EUROPEAN CENTRAL BANK

RECENT DEVELOPMENTS IN LOANS TO HOUSEHOLDS: DISCERNING BETWEEN DEMAND AND SUPPLY DRIVEN FACTORS

Very preliminary version – please do not quote

Ramón Adalid and Ramón Gómez-Salvador[1]

February 2011

[1] The authors work in the ECB's Directorate General Economics. Views expressed represent exclusively the opinion of the author and do not necessarily correspond to those of the European Central Bank.

Abstract

Loans to households decelerated significantly since mid-2008 in the euro area, and the question on whether beyond weak demand this also reflects supply constraints is relevant, especially in a context of financial distress. While lower policy rates tend to foster loan demand, this may not be effective to address a potential supply-side problem. This paper provides a quantification of the relative importance of supply and demand influences by estimating a loan demand equation using a panel of euro area countries. The paper's contribution to answering the question is twofold. First, the series of outstanding loans are adjusted for securitisation, avoiding an important source distortion commonly affecting loan data; second, house prices and credit standards are also included in addition to income conditions and opportunity costs. The inclusion of credit standards is in line with recent empirical papers that have shown advantage of using this variable to capture supply conditions. Two variables are used to measure bank's credit standards, cost of funds and balance sheet constraints (supply conditions), and expectations regarding general economic activity (cycle). The results indicate that loans are positively correlated with real GDP and housing prices, and negatively correlated with interest rates and credit conditions.

1. Introduction

The aim of this paper is to examine to what extent supply side factors are relevant to explain the developments in loans to households, in addition to the demand side factors traditionally considered. This question was particularly relevant in light of the very subdued loan growth observed during the recent financial crisis, which has altered the access to financing of banks.

The supply of bank loans is determined by the ability and willingness of banks to lend independently from demand considerations. From a conceptual point of view, a bank would typically adjust its supply of loans depending on its own financing situation, its capital position, its ability to obtain liquidity in the market, the degree of competition in the market in which it operates, and its assessment about the risk at which its potential borrowers are exposed. However, in practice it is very difficult to identify the importance of these factors in determining loan supply, as they are not only simultaneously at work with demand-side considerations but they are also affected by them. Furthermore, these factors refer to concepts which are difficult to be quantified, such as credit standards, non-interest credit conditions and terms and the existence and intensity of asymmetric information between banks and their prospective borrowers. It is in these two areas that the use of historical survey data can be useful in the process of disentangling supply from demand considerations in the analysis of credit developments.

The Eurosystem has been conducting a survey on the bank lending developments in the euro area, commonly referred to as the BLS, since the first quarter of 2003. The survey has questions on past and expected developments in credit markets for loans to enterprises and loans to households separately, and the information is quantified based on a scale of five possible answers. While the questionnaire covers both loan demand and supply, it focuses more on loan supply factors, contributing in this respect to filling an important data gap for the analysis of credit developments. However, it also has to be taken into account that even these indicators reported to monitor supply factors are not fully independent from demand considerations.

Several papers have focused on the information content of BLS data. From a macro perspective, studies that have explored the usefulness of using BLS data include Lown et al. (2000), which examines the value of the US Senior Loan Officer Opinion Survey in predicting lending and output. The authors found that changes in commercial standards are linked to loan growth and help to predict economic growth and other measures of business activity.

Regarding the euro area, de Bondt et al. (2010) explored the information content of the BLS and found that especially responses related to loans to enterprises are a significant leading indicator for bank credit and output. Their results also seem to support the existence of a bank lending, balance sheet, and risk-taking channel of monetary policy. Ciccarelli et al. (2010) revisit the analysis of the credit channel of monetary policy transmission with US and euro area BLS data. Using a standard VAR model, they find that the credit channel is active through the balance sheets of firms, households and banks, although in the case of households, the demand channel is the strongest, especially for the euro area. Finally, Hempell

and Kok Sørensen (2010) make an extensive use of the euro area BLS dataset and, applying a cross-country panel approach, find evidence that suggests that bank's ability and willingness to supply loans affects lending to firms and to households for house purchase.

