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The bank lending survey

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The Bank Lending Survey

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IES Working Paper: 28/2018



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The Bank Lending Survey

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Abstract:

This article describes the bank lending survey that the Czech National Bank has been using since 2012 to gather valuable qualitative information about the bank credit market as a complement to statistical reporting. The article sets out to conduct a quantitative assessment of the survey results and to determine the roles played in new credit developments in 2012–2016 by changes in credit supply and changes in demand for loans as reported by banks in the survey. The results of the analysis indicate that although some of banks' survey responses are statistically significant in explaining the amounts of new loans reported by banks, the survey's ability to explain credit growth is currently limited. Growth in new loans for house purchase can be attributed primarily to growth in demand driven by falling interest rates. According to the results, supply and demand factors both played a role in the case of loans to non-financial corporations. For consumer credit and other lending to households, the results of the analysis are ambiguous.

JEL: E44, E62, G01, G21

Keywords: Bank lending survey, bank lending standards, macroprudential policy

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1 Introduction

Credit standards and credit terms and conditions¹ play a key role in the decisions of non-financial corporations and households, as they determine the availability of loans and implied credit cycle. Credit standards also fundamentally affect the quality of banks' credit portfolios. Excessively easy credit standards represent a risk to financial stability, because they can lead to excessive risk-taking by banks and their clients. Strong credit growth associated with the easing of credit standards is thus a source of systemic risk. Monitoring credit standards is therefore a very important part of the creation and assessment of central banks' policies. Understanding the transmission of macroprudential policy to banks' credit terms and conditions (such as loan rates) is vital also for monetary policy-making. Surveillance of credit conditions and standards should amend the traditional analyses of credit volume and lending rates from standardised reporting.

The main and the most common data source for non-price credit conditions and standards are bank lending surveys (BLS, sometimes also called loan officer opinion surveys). In BLS the central banks ask banks to assess qualitatively their supply of loans (via credit standards and credit terms and conditions) and to disclose the changes they perceive in demand for their loans. Similar surveys are conducted in many countries, for example the USA (since 1964), the euro area (since 2002), the UK (since 2007) and other European countries. The Czech National Bank (CNB) introduced the BLS in the Czech credit market in 2012 and we use this dataset for the following analysis. A total of 19 regular quarterly rounds of the survey had been completed by the end of 2016.

Unlike the statistical data gathered in the standard reporting process, the BLS allows central banks to disentangle credit supply and demand trends. This helps it understand and isolate factors that affect the amount of credit provided by banks. Bell and Young (2010) and Bell and Pugh (2014) explain how the BLS provides an understanding of the factors causing developments in credit markets. By way of example, they give the global financial crisis, when lending activity fell sharply. It is impossible to determine from the statistical data to what extent this fall reflected a decrease in demand for credit and to what extent banks tightened the supply of credit, whereas the information from the BLS can answer this question.

¹The exact definitions of the terms "credit standards" and "credit terms and conditions" are given in section 3.1

This article begins by (i) introducing the Czech BLS and (ii) describing the evolution of credit standards, demand for loans and related factors in 2012–2016 at the aggregate Czech banking market level. In an econometric analysis, the responses of banks participating in the BLS are then used (iii) to assess their ability to explain the dynamics of new loans and (iv) to determine the roles played in credit developments by changes in credit supply and changes in demand for loans as reported by banks in the BLS.

One of the main contributions of this article is that it is the first to perform an in-depth analysis of Czech BLS data in relation to statistical reporting data. Furthermore, this article – unlike earlier studies of this type from other countries – uses BLS data to explain amounts of new loans rather than changes in stocks of existing loans. In addition to inflows of new loans, changes in stocks of loans are affected by repayments of existing loans, which are not investigated by the BLS and are not taken into account by banks in their survey responses.

The article is structured as follows. Section 2 provides a brief literature survey, section 3.1 describes the nature of the data gathered in the BLS and section 3.2 presents the method used to assess the aggregate survey results. Section 3.3 describes the history of the survey results at the aggregate level and section 3.4 analyses those results in the context of amounts of newly provided loans. Section 4.1 describes the methodology used for the econometric analysis of the relationship between the dynamics of new loans and banks’ responses in the BLS, and section 4.2 presents the results of that analysis. Section 4.3 concludes.

2 Literature survey

This paper follows recent research and contributes to the existing literature that examines the information gathered by bank lending surveys. Lown, Morgan, and Rohatgi (2000) and Lown and Morgan (2006) analyse data gathered by the Federal Reserve in the United States and show that changes in credit supply standards help to predict aggregate volume of loans growth and that standards were tightened before economic recessions in the past. Aron et al. (2012) and Duca and Muellbauer (2014) use same data source, but focus on credit to households. Instead of focusing on growth rates, they construct a level index of and find strong relationship between credit conditions and consumption.

The first European studies to use bank lending surveys to explain credit growth factors

focused on loans to non-financial corporations during the global financial crisis of 2007–2009. On a panel of European countries, Bondt et al. (2010) showed that banks' responses in the survey conducted by the ECB help explain growth in loans to non-financial corporations, real GDP growth and foreign investment growth. Del Giovane, Eramo, and Nobili (2011) used data on Italian banks from the ECB survey and found that the decline in lending in the crisis years was caused not only by a fall in demand, but also by tightened supply. The effect of supply factors was identified as having been strongest after the Lehman collapse. Blaes (2011) conducted a similar study on a sample of German banks and arrived at similar conclusions.

