THE EURO AREA BANK LENDING SURVEY MATTERS

EMPIRICAL EVIDENCE FOR CREDIT AND OUTPUT GROWTH

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EUROPEAN CENTRAL BANK
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In 2010 all ECB publications feature a motif taken from the €500 banknote.

CONTENTS

Abstract

This study examines empirically the information content of the euro area Bank Lending Survey for aggregate credit and output growth. 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. Notwithstanding the short history of the survey, the findings are robust across various specifications, including "horse races" with other well-known leading financial indicators. Our results are supportive of the existence of a bank lending, balance sheet, and risk-taking channel of monetary policy. They also suggest that price as well as non-price conditions and terms of credit standards do matter for credit and business cycles. Finally, we discuss the implications for the 2007/2009 financial and economic crisis.

Non-technical summary

This study analyses empirically the information content of the euro area Bank Lending Survey (BLS) for aggregate credit and output growth. It addresses two main questions. First, is the BLS a reliable leading indicator of euro area bank lending growth? Second, does the BLS have predictive power for euro area GDP growth? The answer to both questions is affirmative. The BLS, in particular the survey responses on loans to enterprises, does matter for the euro area credit and business cycles. The net percentage of banks indicating a tightening in credit standards to enterprises, or the associated terms and conditions, leads bank loan and real GDP growth by three to four quarters. These results for the euro area are fully consistent with the findings obtained using the U.S. Senior Loan Officer Survey. However, they should be interpreted with caution because the time series dimension of the euro area survey is quite short, since the BLS initial information is from the last quarter of 2002. This notwithstanding, our results are robust across different empirical methods and specifications.

We explore the two main issues of interest by applying several methodologies to aggregate euro area data but also exploiting cross-country differences, using panel regressions. The correlation analysis overall confirms that the BLS provides a credible measure of credit availability. The BLS responses on credit standards lead bank loan growth to enterprises by four quarters and to households by one quarter. Credit standards lead also corporate bond spreads in real time, by one quarter. Conversely, the correlations between credit standards and bank lending rate spreads are comparatively low and there are different lead-lag relations depending on the class of borrowers, i.e. corporate lending, loans for house purchase and consumer credit.

In addition, we run cross-country panel regressions to explain bank loan growth, GDP and its components. In all cases, with only a few exceptions, credit standards to enterprises and the corresponding price and non-price conditions and terms significantly help in explaining bank loan growth and real GDP growth in the euro area. After controlling for loan demand, BLS responses concerning corporate credit standards and conditions and terms for loans explain actual bank loan growth with a four-quarter lead. This is an important finding, because it implies that bank loan growth is not only affected by changes in loan demand in the short-term, but also by changes in bank loan supply restrictions. These restrictions are reflected in the price and non-price conditions and terms of the loans, such as the bank margins, the size, the maturity and the collateral requirements of the loans. The panel regression analysis shows a significant predictive content of the BLS responses for real GDP and for some of its components (residential and non-residential investment as well as private consumption). The inclusion of additional control variables in order to capture the various monetary policy transmission channels indicates that the interest rate, bank lending, balance sheet and risk-taking channel are operative in the euro area. This finding implies that a change in the short-term interest rate affects banks behaviour – loan supply factors, the balance sheet position of borrowers and the perception of risk and through all these channels have an impact on output.

The significant predictive power of the BLS for euro area credit and output remains also when other well-known leading financial indicators are included in the analysis, such as a term spread adjusted for swings

in the term premium, corporate bond spread and stock market volatility, and also when the aggregate euro area series is considered.

Focusing on the 2008/2009 financial and economic crisis, the BLS responses provided an early and reliable signal about the deterioration of financing conditions and economic growth in the euro area. For example, 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 real GDP growth in the euro area, according to our panel estimates. Moreover, the observed decline in the net tightening of credit standards to enterprises since the peaks reached in the third and fourth quarter of 2008 is consistent with a rebound in quarterly real GDP growth in the second and third quarter of 2009.

1. Introduction

Since January 2003 when the bank lending survey (BLS) for the euro area was launched, there has been a growing interest in exploring its information content. However, due to the short history of the survey, this kind of analysis had to be postponed until recently. We empirically examine whether the BLS does matter for credit and output in the euro area. In addition, we analyse the importance of various credit determinants and of different monetary policy transmission channels. Our results can also be used to quantify the adverse impacts of the recent financial and economic crisis.

The questions in the euro area BLS refer to bank loan supply and demand relative to euro area residents. The answers are of a qualitative nature among five possible choices. For example, whether credit standards, which can be defined as the internal guidelines or criteria that reflect a bank's loan policy, have i) tightened considerably; ii) tightened somewhat; iii) remained basically unchanged; iv) eased somewhat or v) eased considerably. The answers are expressed in terms of net percentage, i.e. the difference between the percentages of banks that tightened and the percentage of banks that eased credit standards. The questions are posed in terms of changes with respect to the previous three months (realised changes) and the following quarter (expected changes). The response rate is typically 100% despite survey participants answer to the questionnaire on a voluntary basis. The number of responding banks has expanded over time, starting with 86 banks in 2003 and reaching a sample size of 118 banks in 2009, covering approximately 50% of total volume of euro area bank lending to households and non-financial corporations. The changes in the sample size are due to the enlargement of the euro area, an increased coverage for Germany and Italy and merger and acquisition activity. The country results are summed up to a euro area aggregate after weighting using the national lending in the total amount outstanding of euro area lending to euro area residents. On the contrary, at country level no weighting is applied, implying that each bank counts equally. General documentation on the euro area BLS can be found in Berg et al. (2005), an updated description of the BLS findings up to July 2009 in Hempell et al. (2010) and an international comparison of bank lending surveys in Sauer (2010). All survey results for the euro area are available on the ECB website (see http://www.ecb.int/stats/money/surveys/lend/html/index.en.html).

This study complements a recent paper by Maddaloni et al. (2008), which analyses the transmission of monetary policy in the euro area using credit standards. Their results suggest that monetary policy affects credit standards as reported in the euro area BLS and that the different channels of transmission – interest rate, borrower balance sheet, bank lending, but also risk-taking channel – are active. It relates more closely to US studies. The latter empirically examine the senior loan officer opinion survey (Schreft and Owens, 1991, Lown et al. 2000, Lown and Morgan, 2002 and 2006, Cunningham, 2006) and estimate the adverse impact of the recent financial crisis on the real economy through credit (Bayoumi and Melander, 2008; Claessens et al. 2008, Swiston, 2008, Beaton et al., 2009 and Tieman and Maechler, 2009). Lown and Morgan (2006) examine the Federal Reserve System's Senior Loan Officer Opinion Survey on Bank Lending Practices and note that, except for 1982, every recession was preceded by a sharp spike in the net percentage of banks reporting a tightening of lending standards. Asea and Blomberg (1998) also show, based on a large panel of US bank loan terms over the period 1977 to 1993, that banks change their

lending standards from tightness to laxity systematically over the business cycle. They conclude that cycles in bank lending standards are important in explaining aggregate economic activity. Also in a macroeconomic context, changes in the net percentage of senior loan officers reporting tightening standards Granger causes changes in output, loans, and in the federal funds rate. On the contrary, the macroeconomic variables are not successful in explaining variation in the lending standards (Lown and Morgan, 2002, 2006). US credit standards are found to be exogenous with respect to the other variables in a vector autoregression system (Lown and Morgan 2002, 2006 and Lown et al., 2000).

The outbreak of the recent financial crisis highlighted the need to better understand whether the qualitative information provided by senior loan officers can tell us something about credit and output. The more while the US experience shows that the bank lending survey offers useful information to forecast loan growth and real economic activity. This is an interesting result and support the quality of the answers received.

This study empirically examines the information content of the BLS for euro area credit and output. It deals with two main questions: i) is the BLS a reliable (leading) indicator for bank lending? And ii) for real GDP? It also provides evidence which monetary transmission channels do play a role in the euro area. The answers to the two questions are admittedly tentative given the short history of the BLS.

Our answer to the first question is yes. Correlations between the (expected) net tightening of credit standards and other measures of credit availability have the expected signs and are statistically significant. The BLS outcomes significantly lead Monetary Financial Institution (MFI, hereafter simply denoted by bank) loan growth by four quarters for enterprises and by one quarter for households. For corporate bond spreads we find a real-time lead by one quarter. For bank lending rate spreads, the correlations are comparatively weak and ambiguous regarding the lead-lag relation. In addition, regressions using a panel of euro area countries, show that previous BLS responses with respect to realised corporate credit standards and conditions and terms help in explaining bank loan growth with a four-quarter lead, whereas the BLS responses on demand explain loan growth one quarter ahead. This is an important finding, because it implies that bank loan growth is not only affected by changes in loan demand in the short term, but also by bank loan supply behaviour in the medium term, as reflected in the price and non-price conditions and terms of the loans, such as the bank margins on loans, the size and maturity of the loan and collateral requirements.

