DISCUSSION PAPERS

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Analysis of the Bank Lending Survey Results for Bulgaria (for the 2003–2014 Period)

Tania Karamisheva

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Send your comments and opinions to:
Publications Division
Bulgarian National Bank
1, Knyaz Alexander I Square
1000 Sofia, Bulgaria
Tel.: (+359 2) 9145 1351, 9145 1978
Fax: (+359 2) 980 2425
e-mail: Dimova.L@bnbank.org
Website: www.bnb.bg

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Abstract:
This study examines descriptively and empirically the information content of the Bulgarian National Bank's quarterly bank lending survey for credit developments, focusing on lending to non-financial corporations. Carrying out an assessment on a macro and micro level we find that changes in demand estimated by survey data have statistically significant effect on corporate loan dynamics. The empirical research also reveals that other important factors are real GDP growth, the business climate, the share of bad and restructured loans, and bank-specific factors such as the capital to assets ratio and the interest spread between corporate loans and deposits.

Keywords: *Bank lending survey, credit growth, panel data, bank micro data, Bulgaria*

1. Introduction

Since the fourth quarter of 2003 the Bulgarian National Bank has conducted a regular quarterly bank lending survey among commercial banks in Bulgaria. The aim of the survey is to obtain additional qualitative information about changes in banks' lending policy and in the demand for loans, as well as to identify factors, affecting credit demand and banks' credit standards and terms. This additional information may be helpful to enhance understanding of the lending behavior of banks and the role of credit in the economy. Credit developments may have different implications for macroeconomic policy decisions, depending on whether their determinants are demand or supply side driven. The main contribution of the bank lending survey is in making distinction between loan demand and loan supply factors, as definitive conclusions about the exact determinants of changes in lending to enterprises and households cannot be drawn from the available monetary statistics. Thus, the findings of the survey can be useful for a complementary interpretation of existing monetary and interest rate statistics. They can also help to improve the forecasting of credit growth and economic developments.

In this paper we present the results from the bank lending survey and try to examine its information content for lending growth. We try to find a relation between the survey results and other macroeconomic variables such as real GDP growth, loan growth, gross fixed capital formation or industrial confidence. Furthermore we undertake an empirical analysis, first on a macro level using aggregate data on lending. In a next step, we construct a panel for which purpose we merge the individual banks' responses to the bank lending survey (BLS) questions with individual data on lending amounts for the surveyed banks.

The paper is organized as follows. Chapter 2 provides a summary of the main findings of different theoretical and empirical studies analyzing bank lending survey results and their role in explaining credit developments or changes in leading macroeconomic indicators. Chapter 3 provides a short overview of the main banking system and credit developments in Bulgaria before and during the global financial and economic crisis and the role of the BNB monetary policy. Chapter 4 follows with a discussion of the main bank lending survey results for Bulgaria and with a comparison of BLS results with other macroeconomic and financial data. Chapter 5 provides an empirical analysis both on a macro level and by individual banks. Chapter 6 concludes with some final remarks.

2. Literature overview

Credit developments are an important determinant of economic developments, and conditions in credit markets may affect the way monetary policy has an impact on the economy. In this respect, it is of importance to be able to distinguish between factors affecting the credit supply and those altering the demand for credit both of which influence the actual volume of credit. Available data from the monetary statistics on changes in bank lending provide information only on realized transaction volumes. However, they do not give an indication whether and to what extent these changes are influenced by the supply side or the demand side. The objective of the bank lending survey is to contribute to the closure of this gap and to enhance knowledge of developments in banks' lending policies. The qualitative results obtained from the survey should enable policy-makers to assess credit developments more accurately. The survey also provides the banks' assessment of the factors determining their potential changes in the supply of loans and those influencing changes in credit demand. Thus, the findings of the survey can be useful for a complementary interpretation of existing monetary and interest rate statistics. They can also help to improve the forecasting of credit growth and economic developments.

Several studies analyze the information content of bank lending surveys conducted in different countries, part of the Eurozone, the Eurozone as a whole, or the USA for the explanation of changes in credit activity or some real variables like GDP, consumption or investment. In part of the studies only a descriptive analysis is used, based on the graphical comparison of data collected via the bank lending survey and other macroeconomic data and focuses on finding some similar trends in their performance. Berg et al. (2005) for example, present the first results of the bank lending survey for the euro area, conducted since January 2003, and compare them with information derived from other sources. They compare BLS data on credit standards and real GDP growth or MFI loan growth and also carry out a comparison of BLS data and industrial confidence, consumer confidence or gross fixed capital formation. The graphical and descriptive analysis shows that even at this early stage of conducting the survey, it is possible to identify some systematic patterns in the results from the bank lending survey that prove to be in line with indicators retrieved from other sources. Mottiar and Monks (2007) undertake an analysis of the bank lending survey results for Ireland and compare them with aggregate euro area results. By means of graphical and descriptive analysis they also conclude that it is

possible to see some systematic patterns between the bank lending survey and other macro variables, in particular with regards to loan growth, gross fixed capital formation and consumer/industrial confidence.

Other part of the studies focus on an empirical analysis, using different econometric techniques and methods. Lown, Morgan and Rohatgi (2000) for example, using data obtained from the survey undertaken by the Federal Reserve, find that a strong correlation exists between tightening of credit standards and slowdowns in commercial lending and output. They find that the economy seems to grow more slowly during periods, in which banks tighten credit standards and that four of the five past recessions were preceded by sharply tighter standards. The chain of events following a standards' tightening resembles a credit crunch: commercial loans at banks plummet immediately and continue to fall until lenders ease up, output falls, and the federal funds rate, which is identified with the stance of monetary policy, is lowered. In a further study, using VAR analysis, Lown and Morgan (2002) find that fluctuations in credit standards are highly significant in predicting commercial bank loans, real GDP and inventory investment in the trade sector. They conclude that credit standards are more informative about future lending than loan rates, which is consistent with the idea that some sort of friction in lending markets leads lenders to ration loans via changes in standards more than through changes in rates. They also find a feedback from loans to standards, suggesting a sort of credit cycle. Higher loan levels cause tightening standards, perhaps because lenders conclude (or are told by supervisors) that standards are too loose. Tighter standards are followed by lower spending and loan levels, which eventually cause easing standards and higher spending and loan levels etc. Some of their negative findings are that shocks to the federal funds rate do not cause changes in standards, because lenders simply raise loan rates more or less in step with the funds rate. In the Monthly Report of Deutsche Bundesbank (January 2009) a simple regression analysis is undertaken in order to examine the explanatory content of BLS data on credit supply and demand for developments in lending to non-financial corporations in Germany. The regression analysis indicates importance of demand for developments in long-term lending, while the BLS supply variable lacks significance. In the case of long-term loans to enterprises the BLS demand is a robustly significant explanatory factor, which suggests that growth in long-term corporate lending in Germany has been determined in large part by demand-side factors. Bondt et al. (2010) examine empirically the information content of the euro area bank lending survey for aggregate credit and output growth. Using panel regression analysis they show that

the responses of the lending survey, especially those related to loans to enterprises, are a significant leading indicator for euro area bank credit and real GDP growth. Their results support the existence of a bank lending, balance sheet and risk-taking channel of monetary policy. These findings imply that not only changes in the official interest rate and in loan demand matter for credit and output, but also bank loan supply factors, the balance sheet position of borrowers and the risk perception in the economy. Finally, the authors discuss the implications for the 2008/2009 financial and economic crisis and come to the conclusion that the BLS responses provided an early and reliable signal about the deterioration of financing conditions and economic growth in the euro area. According to their panel estimates, the strong net tightening of credit standards and the increases in margins on average and riskier loans to enterprises during the crisis resulted in around one percentage point lower quarterly GDP growth in the euro area. Blaes (2011) undertakes an analysis of the role of bank-related factors in explaining the slowdown in bank lending to non-financial corporations in Germany during the recent financial and economic crisis. For the econometric panel analysis micro data on lending quantities and prices is used and matched to individual banks' survey responses. The main findings of the paper suggest that BLS indicators have a significant explanatory power for bank lending in the period 2003-2010. Both bank-related supply and demand-side factors prove to be important in explaining the sharp slowdown in lending after the collapse of Lehman Brothers. The results indicate that the dampening impact of the bank-related supply factor on loan developments occurred with a time lag of several quarters and was strongest from the third quarter of 2009 to the first quarter of 2010. During this period more than one third of the explained negative loan development was due to the restrictive adjustments of purely bank-side determinants, such as banks' capital costs, market financing conditions and liquidity position.

3. Banking system and credit developments in Bulgaria and the BNB policy after the introduction of the currency board

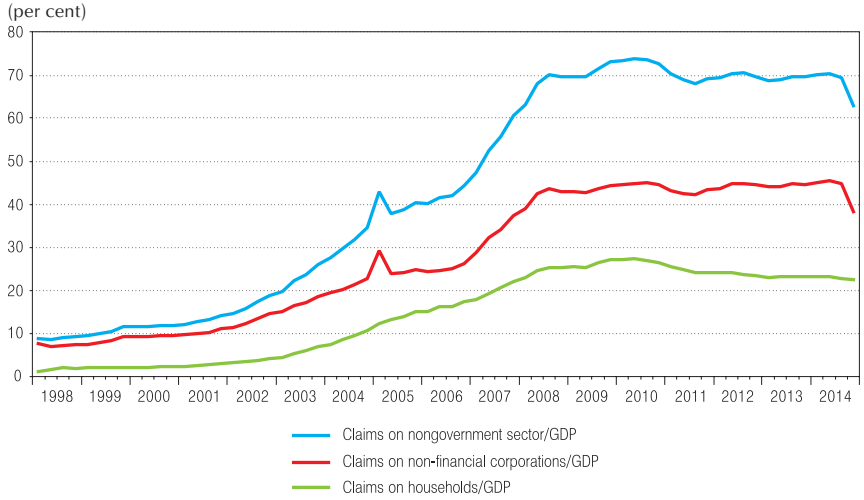
In this section we provide a short overview of the main banking system and credit developments in Bulgaria before and during the global financial and economic crisis along with a description of the Bulgarian National Bank policy over the period after the introduction of the currency board arrangement. The purpose for this is to set the context, in which we will later present the main results from the bank lending survey.

After several inconclusive attempts to stabilize the Bulgarian economy in 1991–1996 and a major financial crisis, which culminated in a short-lived hyperinflationary episode in December 1996–February 1997, a currency board in Bulgaria was introduced with the new Law on the Bulgarian National Bank of 10 June 1997. In the first several years after the adoption of the currency board, credit growth in Bulgaria was moderate and the credit to GDP ratio was low averaging 11% in the period 1998–2001. At that time the banking system in Bulgaria was characterized by comparatively high level of non-performing loans, low capitalization and liquidity constraints. There were also structural factors, which inhibited the expansion in bank lending associated with the fact, that the majority of banks were stated-owned and lacked the knowledge required for modern banking practices. Meanwhile, bank privatization was an important factor which started the gradual process of restructuring of the banking sector in Bulgaria.

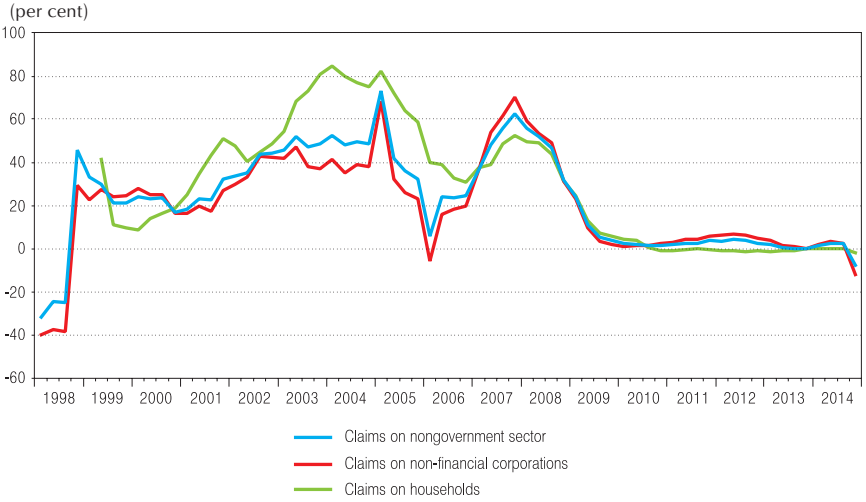
From 2002 onwards a gradual credit expansion was observed and credit to GDP reached nearly 70% in late 2008. In the years before the collapse of Lehman Brothers there were two periods of high growth of credit to the private sector in Bulgaria: the first one from 2003 till 2005 and the second one in 2007. Rapid credit growth in these years was driven on the one hand by high loan demand, which was stimulated by the favorable domestic and external macroeconomic environment and the global upswing in the credit cycle, high expected return on investment and positive income convergence expectations. On the other hand, banks actively expanded their operations. An important factor which contributed to the deepening of the financial intermediation over the period was the privatization of many domestic banks by foreign financial institutions. Parent banks provided capital, liquidity and know-how to their subsidiary banks and

Chart 1: Credit developments in Bulgaria after the introduction of the currency board in 1997

Credit to GDP ratio



Annual growth of credit to the private sector



Source: BNB, NSI.

their branches in Bulgaria, intending to boost their market share in the region where return on capital was very high. These processes prompted a strong competition among banks and certain easing of lending standards was observed. Another factor pushing credit growth was the signing of the Treaty of accession to the EU in 2005, which affected positively investor confidence about the development prospects of the country.

