; Section E examines the scope of non-bank financing; and Section F concludes.

[5] See Adrian et al. (2012) and Abiad et al. (2011). The finding (see Section C) that emerging economies are more prone to weaker and creditless recoveries than advanced economies also lends support to the presence of a link between the depth of financial markets and resilience to shocks.

Figure 1. Baltics: Real GDP and Credit Growth

(Percent change, y-o-y)



Sources: Haver; and IFS.

B. The Financial Sector in the Baltic Countries

7. The financial sector in the Baltic countries is heavily bank-based. Total financial sector assets amount to 140–180 percent of GDP, broadly in line with peer emerging countries (Czech Republic, Hungary, or Poland) but considerably lower than advanced countries in Europe. Banks account for about 80 percent of total financial sector assets, of which almost half is credit to the private domestic sector. Correspondingly, non-bank financing of the non-financial private sector (e.g., bonds and stock market capitalization) is small, amounting to about 4 percent of GDP in Latvia, 10 percent of GDP in Lithuania, and 17 percent of GDP in Estonia, compared to 45 percent of GDP in Poland.[6]

Financial Markets, 2012
(Percent of GDP)

	EST	LVA	LTU	SWE	CZE	HUN	POL	DEU
Banks								
Total assets	137	153	97	209	146	157	98	264
Credit	84	68	51	139	57	56	54	101
in 2001	36	27	13	98	37	33	28*	119
Bonds (stock outstanding)								
Total outstanding	8	21	34	166	59	10	61	122
Turnover (in pct of total)	3	23	70	-	-	-	-	-
Issued by general gvmt	1	19	33	35	42	0	48	61
Issued by financial sector	0	1	1	48	9	3	8	56
Issued by non-financial corporations	7	0	0	18	8	0	5	4
Stock market								
Total capitalization	10	4	10	92	27	15	40	27
Number of stock listed	16	32	33					
Memo items								
GDP (bln euro)	17	22	33	407	152	98	381	2666
GDP per capita	13000	10807	10892	42618	14480	9837	9881	32550

Sources: Authorities; Haver; and IMF staff calculations.
* In 2004

The Banking Sector

8. The banking sector developed rapidly in the last decade. Credit to GDP doubled in Estonia between 2001 and 2012, and more than doubled in Latvia and Lithuania. As a result, Lithuania has caught up with, and Latvia and Estonia have distanced themselves from, their regional peers. In Estonia and Lithuania, loans to households and corporations make up most of banks' assets. Liquid assets in Estonia mainly consist of deposits at banks and the central bank, while in Lithuania they are mainly held in the form of domestic government securities. Latvia differs from the other Baltics in that it has a substantial number of domestic banks that specialize

[6] Throughout the paper, 'non-bank' and 'market-based' are used interchangeably.

in taking non-resident deposits (NRDs)—mainly deposits from CIS countries—which are in turn mostly reinvested in assets abroad.

9. The banking sector is dominated by foreign banks. It is almost fully privatized with high market concentration—the largest banks are all subsidiaries or branches of Nordic banks, accounting for almost 95 percent of total assets and domestic credit in Estonia and Lithuania, and 53 percent and 80 percent of total assets and domestic credit, respectively, in Latvia. The relatively smaller share of total assets in Latvia reflects the role of NRDs and foreign assets held by domestic banks. Thus, foreign banks provide the vast majority of credit to the private sector in all three countries.

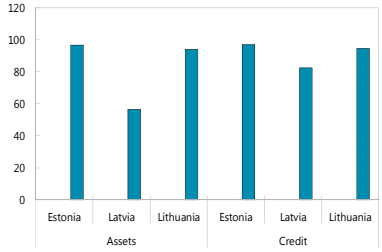
10. Baltic banks remain reliant on funding from parent banks, an important source of potential spillovers. Given the significant share of parent bank funding in bank liabilities, financial conditions in Nordic parent banks could affect the supply of funding to Baltic banks and, by extension, credit conditions. Despite the decline in parent bank funding since the crisis, domestic loan-to-deposit ratios are still quite high (around 133, 119, and 133 percent at end-2013 in Estonia, Lithuania, and Latvia).[7]

The Non-Bank Financial Sector

11. The size of the non-bank financial sector in the Baltic countries is broadly in line with their level of per capita income. But it remains significantly smaller than in Poland relative to GDP per capita and much smaller than in advanced countries in absolute terms.[8]

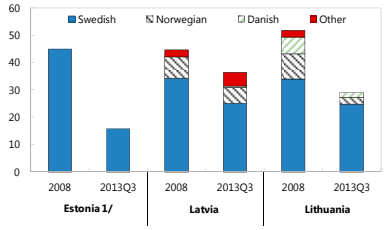
12. Non-bank investors have been relatively scarce in the Baltic countries.

Foreign Banks, 2012
(Percent of total)



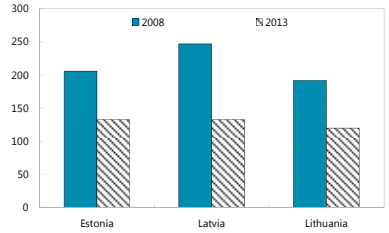
Sources: Authorities, Haver, IMF staff calculations.

Baltics: Parent Funding
(Percent of credit to private sector)



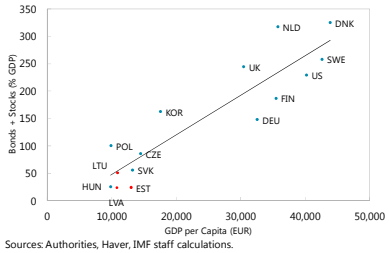
1/ No breakdown by country available for Estonia.
Sources: Country authorities and IMF staff estimates.

Loan-to-Deposit Ratio
(Percent)



Sources: Authorities and IMF staff calculations.

Financial Assets and GDP per Capita



Sources: Authorities, Haver, IMF staff calculations.

[7] Note that the total loan-to-deposit ratio in Latvia is very different from the purely domestic measure, due to the presence of the NRD banking sector. At end-2013 the total loan-to-deposit ratio in Latvia was much lower, at 80 percent.

[8] Very similar results obtain when plotting per capita GDP against non-bank financial assets in percent of total financial assets. Čihák et al. (2012) suggest assessing financial markets on size, degree of utilization, efficiency and stability. The Baltic countries score below median in terms of size (stock and bond market capitalization), efficiency (turnover ratio) and stability (asset price volatility).

- Institutional investment has been fairly limited. Leasing, insurance, investment, and pension funds' total assets amount to around 25–30 percent of GDP compared to 40 and 60 percent in Poland and the Czech Republic, and over 500 percent in Germany. Going forward, these sectors may grow steadily as income convergence increases demand for insurance and investment services.
- Leasing grew very rapidly in Estonia during the period leading to the crisis, but fell sharply afterwards. It developed partly as an alternative to bank lending to circumvent the tighter collateral conditions required for loans and the high costs of seizing collateral in the event of default, since the asset remains legally under the ownership of the lender.[9]

Financial Sector Assets, 2012
(Percent of GDP)

	EST	LVA	LTU	SWE	CZE	HUN	POL	DEU
Banks	137	153	97	209	146	157	98	264
Other financial institutions 1/	31	30	24	301	63	32	42	553
Leasing	10	…	5	…	…	…	5	…
Insurance corporations	8	12	3	107	19	13	10	73
Investment and pension funds	12	…	6	9	…	…	27	…

Sources: Authorities, Haver, and IMF staff calculations
1/ includes leasing, insurance, investment, and pension funds.

13. Baltic bond markets are still undeveloped with relatively low turnover (Table 1).

- In Latvia and Lithuania government securities dominate the debt market, while the share of non-financial corporate bonds is very small. Firms in these two countries have largely relied on internal funding and bank lending for financing.
- By contrast, in Estonia, non-financial corporate bonds dominate the bond market. With very low levels of public debt, the amount of government bonds outstanding is much lower than in Latvia and Lithuania. Corporate bonds developed mainly for hedging currency risk (before euro adoption) and financing higher-risk investments, both of which declined sharply during the bust and subsequent euro adoption. In the event, corporate non-bank financing did not offset the drop in bank credit, and in fact declined slightly more than bank credit during Estonia's recession, while turnover almost came to a halt. Thus, bonds remain only a fraction of total firms' liabilities, but their share in new liabilities is increasing.

14. Equity markets in the Baltics initially saw a spurt of activity as a result of mass privatizations in the 1990s (Table 1). However, these markets soon became illiquid as shares

[9] Comparable data are not available for Latvia and Lithuania. Most leasing agencies in Estonia are in fact bank affiliates.

were consolidated into fewer hands and a large number of corporations delisted. Although stock market development in the Baltics is somewhat comparable to other EMs, it remains in its infancy, with stock exchanges dominated by a few large corporations. There is also little indication that capital markets acted as a substitute to bank financing during the recession: turnover remained low, if not slightly lower than before the crisis.

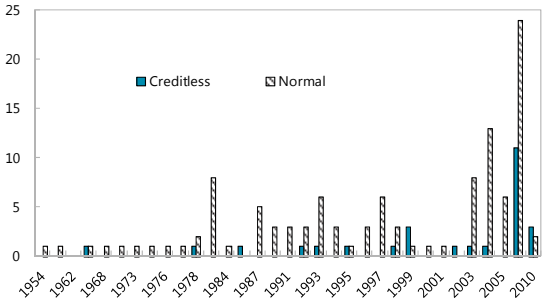
C. Creditless Recoveries: How Do the Baltics Compare?

15. In light of their dependence on bank credit, and the magnitude of the credit boom and depth of the subsequent recession, it is perhaps not surprising that credit has been slow to recover in the Baltic countries. This section aims to put the Baltic countries' experience in a cross-country setting. It examines some stylized facts regarding the likelihood and duration of creditless recoveries, and the growth performance of countries facing creditless recoveries.[10] It also assesses the determinants of credit growth during the recovery and its aftermath. Box 1 provides details on the methodology.

Stylized Findings

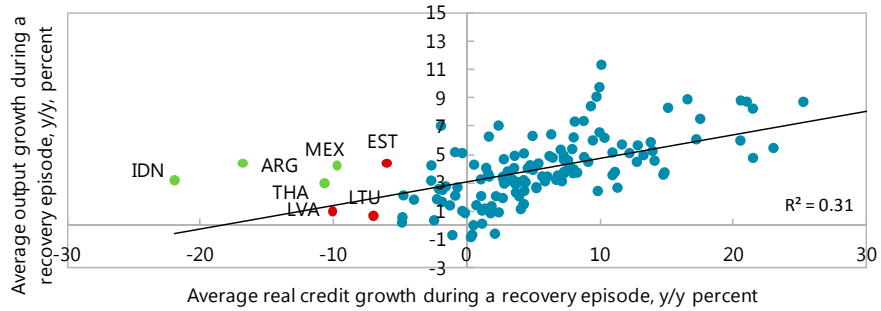
16. About one out of five recoveries—as defined in Box 1—is creditless. The frequency is higher in emerging economies (one out of three) compared with advanced economies (one out of six). The Baltic experience is similar to that of EMs that have faced crises.[11]

Number of Normal and Creditless Recoveries



Source: IMF staff estimates

Output and Real Credit Growth During Recovery
(Percent)



Sources WEO, IFS, Haver, IMF staff estimates.

[10] See Annex I for the description of theoretical link between credit and growth and list of countries included in the exercise.

[11] Most of the creditless recoveries in our sample occurred in the aftermath of the 2008 global financial crisis. The results may therefore be biased by the idiosyncrasies of that episode, including global financial distress, and low economic and borrowing activity at the EU and global level. Also, the cycles in advanced countries in our sample slightly outnumber those in emerging countries. Hence, frequencies over the whole sample will be closer to those in advanced countries. The countries colored in green in the scatter plot are the few countries that have achieved higher output growth combined with even greater declines in credit than the Baltics.

Table 1. Capital Markets

(Percent of GDP)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Sep-13
						Estonia					
Bank credit	52.3	62.3	71.1	83.9	92.4	97.8	108.3	100.2	83.3	77.3	75.5
Bonds (stock outstanding)											
Total outstanding	-	-	-	-	-	12.5	8.1	6.8	7.1	8.2	8.5
issued in Domestic markets	-	-	-	-	-	9.6	5.1	4.1	3.4	3.0	3.0
issued in international markets	-	-	-	-	-	2.9	2.9	2.8	3.8	5.2	5.5
	-	-	-	-	-						
Total issued by general gvmt	-	-	-	-	-	1.2	1.7	1.6	1.4	1.3	1.3
Total issued by financial sector	-	-	-	-	-	6.1	1.2	0.4	0.2	0.1	0.1
Total issued by non-financial corporate sect	-	-	-	-	-	5.2	5.2	4.8	5.6	6.8	7.1
Turnover** (in pct of total)	-	-	-	-	-	28.0	11.0	5.3	3.8	2.8	2.4
Stock market											
Total capitalization*	34.4	46.9	26.5	33.8	25.5	8.6	13.2	11.7	7.7	10.2	10.6
Banks	19.5	31.5	-	-	-	-	-	-	-	-	-
Financial non-banks	-	-	-	-	-	-	-	-	-	-	-
Private non-financial	14.9	15.4	26.5	33.8	25.5	8.6	13.2	11.7	7.7	10.2	10.6
Turnover (in pct of total capitalization)	17.0	16.7	11.4	6.2	14.1	14.0	9.7	12.2	11.2	5.6	5.9
Number of stock listed	13	13	15	17	18	18	16	15	15	16	16
						Latvia					
Bank credit	37.3	48.8	69.0	88.3	89.6	92.1	105.3	99.5	81.7	68.0	61.4
Bonds (stock outstanding)											
Total outstanding	-	-	-	-	-	-	-	12.5	14.9	20.9	20.9
issued in Domestic markets	-	-	-	-	-	-	-	7.0	8.9	5.9	6.1
issued in international markets	-	-	-	-	-	-	-	5.5	6.0	14.9	14.4
Total issued by general gvmt	-	-	-	-	-	-	-	10.6	10.7	19.3	17.7
Total issued by financial sector	-	-	-	-	-	-	-	1.5	3.9	1.3	2.6
Total issued by non-financial corporate sect	-	-	-	-	-	-	-	0.3	0.3	0.3	0.6
Turnover** (in pct of total)	-	-	-	-	-	-	-	101.9	46.3	22.7	
Stock market	-	-	-	-	-	-	-				
Total capitalization*	-	-	-	-	-	-	-	5.2	4.0	3.8	4.1
Banks	-	-	-	-	-	-	-	0.4	0.0	0.0	0.0
Financial non-banks	-	-	-	-	-	-	-	0.0	0.0	0.0	0.0
Private non-financial	-	-	-	-	-	-	-	4.8	4.0	3.8	4.1
Turnover (in pct of total capitalization)	-	-	-	-	-	-	-	84.0	60.1	34.9	-
Number of stock listed	-	-	-	-	-	-	-	34	33	32	32
						Lithuania					
Bank credit	22.7	28.6	40.7	49.8	59.6	62.5	69.7	63.4	53.5	51.2	46.9
Bonds (stock outstanding)											
Total outstanding	15.8	17.1	17.9	19.0	19.4	17.8	29.3	33.9	34.1	34.4	31.3
issued in Domestic markets	5.8	5.8	6.6	5.5	5.6	5.9	8.1	6.6	5.8	5.9	6.3
issued in international markets	10.0	11.3	11.3	13.5	13.9	11.9	21.2	27.4	28.4	28.6	25.1
Total issued by general gvmt	15.3	15.7	15.9	16.6	15.9	13.9	25.2	31.9	32.6	33.4	30.8
Total issued by financial sector	0.3	1.4	1.9	2.2	3.4	3.7	3.9	1.9	1.1	1.0	0.5
Total issued by non-financial corporate sect	0.1	0.0	0.1	0.2	0.2	0.2	0.1	0.1	0.4	0.0	0.0
Turnover** (in pct of total)	401.3	640.8	573.0	444.4	261.6	167.2	157.9	167.9	84.6	69.9	51.0
Stock market											
Total capitalization*	-	26.1	33.1	32.1	24.0	8.0	12.1	15.3	9.9	9.8	9.3
Banks	-	1.0	2.5	3.4	3.6	0.8	1.7	1.5	0.4	0.3	0.2
Financial non-banks	-	0.5	0.8	0.7	0.7	0.1	0.1	0.4	0.3	0.3	0.2
Private non-financial	-	17.8	24.0	20.9	12.5	4.1	6.2	8.5	6.3	6.1	5.6
Turnover (in pct of total capitalization)	-	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0
Number of stock listed	-	46	43	45	44	42	41	42	42	33	34

Sources: Authorities, Haver, and IMF staff calculations

Box 1. Data and Methodology

Data. The analysis covers 59 countries, both advanced and emerging economies for which data on GDP, credit and other explanatory variables are available for different time periods (Annex I). The sources of the data for credit are BIS (2013), where available, and national agencies (via HAVER). Other data are from IFS, WEO and national agencies, as available.

Timeline of a cycle

- Recessions are identified when the cyclical component of real GDP (defined as detrended real GDP using the Hodrick-Prescott filter) falls one standard deviation below zero (Abiad et. al. 2011). The recession starts in the quarter following the previous peak of the cyclical component of real GDP, and ends in the quarter when the cyclical component is at its lowest point.
- Recovery is defined as the first three years (twelve quarters) following the recession, unless a new recession starts during that period.
- A credit-less recovery is one where the average year-on-year growth rate of real credit, defined as the stock of nominal credit in national currency deflated by the GDP deflator, is negative; otherwise it is a normal recovery.
- Aftermath is defined as the next three years after the recovery.
- Booms are defined as the two years before the start of the recession.
- Alternative definitions produce broadly similar results.
- We use the updated database of systemic banking and currency crises by Laeven and Valencia (2008) to date banking and currency crises. A banking crisis is dated on the basis of financial distress and significant policy intervention (Latvia had one in 2008). A currency crisis is defined as a large (more than 30 percent) nominal depreciation, provided there has not been a large depreciation a year before.

Model selection. All variables used in the models can be defined over two periods: averages over boom (two years before recession) and recession (of variable length). In building the probit and regression models in the paper, we start with the shape of the credit cycle and add other relevant variables, on the basis of theoretical links suggested by the literature. Variables are kept in the model if they are significant relative to the model without them, provided including them does not reduce the sample size by more than 20 percent (comparable to the overall frequency of credit-less recoveries).

17. Creditless recoveries are generally weaker and follow significantly deeper recessions than normal recoveries, especially in EMs (Figure 2). For advanced economies, economic growth is about 20 percent lower in a creditless recovery compared with a normal recovery, while for EMs growth falls by about half. These differences become even more pronounced when looking at credit growth rather than economic growth. In EMs, creditless recoveries follow periods of high credit growth

Characteristics of Creditless and Normal Recoveries

	Normal		Creditless	
	Advanced	Emerging	Advanced	Emerging
	q/q	q/q	q/q	q/q
Average GDP growth	0.9	1.7	0.7	1.0
Standard deviation	0.4	0.8	0.4	0.5
Average real credit	1.6	2.7	-0.6	-1.6
Standard deviation	1.3	1.9	0.6	1.9
Number of episodes	64	49	12	16

Source: IMF staff estimates.

during the boom. Median credit growth in EMs reaches 25 percent during the boom in creditless episodes, against 7 percent in normal episodes, and converges to the normal recovery credit growth path only in the last two years of the aftermath.[12]

18. Compared with EMs and advanced economies (especially the Nordics), the Baltics experienced a more extreme credit cycle. The only creditless recoveries identified in the Nordic economies were in Finland and Sweden in the early nineties. They were associated with banking crises and deflating housing bubbles (Sweden) and can therefore be used as additional benchmarks for comparison. During the boom, real GDP and real credit growth rates were higher in the Baltic countries compared with the median EM or the Nordics, while they were comparatively lower (more negative) in the recession (see table below). In the recovery and its aftermath, real GDP grew at levels similar to the Nordics and the median EM (except Estonia, which had higher growth), but real credit contracted by more. In the Nordics and the median EM, real credit growth became positive a year into the aftermath (or about 14 quarters after the trough of the recession), which, for the Baltic economies would mean end-2013.[13]

Creditless Recoveries in the Baltics and Nordics

	Time		Real GDP	Real credit
Country			q/q	q/q
Estonia	2009Q4	2012Q3	1.5	-1.6
Latvia	2009Q4	2012Q3	1.1	-3.1
Lithuania	2009Q3	2012Q2	0.9	-1.9
Finland	1992Q4	1995Q3	0.7	-1.6
Sweden	1993Q1	1995Q4	0.9	-0.6

Source: IMF staff estimates.

19. However, real credit growth remains very weak in the Baltics. Indeed, it appears to be lagging behind what would be expected based on the typical pattern for creditless recoveries in EMs or the Nordic countries (Figure 3). That said, there are considerable differences in the pattern between the Baltic countries; in particular, real credit in Estonia is no longer contracting as in the other two countries.[14] All three countries have made considerable progress in reducing private indebtedness since the crisis. But debt levels are still elevated compared to the level in the early years of the decade, prior to the prolonged upswing in leverage. This is in contrast to the median experience of EMs, where indebtedness levels had fallen to below pre-boom levels by this stage of the cycle.[15] The steeper credit cycle in the Baltic countries created a larger overhang to resolve relative to the median EM (Figure 4).

[12] The convergence to the path of normal recoveries is faster for output than it is for credit.

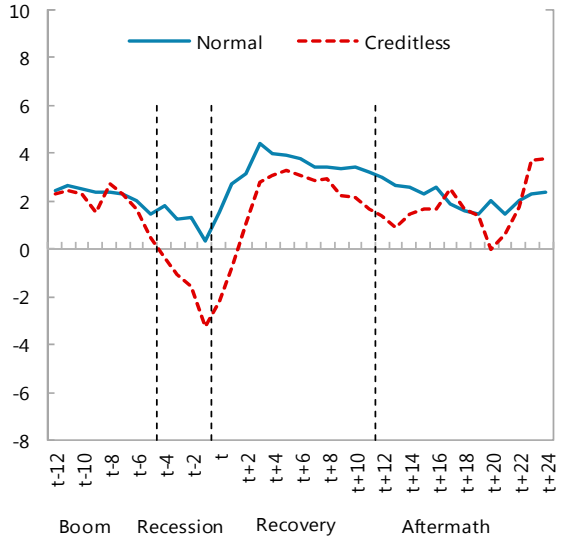
[13] Specifically, it would imply the third quarter of 2013 for Lithuania and the fourth quarter of 2013 for Estonia and Latvia.

[14] In 2013 Q4, year-on-year real credit growth (nominal credit growth adjusted using the GDP deflator) in Estonia was close to zero, whereas in both Latvia and Lithuania real credit contracted by more than 5 percent.

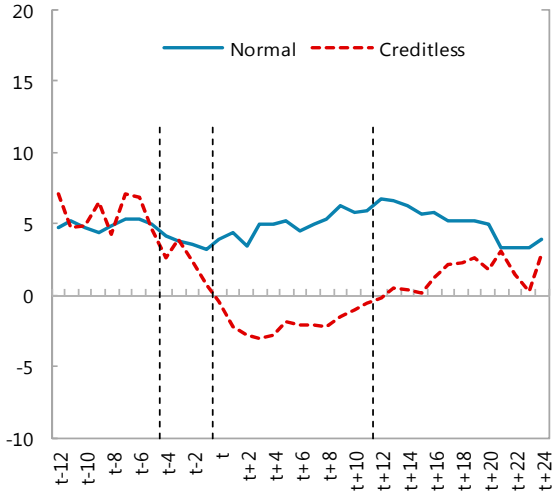
[15] For this comparison, the EM sample is restricted to those countries for which data is available on a comparably long time series.