The answer to the second question is also affirmative. Panel regressions show a significant predictive content of the BLS for real GDP and some of its components (namely, residential and non-residential investment as well as private consumption). The inclusion of additional control variables in order to capture the various monetary policy transmission channels indicate that the interest rate, bank lending, balance sheet and risk-taking channel are all operative in the euro area. This finding implies that the output impact of a change in the official interest rate is amplified by bank behaviour, the balance sheet position of borrowers and by the perception of risk in the equity market.

Several implications emerge about the impacts of the recent financial and economic crisis on credit and real GDP growth in the euro area. The BLS responses suggest ultimately 1.3 percentage points lower

quarterly bank loan growth to non-financial corporations due to the net tightening in credit standards and on top of conventional demand and interest rate impacts. In addition, the BLS responses and the estimated panel regression coefficients suggest an adverse ultimate impact of the crisis on quarterly euro area real GDP growth of between 0.8 and 1.0 percentage points.

The remainder of this paper is organised as follows. Section 2 introduces the methodology and the data. Section 3 discusses the empirical results for bank loan growth and Section 4 for real GDP growth. Section 5 concludes.

2. Methodology and Data

Using an unbalanced panel of up to 12 euro area countries[1] and up to 28 (2002Q4-2009Q3 for the survey data) quarterly observations, we run regressions of the general form:

$$Y_{i,t} = \alpha_i + \beta(BLS/100)_{i,t-h} + \gamma(X/100)_{i,t-h} + \delta(Y)_{i,t-1} + \varepsilon_{i,t} \tag{1}$$

where Y refers to the dependent variables that characterize quarter-on-quarter (henceforth "q-o-q") bank loan (and its maturity breakdown) or real GDP growth (and some of its components); BLS is the net percentage of the relevant BLS response at different lags h (which varies from 0 to 4), X refers to a set of control variables; i is the country identifier and t the time period. Table A.1 in the Appendix provides an overview of the definitions and sources of the variables. We include in all panel regressions country fixed effects. Due to the short-time series dimension of our data set, we follow a restricted to a general approach. We first estimate Equation (1) without control variables, i.e. $\gamma = 0$, and then add control variables. All standards errors are clustered by country to correct for serial correlation.

In our analysis we also exploit the structure of the survey. Figure 1 provides a schematic overview of the euro area BLS questions. The questions are posed with reference to the past three months as well as to the next three months and they are divided into five categories. The BLS variables used in our analysis are always net percentages, defined as the differences between the responses of tightened minus eased (for credit standards) and increased minus decreased (for loan demand).

First, we look at the net percentage of banks tightening their credit standards as reported in the survey (top left box in Figure 1). Bank lending or credit standards are the criteria by which banks determine the risk of loan applicants and rank them based on the default likelihood. These are the criteria that a bank follows when taking a lending decision. Credit standards refer to all the elements that go into making a credit decision, including credit scoring models, the lending culture of the bank, the seniority and experience of loan officers, the banks' hierarchy of decision-making, and so on. They thus include price and non-price terms and conditions written in the loan contract, but also the unwritten practices and their application. While lending rates might be sticky, banks do, in fact, change their overall lending standards

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[1] Due to a lack of long backward BLS time series Cyprus, Malta, Slovenia and Slovakia are not included in the analysis. When considering GDP components regressions Belgium and Greece are also excluded due to the unavailability of some data.

more often. We also add the BLS response with respect to loan demand in order to distinguish better between bank supply and demand factors.

Second, we also examine in detail the loan conditions, distinguishing between various price and non-price conditions and terms (final column in Figure 1). Since overall credit standards include all the terms and conditions of a loan, these two variables tend to be collinear and therefore it seems inappropriate to examine credit standards and conditions and terms simultaneously due to multicollinearity. Indeed, when there is an increase in the net tightening of credit standards also the terms and conditions deteriorate. Among the latter, we first look at the margins on the average loan. It is a natural candidate for determining loan growth, given it captures the price of credit (Calza, Gartner, and Sousa, 2003; Calza, Manrique Simón, and Sousa, 2003, Kok Sørensen et al., 2008). We also examine the margins on riskier loans. Besides these price-related conditions and terms, we consider also other conditions as reported in the BLS, i.e. non-interest rate charges, the size of the loan or credit line, collateral requirements, loan covenants, and maturity. These non-price conditions and terms capture non-price loan supply-related factors. The use of this information distinguishes this paper from the papers mentioned earlier featuring euro area bank credit studies. These studies all have in common the estimation of a bank loan demand equation and do not have such BLS-related loan supply factors in their models.

The third main set of questions exploited in this paper relates to risk perception (marked C in Figure 1). These questions refer to the loan officers' risk perception regarding the general or sector specific prospects, collateral risk and consumer creditworthiness.

{Figure 1}

When considering the control variables, we aim at capturing different transmission channels of monetary policy (Angeloni et al., 2003). The BLS variable is the net tightening in corporate credit standards. The first control variable is the change in the EONIA, broadly capturing the interest rate channel of monetary transmission. The margins on average or riskier loans is subsequently examined instead of the credit standards in order to take into account the balance sheet channel of monetary policy. The margins reflect the external finance premium of borrowers which plays a key role in this transmission channel. Given the balance sheet channel can also work through the corporate bond market (de Bondt, 2004), we use also as control variable the BBB non-financial corporate bond spread. One should keep in mind that this variable, in contrast to the BLS responses, is only available at the euro area aggregate level.[2] Finally, a risk-taking channel is considered by including the perception of risk as reported in the BLS or the implied stock market volatility. The inclusion of a risk perception measure complements recent studies which investigate the impact of monetary policy on the risk-taking behaviour by banks (Ioannidou et al. 2007; Jiménez et al. 2007, Altunbas et al., 2009, Maddaloni et al., 2008). Here we

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[2] The market for corporate bonds is underdeveloped in some euro area countries. Moreover, because of existing differences in regulatory and fiscal requirements across euro area countries on the establishment of companies apt at issuing corporate securities, the country where a corporate bond is issued may not coincide with the country where the originator of the securities is incorporated.

examine whether the risk perception of loan officers or in the equity market as reflected in the implied stock market volatility matters for real GDP growth. Rajan (2006) mentions implied stock market volatility as a measure to capture the risk-taking or risk incentive channel of monetary policy.

Besides real GDP growth, we also consider the GDP components: non-residential investment growth, residential investment growth and private consumption growth.

It is important to know how credit standards as reported in the BLS have behaved compared to other measures of credit availability. Table 1 therefore presents the correlations between the realised and expected net tightening of credit standards as reported in the BLS for different leads and lags and other measures of credit availability: bank loan growth, bank lending rate spread, and BBB corporate bond spreads for non-financial corporations and all corporations. Three conclusions emerge from the table.

1. The signs are mostly as expected.

2. The maximum correlations in absolute value vary between 0.4 and 0.9.

3. Realised credit standards are significantly leading bank loan growth, by four quarters for enterprises and one quarter for households. Expected credit standards even show somewhat higher correlations for enterprises, but not for bank loan growth to households. For the latter the highest correlations are found contemporaneously.[3] Credit standards show a real-time lead by one quarter for corporate bond spreads. The correlations with bank lending rate spreads are comparatively low (at least for households) and without a consistent lead-lag relation across enterprises and households, which points to lending rates having a more limited information content.

Overall, these findings are as expected and they are consistent with results for the United States based on a longer sample (see Cunningham, 2006).

{Table 1}

3. Bank loan growth

Regression results obtained by using the BLS variable as one regressor at the time show that lagged BLS outcomes significantly help in explaining bank loan growth (see Table 2). This suggests that the BLS has significant information content for bank loan growth in the euro area, irrespectively of the loan category. Realised and expected credit standards to enterprises have the highest coefficients after 3 to 4 quarters. Similarly for consumer credit and other lending there seems to be a 3 quarter lag while for bank loan growth to household for house purchase the contemporaneous credit standards show the highest impact. Looking at realised and expected loan demand for all three loan categories a significant coefficient is found for all lags. Overall, in all cases both loan demand and credit standards seem to play an important role in explaining bank loan growth. Particularly in the case of enterprises, this finding is in

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[3] One should, however, keep in mind that the expected credit standards at quarter t are already available in quarter t-1.

line with the US evidence based on a longer time series of data. Cunningham (2006) shows for the United States that credit standards help to predict loan growth.

{Table 2}

Tables 3A, 3B and 3C show the results of several panel regressions where the dependent variable is bank loan growth broken down by maturity. On the right hand side, we consider not only credit standards from the BLS, but also changes in terms and conditions for the loans. The aforementioned tables present the panel regression results for bank loan growth to non-financial corporations using realised corporate credit standards or conditions and terms with a lead of 4 quarters. The rationale behind our choice results from the presumption that the average impact of bank supply behaviour is reflected in loan growth with a lag. Loan demand is included as a control variable in order to better distinguish between loan supply and demand and is lagged by 1 quarter, because the average impact of loan demand, as typically captured by GDP in traditional loan demand studies, is expected to reach its average impact on loan growth much quicker than bank-related variables such as bank margins or collateral requirements. Another control variable is the change in the EONIA, capturing changes in the policy or risk-free interest rate. This control variable also has a one-quarter lag, given a quick pass-through to bank lending rates in the euro area (de Bondt, 2005). Four observations emerge from the table.

