



LIETUVOS BANKAS
EUROSISTEMA

COUNTERCYCLICAL CAPITAL BUFFERS:

BACKGROUND MATERIAL FOR
DECISION

2 0 1 5

June

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|--------|---|
| BCBS | Basel Committee on Banking Supervision |
| CRD IV | Capital Requirements Directive IV, CRD IV |
| CCB | countercyclical capital buffer |
| EU | European Union |
| ESRB | European Systemic Risk Board |
| GDP | gross domestic product |
| LLC | limited liability company |
| MFI | monetary financial institution |
| p.p. | percentage points |
| SE | state-owned enterprise |

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Unless otherwise indicated, data up to 1 May 2015 were used. In addition, for the banking sector analysis, the consolidated data provided by banks operating in Lithuania, including foreign bank branches, were used unless otherwise indicated.

Periods indicated in chart subtitles also include data for the end of period (the year, quarter, etc.).

The decision basis for setting the countercyclical capital buffer rate

The Bank of Lithuania has set the buffer rate at 0 per cent, effective from 30 June 2015. The decision was based on core and complementary indicators for setting the CCB, as well as a recent lending and housing market analysis.

A set of core indicators used to determine the CCB reference rate does not show a build-up of imbalances. Because of a slight contraction of the loan portfolio over a year, a gap between the credit-to-GDP ratio and its long-term trend remained negative at the end of 2014, and, depending on the assessment method, made up –8 per cent and –23 per cent.

Additional indicators for setting the CCB, which include external (foreign) factors of the credit market and developments in the housing market, do not indicate any unsustainable developments in the lending market either. Deposits in banks remained broadly unchanged in the first quarter of 2015, and, following a decrease in the loan portfolio, the bank loan-to-deposit ratio made up 103 per cent at the end of the first quarter of 2015, significantly below its long run average of 120 per cent. Moreover, the current account remained in surplus in the fourth quarter of 2014, largely supported by the growth in service exports and remittances by individuals in foreign countries.

Residential property prices again were lower than the long-term equilibrium, although the gap has narrowed recently. The ratio of housing prices to household income continues to be significantly lower (–10%) than the long-term trend of the indicator. According to preliminary data, both the property market activity and housing prices stayed broadly unchanged in the first quarter of 2015. The demand and supply trends within the real estate market indicate a low likelihood of inconsistent price growth in the nearest future. Various indicators of early warning also show that credit and housing market developments will not pose any system-wide threat for the financial sector in the nearest future.

Principles for setting the CCB rate

One of the objectives¹ of macroprudential policy pursued by the Bank of Lithuania is to mitigate and prevent excessive credit growth and leverage. The countercyclical capital buffer that is applied to domestic exposures of banks in Lithuania is one of the major instruments that may help to curb excessive credit growth. The CCB is one of a few macroprudential policy instruments harmonised at an EU level and to be actively used by all Member States since 2016. The decision on the CCBs rate, based on the analysis of the credit and property market and carried out in line with the principles set in the Bank of Lithuania occasional paper No 5 “Countercyclical Capital Buffer Application in Lithuania”, is going to be taken by the Board of the Bank of Lithuania.

The objective of the countercyclical capital buffer is to safeguard the banking system against losses that may arise due to a pro-cyclical growth of systemic risk, thus contributing to sustainable lending to the real economy during the entire financial cycle. Tier 1 capital is used to secure these buffers. The capital buffer is accumulated during a rapid and unsustainable credit growth period.² The instrument helps to bolster banks’ resilience and mitigate the pro-cyclical effects of lending. The required CCB rate may be reduced if signs of system-wide risk appear, by creating conditions for credit institutions to use their capital stock for covering potential losses and supporting credit demand.

The principle of guided discretion is applied to take the final decision on the CCB rate in Lithuania, i.e. the decision is made based on additional qualitative information and expert evaluation rather than quantitative³ indicators only. CCB reference rates, the value of which is directly associated with the deviations of the credit-to-GDP ratio from its long-term trend, are core quantitative indicators. Two reference rates for the CCB are calculated in Lithuania: the first is based on the gap that is calculated by using a standard Basel method⁴, while the second is based on the gap calculated by using a forecast.⁵ The CCB reference rates will vary linearly between 0 per cent and up to 2.5 per cent in multiples of 0.25 p.p. If necessary, the set CCB rate can be set higher, to achieve the goals associated with this instrument. When the gap between the credit-to-GDP ratio and its long-term trend exceeds 2 p.p., the reference rate for the CCB will be set higher than 0, and when the gap makes up 10 p.p., the reference rate will be 2.5 per cent. The estimated reference rates for the CCB and other quantitative and qualitative information provided by additional indicators are used to accept the final proposal regarding the reference rate for the CCB.

The mandatory reciprocity for the CCB reference rate has been embedded at the EU-level, which aims at ensuring the effectiveness of the CCB instrument and equal competition conditions for both domestic banks and foreign bank branches. Any reference CCB rates will be recognised automatically in other EU countries if they are set below 2.5 per cent, and on a voluntary basis if they are above 2.5 per cent.⁶ In case a Member State sets the CCB reference rate below 2.5 per cent, this rate will be applied to all exposures, including exposures of bank branches and foreign banks in its jurisdiction. The principle of

¹ The Board of the Bank of Lithuania set the objectives of macroprudential policy in its Macroprudential Policy Strategy (No. 03-31); their detailed description can be found in the Financial Stability Review of the Bank of Lithuania of 2013.