Maddalonia and Peydro (2013) also analysed the period of the financial crisis, but, in contrast to the above studies, they concentrated on the effect of monetary and macroprudential policy on banks' credit standards. Their results reveal, among other things, that the accommodative monetary policy of the ECB helped soften banks' lending standards before the crisis. Macroprudential policy had the opposite effect at the same time. During the crisis, conversely, the ECB's low interest rates combined with access to Eurosystem long-term liquidity helped mitigate the impact of the crisis on lending to non-financial corporations.

Among the more recent studies that focus on one country only, we would highlight Bell and Pugh (2014), who examine the situation in the United Kingdom. They look at loans to households in addition to loans to non-financial corporations. Their analysis reveals that the survey responses – especially those for house purchase loans – are significantly associated with movements in the statistical data and that banks' expectations can be used to predict lending growth and changes in credit spreads² one quarter ahead. Veer and Hoerberichts (2016) build their approach on the model by Del Giovane, Eramo, and Nobili (2011), describe the situation in the Netherlands and, like earlier studies, focuses on the effect of the financial crisis. They find that the eased pre-crisis credit standards explain credit growth, and the post-crisis tightening likewise led to a drop in lending. Pintaric (2016) analyses data from the Croatian BLS in 2012–2015 and finds, among other things, that changes in demand have a bigger effect on the amount of loans provided than do changes in the supply of credit (captured in the form of credit standards). Kuchler (2012) who finds evidence that changes in bank-specific lending standards are linked to bank lending in Denmark, is followed by Andersen and Kuchler (2016) who adds firm-level data.

²The difference between the bank lending rate and the central bank monetary policy rate.

Responses of bank lending surveys have been shown to be good predictors not only of aggregate bank lending, but also real GDP growth in the United States and the euro area (Veer and Hoeberichts 2016; Ciccarelli, Maddaloni, and Peydró 2015; Capiello et al. 2010; Bassett et al. 2014). Such results are rather expected since credit growth is highly correlated with GDP growth in almost every country. Above mentioned studies also include GDP growth in their models of credit growth and effects are significant across countries and we find the same evidence.

Our analysis uses more detailed micro-level data (as central bank and supervisory authority we have access to the detailed reporting data) and show that bank's standards have impact on its growth rate of lending. We also analyse each loan segment separately - non-financial institutions, loans to households secured by real-estate and, unsecured loans for consumption. Such analysis amends the up-to-date research by individual central banks presented above and allows us to determined for which loan segment the BLS is the most relevant.

3 The bank lending survey in the Czech Republic

3.1 Nature of the data obtained in the survey

The analysis was performed on a panel of the most significant Czech banks participating in the BLS conducted by the CNB. A total of 18 banks and building societies took part in the BLS in 2012–2015. At the start of 2016, the sample of participating banks was modified to reflect changes in the credit market. One bank was dropped from the BLS and four new ones that had grown in significance since 2012 were added. The 21 participating banks currently account for more than 90% of the banking market.³ This high market share of the participating banks represents an advantage over similar national studies drawing on data from the BLS conducted by the ECB.⁴

The Czech BLS takes the form of a questionnaire in which banks express their opinions on past and expected future changes in credit supply and demand for loans. The structured questionnaire contains 20 questions on banks' lending policies and on non-financial corporations'

³As measured by the amount of loans and claims on clients.

⁴For example, Del Giovane, Eramo, and Nobili (2011) worked with data representing “only” 60% of the Italian banking sector, while Veer and Hoeberichts (2016) used data representing 65% of the Dutch banking sector.

and households' demand for loans as perceived by banks. Banks' lending policies are captured in questions on credit standards⁵ and credit terms and conditions.⁶

The analysis contained in this article draws on banks' responses to questions relating to loans to non-financial corporations, loans to households for house purchase and consumer credit and other lending to households.⁷ Specifically, the questions cover:

- changes in credit standards made by banks in the reference quarter,
- factors affecting credit standards
- perceived changes in loan demand in the reference quarter,
- factors affecting demand for loans.

In the questionnaire, banks can select factors that led to changes in credit standards or demand for loans from the list given in Table 1. These factors are divided into categories and are analysed in this article at the aggregate category level only.

The questionnaire responses are qualitative in nature. Table 2 shows the range of responses for each type of question. To date, banks have most often perceived no change both in their own credit standards and in demand for loans. Changes in demand have been reported significantly more often than changes in credit standards (see Charts 1 and 2). Where banks have changed their credit standards, they have more often indicated a slight easing than a slight tightening. In the case of demand for their loans, banks have more often perceived a slight increase than a slight decrease. This is consistent with the fact that the Czech economy was in a growth phase of the credit cycle in the period under scrutiny. The proportion of the responses indicating considerable changes in credit standards or demand for loans has been minimal. For this reason, the following analysis does not distinguish between responses indicating slight changes

⁵Credit standards are internal criteria or procedures that reflect a bank's lending policy. They are written and unwritten criteria or procedures that are set before the specific credit terms and conditions are negotiated and before the decision on whether or not to approve a loan is made. They define, for example, the types of loan a bank considers desirable/undesirable, its designated geographical priorities and collateral deemed acceptable. They also specify lender eligibility requirements (such as maximum debt, income situation, age and employment status). For the purposes of the survey, changes in formal criteria and changes in their application are relevant.

⁶Credit terms and conditions are defined as the contractual obligations agreed upon by the lender and the borrower. For the purposes of the survey, these obligations consist of the price or interest rate, the maximum size of the loan and the access conditions, and other terms and conditions in the form of charges, collateral (including compensating balances), loan covenants and maturities. The credit terms and conditions depend on the lender's characteristics and can change in accordance with, or independently of, the credit standards.

⁷A specimen questionnaire containing the exact questions can be downloaded from the CNB website: http://www.cnb.cz/en/bank_lending_survey/index.html.

