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LENDING GAINS AND FUNDING RISK IN BALTIC HOUSING MARKETS

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Abstract

This paper analyzes lending gains and funding risk in the Baltic housing markets. Transition economies are exposed to both cycles and structural shifts, relating housing market fundamentals to a more diversified set of processes than in mature economies. Still, as housing is a non-tradable good, transition allows for high rates of appreciation. When house price growth exceeds the mortgage rate, there are lending gains from mortgage-financed housing. As higher leverage increases funding risk, a challenge emerges for transition economies, which are in a monetary union with mature economies. Asymmetric shocks to housing markets may threaten financial stability as the monetary policy does not respond to country-specific house price bubbles. In addition to a discussion on asymmetric shocks and the role of housing, the paper offers an illustration of the lending gain and the funding risk that housing markets in transition economies may entail. The paper simulates the return to housing equity across the Baltic states over the period 2010-2020. While a strong housing market has provided Estonian households with the highest price gains, both Latvian and Lithuanian households have taken advantage of the deepening monetary integration towards the end of the period. Still, the more volatile housing markets in the two southernmost Baltic states make leverage set its mark on the risk-return profile.

Keywords: Baltics, Housing Market, Transition, Lending Gain, Funding Risk

JEL Classifications: R21, R31, F45

1. Introduction

Since the turn of the century, the Baltic states have been through a rough ride. While a substantial boom characterized the period before the crisis[1], the following bust was dramatic (Hilmarsson, 2019). Staehr (2013) argued that the Baltic states are the countries hardest hit by the United States sub-prime crisis.

During the period before the crisis a credit-driven domestic demand boom dominated, while the recovery has been argued as credit-less (IMF, 2014; Abiad *et al.* 2014). Housing

[1] See Reiner (2010) for a discussion.

markets are closely related to credit markets, and the boom-bust cycle of the Baltic housing market was significant during this period. In transition economies, economic growth goes alongside structural shifts. These shifts represent a challenge when assessing fundamental house prices and, ultimately, trying to detect house price bubbles. In addition to demand-side-driven changes in the relative price between tradable and non-tradable goods, as described by the Balassa-Samuelson effect, housing markets in transition economies are characterized by structural shifts residing on the supply side of the market as modern apartments are built alongside older Soviet-type apartments with different functionality and quality (Hegedus *et al.* 1996).

Still, house prices increased faster in the Baltic states compared to the Economic and Monetary Union (EMU) average during the start of the century. Of course, the question arises whether and to what degree the Balassa-Samuelson effect has been a contributing factor. After all, it has been documented (Mihaljek and Klau, 2008) that structural changes are not to be ignored in Central and Eastern Europe and that structural factors augment cyclical factors in producing inflation above the EMU average. In addition, the Baltic states took advantage of deepening monetary integration and lower mortgage rates.

The impact of changes in the mortgage rate on housing markets and housing market stability is often assessed considering the relation between the mortgage rate and the debt-sustainability of households (see Barba and Pivetti (2009)) for households' debt to income ratio and Drehman and Juselius (2012) for debt servicing ability assessments). Analyzing Norwegian housing markets, Borgersen and Greibrokk (2012) divide the return to housing equity (RHE) between a price gain and a lending gain[2]. When the rate of appreciation exceeds the mortgage rate, the funding structure adds to RHE for mortgage-financed housing compared to equity financing. Conventionally, external funding also brings additional risk to the housing market[3]. In transition economies, where cyclical factors accompany structural shifts, the incentives might be stronger than in mature economies. Consequently, also risk might be significantly higher.

This paper contributes to the literature on Baltic housing markets in two distinct – but not unrelated - ways. First, it offers a discussion of asymmetric shocks and monetary integration from a housing market context. For a transition economy that is part of a monetary union dominated by mature economies and where monetary policy is not "leaning against the wind," financial imbalances may develop. The discussion centers on the implications of not "leaning against the wind" for housing markets hit by a combination of asymmetric shocks from monetary integration and a reduction in mortgage rates while simultaneously being exposed to a combination of cyclical factors and structural shifts on the real side of the economy. Second, focusing on the period between 2010 and 2020, the paper simulates the lending gain and funding risk across the Baltics. The lending gain consequences for the return to housing equity - and for the incentives that develop when central banks are not leaning against the wind – are shown in a stylized framework. While stylized and straightforward, the lending gains and the funding risk that emerge as households face incentives to increase leverage show how imbalances might build across housing markets in transition economies.

The paper is structured as follows: The next section sets out some reflections on Baltic housing and mortgage markets. The third section offers some aspects of monetary policy, the "leaning against the wind" argument, and asymmetric shocks framed in the housing market. The fourth section presents a simple model for lending gains from mortgage-financed housing. The fifth section presents simulations on the return to housing equity in Baltic housing markets. The last section discusses the main aspects and concludes.

[2] The lending gain may alternatively be referred to as a leverage gain. The two terms are used interchangeably

[3] See for instance, Harris and Raviv (1991) for a conventional approach to the funding structure approach.

2. Baltic economy, housing, and mortgage markets

The Baltic states experienced high economic growth throughout the 1990s after overcoming the transformational recession, only set back by the Russian economic crisis in 1998. During the eight years from 1998, the Baltics averaged economic growth rates of about 8 percent (Staehr, 2013) and earned the name "the Baltic Tigers". Favorable international financing conditions allowed the Baltics, especially Latvia, to run significant current account deficits prior to the financial crisis. The international savings glut and the entry of the Nordic banks into the Baltic states contributed to the supply side, while increased optimism in households' future income increased the demand for credit. The Baltic states were in a vulnerable position when the international financial crisis erupted in 2008.