Figure 2. Output and Credit Growth Rates in Normal and Creditless Recoveries: Advanced versus Emerging Economies

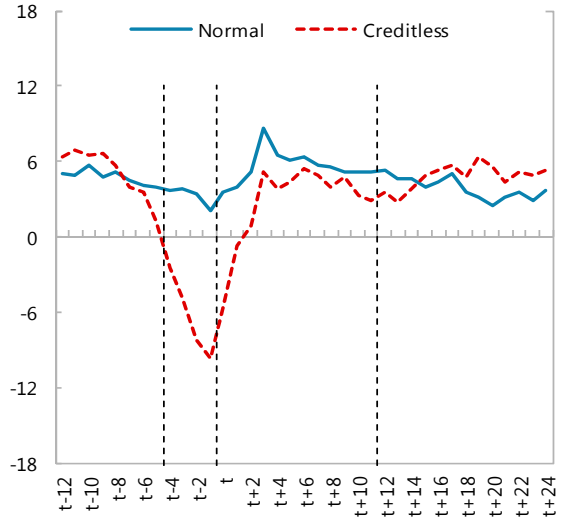
Advanced Economies Output Growth in Normal and Creditless Recoveries
(Percent, yoy)



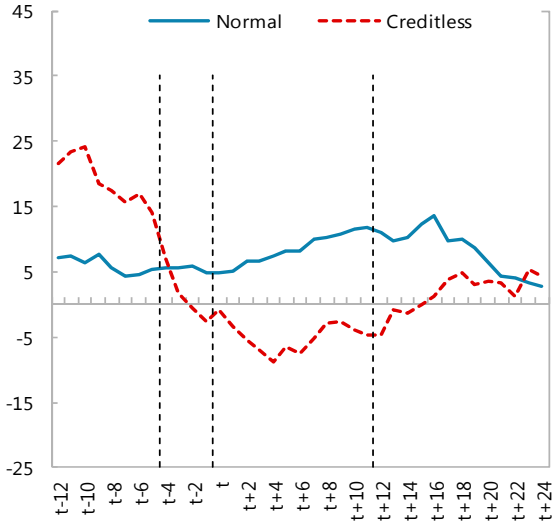
Advanced Economies Credit Growth in Normal and Creditless Recoveries
(Percent, yoy)



Emerging Economies Output Growth in Normal and Creditless Recoveries
(Percent, yoy)

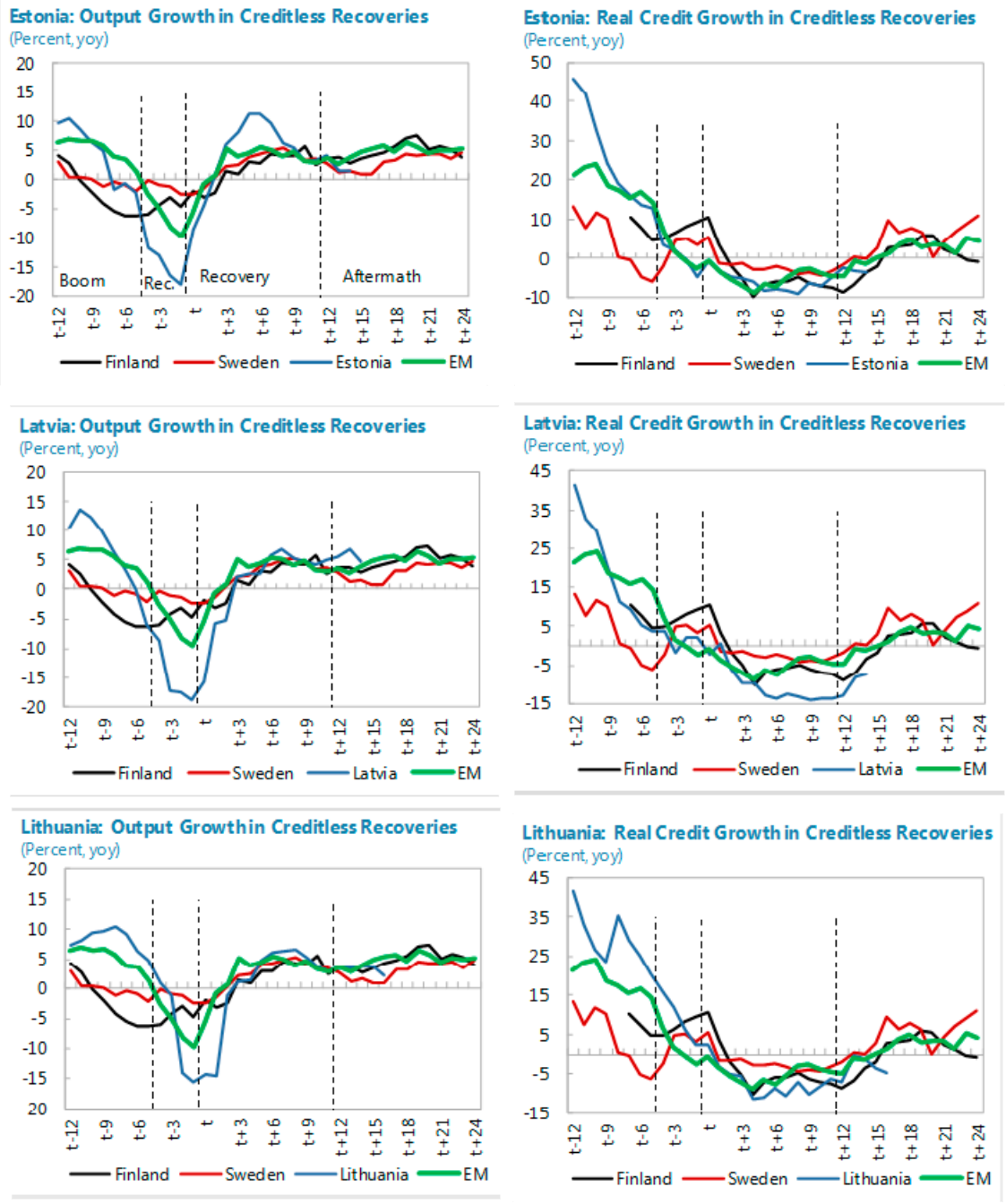


Emerging Economies Credit Growth in Normal and Creditless Recoveries
(Percent, yoy)



Sources: BIS; IFS; HAVER; and IMF staff calculations.
Notes: Solid line denotes the median growth rate for Advanced and Emerging economies at a given point in time. Percentiles are available upon request. Recessions are identified based on HP filtered output, therefore in some cases output growth maybe positive during recessions. Not all recessions last 4 quarters, therefore the border between the boom and the recession is indicative.

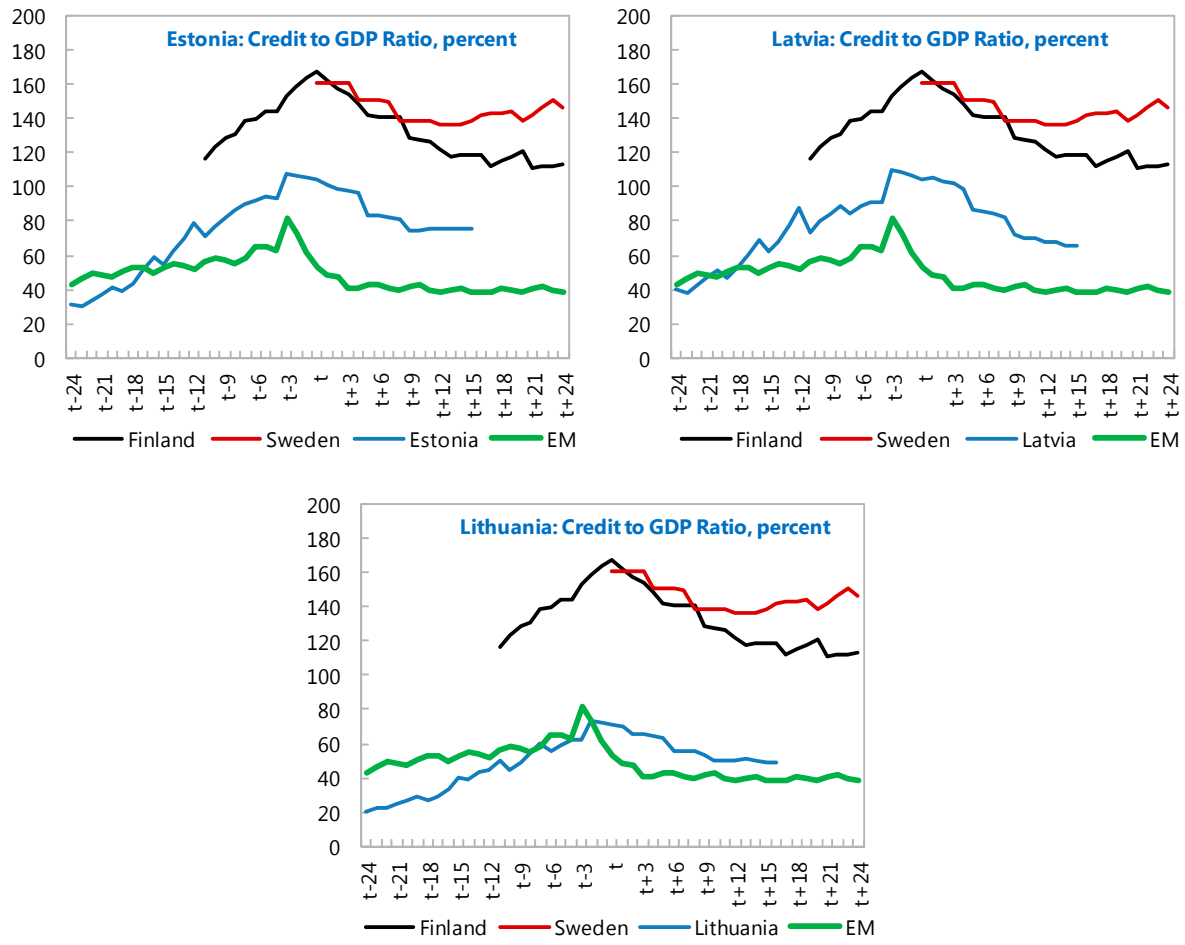
Figure 3. Baltic, Nordic and EM Creditless Recoveries, Growth Rates



Source: BIS, IFS, Haver, and IMF staff estimates.
Note: Not all recessions last 4 quarters, therefore the border between the boom and the recession is indicative.

Figure 4. Credit-to-GDP Ratios in the Baltics

(In percent of GDP)



Sources: IFS, Haver; and IMF staff estimates

Determinants of Creditless Recoveries

20. What are the determinants that govern a creditless recovery? We employ an econometric methodology using both probit models (which estimate the probability that a recovery would be creditless) and standard regression models (which estimate the impact of a set of explanatory variables on credit growth during a recovery). The analysis also estimates the relationship between credit and output growth in creditless recoveries, through a panel dataset. Finally, it examines the behavior of credit growth during the aftermath of the recovery.

21. The results from the probit models confirm that the steepness of the cycle and the presence of a banking crisis are important predictors of a creditless recovery.

- The strength of the expansion during the boom and the depth of the contraction—measured by credit, GDP, and investment growth—are indicators of a creditless recovery. More

specifically, the results suggest that an increase in the average real credit growth rate of 1 percentage point during the boom raises the probability of a creditless recovery by 2 percentage points on average.[16] Conversely, an increase in the average real credit growth rate of 1 percentage point during the recession lowers the probability of a creditless recovery by 2 percentage points (Model 1).

- A banking crisis before the recession, as was the case in Latvia, raises the probability of a creditless recovery by an average of 20 percentage points (Models 2 through 5). Higher export growth during the boom is found to lower the probability of a creditless recovery.[17] One explanation is that an export-driven boom does not lead to a build-up of unsustainable macroeconomic and financial imbalances that ultimately require substantial adjustment.
- Regression models of average credit growth during recovery support the results from the probit models.[18] They also highlight the role of currency crises during the recession, which lower the credit growth rate in recovery by 8½–10 percentage points consistent with the idea that a sudden stop in capital flows can make a recovery creditless (Calvo et. al. 2006).

Average Marginal Effects of Determinants of Creditless Recoveries (Probit model) /1

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Average credit growth during boom	0.019***	0.014***	0.011***	0.006	0.007
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)
Average credit growth during recession	-0.021***	-0.020***	-0.019***	-0.015***	-0.014**
	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)
Recession preceded by a banking crisis?		0.268***	0.199***	0.170***	0.192***
		(0.047)	(0.062)	(0.062)	(0.065)
Real GDP change during recession			-0.013*	-0.006	-0.008
			(0.007)*	(0.008)	(0.009)
Investment growth during recession				-0.007**	-0.006*
				(0.003)	(0.003)
Exports growth during boom					-0.014*
					(0.008)
Number of observations	125	125	125	111	108
Pseudo R-squared	0.16	0.32	0.35	0.40	0.42
Area under ROC curve /2	0.71	0.87	0.88	0.89	0.90

Notes: /1 Robust standard errors for coefficients are in brackets. /2 A measure of performance for probit models, showing the probability that a model will rank the probability of a creditless recovery higher for a randomly chosen creditless recovery than a normal one.

Source: IMF staff estimates.

[16] The average real credit growth rate during the boom is no longer significant when the cumulative change in real GDP, export growth during the boom, and investment growth during the recession are included. Including additional variables reduces the sample size by more than 10 percent—from 125 to 111 and 108 observations—which is significant given that the overall frequency of creditless recoveries is around 20 percent.

[17] In the same line, higher current account deficits (prevalent for Baltic economies) during the boom tend to raise probability of credit-less recovery.

[18] Detailed results are available upon request.

22. The panel data estimates suggest credit and output (and investment) growth are negatively correlated during creditless recoveries (Table 2). This is consistent with balance sheet repair and/or substitution to alternative financing driving the credit decline in these episodes. The relationship reverts back to positive in the aftermath of the creditless recovery. This effect is relatively robust to measurement errors (dropping outliers from the data), estimation technique (fixed effects and IV estimation) and controlling for additional variables and interaction terms. However further analysis, using for instance more detailed data on debt restructuring, is needed to establish whether this result is robust.[19]

Table 2. Panel Regression Results

	Y/Y GDP Growth			Y/Y Investment Growth		
	Fixed Effects	FE w/o outliers /2	IV /3	Fixed Effects	FE w/o outliers /2	IV /3
Credit Growth /1	0.135***	0.159***	0.143***	0.334***	0.457***	0.368***
	(0.017)	(0.015)	(0.008)	(0.059)	(0.056)	(0.045)
Credit Growth X Normal Recovery	0.046***	0.053***	0.062***	0.217***	0.222***	0.238***
	(0.017)	(0.016)	(0.010)	(0.057)	(0.061)	(0.035)
Credit Growth X Creditless Recovery	-0.224***	-0.404***	-0.380***	-1.163***	-1.223***	-1.151***
	(0.077)	(0.076)	(0.032)	(0.256)	(0.385)	(0.100)
Credit Growth X Normal Aftermath				0.122*	0.160***	0.183***
				(0.068)	(0.069)	(0.041)
Credit Growth X Banking Crisis	-0.113***	-0.051***	-0.042**			
	(0.041)	(0.028)	(0.020)			
Y/Y credit growth rate above 1 s.d.?	-1.267***	-1.487***	-1.407***			
	(0.349)	(0.308)	(0.160)			
Credit Growth X Y/Y credit growth rate above 1 s.d.?					-0.308***	-0.306***
				(0.076)	(0.075)	(0.037)
Currency Crisis	-6.048***	-5.632***	-5.682***	-24.840***	-26.604***	-26.589***
	(1.353)	(1.326)	(0.375)	(4.432)	(4.481)	(1.421)
Credit to GDP ratio	-0.029***	-0.028***	-0.028***	-0.068***	-0.062***	-0.066***
	(0.005)	(0.004)	(0.001)	(0.014)	(0.013)	(0.005)
Credit Growth X Credit to GDP ratio				0.001**	0.000	0.001**
				(0.0005)	(0.000)	(0.000)
Constant	5.427***	5.191***	5.293***	7.765***	6.854***	7.452***
	(0.489)	(0.479)	(0.172)	(1.534)	(1.415)	(0.588)
Number of Observations	4926	4816	4764	4420	4324	4280
Overall R-squared	0.22	0.21	0.20	0.26	0.23	0.23

Notes: /1 Robust standard errors for coefficients are in brackets. /2 Regression based on dropping very high (above 99th percentile) and very low (below 1st percentile) observations on credit growth. /3 Lagged credit growth used as an instrument for credit growth.

Source: IMF staff estimates.

23. In the aftermath of recoveries, the analysis suggests that the shape of the credit cycle, banking and currency crises, and private sector indebtedness matter for credit growth. A stronger boom-bust cycle leads to lower credit growth in the aftermath. Similarly, banking crises have long-lasting effects, lowering credit growth in the aftermath by around 4–5 percentage points on average. The overall indebtedness of the private sector also matters—

[19] Some authors have argued that a rebound in the flow of credit has a closer relationship with economic recovery than a rebound in the stock of credit (see e.g. Biggs et. al. (2009)). In terms of specifications in Table 7, this is equivalent to stating that lagged credit growth should have been included among explanatory variables. Such a specification was considered, but lagged credit growth, while having a correct sign, was found to be insignificant.

countries with higher a credit to GDP ratio during the recession have lower credit growth rates in the aftermath. This suggests that the process of debt restructuring and balance sheet repair occurring during the recovery may be more prolonged in countries with high indebtedness.

24. To summarize: the Baltic countries had steeper boom-bust cycles than the median EM, so the fact that they are experiencing creditless recoveries is in line with the past empirical record. At the same time, they have all reached or passed the point at which other EMs began to experience a resumption in credit growth. Moreover, private debt-to-GDP ratios in all three Baltic countries have now returned to pre-boom levels, which in other countries was also associated with a pick-up in credit. It may be that the Baltics should expect a somewhat longer-than-average period of negative credit growth, owing to the steeper-than-average boom-bust cycle in these countries. That said, the empirical record is clear that a creditless recovery cannot be indefinitely prolonged. If past experience is any guide, the Baltics are at or near the stage when credit growth should resume.

Determinants of Credit Growth in the Aftermath of the Recovery /1

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Average credit growth during boom	-0.326***	-0.289***	-0.304**	-0.312***	-0.337***
	(0.106)	(0.109)	(0.117)	(0.113)	(0.104)
Average credit growth during recession	0.296**	0.300**	0.306**	0.293**	0.302**
	(0.144)	(0.152)	(0.154)	(0.146)	(0.135)
Recession preceded by a banking crisis?		-3.902***	-4.011***	-5.317***	-3.445**
		(1.435)	(1.479)	(1.519)	(1.730)
Y/Y credit growth during boom above 1 s.d.?			0.964	0.592	0.758
			(1.393)	(1.391)	(1.286)
Currency crisis during recession				5.845**	3.871
				(2.551)	(2.904)
Average credit to GDP ratio during recession					-0.036***
					(0.011)
Constant	5.523***	6.139***	5.918***	6.151***	9.844***
	(0.762)	(0.806)	(0.784)	(0.790)	(1.558)
Number of observations	124	124	124	124	122
R-squared	0.12	0.18	0.19	0.22	0.31

Notes: /1 Standard errors for coefficients are in brackets and are robust to heteroskedasticity and autocorrelation

Source: IMF staff estimates.

D. Explaining Credit Developments in the Baltics: Demand or Supply?

25. This section takes a closer look at the evolution of credit in the Baltic countries themselves. The analysis encompasses an econometric exercise—broadly following the methodology of Everaert et al (2014) (detailed explanations of data and methodology can be

found in Annex II)—complemented by evidence from surveys and discussions with the authorities and economic agents.

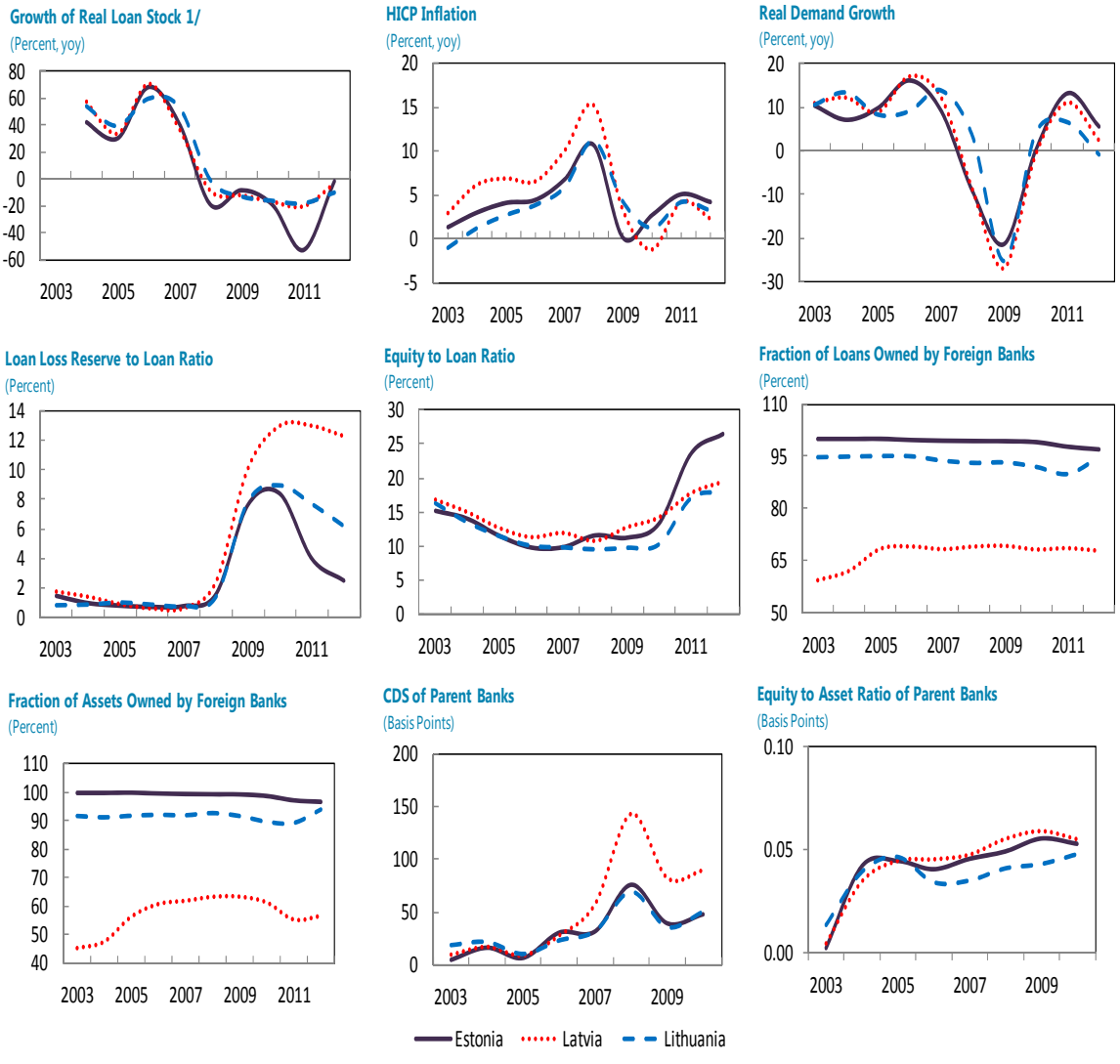
26. The econometric analysis uses cross-country bank-level panel data to explain credit growth in terms of macroeconomic and financial market conditions (Figure 5).[20] It finds that the sensitivity of credit growth to credit demand and supply varied over time. A number of specifications have been explored, though data limitations circumscribe the way we measure credit demand and supply. In our preferred specification, credit demand is measured by domestic demand (sum of consumption and investment), and credit supply by asset quality (proxied by the ratio of loan loss reserves to loans) and parent bank characteristics. Several other variables are considered but dropped as they are insignificant in the results: they include time dummies (to capture global credit supply conditions), interest rates, inflation, loan to deposit ratios, equity to asset ratios, etc. (see Annex II for details). Given that foreign banks dominate the Baltic domestic loan markets, the main conclusions are taken from a regression specification using only foreign banks (Model 1 in Table 3), with the full sample used as supporting evidence (Model 3 in Table 3).