In this context, operating in a currency board and being unable to set interest rates, the Bulgarian National Bank pursued a consistent counter-cyclical policy mostly with macro-prudential and supervisory measures aimed at ensuring the stability of the banking system and at containing rapid credit growth. In the years of high economic growth before 2008, the BNB imposed very strict and conservative regulations for capital, liquidity, risk classifications and provisioning. Some of the macro-prudential measures were related to the conducting of a more restrictive policy regarding banking license issuance, the extension of the deposit base on which minimum reserve requirements (MRR) are calculated or the tightening of banking supervision through different prudential measures. In April 2005 BNB introduced administrative credit limits (credit ceilings), which were effective till January 2007. Banks whose quarterly credit growth exceeded the reference values set by the central bank had to hold additional minimum reserves with the BNB. Following the introduction of the credit ceilings there was an improvement in banks' balances and reduction of the credit risk in the banking system. Certain moderation of credit growth was also observed. After the administrative measures were abolished in the beginning of 2007, credit growth started accelerating again and reached 62.5% at the end of the year. Continuing to conduct a consistent counter-cyclical policy, BNB introduced an increase of the MRR ratio from 8% to 12% in September 2007.

Towards the end of 2008 and following the Lehman Brothers bankruptcy banks' behaviour changed. Parent banks reduced the availability of funds provided for market expansion. The Bulgarian banks tightened their credit standards and started to finance their activities mostly through domestic recourses. Since the end of 2008 growth of lending to the private sector slowed down significantly, reflecting the intensification of the global financial and economic crisis. The Bulgarian economy was affected through increased uncertainty on the international financial markets, lower foreign capital inflows and declining external demand. During the economic downturn, the Bulgarian National Bank continued to conduct a counter-cyclical policy, taking a number of measures in late 2008 and

2009, which aimed at providing greater liquidity management flexibility of commercial banks using liquidity buffers created in previous years. Part of the measures were related to the easing of minimum reserve requirements' regulations and included the recognition of 50% of the cash balances as reserve assets and the reduction of the MRR rate from 12% to 10%, followed by a reduction of the MRR rate to 5% for funds attracted from non-residents and to 0% for government's deposits, collateralized with government securities. After 1 January 2009 the average effective minimum reserve requirement for the banking system fell to some 7 per cent and the overall effect of these BNB measures was a release of liquidity to banks. Other measures taken by the Bulgarian National Bank as a response to the crisis concerned the easing of the loan classification and provisioning rules. These measures aimed to ease credit institutions in negotiating the credit conditions and in converging with the international practices of the more conservative approach applied so far for the classification and loan loss provisions. In this manner, more benevolent conditions were created for banks to be flexible with their viable customers who were experiencing temporary difficulties in a harsh economic situation.

4. Survey results for Bulgaria

Against the background of the banking system and credit developments before and during the financial crisis, described in the previous chapter, in this section we provide an overview of the main results of the bank lending survey for Bulgaria. The questions in the survey concern either developments in credit standards or in demand for loans.[1] First, we present these developments for the period from 2003 Q4 till 2014 Q4. Furthermore, we discuss the contributing factors put forward by the banks surveyed in more detail. Finally, we compare the results of the bank lending survey with information collected from other sources. The analysis covers lending to enterprises as well as lending to private households. Lending to enterprises is further classified into lending for short-term purposes and lending for long-term purposes while lending to households is classified into lending for house purchase and lending for consumer credit.

[1] For details concerning the structure of the bank lending survey see Annex I: Structure and implementation of the BLS, p.43.

4.1. Lending to enterprises

As the time series cover a longer period of time concerning short-term loans and long-term loans to enterprises in comparison to total lending to firms we will focus our analysis on the two types of loans separately.[2] This will enable us to include the recession years in the analysis in order to make more comprehensive conclusions. For the aims of the following analysis we define the recession period as the period from the third quarter of 2008 till the fourth quarter of 2009, when based on seasonally adjusted data on quarterly growth Bulgaria's GDP decreased. By post-recession period we mean the period from the first quarter of 2010 till present. It is important to bear in mind that the so defined recession period for Bulgaria is not identical with the period of the global financial and economic crisis as from the point of view of other countries. The first signs of the crisis were present in the USA in late 2007 and early 2008, but in Bulgaria they showed several quarters later. Bulgarian commercial banks did not have an exposure to securities tied to the US real estate market, which plummeted in 2007 damaging financial institutions globally. The crisis in Bulgaria was channeled through the real economy and was a consequence of increased uncertainty on global financial markets, which led to lower foreign capital inflows and declining external demand.

For the aims of our analysis, in the charts below, which show developments in credit standards and in demand for loans to enterprises, we explicitly indicate the so defined recession period for Bulgaria and the period in which the administrative credit limits (credit ceilings) were effective.[3]

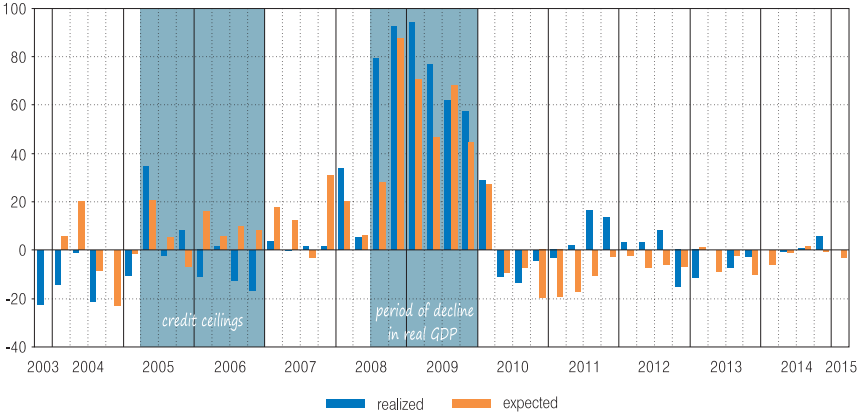
[2] For the period from the fourth quarter of 2003 to the present day, the BLS included questions on demand and credit standards separately for short-term and long-term corporate loans. The BNB has included questions on demand and credit standards for total corporate loans and consumer and housing loans to households since the first quarter of 2010.

[3] See Section 3, p. 9.

Chart 2: Changes in credit standards for loans to enterprises

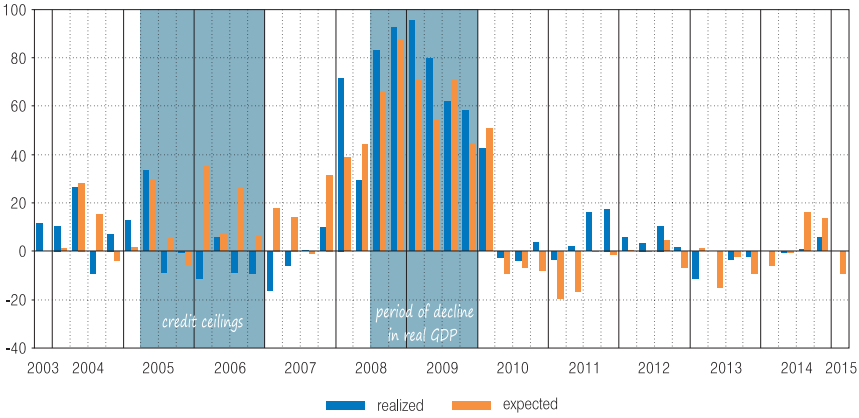
Short-term loans to enterprises

(net balance of opinions, percentage points)



Long-term loans to enterprises

(net balance of opinions, percentage points)



Note: The balance of opinions is defined as a difference in percentage points between the percentage of banks responding 'tightened' ('considerably' and 'somewhat') and the percentage of banks responding 'eased' ('considerably' and 'somewhat'). All bank responses are weighted by the bank's market share in lending to non-financial corporations for the relevant quarter.

'Realized' values refer to the period in which the survey was conducted. 'Expected' values are the net percentages calculated from the responses given by the banks in the previous survey.

Source: BNB – Bank Lending Survey.

Chart 2 shows how credit standards applied to the approval of loans to enterprises changed in the period from 2003 Q4 until 2014 Q4. In the years before the global financial and economic crisis, generally a net easing of credit standards was observed in respect to short-term loans to enterprises. Concerning long-term loans a net tightening of standards was reported in the first several rounds of the bank lending survey and a net easing afterwards. From the third quarter of 2008 till the first quarter of 2010 banks tightened strongly credit standards applied to the approval of short-term as well as long-term loans to enterprises. In the post-crisis years banks did not undertake any serious easing of standards. Easing of credit standards was observed only in respect to loan interest rates and to a lesser extent in respect to fees and commissions, which can be explained by the high competition from other banks. Concerning the maximum size of the loan, the premium on riskier loans and collateral requirements, standards remained tighter (see Chart 12 in Annex II). Expectations of banks concerning developments in their lending policy were generally in line with the actual outcomes in most of the period under consideration.

Concerning banks' responses with regard to changes in demand for loans, a net increase of loan demand from enterprises was observed till the end of 2008, followed by a net decrease in 2009 and the first quarter of 2010 (see Chart 3)[4]. In the post-recession period loan demand started growing again (more pronounced with respect to short-term loans), but growth was more slowly compared to the pre-crisis years. The certain recovery of loan demand from enterprises and the lack of considerable easing of banks' credit standards in the after-crisis years may misleadingly lead to the conclusion that low credit growth from 2010 till 2014 was supply-side driven.[5] However, it should be borne in mind, that growth of lending to enterprises concerns the stock of loans, including the maturing loans. Concurrently, when looking at the volumes of extended new loans to enterprises, they have returned close to their pre-crisis levels.[6] Expectations regarding the development of credit demand were generally in line with the actual outcomes excepting the recession period, when banks did not expect demand for loans to decrease as it did in fact.

[4] By net increase/decrease in demand for loans is meant a positive/negative value for the net percentage of banks reporting an increase in loan demand.

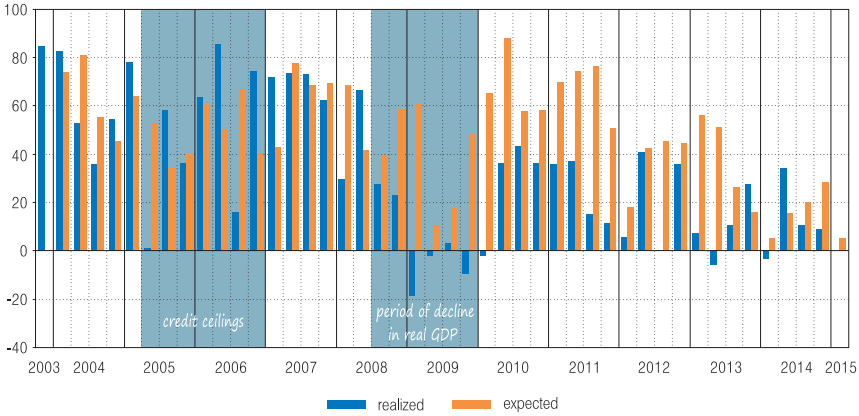
[5] The average annual growth of claims to non-financial corporations in the period 2010-2014 came to 2.8% compared to 38.6% average for the period 2003-2008.

[6] See Chart 14 in Annex II.

Chart 3: Changes in demand for loans to enterprises

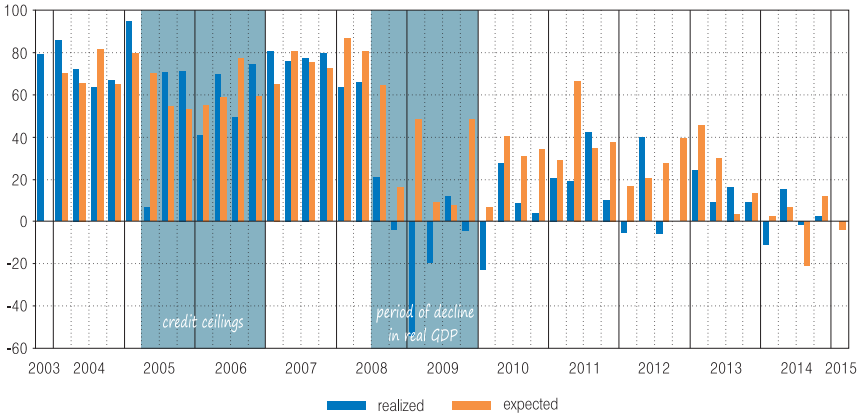
Short-term loans to enterprises

(net balance of opinions, percentage points)



Long-term loans to enterprises

(net balance of opinions, percentage points)



Note: The balance of opinions is defined as a difference in percentage points between the percentage of banks responding 'increased' ('considerably' and 'somewhat'), and the percentage of banks responding 'decreased' ('considerably' and 'somewhat'). All bank responses are weighted by the bank's market share in lending to non-financial corporations for the relevant quarter.