Credit growth and capital inflows (as a share of GDP) to the Baltics exceeded those to most other Central Eastern European (CEE) countries and, reflecting the role of parent bank funding, led to a sharp rise in loan-to-deposit ratios (Purfield and Rosenberg, 2010). Another important characteristic was that many of these banks were exposed to a large share of unhedged borrowers, with income in domestic currency and loans in foreign currency (Grønn and Fredholm (2013)). The crisis hit the Baltic states hard, and the impact on the region's housing markets was no exception. In fact, as nominal house price developments show, housing maybe was the sector hit hardest. Figure 1 illustrates house prices in the Baltic states between 2006 and 2020.

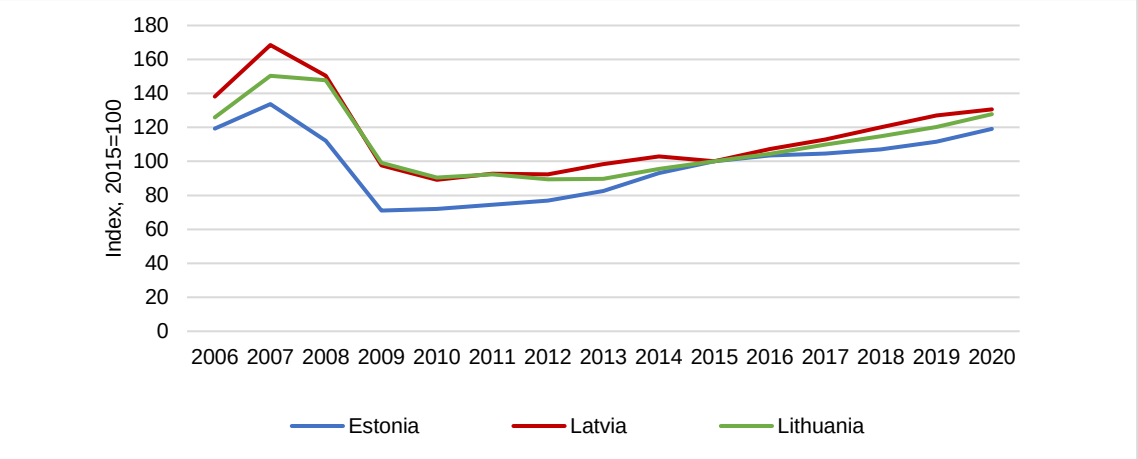


Figure 1. Nominal house price indices in the Baltics, 2006-2020
Source: OECD

A credit-fueled domestic demand boom prior to the crisis was accompanied by a credit-less recovery (IMF, 2014; Abiad *et al.* 2014). Despite a strong turnaround beginning in 2010, credit growth did not bounce back, and as late as 2014, the IMF raised concerns that the dormant credit market curtailed the recovery. Historically, a credit-less recovery is not uncommon due to either excess capacity or tighter lending standards (see Adrian *et al.* (2014)). Both supply and demand factors seem to be at play across the Baltics, but to different degrees in different countries (IMF, 2014).

IMF (2014) suggests that the Baltics' credit expansion during the boom was demand-side driven, but the contraction during the recession was mainly related to worsening bank asset quality. An extended period of deleveraging was necessary to repair balance sheets after the crisis, as the financial sector of the Baltics is heavily bank-based. The foreign domination of banking made the banking sector reliant on funding from parent banks. IMF (2014) states that a credit-less recovery is generally weaker and follows after a deeper recession than normal recovery. Compared to emerging markets – and the Nordic area –, the Baltics experienced a more extreme credit cycle. The banking crisis in Latvia might have contributed to weaker credit market developments in Latvia than in Estonia and Lithuania. Naturally, credit markets impact

housing markets, both during a credit-fueled boom prior to the crisis and in the case of a credit-less recovery.

Snieska *et al.* (2011) analyze housing markets in transition economies and focus on the "peculiarities" in transition economies that are important for housing markets. The highlighted topics range from the role of the initial excess labor productivity, the role of skilled and unskilled labor migration for house prices, and the role of developing a legal base for private homeownership to the need for a fiscal system for the administration of the tax base. As mentioned earlier, the role of mortgage markets in entering homeownership is also pointed out. The transition from a command economy to a market economy may raise the cost of housing significantly, putting the financial sector reform at the forefront of how the transition affects housing markets. Issues related to the supply side are also considered crucial, as bureaucratic inefficiencies hamper the redistribution of property, creating a supply deficit that contributes to house price growth. The Mustil (1995) argument of a more inelastic supply curve in transition economies is closely related to this.

Other "peculiarities" are also relevant. One specific feature of the Baltic housing market is the high share of owner-occupied housing without a link to the mortgage market, often referred to as "outright ownership". In 2019 in Estonia, 59.9% of households owned their home outright. The numbers were 68.7% for Latvia and 81.2% for Lithuania (OECD, 2019). The OECD average for 2019 is 43.1%, and the EU average is 51.7%. The share of owner-occupied housing with mortgages in 2019 is correspondingly low in the Baltic states: 17% in Estonia, 9% in Latvia, and 9% in Lithuania. This is to be seen against the backdrop of 25% OECD average and 20% EU average.

Still, mortgage markets are important for Baltic housing markets. Henilane (2016) describes mortgage lending practices while focusing on the Latvian housing market, and Gaspariene *et al.* (2016), analyzing Lithuanian housing markets, highlight the importance of interest rates and mortgage availability for housing prices. Hilmarsson (2013, 2019) analyzes the Baltic housing markets in a comprehensive framework, taking macroeconomics and social aspects into account, including the role of the financial sector.