- The econometric results suggest that domestic demand growth was a key driver of the aggregate credit boom before 2008: a percentage point increase in domestic demand growth is associated with a 3.7 percentage point increase in credit growth. However, the elasticity of credit growth to domestic demand growth almost disappeared during the recession.
- The econometric results regarding the role of supply factors during the boom are inconclusive—the estimated coefficient in the regression is statistically insignificant—partly because the indicator (the reserves-to-loans ratio) used as a proxy for supply was relatively constant during the boom, making it difficult to identify its effects on credit. However, annecodotal evidence suggests that the interest rate margin shrank substantially during the boom, indicating a role forsupply factors in spurring credit growth.
- Credit supply factors appear to have mattered more in the recession. Deteriorating bank asset quality (captured by larger provisioning ratios) was associated with the contraction of credit during this period. A 1 percentage point increase in the loan loss reserve ratio implied

[20] Loans and assets shown in Figure 5 include both foreign and domestic loans and assets, as Bankscope data does not provide a breakdown. The fraction of assets owned by foreign banks is lower in Latvia than in Estonia and Lithuania because of the presence of sizable domestic banks specializing in the NRD business. The econometric exercise undertaken here is subject to several important caveats, so that this exercise forms only one component of the analysis of demand and supply conditions, and needs to be supplemented with other, more anecdotal evidence. First, the sample size of banks is rather small, and the sample size of parent banks is smaller still (since some big Nordic banks have subsidiaries in more than one Baltic country), limiting the statistical power of the results. Second, the measure of asset quality used in the chapter—the loan loss reserve ratio—is not ideal. Non-performing loans (NPLs) would be a better measure, but bank-specific time-series data are too patchy. Third, we lack firm-level data on the demand side, instead use a less precise macroeconomic measure: the sum of aggregate consumption and investment. And finally, some variables that would ideally have entered the regression specifications—such as interest rate margins—are not available.

a 1.7 percentage point reduction in credit growth. And because asset quality deteriorated by a large amount during the recesion, the economic impact on credit was much more substantial, dominating demand side variables. A plausible explanation for this is that there was a zero lower bound on new credit for borrowers whose demand for credit was sensitive to macroeconomic conditions. When the collapse in domestic demand drove these borrowers out of the loan market, credit growth decoupled from domestic demand growth (since borrowers could not demand negative credit). On the other hand, deteriorating macroeconomic conditions, as reflected in asset quality, tend to lead banks to tighten credit conditions.

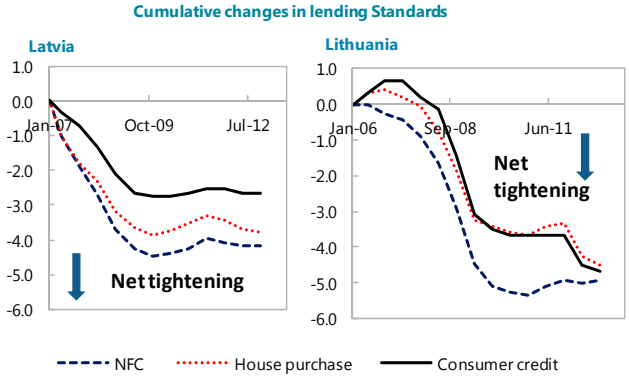
Figure 5. Macroeconomic Conditions and Bank Characteristics in Baltics, 2003–12



1/ Total loans derived from Bankscope database deflated by CPI.

- During the economic recovery, demand again plays a role in determining credit, although to a lesser extent than during the boom: a 1 percent increase in domestic demand growth led to 0.78 percent increase in credit growth. The coefficient on bank asset quality has the expected sign, and is significant in the full sample regression, although identification for the sample of foreign banks is difficult, possibly reflecting that foreign subsidiaries of Baltic countries share many of the same parent banks.

- In the case of Latvia and Lithuania, the view that supply factors remain important in the economic recovery is supported by the fact that credit institutions tightened lending standards severely during the recesssion and have not significantly relaxed these standards even in economic recovery.[21] Discussions with Nordic bank subsidiaries (responsible for the bulk of domestic lending in the Baltics) suggest that, with greater emphasis on credit risk after the crisis, screening costs for small and medium enterprises (SMEs) are often regarded as too high. Moreover, banks' screening criteria put large weight on backward-looking indicators, such as credit history, effectively rationing a number of firms that performed poorly during the recession. In Estonia, however, bank lending was relatively less affected, in line with the relatively lower deterioration and more rapid improvements in the quality of the loan portfolio. Thus supply factors are currently less important in Estonia: bank balance sheets are healthier—as reflected in much lower NPL ratios—and real credit stopped contracting at end-2013. Moreover, in recent years, domestic loans have partly been substituted by cross-border loans from parent banks.



Sources: Survey of banks, Bank of Latvia, Bank of Lithuania.

27. Turning to parent bank characteristics, liquidity conditions of the parent bank can play a role in subsidiaries' lending decisions. A 1 percent higher parent bank CDS spread implied 0.63 percent lower credit growth of its subsidiary.[22] This result suggests that liquidity shocks to parent banks can lead to credit supply shocks in host economies.

28. To summarize, during the recession, supply side factors became temporarily binding, with demand factors taking a backseat to balance sheet retrenchment. With the

[21] Cumulative changes in lending standards are constructed based on financial institutions' responses to the Survey of Credit Institute Lending conducted in Latvia and the Bank Lending Survey in Lithuania. A more negative value means tighter lending standards. For cumulation, it is assumed that the magnitudes of lending standard changes are similar across periods.

[22] We do not interact parent bank CDS with pre-crisis, crisis and recovery dummies, because parent CDS is patchy, making it difficult to identify the elasticity of credit growth to CDS period by period.

economic recovery, however, both demand and supply factors now play a role in credit growth in Latvia and Lithuania, while supply-side constraints appear to have receded in Estonia.

Table 3. Estimation Results of Credit Growth Determinants

VARIABLES	(1) Foreign banks	(2) Domestic banks	(3) All banks
Domestic demand growth (2003 - 07)	3.650***	3.800***	3.680***
	(0.508)	(0.280)	(0.212)
Domestic demand growth (2008 - 10)	0.0207	0.492**	0.338***
	(0.182)	(0.188)	(0.0874)
Domestic demand growth (2011 - 12)	0.779**	1.228***	1.057***
	(0.261)	(0.251)	(0.116)
Bank size	-0.0952	-0.0814	-0.0939**
	(0.0597)	(0.0862)	(0.0291)
Reserves to loan ratio (2003 - 07)	2.259	-10.54	-8.367
	(6.834)	(5.999)	(5.202)
Reserves to loan ratio (2008 - 10)	-1.726**	-2.449***	-2.394***
	(0.648)	(0.666)	(0.479)
Reserves to loan ratio (2011 - 12)	-0.514	-1.165*	-1.241**
	(0.501)	(0.525)	(0.364)
Parent bank leverage	0.702		
	(0.970)		
Parent bank CDS	-0.631*		
	(0.314)		
Constant	-0.162	-0.0998	-0.0961
	(0.135)	(0.173)	(0.0706)
Observations	113	87	204
R-squared	0.808	0.824	0.794
Number of banks	20	24	40

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: IMF staff estimates.

E. Non-Bank Financial Market Development in the Baltics

29. Could non-bank financial markets provide an alternative source of financing for firms at times when banks are unable or unwilling to extend credit? This section examines prospects and challenges for further development of the non-bank financial sector in the Baltics.

30. The Baltic countries have made significant progress in developing some of the institutional features that have been found to be important for the development of an efficient market-based sector. They compare favorably to peer countries, including Poland and Hungary, in several of these areas. These include: (i) a strong underlying legal framework and enforcement, especially regarding investor protection; (ii) good corporate governance with high disclosure standards; (iii) efficient trading and settlement systems; and (iv), the absence of distortions in taxation or regulations to ensure a level playing field.

31. However, the size of the Baltic economies poses a challenge for the development of the non-bank financial sector. The small scale of these markets entails high costs of trading and difficulty in attracting investors and issuers. Thus, markets tend to be relatively illiquid, possibly tying up liquidity even further during downturns instead of providing alternative financing venues.[23]

32. Closer links with each other and integration with larger markets —the Nordics and the EU—could be the way forward. There is ample evidence globally of migration of firms' trading and capital-raising to large international exchanges in search of wider investor bases, more liquid markets, and lower trading and funding costs.[24] The economic literature finds that cross-listing of a firm's shares abroad enhances a firm's visibility and ability to raise financing, while lowering funding costs.[25] Admittedly, such migration reduces the liquidity of the domestic corporate debt and equity markets, and hence the commercial viability of local exchanges and related financial services, but benefits could still outweigh these costs.[26]

33. Capital markets in the Baltic region have been consolidating for a while, and have already reached an advanced level of integration. September 2004 was one milestone when the exchange members began trading on a common Nordic-Baltic trading system and adopted common member rules.

- Baltic countries' securities exchanges are now fully integrated with the Nordic exchanges (within the Nasdaq OMX group), supported by coordinated regulations and supervision under multilateral MOUs, a common trading platform, and a common Baltic securities lists and indexes. Market participants can access and trade on all Nordic and Baltic exchanges through a single entry point, making the region's capital markets more attractive to global investors.

[23] A market is considered to be liquid if transactions can be executed rapidly and with little impact on prices.

[24] See for instance Steil (2002).

[25] See for instance Karolyi, 2006, Pagano et al., 2002, Witmer, 2006.

[26] Domowitz et al. (1998).

- In parallel, greater integration with the EU is ongoing, with most barriers to cross-border equity transactions now removed. Although the data are still too scarce and highly influenced by the recent boom-bust cycle to allow a comprehensive analysis, such integration should provide the same benefits of cross-listing discussed above.
- Central securities depositories (CSDs) in the three Baltic countries are also now highly integrated, allowing for single securities account. Cross-border links enable a close to real-time movement of financial instruments registered with any of the three CSDs. Work is also ongoing on adoption of a new single CSD system and implementation of the euro area single securities settlement infrastructure (Target 2 Securities T2S) by 2017. Nonetheless, some fragmentation remains in regulation, taxation of interest income and capital gains, corporate governance, and auditing and accounting standards, hampering cross-border transactions and investments.

34. Despite these positive steps, more can be done to strengthen existing non-bank financial markets and build the foundation for integrated capital markets.

- Government actions to pin down the yield curve—notably by issuing treasuries at different maturities—remain important to provide a benchmark for local corporate debt, thereby encouraging issuance of longer-term securities. The fact that many EMs typically do not have an efficient government benchmark yield curve to price corporate bond issues is seen as a major impediment for the development and growth of corporate bond markets in surveys of market regulators in EMs (IOSC, 2011). On the other hand, one should be cautious that the crowding-out effects of government issues may be significant in local bond markets of Baltic countries, given their relatively small investor base.
- Further efforts are needed to bring trading rules, corporate governance, disclosure standards, and withholding taxation (including those related to interest income and capital gains) in the Baltics in line with ongoing revisions to the EU regulatory framework, for example, updated rules for markets in financial instruments (MiFID II). This would facilitate cross-border investment and promote financial development.[27] Authorities in EMs with relatively large corporate bond markets—including Brazil, Chile, Mexico, and Peru—took significant measures to overcome similar obstacles in the past (GFSR (2005)).
- Strengthening the investor base is also important for local capital market development, as institutional investors' demand growth has been identified an important factor promoting corporate bond market development in several countries in Latin America and Asia (GFSR (2005)). Institutional demand, however, is shaped by a variety of considerations such as regulatory requirements to hold a minimum of assets in government bonds, limits on maximum exposures to corporate bonds, and favorable tax treatment (IOSC, 2011). These regulatory levers can be reviewed with the objective of fostering bond market development.

[27] See for instance Claessens et al. (2000) and Steil (2001).

With the aging of the population and further economic development, the further growth of pension funds and the insurance industry in the Baltic countries can be an impetus for its corporate bond market development.

35. A particular concern for the Baltics, and indeed for the EU in general, is that, despite integration within larger markets, obstacles may remain for smaller firms or startups (Box 2). These firms arguably underpin economic growth (accounting for about 70 percent of total value added in 2013), while at the same time are the most vulnerable to bank credit crunches. It is likely that these firms will continue to face financing constraints due to high administrative costs of small-scale debt issuance, high risk perception, asymmetric information, and lack of collateral.

Box 2. Financing SMEs

Access to finance by SMEs is an EU-wide concern. According to the European Commission and European Central Bank "Access to Finance" survey (2013) about one third of the SMEs surveyed did not manage to get the full financing they had planned for during 2013, and another ten percent either declined the loan terms offered or did not apply because of anticipated rejection. 15 percent of survey respondents saw access to finance as a significant problem for their companies. In comparison, only 3 percent of loan applications from large enterprises were rejected.

Equity financing was used by only 5 percent of SMEs mainly due to high costs related to the small-scale of issuance and high risk, and the loss of control. On a scale from 1 to 10 (10 meaning extremely important), EU managers rated measures to facilitate equity investments (4.0) relatively lower among various mechanisms to help their company's financing in the future. But the rate appears to be higher for Lithuania and Latvia. Large proportions of SME managers did not think that funding from equity investments and debt securities were relevant to their firm (71 percent and 79 percent, respectively).

Equity financing was the most common among SMEs in Lithuania (45 percent). Well behind this level, but also above average were Latvia (16 percent), Sweden (12 percent), and Finland (10 percent). It was very little used though in Croatia, Estonia, Hungary, and Portugal.

Bank loans remain the preferred type of external financing amongst SMEs that expect to grow in the next two to three years (favored by 67 percent of managers). The next most popular source of external financing was other types of loans, such as trade credit or a loan from a related company, shareholders, or public sources (favored by around 12 percent of managers). Equity investments were typically chosen by only 6 percent of SME managers as the preferred source of financing, but were significantly higher in Latvia (5 percent) (data unavailable for Estonia or Lithuania).

36. Approaches targeting smaller firms have been introduced, but remain in their infancy. The launch in 2007 of an alternative self-regulated stock exchange market (First North), based on the same trading and settlement systems as the main markets, but with less stringent requirements and regulatory demands, is a step in the right direction. This exchange suits companies in all industries and of all sizes, combines the benefits of being public with simplicity, and is often the first step towards listing in the main market. Due to the global crisis, First North did not become operational until 2011, and currently admits only two listed corporations (with a capitalization of a little over 30 million euro). But it could become more active in the future. The example of Israel—a country with a small domestic capital market—is instructive in this regard,

and shows that the lack of a deep domestic market does not necessarily mean that smaller and new companies cannot successfully access financing on a primary market elsewhere. While large Israel corporations tend to select the Nasdaq for their IPOs, a significant number of small Israeli firms have been listed on the London-based alternative exchange, the Alternative Investment Market (AIM) which targets smaller companies than NASDAQ and is less costly.[28] Capitalization of Israeli companies on the AIM exchange has reached almost 5 percent of total stock capitalization compared to ½ percent for First North.

37. Other measures could be explored to ease credit constraints for SMEs. The development of regional rating agencies specialized in the Baltics could provide more informed assessments about the region to supplement those of international rating agencies. This would help mitigate concerns about the creditworthiness of equity and bond issuers, and hence facilitate cross-border investments. The development of a credit guarantee system is another possible route that could be explored to improve firms' access and cost of financing, especially for SMEs lacking collateral or insufficient equity.[29] Credit guarantors could involve regional private agencies (banks, insurance companies) or public institutions, subject to prudent risk management. The Latvian Guarantee Agency (LGA) for example is a public institution that runs active programs to improve SMEs access to financing and support entrepreneurs in early development stages, including through loan guarantees for projects in priority areas. The LGA plans to support the Baltic Innovation Fund—a pan-Baltic effort to promote innovation—which has a fund size of €100 million, including €20 million from each Baltic country and €40 million from European Investment Fund. Another example is Poland's loan guarantee program ("de minimis") launched in autumn 2012 and run by state-owned bank BGK granting guarantees for working capital loans for SMEs. According to BGK, guarantees granted under this program reached PLN 8.4bn by Mar 15, 2014, enabling almost 45,000 companies to access credits worth PLN 15bn or close to 3% of total fixed investment in 2013.

38. However, local markets may be too small to be commercially viable, and government-sponsored credit guarantees run the risk of creating distortions, moral hazard, and being inefficient, as evidenced by the mixed past performance of such schemes in other countries. Analysis is also needed to examine the prospects for appropriately regulated securitization, such as pooling together bonds issued by SMEs, to mitigate concerns about credit risk.[30] Before the financial crisis, securitization had been an effective tool for rapid corporate bond market development in Latin America and Korea (GFSR, 2005).

[28] See Friedman and Grose (2006).

[29] See for instance Shimizu (2007).

[30] See for instance Eichengreen (2004).

F. Conclusion

39. The empirical record suggests that the creditless recovery in the Baltics largely fits the historical pattern, but that the rebound in credit has lagged behind what would have been expected at this stage of the recovery. Although this may be partly explained by the Baltic countries' particularly steep boom-bust cycle, the fact that real credit growth continues to be negative in Latvia and Lithuania and remains weak in Estonia is a concern.

40. Analysis suggests that at the current juncture, in the case of Latvia and Lithuania, both credit demand and credit supply factors are important; while in Estonia supply-side credit constraints appear to have receded and low lending activity is more a consequence of weak demand. For foreign subsidiaries, the cost of funding faced by parent banks is an important determinant of credit growth, in addition to the balance sheet of the subsidiary itself. This finding is an important consideration in foreign-dominated banking systems like the Baltics.

41. Policy should now focus on easing both demand and supply constraints. The latter is more challenging in the Baltics than other economies, because of the dominance of foreign banks; policy makers have more limited influence on the lending decisions of the subsidiaries of large foreign groups compared to domestic banks. Nonetheless, some policy measures could act on both demand and supply positively, in particular, measures to further reduce the overhang of private debt which remains significantly higher than its pre-boom level in all three Baltic countries. On the demand side, healthier balance sheets could spur domestic demand, while on the supply side, balance sheet repair could improve perceptions of credit risk (despite tighter lending standards), thus reinvigorating credit supply. Such measures could involve reforms to improve debt resolution, such as fast-tracking the legal system to clear such cases, improving implementation of existing procedures where necessary, and exploring arbitration procedures to reduce the caseload on regular courts. Latvia, for example, has recently created more courts to reduce the backlog of legal cases, and allowed cases to be shifted from overburdened courts to other jurisdictions. Insolvency procedures could be further speeded up by encouraging alternatives to the formal legal system, such as mediation or arbitration

42. The chapter also reviewed the scope for market-based financing in the Baltics as an alternative to bank credit. Ongoing regional integration—including, most importantly, with the Nordic countries—should facilitate cross-border investment and enhance firms' ability to raise capital and lower the cost of external funds. But access may still be limited for smaller firms, which may find it difficult to comply with higher standards.

43. For policymakers, the challenge will be to continue regional integration while at the same time facilitating access to capital markets by smaller firms. Over the medium term, regional working groups could be established to explore various promising routes, including ways to strengthen the alternative exchange market First North, the development of regional rating agencies, a credit guarantee system, and securitization tools, together with fostering institutional investors in the region to efficiently use the region's savings.

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Annex I. A Simple Model for Credit-Less Recoveries

This annex describes a simple theoretical underpinning for creditless recoveries. It also lists the sample of countries used for the empirical work in Section III.

1. A standard growth model, F(K,L), with capital stock K equated to the stock of credit (e.g., because firms need to borrow to invest), implies a direct positive correlation between output and credit growth in line with conventional wisdom. Short of adjusting capital, output would change only if labor changed (which is usually linked to short term rather than long term financing).

2. However, more realistically, over a cycle output is also adjusted by changing the degree of utilization, m, of capital, i.e., the production function takes the form F(mK,L). At the end of a recession, growth can then take place by restoring m and/or L to previous levels without necessitating an increase in capital, and the stock of credit could continue to decline at the pace of amortization of loans and/or write-offs.

3. A clearer picture can be drawn if we assume two sectors, say construction and manufacturing, and the production function takes the form $F(m_1K_1,m_2K_2;L)$. During the recession both m_1 and m_2 dip quickly, but the construction sector undergoes a structural correction and its capital becomes unproductive, while manufacturing is relatively insulated. Subsequently, manufacturing rebounds (also as a result of higher productivity/lower costs) raising m_2 and employment, and pulling aggregate output with it, without a proportional increase in K_2. Construction, on the other hand, continues a process of liquidation, entailing in turn deleveraging from that sector. How long this takes and its effect on growth then depends on the characteristics of insolvency laws in place, the impact of asymmetric information between borrowers and creditors and efficiency of debt resolution mechanisms, and its impact on resources and demand in the rest of the economy.

4. A similar scenario could be described for households, as they shift spending from big-item durable goods (e.g., housing) requiring long-term financing to consumption goods which require shorter-term financing, thus allowing demand growth while the stock of credit declines.

5. Adding a demand side to the model above, F(K,L) = C + I, one obtains that output growth is also correlated with the growth of the *flow* of credit, since investment essentially equals the flow of capital, and consumption is more related to the flow than the stock of credit if it refers to non-durable goods. The need for short-term operational funds for production introduces another link with the flow of credit. Indeed it is hard to imagine an economic recovery not being correlated with an increase in the flow of credit, as demand for new loans would likely increase, and improving economic conditions would ease the supply of credit and likely reduce the level of write-offs. For that very reason in this paper we focus on the stock of credit rather than the flow, as the stock contains more information.