'Realized' values refer to the period in which the survey was conducted. 'Expected' values are the net percentages calculated from the responses given by the banks in the previous survey.

Source: BNB – Bank Lending Survey.

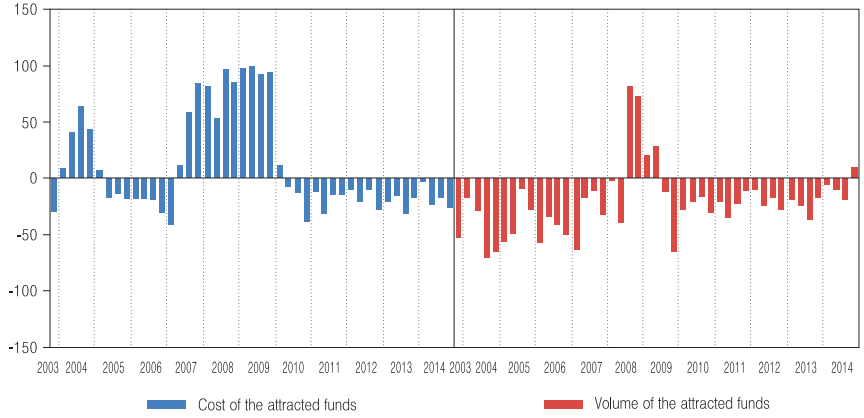
Considering the reasons behind the tightening or easing of credit standards, Chart 4 shows the factors affecting credit standards for approving loans to enterprises. In the pre-crisis years almost all of the factors, included in the bank lending survey, contributed to the easing of credit standards except the credit risk and the collateral risk. During the recession years, the main reasons behind the tightening of credit standards were linked to the increasing cost of attracted funds and the perception of risk. Against the background of heightened uncertainty related to the general economic situation, banks started competing for the attraction of funds from residents, which resulted in higher cost of financing. In the post-recession period, the factors contributing most to the easing of credit standards were related to the stronger competition from other banks, the increased volume and the declining cost of attracted funds, as banks had already accumulated enough liquidity, while perception of risk continued to play a negative role in the background of economic uncertainty.

Concerning the factors affecting demand for loans to enterprises, during the whole period under consideration demand for loans was increasing for financing needs of inventories and working capital, but at a decelerating pace. Before the crisis firms demanded loans for investment purposes, while during the recession years fixed investment was subdued and consequently credit demand decreased. In the post-recession period loan demand for investment purposes recovered slightly, but was far away from pre-crisis levels. A factor which had a positive contribution to the demand for loans to enterprises during the recession was the limited access of firms to alternative sources of finance, such as internal financing or loans from non-banking institutions.

Chart 4: Factors contributing to changes in banks' lending policies

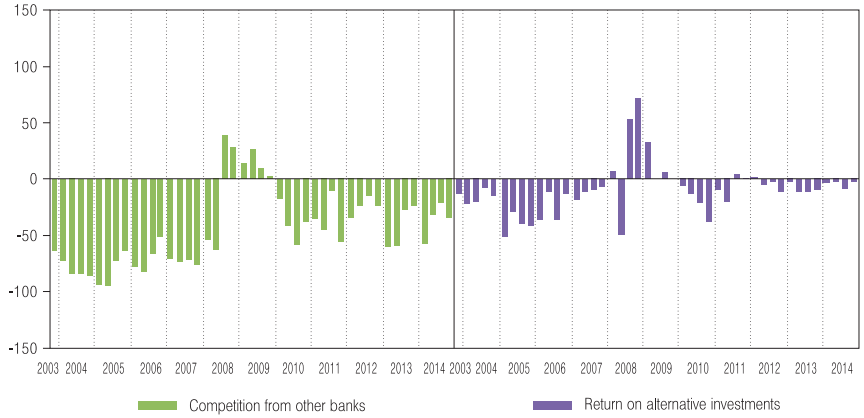
a) Cost and volume of funds

(net balance of opinions, percentage points)



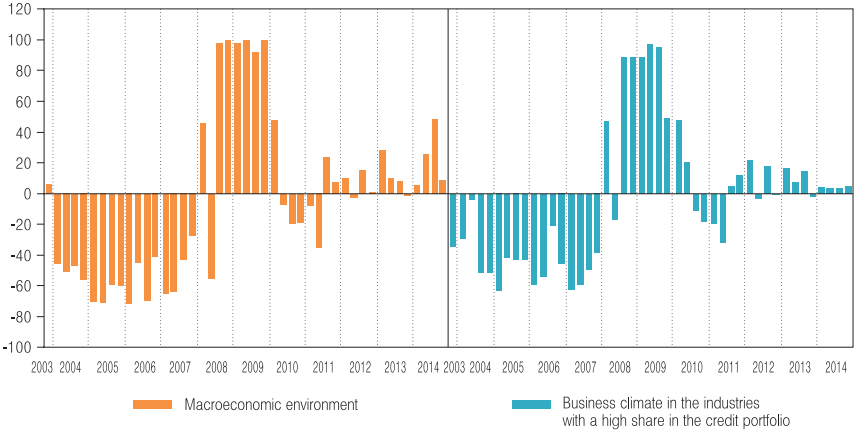
b) Competition and alternative investment

(net balance of opinions, percentage points)

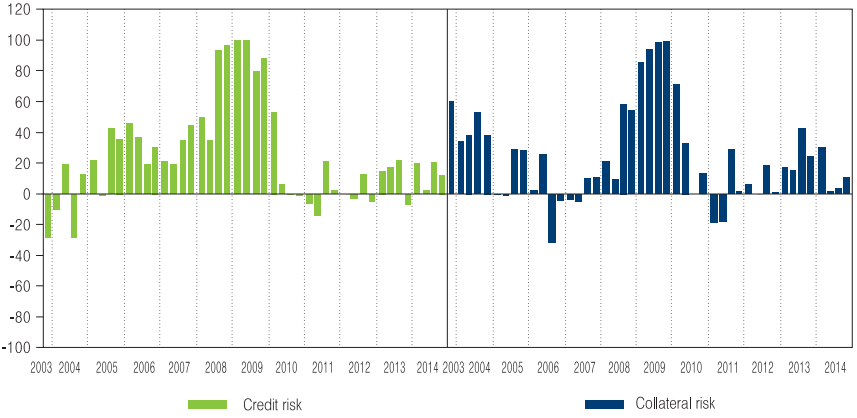


c) Perception of risk

(net balance of opinions, percentage points)



(net balance of opinions, percentage points)



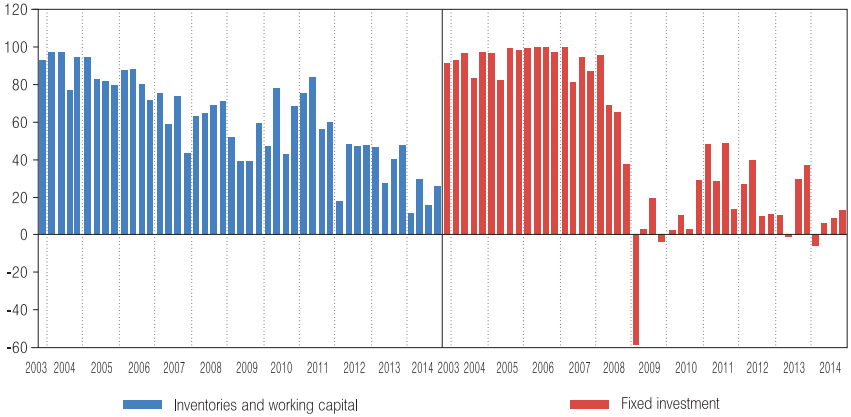
Note: The balance of opinions in responses about factors of credit standards is defined as a difference between the percentage of banks' responses for 'has contributed to tightening' ('considerably' and 'somewhat') and the percentage of banks' responses for 'has contributed to easing' ('considerably' and 'somewhat').

Source: BNB – Bank Lending Survey.

Chart 5: Factors contributing to changes in demand for loans to enterprises

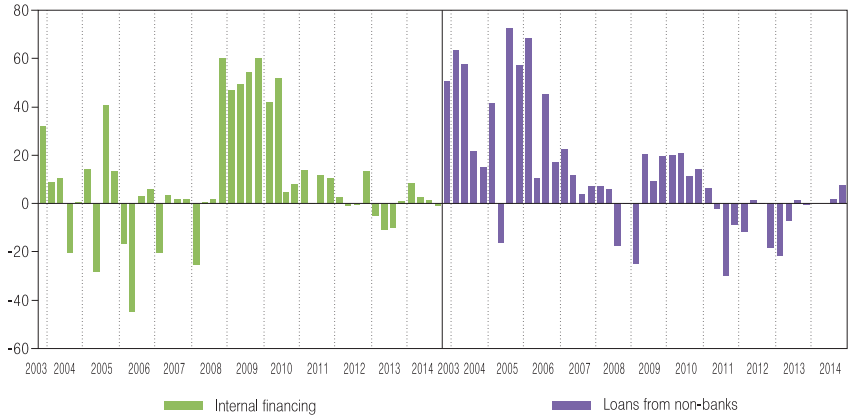
a) Financing needs

(net balance of opinions, percentage points)



b) Use of alternative sources of financing

(net balance of opinions, percentage points)



Note: The balance of opinions in responses about factors of loan demand is defined as a difference between the percentage of banks' responses for 'has contributed to growth' ('considerably' and 'somewhat') and the percentage of banks' responses for 'has contributed to a decrease' ('considerably' and 'somewhat').

Source: BNB – Bank Lending Survey.

4.2. Lending to households

Questions concerning lending to households have been included in the bank lending survey since the first quarter of 2010.[7] Consequently, conclusions about developments in lending for consumer credit and for house purchase during the recession years cannot be drawn from the survey results. In the years after the crisis, survey results show that credit standards for approving loans to households generally eased, more pronounced concerning loans for house purposes (see Chart 6). Banks' expectations about their lending policy were generally in line with actual outcomes. Despite the easing of credit standards, demand for housing loans was decreasing from the last quarter of 2011 till the third quarter of 2012. In the quarters before and after that, changes in demand for loans for house purchase generally moved opposite to changes in credit standards. Demand for consumer loans was increasing during most of the period under consideration, whereas these developments were not always stimulated by banks' lending policy. Concurrently, banks' expectations about developments in credit demand did not always come into realization.

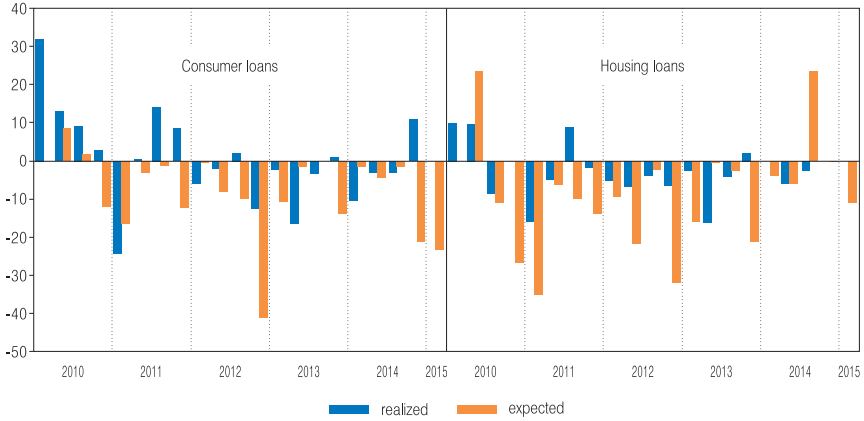
With regard to conditions and terms for approving loans to households, during the period under consideration banks eased their lending policy mostly in respect to loan interest rates, the interest spread and the fees and commissions for approving and managing the loans (see Chart 13 in Annex II). Furthermore, from the first quarter of 2012 banks eased credit standards in respect to the maximum size of loans for consumer credit. Standards were tightened concerning the premium on riskier loans and collateral requirements.

[7] For more detailed description of the structure of the Bank Lending Survey see Annex I: Structure and implementation of the Bank Lending Survey, p. 43.