By addressing the housing market in the Baltics more specifically, Binovska *et al.* (2018) analyze real estate markets to find influencing factors and provide a common structure for market analysis. In another study, Kulikauskas (2016) estimates long-run fundamental house prices across the three capitals without addressing the aspect relating to structural shifts. In transition economies, cyclical factors go alongside structural shifts[4]. Whether or not prices are driven by equilibrium phenomena or departure from equilibrium are important nuances. In transition economies, where structural shifts are important and might contribute to house price shocks, assessments of how structural shifts might impact housing markets should be accounted for. Attempts to answer this question are likely to invoke the Balassa-Samuelson effect. For many countries, it has been observed that non-traded goods' prices increase faster than those of internationally traded goods (Kravis and Lipsey, 1988). Differences in productivity growth between producing tradables and non-tradables lie at the bottom of this phenomenon, according to the

[4] The report on housing and commercial real estate by Ober-Haus (2021) adds to the understanding of nuances in recent housing market developments across the Baltics. While Riga experienced an 11 percent increase in construction in 2020, a supply-side development that contributed to keeping price growth low, Tallinn saw a reduction in rental prices at about 10 percent in the same year as the reduced demand for Airbnb apartments and the lower number of international students in Tallinn due to Covid, returned apartments to the long-run rental market. Even so, in January 2021, the value of signed housing loan contracts increased by 24 percent compared to January 2020. Banks' loan portfolios are reported to have increased by 7 percent over the same period. Banks' low-interest rates and reduced interest rate margins have stimulated mortgage, including high LTV-ratio mortgages. The positive sentiment in mortgage markets in Estonia also seems to be present in Lithuania, as Ober-Haus reports a record high loan portfolio in Lithuania by the end of 2020. Built-up supply has helped to keep prices rather stable, despite strong demand fueled by a larger population and rising household income. For Latvia, Ober-Haus highlights the role of the shadow economy, and the problem of a transparent and documentable income for the part of the society, restricting the availability of mortgage funding.

Balassa-Samuelson model. The tradable goods sector is modeled to have a higher productivity growth than the non-tradable sector, and the latter has faster-rising prices. The Balassa-Samuelson model predicts that the tradable and non-tradable price difference is higher for relatively poor (transition) countries and lower for relatively rich (Western European) countries (Heston *et al.* 1994), leading to a higher Balassa-Samuelson effect in transition countries compared to mature market economies. With housing being a non-tradable good, the faster housing price rises in the Baltic states conform to this theory. Convergence to Western European countries should eventually lessen the impact of price differences.

For example, Mihaljek and Klau (2008) show that in their study of eleven countries of Central and Eastern Europe, including the three Baltic states from the mid-1990s to 2008 (first quarter), the Balassa-Samuelson (B-S) effect was strong. The B-S effect could explain 25% of the difference in inflation between the new EU member states and the Eurozone and 50% of the difference in domestic relative prices between non-tradable and tradable goods. Keeping in mind that housing is a non-tradable good, this finding is relevant to the Baltic housing market. Egert and Mihaljek (2007) and Egert and Podpiera (2008), on the other hand, find that the B-S effect is a relatively insignificant driver of price dynamics in Central and Eastern Europe, where consequently, the effect on house prices would be more modest.

3. Monetary policy, mortgage, and housing markets

The literature on macroprudential policy and the discussion on whether or not monetary policy should target asset inflation is extensive[5]. The Woodford (2012) argument that monetary policy should target other objectives than inflation and output gap when there is a risk of financial imbalances building, and Eichengreen *et al.* (2011) arguing that macroprudential tools are better for ensuring financial stability may be seen as illustrations of the two stands.

For a small transition economy in a monetary union exposed to asymmetric housing market shocks, the problem is not only that monetary policy does not take asset inflation into account but also that monetary policy will not respond to regional or national house price bubbles in a small transition economy. The asymmetric shock argument in the optimal currency area debate is well established (De Grauwe, 2000; Lane, 2000).

In a transition economy where economic growth goes alongside structural shifts, market prices may be a combination of cyclical and structural effects. These two effects can be separated as in the following Equation (1).

$$P = P^{Cyclic} + P^{Structural} \quad (1)$$

The more complicated the price formation in housing markets, the more complicated the assessments relating house prices to fundamental values. The changes in relative prices are both core drivers of and, in part, consequences of transition. They may impact household income, construction cost, and the relative cost of different forms of tenure both in the short and long run. Assessing fundamental house price values is hence not straightforward[6].

Borgersen and King (2011), analyzing structural inflation in Latvia, argue that structural inflation is higher when the share of the non-tradable sector is larger and that structural inflation is context specific. The particular role of housing and the structural shift in the housing market that transition entails, where modern, high-quality flats substitute old Soviet-type apartments, might add a supply side twist to the more conventional demand-side components of structural

[5] See, e.g., Borio and Lowe (2002), Taylor (2007, 2009) or the more recent contributions by Svensson (2017) and Walsh (2017) as well as Arena *et al.* (2020).

[6] An *et al.* (2021) analyze house price determinants in a transition economy, focusing on the case of Kazakhstan. Analyzing a boom-and-bust period, the paper finds prices moving together closely across regions and argues for a linked housing market system where wealth effects are felt throughout the urban economy. Posedel and Vizek (2009) analyze housing in a number of transition economies, while Ionascu (2017) analyzes housing markets in the CEE area before, during, and after the transition.

inflation in housing markets. Considering demand-side and supply-side effects together, house price growth in a transition economy may exceed house price growth in mature economies.