Table: Sample countries

Advanced economies	Sample	Emerging economies	Sample
Australia	1959Q3 - 2013Q2	Argentina	1993Q1 - 2013Q2
Austria	1988Q1 - 2013Q3	Brazil	1994Q1 - 2013Q2
Belgium	1980Q1 - 2013Q2	Bulgaria	1997Q1 - 2013Q2
Canada	1981Q2 - 2013Q2	Chile	1997Q4 - 2013Q2
Cyprus	2005Q4 - 2013Q2	China, Mainland	1992Q1 - 2013Q3
Denmark	1988Q1 - 2013Q2	Colombia	2001Q1 - 2013Q2
Finland	1975Q1 - 2013Q2	Croatia	1997Q1 - 2013Q2
France	1980Q1 - 2013Q2	Czech Republic	1996Q1 - 2013Q2
Germany	1991Q1 - 2013Q2	Egypt	2001Q3 - 2013Q2
Greece	1970Q1 - 2013Q2	Estonia	1997Q1 - 2013Q2
Iceland	2001Q4 - 2013Q2	Hong Kong	1990Q1 - 2013Q3
Ireland	1997Q1 - 2013Q2	Hungary	1995Q1 - 2013Q2
Italy	1970Q1 - 2013Q2	India	1996Q2 - 2013Q2
Japan	1980Q1 - 2013Q3	Indonesia	1983Q1 - 2013Q3
Luxembourg	2003Q1 - 2013Q2	Israel	1999Q4 - 2013Q3
Malta	2005Q1 - 2013Q2	Jordan	2002Q1 - 2013Q3
Netherlands	1988Q1 - 2013Q3	Korea	1970Q1 - 2013Q3
New Zealand	1988Q1 - 2013Q2	Latvia	2001Q1 - 2013Q2
Norway	1978Q1 - 2013Q3	Lithuania	2001Q1 - 2013Q3
Portugal	1995Q1 - 2013Q2	Malaysia	1991Q1 - 2013Q2
Spain	1980Q1 - 2013Q2	Mexico	1993Q1 - 2013Q1
Sweden	1980Q1 - 2013Q2	Morocco	2006Q1 - 2013Q3
Switzerland	1980Q1 - 2013Q2	Peru	1980Q1 - 2013Q2
United Kingdom	1963Q1 - 2013Q1	Philippines	2001Q4 - 2013Q2
United States	1952Q1 - 2013Q1	Poland	1995Q1 - 2013Q2
		Romania	2004Q4 - 2013Q2
		Russia	1995Q2 - 2013Q1
		Singapore	1991Q1 - 2013Q1
		Slovak Republic	2006Q1 - 2013Q3
		Slovenia	2007Q1 - 2013Q2
		South Africa	1965Q1 - 2013Q1
		Thailand	1993Q1 - 2013Q3
		Turkey	1987Q1 - 2013Q2
		Ukraine	2002Q4 - 2013Q2

Total: 59 countries

Annex II. Data and Methodology of the Regression Analysis in Section IV

1. The analysis broadly follows the methodology in Everaert et al. (2014), by using bank-level balance sheet characteristics from the Bankscope data set and country-level variables to explain credit growth in terms of macroeconomic and financial market conditions. Variables that are considered to reflect credit demand include macroeconomic variables, such as domestic demand and inflation. On the supply side, loan loss reserves and the equity to loan ratio represent, respectively, asset quality and banks' ability to expand lending. Moreover, given that foreign banks have a dominant presence in the Baltics, characteristics of parent banks (including measures that represent possible funding stress) are also included. This bank-level methodology alleviates the well-known simultaneity problems that arise in aggregate analyses. Our sample is restricted to the Baltics to achieve a better fit to these countries. The econometric model is specified as follows:

$$g_{i,t}^{Credit} = \alpha + \vec{\beta}_{Bank} \cdot \vec{X}_{i,t}^{Bank} + \vec{\beta}_{Capital\ market} \cdot \vec{X}_{i,t}^{Capital\ market}$$
$$+ \vec{\beta}_{Parent\ bank} \cdot \vec{X}_{i,t}^{Parent\ bank} + \vec{\beta}_{Demand} \cdot \vec{X}_{t}^{Demand} + \rho_i + C_t + \varepsilon_{i,t}$$

where $g_{i,t}^{Credit}$ is the credit growth rate of bank i at time t, ($\vec{X}_{i,t-1}^{Bank}$), ($\vec{X}_{t}^{Demand}$), and ($\vec{X}_{t}^{Capital\ market}$) represent bank characteristics at time t-1, aggregate demand conditions, and capital market conditions in the current period respectively, (ρ_i) is bank fixed effects and (C_t) is year fixed effects.

- **Bank characteristics include three categories of variables:** variables measuring the asset quality of portfolios, proxied by (loan loss) reserve to loan ratio; variables measuring room to expand for individual banks, such as equity to loan ratio, loan to deposit ratio and bank asset size; and variables measuring liquidity, proxied by current assets divided by short-term debt.
- **Capital market conditions include cost of funding and return on equity**. Cost of funding is measured by the three-month unsecured loan rate.
- **Aggregate macroeconomic variables include domestic demand growth and inflation.** Higher domestic demand growth may entail higher credit growth as households borrow more to spend and firms borrow to expand their business. Higher inflation increases economic uncertainty, and has a negative impact on credit.
- **Time-fixed effects for 2008–12 and bank fixed effects are also used as controls.** The former are relevant as the recession periods of the Baltic countries coincided with the global banking crisis. Shocks to global capital markets could affect all banks in the Baltic region and time-fixed effects can capture such shocks. The latter are important as they control for unobserved time-invariant bank characteristics. To save degrees of freedom, we set: $C_t = 0 \text{ for } t < 2008$.

- **Interaction terms between explanatory variables and pre-crisis, crisis, and recovery dummies are also included** to allow for the elasticities of credit growth to differ between these periods. To save degrees of freedom, we only keep those which are significant in our preferred estimation. **For subsidiaries of foreign banks, the characteristics of their parent banks are introduced in the regressions.** These include the CDS of parent banks whenever available[1] and the equity to asset ratio of parent banks. The former provides an indication of the liquidity of parent banks, while the latter measures their leverage.
- **The data sample covers commercial banks operating in Baltic countri**es in the period between 2003 and 2012. This yields 288 bank-year observations. Summary statistics are shown in the table attached below.

2. We use the following strategy to test the validity of our explanatory variables: first, we run a simple regression with only time fixed-effect dummies, and second, we run a full-fledged regression with all variables. Given that important factors influencing credit growth are controlled for, we should expect the time fixed effect dummies to lose most of their economic and statistical significance in the full-fledged regression compared to the simple regression. We do find these in our results.

3. Another consideration in designing the regression model is that we drop all the variables which do not have significant coefficients. An important reason for doing this is that we tend to have multiple variables in one category of factors, and they inevitablely may correlate with each other and make the identification difficult. For this reason, we drop inflation and several variables of bank characteristics.

4. Finally, our preferred specification restricts the sample to foreign banks. Given the dominance of foreign banks in domestic credit markets, adding in a large number of small domestic banks responsible for a very small share of lending creates noise. Nonetheless, we use the sample of domestic banks, and the sample of all banks, as robustness tests.

[1] If the parent bank CDS is not available, we use sovereign bond CDS of the country the parent bank is headquartered in plus a spread. The spread is defined as the average difference between bank and sovereign CDS over a period where (i) both time series are available; and (ii) markets are relatively calm.

Distributions of Total Assets, Equity to Asset Ratio and Loan to Asset Ratio.

Total assets (million USD)

Year	Foreign banks				Domestic banks			
	N	25%	50%	75%	*N*	25%	50%	75%
2003	10	936	1863	2172	16	52.3	217.4	393.1
2004	11	782	2509	3194	19	67.1	282.7	606.2
2005	13	1253	3106	3787	20	74	336	790
2006	13	2486	4605	6675	21	112	289	1218
2007	18	573	3854	8297	17	246	598	1845
2008	17	513	4424	7567	16	264	706	1790
2009	17	585	2266	6849	19	257	544	1809
2010	18	456	1677	5779	20	256	461	1700
2011	17	426	1825	5310	19	297	517	1255
2012	17	641	1953	5519	17	190	573	977

Equity to asset ratio

Year	Foreign banks				Domestic banks			
	N	25%	50%	75%	*N*	25%	50%	75%
2003	10	8.34%	10.37%	11.00%	16	6.89%	9.79%	16.00%
2004	11	8.34%	9.27%	10.61%	19	6.73%	7.38%	14.45%
2005	13	6.29%	7.16%	8.32%	20	7.09%	10.64%	19.05%
2006	13	5.71%	6.81%	7.67%	21	8.07%	11.16%	15.17%
2007	18	6.42%	7.07%	7.36%	17	8.97%	11.17%	14.10%
2008	17	6.10%	7.60%	8.99%	16	8.14%	12.13%	14.15%
2009	17	6.35%	8.16%	10.03%	19	8.61%	11.91%	13.69%
2010	18	6.55%	8.31%	9.67%	20	7.51%	10.75%	12.89%
2011	19	8.75%	11.375	14.76%	19	4.97%	9.90%	11.48%
2012	17	7.97%	10.48%	15.99%	17	5.93%	10.59%	12.30%

Loan to asset ratio

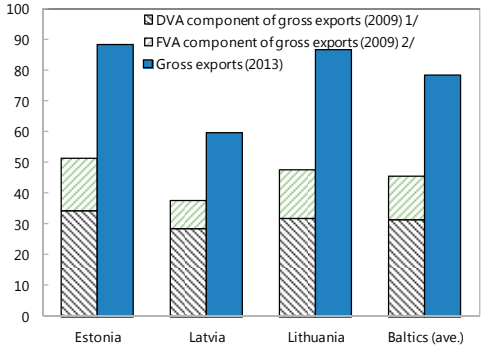
Year	Foreign banks				Domestic banks			
	N	25%	50%	75%	*N*	25%	50%	75%
2003	10	58.44%	66.73%	78.57%	16	26.55%	32.66%	64.64%
2004	11	66.50%	71.85%	79.56%	19	25.19%	36.07%	62.04%
2005	13	56.49%	73.56%	82.63%	20	35.60%	49.55%	69.27%
2006	13	68.75%	76.79%	82.39%	21	40.77%	62.38%	72.01%
2007	18	68.16%	78.09%	80.25%	17	45.76%	61.95%	69.67%
2008	17	77.51%	81.43%	83.52%	16	52.66%	63.67%	74.01%
2009	16	72.32%	83.75%	87.09%	19	42.72%	61.06%	71.21%
2010	17	68.70%	80.37%	84.11%	20	35.48%	51.11%	66.72%
2011	16	70.16%	76.57%	85.50%	18	24.40%	38.17%	65.73%
2012	16	53.92%	71.19%	79.30%	17	15.09%	40.78%	55.59%

EXPORTS AND GLOBAL-VALUE-CHAIN LINKUPS: EXPERIENCE AND PROSPECTS FOR THE BALTIC ECONOMIES[1]

A. Introduction

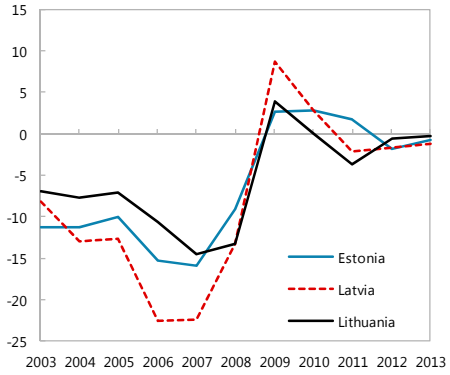
1. The external sectors of Estonia, Latvia, and Lithuania share important features and linkages. All three economies are typical small open economies with large exports relative to output, both in gross terms and in terms of the domestic value added of exports. They have become more open over time, gained market share, and reoriented trade away from the CIS. There are important similarities in the types of goods and services that they export and in what makes them attractive to foreign investors. The Baltic export sectors are further tied together by intra-Baltic trade, which has increased significantly over time, and strong trade linkages to the euro area and the Nordic countries have been longstanding characteristics of all three countries. They also all went through an extraordinary boom phase in the years preceding the global financial crisis which saw their current account deficits widen to unprecedented levels. A revival of exports on the back of wage restraint and productivity growth was instrumental in pulling out of the deep crisis and restoring external balance.

Trade Openness and External Demand Exposure
(Percent of GDP)



Sources: IMF, WEO; WIOT; and IMF staff calculations.
1/ Domestic Value Added.
2/ Foreign Value Added.

Current Account Balance, 2003-13
(Percent of GDP)



Source: IMF, WEO.

2. Thriving export sectors hold the key to future economic success of the Baltic economies and income convergence with Western Europe. Deep involvement in international trade is pivotal for the success of small economies, as they typically lack the market scale, input

[1] Prepared by Ramdane Abdoun, Bartek Augustyniak, M. Astou Diouf, Ruy Lama, Weicheng Lian, and Hongyan Zhao under the guidance of Christoph Klingen. Bartek Augustyniak provided excellent research assistance, and Solange de Moraes Rego and Fernando Morán Arce provided outstanding support.

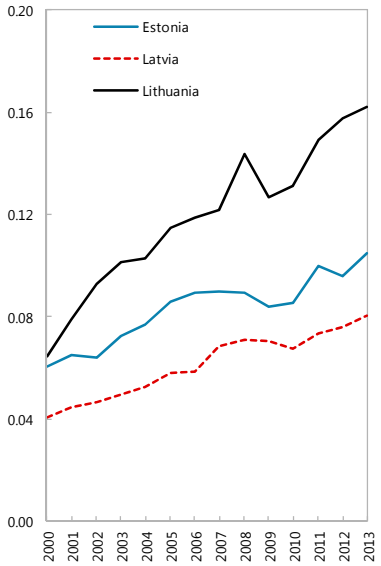
endowments, and comparative advantage in all the tasks involved in the production of sophisticated goods and services. Global value chains (GVCs), which allocate the stages of production of a good or service across many countries based on cost and competency considerations, have only further increased the role of the export sector in general, and the importance of being linked-up to GVCs in particular, although success can also derive from nimble niche market players or exporters that concentrate their production activities at home. The Baltic's own recent economic history speaks loudly to the fallacy of income convergence primarily based on boosting domestic demand and the nontradable sector: convergence advanced quickly in the boom years only to suffer a huge setback in the crisis with the income gap to Western Europe now no smaller than six years ago. But trade openness inevitably also gives rise to spillovers as the economic wellbeing of trading partners—or rather all other GVC participants—has repercussions for economic activity at home.

3. This chapter explores the prospects for Baltic exports and what could be done to enhance them further. Section B reviews key features and developments of their export sectors, and confirms that they have been overall successful and a key pillar of the Baltic economies. Section C looks at FDI and involvement of the Baltic economies in GVCs and their role in export performance. On this front, the region has also faired fairly well but falls short of the achievements of the CE4 countries (Czech Republic, Hungary, Poland, and Slovakia), which are tightly linked into the German supply chain. Section D focuses on the main challenges that could arise. It finds that Baltic exports benefitted from tailwinds in the past, such as strong trading partner growth and favorable terms-of-trade developments. But more importantly, demographic aging and income convergence will likely make it an uphill battle to continue to thrive on labor-intensive exports. Section E concludes with perspectives on how these challenges could be addressed. It identifies a number of direct obstacles that stand in the way of trade and GVC linkup and explores scope for more regional cooperation and harmonization that hold the promise of efficiency gains and making the region more attractive to foreign investors.

B. Key Features and Developments of the Baltic Export Sectors

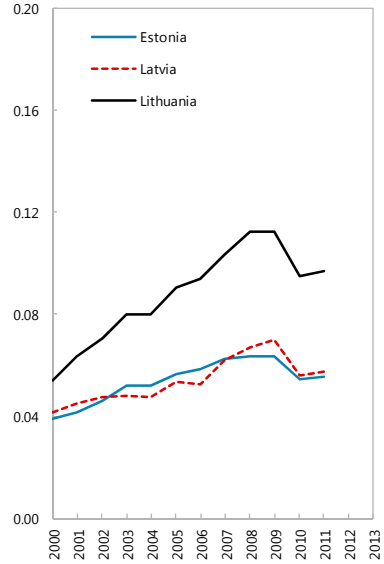
4. Pronounced gains in market share and rising export-to-GDP ratios are prima facie evidence of strong export performance. Since 2000, Latvian and Lithuanian exporters have increased their world markets shares by 100 and 150 percent, respectively, while Estonia, which had already secured a very strong position prior to 2000, managed a 70-percent increase. Market share gains were broad based for Latvian and Lithuanian exporters, but more confined to the Nordics and the United States in the case of Estonia. Market shares are lower when stripping out the import content of exports, i.e., focusing on domestic value-added exports rather than gross exports, as Baltic exports seem to embed more foreign inputs than those of the rest of the world, but the trend in market share gains is similar to the one for gross exports. Increases in the export-to-GDP ratio were also impressive. They came mainly after the 2008/09 crisis, after moving sideways in the preceding boom years.

Share of Exports in World Exports
(Percent)



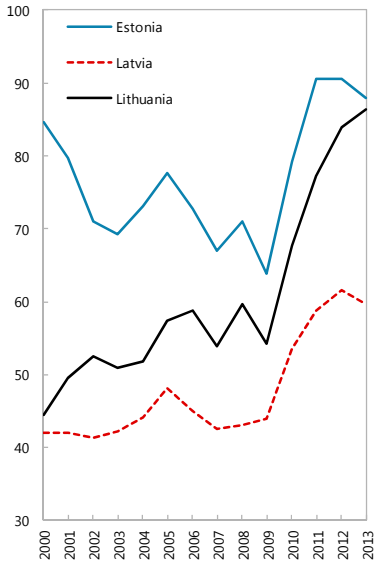
Source: IMF, WEO.

Share of DVA of Exports in Global DVA of Exports
(Percent)



Sources: IMF, WEO; and WIOT.

Export to GDP Ratio
(Percent of GDP)



Source: IMF, WEO.

5. Some qualifications to this strong export performance are in order. The increase of export-to-GDP ratios is also due to favorable export price developments for all three countries and fast growth in the trading partners of Latvia and Lithuania. In addition, the very strong increase of export ratios in the post-crisis period seems to have been driven in part by a surge in re-exports—goods that enter and leave the country in the same state and therefore contribute to domestic activity only through related services exports, such as transport.[2] Nonetheless, a sizable underlying improvement of the export-to-GDP ratio remains.[3]

[2] Re-exports accounted for 30 percent of Lithuania's exports in 2009 and are predominantly destined for Russia. In the subsequent three years they grew by 137 percent, whereas exports of Lithuanian origin grew at a slower rate of 77 percent (cumulatively and in nominal terms). In Estonia, re-exports account for 12 percent of total exports. Comparable data for Latvia are unavailable.

[3] Exchange rate movements are likely to have flattered world market share gains. The euro has appreciated by about one-third against the US dollar since 2000, thereby boosting the valuation of trade with advanced Europe relative to global trade and thus the market share of countries that trade heavily with advanced Europe, such as the Baltic economies. Consistently, market shares calculated from real exports show only half the gain seen in market shares based on nominal exports.

Baltic Countries: Decomposition of the Export Performance
(Percent of GDP)

	2009-13			2003-08			2000-13		
	Estonia	Latvia	Lithuania	Estonia	Latvia	Lithuania	Estonia	Latvia	Lithuania
Exports, beginning period year	63.9	43.9	54.2	69.2	42.2	50.9	84.6	41.9	44.5
Exports, end period year	88.0	59.7	86.3	71.0	43.1	59.6	88.0	59.7	86.3
Exports, change	24.1	15.7	32.1	1.9	0.9	8.7	3.4	17.7	41.8
Underlying export effort	20.5	4.0	16.5	-1.3	2.9	3.5	6.5	6.0	35.8
Global and other factors	3.7	11.7	15.6	3.1	-2.0	5.2	-3.1	11.7	6.0
Globalization effect 1/	5.8	4.0	4.9	10.5	6.4	7.7	11.9	5.9	6.2
Trading partner effect 2/	1.1	2.5	0.3	4.5	1.7	1.3	9.9	7.9	4.2
Global price effect 3/	-7.0	-4.8	-5.9	-0.3	-0.2	-0.2	-14.7	-7.3	-7.8
National price effect 4/	5.8	9.6	16.7	-7.1	-4.2	2.8	-4.7	8.2	9.4
National GDP growth effect 5/	-1.2	0.5	0.4	-3.2	-4.8	-5.7	-2.5	-1.8	-4.0
Unallocated	-0.8	-0.1	-0.8	-1.3	-0.9	-0.7	-2.9	-1.1	-2.1

Sources: IMF, World Economic Outlook; and IMF staff calculations.

1/ Arising from global real exports growing faster (+) or slower (-) than global real GDP.
2/ Arising from trading partner real imports growing faster(+) or slower (-) than real global exports.
3/ Arising from global export prices growing fast (+) or slower (-) than the deflator of global GDP.
4/ Arising from national export prices growing faster (+) or slower (-) relative to the national GDP deflator than global export prices relative to the deflator of global GDP. Also captures to some extent quality improvements in export goods and post-crisis "internal devaluation," which could be viewed as part of the underling export effort. However, due to data limitation these cannot be separated out and reclassified.

5/ Arising from national real GDP growing faster (-) or slower (+) than global real GDP.

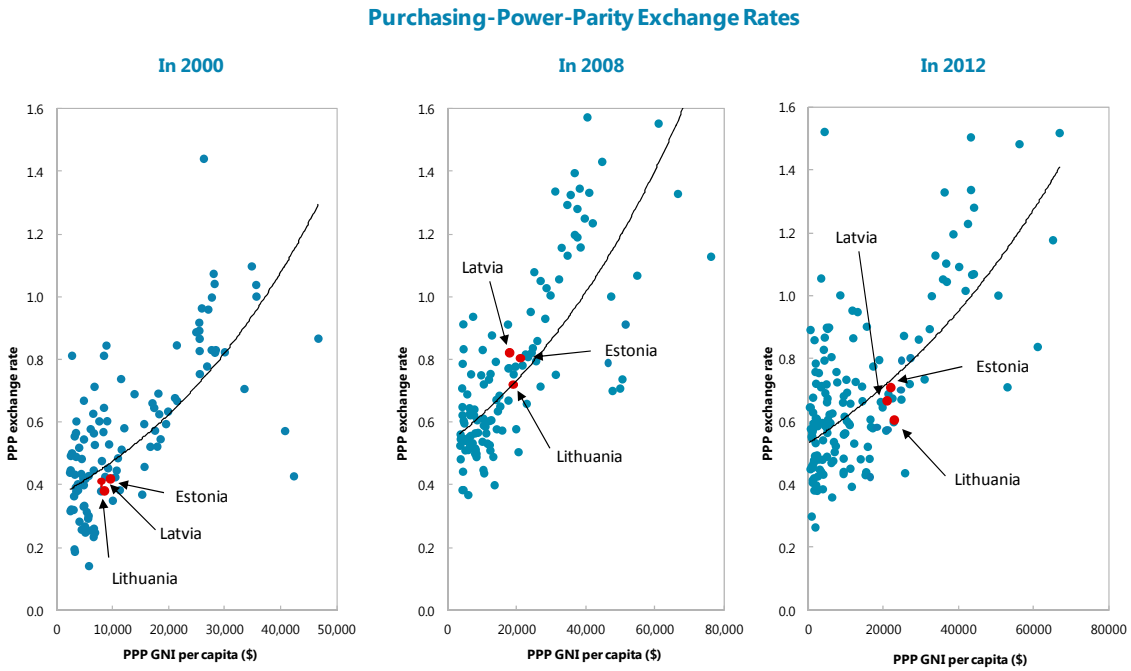
6. Baltic exports seem competitively priced, consistent with market share gains and rising export ratios. The various approaches routinely employed by IMF staff to detect exchange rate misalignments confirm the absence of significant over or undervaluation in the exchange rates of Estonia, Latvia, and Lithuania at this time. Price competitiveness had been dented in the boom years as unit labor costs in the Baltic economies grew much faster than in western competitors, contributing to stagnation in export-to-GDP ratios and confining market share gains largely to terms-of-trade effects. Real exchange rate assessments based on purchasing power considerations also point to a degree of overvaluation in the boom years, although the bulk of the large current account deficits of the time reflected imports bloated by the domestic demand boom rather than exports hampered by overvaluation. In any event, a combination of wage restraint and productivity advances in the post-crisis period reduced Baltic unit labor costs by 10 to 20 percent

Decomposition of ULC Change 2008-12
(Percent)

	Relative to Western Europe	Nominal ULC
Estonia		
Change in ULC	-10.5	-1.5
Labor compensation	-6.3	4.0
Labor productivity 1/	-4.6	-5.5
Latvia		
Change in ULC	-21.7	-13.9
Labor compensation	-10.3	-0.5
Labor productivity 1/	-14.6	-15.6
Lithuania		
Change in ULC	-14.2	-5.6
Labor compensation	-3.5	7.0
Labor productivity 1/	-12.4	-13.4
CE4		
Change in ULC	-8.8	0.4
Labor compensation	-6.2	4.1
Labor productivity 1/	-2.8	-3.7
CESEE		
Change in ULC	-5.2	4.3
Labor compensation	-6.4	3.9
Labor productivity 1/	1.2	0.4

1/ Negative sign indicates negative impact on ULCs and an improvement in labor productivity.
Sources: Eurostat; and IMF staff calculations.

relative to those of western European competitors. This boost to price competitiveness was promptly rewarded by a surge in exports.[4]

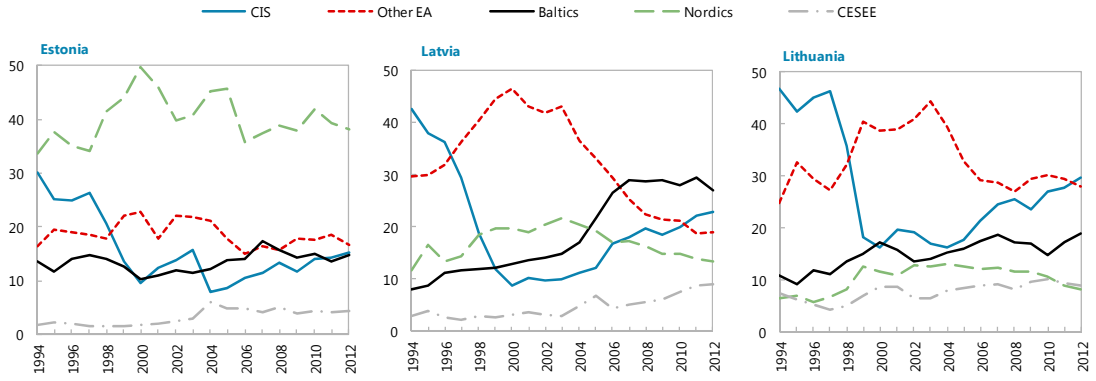


Sources: WDI; and IMF staff calculations.