Chart 6: Credit standards and demand for loans for consumer credit and house purchase

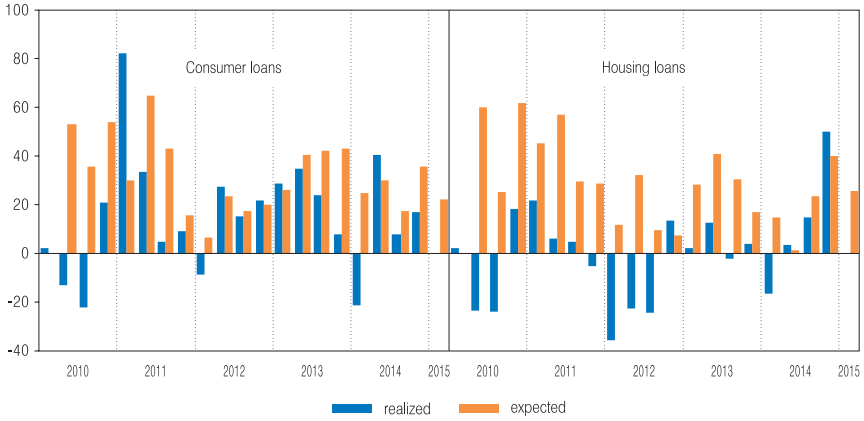
Changes in credit standards

(net balance of opinions, percentage points)



Changes in demands for loans

(net balance of opinions, percentage points)



Note: The balance of opinions is defined as a difference in percentage points between the percentage of banks responding 'tightened/increased' ('considerably' and 'somewhat') and the percentage of banks responding 'eased/decreased' ('considerably' and 'somewhat'). All bank responses are weighted by the bank's market share in lending to households for the relevant quarter.

'Realized' values refer to the period in which the survey was conducted. 'Expected' values are the net percentages calculated from the responses given by the banks in the previous survey.

Source: BNB – Bank Lending Survey..

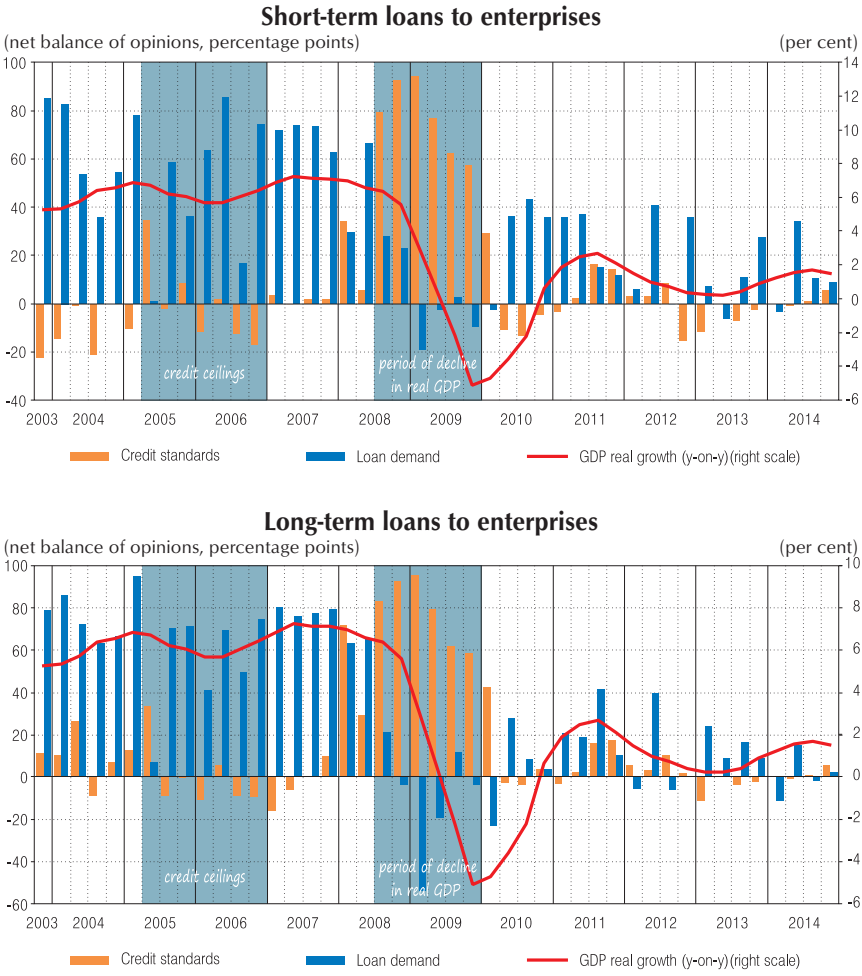
4.3. Comparison of bank lending survey data with other indicators

This section aims at comparing some of the reported variables in the survey with information from other sources (real GDP growth, loan growth, gross fixed capital formation and industrial confidence). The purpose of this analysis is to assess the information content of BLS results in relation to other macroeconomic and financial data.

Credit standards, among other factors such as interest rates, exchange rates, consumer or business confidence, may be linked to economic activity. To the extent that credit availability depends on lenders' standards, a tightening of banks' lending policy should cause a decline in spending by firms and households that depend on banks for credit and this in turn should lead to lower economic activity. Chart 7 presents developments in real activity alongside those in banks' credit standards and in demand for loans to enterprises.

In the years before the global financial crisis, a net easing of credit standards in respect to short-term loans to enterprises was generally observed. Concerning long-term loans to enterprises a net tightening of banks' lending policy was reported in the period 2003Q4–2005Q2 and a net easing afterwards. Indeed, taking into account the very tight initial credit standards, the cumulative effect in this period was easing of banks' lending policy towards enterprises, driven by supply factors and competition for market share. At that time banks had plain access to foreign financing. Financial resources were provided by parent banks to their subsidiary banks and their branches in Bulgaria, with the aim of boosting their market share in the region because of the significant return on investment. At the same time demand for short-term as well as for long-term loans was increasing rapidly. In line with developments in credit standards and credit demand real activity was strong, averaging 6.2% for the period 2003–2007. Banks started tightening their lending policy from the first quarter of 2008, shortly after the first signs of the global financial crisis had appeared and demand for loans started declining several quarters later. A possible explanation of these developments is the fact that banks could react more rapidly to what was happening on international financial markets and change their lending policy accordingly. At the same time, a longer period of time was needed to see a change in firms' behavior. The first signs of a slight improvement of economic activity could be observed from the first quarter of 2010 and credit demand started growing again one quarter later. Banks also started easing their lending policy from the second quarter of 2010. During the post-recession period demand for loans from

Chart 7: Comparison of BLS data on credit standards and demand for loans to enterprises and real GDP growth



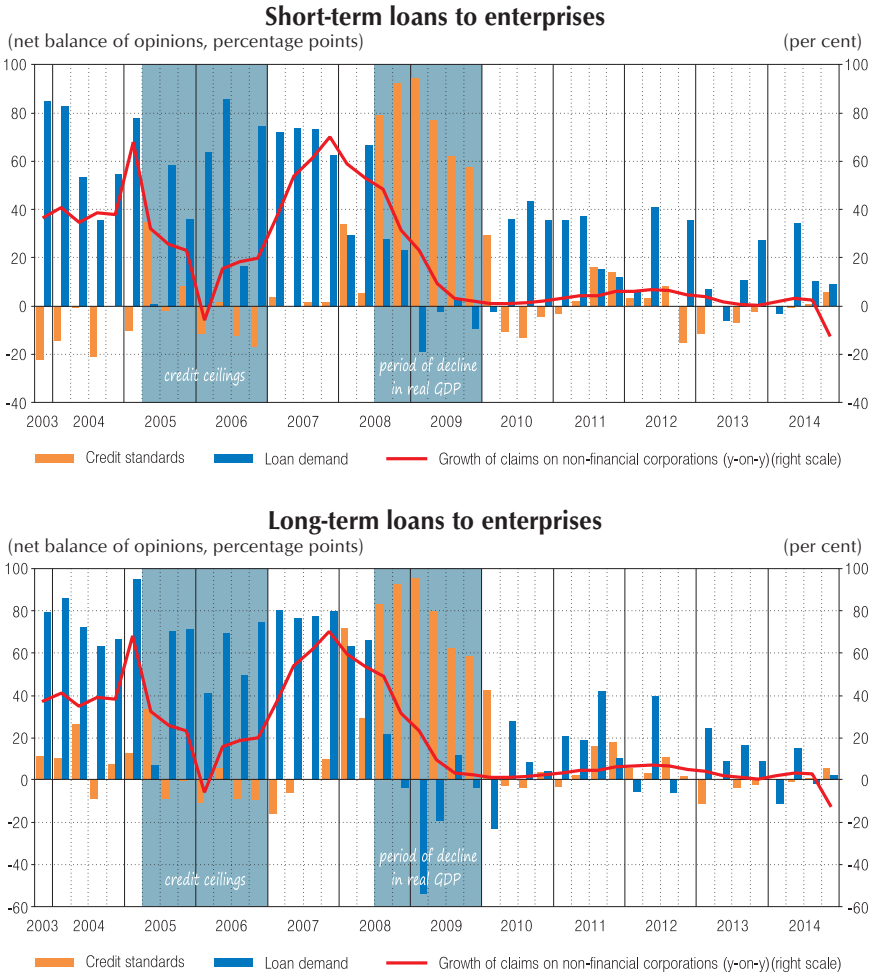
Source: BNB – Bank Lending Survey, NSI.

enterprises has been increasing in most of the time, while banks' lending policy has been not very consistent as there were periods of easier as well as of tighter lending standards.

One of the objectives of the bank lending survey is to complement information, retrieved from other sources, such as the monetary statistics. It can be expected, that a high net percentage of tightening of credit standards should be associated with low (if negative) lending growth.

In Chart 8 data from the bank lending survey is plotted together with data on the claims on non-financial corporations from the monetary statistics. As a matter of fact, in the period from the first quarter of 2008 till the first quarter of 2010 a high net tightening of credit standards was observed and at the same time the year-on-year growth of lending to non-financial corporations was posting a significant deceleration (from a peak of 70.2% in 2007 Q4 it came to around 1% at the beginning of 2010). However, the results of the bank lending survey show that the inverse relationship between tightening of credit standards and loan growth is not always apparent. For example the net tightening of standards with regard to long-term loans to enterprises over the first several rounds of the survey was associated with a net increase in demand for such loans according to banks' answers and the year-on-year growth of lending to NFC was not showing any signs of deceleration. Possible explanations for the increased loan demand from enterprises in this period are the optimistic expectations of firms for the medium-term economic outlook. With respect to short-term loans the relationship is more intuitive for the first several survey rounds. In the post-recession years there are also periods in which standards and credit growth were not moving in opposite directions. One possible reason for these results may be that banks' answers regard to short-term and long-term loans separately while the growth of lending to non-financial corporations concerns total loans to enterprises. However, if we look at banks' answers concerning total loans to enterprises, for which we have data since the first quarter of 2010, and compare them with data on lending to NFCs from the monetary statistics, the results do not show a very different picture. It is highly possible that in the after-crisis years many other factors besides credit standards, such as the uncertain economic environment, postponed investment by firms or unwillingness of enterprises to run up more debts have influenced credit growth.

Chart 8: Comparison of BLS data on credit standards and demand for loans to enterprises and growth of loans to NFCs



Note: In the fourth quarter of 2014 the year-on-year decline in claims on non-financial corporations is driven by the exclusion of Corporate Commercial Bank as a reporting unit from the monetary statistics since November 2014 after its banking license revocation.

Source: BNB – Bank Lending Survey and Monetary Statistics.

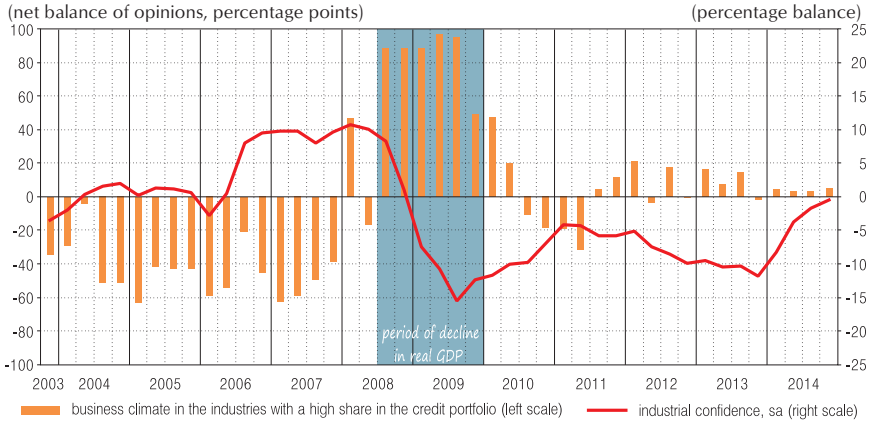
However, if we look at BLS data on demand for loans from enterprises and compare it with the growth of claims on non-financial corporations, there is much more systematic pattern in the directions they move. In the years before the global financial and economic crisis demand for loans from enterprises was high, stimulated by the favorable macroeconomic environment and high expected return on investment. At the same time rapid credit growth, as reported from the monetary statistics, was observed with the exception of the period from 2005 Q2 till 2006 Q1. The significant deceleration of growth of loans to non-financial corporations in 2005 and the beginning of 2006 was most certainly strongly affected by the introduction of the credit ceilings by the BNB and was not driven by declining loan demand.[8] During the recession years demand for loans started decreasing and credit growth was decelerating as well. In the post-recession period loan demand from enterprises returned to certain levels, while the growth of claims on non-financial corporations remained weak, but at least in positive territory and both indicators moved in the same direction.