First, credit standards and conditions and terms to enterprises have the expected impact on corporate bank loan growth. In all cases these impacts are significantly different from zero. According to specification (1), which does not consider any control variable, a tightening in the corporate credit standards by 1 percentage point results after four quarters in a decline in the total q-o-q loan growth by about 0.023 percentage points. Impacts are even higher when considering the maturity structure: -0.053 percentage points for short-term loans and -0.024 for long-term. These figures reduce respectively to 0.018, 0.046 and 0.022 when taking loan demand into account (see estimates of (2) in Tables 3A, 3B and 3C).

Second, price as well as non-price conditions and terms have a significant impact on loan growth. This finding suggests that credit standards indeed capture the complete spectrum of conditions and terms. Margins, but also the size of the loan, the collateral requirements and loan covenants all help in explaining bank loan growth.

Third, loan demand is in most cases found to be a significant determinant of bank loan growth to non-financial corporations. The significant estimated coefficients for loan demand of between 1.1 and 1.3 for total loans (Table 3A) are in line with conventional loan demand studies where the elasticity of the scale variable which captures financing needs, such as GDP, is of a similar size.

Fourth, the change in the EONIA is also a significant determinant of loan growth. An increase in the EONIA results in higher growth for loan to enterprises. Such a positive effect is in line with US evidence. Indeed a tighter monetary policy typically leads to higher liquidity needs over the short term (see for

example Bernanke and Gertler, 1995). These needs may arise to finance increased inventory stocks or to substitute for funds previously collected on the commercial paper market.

{Table 3A}

Maddaloni et al. (2008) find that banks tend to reduce the maturity of their loans when there is a monetary policy tightening. Following up on this observation, Tables 3B and 3C report the regression results distinguishing between short and long-term bank loan growth to non-financial corporations. In line with the results for all loans, credit standards or the price and non-price conditions and terms significantly help in explaining short and long-term bank loan growth to non-financial corporations. However, changes in the short-term interest rates have a significant (and positive) coefficient only for short-term loans. This result may hinge on two different effects. First, changes in policy rate affect primarily short-term loans, since the rates for long-term loans are linked also to long-term expectations of economic activity and there might be more scope for a diversification of financing means (for example, issuing corporate bonds). At the same time, the result may reflect also the fact that banks tend to reduce the overall maturity of their loans and therefore, in aggregate, the volume of short-term loans would increase in response to policy tightening.

{Tables 3B and 3C}

Table 3D shows the results of similar regressions when the dependent variable is the growth of mortgage loan volume. Compared to the results obtained for loans to enterprises, the change in EONIA is never significant. Concerning the terms and conditions for the loans, changes in margins are significant and the coefficient has the expected negative sign (lower price of loans imply higher growth volume). Loan growth increases when both non-interest rate charges and loan-to-value requirements are relaxed.

However, this second set of results may be somewhat misleading because the volume of loans granted to households may be greatly affected by securitization activity. Indeed in the euro area loans to households represent the largest share of loans underlying securitised assets (Carter and Watson, 2006). The possibility to securitize loans provides the banks with a risk transfer device (Maddaloni and Peydró, 2009) and therefore imply that banks may relax their lending standards related to collateral risk and grant more loans than they would in case securitization was not possible. In order to test the effect of securitization activity we use time series of loans corrected for securitization, i.e., the loan series adjusted for the derecognition of loans from the bank balance sheet due to sale or securitization. One should keep in mind that the securitization data refer to overall activity and can not be specifically allocated to the three loan categories considered. Furthermore, not all loan securitizations lead to the removal of the securitized loans from the bank balance sheet, because certain accounting standards view the securitization as a collateralized borrowing by the bank and not as a divestment. In these cases, no correction is needed and none is applied. Synthetic securitisations referenced to the bank's own loan portfolio do not need any correction of the loan series either, because no asset is sold. When we use the corrected series as dependent variable both the coefficients of lending standards related to collateral requirements and loan-to-value ratio for mortgage loans are significant, supporting the role of securitization as a risk-transfer device (see Table 3E).

{Tables 3D and 3E}

The results for consumer loans - a comparatively less important segment of the credit market in the euro area (around 10% of total loans) - are also consistent with a role of securitization as risk-transfer device. Credit standards do significantly matter for consumer credit, but not when corrected for securitization activity (see Tables 3F and 3G).

{Tables 3F and 3G}

In order to examine the marginal predictive content of the BLS, we apply a horse race between the information content of the BLS for bank loan growth compared to other indicators which have shown predictive content for the business cycle. We consider financial spreads, term spreads from the government bond market but also credit spreads from the corporate bond market, and one indicator from the stock market, i.e. stock market volatility.

Economic theory identifies a number of reasons why financial spreads may lead economic growth (Davis and Fagan, 1997) and therefore loan growth. The term spread, in this paper defined as the quarterly average of the daily spread between the ten-year government bond yield and the three-month Euribor, is a widely studied predictor for economic activity (see Wheelock and Wohar, 2009 for a recent survey of the literature). According to the expectations theory of the term structure of interest rates (read: interest rate channel of monetary policy), the term spread embodies market expectations of future inflation and the future real rate. The link to expected economic growth requires that inflation and output growth are positively related. For example, a declining term spread, signalling a future slowdown in economic growth, is consistent with a macroeconomic theory where short-term interest rates are temporarily high, perhaps due to restrictive monetary policy and vice versa. Similarly, if market participants feel future economic growth will be low, and expect a Philips curve relation to hold, then inflation would be expected to drop and the term spread to decrease. Another interpretation is that the short-term interest rate captures the monetary policy stance and thus the degree of price stability, making the term spread a proxy for the real long-term interest rate. In recent years several studies (Ang et al., 2006, Kremer and Werner, 2006 and Rosenberger and Mauer, 2008) argue that swings in the term premium distort the predictive content of the term spread and suggest to adjust the term spread by taking out the term premium. We therefore follow this approach and include a term premium adjusted term spread in the analysis.

The theory of the financial accelerator (read: the balance sheet channel of monetary policy) implies that the corporate bond spread tends to be, as a proxy for the premium on external financing and default risk, counter-cyclically related to real economic activity (de Bondt, 2004, and Mody and Taylor, 2004). The proxy that we use for the corporate bond spread is the quarterly average of the daily spread between the BBB non-financial corporate bond yield and AAA government bond yield.

Fornari and Mele (2009) show that stock market volatility helps in predicting turning points over and above traditional financial variables such as term and credit spreads. Their volatility measure is designed

to capture long-run uncertainty in capital markets and is particularly successful at explaining trends in the economic activity at horizons of six months and one year. We consider the quarterly average of the daily implied stock market volatility. This measure is expected to be counter-cyclical, so that at its peak it should typically anticipate recessions. In addition to this, it tends to be positively correlated with risk aversion, which, in turn, has the tendency to decline across economic expansions. Hence, higher-than-average stock market volatility will imply high risk aversion, which anticipates periods of low activity. Also, the stock market volatility is related to the occurrence of corporate defaults, as in the traditional Merton (1974) model. In this framework, rises in stock market volatility decrease the distance to default of firms, i.e., the probability that assets will be below the value of debt, which is typically the highest in recessions.

Table 4 reports the findings of a horse race between the information content of the BLS for bank loan growth compared to the other financial indicators considered. The main conclusion is that the BLS maintains its information content also when other forward looking variables are additionally taken into account.

{Table 4}

4. Real GDP growth

The second set of results relate to the information content of the BLS for output. We analyse this by estimating Equation (1) with the q-o-q growth rate of the various real economic variables as dependent variable (see Tables 5-8). The regression results show that the BLS has significant prediction content for real GDP, non-residential investment, residential investment and for private consumption.[4]

In Table 5 the predictive content of overall lending standards and of demand (both realised and expected) is analysed for all type of loans. The coefficient of lending standards is almost always significant for all loans and lags. The same holds for the coefficients relative to the demand for loans.

Tables 6, 7 and 8 show the results of similar regressions with a GDP component as dependent variable. Presumably credit to enterprises should be more related to non-residential investment and indeed lending standards to enterprises have a predictive power for this component of GDP at various lags (see Table 6). Table 7 reports the results of panel regressions when considering instead residential investment. We put this component of GDP in relation with loans to households for house purchase and consumer loans. Both lending standards and demand have significant coefficients for all lags. Broadly similar results hold when considering real private consumption growth (see Table 8).

{Tables 5-8}

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[4] Same conclusion is derived from correlations between the realised and expected net tightening of credit standards as reported in the BLS for different leads and lags and the seasonally adjusted q-o-q growth rate of various real economic variables: GDP, investment, non-residential investment, residential investment and private consumption (not reported).