7. Over the past two decades, Baltic exports reoriented successfully from the CIS toward CESEE and to intra-Baltic trade. The European Union as a whole has been the most important export destination from the mid-1990s, reaching a peak a decade later, and declining moderately since to 67 percent in Estonia, 61 percent in Latvia, and 55 percent in Lithuania. A more granular analysis shows a steady rise in the importance of trade among the Baltic economies (reaching a share of 15–27 percent) and with CESEE (reaching a share of 4–9 percent). The share of the CIS collapsed in the 1990s but made a partial comeback after the Russian crisis in 1999 and remains sizable, especially in Latvia and Lithuania. The Nordic countries are consistently important export destinations, above all for Estonia with a share of around 40 percent. The rest of the euro area absorbs between 17 and 28 percent of Baltic exports, with no clear trend over time.

[4] For a broader discussion of the Baltic boom-bust-recovery experience see Bakker and Klingen (2012), or Hansson and Randveer (2013). Blanchard et al. (2013) offer a discussion of the case of Latvia.

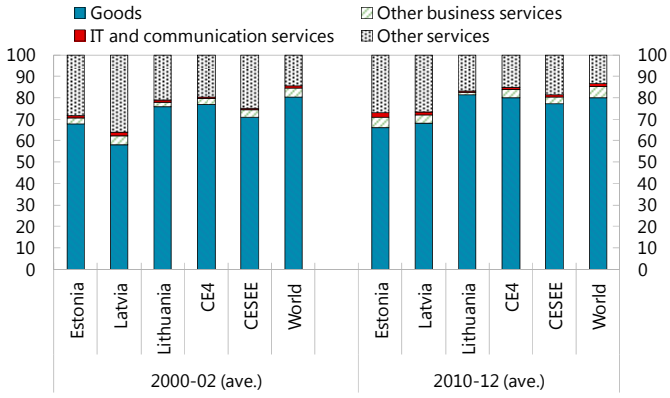
Baltic Countries: Export by Destination, 1994-12
(Percent of total exports)



Sources: DOTS; and IMF staff calculations.

8. Services exports are a traditional strength of the Baltic economies but only Estonia has a strong presence in the high-end segments. In all three countries, external services accounts have always been in surplus, reflecting large exports of transportation services related to Russian trade going through Baltic ports. Overall, services exports account for a somewhat larger share in total trade than in CESEE or globally. However, sophisticated and particularly dynamic services exports, such as information and communication technology (ICT) or "other business services," play an important role only in Estonia. At 7 percent of total exports their share is not far behind that of the Nordic countries or the euro area. In Latvia and Lithuania these shares are only half as large at best, though ahead of CESEE generally.

Composition of Exports
(Percent of total)



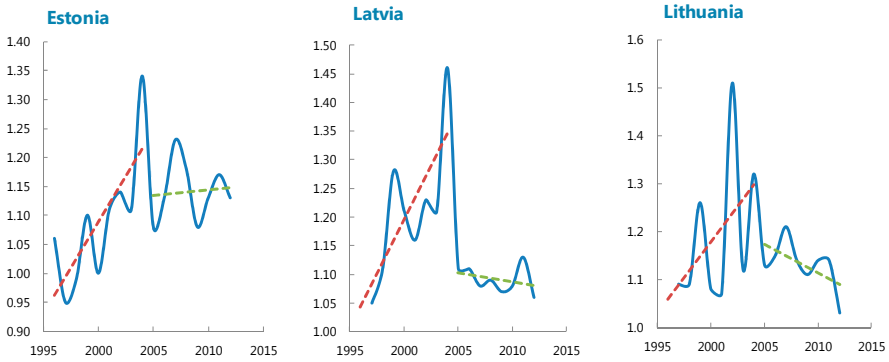
Sources: UNCTAC; DOTS; and IMF staff calculations.

9. The quality catch-up in the goods that the Baltic countries export seems to have plateaued. Judging by the prices that Baltic exports are managing to fetch in global markets, the quality of export goods appears to have improved strongly between the mid-1990s and the mid-2000s, consistent with outdated products inherited from the central-planning era being upgraded to western standards.[5] Since then, the quality of Baltic exports have broadly evolved in

[5] The quality of the exports in a given product category can be inferred from the prices they command in world markets compared to products in the same category produced in the rest of the world (Fabrizio, Ignan, and Mody, 2006). An index above (below) one indicates above-average (below-average) quality. This approach is suitable to ascertain the quality of a countries' given export mix—it is silent on whether this export mix is skewed toward or away from high quality products.

line with global trends, but not improved faster than in global markets generally. With the bulk of the quality catch-up of the existing product mix already accomplished, the ability to fetch higher prices in global markets going forward will depend on the capacity of Baltic exporters to shift to new products and enhance non-price competitiveness. Benkovskis and Wörz (2013, 2014) underscore the importance of non-price factors and empirically show their dominant role for the BRICS countries in gaining world market share between 1996 and 2011.

Baltic Countries: Product Quality of Exports
(1995 - 2012)



Sources: WITS; and IMF staff calculations.

10. Evidence on how well the product structure positions the Baltic export sectors for future growth is mixed:

- **On the one hand, export growth has been concentrated in labor intensive goods and services rather than knowledge intensive sectors, which likely have better future potential.** Baltic exports generally exhibit revealed comparative advantage in labor intensive goods and services and disadvantage in knowledge intensive activities, although Estonia has carved out a small advantage in knowledge intensive services in recent years.[6] Major Baltic exports with high revealed comparative advantage are wood, food products, animals and vegetables,

Baltic Countries: Revealed Comparative Advantage by Industry Groups
(In terms of DVA exports, 2007-09 average)

	Estonia	Latvia	Lithuania
Agriculture and mining	0.30	0.39	0.31
Labor-intensive manufacturing	2.58	1.89	1.73
Capital-intensive manufacturing	1.07	0.72	1.09
Knowledge-intensive manufacturing	0.56	0.30	0.37
Labor-intensive service	2.17	5.07	3.99
Capital-intensive service	1.51	2.24	2.82
Knowledge-intensive service	1.07	0.54	0.26
Public service	0.79	1.51	0.68

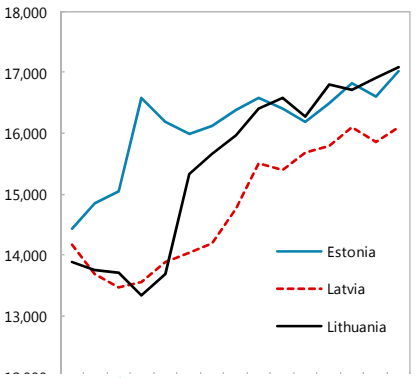
Sources: WIOT; and IMF staff calculations.

[6] A country is said to have revealed comparative advantage (disadvantage) in a product if its exports of this product account for a larger share in its total exports than global exports of this product in total global exports. The classification of goods and service into labor intensive, capital intensive, and knowledge intensive categories follows Rahman and Zhao (2013, p. 40).

as well as fuels in the case of Lithuania, reflecting to a large extent the countries' resource endowments. Classifying exports according to their technology intensity confirms that high and medium-to-high technology goods account for a relatively low share of Baltic exports compared to the CE4 countries, although in absolute terms the sophistication of Baltic exports has increased substantially since the turn of the century whether measured in terms of factor intensity, educational intensity, or technological intensity (Bank of Lithuania, 2013).

- **Summary indicators of export sophistication confirm progress but at a declining rate.** Hausmann et al. (2005) propose the indicator of the "income level implicit in exports," which essentially is a weighted average of the per-capita GDP of competitor countries in the relevant export product groups. For the Baltics, this measure shows a steep increase during 1997–2005; but a flattening thereafter. In an application to Latvia, Vitola and Davidsons (2008) find that "potential of almost all groups of currently produced goods to act as drivers of development has already been exhausted to a large extent" (p. 2).

Income Level Implicit in Exports, 1997-2011
(PPP GDP per capita in 2005 US$)



- **One the other hand, a fair proportion of Baltic exports is concentrated in globally dynamic product categories and Baltic exporters managed to gain market share in most of them.** During 2008–12, between 35 and 45 percent of Baltic exports comprised products the markets for which expanded relatively strongly at the global level.[7] The pertinent dynamic product categories for the Baltic countries include food, chemicals, plastics and rubber, metals, and footwear—and have changed little from earlier periods. While Baltic exports are thus somewhat underexposed to globally dynamic product categories, they are still better positioned than exports from CE4 economies, where exports of dynamic products account for only 31 percent of total exports. Moreover, Baltic exporters managed to gain market share in most of the dynamic product

Share of Exports by Its Type
(Percent of total exports)

	1998-2002	2003-07	2008-12
Estonia			
Dynamic products	47.5	29.9	40.5
Of which: with rising Estonian market share	33.3	22.6	31.3
Non-dynamic products	52.5	70.1	59.5
Latvia			
Dynamic products	34.0	34.7	33.8
Of which: with rising Latvian market share	17.3	32.0	17.4
Non-dynamic products	66.0	65.3	66.2
Lithuania			
Dynamic products	47.4	40.9	45.5
Of which: with rising Lithuanian market share	40.2	36.3	33.9
Non-dynamic products	52.6	59.1	54.5
CE4 countries			
Dynamic products	45.5	43.8	31.3
Of which: with rising CE4 market share	37.3	41.7	9.1
Non-dynamic products	54.5	56.2	68.7

Sources: UNCOMTRADE; and IMF staff calculations.

[7] The calculations group global exports by product category. The fastest (slowest) growing categories that comprise 50 percent of global exports are considered globally dynamic (non-dynamic). Accordingly, countries that have more (less) than 50 percent of exports concentrated in globally dynamic product categories are considered overexposed (underexposed) to globally dynamic product categories. Natural-resource intensive product categories are excluded from the exercise because of their high susceptibility to global commodity price swings (animals and vegetables, minerals, and fuels).

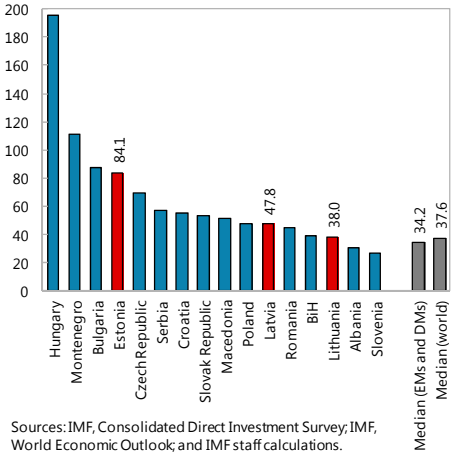
categories they operated in during 2008–12, whereas less than a third of the CE4 exporters did so.

C. FDI and Integration in Global Value Chains

11. FDI and GVC linkup can substantially strengthen the export sectors of catch-up countries and thereby spur income convergence. Inward FDI provides additional resources for investment to the recipient economy, facilitates the transfer of technology and knowhow, and spurs exports if directed at the tradable sector. Foreign firms in the Baltic countries appear more productive and export oriented than domestic firms, judging from the detailed information available for Estonia (Box 1). FDI is often closely related to GVCs, with companies from advanced economies that move part of their production processes abroad also investing abroad (UNCTAD, 2013). Compared to traditional FDI, GVCs offer the additional benefit of at least partially involving host countries in operations that would be too large and complex to run purely on a domestic basis and would otherwise likely not materialize at all—a particularly pertinent consideration for small economies not operating at the cutting edge of technological advancement. GVC participation tends to push up trade in intermediate goods and the content of imported inputs embedded in exports. While rising amounts of imported inputs eat into the value added of exports that is generated domestically, GVCs typically spur gross exports sufficiently to accommodate an increase of both foreign-generated and domestically-generated value added from exports (Rahman and Zhao, 2013). Outsourcing, also referred to as off-shoring, creates GVCs too, but through contracting some business tasks out to third-party providers abroad rather than engaging in FDI. Just as FDI, outsourcing gives rise to valuable transfer of knowhow to host countries, at least over time as less demanding tasks such as operating call centers evolve into mid-office functions, such as financial analysis or tax management (Cienski, 2013).

12. The Baltic countries managed to attract sizeable amounts of FDI, with Estonia particularly successful. At 80 percent of GDP, Estonia's FDI stock was roughly twice as large as that of its Baltic neighbours. Latvia and Lithuania rank somewhat lower than most countries in the region in terms of the cumulative FDI up to 2012, but they are still above the global median. Swedish companies are the most important foreign direct investors in all three countries, followed by Finland in the case of Estonia, the Netherlands in the case of Latvia, and Poland in the case of Lithuania.

Foreign Direct Investment, 2012
(Percent of GDP)



Sources: IMF, Consolidated Direct Investment Survey; IMF, World Economic Outlook; and IMF staff calculations.

Box 1. Foreign Enterprises in Estonia

Foreign companies in Estonia are mainly involved in export-oriented activities, including manufacturing; transportation and storage, trade and motor vehicle repairs, information and communication, and professional, scientific, and technical activities. In 2011, they represented some 27 percent of employment in the tradable sector, and contributed about 18 percent of the country's GDP and 40 percent of its exports.

- Compared with its domestic counterpart, a foreign firm employing 20 workers or more is on average twice as big, more profitable, and has a higher export ratio. Also, it has higher labor compensation and higher labor productivity.

Estonia: Key Indicators Of Enterprises Employing More Than 20 Workers

(Percent, unless otherwise indicated; 2011)

	Foreign firms		Domestic firms
	Total	O/w: Nordics	
Average size (number of employees)	117	118	65
Average compensation per employee (CE)	15.4	14.9	13.1
VA per employee (1,000 euros)	28.8	28.3	22.4
CE as a share of VA	53.5	52.5	58.5
Net profit as ratio to VA	27.5	28.0	25.4
Fixed investment as ratio to VA	17.8	21.1	38.0
Export ratio	65.9	67.5	38.6

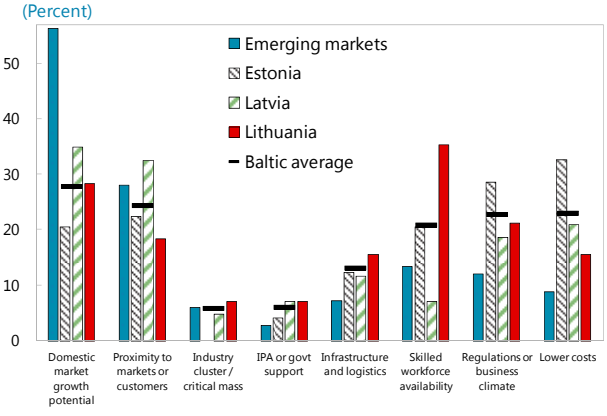
Sources: Estonian authorities; and IMF staff calculations.

- During 2008–11, foreign enterprises were responsible for half of Estonia's exports and two-thirds of manufacturing exports. They played a key role in Estonia's export-led economic recovery of 2010–11, when their exports grew by a cumulative 117 percent compared to a 37 percent expansion of exports by domestic firms.
- During 2008–12, foreign enterprises accounted for about one third of private investment and over 40 percent of private investment in the manufacturing sector.

13. The availability of skilled labor at affordable prices and a favourable business environment seem to be the key attractions of the Baltic economies. Domestic market growth potential and proximity to markets and consumers emerge as key attributes of emerging market economies in the comprehensive survey of foreign investors by fDi Markets, including for the Baltic economies. But the comparative advantage of the Baltic economies seems to lie in lower costs and skilled work-force availability, with these factors deemed much more important than for emerging market economies generally. Regulations or business climate are also key assets bringing foreign investors to the Baltic

Baltic Countries: FDI Projects' Most Frequent Motives and Determinants, 2003-13

(Percent)

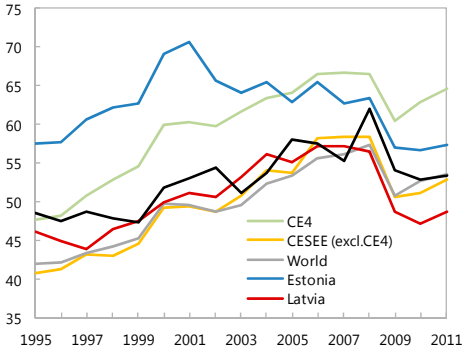


Sources: fDi Markets, Financial Times; and IMF staff calculations.

countries, consistent with the favorable readings of the "Doing Business" indicators complied by the World Bank, which rank Lithuania, Estonia, and Latvia 17th, 22nd, and 24th, respectively, out of 189 participating countries.

14. The Baltic economies also achieved a fairly good linkup to GVCs, but only Estonia comes close to the degree of integration seen in the CE4 countries. According to the GVC participation index, Latvia and Lithuania are linked up as much as the global average, which increased steadily up until the global financial crisis.[8] Notwithstanding Estonia's substantially higher participation, all three Baltic economies are considerably less involved in GVCs than that the CE4, whose pivotal role in the German supply chain is well known and documented (IMF, 2013). Apart from large unit labor cost differentials and adequate labor skills to support supply chain activities, the CE4's integration into the German supply chain reflects several bilateral advantages vis-à-vis Germany: geographical proximity, cultural similarities, and similar sectoral structure.

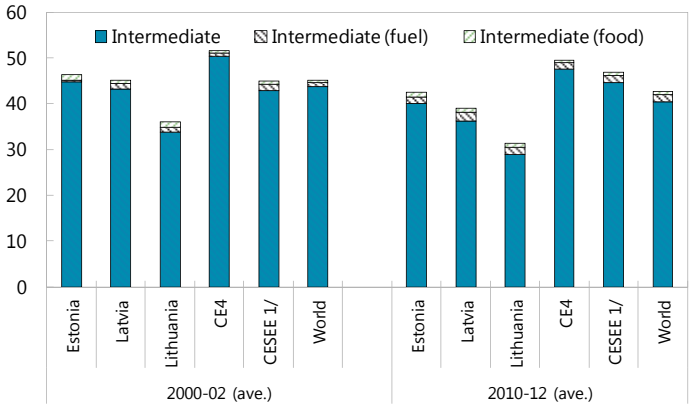
Global Value Chain Participation 1/
(Percent)



Sources: WIOT; and IMF staff calculations.
1/ Foreign value added of exports plus domestic value added of exports that are used as inputs for exports in country of primary destination. Both are expressed as shares of exports.

15. The Baltic GVCs may take a looser form than those in the CE4 or Asia. The GVC participation index makes no distinction between tighter and looser forms of GVCs: by measuring the amount of imported inputs embedded in exports and the amount of exports going to third countries, it makes no distinction between a tight relationship like the one between Volkswagen of Germany and Skoda of the Czech Republic and a looser one where a domestic exporter simply sources a lot of inputs abroad. Anecdotal evidence suggests that these tight forms of GVCs are generally rather rare in the Baltic countries, although a fair number of them seem to have developed between Estonia and Finland and Sweden and there should be no presumption that tight GVCs are necessarily more advantageous than loose ones. The share of intermediate industrial goods in trade is a

Share of Intermediate Goods in Total Trade
(Percent of total goods exports)



1/ Excluding CE4 countries (Czech Republic, Hungary, Slovak Republic, Poland).
Sources: UNCOMTRADE; and IMF staff calculations.

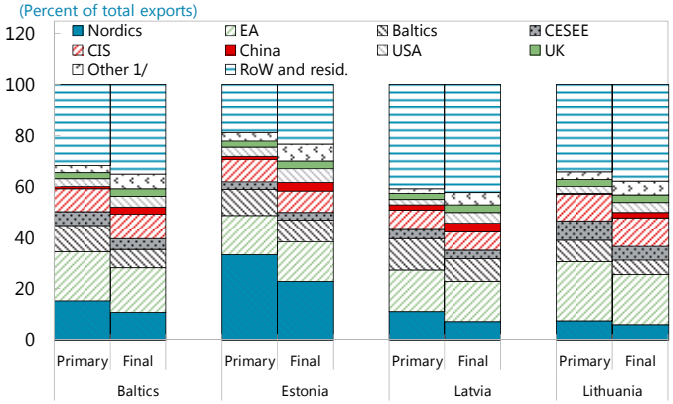
[8] The degree of GVC participation can be gauged by an index constructed as the sum of (i) the share of imported inputs embedded in exports, and (ii) the share of exports that do not stay in the country of primary destination but rather serve as input into further exports to third countries (Koopman et al., 2014, and OECD, 2012).

useful supplementary indicator for GVC involvement that is less prone to capture loose GVC links. On this metric, all three Baltic countries show less involvement in global value chains than the world as a whole.

16. GVC involvement also means that the Baltic countries' exposure to global economic developments is different than that suggested by gross export figures. Exposure to overseas developments is best gauged by the domestic value added of exports absorbed by the country of final destination. Imported inputs embedded in exports do not affect domestic economic activity; exports that are not consumed in the primary country of destination but embedded in further exports to third countries depend on economic developments in third countries. In the Baltic economies, exports in domestic value added terms account for between 45 and 60 percent of GDP, suggesting that a foreign demand shock of 1 percent would affect GDP to the tune of 0.45 to 0.6 percent on impact. In terms of the geographical composition of exposure, the importance of the Nordic countries, the euro area, CESEE, and intra-Baltic trade declines when focusing on the final destination of domestic-value added exports rather than the primary destination of gross exports. This suggests that these regions—particularly the Nordics—function to some extent as gateways for Baltic exports to the rest of the world.

Gross Exports by Primary Destination vs. DVA Exports by Final Destination, 2011

(Percent of total exports)



1/ Other includes: Australia, Brazil, Canada, India, Indonesia, Japan, Korea, Mexico and Taiwan.
Sources: WIOT; and IMF staff calculations.

17. The Baltic countries have been recipients of business outsourcing but its extent is hard to quantify. Unlike FDI, outsourcing is not tracked in official statistics. Tholon, the global outsourcing advisory firm, keeps tabs on the top outsourcing destination around the world. It currently only lists Tallinn among its top 100 destinations. Deloitte mentions Vilnius as a "hotspot" for shared services locations in Europe—because of high growth rates from a modest base. There are also numerous examples of Lithuania attracting technical support centers or regional operations centers of multinational companies, although these seem to be typically established by these companies themselves and would therefore already be captured in FDI statistics. According to Tholon, key factors for attracting outsourcing are skills and scalability of labor, overall costs, the business environment, infrastructure, and low risks to business.

D. Potential Challenges for the Baltic Export Sectors

18. Despite their past good performance, future success of the Baltic export sectors should not be taken for granted. Export volume growth has come down sharply from the double-digit rates achieved in the early years of the post-crisis recovery phase, to reach 2.3, 1.1, and 8 percent in 2013 for Estonia, Latvia, and Lithuania, respectively. While still a respectable performance in a year where global trade expanded only at timid rate of 2.7 percent,

it may also indicate that the momentum from post-crisis adjustment and reform is petering out. The Baltic economies have also been less successful in attracting FDI in recent years—their share of global FDI declined from 0.38 percent during 2005–07 to 0.21 percent during 2010–12. In any event, continued success of the Baltic export sectors will hinge on their ability to adapt to a fast-changing global economy.