In addition to structural factors impacting house price growth, housing markets are affected by the lower mortgage rates produced by monetary integration. In fact, the combination of high(er) house price growth and lower mortgage rates creates incentives for higher leverage across Baltic housing markets. Conventionally, when able to borrow at a rate lower than the return on the asset one invests, there is a potential lending gain from housing investments in the short run. A house price growth rate that exceeds the mortgage rate incentivizes households to increase mortgage-financed housing investments. Increased use of external funding lifts funding risk, which ultimately will feed back into housing market risk.

Calculating the RHE for Norwegian households, Borgersen and Greibrokk (2012) find a substantial lending gain that adds to the price gain when estimating the RHE. In transition economies, where structural shifts add to the price gains of mature economies, lending gains might be even more pronounced. Larger lending gains in the short run might naturally have implications for funding risk and housing market risk[7].

While not so common when analyzing housing investments, the funding structure approach is more common when analyzing commercial real estate and other business investments. Different papers highlight aspects such as the impact of tax policy on interest and dividends, stock prices and interest rates, the level of business activity, risk attitude, optimal operational control, and future flexibility (Flannery et al (2006); Delcoure, (2007). An optimal capital structure minimizes the cost of capital and maximizes return or firm value analog to a household maximizing the return to housing equity on their housing investments.

When lending gains are present, incentives exist to change one's funding structure of housing investments in favor of the loan-to-value (LTV) ratio. In the years before the subprime crisis in the United States, a tendency for higher LTV-ratios among households developed. While LTV-ratios rose, one also saw variations, and while Calza *et al.* (2013) find variation across Europe, Amior and Halkiet (2014) see variation across US cities. There has also been a tendency for higher LTV-ratios across the Baltics. In terms of maximum LTV-ratios, i.e., the most substantial mortgage loan that a household can obtain relative to the valuation of the owned asset, the situation in the Baltic states is as follows: Estonia 1.0 before and after the financial crisis; Latvia 0.9 before the financial crisis and 0.8 after the financial crisis; and Lithuania 0.95 before the financial crisis and 0.85 after the financial crisis (Zidonyte, 2015)[8].

4. Excess return to housing and incentives for higher LTV-ratios

Analyzing the return to housing investments, Borgersen and Greibrokk (2012) take the funding structure of housing investments into account by using a framework conventional for analyzing commercial real estate but rather novel for housing. The study, highlighting the short-term nature of the reasoning, separates the return to housing equity (RHE) between a price gain and a leverage gain. The RHE before taxes is given (Borgersen and Greibrokk, 2012) in Equation (2).

$$e = p + \frac{D}{E}(p - r_B) \tag{2}$$

, where "e" is the return to home equity, "p" is the house price growth, "r_B" is the borrowing rate, "D" is the debt, and "E" is the equity, making the ratio D/E equal to the mortgage-to-equity ratio.

[7] Several papers address different aspects of Baltic housing markets in a more 'partial' way. Kulikauskas (2017) estimates user costs across the Baltics, a crucial component in equilibrium assessments of rental and owner-occupied housing markets. Aus *et al.* (2015) focus on the Estonian housing market cycle, while Cuestas and Kukk (2020) analyze the mutual dependence between house prices and housing credit in Estonia, finding asymmetric relations between house prices and credit supply. Balode and Kamols (2019) provide an interesting analysis of the Latvian rental market. In another study, Tupenaite *et al.* (2017) offer a case study of Lithuanian housing market fluctuations.

[8] The period "before the financial crisis" refers to 2006-2009, and "after the financial crisis" refers to 2010-2014.

The price gain equals house price growth. Expression 2 shows how RHE exceeds the price gain in the presence of mortgage-financed housing (D/E>0) when there is excess return to mortgage-financed housing – defined as $(p - r_B) > 0$ in Equation (2). The latter term represents a leverage gain (lending gain) for mortgage-financed housing, which is positively related both to the debt-to-equity ratio (D/E) and the excess return to mortgage-financed housing.

When the excess return to mortgage-financed housing is positive, a higher debt-to-equity ratio increases the RHE, which again provides incentives for households to change the funding structure of their housing investments and increase the LTV-ratio. Such incentives might be particularly strong when the investment motive dominates housing demand.

From a supply-side perspective, Goodhart and Hoffman (2008) argue that higher LTV-ratios might be used to fulfill nominal return targets in a low-interest rate environment. As a higher LTV-ratio increases a mortgagor's RHE and allows her to build equity faster, it also reduces the partial risk in a mortgage portfolio. It might be beneficial for a mortgagor to allow for higher LTV-ratios among its mortgage applicants in the short run. In the long run, higher leverage increases risk, but when regulation or the market discipline is weak, short-termism might prevail.[9]

Using the house price statistics of Eurostat and a comparable interest rate across the three Baltic states over the period 2010-2020 given by the IMF (harmonized euro area rates loans to households for house purchase over a 5-year horizon), this section simulates the price gain and the leverage gain (before taxes) across the three Baltic housing markets. The price gain is equal to the annual house price growth, while the lending gain (leverage gain) is derived from the second term of Equation (2) using a 45 percent LTV-ratio. We begin with Figure 2, showing house price growth in the Baltic states.