Turning to the factors affecting credit standards, one of the reasons reported for the tightening of credit standards for loans to enterprises is the risk perception related to the business climate in the industries with a high share in the credit portfolio. Chart 9 compares the net percentage reported for the business climate with the industrial confidence indicator as reported by the European Commission's Business and Consumer Surveys.[9] In most of the period before the recession industrial confidence was positive and, at the same time, banks reported this factor as contributing to the easing of credit standards. Since the third quarter of 2008 the industrial confidence indicator started declining and even turned negative in the beginning of 2009. Along with the enhancement of risk perception banks reported a tightening of credit standards. In the post-crisis period, generally an improvement in industrial confidence, in the sense of a less negative value of the indicator, was associated with an easing of lending policy of banks, and a deterioration of the confidence indicator went along with tighter credit standards.

[8] For details see section 3.

[9] The industrial confidence indicator is the arithmetic average of the balances (in percentage points) of the answers to the questions on production expectations, order books and stocks of finished products. Balances are seasonally adjusted.

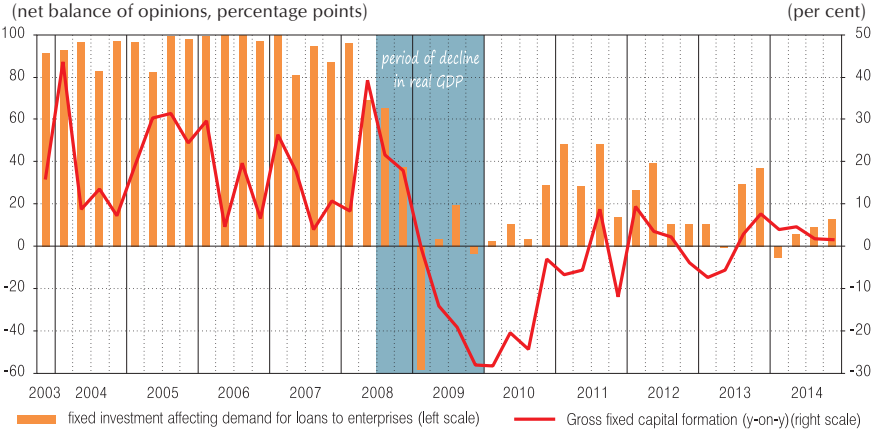
Chart 9: Comparison of BLS data and industrial confidence



Note: The balance of opinions is defined as a difference in percentage points between the percentage of banks responding "contributed considerably to tightening" and "contributed somewhat to tightening" and the percentage of banks responding "contributed somewhat to easing" and "contributed considerably to easing".

Source: BNB – Bank Lending Survey, EC.

Chart 10: Comparison of BLS data and gross fixed capital formation



Note: The balance of opinions is defined as a difference in percentage points between the percentage of banks responding "contributed considerably to higher demand" and "contributed somewhat to higher demand" and the percentage of banks responding "contributed somewhat to lower demand" and "contributed considerably to lower demand".

Source: BNB – Bank Lending Survey, NSI.

Turning to the demand side, the bank lending survey provides information on the reasons driving the demand for loans from both enterprises and households. In the pre-crisis period, almost all of the banks, participating in the bank lending survey, reported that financing needs related to fixed investment contributed to higher demand for loans from enterprises. During the recession, in the background of uncertain macroeconomic environment, demand for bank loans for financing investment opportunities declined, and recovered to certain levels in the period thereafter. Chart 10 compares this information from the bank lending survey with the growth rate of gross fixed capital formation, which is the GDP component that is mostly related to investment.

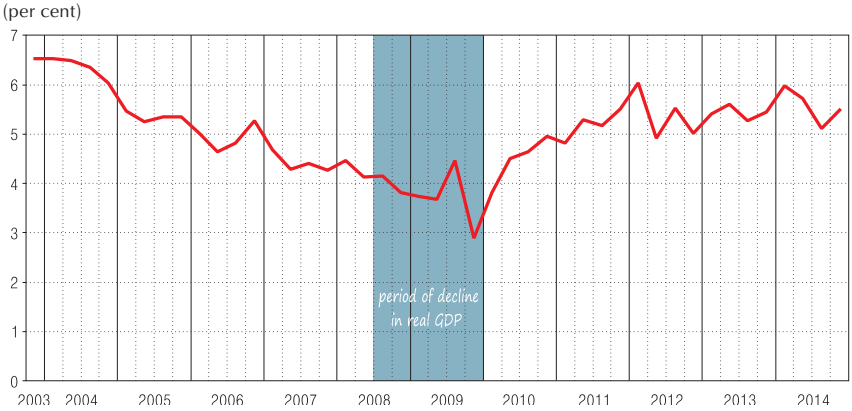
This chart shows that both indicators move in the same direction. High demand for loans from enterprises for investment purposes before the crisis was associated with comparatively high growth in gross fixed capital formation. At the same time lower credit demand for financing fixed investment, as reported in the bank lending survey, was accompanied by lower or even negative growth in gross fixed capital formation in the period from the fourth quarter of 2008 till the third quarter of 2010.

The inference from the graphical analysis displayed above is that there is comparability of data obtained from the bank lending survey with macroeconomic data, collected from other sources like GDP growth, loan growth, investment or industrial confidence. In the next section we will try to examine empirically the information content of the bank lending survey results by using them as explanatory variables for credit developments. Most certainly credit growth cannot be explained entirely by survey results. Therefore, along with survey data, we include in the empirical analysis other variables like real GDP growth, the spread between interest rates on loans and deposits of enterprises, the capital-to-asset ratio, bad and restructured loans as a share of total loans[10] and the business climate. As can be seen from Chart 11, during the recession period when the business climate was starting to deteriorate sharply, there is evidence for an increasing share of bad and restructured loans and declining banks' profit margins. Banks tried to hedge against the uncertainty and the deteriorating economic environment by increasing their capital buffers. The decrease of profit margins of banks was partly due to the significant increase of interest rates, which banks were ready to pay to attract more deposits from residents in the background of reduced access to international financial

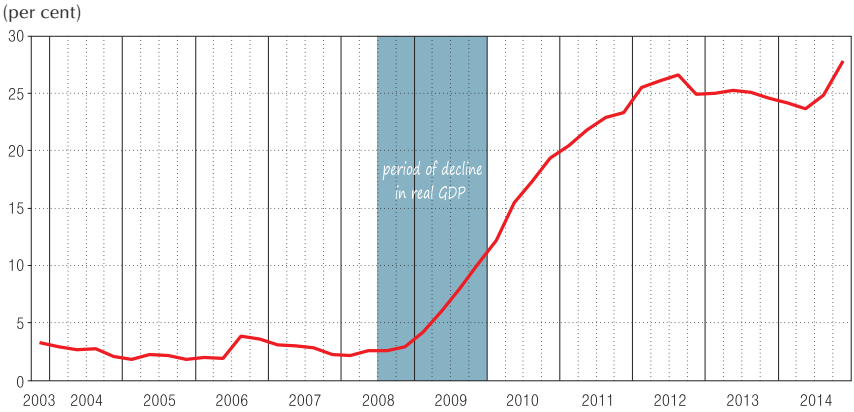
[10] Data on bad and restructured loans is taken from the monetary statistics. See also footnote 13.

Chart 11: Indicators used in the empirical analysis

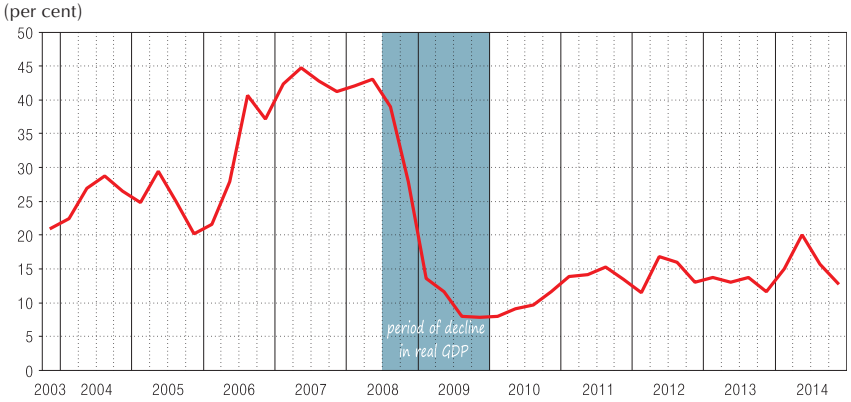
Interest rate spread



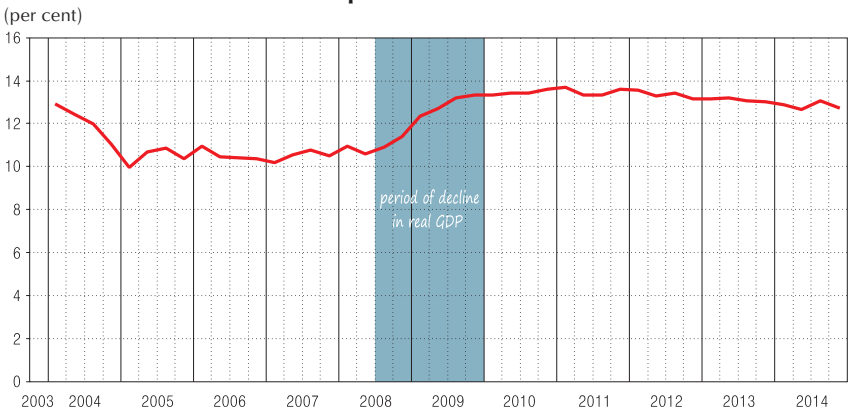
Bad and restructured loans



Business climate



Capital-to-asset ratio



The interest rate spread is defined as the spread between the average weighted interest rates on loans to non-financial corporations and the average weighted interest rates on deposits of non-financial corporations. Bad and restructured loans are defined as the share of loans to NFC with impaired performance past-due over 90 days and restructured loans in total loans to enterprises. Data on bad and restructured loan is provided by the monetary statistics. The business climate indicator is taken from the NSI tendency surveys. The capital-to-asset ratio is the ratio of bank capital to bank assets for the banking system as a whole.

Source: BNB, NSI.

markets. In the post-recession period the profit margins of commercial banks returned to certain levels, as faced to high accumulated liquidity they started decreasing deposit interest rates again. After reaching a capital-to-asset ratio of around 13% banks kept the level of capitalization close to this percentage. As a consequence of the worsened economic environment, firms started to experience difficulties in financing their investments and to repay their obligations to banks, which translated into increasing share of bad and restructured loans even after the crisis period.

Using data obtained from the bank lending survey and combining it with these additional variables, which could possibly explain changes in credit developments we will try to examine the information content of BLS results for growth of lending to enterprises. The analysis will be done first at the macro level and subsequently at the micro level using data by individual banks.

5. Empirical evidence

5.1. Macro level

As already mentioned above, definitive conclusions about what are the exact determinants of changes in bank lending cannot be drawn from the available statistics. Since there is only a limited possibility of making a clear-cut distinction between supply and demand variables using macroeconomic measurement variables, typically in loan equations are used approximation values such as GDP or investment for the demand side as well as an interest spread to capture the supply factors. In this respect, the bank lending survey can provide valuable information for a separate treatment of loan demand and loan supply as determinants in a loan equation. The net balances of banks' responses in respect to loan demand and credit standards for approving loans can be used as alternative indicators of a change in the supply of credit ($\Delta supply_t$), and of an adjustment of the demand for credit ($\Delta demand_t$), respectively.[11] In this section, using data on aggregate lending to enterprises (claims on non-financial corporations from the monetary statistics) and combining it with the results from the bank lending survey, we will try to make a distinction between loan supply-side and loan demand-side factors,

[11] Positive values for the net balances indicate an increase in demand for loans or a tightening of credit standards.

affecting the actual growth of credit. For the purpose of this analysis, we will use the following equations:[12]

$$(1) \qquad \Delta \ ln \ K_t = \beta_0 + \beta_1 \ \Delta demand_t\_sh + \beta_2 \ \Delta supply_t\_sh + \varepsilon_t \quad and$$

$$(2) \qquad \Delta \ ln \ K_t = \beta_0 + \beta_1 \ \Delta demand_t\_lg + \beta_2 \ \Delta supply_t\_lg + \varepsilon_t$$

where, the dependent variable $\Delta \ ln \ K_t$ is the growth rate of claims on non-financial corporations, $\Delta demand_t\_sh$ and $\Delta supply_t\_sh$ are the net balances of banks' responses to the BLS questions on the change in the demand and in credit standards in respect to short-term loans to enterprises, $\Delta demand_t\_lg$ and $\Delta supply_t\_lg$ are the net balances of banks' responses to the BLS questions on the change in the demand and in credit standards in respect to long-term loans to enterprises. The expected signs are positive for the coefficients β_1 and negative for the coefficients β_2. Cross correlations between the above defined BLS indicators and growth of claims on non-financial corporations at various lags (-) and leads (+) are presented in Table 4 in Annex II and tests for stationarity are reported in Table 6 in Annex II. The regression equations are estimated using the ordinary least squares method. Initially, only survey results are included in the regression, and subsequently additional explanatory variables, such as quarter-on-quarter seasonally adjusted real GDP growth (Δ ln GDP), interest spread defined as the difference between weighted average lending rates and weighted average deposit rates for non-financial corporations, the share of bad and restructured loans in the total amount of loans to non-financial corporations (Δ BRL)[13], business climate and banking system capital to assets ratio. Cross correlations between growth of claims on non-financial corporations and the additional explanatory variables at various lags (-) and leads (+) are presented in Table 5 in Annex II and tests for stationarity in Table 6 in Annex II. To deal with problems of normal distribution of the

[12] The approach we follow in this section is similar to the one used in the Monthly Report of Deutsche Bundesbank (January 2009).