The next step is to include control variables, in particular monetary policy rates, and the terms and conditions of loans in order to identify channels of transmission of monetary policy. Realised credit standards or conditions and terms to enterprises are included with a lead of 4 quarters, because a transmission lag of about one year for the bank lending and balance sheet channel is typically found. The control variables are also included with a lag of four quarters. Table 9 reports the panel regressions results for real GDP growth as dependent variable including the change in the EONIA as a control variable. The main finding of the table is that the panel regression estimates suggest that besides an interest rate channel, also a credit channel, especially a balance sheet channel, and risk taking channel have been operative in the euro area. The conventional interest rate channel, as captured by the change in the EONIA is in almost all cases a significant transmission channel. In addition, credit standards and margins on average or riskier loans contribute in explaining real GDP growth, suggesting that also a bank lending and balance sheet channel of monetary policy have been operative. Also a risk-taking channel, as reflected in stock market volatility and in the non-financial BBB corporate bond spread, is a relevant transmission channel in the euro area. At the same time, risk perception measures from the BLS responses are not found to significantly help predicting real GDP growth when controlling for the EONIA.

{Table 9}

On the basis of the estimated panel regression coefficients as reported in Table 9, the impact of bank behaviour during the recent financial and economic crisis on euro area real GDP growth can be quantitatively assessed. The peaks in the net percentage of tightening in credit standards to enterprises and in the margins on average and riskier loans resulted ultimately in between 0.8 and 1.0 percentage points lower quarterly real GDP growth according to our panel estimates. This finding suggests that the impact of bank behaviour in the context of the crisis has had a not negligible adverse impact on economic growth in the euro area.

In order to further investigate the predictive content of the credit standards to enterprises further, a horse race exercise has been applied by examining also the other indicators as earlier introduced, i.e. premium-adjusted term spread, corporate bond spread and implied stock market volatility, which are known to have predictive content for output.

Table 10 presents the estimation results of examining these indicators on their own as well as together with the net tightening in the margins on average and riskier loans. The latter significantly help in predicting the annual growth rate in real GDP in the euro area in isolation as well as together with one of the other indicators considered. The significant result for the stock market volatility can be viewed that besides a credit channel as captured by the BLS also a risk taking channel among equity investors has been operative in the euro area.

{Table 10}

The predictive power of the BLS is additionally examined by analysing only euro area data, thus only the time series dimension of the data. Given the low number of observations (28) more than usual caution is warranted in the interpretation of the results. This is also the reason why all specifications are also estimated including a time trend. Table 11 reports the estimates of predictive regressions where the annual growth rate of euro area real GDP one year ahead is explained by a constant and the current level of an indicator in isolation or jointly. The main conclusion is that the predictive power of the BLS considered in isolation or jointly is among the strongest as reflected in comparatively high t-statistics and R-squared. For the estimated specifications where the financial variables are considered in isolation, the BLS measures have a t-statistic of between 2.1 and 2.7 and for the specifications with a time trend of between 5.5 and 10.4, explaining between 52% and 92% of the variation in annual growth in real GDP one year ahead. The predictive power of the BLS is even more convincing for the results where the various variables are jointly considered. The BLS measure (net tightening of credit standards to enterprises or the margins on average or riskier corporate loans) is the only financial variable which has a consistent marginal predictive content for real GDP growth one year ahead. The premium-adjusted term spread and stock market volatility also significantly help in predicting real GDP growth, but they loose their significance as also a time trend is taken into account. This is despite the fact that the time trend itself is not always significantly different from zero. Furthermore, the estimated stock market volatility coefficient has the wrong sign. All in all, the (marginal) predictive content of the BLS for future real GDP growth has been the most convincing among the financial indicators considered since 2003.

{Table 11}

6. Conclusion

By means of panel regressions we have shown convincingly that the BLS has information content to predict credit and output. Realised and expected credit standards as reported in the BLS are reliable measures of credit availability. With a lead of 3 to 4 quarters they significantly explain bank loan growth to non-financial corporations. In addition, net credit standards to non-financial corporations help in explaining real GDP growth and its main components (residential investment growth, non-residential investment growth and real private consumption growth). Exploiting the variety of BLS responses we can disentangle the impact of various monetary policy transmission channels, like the interest rate, the bank lending, the balance sheet and the risk-taking channel in the euro area. This finding implies 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.

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Figure 1 Stylised illustration of questions posed in the euro area Bank Lending Survey

	Change in credit standards?	Which factors affect credit standards?	Which loan conditions changed?
Corporate lending	tightened/ unchanged/ eased?	A Cost of funds & balance sheet constraints - cost of solvency - access to financial markets - liquidity position	A Price - margin on average loans - margin on riskier loans
Small / large enterprises? short / long term?		B Competitive pressure - competition from other banks - competition from non-banks - competition from financing by other market parties	B Other standards - costs excluding interest - size of loan / credit line - collateral requirements - loan covenants - maturity

CREDIT SUPPLY

C Risk perception
- expected economic activity
- company/industry prospects
- collateral risk

Loans for house purchase, consumer credit and other loans to households	tightened/ unchanged/ eased?

A Costs of funds & balance sheet constraints

A Price
- margin on average loans
- margin on riskier loans

B Competitive pressure
- competition from other banks
- competition from non-banks

B Other standards
- costs excluding interest
- loan-to-value ratio
- collateral requirements
- maturity

C Risk perception
- expected general economic activity
- housing market prospects
- collateral risk
- consumer creditworthiness

	Change in credit demand?	Which factors affect credit demand?
Corporate lending	decreased/ unchanged/ increased?	A Financing needs - fixed investments - inventories and working capital - mergers and acquisitions - debt restructuring
Small / large enterprises? short / long term?		B Alternative sources of finance - internal financing - loans from other banks - loans from non-banks - issuance of debt securities - issuance of equity

CREDIT DEMAND

Loans for house purchase, consumer credit and other loans to households	decreased/ unchanged/ increased?

A Financing needs
- housing market prospects
- consumer confidence
- non-housing related consumption expenditure
- spending on durables

B Use of alternative finance
- household savings
- loans from other banks
- other sources of finance

OPEN QUESTION: may vary each time

Questions highlighted in the shaded boxes are posed with reference to the past three months as well as to the next three months.

Table 1 Correlations between net percentages of (expected) credit standards applied to loans and other measures of credit availability at various leads (-) and lags (+) at the euro area level

Table 1 shows the correlations between the net percentage tightening of (expected) credit standards applied to loans and other measures of credit availability at various leads (-) and lags (+). Net percentage tightening (*NetP*) is reported in the Bank Lending Survey. *Bank loan growth* refers to the seasonally adjusted quarter-on-quarter growth rates. *Bank spreads* are calculated as the quarterly average spread between the respective composite MFI rate weighted by new business volumes and the short- (3-month EURIBOR) or long-term (10-year government bond yield) interest rate. *BBB nfc spreads* are quarterly averages of daily non-financial euro-denominated BBB spreads. *BBB spreads* are quarterly averages of daily corporate BBB spreads. * indicates significance at 10%, ** indicates significance at 5% and *** indicates significance at 1%. The sample covers the period between 2002Q4 and 2009Q2.

Realised credit standards

NetP reported at time t	enterprises				house purchase		consumer credit	
	Bank loan growth$_t$	Bank spread$_t$	BBB nfc spreads$_t$	BBB spreads	Bank loan growth$_t$	Bank spread$_t$	Bank loan growth$_t$	Bank spread$_t$
-4	-0.80 ***	-0.35	0.46 **	0.47 **	-0.53 ***	0.09	-0.46 **	0.32
-3	-0.78 ***	-0.33	0.57 ***	0.57 ***	-0.69 ***	0.12	-0.61 ***	0.27
-2	-0.67 ***	-0.02	0.68 ***	0.68 ***	-0.73 ***	0.19	-0.72 ***	0.24
-1	-0.50 ***	0.27	0.78 ***	0.73 ***	-0.83 ***	0.41 **	-0.79 ***	0.15
0	-0.21	0.48 **	0.70 ***	0.61 ***	-0.82 ***	0.41 **	-0.78 ***	0.00
1	0.12	0.55 ***	0.55 ***	0.50 ***	-0.77 ***	0.27	-0.56 ***	-0.19
2	0.37 *	0.56 ***	0.44 **	0.46 **	-0.70 ***	0.26	-0.38 *	-0.44 **
3	0.54 ***	0.65 ***	0.48 **	0.53 ***	-0.71 ***	0.19	-0.25	-0.55 ***
4	0.70 ***	0.52 **	0.31	0.39 *	-0.61 ***	0.00	-0.06	-0.69 ***

Expected credit standards

NetP reported at time t	enterprises				house purchase		consumer credit	
	Bank loan growth$_t$	Bank spread$_t$	BBB nfc spreads$_t$	BBB spreads	Bank loan growth$_t$	Bank spread$_t$	Bank loan growth$_t$	Bank spread$_t$
-4	-0.89 ***	-0.48 **	0.34	0.38 *	-0.20	0.09	-0.51 **	0.48 **
-3	-0.85 ***	-0.39 *	0.51 **	0.53 ***	-0.31	0.14	-0.55 ***	0.27
-2	-0.84 ***	-0.36 *	0.66 ***	0.67 ***	-0.63 ***	0.15	-0.68 ***	0.16
-1	-0.68 ***	0.02	0.76 ***	0.76 ***	-0.66 ***	0.25	-0.77 ***	0.12
0	-0.45 **	0.38 *	0.79 ***	0.72 ***	-0.81 ***	0.35 *	-0.80 ***	-0.01
1	-0.17	0.52 ***	0.67 ***	0.60 ***	-0.65 ***	0.28	-0.59 ***	-0.27
2	0.13	0.52 ***	0.58 ***	0.58 ***	-0.70 ***	0.24	-0.40 **	-0.53 ***
3	0.38 *	0.60 ***	0.61 ***	0.64 ***	-0.70 ***	0.34	-0.20	-0.55 ***
4	0.53 ***	0.58 ***	0.41 *	0.49 **	-0.68 ***	0.20	-0.09	-0.65 ***