² ESRB recommendation ECB/2013/1 on intermediate objectives and instruments of macroprudential policy of 4 April 2013.

³ Thematic paper of the Bank of Lithuania “Operationalizing the countercyclical capital buffer in Lithuania: indicators for the build-up phase” of the Bank of Lithuania (prepared for publishing).

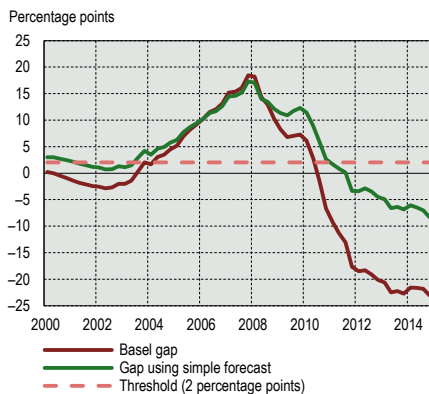
⁴ The gap is calculated as a difference between the credit-to-GDP ratio and its long-term trend, where the long-term trend is estimated by applying a one-sided Hodrick-Prescott filter with the smoothing parameter λ set to 400 000.

⁵ The gap may also be computed by using the method augmented with a simple forecast as a difference between the credit-to-GDP ratio and its long-term trend, where the trend is estimated by using a one-sided Hodrick-Prescott filter with the smoothing parameter λ set to 400 000; however, to specify the real-time gap estimate, the line of the credit-to-GDP ratio is augmented by a forecast.

⁶ Decisions of EU countries on reference rates for the CCB are published by the ESRB (see <https://www.ersb.europa.eu/mppa/html/index.en.html>).

Chart 1 Gap between the credit-to-GDP ratio and its long-term trend

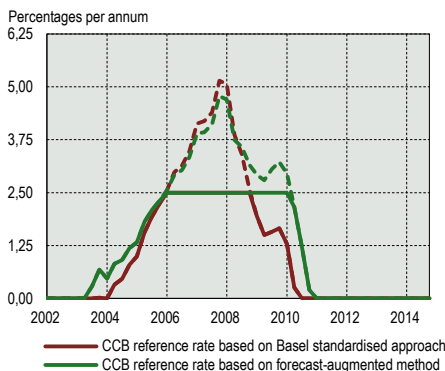
(Q1 2002 to Q4 2014)^s



Sources: Statistics Lithuania and Bank of Lithuania calculations.

Chart 2 CCB reference rates

(Q1 2002 to Q4 2014)

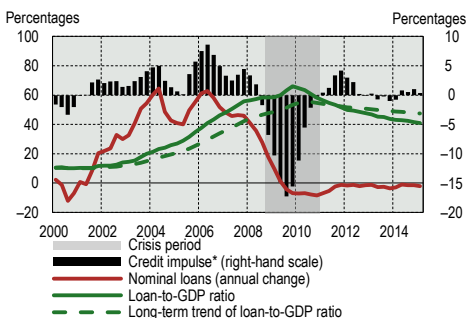


Source: Bank of Lithuania calculations.

Note: Dotted line shows the CCB rate when no maximum CCB rate value (2.5%) is applied.

Chart 3 Developments of loans to private non-financial sector

(Q1 2000 to Q1 2015)



Sources: Statistics Lithuania and Bank of Lithuania calculations.
Note: The long-term trend is estimated by applying a one-sided HP filter with the smoothing parameter λ set to 400 000; before applying the filter, the credit-to-GDP ratio is modelled for the next five-year window using a four-quarter weighted average.

* The ratio of gap between loan portfolio annual change and loan portfolio from the previous year with the nominal GDP.

reciprocity will be completely implemented only at the end of the transitional period set in the CRD IV (i.e. as from 31 December

2018)⁷.

Assessment of credit and housing market imbalances

The gap between the credit-to-GDP ratio and its long-term trend remained negative in 2014 (see Chart 1); therefore, the reference rate for the CCB calculated by the Bank of Lithuania based on both the Basel method and the method augmented by a forecast was 0 per cent at the end of the year (see Chart 2). The CCB reference rate is computed using the data of credit to the private sector, which include all creditor-issued loans to non-financial corporations and households, as well as the holdings of debt securities issued by non-financial corporations. Loans issued by other MFIs (banks and credit unions) to the private non-financial sector account for about 72 per cent of the credit; so the credit market analysis below is based on the latest lending data of other MFIs.⁸

In the first quarter of 2015, the debt level of the private non-financial sector to other MFIs went down (see Chart 3). Loan repayment by enterprises had the most significant effect on the loan portfolio decrease. The fall was slightly offset by a moderate growth in the household borrowing in February and March. Moreover, the portfolio of loans issued by MFIs to financial intermediaries moved up by EUR 126.7 million or 11.8 per cent in the first quarter of 2015 mainly because of several banks' lending to their leasing subsidiaries. The portfolio of loans to non-financial corporations went down by EUR 176.7 million or 2.3 per cent in the first quarter of 2015 and by EUR 378.4 million or 4.8 per cent year-on-year. With overall loan growth still being negative (a year-on-year fall of 2.3%) and GDP growing moderately (in Q2 2014 to Q1 2015, GDP at current prices was higher by 3.1 per cent compared to the corresponding period a year ago), the loan-to-GDP ratio decreased over the past year to 40.9 per cent. Fixed five years ago the highest value of the ratio declined by 25.0 p.p. In the first quarter of 2015, the credit impulse of loans to the private sector, which shows the ratio of the credit flow change to nominal GDP (see Chart 3) made up 0.4 per cent, as measured over the year and was lower than the ratio average in previous years (0.7%). Compared to the period between 2006 and 2008, the credit impulse of loans to the private sector is a few times lower, and therefore do not indicate any imbalances.