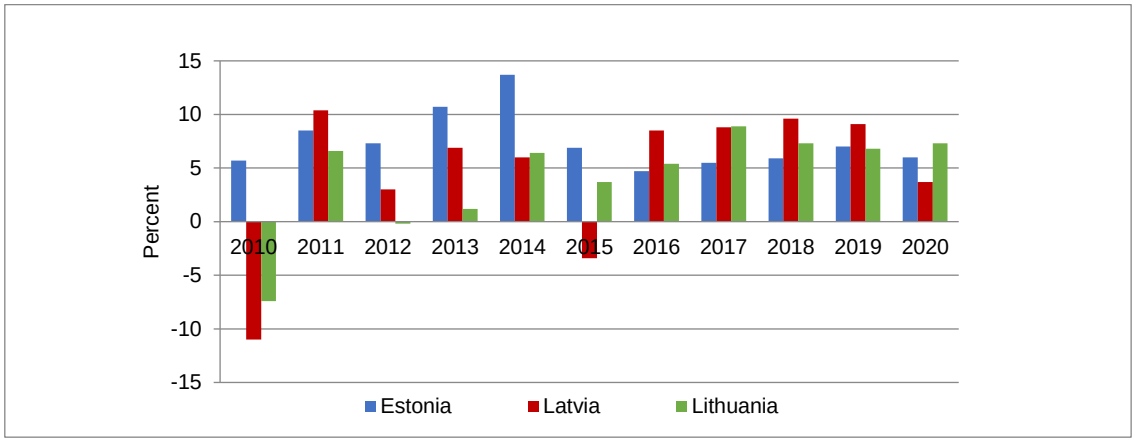


Figure 2. Annual house price growth in the Baltic states, 2010-2020
Source: Eurostat

Figure 2 shows how annual house price growth in Latvia was negative both in 2010 and 2015 and how house price growth almost reached double digits in the years from 2016 until COVID-19 hit the economy in 2020. In Estonia, house price growth peaked in 2014 and has since shown growth rates between 4 percent and 7 percent. Lithuania had seen a relatively stable house price growth, except in 2010, when house price growth was negative (as in Latvia). Annual

[9] When simulating the role of the funding structure in the Norwegian housing market over the period 2001-2010, Borgersen and Greibrokk (2012) found a leverage gain to supplement the price gain in the RHE for mortgage-financed housing investments. The Norwegian mortgage market was characterized by structural shifts in favor of higher LTV-ratios, increased maturity, and higher use of interest-only mortgages at the same time as the simulations found the leverage gain to peak in 2005-2006, indicating that Norwegian households took advantage of the stronger incentives to borrow that prevailed. Ultimately, the changes in the funding structure of housing investments lead to implementing of a number of macroprudential policies, among others such as LTV-caps and restrictions on debt-to-income ratios.

house price growth rates indicate that the Estonian housing market is the most stable of the Baltic markets, while the Latvian is characterized by the strongest boom-bust cycles. Figure 3 shows the excess return to mortgage-financed housing.

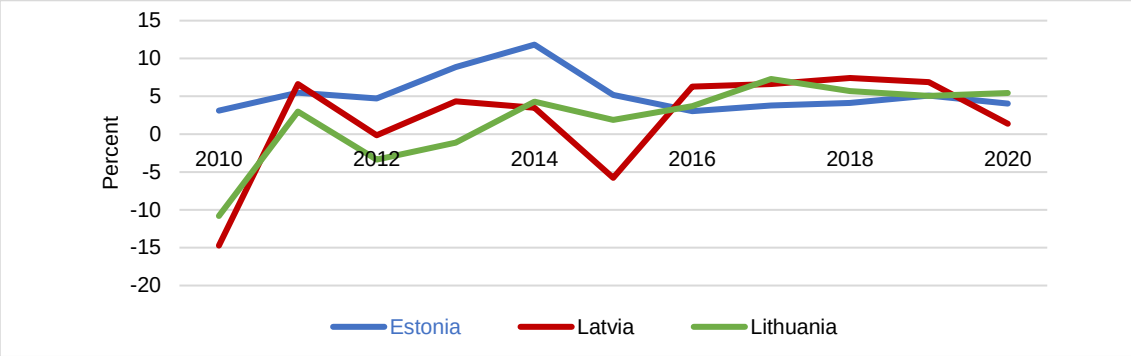


Figure 3. The excess return to mortgage-financed housing in the Baltics, 2010-2020
Source: Authors' own calculations

From Equation (2), we know how annual house price growth equals the price gain. On the other hand, the leverage gain takes both the funding structure of housing investments and the excess return to mortgage-financed housing into account, where the latter is shown in Figure 3. It shows how the Estonian housing market has the highest excess return to mortgage-financed housing across the Baltics. During the latter part of the period, the excess return improved in the Lithuanian market, while the volatile Latvian housing market made its excess return rather unstable. As the monetary integration deepened across the Baltics and the two southernmost economies in the Baltics were allowed to take advantage of low and stable interest rates, both Latvia and Lithuania have seen their excess return to mortgage-financed housing increase.

Figure 4 shows the lending gain across the Baltics, in other words, the difference between annual house price growth and the mortgage rate between 2010 and 2020. Some general characteristics seem to stand out. First, while the Estonian housing market seems to be the most stable in the Baltics over this period, the leverage gain has been substantial for the last part of the period in both Latvia and Lithuania as the two countries benefit from deepened monetary integration. Second, while the leverage gain cycle relates to the price gain cycle, the leverage gain in the Latvian experience is almost double that of the other two economies, showing the relevance of the interest rate and the extent monetary policy targets asset inflation.