Table 2 Panel regression results with quarterly bank loan growth as dependent variable

Table 2 shows regression results of using a panel of 12 countries (Belgium, Germany, Ireland, Greece, Spain, France, Italy, Luxembourg, Netherlands, Austria, Portugal and Finland) and up to 28 observations (from 2002Q4 to 2009Q3). We use the reduced form: $Y_{i,t} = \alpha_i + \beta(BLS/100)_{i,t-h} + \delta(Y)_{i,t-1} + \varepsilon_{i,t}$ (1) where Y is the seasonally-adjusted quarter-on-quarter bank loan growth rate to non-financial corporations, households for house purchase and households for consumer credit and other lending. *BLS* is the net percentage of different variables derived from the Bank Lending Survey. In particular, "cs" indicates credit standards as reported in the BLS; "dem" indicates demand as reported in the BLS; "nfc" indicates non-financial corporations; "hp" indicates households for house purchase; "cc" indicates households for consumer credit; "r" indicates realised and "e" indicates expected. * indicates significance at 10%, ** indicates significance at 5% and *** indicates significance at 1%. The estimated coefficients for the constant and lagged dependent variable are not shown in order to save space.

Dependent variable	Bank loan growth to non-financial corporations				Bank loan growth to households for house purchase				Bank loan growth to households for consumer credit and other lending			
BLS	cs_nfc_r	dem_nfc_r	cs_nfc_e	dem_nfc_e	cs_hp_r	dem_hp_r	cs_hp_e	dem_hp_e	cs_cc_r	dem_cc_r	cs_cc_e	dem_cc_e
BLS [t]	-0.997 ***	1.326 ***	-1.389 ***	0.998 ***	-2.706 ***	2.094 ***	-2.597 ***	0.946 ***	-1.912 ***	2.034 ***	-2.209 ***	1.829 ***
BLS [t-1]	-1.360 ***	1.804 ***	-2.034 ***	1.578 ***	-2.625 ***	1.999 ***	-2.170 ***	0.785 ***	-2.343 ***	1.623 ***	-1.906 ***	2.003 ***
BLS [t-2]	-1.643 ***	2.068 ***	-2.373 ***	1.936 ***	-1.943 ***	2.225 ***	-2.490 ***	0.872 ***	-2.087 ***	1.546 ***	-1.895 ***	1.642 ***
BLS [t-3]	-2.147 ***	1.742 ***	-2.760 ***	0.860 **	-1.767 ***	2.185 ***	-1.506 **	0.622 ***	-2.328 ***	1.536 ***	-2.334 ***	1.157 **
BLS [t-4]	-2.298 ***	1.295 ***	-2.913 ***	1.358 ***	-1.638 ***	2.177 ***	-2.079 ***	0.123 ***	-2.208 ***	1.895 ***	-0.625	1.110 **
R-sq overall [t]	0.42	0.41	0.42	0.40	0.26	0.31	0.26	0.25	0.27	0.30	0.27	0.28
[t-1]	0.43	0.42	0.43	0.40	0.26	0.29	0.25	0.26	0.25	0.29	0.27	0.27
[t-2]	0.43	0.42	0.41	0.39	0.24	0.29	0.25	0.24	0.26	0.31	0.29	0.29
[t-3]	0.43	0.40	0.41	0.38	0.25	0.29	0.24	0.25	0.28	0.32	0.29	0.31
[t-4]	0.41	0.39	0.39	0.37	0.25	0.29	0.25	0.24	0.29	0.33	0.31	0.31

Table 3 Panel regression results with quarterly bank loan growth as dependent variable including control variables

Tables 3A-G show regression results using an unbalanced panel of 12 countries (Belgium, Germany, Ireland, Greece, Spain, France, Italy, Luxembourg, Netherlands, Austria, Portugal and Finland) and up to 28 observations (from 2002Q4 to 2009Q3). We use the general form: $Y_{i,t} = \alpha_i + \beta(BLS/100)_{i,t-h} + \gamma(X/100)_{i,t-h} + \delta(Y)_{i,t-1} + \varepsilon_{i,t}$ where Y is the seasonally-adjusted quarter-on-quarter bank loan growth rate to non-financial corporations (3A), short-term (i.e. up to one year) bank loan growth rate to non-financial corporations (3B), long-term (i.e. over one year) bank loan growth rate to non-financial corporations (3C), bank loan growth rate to households for house purchase (3D), bank loan growth rate to households for house purchases corrected for securitisation (3E), bank loan growth rate to households for consumer credit (3F), bank loan growth rate to households for consumer credit corrected for securitisation (3G). *Credit standards* is the net percentage of banks in the euro area which have reported to have tightened their credit standards over the past three months. *Demand* is the net percentage of banks in the euro area which have reported an increase in the demand for loans over the past three months. *d(Eonia)* is the changes in the quarterly averages of the daily overnight rates. The other regressors are the net percentage of banks that indicated that the correspondent factor has affected changes in credit standards. T-statistics are reported below the coefficient estimates. * indicates significance at 10%, ** indicates significance at 5% and *** indicates significance at 1%.

A. TOTAL LOANS TO NON-FINANCIAL CORPORATIONS

	q-o-q MFI loan growth to non-financial corporations									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Credit standard t-4	-2.30	-1.80	-1.25							
	4.51 ***	3.79 ***	2.52 **							
Demand t-1		1.17	1.03	0.99	0.83	1.27	1.11	1.17	1.08	1.23
		2.19 *	1.77	1.60	1.30	2.22 **	1.85 *	2.09 *	1.86 *	2.17 *
d(Eonia) t-1			0.84	0.65	0.71	0.99	0.96	0.99	0.98	1.03
			2.32 **	1.86 *	2.22 **	2.65 **	2.66 **	2.62 **	2.71 **	2.88 **
Margins on average loans t-4				-1.29						
				4.07 ***						
Margins on riskier loans t-4					-1.97					
					4.14 ***					
Non-interest rate charges t-4						-1.50				
						1.83 *				
Size of the loan or credit line t-4							-1.85			
							2.89 **			
Collateral requirements t-4								-1.48		
								2.21 **		
Loan covenants t-4									-2.08	
									4.23 ***	
Maturity t-4										-0.80
										2.25 **
MFI loan growth t-1	0.41	0.39	0.36	0.34	0.33	0.36	0.33	0.33	0.33	0.38
	7.71 ***	8.78 ***	6.69 ***	5.88 ***	7.86 ***	8.33 ***	7.29 ***	7.34 ***	9.21 ***	6.97 ***
Number of observations	288	288	288	288	288	288	288	288	288	288
Number of countries	12	12	12	12	12	12	12	12	12	12
Adjusted R-squared	0.35	0.37	0.39	0.41	0.43	0.39	0.4	0.39	0.41	0.38

B. SHORT-TERM LOANS TO NON-FINANCIAL CORPORATIONS

				q-o-q short-term MFI loan growth to non-financial corporations						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Credit standard t-4	5.34	4.61	1.62							
	3.54 ***	3.86 ***	1.71							
Demand t-1		2.53	2.13	2.00	1.81	2.42	2.09	2.23	2.16	2.25
		1.19	1.03	0.96	0.89	1.17	0.97	1.12	1.11	1.04
d(Eonia) t-1			3.76	2.96	3.18	3.83	3.79	3.76	3.75	3.91
			4.38 ***	4.05 ***	4.36 ***	4.31 ***	4.34 ***	4.26 ***	4.06 ***	4.52 ***
Margins on average loans t-4				2.51						
				3.57 ***						
Margins on riskier loans t-4					3.29					
					6.93 ***					
Noninterest rate charges t-4						2.39				
						3.25 ***				
Size of the loan or credit line t-4							2.54			
							2.34 **			
Collateral requirements t-4								2.32		
								2.96 **		
Loan covenants t-4									3.08	
									3.67 ***	
Maturity t-4										1.32
										1.26
MFI loan growth t-1	0.02	0.04	0.10	0.11	0.11	0.10	0.11	0.11	0.11	0.09
	0.14	0.26	0.73	0.93	0.87	0.76	0.91	0.84	0.83	0.75
Number of observations	288	288	288	288	288	288	288	288	288	288
Number of countries	12	12	12	12	12	12	12	12	12	12
Adjusted Rsquared	0.07	0.08	0.18	0.2	0.21	0.18	0.18	0.18	0.19	0.17