The provisional data of the portfolio of MFI loans to non-financial corporations for the first quarter of 2015 revealed a decrease in the amount of loans issued to enterprises that held most of the liabilities to the financial sector and were engaged in some specific types of economic activities (e.g. construction and property). The portfolio of loans to enterprises of these types of economic activities accounted for more than one third of total loans to non-financial corporations, but went down by 10.9 per cent over the year. At the same time, loans to enterprises engaged in energy supply, transportation, and storage and trade activities, accounting for a similar share in the total MFI loans to non-financial corporation's portfolio, increased by 6.4 per cent. In other words, banks remained conservative towards lending to enterprises in real estate business; consequently, the real estate development projects were undertaken mainly by enterprises with significant reserves of their own funds. Banks were lending somewhat more actively to economic activities linked to the public sector (e.g. energy supply) or recovering private consumption (e.g., retail, transportation).

The portfolio of loans to households remained largely unchanged. In March 2015, lending for house purchase was higher by 0.5 per cent year on year, while consumption and other lending to households grew by 1.4 per cent over the same period. It should be noted that household borrowing for other needs than house purchases are growing more rapidly compared to what we can see from MFI data. In the meantime, households have been borrowing quite intensively not only from banks, but also from consumer credit providers and leasing companies to finance their consumption needs. Reduced amount of consumer and other lending to households in 2014 was fully offset by a hike in borrowing (nearly EUR 50 million)

from leasing companies and consumer credit lenders (non-banks).

⁷ As provided for in Article 160 of the CRD IV.

⁸ Statistical data of the MFI balance sheet, adjusted because of the removal of bankruptcy undergoing MFIs from the statistics and technical factors, are used. For more details, see Annex 2 "MFI loan portfolio adjustment for technical factors", Lithuanian Economic Review of December 2014 (http://www.lb.lt/lithuanian_economic_review_december_2014).

In 2014, banks operating in the country reduced their liabilities to foreign creditors and rapidly increased the share of Lithuanian residents' deposits (see Chart 4). The process of reducing foreign liabilities has continued from 2009 (the year of economic downturn) and is related to the repayment of loans by the branches and subsidiaries of Scandinavian banks, which were received from their parent companies. At the end of 2014, it was supported also by increase in overnight deposits reflecting a decrease in cash holdings before the euro was introduced. Deposit holdings in banks remained broadly unchanged in the first quarter of 2015, while the loan-to-deposit ratio improved as the result of ongoing contraction of the loan portfolio. Thus, the bank loan-to-deposit ratio (seasonally adjusted) made up 103 per cent and was lower than the long-term average of 120 per cent. The banking sector actively borrowed from external sources during the period of unsustainable economic development (2005 to 2008). In 2014, Lithuania's current account remained in surplus (see Chart 5), supported mainly by service export that was higher than service import, and remittances of individuals from foreign countries to Lithuania. There is no reason for a significant change in these indicators in the nearest future. The Bank of Lithuania's macroeconomic forecast for March 2015 suggests a balanced current account in 2015.

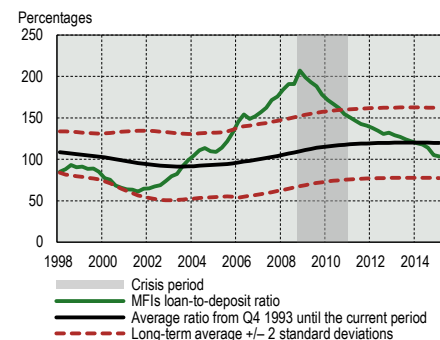
At the end of the first quarter of 2015, not only credit market indicators, but other indicators of the domestic financial sector also did not show any build-up of systemic risk in the financial sector (see Chart 6). Composite indicators of early warning of crisis, adapted to Lithuania are used to sum up the situation in the credit market, housing affordability, capability of borrowers to fulfil their financial liabilities, and developments in the stock market.⁹ These indicators can be considered estimates of the likelihood of systemic banking crisis (approximately for a 5-year period). From 2012, these estimates are close to zero, and therefore there is no reason to believe that the domestic financial market is witnessing or will witness a build-up in systemic risk in the nearest time.

A decline in the private non-financial sector's debt level is likely in the nearest future too. Commercial banks surveyed by the Bank of Lithuania in April 2015 claimed they would expect moderate growth in their loan portfolio this year and next year. Even in the case that optimistic forecasts of commercial banks materialise (although historic data show that banks tend to overestimate the loan portfolio developments), the debt level will not edge up as the loan portfolio growth will coincide with a forecast increase in the nominal GDP. The empirical estimates of the Bank of Lithuania suggest a further moderate decline in the MFI lending to residents in 2015 and 2016.