Table 1: Factors affecting credit standards and demand for loans and their categorisation

| Categories of factors affecting credit standards | Factors affecting credit standards | Categories of factors affecting demand for loans | Factors affecting demand for loans | |
|--|---|--|--|------------------------------------|
| | | | NFC | households |
| Cost of funds and balance sheet constraints | Costs related to the bank's capital position | Financing needs | Fixed investment | Housing market prospects |
| | The bank(s) ability to access market financing | | Working capital | Consumer confidence |
| | The bank's liquidity position | | Mergers/acquisitions and corporate restructuring | Consumer expenditure |
| Pressure from competition | Competition from other banks | Use of alternative finance | N/A | Spending on durable consumer goods |
| | Competition from non-banks | | Internal financing | Saving |
| | Competition from market financing | | Loans from other banks | Loans from other banks |
| Risk perception | Expectations regarding the general economic situation | | Issuance of debt securities | Other sources of finance |
| | Industry or firm-specific outlook | | Issuance of equity | N/A |
| | Risk on collateral demanded | | N/A | N/A |

t statistics in parentheses

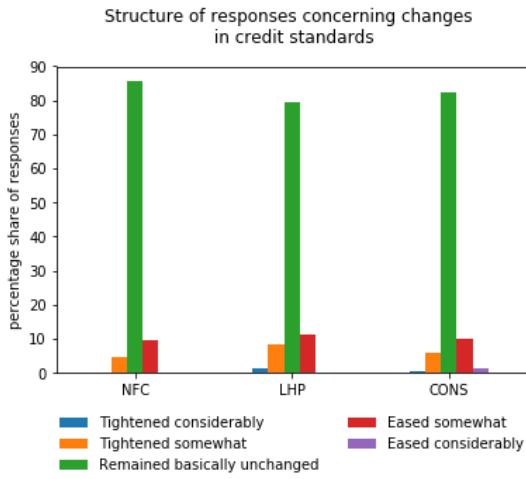


Figure 1: Structure of responses concerning changes in credit standards

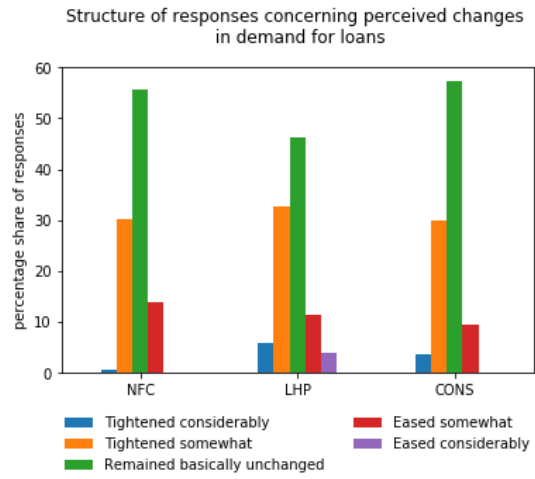


Figure 2: Structure of responses concerning perceived changes in demand for loans

and considerable changes in credit standards and demand for loans. For each type of question, the banks' responses were therefore aggregated into just three categories (increased/tightened – remained basically unchanged – decreased/eased).

Table 2: Range of responses for each type of question

| Credit standards | Factors affecting credit standards | Demand for loans | Factors affecting demand for loans |
|------------------------------|---|------------------------------|---|
| Tightened considerably | Contributed considerably to tightening | Increased considerably | Contributed considerably to higher demand |
| Tightened somewhat | Contributed somewhat to tightening | Increased somewhat | Contributed somewhat to higher demand |
| Remained basically unchanged | Contributed to basically unchanged credit standards | Remained basically unchanged | Contributed to basically unchanged demand |
| Eased somewhat | Contributed somewhat to easing | Decreased somewhat | Contributed somewhat to lower demand |
| Eased considerably | Contributed considerably to easing | Decreased considerably | Contributed considerably to lower demand |

3.2 Method for evaluating the aggregate survey results

The qualitative responses of banks are assessed at the aggregate level by means of net percentages. A net percentage is calculated for each sector as the difference between the market share of

banks reporting a tightening of standards/conditions (or observing an increase in demand) and the market share of banks reporting an easing of standards/conditions (or observing a decrease in demand).⁸ A positive (negative) net percentage indicates an aggregate tightening (easing) of credit standards/conditions or an aggregate increase (decrease) in demand for loans.

Net percentages are calculated for factors affecting credit standards and demand for loans in the same way as for changes in credit standards and demand themselves. However, there is no formal relationship between the effects of the individual factors and changes in credit standards or demand for loans. A bank may thus, for example, report no change in credit standards yet identify factors that fostered a change in credit standards, or even identify factors that fostered an easing of credit standards even though it tightened credit standards. So, in the aggregated results presented in the form of net percentages, discrepancies can arise between changes in credit standards and demand for loans and in related factors fostering those changes.

3.3 Analysis of the aggregate survey results

Between 2012 and 2016, the changes in credit standards, demand for loans and related factors reported by banks were in line with the credit cycle and the observed market situation in all the sectors under review. From around 2014 onwards, there was stronger growth in demand on the credit market, risk perceptions changed, and pressure from competition strongly fostered an easing of credit standards. Regulatory and legislative interventions in the area of lending to households led to a sharp tightening of credit standards at the end of 2016.

In 2012 and 2013, non-financial corporations mostly experienced tightening credit standards linked with negative risk perception in the market (see Chart 3). From 2013 onwards, pressure from competition significantly fostered an easing of credit standards. As a result, credit standards eased continuously (with one exception) between 2014 Q2 and the end of 2016. Risk perception also recorded a turnaround in 2014 and mostly fostered an easing of credit standards from 2015 onwards. Cost of funds and balance sheet constraints had a smaller effect on credit standards in the period under review, mostly fostering an easing of credit standards. Demand for loans to non-financial corporations rose continuously from 2014 Q2 onwards (see Chart 4).