C. LONG-TERM LOANS TO NON-FINANCIAL CORPORATIONS

				q-o-q long-term MFI loan growth to non-financial corporations						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Credit standard t-4	-2.38	-2.21	-2.19							
	4.26 ***	3.73 ***	3.12 ***							
Demand t-1		0.34	0.33	0.42	0.43	0.79	0.59	0.64	0.56	0.67
		0.55	0.54	0.64	0.65	1.33	1.03	1.11	0.90	1.11
d(Eonia) t-1			0.03	0.04	0.15	0.35	0.23	0.32	0.38	0.35
			0.08	0.15	0.71	1.36	0.74	1.08	1.60	1.37
Margins on average loans t-4				-1.52						
				3.74 ***						
Margins on riskier loans t-4					-2.04					
					3.31 ***					
Non-interest rate charges t-4						-2.33				
						1.91 *				
Size of the loan or credit line t-4							-3.21			
							3.52 ***			
Collateral requirements t-4								-2.45		
								2.29 **		
Loan covenants t-4									-2.73	
									3.01 **	
Maturity t-4										-1.84
										3.05 **
MFI loan growth t-1	0.40	0.39	0.39	0.39	0.37	0.40	0.34	0.33	0.35	0.40
	6.30 ***	5.43 ***	5.43 ***	5.35 ***	5.87 ***	6.28 ***	4.95 ***	5.11 ***	6.05 ***	5.58 ***
Number of observations	288	288	288	288	288	288	288	288	288	288
Number of countries	12	12	12	12	12	12	12	12	12	12
Adjusted R-squared	0.32	0.32	0.32	0.31	0.32	0.3	0.33	0.32	0.32	0.29

D. TOTAL LOANS TO HOUSEHOLDS (house purchase)

	q-o-q MFI loan growth to households								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Credit standard t-4	-1.62	-1.34	-1.32						
	3.07 **	2.74 **	2.60 **						
Demand t-1		1.70	1.70	1.80	1.78	1.81	1.76	1.78	1.75
		2.87 **	2.87 **	3.03 **	2.96 **	3.14 ***	3.00 **	2.97 **	3.05 **
d(Eonia) t-1			0.05	0.03	0.00	0.22	0.14	0.29	0.02
			0.12	0.07	0.00	0.62	0.36	0.63	0.07
Margins on average loans t-4				-0.91					
				3.30 ***					
Margins on riskier loans t-4					-1.81				
					4.51 ***				
Non interest rate charges t-4						-1.18			
						1.96 *			
Collateral requirements t-4							-1.66		
							1.74		
Maturity t-4								0.00	
								0.00	
Loan-to-value ratio t-4									-1.83
									3.47 ***
MFI loan growth t-1	0.36	0.19	0.18	0.18	0.16	0.20	0.19	0.20	0.17
	1.88 *	1.00	0.86	0.84	0.75	0.92	0.90	0.95	0.80
Number of observations	288	288	288	288	288	288	288	288	288
Number of countries	12	12	12	12	12	12	12	12	12
Adjusted Rsquared	0.2	0.29	0.29	0.28	0.29	0.28	0.28	0.27	0.3

E. TOTAL LOANS TO HOUSEHOLDS (house purchase) CORRECTED FOR SECURITISATION

	q-o-q MFI loan growth to households corrected for securitisation								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Credit standard t-4	-0.99	-0.90	-0.77						
	3.15 ***	2.03 *	1.55						
Demand t-1		0.83	0.82	0.85	0.84	0.86	0.84	0.85	0.85
		7.06 ***	6.77 ***	7.02 ***	6.41 ***	7.49 ***	6.58 ***	6.06 ***	7.26 ***
d(Eonia) t-1			0.26	0.33	0.29	0.36	0.24	0.30	0.26
			1.51	1.73	1.67	2.59 **	1.58	1.90 *	1.85 *
Margins on average loans t-4				-0.20					
				0.65					
Margins on riskier loans t-4					-0.55				
					1.30				
Non interest rate charges t-4						-0.40			
						0.66			
Collateral requirements t-4							-1.74		
							2.49 **		
Maturity t-4								-0.97	
								2.40 **	
Loan-to-value ratio t-4									-0.93
									1.99 *
MFI loan growth t-1	0.50	0.37	0.35	0.37	0.36	0.38	0.35	0.36	0.34
	3.35 ***	2.51 **	2.25 **	2.35 **	2.34 **	2.31 **	2.29 **	2.27 **	2.30 **
Number of observations	288	288	288	288	288	288	288	288	288
Number of countries	12	12	12	12	12	12	12	12	12
Adjusted Rsquared	0.33	0.38	0.38	0.36	0.37	0.36	0.38	0.37	0.38

F. TOTAL LOANS TO HOUSEHOLDS (consumer credit)

	q-o-q MFI loan growth to households							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Credit standard t-4	-1.69	-1.16	-1.20					
	2.73 **	2.50 **	2.41 **					
Demand t-1		1.31	1.35	1.46	1.48	1.59	1.39	1.62
		2.27 **	2.58 **	2.61 **	2.67 **	2.92 **	2.32 **	2.74 **
d(Eonia) t-1			-0.09	-0.04	-0.08	0.04	-0.13	0.07
			0.23	0.10	0.20	0.10	0.32	0.18
Margins on average loans t-4				-0.48				
				1.05				
Margins on riskier loans t-4					-0.77			
					1.08			
Non interest rate charges t-4						0.30		
						0.26		
Collateral requirements t-4							-2.02	
							1.56	
Maturity t-4								0.63
								0.60
MFI loan growth t-1	0.37	0.30	0.30	0.31	0.30	0.31	0.31	0.31
	2.02 *	1.55	1.44	1.44	1.44	1.43	1.47	1.42
Number of observations	288	288	288	288	288	288	288	288
Number of countries	12	12	12	12	12	12	12	12
Adjusted Rsquared	0.19	0.21	0.21	0.2	0.2	0.2	0.21	0.2

G. TOTAL LOANS TO HOUSEHOLDS (consumer credit) CORRECTED FOR SECURITISATION

	q-o-q MFI loan growth to households corrected for securitisation							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Credit standard t-4	-1.00	-0.42	-0.38					
	4.91 ***	1.36	1.10					
Demand t-1		1.41	1.37	1.40	1.41	1.44	1.46	1.55
		7.36 ***	7.02 ***	7.06 ***	7.24 ***	7.15 ***	6.82 ***	7.28 ***
d(Eonia) t-1			0.08	0.09	0.08	0.12	0.14	0.20
			0.60	0.63	0.46	0.92	0.72	1.37
Margins on average loans t-4				-0.21				
				0.61				
Margins on riskier loans t-4					-0.27			
					0.49			
Non interest rate charges t-4						0.05		
						0.08		
Collateral requirements t-4							0.30	
							0.21	
Maturity t-4								1.05
								1.77
MFI loan growth t-1	0.53	0.40	0.39	0.39	0.39	0.40	0.40	0.38
	3.62 ***	2.99 **	2.85 **	2.83 **	2.85 **	2.81 **	2.81 **	2.58 **
Number of observations	288	288	288	288	288	288	288	288
Number of countries	12	12	12	12	12	12	12	12
Adjusted Rsquared	0.32	0.37	0.37	0.37	0.37	0.37	0.37	0.38

Table 4 Horse race results for predicting the MFI loan growth to non-financial corporations

Table 4 reports the results of a panel estimation where several financial indicators are regressed contemporaneously on the loan growth of loans to non-financial corporations to evaluate their predictive power. T-statistics are reported below the coefficient estimates. * indicates significance at 10%, ** indicates significance at 5% and *** indicates significance at 1%.

	y-o-y MFI loan growth to non-financial corporations		
	(1)	(2)	(3)
Credit standards$_{t-4}$	-0.10		
	3.93 ***		
Margin on average loans$_{t-4}$		-0.08	
		5.71 ***	
Margin on riskier loans$_{t-4}$			-0.08
			4.22 ***
Premium-adjusted term spread$_{t-4}$	-0.02	-0.01	-0.01
	0.81	0.43	0.38
BBB corporate bond spread$_{t-4}$	-0.06	-0.06	-0.06
	2.87 **	2.83 **	2.81 **
Implied stock market volatility$_{t-4}$	0.22	0.24	0.23
	3.90 ***	3.59 ***	3.71 ***
MFI loan growth$_{t-4}$	0.57	0.63	0.56
	5.55 ***	5.78 ***	4.98 ***
# of observations	288	288	288
# of countries	12	12	12
Adjusted R-squared	0.53	0.55	0.50

Table 5 Panel regression results with quarterly real GDP growth as dependent variable

Table 5 shows some regression results using a panel of 12 countries (Belgium, Germany, Ireland, Greece, Spain, France, Italy, Luxembourg, Netherlands, Austria, Portugal and Finland) and up to 27 observations (from 2002Q4 to 2009Q2). We use the reduced form: $Y_{i,t} = \alpha_i + \beta(BLS/100)_{i,t-h} + \delta(Y)_{i,t-1} + \varepsilon_{i,t}$ (1) where Y is the seasonally-adjusted (where available) quarter-on-quarter real GDP growth rate. *BLS* is the net percentage of different variables derived from the Bank Lending Survey. In particular, "cs" indicates credit standards as reported in the BLS; "dem" indicates demand as reported in the BLS; "nfc" indicates non-financial corporations; "hp" indicates households for house purchase; "cc" indicates households for consumer credit; "r" indicates realised and "e" indicates expected.* indicates significance at 10%, ** indicates significance at 5% and *** indicates significance at 1%. The estimated coefficients for the constant and lagged dependent variable are not shown in order to save space.