[13] The regression analysis is based on monetary statistics data on loans, which are restructured and with impaired performance past-due over 90 days, due to available data time series for the whole period under review (fourth quarter of 2003 to fourth quarter of 2014). It should be stated that in monetary statistics banks provide aggregated data on these loans, because detailed data on the exposures according to their past-due periods are not collected for the purpose of these statistics. In accordance with the international practice, reporting of monetary statistics differs from supervisory reporting, including the reporting of loans, which are restructured or with impaired performance. Therefore, the aggregated data on loans which are restructured and with impaired performance past-due over 90 days represent neither the total loans with impaired performance, nor the share of loans with impaired performance past-due over 90 days.

Table 1: Dependent Variable: Δ ln Claims on Non-financial Corporations (Δ ln K_t)

Explanatory Variables	Short-term loans to corporations		Long-term loans to corporations	
Constant	0.01 (0.01)	0.01 (0.01)	0.01* (0.01)	0.00 (0.01)
Δ credit demand (-1)	0.05** (0.02)	0.03 (0.03)	0.07*** (0.02)	0.07*** (0.03)
Δ credit supply (-1)	0.02 (0.03)	0.01 (0.02)	0.01 (0.02)	-0.01 (0.02)
d_2005q1	0.20** (0.03)	0.26*** (0.03)	0.20*** (0.03)	0.25*** (0.03)
d_2005q2	-0.32** (0.04)	-0.27*** (0.04)	-0.31*** (0.04)	-0.26*** (0.04)
d_2005q4	-0.17*** (0.03)	-0.17*** (0.03)	-0.16*** (0.03)	-0.16*** (0.03)
Δ BRL (-1)		-0.55 (0.56)		-0.47 (0.52)
Δ ln GDP (-1)		1.20* (0.71)		0.34 (0.73)
Δ Business climate (-1)		0.00 (0.00)		0.00 (0.00)
Δ Capital/Assets (-1)		5.41*** (1.78)		5.46*** (1.64)
Δ Interest spread (-1)		0.58 (1.11)		0.98 (1.00)
Δ ln K_t (-1)	0.38*** (0.12)	0.43*** (0.11)	0.24** (0.12)	0.29** (0.12)
R^2	0.81	0.88	0.84	0.90
S.E. of regression	0.03	0.03	0.03	0.03
Jarque-Bera test	0.06	0.58	0.11	0.67
Breusch-Godfrey LM test	0.40	0.90	0.97	0.68
Durbin-Watson test	1.61	2.03	1.72	2.05
Breusch-Pagan-Godfrey test	0.04	0.01	0.56	0.25
Number of observations	45	42	45	42

**** indicates significance at the 1% level, ** at the 5% level,* at the 10% level, standard errors in parenthesis.*

Notes: Three dummies are included in the specifications: d_2005q1, d_2005q2 and d_2014q4 for the first and second quarters of 2005, and the fourth quarter of 2014.

The results of the following test are presented in the table: Jarque-Bera normality test for distribution of residuals with null hypothesis: normal distribution, p-value is presented; Breusch-Godfrey LM test for serial correlation with null hypothesis: a lack of serial correlation in the residuals, p-value is presented; Durbin-Watson test for serial correlation in the residuals with DW statistics presented; Breusch-Pagan-Godfrey test for heteroscedasticity with null hypothesis: a lack of heteroscedasticity, p-value is presented.

According to Jarque-Bera criterion for normality of residuals, they are normally distributed. While the tests indicate that no serial correlation in the residuals is observed, Breusch-Pagan-Godfrey test reveals problems with heteroscedasticity of residuals regarding short-term loans to corporations. When applying the White's procedure to clear heteroscedasticity, the significance of coefficients in front of explanatory variables remained unchanged. Therefore, it may be concluded that it has no effect on empirical assessment conclusions.

Source: BNB

residuals we include three dummies for 2005Q1, 2005Q2 and 2014Q4 in our specifications and to deal with problems of serial correlation we include one lag of the dependent variable. The main results of the empirical macro analysis are presented in Table 1.

The empirical analysis outcomes show that the variable recording the change in demand for loans by corporations is statistically significant for the growth of claims, both for short-term and long-term loans to corporations. These results remain unchanged, if demand significance in the current or previous period is tested (i.e. if the first lag of explanatory variable is taken into account). The inclusion of additional explanatory variables into the specifications has also no impact on the robustness of estimates. The coefficient in front of the variable recording the changes in demand for loans remains stable in the various specifications, moving within a range of 0.05 to 0.07, i.e. the 1 percentage point increase in demand for loans positively affects the growth of claims on non-financial corporations by 0.05–0.07 percentage points. Changes in credit standards have statistically insignificant effect on corporate loans dynamics. Among the additional explanatory variables, statistical significance for the growth of claims is found regarding real GDP growth and banking system capital to assets ratio. The coefficients in front of these variables have the expected positive signs and are relatively higher than those in front of the variables from the survey. The overall explanatory power of the equations is comparatively high: the explanatory variables explain between 80 and 90% of the variation of the dependent variable.

To test if our conclusions till now can change if we go down to the micro level, we will do the analysis taking into account individual banks' answers to the bank lending survey and matching them to individual volumes of loans, granted by each bank.

5.2. Individual banks

By matching BLS responses to aggregate data on lending, potential mismatch errors and inaccurate interpretations of the results could arise. To deal with this problem, we construct a panel, for which purpose we merge the individual banks' responses to the BLS-questions with individual data on lending amounts for the surveyed banks. In doing so, we guarantee that survey responses and loan data refer to the same panel of banks. Data on banks' lending amounts are drawn from the financial supervision reports and represent the end-of-quarter values of stocks. Complementary to the survey results, additional explanatory variables are added to the

panel. They comprise specific factors for each individual bank, such as interest spread between corporate loans and deposits by individual bank[14], individual bank capital to assets ratio[15], and variables that are common to all banks, as real GDP growth (quarter-on-quarter seasonally adjusted), business climate in Bulgaria and the share of bad and restructured loans in the total amount of loans to non-financial corporations[16].

The panel econometric analysis is carried out for unbalanced data panel comprising the period between the fourth quarter of 2003 and the last quarter of 2014, applying panel estimation with cross-section fixed effects to account for the unobserved variation among the banks. To examine the determinants of banks' lending to non-financial corporations, we estimate an equation of the following form:[17]

$$(3) \qquad \Delta \ln K_{i,t} = \alpha_i + \beta\,(L)\, BLS_{i,t} + \gamma\,(L)\, X_{(i)t} + \varepsilon_{i,t}$$

where, the dependent variable $\Delta \ln K_{i,t}$ is the first difference of the logarithm of loans to enterprises for bank *i* in period *t*. $BLS_{i,t}$ denotes a set of BLS indicators for loan supply and loan demand for bank *i* in period *t* and $X_{(i)t}$ is a vector with the additional macro and micro control variables mentioned above. Since the information content of the BLS indicators is of qualitative nature, they are included in our specifications as dummy variables. As regards loan demand and credit standards, two pairs of variables are designed for a decrease and an increase in loan demand by corporations and a tightening and an easing of credit standards respectively. Thus, specification equation (3) can be rewritten as:

$$(4) \qquad \Delta \ln K_{i,t} = \alpha_i + \beta_1\,(L)\, Demand\ decreased_{i,t} + \beta_2\,(L)\, Demand\ increased_{i,t} + \\ + \beta_3\,(L)\, Standards\ tightened_{i,t} + \beta_4\,(L)\, Standards\ eased_{i,t} + \gamma\,(L)\, X_{(i)t} + \varepsilon_{i,t}$$

where, for instance, the variable '*demand decreased*' takes the value 1 if bank *i* has reported a decrease in demand in period *t* (response categories

[14] Interest spread between corporate loans and deposits by individual bank is implicitly calculated, using the ratio of interest income on extended loans to average loans and the ratio of interest expenditure on attracted funds to the average amount of attracted funds.

[15] Data of the Banking Supervision Department on capital and assets of individual banks.

[16] Monetary statistics data. See also footnote 13 above.

[17] The approach used in this section is similar to the one in Blaes (2011).

'*decreased considerably*' or '*decreased somewhat*') and 0 otherwise. The variable 'standards tightened' takes the value 1 if bank i has reported a tightening of credit standards in period *t* (response categories '*tightened considerably*' or '*tightened somewhat*') and 0 otherwise. Similarly, the variables '*demand increased*' and '*standards eased*' are designed. The expected signs are negative for the coefficients β_1 and β_3, and positive for β_2 and β_4. We estimate six alternative specifications. We first estimate the impact of only BLS indicators on growth of lending to enterprises and include step by step the additional control variables afterwards. In Annex II (Table 7) we report cross correlations between loan growth and the additional macro and micro control variables at various lags (-) and leads (+). Tests for Unit Roots are presented in Table 8 in Annex II. The main results of the empirical micro analysis with respect to banks' answers concerning credit standards and demand for short-term loans are presented in Table 2, while those concerning credit standards and demand for long-term loans are shown in Table 3.

As can be seen from Table 2 (concerning short-term loans to enterprises) the constructed variables for "demand decreased" and "standards tightened" have the expected negative sign, meaning that lower credit demand or tighter banks' lending policy affect negatively the growth of loans to enterprises, while the corresponding variables for "demand increased" and "standards eased" show the expected positive sign. However, the results show that the BLS indicators, which are significant in explaining growth of lending to enterprises, are those for "demand decreased" and "standards tightened". As a matter of fact, the BLS indicator "demand decreased" is significant in all six specifications and the BLS indicator "standards tightened" is significant in two of them. The coefficients are broadly comparable among the different specifications used. In our baseline specification (1), the coefficient of "demand decreased", for example, indicates that a decrease in credit demand by 1 percentage point in period t-1 is associated with a decline of loan growth amounting to 0.09 percentage points in period t. The impact of this variable on lending remains robust, even when we include additional variables in the estimation. Regarding these additional control variables (the growth of real GDP, the interest spread by bank, the change in the capital-to-assets

Table 2: Dependent Variable: Δ ln Loans to Corporations (Δ ln K), Unbalanced Panel (OLS, Cross-Section Fixed Effects), short-term loans

Explanatory Variables	Short-term loans to corporations					
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.05*** (0.01)	-0.01 (0.02)	-0.02 (0.02)	-0.02 (0.02)	-0.01 (0.02)	-0.01 (0.02)
Δ credit demand (-1) (decrease)	-0.09*** (0.03)	-0.09*** (0.03)	-0.08*** (0.03)	-0.08*** (0.03)	-0.08*** (0.03)	-0.08*** (0.03)
Δ credit demand (-1) (increase)	0.02 (0.02)	0.02 (0.02)	0.02 (0.02)	0.02 (0.02)	0.02 (0.02)	0.01 (0.02)
Δ credit standards (-1) (tightening)	-0.04* (0.02)	-0.04** (0.02)	-0.01 (0.02)	-0.01 (0.02)	0.00 (0.02)	0.01 (0.02)
Δ credit standards (-1) (easing)	0.03 (0.03)	0.03 (0.03)	0.02 (0.03)	0.03 (0.03)	0.03 (0.03)	0.03 (0.03)
Interest spread by bank		1.26*** (0.39)	0.86** (0.39)	0.82** (0.39)	0.83** (0.39)	1.04*** (0.39)
Δ ln real GDP			4.09*** (0.67)	4.29*** (0.67)	3.79*** (0.69)	2.49*** (0.80)
Δ Capital to assets				0.75*** (0.21)	0.73*** (0.21)	0.72*** (0.21)
Δ BRL (-1)					-2.00*** (0.69)	-2.32*** (0.69)
Δ Business climate						0.01*** (0.00)
Δ ln K (-1)	-0.22*** (1.11)	-0.23*** (1.11)	-0.24*** (1.11)	-0.24*** (1.11)	-0.24*** (1.11)	-0.24*** (1.00)
Periods	43	43	43	43	43	43
Cross-sections	41	41	41	41	41	41
Number of observations	1303	1301	1301	1301	1301	1301
R^2	0.08	0.09	0.12	0.13	0.13	0.14
DW	2.12	2.14	2.12	2.09	2.09	2.08

**** indicates significance at the 1% level, ** at the 5% level,* at the 10% level, standard errors in parenthesis.*

Notes: The results of the following test are presented in the table: Durbin Watson (DW) test for serial correlation is presented with DW statistics. The results of this test suggest that no serial correlation is observed in the residuals.