The access to very rich databases of bank credit records has recently allowed carrying studies from a micro perspective, in particular there are two recent examples at the euro area. Del Giovane et al. (2010) paper aims at disentangling supply and demand factors by combining the BLS information for Italy at the individual bank level together with the loans granted over time to non-financial corporations and to households for house purchase, apart from considering other bank-specific variables. They found that both demand and supply conditions captured by BLS indicators have a significant effect in explaining loans to enterprises, especially through increases in margins in riskier loans and changes in non-price conditions. Jimenez et al. (2010), focusing on non-financial corporations, try to disentangle loan demand and loan supply and firm and balance sheet channels using two micro datasets of Spanish banks that allow the authors to focus on both the extensive and the intensive margin of loan activity. On the extensive margin, they find that loans are positively correlated with activity and negatively with changes in short-term rates; a fall in firm capital reduces loan granting, while a decline in bank capital or liquidity increases loan granting; and that the impact of activity and changes in interest rates on credit availability is stronger for firms with low capital. At the same time, the intensive margin approach points to the existence of a bank lending channel, which is stronger when accounting for unobserved time-varying firm heterogeneity in loan demand and quality.

This paper focuses on loans to households for the panel of euro area countries, it breaks down the information contained at the BLS into two dimensions – i.e. perception of risk and balance sheet constraints –, and investigates the role that these two dimensions play in explaining developments in loans to households in a traditional loan demand framework, such as that used by Calza et al. (2003). Its main contribution is to deepen on the question of the role of demand versus supply factors in the developments of loans to the household sector. It uses a panel approach and a series of outstanding loans adjusted for securitisation. The latter became an important source of statistical distortion in the run-up to the financial crisis, in the immediate aftermath of the collapse of Lehman Brothers, as well as more recently as a consequence of the different bad bank arrangements. Apart from income conditions and opportunity costs (typically used in a demand framework) and house prices, credit standards are also included.

The rest of the paper is organised a s follows. Section 2 describes the impact of securitisation on loans, the variables used from the BLS, as well as recent loan developments in the euro area. Section 3 introduces a standard loan demand model and an augmented from including BLS variables and house prices. Section 4 presents the empirical results of a broad demand equation, also decoupling loans for house purchase and consumer credit. It also presents some robustness checks. Section 5 concludes.

2. Recent developments in credit and lending standards

Before moving into the methodological and empirical analysis, it is relevant to briefly discuss, on the one hand, recent developments in loans to the household sector and the importance of adjusting loan data for the distortions introduced by securitisation practices, and on the other, the evolution and different nature of the factors behind the recent tightening in credit standards.

2.1 Loan developments: the impact of securitisation

Securitisation, i.e. the issuance of fixed-income securities backed by a pool of financial assets, such as residential mortgage loans, is a practice that expanded dramatically over the past decade as part of a wider trend of financial innovation in credit markets. Securitisation, however, is a source of statistical distortion in the measurement of loan growth, as in practice, it implies a sale of loans from the originating bank to another entity (a special purpose vehicle set up to this effect). This typically results in a one-to-one reduction of the size of the loan portfolio of the bank if the loans that have been sold are considered to have left the balance sheet of the originating bank. [2] As a consequence, given that statistics on bank loans are derived from the outstanding amount of loans on the balance sheet of banks, the process of securitising translates into a reduction in the reported growth rates. This impact, however, can be adjusted if the amount of loans leaving the balance sheet of banks as a result of securitisation activities is known.

While the market for securitised products practically disappeared after the collapse of Lehman Brothers, securitisation practices continued to exert an important statistical effect as banks continued to securitise in order to generate collateral for central bank operations. More recently, securitisation has been a central element in the various "bad bank" arrangements set up in a number of euro area countries, and thus the described statistical adjustment continues to be relevant.

Chart 1 depicts the statistical impact that securitisation has had on the euro area loans to households in the euro area since 2004. It can be observed, that the impact on the annual growth rates steadily grew until early 2009, when it reached more than 3 percentage points. Later the gap between the adjusted and the unadjusted series progressively closed, but the adjustment is still visible in the monthly flows.

The loans series used in the rest of the paper have been adjusted for the impact of securitisation.