BLS	non-financial corporations				households for house purchase				households for consumer credit and other lending			
	cs_nfc_r	dem_nfc_r	cs_nfc_e	dem_nfc_e	cs_hp_r	dem_hp_r	cs_hp_e	dem_hp_e	cs_cc_r	dem_cc_r	cs_cc_e	dem_cc_e
BLS [t]	-1.23 ***	0.92 ***	-1.99 ***	0.68 ***	-1.16 ***	0.73 ***	-1.55 ***	1.01 ***	-1.72 ***	1.48 ***	-1.87 ***	1.51 ***
BLS [t-1]	-1.52 ***	0.98 ***	-1.88 ***	0.63 ***	-1.41 ***	0.78 ***	-1.65 ***	1.03 ***	-1.73 ***	1.03 ***	-1.78 ***	1.38 ***
BLS [t-2]	-1.40 ***	0.63 ***	-1.44 ***	0.59 **	-1.40 ***	0.96 ***	-1.34 ***	0.75 ***	-1.35 ***	0.83 ***	-1.18 ***	0.99 ***
BLS [t-3]	-1.08 ***	0.49 **	-1.08 ***	0.69 ***	-1.19 ***	0.90 ***	-0.93 ***	0.99 ***	-0.99 ***	0.76 ***	-1.01 ***	0.97 ***
BLS [t-4]	-0.89 ***	0.29	-0.60 *	0.13	-1.30 ***	0.97 ***	-0.81 **	0.56 **	-0.63	0.54 *	-0.35	0.84 ***
R-sq overall [t]	0.18	0.15	0.25	0.12	0.15	0.17	0.17	0.18	0.17	0.17	0.16	0.15
[t-1]	0.22	0.16	0.22	0.13	0.18	0.17	0.19	0.18	0.16	0.13	0.16	0.14
[t-2]	0.20	0.14	0.20	0.15	0.18	0.22	0.18	0.17	0.15	0.13	0.15	0.14
[t-3]	0.18	0.15	0.16	0.15	0.18	0.21	0.15	0.19	0.15	0.15	0.14	0.14
[t-4]	0.16	0.14	0.15	0.15	0.18	0.21	0.16	0.16	0.14	0.13	0.14	0.15

Table 6 Panel regression results with quarterly real non-residential investment growth as dependent variable

Table 6 shows some regression results using an unbalanced panel of 10 countries (Germany, Ireland, Spain, France, Italy, Luxembourg, Netherlands, Austria, Portugal and Finland) and up to 27 observations (from 2002Q4 to 2009Q2). We use the reduced form: $Y_{i,t} = \alpha_i + \beta(BLS/100)_{i,t-h} + \delta(Y)_{i,t-1} + \varepsilon_{i,t}$ (1) where Y is the seasonally-adjusted (where available) quarter-on-quarter real non-residential investment growth rate. The latter has been calculated as difference between real GDP and real residential investment. *BLS* is the net percentage of different variables derived from the Bank Lending Survey. In particular, "cs" indicates credit standards as reported in the BLS; "dem" indicates demand as reported in the BLS; "nfc" indicates non-financial corporations; "r" indicates realised and "e" indicates expected. * indicates significance at 10%, ** indicates significance at 5% and *** indicates significance at 1%. The estimated coefficients for the constant and lagged dependent variable are not shown in order to save space.

BLS	cs_nfc_r	dem_nfc_r	cs_nfc_e	dem_nfc_e
BLS [t]	-3.68 ***	3.18 ***	-5.15 ***	3.01 ***
BLS [t-1]	-4.26 ***	4.74 ***	-6.35 ***	2.67 **
BLS [t-2]	-4.85 ***	3.60 ***	-5.90 ***	3.05 **
BLS [t-3]	-4.70 ***	3.08 ***	-5.75 ***	4.75 ***
BLS [t-4]	-5.03 ***	3.00 **	-4.90 ***	3.75 ***
R-sq overall [t]	0.07	0.04	0.10	0.03
[t-1]	0.09	0.09	0.13	0.02
[t-2]	0.11	0.05	0.10	0.02
[t-3]	0.09	0.03	0.07	0.05
[t-4]	0.09	0.03	0.05	0.03

Table 7 Panel regression results with quarterly real residential investment growth as dependent variable

Table 7 shows some regression results using an unbalanced panel of 10 countries (Germany, Ireland, Spain, France, Italy, Luxembourg, Netherlands, Austria, Portugal and Finland) and up to 27 observations (from 2002Q4 to 2009Q2). We use the reduced form: $Y_{i,t} = \alpha_i + \beta(BLS/100)_{i,t-h} + \delta(Y)_{i,t-1} + \varepsilon_{i,t}$ (1) where Y is the seasonally-adjusted (where available) quarter-on-quarter real residential investment growth rate. *BLS* is the net percentage of different variables derived from the Bank Lending Survey. In particular, "cs" indicates credit standards as reported in the BLS; "dem" indicates demand as reported in the BLS; "hp" indicates households for house purchase; "cc" indicates households for consumer credit; "r" indicates realised and "e" indicates expected.* indicates significance at 10%, ** indicates significance at 5% and *** indicates significance at 1%. The estimated coefficients for the constant and lagged dependent variable are not shown in order to save space.

BLS	cs_hp_r	dem_hp_r	cs_hp_e	dem_hp_e	cs_cc_r	dem_cc_r	cs_cc_e	dem_cc_e
BLS [t]	-3.62 ***	3.53 ***	-4.95 ***	3.14 ***	-5.36 ***	5.52 ***	-4.64 ***	4.73 ***
BLS [t-1]	-4.33 ***	4.02 ***	-4.98 ***	4.33 ***	-4.78 ***	4.32 ***	-5.64 ***	5.21 ***
BLS [t-2]	-4.00 ***	4.95 ***	-4.93 ***	4.51 ***	-5.14 ***	4.91 ***	-4.16 ***	5.53 ***
BLS [t-3]	-4.44 ***	5.10 ***	-4.19 ***	4.97 ***	-5.85 ***	3.76 ***	-4.20 ***	4.81 ***
BLS [t-4]	-5.32 ***	4.53 ***	-5.81 ***	3.77 ***	-4.53 ***	2.46 **	-3.62 **	3.33 ***
R-sq overall [t]	0.08	0.14	0.10	0.07	0.10	0.13	0.08	0.11
[t-1]	0.10	0.16	0.09	0.13	0.08	0.08	0.10	0.11
[t-2]	0.08	0.21	0.08	0.11	0.09	0.10	0.06	0.11
[t-3]	0.09	0.18	0.05	0.12	0.09	0.06	0.05	0.09
[t-4]	0.10	0.14	0.07	0.06	0.05	0.03	0.03	0.05

Table 8 Panel regression results with quarterly real private consumption growth as dependent variable

Table 8 shows some regression results using an unbalanced panel of 10 countries (Germany, Ireland, Spain, France, Italy, Luxembourg, Netherlands, Austria, Portugal and Finland) and up to 27 observations (from 2002Q4 to 2009Q2). We use the reduced form: $Y_{i,t} = \alpha_i + \beta(BLS/100)_{i,t-h} + \delta(Y)_{i,t-1} + \varepsilon_{i,t}$ (1) where Y is the seasonally-adjusted (where available) quarter-on-quarter real private consumption growth rate. *BLS* is the net percentage of different variables derived from the Bank Lending Survey. In particular, "cs" indicates credit standards as reported in the BLS; "dem" indicates demand as reported in the BLS; "hp" indicates households for house purchase; "cc" indicates households for consumer credit; "r" indicates realised and "e" indicates expected. * indicates significance at 10%, ** indicates significance at 5% and *** indicates significance at 1%. The estimated coefficients for the constant and lagged dependent variable are not shown in order to save space.

BLS	cs_cc_r	dem_cc_r	cs_cc_e	dem_cc_e	cs_hp_r	dem_hp_r	cs_hp_e	dem_hp_e
BLS [t]	-1.56 ***	1.87 ***	-1.36 ***	1.48 ***	-1.19 ***	0.59 **	-1.48 ***	0.81 ***
BLS [t-1]	-2.04 ***	1.42 ***	-1.85 ***	1.68 ***	-1.69 ***	0.79 ***	-1.90 ***	0.96 ***
BLS [t-2]	-1.96 ***	1.17 ***	-2.32 ***	1.73 ***	-1.45 ***	1.18 ***	-1.84 ***	1.56 ***
BLS [t-3]	-1.55 ***	1.86 ***	-1.92 ***	1.94 ***	-1.42 ***	1.33 ***	-1.97 ***	1.79 ***
BLS [t-4]	-2.04 ***	1.68 ***	-1.60 ***	1.45 ***	-1.48 ***	1.58 ***	-1.57 ***	1.41 ***
R-sq overall [t]	0.06	0.10	0.06	0.06	0.06	0.05	0.06	0.04
[t-1]	0.08	0.06	0.07	0.06	0.10	0.06	0.08	0.04
[t-2]	0.07	0.04	0.09	0.05	0.07	0.09	0.08	0.09
[t-3]	0.05	0.07	0.07	0.05	0.07	0.10	0.08	0.09
[t-4]	0.08	0.05	0.06	0.04	0.07	0.12	0.06	0.07

Table 9 Panel regression results with quarterly real GDP growth as dependent variable including control variables

Table 9 shows some regression results using an unbalanced panel of 12 countries (Belgium, Germany, Ireland, Greece, Spain, France, Italy, Luxembourg, Netherlands, Austria, Portugal and Finland) and up to 27 observations (from 2002Q4 to 2009Q2). We use the general form: $Y_{i,t} = \alpha_i + \beta(BLS/100)_{i,t-h} + \gamma(X/100)_{i,t-h} + \delta(Y)_{i,t-h} + \varepsilon_{i,t}$ where Y is the seasonally-adjusted (where available) quarter-on-quarter real GDP growth rate. A uniform lead of 4 quarters is assumed (h=4). T-statistics are reported below the coefficient estimates. * indicates significance at 10%, ** indicates significance at 5% and *** indicates significance at 1%.