No significant changes are projected in the portfolio of loans for house purchases in the nearest future (see Chart 7). Last year, some share of the total house purchase decisions was made by intentions to replace financial assets with property before abandoning the national currency and introducing the euro. Higher activity was especially pronounced in the second half of 2013 and first half of 2014, but it subsided later. It is very likely that the year 2014 took a share of the 2015 housing demand, and, as seen from the lending surveys conducted by the Bank of Lithuania, commercial banks do not expect any significant growth in the housing credit in 2015. Even in case of a more rapid increase of housing credits in the nearest future, this growth can be considered consistent with changes in households' capabilities to take financial liabilities. For example, the ratio of the loans for housing purchase's to total annual payroll fund, which is one of the indicators signalling households' debt burden, made up 52.2 per cent in 2014, a quarter-on-quarter decrease of 0,4 p.p. According to the March 2015 Bank of Lithuania forecast, nominal wage is to grow at a pace of 4.9 per cent in Lithuania in 2015, while bank-lending survey participants project loans for house purchase to grow only by 1.9 per cent; thus, the household debt level is likely to decrease further.

Chart 4 Private sector loans-to-deposits ratio (seasonally adjusted)

(Q1 1998 to Q1 2015)

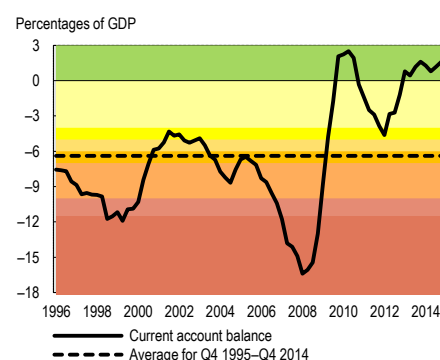


Source: Bank of Lithuania calculations.

Note: the ratio develops in a balanced way if it does not deviate from its long-term average by more than two standard deviations. Standard deviations are computed on the basis of Q4 1993–Q1 2006 data covering the period of moderate changes in the ratio.

Chart 5 Current account balance

Q1 1996 to Q4 2014)

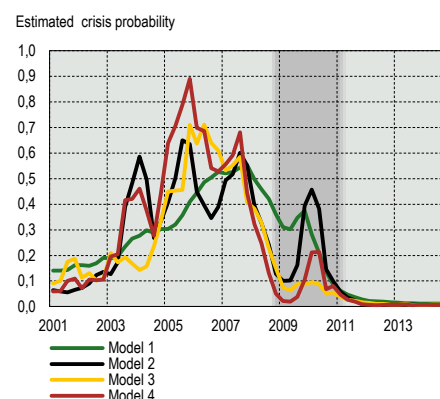


Sources: Statistics Lithuania and Bank of Lithuania calculations.

Note: the level of risk is measured based on Reinhart i.S. M. and V. R. Reinhart (2008): "Capital flow bonanzas: An encompassing of the past and

Chart 6 Composite early warning indicators for crisis in Lithuania

(Q1 2001 to Q1 2015)

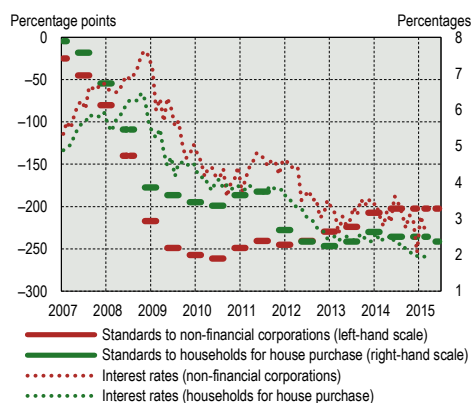


Sources: Detken et al. (2014), Arregui et al. (2013), Statistics Lithuania, and Bank of Lithuania calculations.

⁹ A set of variables for Lithuania has been selected based on econometric models estimated by the ESRB (see Detken et al. "Operationalising the Countercyclical Capital Buffer: Indicator Selection, Threshold Identification and Calibration Options", ESRB Occasional Paper No. 5, 2014) and composed of various combinations of these variables such as the bank credit-to-GDP ratio gap, annual change in the house price-to-income ratio, the debt service-to-income ratio, annual change in equity price. Composite indicators show the estimate of a systemic financial crisis probability in future and, very likely are more precise compared to individual early warning indicators-related variables.

Chart 7 Bank lending standards and interest rates for new private sector loans

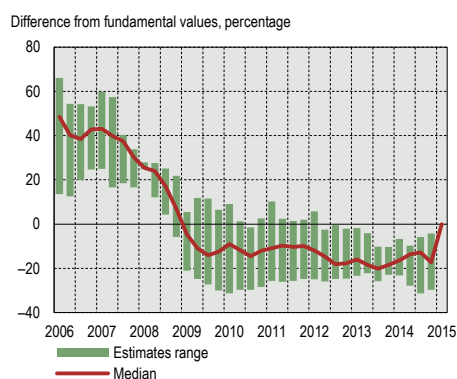
(January 2007 to April 2015; the June 2015 forecast)



Sources: Bank lending survey and Bank of Lithuania calculations.