2.2 Credit standards: measuring supply factors

Information on credit standards contained in the BLS is classified in three groups: balance sheet constraints, perceptions of risk, and competition. Balance sheet constraints can be interpreted as pure supply-side factors, in the sense of proxying for the "bank lending channel" of monetary policy

[2] Following the adoption of the International Accounting Standards (IAS39) by the euro area MFIs, a true-sale securitisation transaction may not lead to a decrease in the loan holdings of banks if the securitised loan is not de-recognised., i.e. taken off the bank balance sheet in accounting and statistical terms.

transmission. Perceptions of risk summarise banks' assessment of the impact that macroeconomic conditions have on borrowers' risk profiles and creditworthiness. These can be considered a supply-side influence to the extent that it determines banks' willingness to lend. However, it also reflects a usual reaction over the business cycle that does not indicate an active restriction of the supply of loans. Finally, the competition factor includes competition from other banks, from non-banks and from market finance. This factor has, however, proved to be less significant in explaining developments over the cycle during the financial crisis.

In light of this discussion, we focus on the first two factors (i.e. balance sheet constraints and perceptions of risk) as our proxies for supply-side influences. However, it has to be taken into account that even these two indicators, especially the perceptions of risk, are not fully independent from demand considerations.

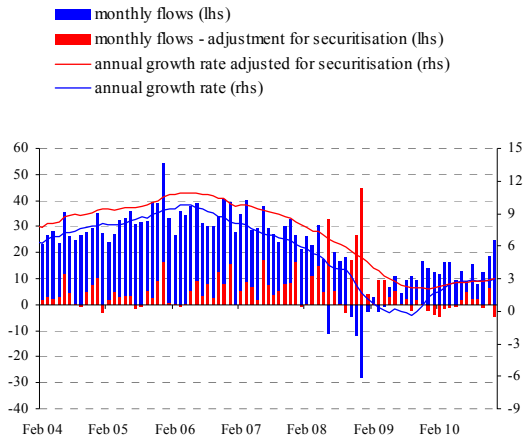
The Bank Lending Survey indicates that during 2008 the tightening of credit standards to households (for house purchase) has reached levels not seen since the survey started in 2002, measured in terms of net percentage change[3]. This tightening is explained by developments in both the perception of risk and by balance sheet constraints. Indeed, although the former is more relevant in absolute terms, the latter has reach very high levels in relative terms.

As Charts 2 shows, the cumulative tightening at the euro area level in 2008 was clearly above the previous record observed, over four quarters. The contribution of supply side factors to the overall tightening has been increasing over 2008, while factors linked to the economic environment and the borrower's financial situation have also contributed significantly to the overall tightening.

[3] The net percentage for changes in credit standards is calculated as the difference between the percentage of banks answering that they tightened considerably or somewhat, minus the percentages responding that they eased considerably or somewhat.

Chart 1: The impact of securitisation on the growth of loans to households in the euro area

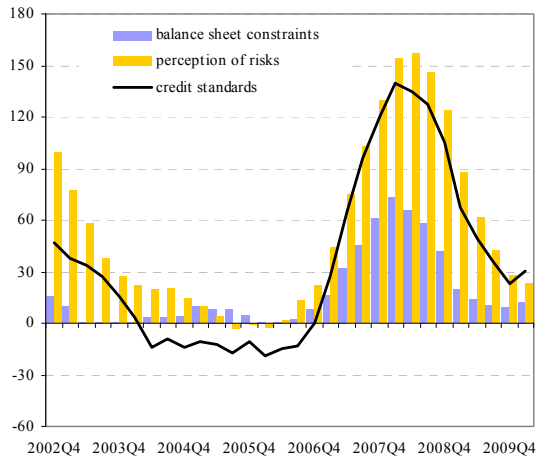
(annual growth rates, flows in EUR bn., monthly frequency, seasonally adjusted)



Sources: ECB and authors' calculations.

Chart 2: Developments in credit tightening in the overall households in the euro area

(tightening cumulated over four successive quarters: 2008 relative to maximum in the sample)



Sources: ECB and ECB calculations.

At the same time, the deceleration in loans to households was also very marked in the course of 2008, even after taking into account the impact that the process of securitisation had on MFIs loan flows. Euro area countries can be divided in three groups according to the developments observed in 2008. A first group would include those countries for which the deceleration has implied a decline in loans to households at the end of the year, such as Ireland and, to a lesser extent, Luxembourg. A second group that recorded a strong decline in the growth rates of loans, although still remaining positive, including Greece, Spain and Portugal among others. And finally, a third group, that only includes the Netherlands and Germany, where loan developments improved slightly over the year, although still remaining in the negative territory in the case of Germany.