⁸A net percentage assessment is performed in each round of the BLS, and time series summarising the aggregate results of all the rounds to date are published every quarter on the CNB website at http://www.cnb.cz/en/bank_lending_survey/index.html.

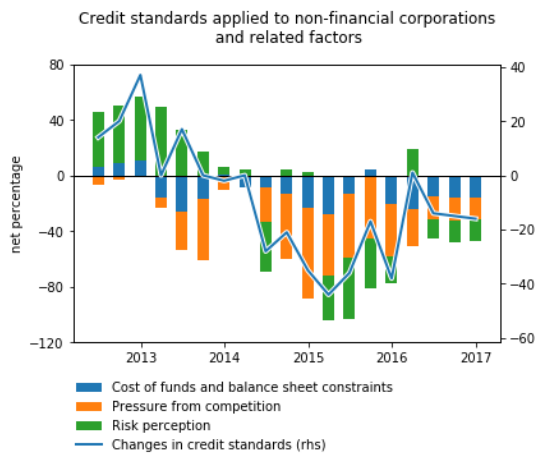


Figure 3: Credit standards applied to non-financial corporations and related factors

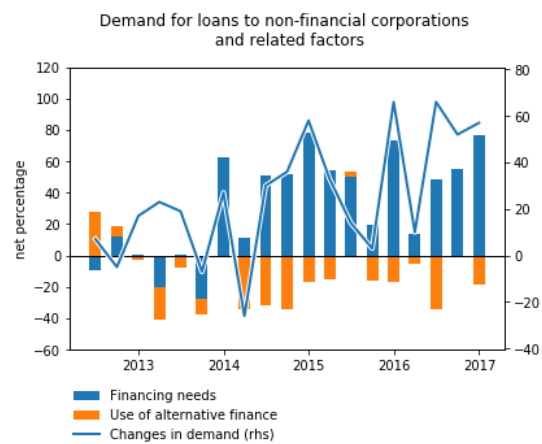


Figure 4: Demand for loans to non-financial corporations and related factors

Financing needs had a significant upward effect on demand, while use of alternative finance acted in the opposite direction to a lesser extent.

Until 2016 Q3, credit standards applied to loans to households for house purchase showed mixed movements, though with a moderate easing tendency, which was most apparent in late 2014 and the first half of 2015 (see Chart 5). In 2016 Q4, credit standards were tightened across the board by regulatory interventions.⁹ Pressure from competition constantly fostered easier credit standards. Risk perception and cost of funds and balance sheet constraints acted more often towards an easing than a tightening of credit standards. Demand for loans for house purchase mostly increased, doing so sharply and continuously from 2015 onwards (see Chart 6). Financing needs had a significant upward effect on demand for loans. Use of alternative finance had a mixed effect according to banks' responses.

Credit standards applied to consumer credit and other lending tended to get tighter until 2014 Q3, with risk perception fostering a tightening in several quarters (see Chart 7). Credit standards eased continuously from the end of 2014 until 2016 Q3. Credit standards were tightened in some banks in 2016 Q4 following the adoption of a new consumer credit law. Pressure from competition and risk perception both fostered an easing. Cost of funds and balance sheet constraints had no major effect on credit standards. Banks more often perceived a rise than a fall in demand for consumer credit and other lending to households. In five quarters, growth

⁹A new consumer credit law and recommendations on the management of risks associated with the provision of retail loans secured by residential property were issued.

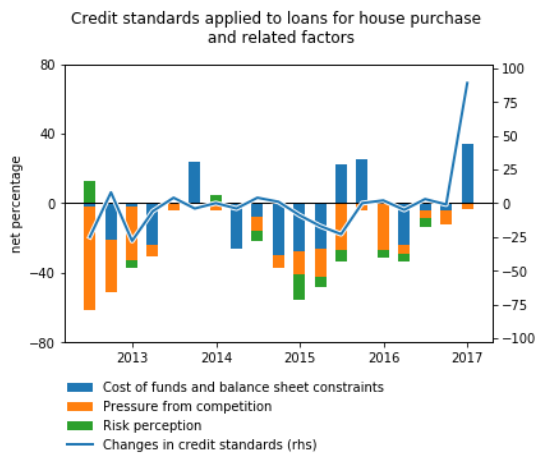


Figure 5: Credit standards applied to loans for house purchase and related factors

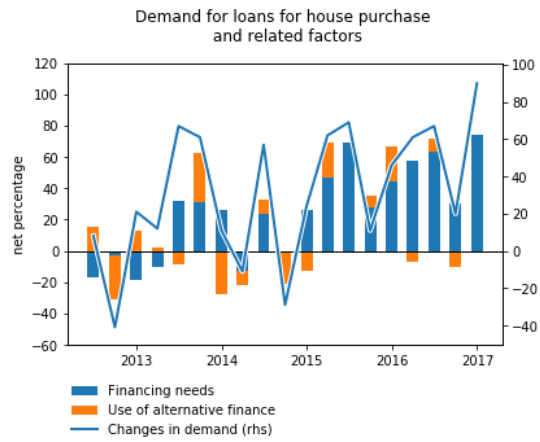


Figure 6: Demand for loans for house purchase and related factors

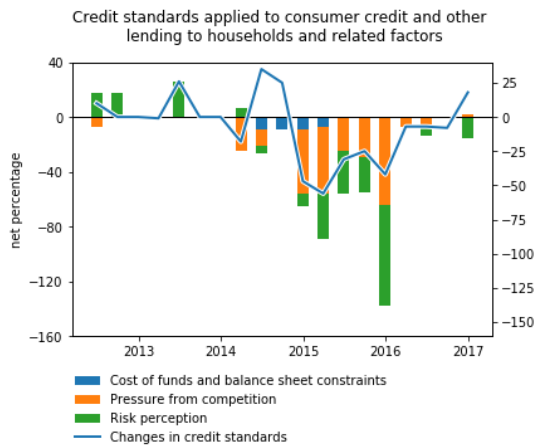


Figure 7: Credit standards applied to consumer credit and other lending to households and related factors