19. Several tailwinds that benefitted the Baltic export sectors in the past are likely to fade. Fast growing imports of trading partners facilitated the expansion of Baltic exports in the past. However, according to the latest WEO, trading partner import growth for all three Baltic economies is projected to decline substantially and fall below global trade growth—a sharp contrast with the past decade when it enjoyed a premium. Favorable price developments for Baltic exports are also likely to subside. No matter whether they reflected fortuitous movements of prices on global markets or the catch-up in the quality of Baltic exports to western standards that is now largely complete, a repeat cannot be expected.

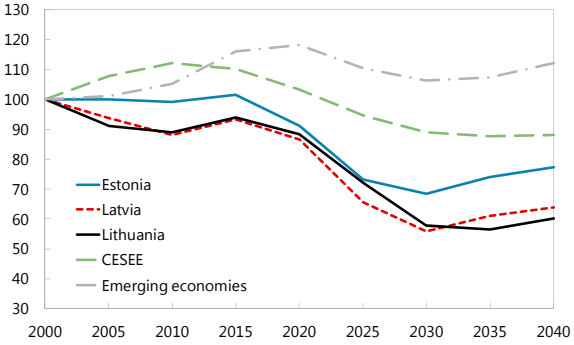
Baltic Countries: Trading Partners' Real Import Growth
(Percent, annual average)

	2003-13	2014-18
Estonia	6.1	4.7
Latvia	6.5	4.9
Lithuania	6.0	4.5
Global exports	5.6	5.3

Sources: DOTS; and IMF staff calculations.

20. Demographic aging is emerging as a new key challenge for Baltic export sectors, including their ability to attract FDI. Birth rates in all Baltic countries collapsed some 25 years ago in early transition—and have yet to recover decisively. This means that the cohorts that will be completing tertiary education from now on will be much smaller than in the past. The associated drain on labor supply is a particular challenge when the export sectors are specialized in the provision of labor intensive goods and services. It will also make it more difficult to attract foreign investors who have traditionally flocked to the Baltic region because of the availability of affordable and skilled labor. More generally, demographic aging tends to adversely affect FDI (Narciso, 2010).

Population Age 25-34, 2000-40
(2000=100)



Sources: UN Population Division; and IMF staff calculations.

21. The export product mix and the degree of GVC involvement raise questions about the ability to extend the Baltic export success. The Baltic export sectors have been specialized in labor intensive goods and services and have fared well. Nonetheless, rising sophistication of products and production, the critical importance of technology and knowledge, and intensifying competition from developing and emerging market economies suggest that maintaining strong performance with the existing export mix could well prove an uphill battle, even without the demographic challenges. Berg et al. (2008) show that export composition matters, as increasing

export product sophistication tends to prolong growth episodes. Increasing sophistication at the global level will also make it more critical than ever to be tightly involved in GVCs—an area where at least the export sectors of Latvia and Lithuania have some way to go in catching up with the best performers in the region.

E. Securing Vibrant Export Sectors for the Future

22. Vibrant export sectors in the Baltics are vital for long-term economic stability and income convergence. Securing and expanding market share, moving up the value chain, attracting FDI and GVC linkup, and repositioning toward promising export products against the inevitable odds of demographic aging will require a multi-pronged approach. Generally speaking, the Baltic countries should seek to build on their existing strengths, including economic flexibility, qualified human capital, sound macroeconomic policies, and generally good economic governance. Policies will need to aim at maintaining competitiveness and strengthening resilience to shocks.

23. Maintaining price competitiveness and fostering productivity growth will be essential. The post-crisis experience clearly speaks to the powerful effects from lowering ULCs relative to competitors. These hard-won competitiveness gains should be protected by keeping wage developments in line with productivity growth. Wage formation should remain market determined with a role for government in setting public sector and minimum wages and providing analysis of labor market developments. The focus should clearly be on securing high productivity growth, including through the steps discussed below, with wages following suit as productivity gains materialize over time.

24. The Baltic economies generally fare well on business-environment indicators, but addressing areas of relative weaknesses is essential to remain attractive. The Baltic countries ranked among the best on the World Bank 2014 Doing Business indicators, outperforming most of their EU peers, and were among the 25 countries (out of 189) where doing business is deemed the easiest. The IMD World Competitiveness Report paints a less favorable picture as the region's competitiveness is dragged down by limitations in the R&D culture (except for Estonia) and inefficiencies in the legal environment and public services. Perhaps most directly relevant for trade, FDI and GVC linkup are perceived impediments identified in the WEF's Global Enabling Trade Report (2012). While all countries score above average overall, there are areas for improvement: shortcomings in services and infrastructure seem to stand in the way of transshipment connectivity, hiring of foreign labor appears to be difficult, and trade financing is reportedly not easy to come by.

Baltic Countries: Global Enabling Trade Index 2012
(Country rank out of 132 countries)

	Estonia	Latvia	Lithuania
Overall Index	**26**	**52**	**45**
1st pillar: Domestic and foreign market access	67	67	67
2nd pillar: Efficiency of customs administration	11	49	44
3rd pillar: Efficiency of import-export procedures	8	23	34
4th pillar: Transparency of border administration	23	52	41
5th pillar: Availability and quality of transport infrastructure	50	47	62
5.01 Airport density, number per million pop.	10	80	41
5.02 Transshipment connectivity, index 0–100 (best)	89	92	90
5.03 Paved roads, % of total	87	1	88
5.04 Quality of air transport infrastructure, 1–7 (best)	71	51	101
5.05 Quality of railroad infrastructure, 1–7 (best)	44	37	25
5.06 Quality of roads, 1–7 (best)	47	94	31
5.07 Quality of port infrastructure, 1–7 (best)	17	48	41
6th pillar: Availability and quality of transport services	54	76	58
6.01 Liner Shipping Connectivity Index, 0–152.1 (best)	88	91	79
6.02 Ease and affordability of shipment, 1–5 (best)	74	84	56
6.03 Logistics competence, 1–5 (best)	65	89	57
6.04 Tracking and tracing ability, 1–5 (best)	59	64	82
6.05 Timeliness of shipments in reaching destination, 1–5 (best)	76	91	37
6.06 Postal services efficiency, 1–7 (best)	25	68	55
6.07 GATS commitments in the transport sector, index 0–1 (best)	27	25	21
7th pillar: Availability and use of ICTs	15	36	24
8th pillar: Regulatory environment	30	62	74
8.01 Property rights, 1–7 (best)	27	66	58
8.02 Ethics and corruption, 1–7 (best)	30	62	67
8.03 Undue influence, 1–7 (best)	27	62	66
8.04 Government efficiency, 1–7 (best)	28	90	72
8.05 Domestic competition, 1–7 (best)	27	62	85
8.06 Efficiency of the financial market, 1–7 (best)	44	70	85
8.07 Openness to foreign participation, index 1–7 (best)	21	61	77
Ease of hiring foreign labor, 1–7 (best)	86	70	96
Prevalence of foreign ownership, 1–7 (best)	42	63	83
Business impact of rules on FDI, 1–7 (best)	18	94	106
Openness to multilateral trade rules, index 0–100 (best)	15	44	12
8.08 Availability of trade finance, 1–7 (best)	62	68	100
9th pillar: Physical security	19	52	42

Source: WEF, The Global Enabling Trade Report 2012. Highlights added.

25. Domestic investment is a key ingredient for future export performance. It will help boost future productivity, secure continued capital stock accumulation and ensure its modernization, and facilitate the gradual shift to product categories that have high potential for the future. Private investment has not yet fully recovered from the crisis and remains below its long-term average. In this context, it remains essential to ensure that financing is not unduly held back by credit supply by banks and that other financing avenues are explored, as discussed in Chapter II. Securing sufficient fiscal space for public investment is equally important. Thanks to EU funds, which the Baltic countries are very successful at absorbing, public investment ratios are only marginally below their longer-term average. But it is less clear whether EU funds are efficiently deployed to help shift exports toward more promising goods and services.

26. Upgrading infrastructure and making the most of the available labor force are priorities for attracting FDI, facilitating GVC linkup, and strengthening the export sector generally.

- It is difficult to change the demographics of the labor market in the short-run, but tackling high structural unemployment could materially augment the effective labor force. Despite being viewed by investors as having relatively skilled labor forces, skill and education

mismatches still appear to be an issue in the Baltics. Chapter IV analyzes these issues and makes a number of recommendations for addressing skill mismatches and upgrading skill levels.[9] Moreover, liberalization of emigration practices could help address shortages in selected labor market segments, thereby suitably supplementing the domestic labor force.

- An efficient and integrated transportation infrastructure is key for trading across borders and can bring important benefits for countries that are geographically close to key markets. The Baltic transportation infrastructure is well attuned to trade in the east-west direction, but north-south passage ways are less well developed. Moreover, a smooth interface between different modes of transportation, supported by integrated services, is important.
- Energy prices are an important cost factor for exports. The Baltic energy sectors remain highly dependent on Russia as their dominant supplier, which also limits the scope for unleashing the full forces of competition in the energy sector. Currently, the Baltic countries face among the highest energy costs in Europe (when adjusted for purchasing power), which weighs on investment and competitiveness. The authorities are rightly pushing ahead with building the infrastructure that will secure diversity in energy supplies to lower import prices and facilitate competition between energy providers.

27. Regional cooperation and harmonization could also improve the operating environment for Baltic exports. As small countries, the Baltic economies might lack the economies of scale that some of their larger competitors enjoy: foreign investors might not come because of insufficient market size or labor pools, lumpy infrastructure investment might be too large for any one of the Baltic countries to shoulder on its own, etc. While the argument that small countries face a disadvantage of scale should not be taken too far—there are a host of highly successful small states around the world, because being small also comes with the advantage of being able to be more flexible—cooperation and harmonization can ameliorate scale disadvantages where they truly exist. Infrastructure is yet again a prominent candidate, ranging from transportation and energy to financial markets, where investments are bulky and may not pay off if carried out by each country individually in an uncoordinated fashion. Harmonization of rules and practices across the Baltic countries would contribute to investors starting to perceive the region as a larger economically integrated entity where they can count on similar standards to apply. A joint FDI agency might help spread the message.

[9] Analysis of the Baltic countries' education systems is beyond the scope of this report, but a review of Latvia points to significant scope for improvement on the educational front (IMF, 2012).

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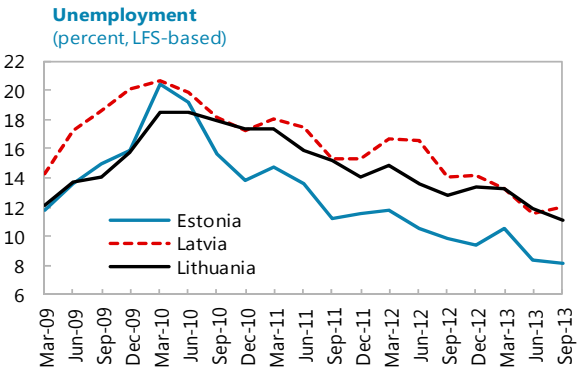
UNEMPLOYMENT IN THE BALTICS[1]

A. Introduction

1. Unemployment remains persistently high in the Baltic countries. While it has fallen significantly from its post-crisis peak, it remains in the 8–12 percent range. And it is particularly high for youth, and about half the unemployed have been out of a job for more than one year. This chapter estimates the equilibrium or structural level of unemployment (NAIRU) and supports these estimates with several robustness checks. It then explores traditional and nontraditional hypotheses to explain these results and draws policy conclusions.

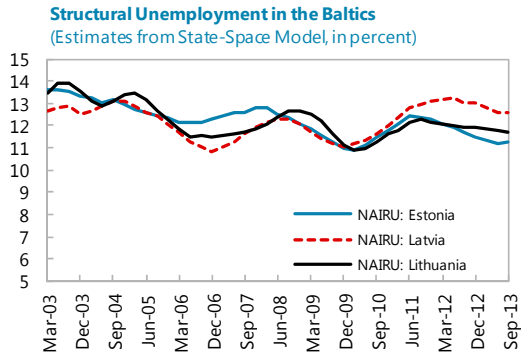


Source: Eurostat.

2. The analysis finds that structural unemployment appears to be high, and likely the result of high taxation on labor and skill mismatches. It suggests that the current level of unemployment is close to the structural level, implying that it will be more difficult to reduce unemployment without engendering wage pressures in the future. Unlike in many other economies, high structural unemployment appears to coexist with relatively flexible labor markets, suggesting that the main culprit is not a lack of dynamism in the labor market. At the same time, taxes on labor are high, which raises the cost of hiring, particularly lower skilled workers. Skill mismatches also appear to be a concern, and policies to address them are underused.

B. What is the Structural Level of Unemployment?

3. Finding a solution to unemployment depends critically on whether it reflects cyclical or structural factors. Policies to address cyclical unemployment primarily focus on demand management. However, addressing structural unemployment requires deep and targeted reforms that tackle the underlying forces of why the unemployed do not find the way to matching jobs and employment.



Sources: National authorities; and IMF staff calculations.

[1] Prepared by Christian Ebeke and Greetje Everaert under the guidance of Tom Dorsey. Bartek Augustyniak provided excellent research assistance, and Solange de Moraes Rego and Fernando Moran Arce provided outstanding support.

4. Our estimates suggest that the NAIRU in the Baltics is high, stable, and close to the current level of unemployment (Box 1 and Figure 1).[2] For Lithuania and Latvia, the time-varying point estimate ranges between 10¾ and 13¾ percent, while for Estonia it ranges between 10¾ and 15¼ percent. The 95-percent confidence intervals around these point estimates shrink over time—by the end of the estimation period they are +/- 1¼ percentage point (1½ percentage point for Lithuania). Current levels of unemployment are close to the estimated NAIRU (in 2013) for Latvia and Lithuania and somewhat below the NAIRU (in 2013) for Estonia. In other words, the still high unemployment in the Baltics appears to reflect equilibrium trends. It also implies that with output growing at potential, unemployment would not drop significantly without rising wage and inflationary pressures.

C. Is Structural Unemployment Really That High? Robustness Checks

5. We gather further evidence to test the finding that the NAIRU is high and relatively stable over time. Specifically, we look at historical averages, the relationship between wages and unemployment, the relationship between vacancies and unemployment (the Beveridge curve), and the relationship between output and unemployment (the Okun relationship).

6. First, our estimates for the NAIRU are not out of line with historical experience of unemployment in the Baltics. In particular, while unemployment increased significantly following the crisis, a longer-time view indicates that this increase was from a historical low.

Table. Historical Average and NAIRU Unemployment
(Percent)

	Historical Average 1/	NAIRU average 2/
Estonia	9.7	12.4
Latvia	12.2	12.3
Lithuania	11.1	12.4

1/ Historical average Estonia: 1993Q1-2013Q3; Latvia: 1996Q1-2013Q3; Lithuania: 1998Q2-2013Q3.
2/ 2002Q1-2013Q4.
Sources: National authorities; and IMF staff estimates

[2] The equilibrium or structural level of unemployment (NAIRU or NAWRU) is the level of unemployment that is consistent with a balanced economy where the output gap is closed. In this state, the level of unemployment does not generate accelerating inflationary or wage pressures. Cyclical unemployment occurs when the output gap is negative.

Box 1. Estimating Structural Unemployment in the Baltics

To estimate the level of structural unemployment in the Baltics, we draw on approaches used by Laubach (2001), the OECD (discussed in Gianella et al., 2008 and, in Guichard and Rusticelli, 2011) and the IMF (2013). The analysis consists of estimating time-varying NAIRUs contained in a reduced form Phillips curve equation (linking inflation to the unemployment gap) by means of the Kalman filter. One of the main advantages of this method is that an explicit econometric estimation, unlike a filter, helps assess the uncertainty as reflected in confidence intervals, and helps avoid the end point problem common to simple statistical filters such as the HP filter. In particular, applying simple filters (such as the HP) increases the risk of putting too much weight on the end data points. The Phillips curve equation controls for short-term (supply) shocks captured by import price inflation. Domestic inflation is measured by core consumer price inflation. The estimated Phillips curve relationship takes the following form:

$$\pi_t = \theta_t \bar{\pi}_t - \kappa_t (U_t - U_t^*) + \gamma_t \pi_t^m + \epsilon_t, \qquad [1]$$

where π_t is the year-on-year core CPI inflation adjusted for changes in indirect taxes, $\bar{\pi}_t$ are inflation expectations approximated by the past 4-quarter rolling average of the core CPI inflation, θ_t is a time-varying parameter, U_t is the unemployment rate, U_t^* is the NAIRU, π_t^m is import price inflation, and ϵ_t is a cost-push shock. Depending on data availability, the sample period starts in the early 2000s and ends in Q4 2013.

The unemployment gap and the NAIRU are assumed to follow an AR(1) and random walk processes, respectively. This adjustment has the advantage that the NAIRU is inferred not only on the basis of inflationary pressures, but also on the basis of the unemployment rate dynamics captured by the AR(1) process. Assumptions on the stochastic process followed by the NAIRU follow Laubach (2001) and Gianella et al. (2008) and, rely on two transition equations specifying the time-series properties of respectively the NAIRU and the unemployment gap (the gap between the NAIRU and the unemployment rate). First the NAIRU is modeled as a simple random walk process, its transition equation takes the following form:

$$U_t^* = U_{t-1}^* + \epsilon_t^{U^*}, \qquad [2]$$

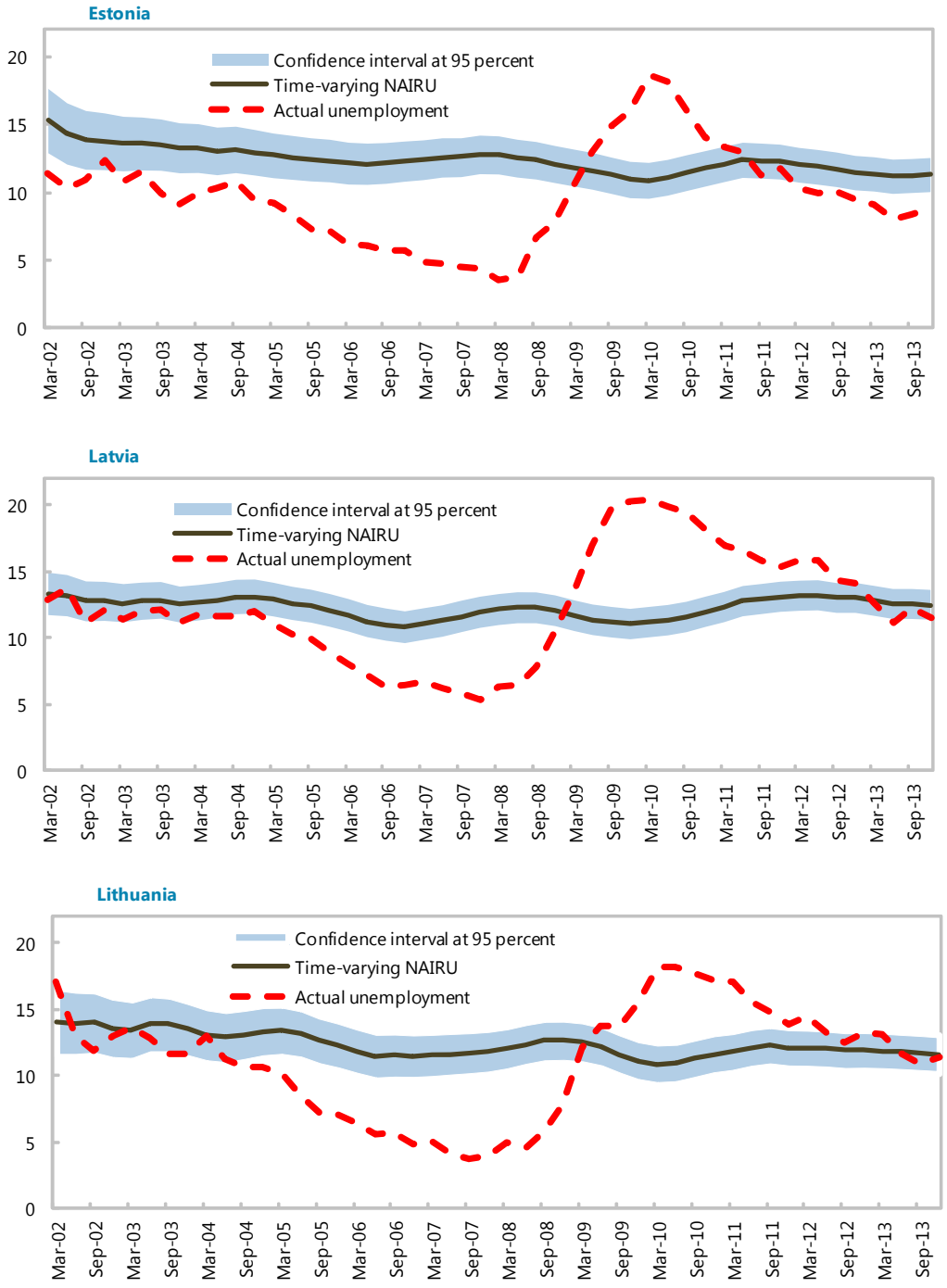
where the error term $\epsilon_t^{U^*}$ is assumed to be normally distributed and uncorrelated with the error term of the Phillips curve equation ϵ_t. Second, a law of motion is imposed on the unemployment gap to ensure that the unemployment rate converges to its structural rate in the absence of shocks and, the unemployment gap is assumed to follow an autoregressive process:

$$(U_t - U_t^*) = \rho (U_{t-1} - U_{t-1}^*) + \epsilon_t^{(U-U^*)}, \qquad [3]$$

Some assumptions are required to estimate the model. For example, the values and variances of the two state variables (the NAIRU and the unemployment gap) in the initial period have to be pre-specified. The goal is to strike a balance between avoiding estimating a NAIRU which tracks too closely the actual dynamics of the jobless rate and seeking a NAIRU which presents some reasonable variability. The initial value of the NAIRU has been set equal to the unemployment rate in each country seen in the mid of the 2000s (2005Q1), given that the Baltic economies were assessed to have broadly closed output gaps at that time. The initial value of the unemployment gap being set equal to the difference between the unemployment rate in the initial period of the sample and the specified initial NAIRU. Second, assumptions are made about the relative variances of the residuals of the three equations. The variance of the error term in the transition equation of the NAIRU (equation [2]) relative to the one of the error term in the Phillips curve equation (equation [1]) determines the smoothness of the NAIRU series. The smaller this 'signal-to-noise ratio', the less volatile will be the resulting NAIRU. The parameters and shock variances are estimated with maximum likelihood using a nonlinear Kalman filter. Therefore, we allow for signal-to-noise ratios in the range of estimates in the literature (see Laubach, 2001) and consistent with a certain variability of the estimated NAIRUs. The estimates of the NAIRUs are robust to reasonable modifications of the signal-to-noise ratio and different assumptions regarding the initial NAIRUs and unemployment gaps.

Figure 1. Baltic Countries: NAIRU Estimates

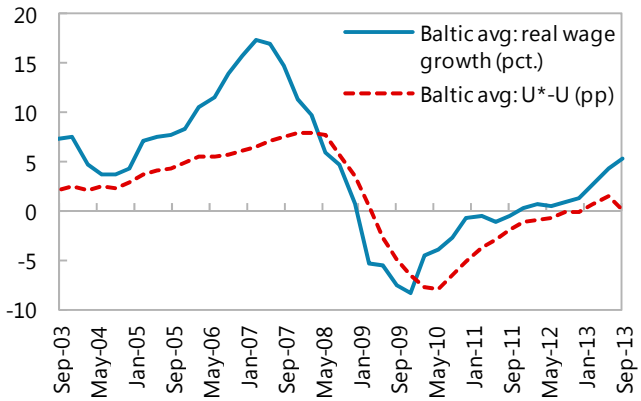
(Percent of total labor force)



Source: National Authorities; and staff estimates.