Chart 8 Dispersion of the gap between housing prices and long-term equilibrium value

(Q1 2006 to Q1 2015)

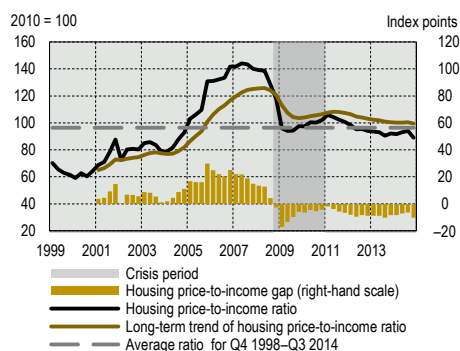


Source: Bank of Lithuania calculations.

Note: estimates are based on price to rent ratio, price to income ratio, econometric model and HP filter.

Chart 9 Long-term trend of the housing price-to-household income ratio and the gap between the ratio and the trend

(Q1 2000 to Q4 2014)



Sources: Statistics Lithuania and Bank of Lithuania calculations.

Note: time series is extended with 4-quarter weighted moving average forecasts 5 years ahead and long-term trend is estimated using one-sided HP filter with smoothing parameter 400,000.

Lending to households for house purchase and developments of residential property prices are closely interrelated. The growth of housing prices relies heavily on borrowed funds rather than fundamentals, such as overall growth of economy, wages, employment, etc., and therefore cannot be seen as sustainable. Too easy access to borrowing and unjustified anticipation of property price increase may lead to a build-up of self-fulfilling expectations, when housing purchases are booming because of anticipated growth of housing prices. Residential property is often used to secure bank loans; therefore it is an attractive instrument for mitigating credit risk when housing prices are climbing rapidly. In such cases, it becomes even easier to get a loan for house purchase, which creates conditions for even faster growth of imbalances. Moreover, trends in the property market have a significant impact on the operational stability of MFIs, as more than half of the loan portfolio is directly related to this market. As a result, it is important to assess trends within the property market and their impact on the loans market.

Residential property prices remained lower than their long-term equilibrium value, although the gap has narrowed recently (see Chart 8). In the first quarter of 2015, the indicator showing the price-to-rent ratio revealed an increase in gap driven by a 14.5 per cent annual growth of the housing rent price, at the same moment, the dispersion of estimates increased. If measured in terms of other indicators, housing prices came close to their long-term equilibrium value, but remained lower by 6 per cent to 16 per cent (compared to 11% to 18% a year ago). Because of this, the median value of the indicator value remained at the highest value of the dispersion. The gap between the ratio of housing prices-to-household income and its long-term trend increased over 2014 to 10.3 per cent from 8.3 per cent a year ago (see Chart 9) driven by a rapid income growth.

In the first quarter of 2015, a decline in the amount of the property market transactions materialised (see Chart 10). The seasonally adjusted number of properties transferred to other owners was 20.9 thousand in the first quarter of 2015, a quarter-on-quarter decrease of 9.0 per cent (seasonally adjusted). A year ago, the property market activity was higher by one fifth. Activity went down in all sectors of the property market: the most (by 31.4 per cent quarter-on-quarter) in non-residential real estate and the least (by 6.8 per cent quarter-on-quarter) in land lots. Over the first three months of 2015, the proportion of housing purchased for at least partially borrowed funds was slightly below a quarter, a decrease from an average level of 30.7 per cent in 2014. Hence, we may conclude that market trends remained largely driven by buyers who do not use borrowed funds to pay for the purchase.

According to preliminary data, average housing prices in Lithuania did not change in the first quarter of 2015, although a significant slump was observed in separate sectors of the market. The increase in prices of newly built houses stopped in the fourth quarter of 2014 after expectations regarding the likely impact from the introduction of the euro subsided (see Chart 11). During the reported period, the largest price decrease (7.1% over a quarter) was observed in the newly built house market, mainly because of the supply that shot up significantly in response to the increase of property demand in 2014. As a result, the number of unsold newly built dwellings in the country grew before the end of 2014 from 3.3 to 6.3 thousand, of which nearly 4.4 thousand stood vacant in the capital city, compared to 4.3 thousand at the end of the first quarter of 2015 (see Chart 12). In view of the fact, that the number of unsold new dwellings in Vilnius fluctuated from 1,500 to 3,000 in the period from 2011 to 2013 and making assumption that the demand for housing will change at a moderate pace, the likelihood of price growth in the nearest future is low.

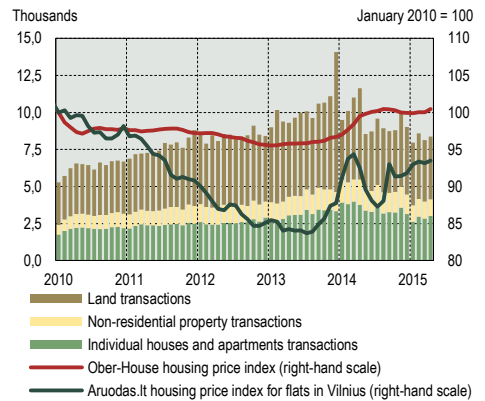
According to estimations of the State Enterprise Centre of Registers (V/ Registrų centras), prices for new dwellings in Vilnius went down by 11.3 per cent during the first quarter of 2015. Eventually, prices for new dwellings in the capital city were lower by 0.9 per cent on average compared to 2014. Vilnius is the only Lithuanian city where the number of population does not decrease and the housing rent yields are the most attractive. As a result expectations regarding the property price increase after the introduction of the euro prompted buyers to focus their attention on the capital city housing market last year. In the environment of low interest rates, it may be perceived as an alternative for ordinary investment instruments. For example, annual nominal yield on average class housing rent was 4.0 per cent at

the end of the first quarter of 2015.¹⁰ Although it was lower compared to the average (4.6%) in the period from 2000 to 2015, it continued to be an attractive alternative for, let's say, term deposits.