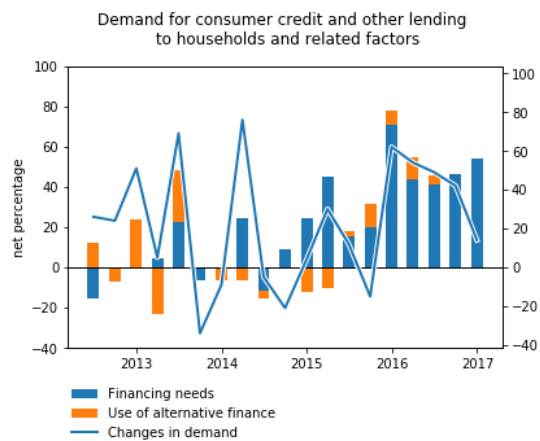


Figure 8: Demand for consumer credit and other lending to households and related factors

in demand was reported in a net percentage of more than 50% of the market (see Chart 8). In the period under review, demand was driven up predominantly by financing needs.

3.4 Relationship between the aggregate survey results and the dynamics of new loans

The statistical data on new bank loans can be used to carry out a basic aggregate-level analysis of the relationship between the results of the previous 19 rounds of the Czech BLS and the

dynamics of new loans. Seasonally adjusted¹⁰ percentage changes in the amount of new loans provided in each quarter were calculated for the set of banks participating in the BLS. They were compared with the net percentages for the responses to the BLS questions relating to credit standards and demand for loans.

In the case of non-financial corporations, the amounts of new loans went up in quarters when banks had indicated growth in demand and a simultaneous easing of credit standards in their responses (see Chart 9a). The dynamics of new loans between mid-2013 and the start of 2015 were similar to the dynamics of demand as perceived by banks. Between the end of 2015 and September 2016, the BLS results seem to precede the changes in new loans by one quarter.

The amount of new loans for house purchase mostly increased in the period under review. Likewise, banks most often perceived quarter-on-quarter increases in demand in this period in their BLS responses (see Chart 9b). In the first year under review, the dynamics of new loans were similar to those of demand as perceived by banks and partly also to those of credit standards. The graphical analysis also indicates that between September 2014 and December 2015, movements in demand for loans preceded actual movements in the amount of new loans by one quarter.

The similarity between movements in the BLS results and the dynamics of new loans is most apparent for consumer credit and other lending to households (see Chart 9c). The changes in the amount of new lending to this sector were mixed, and so were those in credit standards and demand perceived by banks. The quarters with the strongest growth in new loans usually match those when banks perceived the biggest increases in demand for their loans. Some similarity can also be seen between the changes in credit standards and the dynamics of new loans between mid-2014 and mid-2016.

A correlation analysis revealed no significant relationship between the changes in credit standards and the dynamics of new loans at the aggregate level in the period under study. However, a relationship was identified between changes in demand as perceived by banks and the dynamics of new loans (see Table 3). A significant positive correlation was found between changes in demand and changes in new loans in both categories of loans to households (in the same quarter). In addition, a significant negative correlation between changes in demand (with

¹⁰The BLS questionnaire instructs banks to take into account seasonal effects in their responses and not to report changes that occurred as a result of them. For this reason, the percentage changes in the amount of new loans are also seasonally adjusted.