The number of cross-sections is determined by the existence of restructuring in the banking sector over the review period related to mergers at banks or emergence of new banks. In the case of mergers, individual banks before the merger and the emerged new bank thereafter are treated as separate units in the panel.

Source: BNB

Table 3: Dependent Variable: Δ ln Loans to Corporations (Δ ln K), Unbalanced Panel (OLS, Cross-Section Fixed Effects), long-term loans

Explanatory Variables	Short-term loans to corporations					
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.05*** (0.01)	-0.01 (0.02)	-0.02 (0.02)	-0.02 (0.02)	-0.01 (0.02)	-0.01 (0.02)
Δ credit demand (-1) (decrease)	-0.07*** (0.03)	-0.07*** (0.03)	-0.05** (0.03)	-0.05** (0.03)	-0.04* (0.03)	-0.05* (0.03)
Δ credit demand (-1) (increase)	0.03 (0.02)	0.02 (0.02)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)
Δ credit standards (-1) (tightening)	-0.02 (0.02)	-0.02 (0.02)	0.01 (0.02)	0.01 (0.02)	0.01 (0.02)	0.02 (0.02)
Δ credit standards (-1) (easing)	0.04 (0.03)	0.03 (0.03)	0.03 (0.03)	0.03 (0.03)	0.03 (0.03)	0.03 (0.03)
Interest spread by bank		1.15*** (0.39)	0.80** (0.39)	0.76** (0.39)	0.78** (0.39)	1.00*** (0.39)
Δ ln real GDP				4.30*** (0.67)	3.80*** (0.69)	2.38*** (0.80)
Δ Capital to assets				0.76*** (0.21)	0.73*** (0.21)	0.72*** (0.21)
Δ BRL (-1)					-2.02*** (0.69)	-2.35*** (0.69)
Δ Business climate						0.01*** (0.00)
Δ ln K (-1)	-0.22*** (0.03)	-0.23*** (0.03)	-0.24*** (0.03)	-0.24*** (0.03)	-0.24*** (0.03)	-0.24*** (0.03)
Periods	43	43	43	43	43	43
Cross-sections	41	41	41	41	41	41
Number of observations	1303	1301	1301	1301	1301	1301
R^2	0.08	0.09	0.11	0.12	0.13	0.14
DW	2.13	2.14	2.12	2.09	2.09	2.07

**** indicates significance at the 1% level, ** at the 5% level,* at the 10% level, standard errors in parenthesis.*

Notes: The results of the following test are presented in the table: Durbin Watson (DW) test for serial correlation is presented with DW statistics. The results of this test suggest that no serial correlation is observed in the residuals.

The number of cross-sections is determined by the existence of restructuring in the banking sector over the review period related to mergers at banks or emergence of new banks. In the case of mergers, individual banks before the merger and the emerged new bank thereafter are treated as separate units in the panel.

Source: BNB

ratio or in bad and restructured loans), their estimated coefficients are highly significant in most specification variants. In particular, the coefficient of real GDP growth has the expected positive sign, meaning that positive developments in economic activity translate into higher growth of lending. The sign of the capital-to-assets ratio, included as a further micro variable is also positive, indicating that higher capitalization of the banking system and hence lower risk is a factor stimulating loan growth from the supply side. Non-performing loans as a macroeconomic risk variable have the expected negative impact on bank lending growth. According to the panel estimation results, an increase of NPL by one percentage point in period t-1 is associated with a decline in growth of loans to enterprises by around 2 percentage points in period t. The coefficient of the interest spread between corporate loans and deposits is positive, indicating that higher banking profits stimulate banks to increase the credit supply and translate into higher lending growth. The business climate, included as an explanation variable in the last specification, has the expected positive sign, but the coefficient is low, meaning that it does not explain much of the variance of credit growth to enterprises.

The panel estimation results with respect to banks' answers concerning long-term loans to enterprises (Table 3) show that the BLS indicators still have the expected signs, but the only variable which is statistically significant for the growth of corporate loans is the variable for "demand decreased". The coefficient in front of this BLS indicator remains broadly unchanged among the different specifications (it varies between -0.05 and -0.07). Concerning the additional macro and micro control variables their explanatory power for loan growth remains high. According to the estimation results corporate loan dynamics is positively influenced by real GDP growth, the interest rate spread and the capital to asset ratio, and negatively by the share of bad and restructured loans in total loans extended to enterprises.

In conclusion, the results of empirical micro analysis generally confirm macro analysis results. The variable recording the changes in demand for loans by corporations, particularly 'demand decreased', has the expected negative sign and is statistically significant for the growth of

corporate loans in all tested specifications. The coefficient in front of it is stable, ranging between -0.04 and -0.09. Overall, changes in credit standards have statistically insignificant effect on credit growth. These results are not affected by the inclusion of additional explanatory micro and macro variables. Besides the demand for loans by corporations, a statistical significance is found regarding real GDP growth, the share of bad and restructured loans in the total amount of loans to non-financial corporations, as well as for bank-specific factors, such as interest spread between loans and deposits and individual banks' capital to assets ratio. The coefficients in front of these variables display the expected signs: positive for real GDP growth, business climate indicator and individual banks' specific interest spread and capital to assets ratio, and negative in front of the share of bad and restructured loans in the total amount of corporate loans. The coefficients in front of these variables are relatively higher than those in front of the variables derived from the survey.

6. Conclusions

The main goal of this paper was to shed some additional light on the factors that influence credit growth on the demand as well as on the supply side in Bulgaria, with a more detailed focus on lending to non-financial corporations. Using data obtained from the regular quarterly bank lending survey, conducted by the BNB among commercial banks in Bulgaria and combining it with data from the monetary statistics, the banking supervision and with other macroeconomic variables like GDP growth or the business climate we undertook first a descriptive analyses, followed by an empirical assessment on a macro level and at the level of individual banks.

The general conclusion of the descriptive analysis suggests broadly similar trends in the change of demand and credit standards based on the survey results, on the one hand, and the growth dynamics of loans to non-financial corporations based on monetary statistics data, on the other hand. A similar conclusion can be made comparing the survey results with other macroeconomic indicators as real GDP growth, investment in fixed capital and the confidence in the industry sector based on the business situation survey.

Empirical analysis carried out on the basis of macro data and individual bank data for the 2003 to 2014 period show that changes in demand estimated by survey data have statistically significant effect on corporate

loans dynamics. The empirical research also reveals that important factors positively affecting corporate loans dynamics at both analyzing levels are real GDP growth and banks' capital to assets ratio. The analysis at individual banks level finds that statistically significant factors for the growth in corporate loans are also the improvement in business climate in Bulgaria, the decrease in the share of bad and restructured loans in the total amount of loans, and bank-specific factors such as interest spread between corporate loans and deposits.

References

Bassett, W.F., M.B. Chosak, J.C. Driscoll, and E. Zakrajsec. "Changes in bank lending standards and the macroeconomy." *Journal of Monetary Economics* 62, (2013): 23 – 40.

Berg, J., A. van Rixtel, A. Ferrando, G. de Bondt and S. Scopel. "The bank lending survey for the euro area." *ECB Occasional Paper No 23*, European Central Bank, 2005.

Blaes, B. "Bank-related loan supply factors during the crisis: an analysis based on the German bank lending survey." *Discussion Paper Series 1: Economic Studies No 31/2011*, Deutsche Bundesbank, 2011.

De Bondt, G., A. Maddaloni, J.-L. Peydro and S. Scopel. "The euro area bank lending survey matters: empirical evidence for credit and output growth." *ECB Working Paper Series No 1160, European Central Bank*, 2010.

Deutsche Bundesbank. "Bank Lending Survey: an interim assessment and current developments." *Monthly Report*, January (2009): 15 – 30.

Hempell, H.S. "New Bank Lending Survey of the Eurosystem: Interpretation and Use of First Results for Germany." *Journal of Business Cycle Measurement and Analysis* Vol. 1, No 3, (2004): 387 - 407.

Lown, C.S. and D.P. Morgan. "The Credit Cycle and the Business Cycle: New Findings Using the Loan Officer Opinion Survey." *Journal of Money, Credit, and Banking* Vol. 38, No 6, (2006): 1575 – 1597.

L**own, C.S., D.P. Morgan and S. Rohatgi.** "Listening to Loan Officers: The Impact of Commercial Credit Standards on Lending and Output." *FRBNY Economic Policy Review*, July 2000.

Mottiar, R. and A. Monks. "The Bank Lending Survey for Ireland." *Quarterly Bulletin No 2 2007, Central Bank & Financial Services Authority of Ireland*, (2007): 147 – 178.

Annex I

Structure and implementation of the Bank Lending Survey

The current questionnaire of BNB's Bank Lending Survey is consistent with the survey conducted by the ECB. It consists of 12 regular questions and is divided into two subsections. The first one concerns loans to enterprises (short-term loans and long-term loans) and the second one lending to households (consumer and housing loans). Parts of the questions are backward-looking and examine developments during the preceding three months. Changes in credit demand and the factors underlying these changes are covered by the survey. On the supply side questions concern changes in credit standards, their determinants, and changes in credit term and conditions. Furthermore, there is a forward-looking element in the survey whereby banks are asked to give an opinion on what changes they expect on both in their own lending policy and in customer demand during the next three months. By answering questions concerning changes in demand for loans and in credit standards banks have to choose between five options: 1 – decreased/tightened considerably, 2 – decreased/ tightened somewhat, 3 – remained basically unchanged, 4 – increased/ eased somewhat, 5 – increased/eased considerably. Regarding the factors affecting demand for loans or credit standards and terms banks are asked to attribute answers on a scale ranging from "- -", "-", "0", "+", "++" and NA.[18]

The bank lending survey is conducted in the first month of each quarter (i.e., January, April, July and October). In Bulgaria the survey is addressed to contact persons set up by the individual banks, who answer the questionnaire electronically. All 27 commercial banks operating in Bulgaria at present have taken part in the survey. After all of the participating banks have passed on their answers to the BNB, the central bank undertakes an aggregation of the results on the basis of individual banks weights. These weights are calculated as a ratio of the amounts of loans to enterprises, consumer and housing loans, allowed by each bank to the total amount of the respective loans, allowed by the banking system as a whole. Each quarter the results of the survey are sent back to the participating banks and are also published in the quarterly economic review of the BNB.

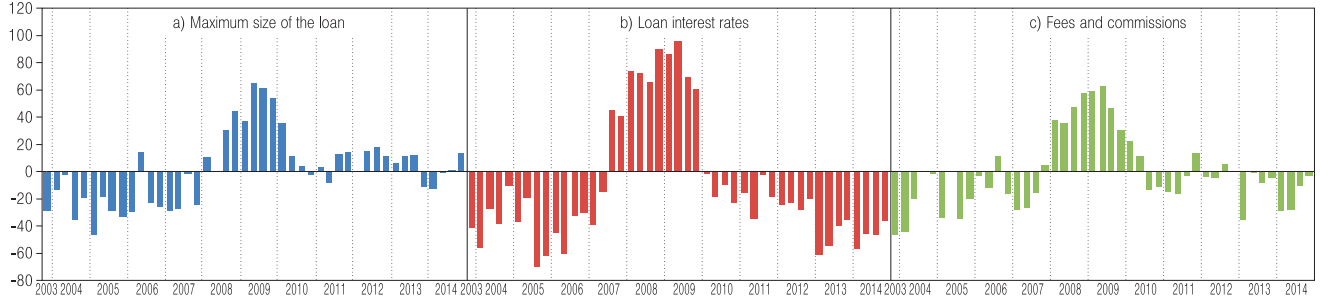
[18] „ - -" (contributed considerably to lower demand/tightening of credit standards), "-" (contributed somewhat to lower demand/tightening of credit standards), "0" (contributed to basically unchanged demand/credit standards), "+" (contributed somewhat to higher demand/ easing of credit standards), "+ +" (contributed considerably to higher demand/easing of credit standards), NA (not applicable).

The bank lending survey in Bulgaria has been conducted since the fourth quarter of 2003, i.e., the data set covers a period of forty five quarters. However, it should be noted that the data set covers the whole period from 2003 Q4 to 2014 Q4 only in respect to short-term and long-term loans to enterprises. Regarding total lending to firms, housing and consumer loans data is available only from 2010 Q1 till present. When interpreting the survey findings the qualitative nature of the results should be borne in mind. They are not objective, quantitative data such as precise figures on credit volume but reflect tendency estimates recorded on a five-point scale. Furthermore, the survey is concerned only with identifying changes in respect to the previous quarter. As a result, information on levels (such as the degree of restriction imposed by a bank's current lending policy) cannot be automatically derived from the survey data. In order to be able to interpret and analyze the results the net balance of responses in percentage terms is calculated. For questions related to the supply side of lending, this net percentage is the difference between the percentage share of responses in the restrictive range (i.e., reporting a tightening of credit standards) less the percentage share of responses in the expansionary range (i.e., reporting an easing of credit standards). This means that a positive value suggests a restrictive tendency while a negative value indicates an expansionary tendency. Regarding loan demand, the net percentage is the difference between the percentages reporting an increase and a decrease in demand.