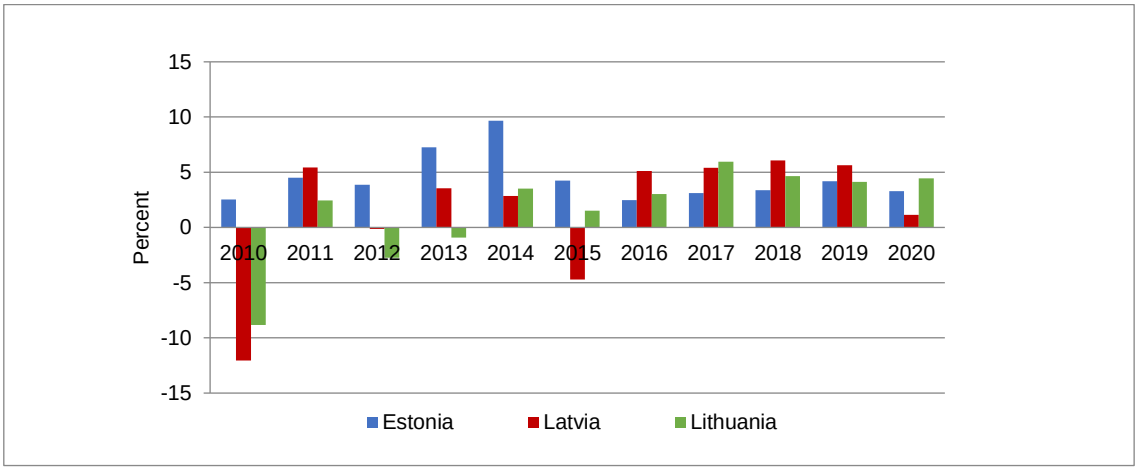


Figure 4. Lending gains in the Baltic states, 2010-2020 (LTV= 45%)
Source: Eurostat, IMF, and authors' own calculations

5. Country specific assessments

Looking at the three countries individually, we see the Estonian RHE peaking in 2014, while the RHE in the latter half of the period is approximately at 10 percent. In this latter half of the period, the price gain is stable at about 5 percent, while the leverage gain from the Estonian housing market is somewhat lower than the price gain throughout the period. The 2014 peak in the Estonian house price growth is the key driver for the 2014 RHE peak, as shown in Figure 5.

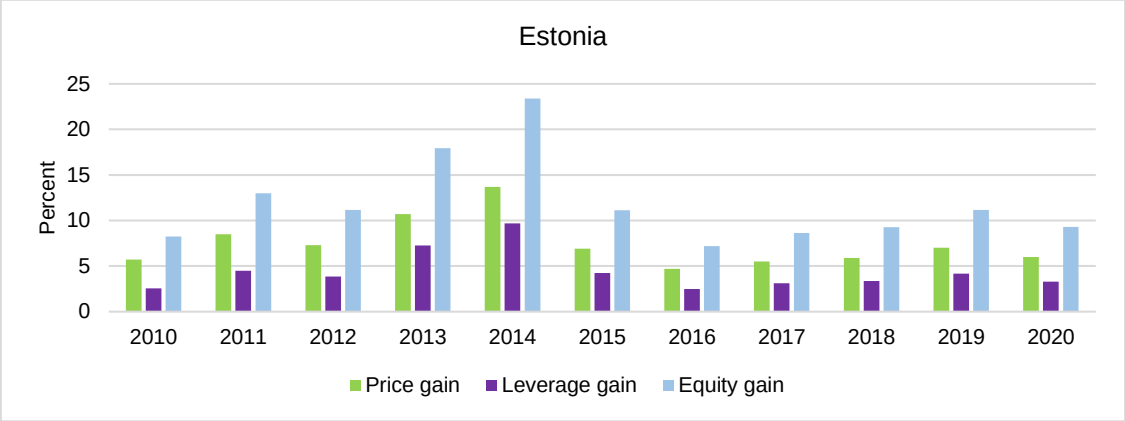


Figure 5. Gains from mortgage-financed housing in Estonia, 2010-2020 (LTV= 45%)
Source: Eurostat, IMF, and authors' own calculations

Moving south to Latvia, we see a negative RHE both in 2010 and 2015, but until the COVID-19 effect hit the Latvian economy in 2020, RHE exceeded 15% since 2016. The higher RHE from mortgage-financed housing in Latvia than in Estonia during the latter part of the period is driven by both a higher house price gain and a higher leverage gain. The RHE is also more volatile in Latvia than in Estonia, a feature related to the more volatile Latvian housing market, as seen in Figure 6.

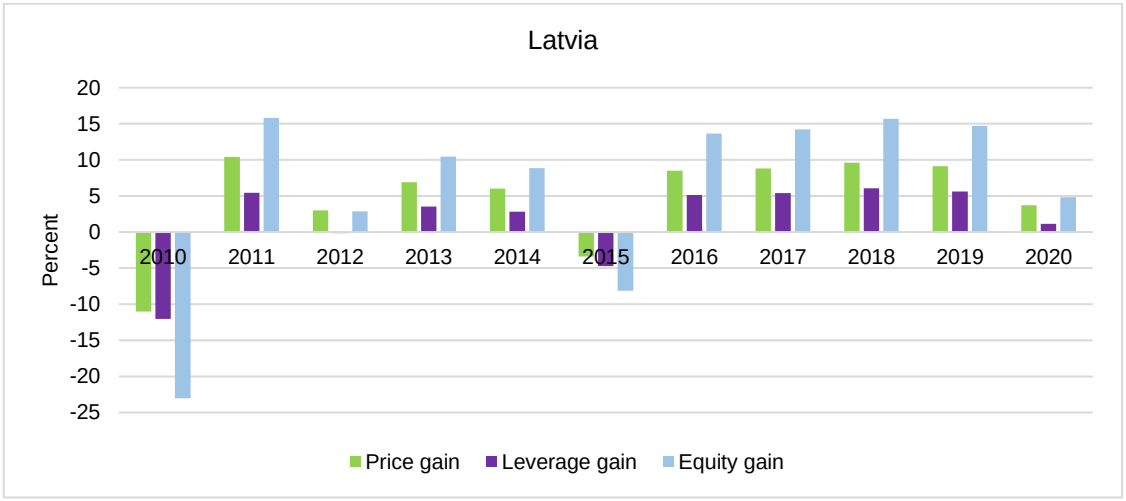


Figure 6. Gains from mortgage-financed housing in Latvia, 2010-2020 (LTV= 45%)
Source: Eurostat, IMF, and authors' own calculations

Also, in Lithuania, the RHE from mortgage-financed housing was negative in 2010, while it was close to zero in 2012 and 2013. Since 2014 the RHE has been relatively stable, and the price gain has exceeded the leverage gain. This can be seen in Figure 7.