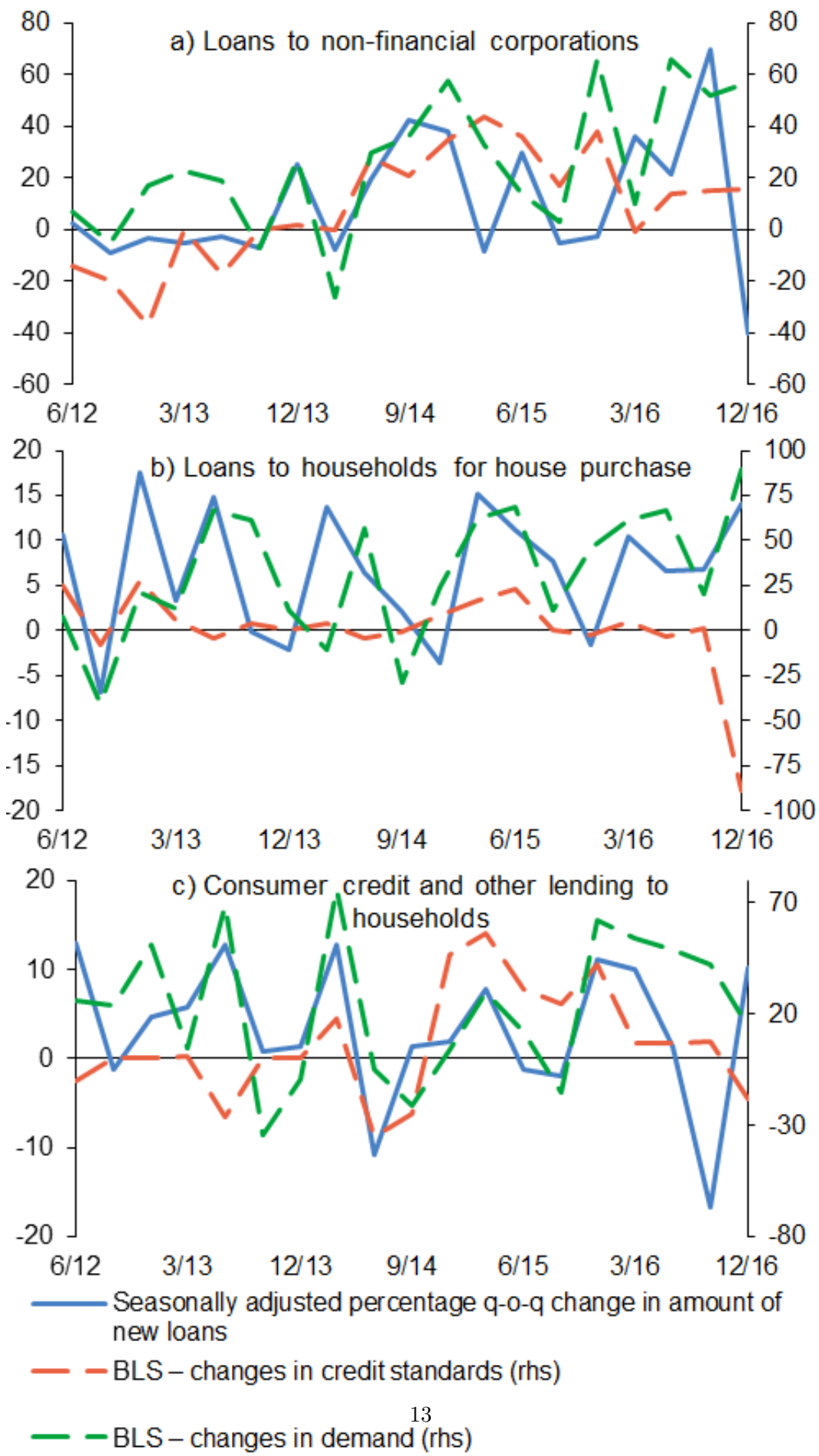


Figure 9: Dynamics of new loans and banks' responses in the BLS

a lead of one quarter) and the dynamics of new loans was found for consumer credit and other lending to households. A possible interpretation is that if demand for loans goes up in a quarter, for example as a result of advertising campaigns or special offers run by banks, customers who would otherwise not take out a loan until the next quarter will expedite their decisions. Fewer loans are thus provided in the following quarter.

Table 3: Correlation analysis between the aggregate BLS results and the dynamics of new loans

| | Correlation between changes in credit standards according to BLS and dynamics of new loans | | | Correlation between changes in demand according to BLS and dynamics of new loans | | |
|--------------------|--|----------|-------------|--|---------|-------------|
| | NFC | Housing. | Consumption | NFC | Housing | Consumption |
| Same quarter | 0,25 | 0 | 0,1 | 0,27 | 0,43* | 0,43* |
| Lead (one quarter) | 0,33 | -0,21 | 0,02 | 0,22 | -0,13 | -0,45* |

Note: * denotes significance at the 10% level. The dynamics of new loans have been seasonally adjusted.

4 Analysis of the relevance of the survey results to bank-level credit dynamics

4.1 Methodology and data

In this section, we empirically analyse the effect of changes in credit standards and demand for loans (according to the BLS) on the dynamics of new loans in the three sectors under study. The analysis is performed on an unbalanced panel of the 21 banks¹¹ monitored in the 19 rounds of the BLS conducted in the period of 2012 Q2–2016 Q4. Given the nature of the data, we decided – in line with earlier studies (Blaes 2011; Del Giovane, Eramo, and Nobili 2011; Bassett et al. 2014; Pintaric 2016) – to estimate a fixed-effects dynamic panel regression model for each sector of the market separately. The basic econometric model is expressed by the equation

$$y_{i,t} = \alpha y_{i,t-1} + \beta BLS_{i,t-h} + \gamma X_{i,t} + F_i + F_t + \epsilon_{it}, \quad (1)$$

¹¹The number of banks differs depending on the sector analysed. There are 13 respondent banks in the non-financial corporations sector, 15 in the house purchase loans sector and 10 in the consumer credit sector. A number of banks with very small sector shares whose responses seemed heavily biased towards reporting no changes were excluded from the econometric analysis.

where $y_{i,t}$ is quarter-on-quarter logarithmic growth in new loans provided by bank i at time t , $BLS_{i,t-h}$ is a vector of survey responses with a lag of 0–1 quarters ($h = 0,1$),¹² X_{it} is a vector of additional control variables, F_i is a bank fixed effect and F_t is a quarter fixed effect to control for seasonality in the data. The survey responses are qualitative, so in the regression we use vectors of binary variables where each vector corresponds to one option from a condensed range of possible responses in the BLS. The indicators capture changes in credit standards and demand in both directions – tightening and easing/increase and decrease. The relationship between the dynamics of new loans and the survey responses from the basic model specification can therefore be described as:

$$y_{it} = \alpha y_{i,t-1} + \beta_1 Standardseased_{i,t-h} + \beta_2 Standardstightened_{i,t-h} + \beta_3 Demanddecreased_{i,t-h} + \beta_4 Demandincreased_{i,t-h} + \gamma X_{it} + F_i + F_t + \epsilon_{it} \quad (2)$$

The control variables used differ depending on the sector analysed and consist of the average interest rates on new loans provided by a given bank in a given sector, nominal quarter-on-quarter GDP growth,¹³ gross fixed capital formation (GFCF) for non-financial corporations, unemployment for both categories of loans to households and the apartment price index¹⁴ for loans to households for house purchase. As branches of foreign banks are represented in the BLS and domestic banks did not have any problems with lending constraints due to capital shortages in the period under scrutiny, our analysis – in contrast to Blaes (2011) – does not contain bank capital variables.