In the first quarter of 2015, the activity of the non-residential segment of the property market went down (just above a quarter in three months) to approximately the average level of 2013. Such a decrease indicates that this market segment is getting back to the ordinary activity level, as non-residential property sales were more intense (12.9%) in 2014 compared to 2013, expecting an increase in its value after the introduction of the euro. The impact of high market activity on sale prices has been subdued so far: in 2014, office transactions were carried at 9.2 per cent higher prices on average than in 2013, while in the first quarter of 2015, these prices were lower by 13.1 per cent year-on-year. However, office rent prices, in the opinion of market participants, after growing slightly by more than one tenth over 2014, hiked another 1.3 per cent in the first quarter of 2015. No growth was observed in the office sale-to-office rent prices ratio, and in the first quarter of 2015, it was about 5 per cent below its own average during the period from 2005 to 2015.

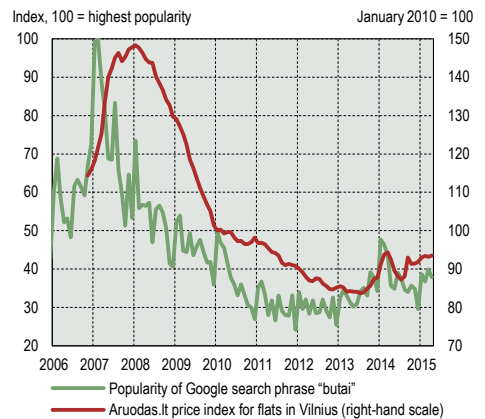
The likelihood of unbalanced credit growth remains low. Banks remain conservative regarding the easing of lending requirements that historically are relatively tight. Although some households cannot lower their debt level, they dare to borrow only for house purchase so far. Housing transactions continue to be paid largely by other than borrowed funds. Nearing the introduction of the euro, a shift from cash to tangible assets in 2014 was supported by the expected currency switch, but after changeover, the cause has disappeared. Moreover, housing supply is sufficient to satisfy the existing demand.

Chart 10 Activity of property market (seasonally adjusted) and housing
(January 2010 to April 2015)



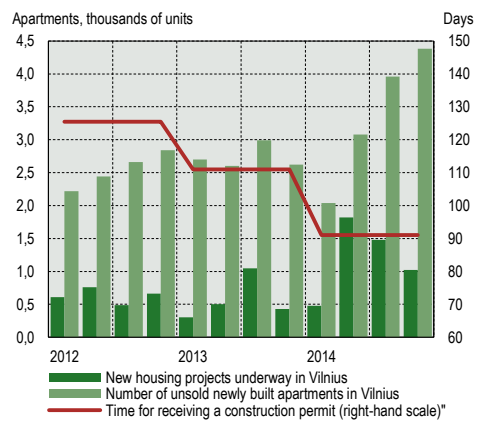
Sources: State Enterprise Centre of Registers, Ober-House, Aruodas.lt and Bank of Lithuania calculations.

Chart 11 Popularity of Google search phrase "butai" (engl. "apartments", seasonally adjusted) and apartment prices
(January 2006 to December 2014)



Sources: „Google Trends“, Aruodas.lt and Bank of Lithuania calculations.

Chart 12 Supply of newly built dwellings in Vilnius and time for receiving a construction permit
(Q1 2012 to Q4 2014)



Sources: "Inreal", "Doing Business" and Bank of Lithuania calculations.

¹⁰ These calculations were done based on the data from UAB Ober-Haus, as no official statistics sources contain housing rent prices by cities. It is assumed that a house unit for rent is newly built and of 60 square meters, and that its annual maintenance costs make up 1 per cent of its value.

Annex. CCB reference rates and early warning indicators of the need to raise CCBs

Core indicators:

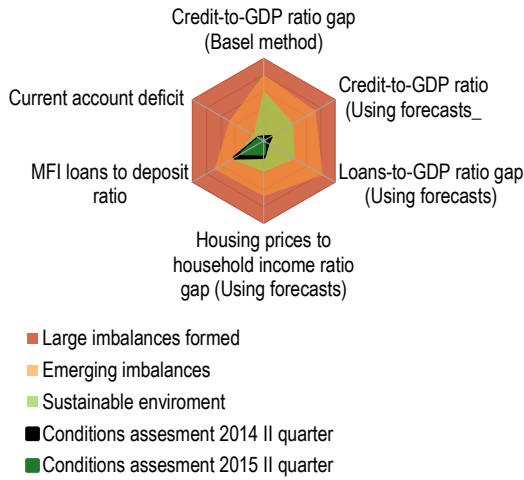
1. Credit-to-GDP gap (calculated by using a standard Basel method)
2. Credit-to-GDP gap (forecast-augmented)

Complementary indicators:

1. MFI lending-to-GDP gap (forecast-augmented)
2. Housing price-to household income gap (forecast-augmented)
3. MFI lending-to-deposits ratio
4. Current account balance (deficit)-to-GDP ratio