7. Second, real wage behavior around our NAIRU estimates is consistent with the notion that real wage growth should accelerate once unemployment falls below the NAIRU. We find that real wage growth is highly correlated with the inverse of such a calculated unemployment gap.[3] This further confirms our NAIRU estimates (which were derived from inflation rather than wage dynamics).[4] Also of note is the high downward flexibility of wages in the Baltics, consistent with their relatively flexible labor market institutions (see section D).

Real Earnings Growth and Deviation from NAIRU



Sources: National authorities; and IMF staff calculations.

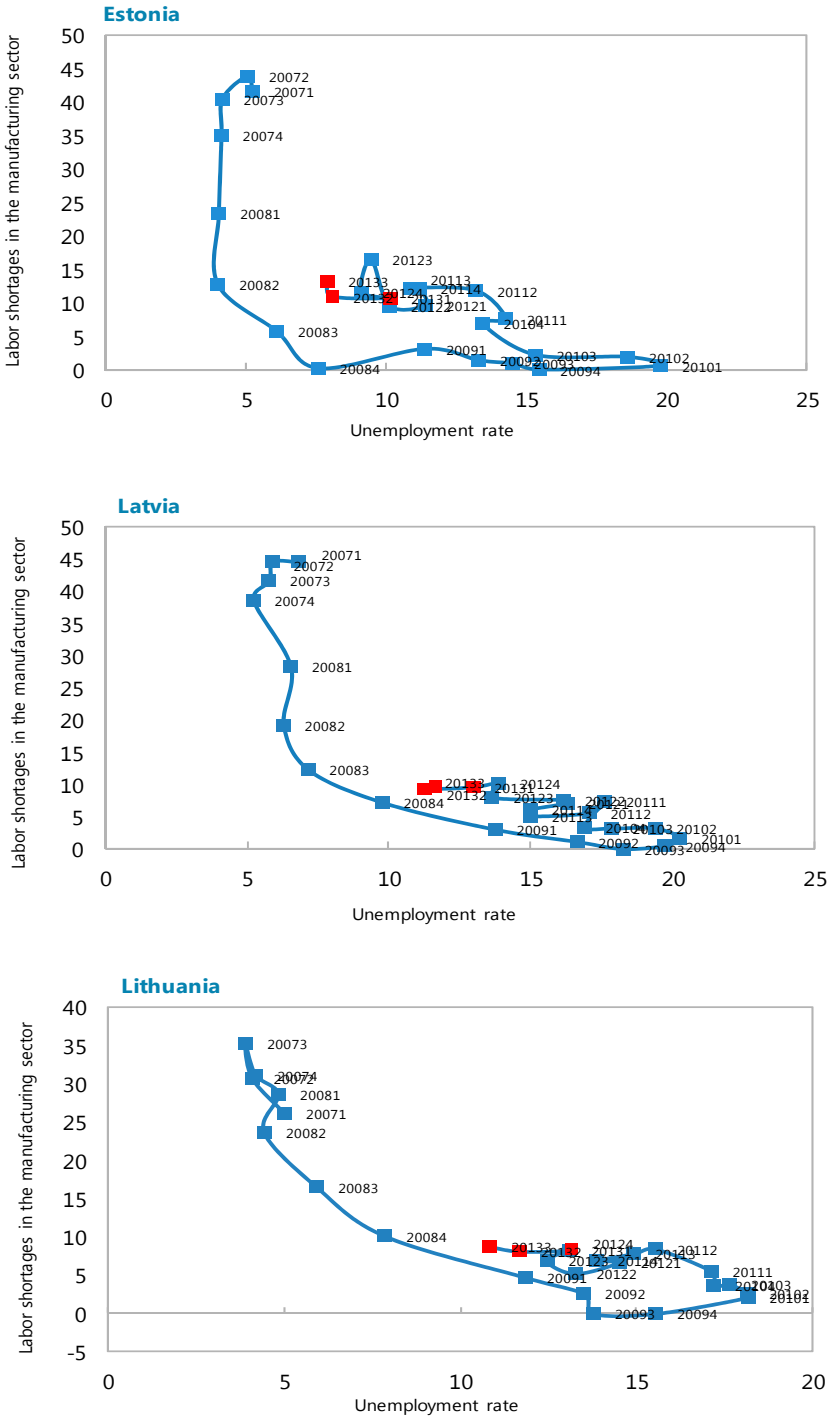
8. Third, the Beveridge curve (the relationship between the number of job vacancies and the level of unemployment) has remained stable (Figure 2). Tracking this relationship over time provides an indication of whether falling unemployment coincides with a higher number of vacancies (movements along the Beveridge curve), or whether falling unemployment coexists with an unchanged level of vacancies (shifts of the Beveridge curve). Shifts of the Beveridge curve are typically associated with increased inefficiencies of labor matching and hence, increasing structural unemployment, while movements along the curve tend to reflect cyclical variations in unemployment around an unchanged structural level. A visual test of the Beveridge curve suggests that it has not shifted over time. We also test for a shift or a change in the slope of the curve, and we find that the post-crisis dummy is statistically insignificant across different specifications, indicating no change (Box 2).

[3] The correlation is 0.86 percent for the Baltics. For countires individually, the correlation is 0.81 for Estonia, 0.82 for Latvia and 0.87 for Lithuania (2002q1–2002q2).

[4] Given that our estimation of the NAIRU relied on inflation dynamics in the Philips curve, it also indicates that a very similar result would be obtained if we were to use wage dynamics instead (the non-accelerating wage rate of unemployment or NAWRU).

Figure 2. Baltic Countries: Beveridge Curves, 2007–13

(Percent)



Sources: Eurostat Business Sentiment Survey; and IMF staff calculations.

Box 2. Have Beveridge Curves Shifted in the Baltics Since the Crisis?

Changes in the matching efficiency of the labor market can be inferred from the estimation of the relationship between the jobless rate and vacancies (the 'Beveridge curve'). Such analysis provides key information to assess whether joblessness is mostly linked to temporary demand shifts or more structural changes in the efficiency of the matching process of the labor market.

Dynamics in the Beveridge curve can take the form of movements along the curve or shifts of the curve itself, with important implications for the identification of shocks affecting the labor market. Movements along the curve are associated with the state of the business cycle. When labor demand is weak, employers are reluctant to hire and the number of unfilled vacancies is low while the unemployment rate is high. Shifts of the curve are instead of a structural nature, and linked to the efficiency of workers-to-jobs matching, or the rate at which existing jobs are destroyed. Shifts of the Beveridge curve are of particular interest, since they are suggestive of structural changes in the unemployment-vacancy relationship.

We apply this framework to the Baltics by estimating country-specific Beveridge curves using the new data compiled by the European Commission on labor shortages in the manufacturing sector. We follow the recent contribution by Bonthuis et al. (2013) applied to euro area countries. Since official data on job vacancy developments suffer from differences in national definitions and lack of availability over longer horizons, we consider the longer European Commission series of employers' perceptions of labor shortages in manufacturing.

We develop a framework to assess whether the Beveridge curve in the Baltics has shifted since the onset of the crisis. The framework consists of estimating country-specific Beveridge curves, but also a unique Beveridge curve for the Baltic countries as a group using a panel data specification. We specify a Beveridge curve equation by regressing the unemployment rate on labor shortages (used as a proxy for vacancy rate developments), plus a range of shift parameters, following recent studies (Bonthuis et al., 2013). The model estimated for each country is represented as follows:

$$U_t = \alpha + \rho U_{t-1} + \theta_1 LS_t + \theta_2 LS_t^2 + \theta_3 D_t^c + \theta_4 (LS_t * D_t^c) + \epsilon_t, \qquad [1]$$

where *U* and *LS* denote the LFS unemployment rate and the labor shortage in the manufacturing, respectively. D_t^c represents the crisis dummy taking the value 1 since 2009:1 onwards and, 0 otherwise. The quadratic term LS^2 is designed to ensure the convexity of the Beveridge curve and thus captures nonlinearities in the Beveridge relationship. To test for the impact of the crisis on the Beveridge curve, we incorporate the dummy variable D_t^c. Changes in the slope of the Beveridge curve due to the crisis are identified by the parameter θ_4, while shifts in the Beveridge curve (our proxy for the effect of structural factors) are identified by the parameter θ_3. This parameter measures to what extent, for a given level of labor shortages, unemployment rate is "abnormally" different since the crisis compared to what would have been observed before the crisis for a given level of job vacancies. Positive or negative (significant) values of this parameter would suggest outward or inward shifts of the Beveridge curve.

The cross-country version of the equation [1] is specified as follows:

$$U_{it} = \alpha + \rho U_{it-1} + \theta_5 LS_{it} + \theta_6 LS_{it}^2 + \theta_7 D_t^c + \theta_8 (LS_{it} * D_t^c) + u_i + \epsilon_{it}, \qquad [2]$$

where country-fixed effects are controlled for through u_i. Because equation [2] includes both the lagged dependent variable and country-fixed effects, OLS estimates are likely to be biased because of the correlation between U_{it-1} and u_i. We correct for this bias using the Least Square Dummy Variable Corrected estimator (LSDVCE) which is suitable in presence of dynamic panel model with large *T* and small *N*.

Box 2. Have Beveridge Curves Shifted in the Baltics Since the Crisis? (Continued)

Econometric estimates do not reject the hypothesis that Beveridge curves have not shifted since the crisis. This result is consistent with the finding that structural unemployment has been broadly stable without a noticeable structural break due to the crisis. The models are estimated with quarterly data spanning from 2000:1 through 2013:3. Regardless of the specification (time-series or cross-country approaches), we did not find any statistically significant estimate of the parameters θ_3 and θ_7. We also did not find that the slopes of the Beveridge curves have changed since the crisis. Movements of job vacancies and the unemployment rate since the crisis were therefore consistent with short-term cyclical shocks in the labor market while structural unemployment has remained elevated but broadly unchanged. These results contrast with the findings of Bonthuis et al. (2013) who find that Beveridge curve slopes remained unchanged since the crisis in the Euro area, however, outward shifts in the curve were significant (except in Germany where an inward shift was found).

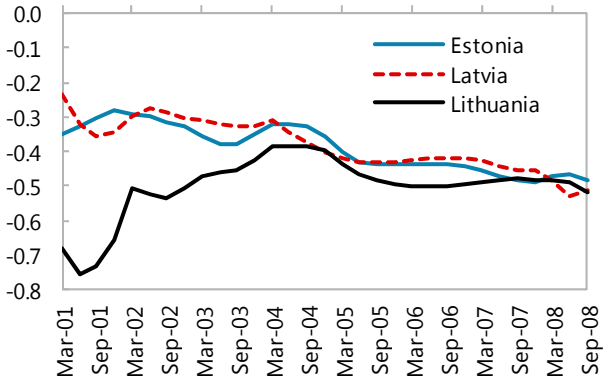
Table. Beveridge Curve Estimates for the Baltic Countries

Dependent variable: Unemployment rate at each quarter (LFS data)	Pooling	Estonia	Latvia	Lithuania	Fixed-effects estimates	LSDVCE
	(1)	(2)	(3)	(4)	(5)	(6)
Labor shortage	-0.171 ***	-0.18	-0.324 ***	-0.161	-0.169 *	-0.168 ***
	(-3.032)	(-1.526)	(-2.904)	(-1.553)	(-3.345)	(-3.064)
Labor shortage ^{2}	0.0024 **	0.0022	0.0050 **	0.0021	0.0022	0.0023 **
	(2.384)	(-1.076)	(-2.600)	(-0.884)	(-2.412)	(-2.179)
Labor shortage * Crisis dummy	-0.05	-0.0538	-0.0226	-0.0482	-0.0513	-0.0488
	(-1.204)	(-0.706)	(-0.266)	(-1.020)	(-2.678)	(-1.395)
Crisis dummy	0.68	-0.18	0.70	1.08	0.64	0.61
	(1.080)	(-0.134)	(-0.515)	(-1.384)	(-1.563)	(-1.068)
Unemployment rate $_{t-1}$	0.746 ***	0.761 ***	0.617 ***	0.723 ***	0.737 ***	0.748 ***
	(19.44)	(-11.340)	-10.00	-9.60	-22.80	-21.53
Intercept	4.259 ***	4.657 ***	7.113 ***	4.142 ***	4.4 **	
	(4.913)	-2.702	-4.615	-2.862	-6.161	
Country fixed-effects	No	...	...	...	Yes	Yes
Number of countries	3	1	1	1	3	3
Observations	138	53	38	47	138	138
R-squared	0.936	0.907	0.964	0.947	0.935	...

Robust *T*-statistics in parentheses.
*** p<0.01, ** p<0.05, and * p<0.1.

9. Fourth, the Okun relationship, which relates unemployment and output dynamics, has been relatively stable since the crisis. We test whether the Okun relationship, has changed over time (Box 3). We do so by first estimating the Okun relationship both for the overall sample period, and second, by repeating this estimation over 20-quarter rolling regressions to obtain time-varying estimates of Okun's beta. We find that the absolute value of Okun's beta is relatively high, and comparable to levels found for the Anglo-Saxon and Nordic countries. A higher beta is typically associated with a higher degree of labor market flexibility, and in this respect our finding on the size of beta suggests a relatively high degree of labor market flexibility also exists in the Baltics. We also find that Okun's beta, while generally trending down over time, does not feature a break since the 2008/09 crisis. This relative stability implies that the responsiveness of unemployment to output variations hasn't changed since the 2008/09 crisis. This is consistent with our finding that there is no evidence of a change in structural unemployment since the crisis.

Okun's Beta
(20-Quarter Rolling Regressions, level specification)



Sources: National authorities; and IMF staff calculations.

10. Finally, our NAIRU estimates align with those of other international institutions. We compare our time-varying estimates to those obtained by the European Commission and the OECD. We find that, on average, our point estimates of the NAIRU are very similar.

Table. Average of Structural Unemployment Rate Estimates (2002-2013)

	EC AMECO database	OECD estimates	IMF staff estimates
Estonia 1/	11.6	9.8	12.4
Latvia	12.1	…	12.3
Lithuania	11.3	…	12.4

1/ Estonia averages are 2008-13 for EU AMECO database.

Sources: European Commission; OECD; and IMF staff estimates.

Box 3. Has the Okun Relationship Changed in the Baltics Since the Crisis?

The Okun relationship relates output developments to unemployment dynamics. It predicts how much unemployment is expected to change in response to a given change in output. The literature uses specifications in both levels and in differences, with the specification in levels taking the following form:

$$U_t - U^* = \beta (Y_t - Y^*) + \varepsilon_t$$

where U_t and Y_t denote the level of unemployment and the log of output at time t respectively, U^* and Y^* are the level of structural unemployment and the log of potential output respectively, and ε_t is the error term assumed to be normally distributed. The specification in differences is obtained by substituting U^* and Y^* with U_{t-i} and Y_{t-I} respectively. β is referred to as "Okun's beta", as it describes the relationship between output and unemployment.

Recent analysis suggests that the Okun relationship tends to be stable over time in most countries. Ball et al. (2013) confirms this, and finds that, while temporary deviations from Okun's law occur, these are usually short-lived and modest in size. But Okun's beta does vary across countries, likely reflecting idiosyncratic features in national labor markets. For instance, Okun's beta for the United States is estimated at between -0.4 to -0.5, while in Japan it is -0.15, and in Spain it is -0.85.

We test the stability of the Okun equation in the Baltics. We estimate the above equation for the three Baltic countries. We first estimate the equation for the entire sample period, and then perform 20-quarter rolling regressions. The estimation uses quarterly data and simple ordinary least squares, where U^* and Y^* were obtained using an HP filter with λ=1600. The sample period varies by country but basically covers late the 1990s through 2013Q3.

Estimates of Okun's beta for the Baltics are relatively high and relatively stable over time, featuring a slight downward trend.

Table. Okun's Beta

	Beta	Adj. R^2
Anglo-Saxon	**-0.42**	
Australia	-0.536***	0.80
Canada	-0.432***	0.81
Ireland	-0.406***	0.77
New Zealand	-0.341***	0.59
UK	-0.343***	0.60
US	-0.454***	0.82
Nordics	**-0.44**	
Denmark	-0.434***	0.72
Finland	-0.504***	0.77
Norway	-0.294***	0.62
Sweden	-0.524***	0.62
DEU/NLD	**-0.44**	
Germany	-0.367***	0.51
Netherlands	-0.511***	0.62

Source: Ball et al. (2013)

*** Significant at 1 percent level.

- The estimation over the entire sample period yields a value of Okun's beta of 0.42 on average, with Okun's beta slightly higher for Lithuania (0.49) than for Estonia (0.41) or Latvia (0.41). The fit of the model is good, as measured by a high adjusted R^2 value. Broadly similar results are found when estimating the Okun relationship in the alternative differences specification. In both specifications, the level of Okun's beta is similar to the average found in Ball et al. (2013) for Anglo-Saxon or Nordic countries, and is consistent with the relatively flexible labor market institutions that the Baltics share with these comparator country groups.

Table. Okun's Beta 1/

	Beta	St. Error	P-value	Adj. R^2
Estonia	-0.34	0.04	0.00	0.54
Latvia	-0.39	0.03	0.00	0.71
Lithuania	-0.43	0.04	0.00	0.66

1/ Specification in differences.

Table. Okun's Beta 1/

	Beta	St. Error	P-value	Adj. R^2
Estonia	-0.41	0.03	0.00	0.71
Latvia	-0.41	0.02	0.00	0.84
Lithuania	-0.49	0.04	0.00	0.73

1/ Specification in levels.

Box 3. Has the Okun Relationship Changed in the Baltics Since the Crisis? (continued)

- The results of the rolling regressions indicate that Okun's beta has been on a gradual downward trend. However, this seems to be a feature that had set in well before the crisis, especially taking into account that estimates of Okun's beta are derived from the 20 quarters preceding the crisis. A simple regression of Okun's beta on a time trend shows that this is significant for Estonia and Latvia, but not for Lithuania. To test whether the slope of this trend has changed since the crisis, we interact this time trend with a post-crisis dummy that takes the value one for 2008Q1–2013Q3. This interaction term is not statistically significant in the case of Estonia or Latvia. For the case of Lithuania, we find a small but positive value for the coefficient, implying that Okun's beta has decreased slightly in absolute value in the post-crisis period, even if a longer-term trend was not found to be significant.

Table. Does Okun's Beta Trend With a Break? 1/

	Estonia	Latvia	Lithuania
Dependent variable: Beta from 20Q rolling regressions Sample period 2006Q1-2013Q3			
Time trend	-0.01	-0.01	0.01
(St. Error)	0.00	0.00	0.00
(P-Value)	0.00	0.00	0.00
Timetrend*Postcrisis Dummy	0.00	0.00	-0.01
(St. Error)	0.00	0.00	0.00
(P-Value)	0.28	0.55	0.00
Adj. R^2	0.84	0.83	0.51

1/ Specification in levels from 20Q rolling regressions.
Postcrisis dummy equals 1 for beta's estimated with a sample that includes at least 12 (out of 20) quarters in the post-crisis period (2008Q1 and after).

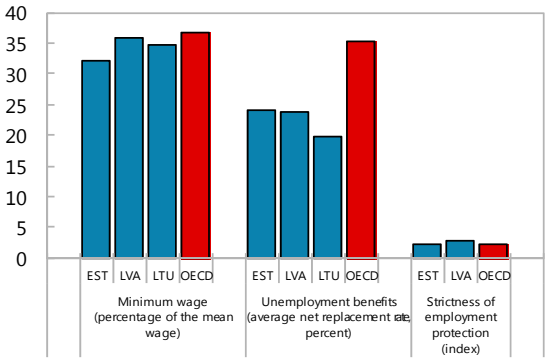
D. What Explains the High Level of Structural Unemployment?

11. This section examines possible explanations for high structural unemployment in the Baltics. Because the literature typically relates structural rigidities in the labor market to high structural unemployment, we first explore this traditional hypothesis by looking at labor market characteristics. We then explore some non-traditional factors that may further help explain high levels of structural unemployment in the Baltics.

Traditional Factors—Labor Market Characteristics

12. The Baltics score favorably on traditional indicators of labor market flexibility, implying these do not appear to explain high structural unemployment. Minimum wages do not appear excessive: expressed as a share of the mean wage, they are below or close to the average found in the OECD. Unemployment benefits are much less generous than in OECD countries on average, providing strong monetary incentives for the unemployed to seek work. Employment protection is also in line with the OECD average.

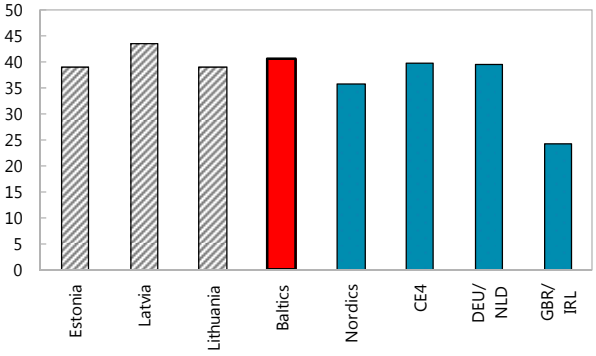
Indicators of Labor Markets' Micro-flexibility



Source: OECD Statistics.

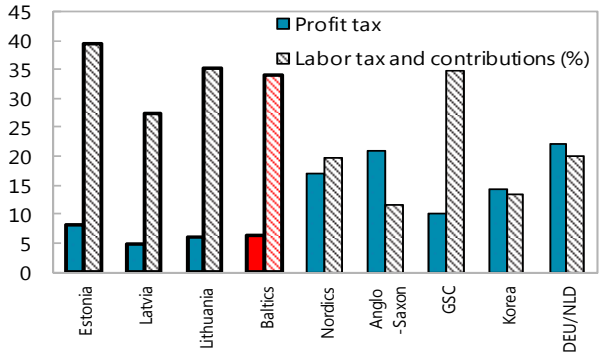
13. Yet, labor tax wedges are high in the Baltics largely because of high social security contribution rates. Economic theory suggests that high tax rates on labor income depress labor supply and employment, and expand the shadow economy. Specifically, the tax wedge—a measure of the difference between labor costs to the employer and the net take-home pay of the employee—should be one the main determinants of the level of structural unemployment, and reductions in the tax wedge are found to be associated with declines in structural unemployment in both cross-country and events studies (Box 4).

Tax Rate on Low Wage Earners: Tax Wedge on Labor Costs, 2012
(Percent)



Source: Eurostat.

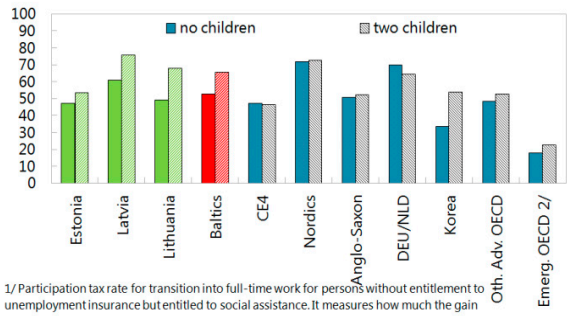
Taxation Rates
(Percent)



Source: World Bank Doing Business.