The procedure for the econometric analysis was the following. First, a general model specification containing all the binary variables reflecting the survey responses and the significant dummies was estimated. The selected model specification was derived from the general specification, from which certain insignificant variables were removed so as to obtain the model with the highest possible explanatory power and efficiency as measured by the adjusted R2. In all the

¹²Owing to the possible lag between changes in bank lending policies or demand for loans as perceived by banks and the manifestation of those changes in the amount of new loans provided, we also analyse the effect of the survey responses with a lead of one quarter. We also investigated a lag of two quarters, but this link was not significant in any model.

¹³Nominal GDP was chosen because the dependent variable (changes in the amount of new loans) is also nominal in nature.

¹⁴Source: CZSO.

specifications tested, we checked the stability of the coefficients by comparison with the original general model to ensure that the results were robust across the specifications tested. In this article, we present both the original general model and the selected adjusted-R2-maximising specification.

4.2 Results

Table 4 shows the results of the generally specified model in the three sectors under analysis (columns 1, 2 and 3) and the results of the selected models with the highest explanatory power (columns 1a, 2a and 3a). In all sectors, some of the survey responses were found to have significant effects on credit growth. In the non-financial corporations sector, the responses relating to both credit standards and demand were found to have significant effects. Only demand was found to have effects for loans for house purchase, and only credit standards were found to have effects for consumer credit and other lending to households. To check the robustness of the results of the econometric analysis, we tested alternative specifications of the regression model and we found that the variables which significantly affect new loans are identical across specifications and their coefficients are stable.

The effects found, and hence also the relevance of the banks' survey responses to the explanation of credit dynamics, are lower than in similar studies conducted in other countries. This may be because the Czech BLS data cover a relatively short time period and do not contain information from the crisis years. It may also be related to the tendency of some banks not to report changes in their lending policies or in demand for their loans even though small changes do occur. At the same time, the fact that the period under analysis only covers a growth phase of the credit cycle means that the responses in the BLS were found to have significant effects only for variables indicating an increase in demand or an easing of credit standards.

For loans to non-financial corporations, the results can be interpreted as meaning that credit growth is driven by both the supply side (the one-quarter-lagged positive effect of an easing of standards) and by rising demand. The positive correlation with GDP¹⁵ indicates that demand is linked to the overall economic cycle. The dynamic correlation of loans between quarters is also statistically significant (a significant negative effect of the lagged dependent variable). This

¹⁵We address the possible endogeneity of GDP with respect to new loans in the estimates using instrumental variables – lagged values.

would correspond with the practice of balancing loan flows between accounting quarters. A possible interpretation based purely on time progression is a strong supply-side effect whereby an easing of standards in one quarter results in higher demand the following quarter, which, in turn, manifests itself later on in the amount of new loans provided.

In the case of loans to households, we can see a dichotomy between loans for house purchase and consumer credit and other lending. New loans for house purchase are driven primarily by demand, whereas consumer credit and other lending to households tend to be strongly affected by the supply side. In both cases, new loans react positively to a reduction in interest rates, though the reaction is stronger for loans for house purchase. The relationship between new loans for house purchase and the apartment price index was not found to be significant.

4.3 Conclusion

The bank lending survey provides the central bank with valuable information complementing the data it obtains from statistical reporting. The qualitative nature of the survey, verbal comments made by banks and regular meetings with representatives of participating banks greatly assist the central bank in forming a complete picture of the current credit market situation. CNB uses this information in making macroprudential and monetary policy and assessing its impacts. However, the analysis of the aggregate survey results and the econometric analysis of banks' responses contained in this article indicate that only some of the data gathered in the survey are relevant in the context of statistical data on new loans.

In the case of loans to non-financial corporations, the econometric analysis suggests that a perceived increase in demand and an easing of credit standards have significant effects (with a one-quarter lag). This result, however, is not supported by the analysis of the aggregate survey results. The results of the analysis of loans for house purchase confirm the general view about the market situation, namely that the credit growth recorded in 2012–2016 was driven mostly by demand stimulated by falling interest rates. This conclusion is confirmed both by the econometric analysis and by the analysis of the aggregate survey results. In the case of consumer credit and other lending to households, the econometric analysis finds that only the supply side has an effect, while the analysis of the aggregate survey results suggests that demand has a stronger effect.

Table 4: Results of the panel regression for quarter-on-quarter logarithmic growth in new loans in the three sectors under study