Chart A. Evaluation of credit market imbalances based on core and complementary indicators

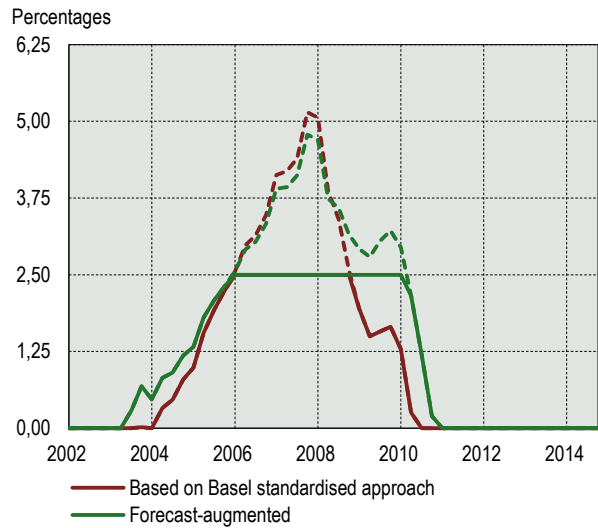
(evaluation carried in Q2 2015)



Source: Bank of Lithuania calculations and Statistics department

Chart B. CCB reference rates

(Q1 2002 to Q4 2014)

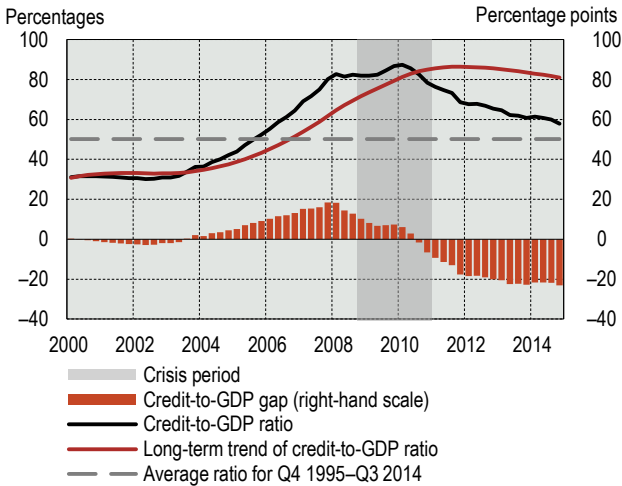


Source: Bank of Lithuania calculations.

Notes: Dotted line shows the CCB rate when no maximum CCB rate value (2.5%) is applied.

Chart C. Core indicator I: credit to private non-financial sector-to-GDP gap (based on standard Basel method)

(Q1 2000 to Q4 2014)

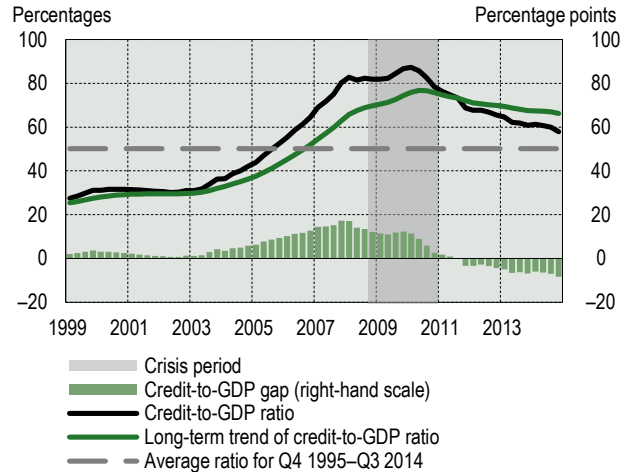


Sources: Statistics Lithuania and Bank of Lithuania calculations.

Note: long-term trend is estimated using one-sided HP filter with a smoothing parameter 400,000.

Chart D. Core indicator II: credit to private non-financial sector-to-GDP gap (forecast-augmented)

(Q1 2000 to Q4 2014)

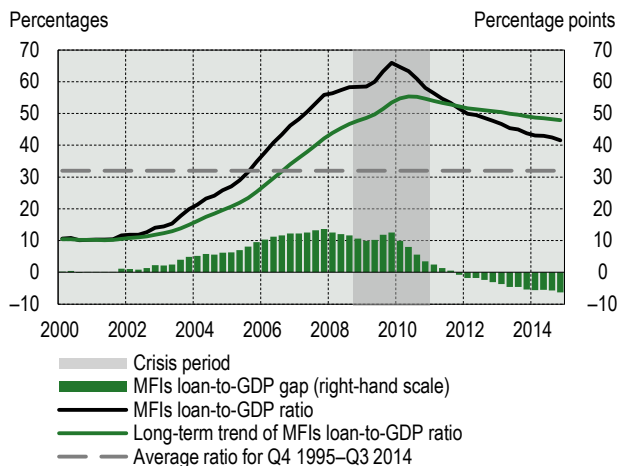


Sources: Statistics Lithuania and Bank of Lithuania calculations.

Note: time series is extended with 4-quarter weighted moving average forecasts 5 years ahead and long-term trend is estimated using one-sided HP filter with smoothing parameter 400,000.