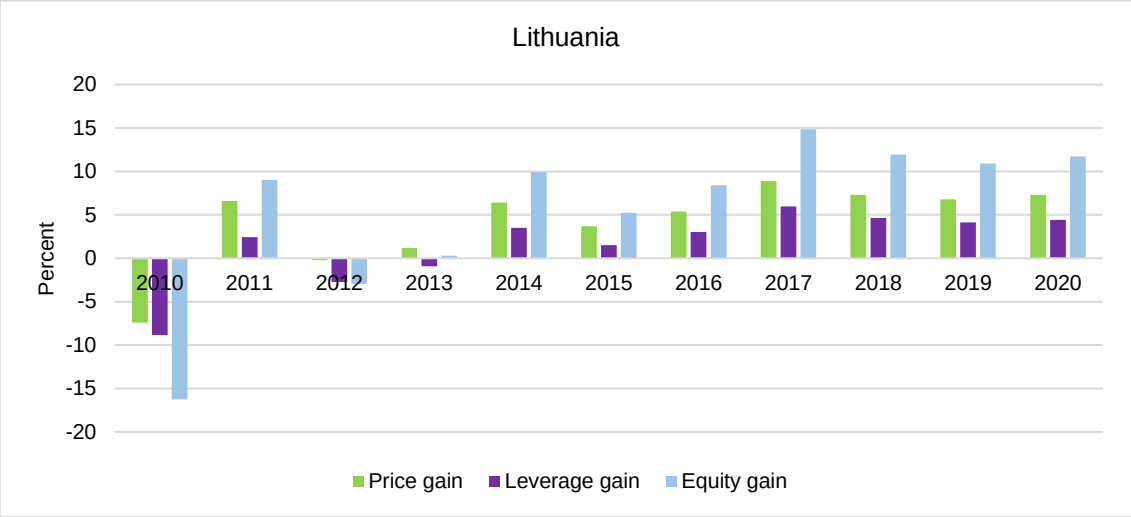
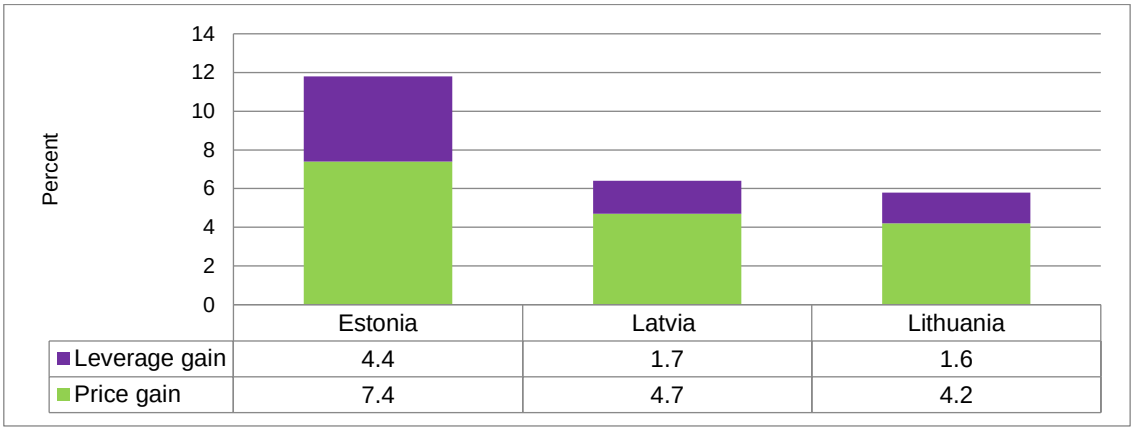


Figure 7. Gains from mortgage-financed housing in Lithuania, 2010-2020 (LTV= 45%)
Source: Eurostat, IMF, and authors' own calculations

Throughout the period 2010-2020, the mean RHE is highest in Estonia (11.9%) in terms of annual equity gain, while it is lowest in Lithuania (5.8%). The mean price gain in Lithuania (4.2%) is close to that of Latvia (4.7%). Figure 8 illustrates the shares in RHE.