| | Non-financial corporations | | Loans to households for house purchase | | Consumer credit and other lending to households | |
|---|----------------------------|-----------------------|--|-----------------------|---|-----------------------|
| | (1) | (1a) | (2) | (2a) | (3) | (3a) |
| Demand and standards (BLS) | | | | | | |
| Demand increased | 31.144* (16.020) | 30.026* (15.939) | 10.225** (4.672) | 9.853** (4.655) | 4.740 (4.299) | - |
| Demand increased (t - 1) | -9.072 (15.793) | -8.920 (15.091) | 0.827 (4.672) | 1.013 (4.611) | 0.476 (4.315) | - |
| Demand decreased | 5.459 (22.570) | 3.977 (22.553) | 0.867 (5.550) | 0.798 (5.525) | -3.306 (7.736) | - |
| Demand decreased (t - 1) | 6.638 (21.487) | - | -3.541 (5.600) | -3.516 (5.568) | 8.217 (7.736) | - |
| Standards tightened | 18.020 (37.335) | - | -6.169 (9.271) | - | -0.657 (8.900) | - |
| Standards tightened (t - 1) | 36.988 (35.987) | 33.689 (36.220) | -10.076 (8.769) | - | 3.600 (8.056) | - |
| Standards eased | -22.037 (24.782) | -26.623 (24.447) | 0.700 (6.590) | 1.650 (6.534) | 23.356** (11.065) | 21.376** (10.281) |
| Standards eased (t - 1) | 49.377** (23.010) | 48.558** (22.817) | -4.774 (6.048) | -4.205 (5.999) | 1.260 (7.422) | - |
| Control variables | | | | | | |
| Logarithmic growth in new loans (t - 1) | -0.684*** (0.057) | -0.685*** (0.056) | -0.124* (0.070) | -0.127* (0.070) | -0.061 (0.094) | -0.060 (0.090) |
| GDP growth (qoq) | 29.041*** (9.541) | 31.415*** (10.215) | - | - | - | - |
| D.GFCF | - | - | - | - | - | - |
| D.weighted interest | - | - | -22.255** (8.815) | -21.155** (8.732) | -4.154* (2.190) | -4.200** (2.109) |
| D.apartment prices | - | - | - | - | - | - |
| Constant | -103.086* (56.480) | -95.808* (55.662) | -20.823*** (4.538) | -21.222*** (4.490) | -13.640*** (4.875) | -11.773*** (3.973) |
| Bank fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Time fixed effects for seasonality | Yes | No | Yes | Yes | Yes | Yes |
| R2 | 0,467 | 0,474 | 0,322 | 0,355 | 0,211 | 0,256 |
| N | 163 | 163 | 223 | 223 | 109 | 109 |

Note: D denotes difference. ***, **, and * indicates 1%, 5%, and 10% significance level. The symbol '-' denotes that the explanatory variable was tested in the given specification but not included in it.

The explanatory power of banks' survey responses for credit dynamics is lower than that in similar studies conducted in other countries. Some of the relationships between the survey results and credit dynamics indicated by the analysis of the aggregate results were not confirmed by the econometric analysis. This is mainly due to the still relatively short period of time over which the Czech BLS has been conducted, a period which only covers an upward and relatively calm phase of the financial cycle (with the exception of the latest developments in loans for house purchase). The survey's ability to explain credit growth is thus currently limited.

References

- Andersen, Svend Greniman and Andreas Kuchler (2016). *Credit standards and capital allocation in a low interest rate environment*. Tech. rep. 107. Danmarks Nationalbank Working Papers.
- Aron, Janine et al. (2012). “Credit, housing collateral, and consumption: Evidence from Japan, the UK, and the US.” In: *Review of Income and Wealth* 58.3, pp. 397–423.
- Bassett, William F et al. (2014). “Changes in bank lending standards and the macroeconomy.” In: *Journal of Monetary Economics* 62, pp. 23–40.
- Bell, Venetia and Alice Pugh (2014). *The Bank of England Credit Conditions Survey*. Tech. rep. Bank of England.
- Bell, Venetia and Garry Young (2010). “Understanding the weakness of bank lending.” In: *Bank of England Quarterly Bulletin* 50.4.
- Blaes, Barno (2011). *Bank-related loan supply factors during the crisis: an analysis based on the German bank lending survey*. Discussion Paper Series 1: Economic Studies 2011,31. Deutsche Bundesbank.
- Bondt, Gabe de et al. (2010). *The Euro area bank lending survey matters: Empirical evidence for credit and output growth*. Working Paper Series 1160. European Central Bank.
- Cappiello, Lorenzo et al. (2010). *Do bank loans and credit standards have an effect on output? A panel approach for the euro area*. Tech. rep. ECB Working Paper No. 1150.
- Ciccarelli, Matteo, Angela Maddaloni, and José-Luis Peydró (2015). “Trusting the bankers: A new look at the credit channel of monetary policy.” In: *Review of Economic Dynamics* 18.4, pp. 979–1002.
- Del Giovane, Paolo, Ginette Eramo, and Andrea Nobili (2011). “Disentangling demand and supply in credit developments: a survey-based analysis for Italy.” In: *Journal of Banking & finance* 35.10, pp. 2719–2732.
- Duca, John and John Muellbauer (2014). “Tobin LIVES: Integrating Evolving Credit Market Architecture into Flow-of-Funds Based Macro-Models.” In: *A flow-of-funds perspective on the financial crisis*. Springer, pp. 11–39.
- Kuchler, Andreas (2012). *The interplay between credit standards and credit demand: Microeconomic evidence from Denmark*. Tech. rep. 82. Danmarks Nationalbank Working Papers.

- Lown, Cara and Donald P Morgan (2006). “The credit cycle and the business cycle: new findings using the loan officer opinion survey.” In: *Journal of Money, Credit and Banking*, pp. 1575–1597.
- Lown, Cara, Donald P Morgan, Sonali Rohatgi, et al. (2000). “Listening to loan officers: the impact of commercial credit standards on lending and output.” In: *Economic Policy Review* Jul, pp. 1–16.
- Maddalonia, Angela and Jose-Luis Peydro (2013). “Monetary Policy, macroprudential Policy, and Banking Stability: Evidence from the Euro Area.” In: *International Journal of Central Banking* 9.1, pp. 121–169.
- Pintaric, Martin (2016). “What is the effect of credit standards and credit demand on loan growth? Evidence from the Croatian Bank lending survey.” In: *Comparative Economic Studies* 58.3, pp. 335–358.
- Veer, Koen JM van der and Marco M Hoeberichts (2016). “The level effect of bank lending standards on business lending.” In: *Journal of Banking & Finance* 66, pp. 79–88.

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