Chart E. Complementary indicator I: MFI lending to private non-financial sector-to-GDP gap (forecast-augmented)

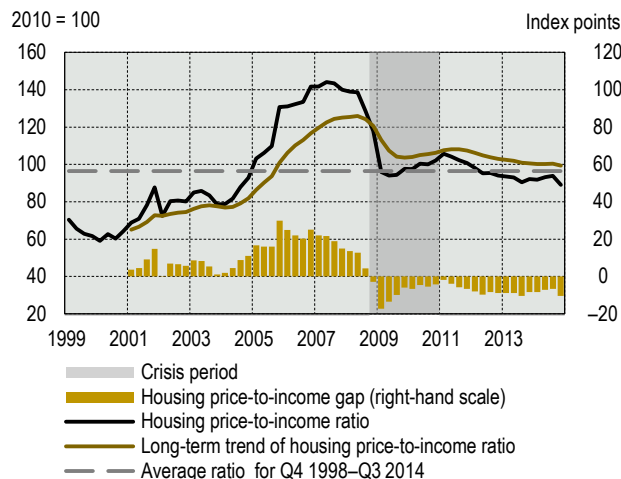
(Q1 2000 to Q1 2015)



Sources: Statistics Lithuania and Bank of Lithuania calculations.
 Note: time series is extended with a 4-quarter weighted average forecasts 5 years ahead and long-term trend is estimated using one-sided HP filter with smoothing parameter 400,000.

Chart F. Complementary indicator II: housing price-to-household income gap (forecast-augmented)

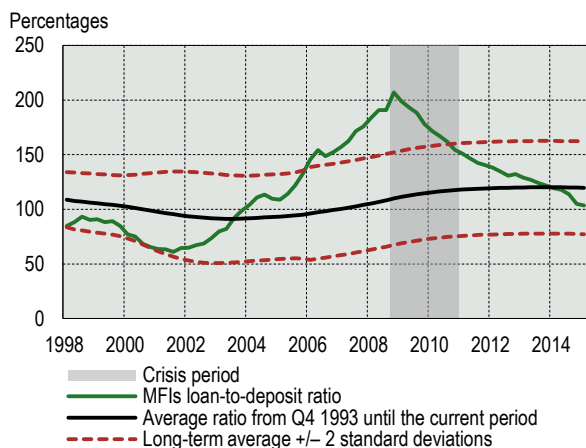
(Q1 2000 to Q4 2014)



Sources: Statistics Lithuania and Bank of Lithuania calculations.
 Note: time series is extended with 4-quarter weighted moving average forecasts 5 years ahead and long-term trend is estimated using one-sided HP filter with smoothing parameter 400,000.

Chart G. Complementary indicator III: MFI lending to private sector-to-private sector deposits (seasonally adjusted) ratio

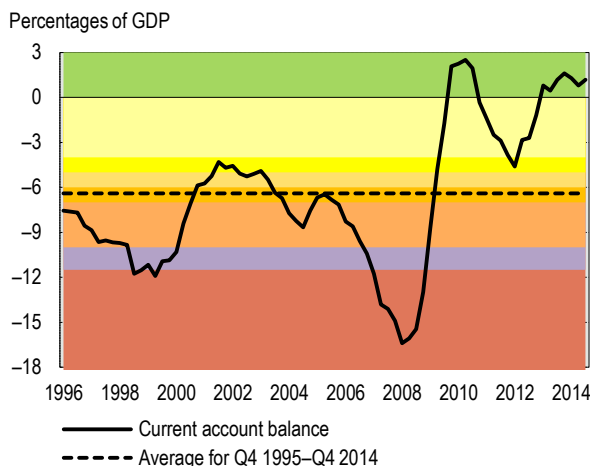
(Q1 1998 to Q1 2015)



Source: Bank of Lithuania calculations.
 Note: the ratio develops in a balanced way if it does not deviate from its long-term average by more than two standard deviations. Standard deviations are computed on the basis of Q4 1993-Q1 2006 data covering the period of moderate changes in the ratio.

Chart H. Complementary indicator IV: Current Account Balance

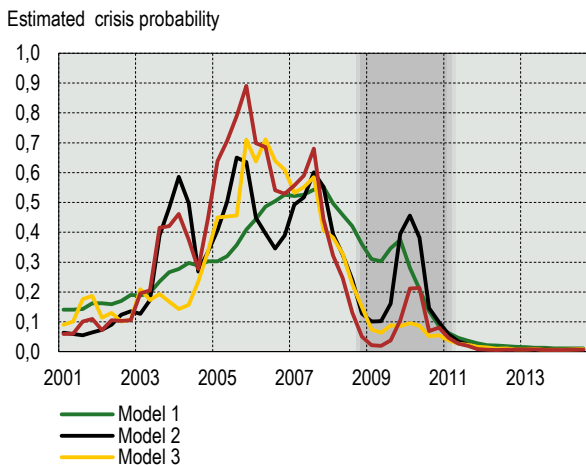
(Q1 1996 to Q4 2014)



Sources: Statistics Lithuania and Bank of Lithuania calculations.
 Note: the level of risk is measured based on Reinhart iS. M. and V. R. Reinhart (2008): "Capital flow bonanzas: An encompassing of the past and present", NBER working paper, 14321.

Chart I. Composite early warning indicators for crisis, adapted to Lithuania

(Q1 2001 to Q1 2015)



Sources: Detken et al. (2014), Arregui et al. (2013), Statistics Lithuania, and Bank of Lithuania calculations.