	Estonia	Latvia	Lithuania
Leverage gain	4.4	1.7	1.6
Price gain	7.4	4.7	4.2

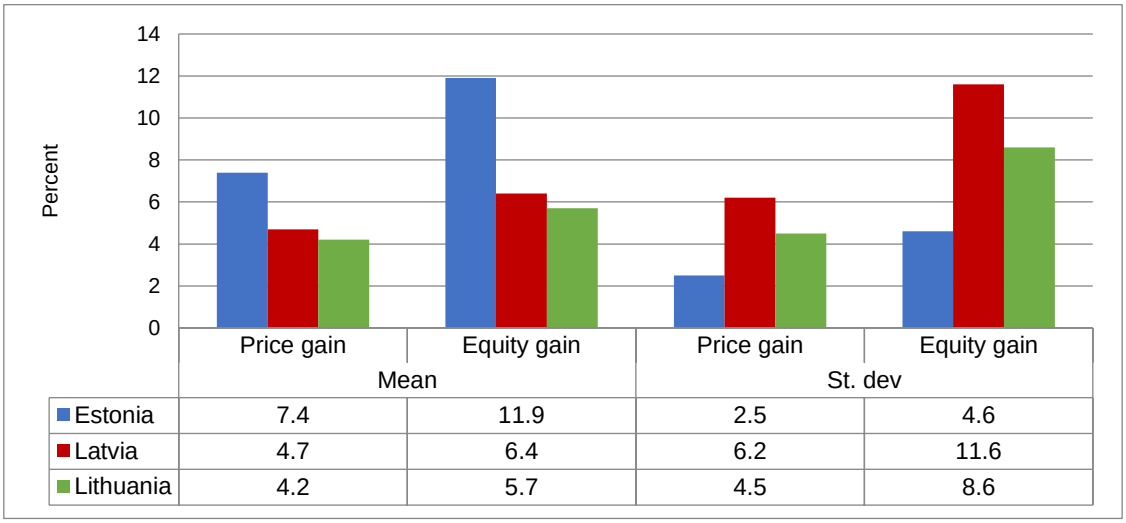
Figure 8. The contributions to mean RHE, 2010-2020 (LTV= 45%)
Source: Eurostat, IMF, and authors' own calculations

When thinking in terms of a risk-return context, leverage may conventionally be argued to increase both (expected) return and risk. Using the standard deviation as a proxy for funding risk and RHE as the return to housing investments, our simulation is useful for statements regarding the risk-return profile of housing investments across the three Baltic markets.

We consider the risk-return profile of two housing investments in each country. The price gain gives the RHE of a housing investment without mortgage funding. The return to a housing investment without mortgage funding (LTV=0) is equal to house price growth (see Equation 2). The RHE of a housing investment with a 45 percent LTV-ratio is given by the equity gain. Figure 9 compares the mean return and the risk associated with the two funding structures, where the standard deviation now represents risk.

The more stable Estonian housing market, where the biggest contribution to RHE comes from the price gain, has the highest RHE across both funding structures. In combination with monetary integration and the harmonization of interest rates across the EMU, the higher rate of house price growth also allows Estonian homeowners a leverage gain that exceeds that of the

two other housing markets. The more volatile housing markets in Latvia and Lithuania do not allow these countries to take advantage of the interest rate harmonization to the same degree as Estonia. In combination with lower price gain in Latvia and Lithuania, the leverage gain is smaller for households in these two countries. The country-specific shocks to housing markets in Latvia (2010 and 2015) and Lithuania (2010 and 2013) also contribute to lower leverage gains.



	Mean		St. dev	
	Price gain	Equity gain	Price gain	Equity gain
Estonia	7.4	11.9	2.5	4.6
Latvia	4.7	6.4	6.2	11.6
Lithuania	4.2	5.7	4.5	8.6

Figure 9. The risk and return of housing market investment, 2010-2020 (LTV= 45%)
Note: We apply different funding structures across Baltic states.
Source: Eurostat, IMF, and authors' own calculations

The more volatile Latvian house price growth produces the highest risk across the three Baltic markets, even when the housing investment is financed only by equity. When including leverage and the presumed 45 percent LTV-ratio, the risk measured in terms of the standard deviation of the equity gain is also highest in Latvia. The additional risk, measured in terms of increased standard deviation, that leverage imposes on households is 2.1% points for Estonian homeowners, 4.1% percentage points for Lithuanian households, and 5.4% points for Latvian households. At the same time, the additional return is 4.5% points for Estonian households but only 1.7% points for Latvian households when assessed before taxes. Hence, the risk-return profile is somewhat constrained for the Baltic housing markets during 2010-2020 when considering mortgage-financed housing investments, as leverage sets its mark on the return to housing equity.

6. Conclusion

When house price growth exceeds the mortgage rate, there is a lending gain associated with mortgage-financed housing investments. Gaps between the cost of funding and the return to mortgage-financed housing investments produce incentives to increase leverage as the lending gain is positively related to the LTV-ratio. Higher LTV-ratios conventionally increase funding risk, and as funding risk increase, so does housing market instability. After the subprime crisis in the United States, LTV-caps have surfaced as important macroprudential tools to constrain housing market risk and stimulate financial stability.[10]

For transition economies that benefit from monetary integration and lower mortgage rates simultaneously as structural shifts add to cyclical effects and stimulate house price growth, the lending gains may be significant. As small economies at the periphery of the European Union, the three Baltic states do not expect policies to be designed to accommodate them. Asymmetric shocks will have to be endured without mitigating policies.

[10] See Gelati and Moessner (2011) or IMF (2020) for important contributions.

In order to give some purchase to the argument of lending gain and funding risk, this paper simulates the lending gains prevailing in Baltic housing markets using the approach of Borgersen and Greibrokk (2012), which is a conventional approach when analyzing the return to equity for commercial real estate but rare when analyzing housing markets.

While stylized, the simulations illustrate how the lending gain produces incentives for higher LTV-ratios across the Baltics over the last decade. The more stable Estonian housing market contributes to a lending gain for Estonian households, even though both Latvian and Lithuanian households benefit more from higher lending gains in the latter part of the period as monetary integration deepens across the Baltics. However, when comparing the return to housing equity for households with and without mortgage financing, we find a somewhat constrained risk-return structure across Latvia and Lithuania due to their more volatile housing markets.

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