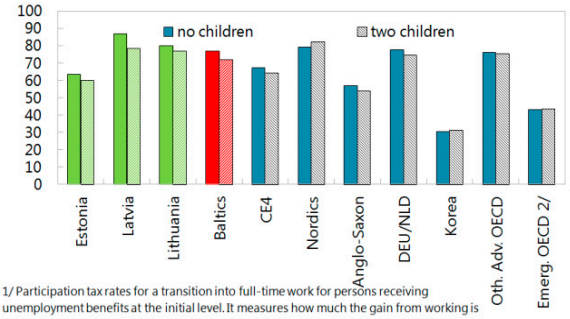
14. High tax wedges, in combination with benefit changes, may also lead to high unemployment and inactivity traps. High taxes on labor, when combined with the loss of certain social and/or unemployment benefits upon finding employment decrease the net financial gain of taking up employment. This reduces the incentive for participating in the labor market, especially for lower-wage earners. This leads to unemployment and inactivity traps in the Baltics that are generally higher than those in the CE4, Anglo-Saxon, or other emerging market OECD countries.

Inactivity Trap (wage earners at 50% of average wage) 1/
(Percent)



1/ Participation tax rate for transition into full-time work for persons without entitlement to unemployment insurance but entitled to social assistance. It measures how much the gain from working is reduced (or taxed away) after taking into account the loss of net income from higher labor taxes and reduced benefits.
2/ excl. Mexico.
Source: OECD.

Unemployment Trap (wage earners at 50% of average wage) 1/
(Percent)



1/ Participation tax rates for a transition into full-time work for persons receiving unemployment benefits at the initial level. It measures how much the gain from working is reduced (or taxed away) after taking into account the loss of net income from higher labor taxes and reduced benefits.
2/ excl. Mexico.
Source: OECD.

Box 4. Labor Taxation and Structural Unemployment: What the Literature Says and What It Implies for the Baltics

Economic theory suggests that high tax rates on labor income depress labor supply, employment, and expand the shadow economy. On the supply side, higher labor taxes depress labor supply and workers' effort by driving a wedge between marginal productivity and the reward for work. On the demand side, to the extent that wage earners succeed in shifting the tax burden onto employers, higher labor taxes raise labor costs which have adverse effects on employment. A high tax burden on labor creates an incentive to resort to the shadow economy that would result in lower tax revenue.

Recent econometric works find a strong and significant impact of labor taxation on the *level* of structural unemployment. Recent work has focused on the determinants of structural unemployment using cross-country data. The main finding of these studies is that the tax wedge—a measure of the difference between labor costs to the employer and the corresponding net take-home pay of the employee—is one the main determinants of the *level* of structural unemployment.

Table. Recent Cross-country Studies on the Determinants of Structural Unemployment

Studies	Coefficient of tax wedge	Sample	Period	Technique
Gianella et al. (2008)	[0.34 - 0.36]	OECD 19	1978-2002	Panel GMM
Orlandi (2012)	0.29	EU 13	1985-2009	Panel fixed effects
European Commission (2013)	[0.173 - 0.223]	EU 15	1985-2008	Panel fixed effects

The sensitivity of structural unemployment with respect to the tax wedge is found to be large, significant, and relatively stable across these studies. The point estimate associated with the tax wedge variable ranges from 0.17 to 0.36, depending on the studies. These results suggest that a reform on labor taxation in the Baltics which reduces the tax wedge by, for example, 10 percentage points would lead to a reduction in structural unemployment by 2 to 4 percentage points, all else equal.

We also confirm the role of the tax wedge in structural unemployment by setting up an event study. We have identified nine episodes of large declines in structural unemployment (a decline of at least 2.5 percentage points) based on the European Commission's time series estimates for structural unemployment (see Table and Figure below). We correlate these episodes with estimates of the tax wedge ratios (for the unskilled workers). In nearly all episodes identified, declines in structural unemployment are associated with significant reductions in the tax wedge. Latvia and Lithuania stand out as interesting special cases: In the two Baltics, recent large changes in the structural unemployment rate are not as large as those in other countries. Interestingly, the tax wedge did not significantly decline in these countries.

We find a strong and positive correlation between large declines in structural unemployment and corresponding changes to the tax wedge in our event study. The correlation coefficient from an OLS regression is 0.4 with an R^2 of 0.3, suggesting that reductions in the tax wedge explain about 30 percent of the variation in structural unemployment.

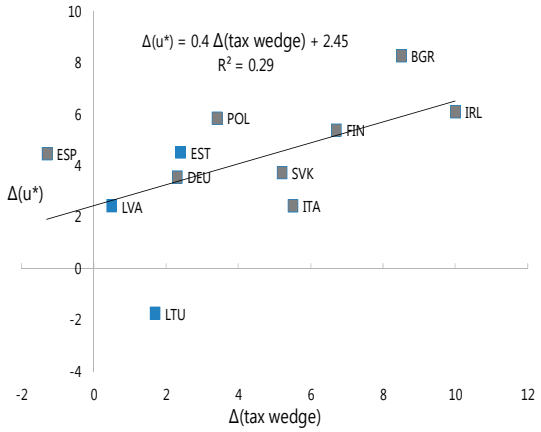
Box 4. Labor Taxation and Structural Unemployment: What the Literature Says and What It Implies for the Baltics (continued)

Table. Historically Large Declines in Structural Unemployment

Country	Period	Reduction in tax wedge	Reduction in structural unemployment
Bulgaria	2001-08	8.5	8.3
Finland	1996-2008	6.7	5.4
Germany	2005-13	2.3	3.6
Ireland	1996-2001	10	6.1
Italy	1996-2007	5.5	2.5
Poland	2002-08	3.4	5.9
Slovakia	2001-08	5.2	3.7
Spain	1996-2007	-1.3	4.5

Sources: Eurostat; AMECO database; and IMF staff estimates.

Figure - Correlation between sharp reductions (+) in structural unemployment Δ(u*) and corresponding declines (+) in tax wedge reductions Δ(tax wedge).
(in percentage points)

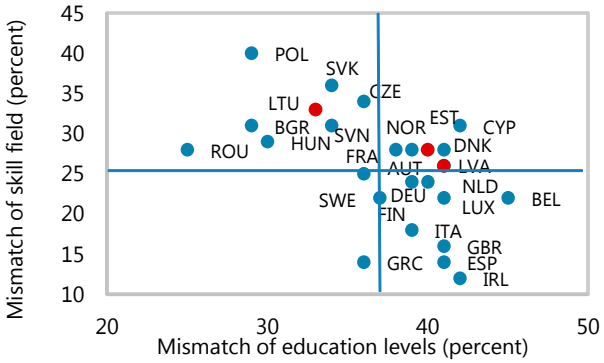


Sources: European Commission; IMF staff estimates.

Non-Traditional Factors—Are Skill Mismatches a Factor?

15. Skill mismatches appear important amid mixed education outcomes. The Baltics score close to OECD averages on PISA tests given to secondary school students, indicating that quality of current education is broadly satisfactory.[5] Tertiary enrollment rates are also in line with OECD averages (albeit male tertiary enrollment is low). Still, mismatches exist both in terms of the degree of educational attainment needed within a profession/sector and in terms of training in the right profession or sector. All three Baltics score worse than the average skill field mismatch. Skill mismatches and educational attainment also interplay with regional divides. For example in the case of Lithuania, rural unemployment—which is much above urban unemployment—consists mostly of people with below-tertiary education.

Skill Mismatches 1/



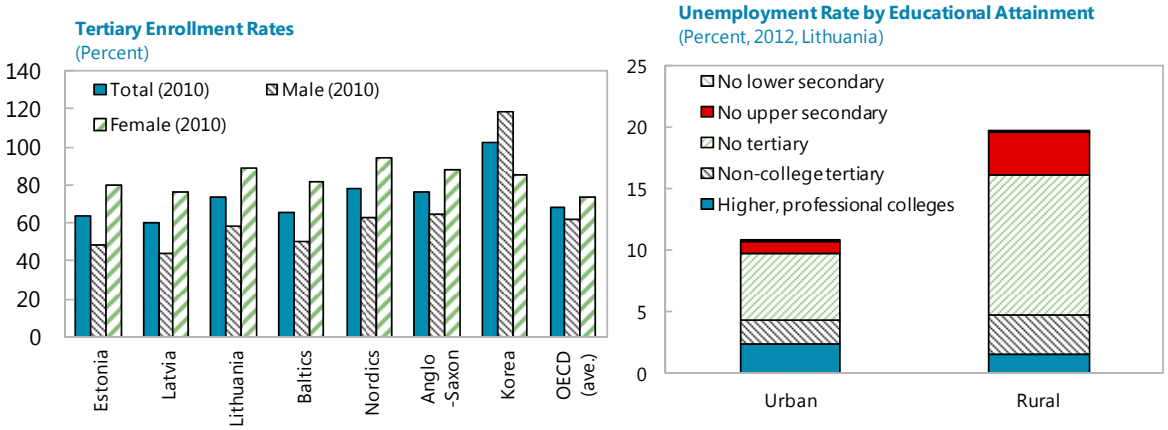
Sources: SEO Economic Research and Randstad (2012).

1/ Note: Each axis shows the share of workers facing that type of skill mismatches. Mismatch of education levels happens when the education level of a worker (e.g. high school) does not match the job requirements (e.g. university). Mismatch of skills field refers to cases where the worker's field of education (e.g. engineering) does not match the job requirements (e.g. medicine). Axes indicate sample

[5] There is variation among the Baltics with Lithuania lagging and Estonia outperforming the OECD average.

Table: PISA Scores

	Estonia	Latvia	Lithuania	Baltic (ave.)	OECD (ave.)
Math	521	491	479	497	494
of which:					
Low performers 1/	10.5	19.9	26.0	18.8	23.0
High performers 2/	14.6	8.0	8.1	10.2	12.6
Reading	516	489	477	494	496
Science	541	502	496	513	501
of which:					
Low performers 1/	5.0	12.4	16.1	11.2	17.8
High performers 2/	12.8	4.4	5.1	7.4	8.4
Girls	543	510	503	519	500

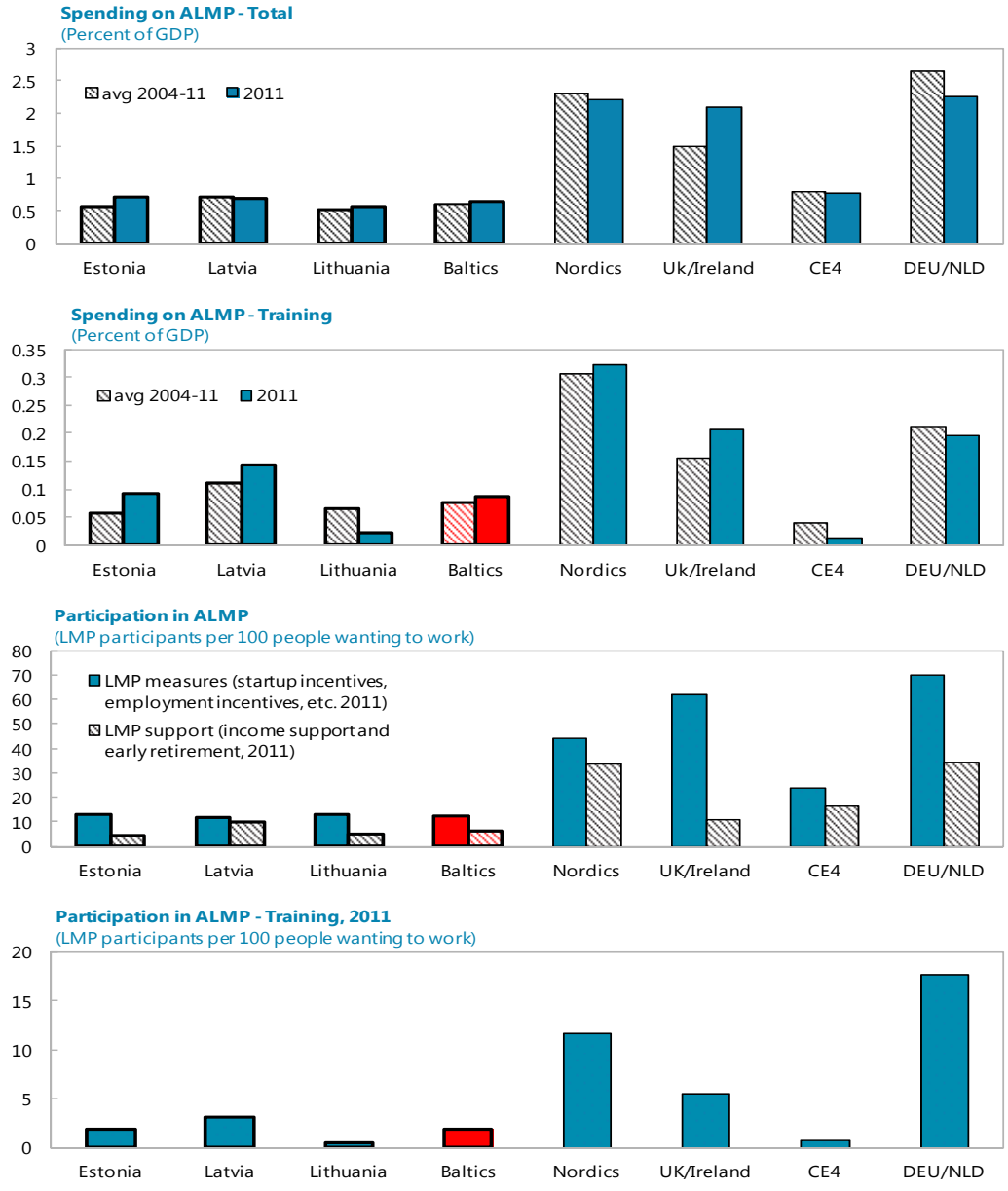


1/ Percent below proficiency level 2.
2/ Percent in proficiency level 5 and 6.

Sources: PISA Report 2012; World Development Indicators; Eurostat; and Lithuanian authorities.

16. Training and active labor market policies to address mismatches are not widespread (Figure 3). Spending on active labor market policies (ALMPs) amounted to 0.5 percent of GDP in the Baltics, compared with over 2 percent in the Nordics; unlike Ireland and Iceland where ALMP spending was ramped up to significant levels since the 2008/09 crisis (Box 5), ALMP spending in the Baltics did not increase dramatically or the increases was from a small base (e.g. in the case in Estonia). Only 0.1 percent of GDP was spent on ALMP training in the Baltics—less than half that in the Nordics. Moreover, "passive" labor market support programs, including out-of-work income support and in the case of Latvia and Lithuania also early retirement, account for a very significant share of total ALMP spending in the Baltics. Low spending is not the result of high efficiency of ALMPs in the Baltics, but rather reflects very low participation in these programs. Longer-term averages of unemployment (especially for youth) seem to show a negative correlation with spending on ALMPs, indicating their potential in addressing skill mismatches.

Figure 3. Baltic Countries: Active Labor Market Policies and Labor Market Supports



Source: Eurostat.

Box 5. Iceland: Active Labor Market Policies During the Crisis

During the 2008/09 crisis, Iceland implemented a number of ALMPs. With unemployment rising sharply following Iceland' banking and economic crisis, a number of measures were introduced to address high and rising unemployment. Measures initially focused on expanding registration for unemployment benefits and educating the public about available options. Gradually, other initiatives for active job seekers were introduced, including job retraining, subsidized hiring for trial periods, study programs, subsidized hiring, and volunteer work, opening secondary education to anyone under age 25, programs that emphasized work-related education, and greater cooperation between social partners and the education system.

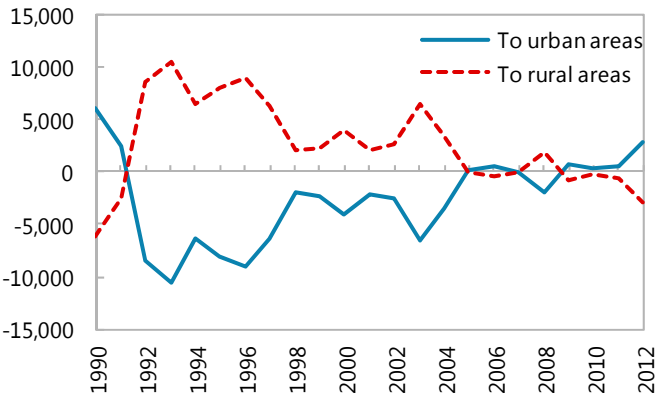
Iceland's experience demonstrates that ALMPs can be successful, even if they addressed mostly cyclical unemployment problems at the time. The wide scope of ALMPs and their gradually changing role over the course of the crisis helped to increase the number of participants in the programs. And while success rates vary, programs providing on-the-job training/apprenticeships or employment in specific projects seem to have increased chances of participants "de-listing" from the unemployment rolls. Available information suggests that about half of unemployed youth found jobs after participating in the programs.

Non-Traditional Factors—Migration

17. Finally, we look at the role of migration.

- **Internal migration**. In all three Baltic countries, urban populations have increased relative to rural ones. In the case of Lithuania, where rural unemployment rates exceed those in urban areas, it is possible that the better skilled have migrated out of rural areas (leaving the rural population with a lower skill mix), but migration out of rural areas has not seemed to have exacerbated rural unemployment since the crisis. However, in the case of Estonia, rural unemployment rates are below those in urban areas, even if internal migration also leads to net inflows into urban areas.

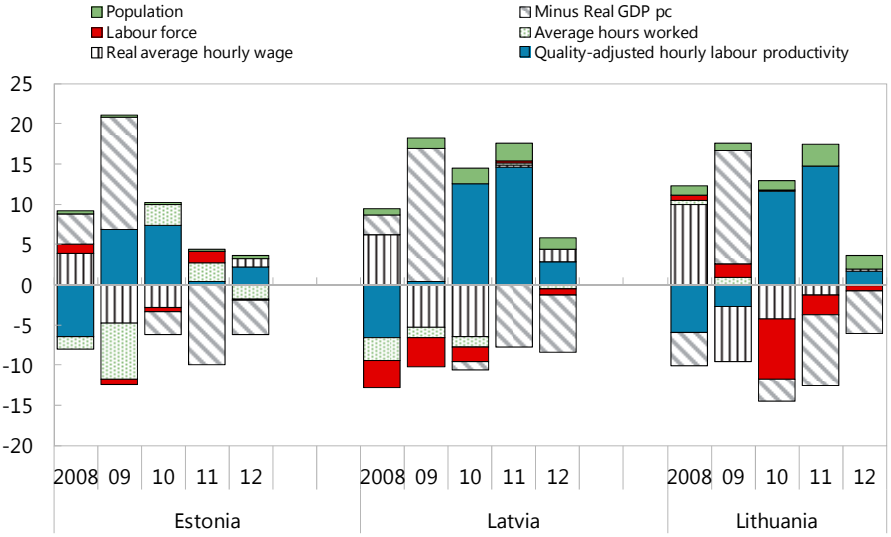
Net Inflows by Due to Internal Migration
(Persons)



Source: National authorities.

- **International migration**. The Baltic countries have also faced substantial emigration before and since the crisis. Migrants have been predominantly the young, with popular destinations being the UK and Ireland (for Latvia and Lithuania) and Finland (for Estonia). Much like internal migration to urban areas, migrants leaving the Baltics may have been those with the best skills and best equipped for finding jobs abroad. However, a decomposition of unemployment demonstrates that population change has contributed only a very small fraction in the total change in unemployment during the crisis (Box 6).

Canonic Decomposition of Annual Changes to Unemployment Rate in the Baltics
(Growth rates, in percent)



Sources: IMF staff estimates

Box 6. Decomposing the Changes in Unemployment Rates in the Baltics Since 2008

We provide an analytical framework to decompose the changes in the jobless rate. We follow and extend the methodology discussed in OECD (2012) by taking into account changes in total population. More formally, the decomposition of the unemployment rate can be approximated by the following formula:

$$\Delta\left(\frac{U}{LF}\right) \approx -\Delta ln\left(1-\frac{U}{LF}\right) = -\Delta ln\left(\frac{E}{LF}\right)$$

$$= -\Delta ln\left(\frac{Y}{N}\cdot\frac{EHW}{Y}\cdot\frac{EH}{EHW}\cdot\frac{E}{EH}\cdot\frac{1}{LF}\cdot\frac{N}{1}\right) = \Delta ln\left(\frac{1}{\left(\frac{Y}{N}\right)}\cdot\frac{Y}{EHW}\cdot\frac{EHW}{EH}\cdot\frac{EH}{E}\cdot\frac{LF}{1}\cdot\frac{1}{N}\right), \qquad [1]$$

where *U* refers to the number of persons unemployed, *LF* to the number of participants in the labor force, *E* to the number of persons employed, *H* to average hours worked, *W* to the hourly wage, *Y* to the real GDP and, *N* to the total population. From equation [1], changes to the unemployment rate arise from: *i)* the change in the real GDP per capita; *ii)* the change in the quality-adjusted labor productivity (simply measured as the ratio of output to the wage bill); *iii)* the change in average hourly wages; *iv)* the change in average hours worked; *v)* the change in labor force participation; and *vi)* the change in total population. Annual data spanning from 2008 to 2012 are used for each of the three countries of the region.

The decomposition confirms the prominent role played by real wages, hours worked, and real income in explaining the large movements in the unemployment rate.

- Unemployment accelerations were uniformly associated with sharp declines in per capita GDP, compressed real wages and to some extent with the drop in the number of hours worked (in Latvia and Estonia) suggesting that labor costs significantly adjusted downward during the crisis. The other factors (population and labor force participation) played a very limited role.
- The deceleration in the unemployment rates across countries was associated with recoveries in the per capita GDP and surprisingly by improvements in the quality-adjusted labor productivity (especially in Latvia and Lithuania). Wages and the number of hours worked were almost flat.

E. Policy Recommendations and Conclusions

18. This paper has found that high unemployment mainly reflects structural factors. Our analysis suggests that structural unemployment is in double digits and close to actual levels but also that it has not significantly worsened following the 2008/09 crisis. The underlying reasons for high structural unemployment seem to relate to high taxation of labor, residual shortcomings in the education system that cause skill mismatches, limited policy intervention to address skill mismatches through ALMPs, and specific rigidities in rural areas that prevent growth to translate into more jobs.

19. While some of these reasons are better understood than others, a number of policy recommendations emerge:

- **Reconsider labor taxation.** Cross-country experience suggests that reductions in the tax wedge can be associated with declines in structural unemployment. At the same time, revenue to GDP ratios in the Baltic countries are already low, suggesting that reductions in labor taxation need to be carefully considered and offset with other sources of revenue. Options include increasing taxation on capital and wealth, base broadening, and improvements in revenue administration. In all cases, changes to the tax system would need to be complemented with improvements in revenue administration to ensure that revenue shortfalls do not materialize. And adjustments in tax rates could be considered in a coordinated manner.
- **Improve education outcomes.** As small economies at the fringes of Europe, the Baltics may need to exceed educational outcomes in other countries in order to attract FDI and other investments. Estonia is already well on the way to achieve this, but there is scope to improve educational outcomes in Latvia and Lithuania. Specific policies could include better coordination between universities are employers to help reduce education and skill mismatches.
- **Increase spending and participation in ALMPs.** There is ample scope to utilize ALMPs to help reduce skill mismatches, especially among the unemployed. Given the Baltic countries tight links with their Nordics, and the Nordics effective use of ALMPs, a policy dialogue which seeks to draw lessons from the Nordic experience could help inform policy choices by the Baltic authorities. Available EU funds could support stronger ALMPs.
- **Enhance the policy dialogue.** Policy fora on tackling high unemployment could provide a venue for Baltic policymakers to draw on each other's experiences. These fora could be expanded to include their Nordic partners in areas where there is a long tradition of relative success, such as in education and training policies.
- **Review incentives for high rural unemployment, in the case it exceeds urban unemployment by a significant margin.** While a more thorough analysis may be needed, tax incentives for those engaged in agricultural activity, high informality in rural areas, and benefit incentives, may be behind the high number or rural unemployed. Policy to address these issues in turn and in tandem, combined with ALMPs could help reduce rural

unemployment. To the extent regional mobility is a factor (along with the cost of living in urban areas), spending on regional infrastructure to connect urban and rural areas may be needed.

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