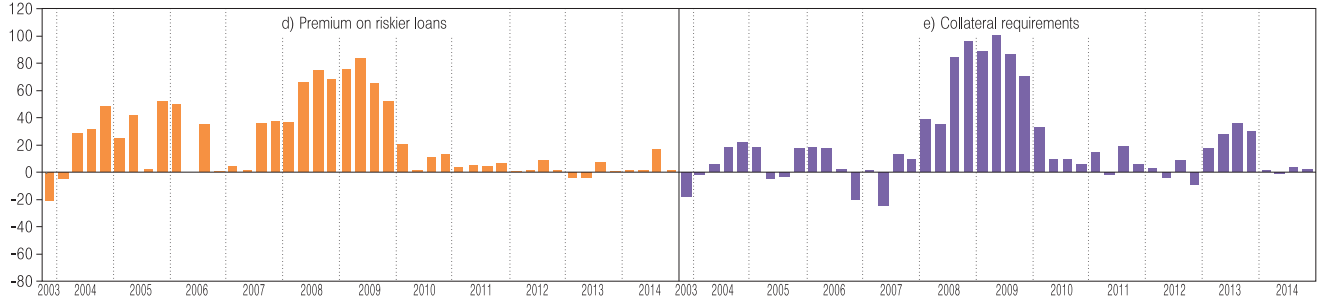
Annex II

Chart 12: Conditions and terms for approving loans and enterprises

(net balance of opinions, percentage points)



(net balance of opinions, percentage points)



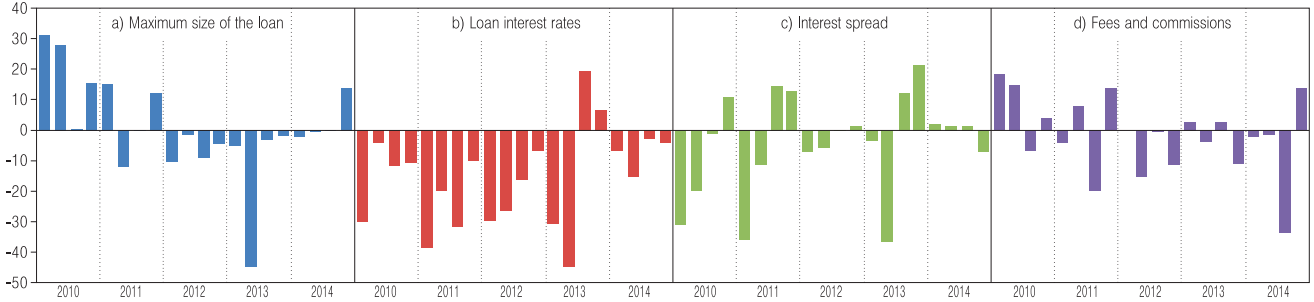
Note: The balance of opinions is defined as a difference in percentage points between the percentage of banks responding "tightened considerably" and "tightened somewhat" and the percentage of banks responding "eased somewhat" and "eased considerably".

Source: BNB – Bank Lending Survey.

Chart 13: Conditions and terms for loans to huseholds

Chart 13.1: Loans for consumer credit

(net balance of opinions, percentage points)



(net balance of opinions, percentage points)

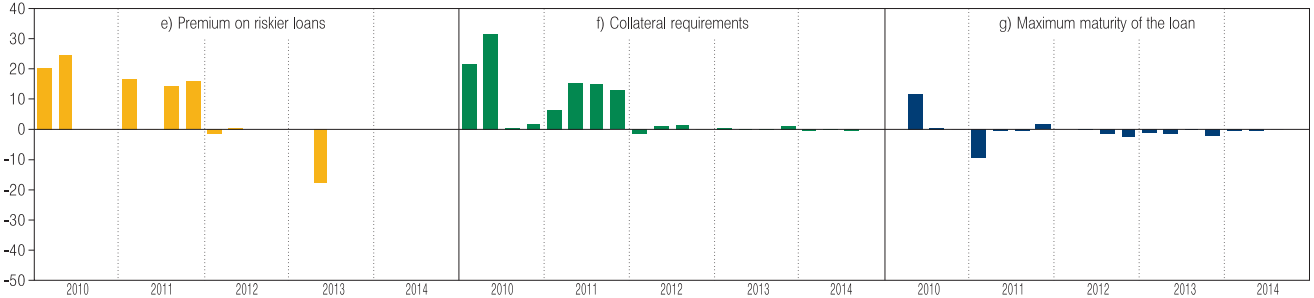
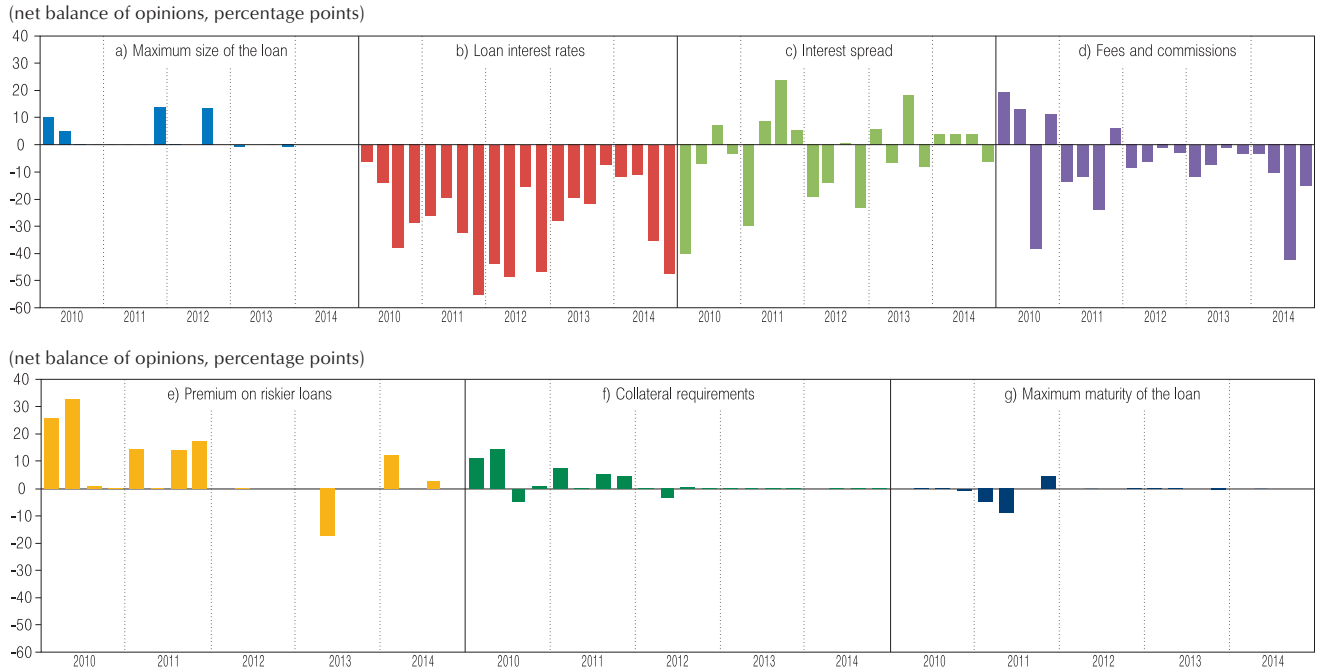


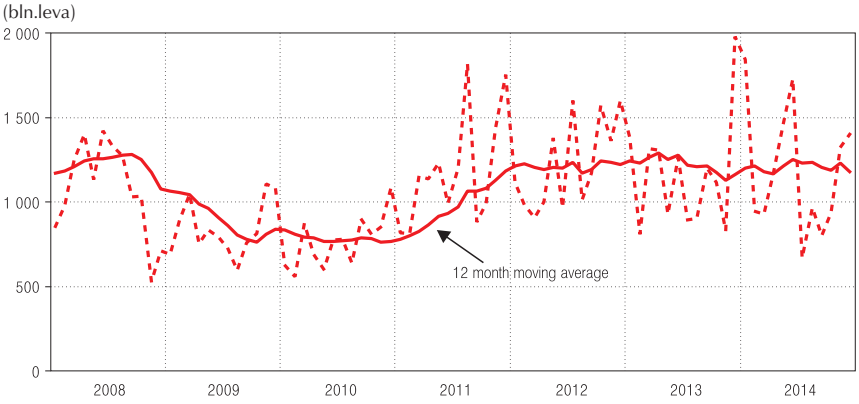
Chart 13.2: Loans for house purchase



Note: The balance of opinions is defined as a difference in percentage points between the percentage of banks responding "tightened considerably" and "tightened somewhat" and the percentage of banks responding "eased somewhat" and "eased considerably".

Source: BNB – Bank Lending Survey.

Chart 14: Volume of new-business loans to non-financial corporations



Source: BNB

Table 4: Cross correlation between growth of claims on non-financial corporations (in period t=0) and BLS indicators at various lags (t-k) and leads (t+k), k=1...4. Macro level.

Δ ln Kt	Δ demand_sh	Δ supply_sh	Δ demand_lg	Δ supply_lg
-4	0.44**	-0.03	0.39**	-0.02
-3	0.49**	0.09	0.48**	0.19
-2	0.30**	-0.08	0.41**	-0.07
-1	0.39**	0.13	0.46**	0.08
0	0.66**	-0.10	0.70**	0.04
1	0.21	0.49**	0.28	0.45**
2	0.34**	-0.03	0.32**	-0.04
3	0.05	0.27	0.27	0.23
4	0.09	-0.02	0.12	0.02

*** indicates significance at the 5 % level*

Table 5: Cross correlations between growth of claims on non-financial corporations (in period t=0) and additional explanatory variables at various lags (t-k) and leads (t+k), k=1...4. Macro-level.

Δ ln Kt	Δ ln real GDP	Δ Interest spread	Δ BRL	Δ Business climate	Δ Capital/ Assets
-4	0.29	-0.08	-0.13	0.15	0.03
-3	0.40**	-0.16	-0.15	0.23	-0.14
-2	0.47**	-0.01	-0.08	0.21	0.06
-1	0.35**	0.05	-0.27	0.19	-0.13
0	0.35**	-0.23	-0.45**	0.03	-0.44**
1	0.33**	-0.16	-0.26	0.14	0.13
2	0.17	-0.13	-0.23	-0.1	0.06
3	0.12	-0.03	-0.18	-0.22	-0.08
4	-0.03	-0.07	-0.15	-0.30	0.34**

*** indicates significance at the 5 % level*

Table 6: Unit-Root Tests

H0: Variable has a Unit Root	ADF Test t-statistics			Phillips-Perron Test t-statistics		
	Level	First difference	First difference of the log	Level	First difference	First difference of the log
Claims on non-financial corporations	-1.82	-2.63*	-4.85***	-1.80	-2.52	-5.24***
Demand for loans (BLS): short-term loans	-4.30***			-4.65***		
Credit standards (BLS):short-term loans	-2.39	-8.60***		-2.42	-8.45***	
Demand for loans (BLS): long-term loans	-3.06**			-3.21**		
Credit standards (BLS): long-term loans	-2.35	-9.05***		-2.38	-8.80***	
BRL	0.27	-2.96**		0.20	-2.62*	
Real GDP_sa	-2.47	-2.92**	-2.93**	-2.64*	-2.96**	-2.94**
Business climate	-1.68	-4.74***		-1.49	-4.76***	
Capital to asset ratio	-1.06	-5.60***		-1.32	-5.62***	
Interest rate spread	-2.50	-9.36***		-2.58	-9.48***	

*** indicates significance at the 1 % level; ** at the 5% level;* at the 10% level*

Table 7: Cross correlations between growth of loans to corporations (in period t=0) and additional explanatory variables at various lags (t-k) and leads (t+k), k=1...4. Micro-level.

Δ ln Kt	Δ ln of real GDP	Interest spread by bank	Δ Capital/ Assets	Δ BRL	Δ Business climate
-4	0.10 **	0.00	0.05**	-0.06**	0.07**
-3	0.13 **	0.01	0.09**	-0.02	0.16**
-2	0.12 **	0.09 **	0.00	-0.04	0.06**
-1	0.05 **	0.08 **	-0.07**	-0.11**	-0.06**
0	0.17 **	0.07 **	0.08**	-0.07**	0.13**
1	0.06 **	0.05	0.01	-0.04	0.07**
2	0.07 **	0.10 **	-0.15**	-0.09**	-0.1**
3	-0.03	0.13 **	0.05**	-0.05	-0.17**
4	0.02	0.07 **	0.04	-0.19**	-0.19**

*** indicates significance at the 5 % level*

Table 8: Panel Unit-Root Tests

H0: Variable has a Unit Root	Im, Pesaran and Shin W-statistics		
	Level	First difference	First difference of the log
Loans to corporations	0.65	-15.69***	-18.58***
Real GDP_sa	-1.14	-2.73***	-2.25***
Interest rate spread by individual banks	-2.62***		
Capital to asset ratio	-3.96***		
BRL	11.57	-3.69***	
Business climate	-0.90	-17.46***	

*** indicates significance at the 1 % level; ** at the 5% level;* at the 10% level*

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