	Real quarterly GDP growth									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Credit standard t-4	-0.89	-1.01								
	2.05 *	2.33 **								
d(Eonia) t-4		-0.44	-0.70	0.20	-0.44	-0.28	-0.51	1.05	-0.34	-0.23
		5.59 ***	6.83 ***	0.97	2.74 **	1.34	3.51 ***	2.91 **	3.20 ***	1.07
Margins on riskier loans t-4			-0.96							
			3.25 ***							
Margins on average loans t-4				-0.92						
				2.98 **						
Expectations regarding general economic activity t-4					-0.51					
					1.57					
Industry or firm-specific outlook t-4						-0.33				
						0.81				
Risk on the collateral demanded t-4							-1.17			
							1.90 *			
Premium-adjusted term spread t-4								0.01		
								3.80 ***		
BBB non-financial corporate bond spread t-4									0.00	
									2.68 **	
Implied stock market volatility t-4										-0.01
										1.82 *
Real GDP growth t-1	0.25	0.24	0.23	0.20	0.30	0.32	0.28	-0.02	0.25	0.33
	1.17	1.11	1.16	0.97	1.43	1.51	1.32	0.09	1.31	1.75
Number of observations	276	276	276	276	276	276	276	276	276	276
Number of countries	12	12	12	12	12	12	12	12	12	12
Adjusted R-squared	0.15	0.15	0.15	0.17	0.11	0.1	0.12	0.35	0.12	0.10

Table 10 Horse race results for predicting the annual growth in euro area real GDP

Table 10 reports the results of a panel estimation where several financial indicators are regressed contemporaneously on the annual real GDP growth to evaluate their predictive power. T-statistics are reported below the coefficient estimates. * indicates significance at 10%, ** indicates significance at 5% and *** indicates significance at 1%.

	Real annual GDP growth		
	(1)	(2)	(3)
Credit standards to enterprises$_{t-4}$	-0.02		
	2.55 **		
Margin on average loans$_{t-4}$		-0.03	
		4.54 ***	
Margin on riskier loans$_{t-4}$			-0.03
			4.00 ***
Premium-adjusted term spread$_{t-4}$	0.02	0.02	0.02
	4.20 ***	4.27 ***	4.28 ***
BBB corporate bond spread$_{t-4}$	-0.03	-0.03	-0.03
	7.02 ***	6.45 ***	5.47 ***
Implied stock market volatility$_{t-4}$	0.12	0.13	0.13
	13.04 ***	11.45 ***	11.76 ***
# of observations	276	276	276
# of countries	12	12	12
Adjusted R-squared	0.60	0.66	0.63

Table 11 Predictive regressions for the annual growth in euro area real GDP one year ahead

Table 11 shows the ordinary least squares estimates by regressing the annual growth in euro area real GDP on a constant and the level of the indicator(s) four quarters ago. The sample period starts in 2003Q4 and ends in 2009Q3. T-statistics are reported below the coefficient estimates. * indicates significance at 10%, ** indicates significance at 5% and *** indicates significance at 1%.

Indicator	In isolation	R^2		Trend	R^2	Jointly Without trend			With trend		
BLS: credit standards$_{t-4}$	-7.40	0.54	-6.93	-0.18	0.80	-9.06			-9.57		
	2.59 **		5.53 ***	3.91 **		5.04 ***			4.49 ***		
BLS: margins on average loans$_{t-4}$	-5.60	0.56	-5.75	-0.21	0.92		-6.69			-7.25	
	2.66 **		10.4 ***	7.40 ***			7.45 ***			9.05 ***	
BLS: margins on riskier loans$_{t-4}$	-6.22	0.52	-6.92	-0.23	0.86			-8.51			-9.23
	2.08 **		7.35 ***	6.43 ***				4.33 ***			5.12 ***
Premium-adjusted term spread$_{t-4}$	2.58	0.57	3.05	0.06	0.58	0.70	1.25	1.35	-0.52	-0.60	-0.30
	3.13 ***		3.75 ***	0.90		1.76 *	5.23 ***	4.86 ***	0.37	0.74	0.26
BBB corporate bond spread$_{t-4}$	-3.44	0.52	-3.03	-0.16	0.72	-1.32	-0.97	-1.22	-0.86	-0.23	-0.57
	2.36 **		3.85 ***	2.96 ***		1.06	1.47	1.39	0.72	0.43	0.96
Implied stock market volatility$_{t-4}$	-0.08	0.08	-0.17	-0.28	0.63	0.19	0.18	0.21	0.12	0.06	0.11
	1.08		3.37 ***	3.30 ***		5.21 ***	7.36 ***	5.69 ***	2.09 **	1.60	1.73
Trend									-0.15	-0.23	-0.21
									1.00	2.51 **	1.58
R-squared						0.83	0.92	0.88	0.84	0.94	0.90

Appendix

Table A.1 Definitions and sources of the variables

VARIABLES	DEFINITION	DATA SOURCE
BLS variables		
Credit standards (realised)	Net percentage of banks reporting a tightening over the previous quarter	ECB, BLS questions 1 and 8
Credit standards (expected)	Net percentage of banks reporting a tightening over the next quarter	ECB, BLS questions 6 and 16
Margin on average loans	Net percentage of banks reporting a tightening over the previous quarter	ECB, BLS questions 3, 10 and 12
Margin on riskier loans	Net percentage of banks reporting a tightening over the previous quarter	ECB, BLS questions 3, 10 and 12
Non-interest rate charges	Net percentage of banks reporting a tightening over the previous quarter	ECB, BLS questions 3, 10 and 12
Size of loan	Net percentage of banks reporting a tightening over the previous quarter	ECB, BLS question 3
Collateral requirements	Net percentage of banks reporting a tightening over the previous quarter	ECB, BLS questions 3, 10 and 12
Loan covenants	Net percentage of banks reporting a tightening over the previous quarter	ECB, BLS question 3
Maturity	Net percentage of banks reporting a tightening over the previous quarter	ECB, BLS questions 3, 10 and 12
Loan-to-value ratio	Net percentage of banks reporting a tightening over the previous quarter	ECB, BLS question 10
Maturity	Net percentage of banks reporting a tightening over the previous quarter	ECB, BLS question 3
Industry or firm-specific outlook	Net percentage of banks reporting that the factor has contributed to tightening credit standards over the previous quarter	ECB, BLS question 2
Expectations regarding general economic activity	Net percentage of banks reporting that the factor has contributed to tightening credit standards over the previous quarter	ECB, BLS questions 2, 9 and 11
Demand (realised)	Net percentage of banks reporting an increase in loan demand over the previous quarter	ECB, BLS questions 4 and 13
Demand (expected)	Net percentage of banks reporting an increase in loan demand over the next quarter	ECB, BLS questions 7 and 17
Macroeconomic and financial variables		
EONIA	Quarterly average of the EONIA overnight interest rate	ECB
GDP growth	Quarter-on-quarter real seasonally adjusted GDP growth	Eurostat
MFI loan growth	Quarter-on-quarter seasonally adjusted MFI loan growth	ECB
MFI loan growth to households adjusted for securitization	Quarter-on-quarter seasonally adjusted MFI loan growth to households adjusted for the derecognition of loans from the MFI balance sheet due to sale or securitization	ECB, ECB calculations
Bank interest rate spread	Quarterly average spread between the respective composite MFI rate weighted by bank loan outstanding amounts and the short- (3-month EURIBOR) or long-term (10-year government bond yield) interest rate	ECB, Reuters and ECB calculations
BBB corporate bond spreads	Quarterly averages of daily corporate euro-denominated bond spreads	Thomson Financial Datastream
Non-financial BBB corporate bond spreads	Quarterly averages of daily non-financial euro-denominated bond spreads	Thomson Financial Datastream
Stock market volatility	Quarterly averages of implied stock market volatility	Bloomberg
Premium-adjusted term spread	Quarterly averages of the spread between the 10-year government bond yield and the 3-month EURIBOR excluding a term premium derived from an affine term structure model enriched with survey information.	Bloomberg, Consensus Economics and ECB calculations