3. The model

This section introduces briefly the model in which the empirical analysis, carried out in the next section, is based. The functional form chosen is a standard loan demand function, following Calza et al. (2003):

$$(loans - p)_{it} = \alpha_0 + \alpha_1 y_{it} + \alpha_2 R_{it} + \alpha_3 \pi_{it}$$

where loans to the household sector (in real terms) is a function of a scale variable, income (*y*); a cost variable, interest rates (*R*); and a price variable (*p*). All variables are transformed in annual growth rates, except interest rates that appear in annual changes. Loans at the country level are corrected by securitisation and deflated using the GDP deflator, under the hypothesis that long run nominal loans are homogeneous with respect to prices. However, inflation is also included in the equation, to allow for deviations from the long run relationship. In addition, the inclusion of inflation also allows for deviations of the hypothesis of homogeneity between the nominal lending rate and inflation, which would impose the restriction $\alpha_2 = -\alpha_3$. Income is proxied by real GDP at the country level, and interest rates are the nominal composite lending rate of loans to households at the euro area level, due to the lack of data for some countries.

The standard model has been augmented by means of two sets of information. First, using the information contained at the BLS, both balance sheet constraints ($BLS^{balance\_sheet}$) and perception of risk ($BLS^{risk\_perception}$), as defined previously, cumulating the quarterly results on an annual basis. Second, given the big share that loans to households for house purchase have on overall loans to households and the strong link shown in recent years between house prices and loan to house purchase developments, the annual change of house prices has been also included (*housepr*). The final equation is the following:

$$(loans - p)_{it} = \alpha_0 + \alpha_1 y_{it} + \alpha_2 R_{it} + \alpha_3 \pi_{it} + \alpha_4 BLS_{it}^{risk\_perception} + \alpha_5 BLS_{it}^{balance\_sheet} + \alpha_6 housepr_{it}$$

The inclusion of balance sheet constraints and the perception of risk can be linked to the "balance sheet channel" of monetary policy transmission, see Bernanke (1993) and Bernanke and Gertler (1995), according to which in the presence of frictions, due to information asymmetries for instance, changes in economic conditions and policies can have an impact on banks' balance sheets and on the financial position of borrowers, and therefore may affect bank loans supply and its conditions. In that sense, the BLS measure of balance sheet constraints is expected to capture the former element, i.e. the impact of supply constraints, due to difficulties in financing or balance sheet deleveraging. While the latter element is expected to be captured by the BLS measure of the perception of risk, which adds to the pure income effect measured by real GDP.[4]

What are the expected signs of the coefficients in the loan demand equation? Based on the hypothesis that credit is demanded to finance transactions, the stock of loans is expected to be positively related with real GDP. In particular, households may demand loans for liquidity reasons. At the same time, it is expected

[4] For an analysis of bank loans supply conditions, see Hempell an Kok Sorensen (2010).

to find a negative relationship between the nominal interest rate and the stock of loans, as the nominal interest rate can be seen as the nominal cost of loans. The sign of inflation is expected to be positive, as a rise in inflation implies a fall in the real cost of loans, therefore fostering household loan demand. Turning to the variables derive form the BLS, they are both expected to have a negative impact in the stock of loans, as an increase in balance sheet constraints and in the perception of risks should reduce the amount of loans supplied, therefore resulting, ceteris paribus, in a reduction in the stock of loans. Finally, housing prices, that is introduced as more as a control variable than as a pure explanatory variable, is expected to be positively correlated with the stock of loans, as house prices growing above average inflation should result in an increase in the value of the stock of loans.

4. Empirical results: demand versus supply driven factors

4.1 Overall loans to households

Table 1 summarises the panel data estimates of loans to the household sector (in real terms). Column (1) reports the results for a standard loan demand equation, according to which loans depend: positively on economic developments, both current and lagged; also positively on inflation (measured by the GDP deflator); and negatively on overall interest rate developments, although the negative impact in the current period is partly compensated by the positive impact of the variable lagged one period. These results are in line with the expectations, as explained in the previous section.

Columns (2) to (6) present the results of the augmented loan demand equation, including the additional variables step by step. Column (2) shows the impact of house prices, and confirms that lagged house prices, in real terms, have had a significant impact on households' loan demand. Next, column (3) includes the impact of balance sheet constraints, which is negative and significant for the first lag. As expected, banks' difficulties to find funding have a negative impact on loan developments.[5] Column (4) does the same exercise with a transformation of the variable balance sheet constraints. As the results of the BLS indicate the direction of credit standards and its components rather than the current level, this column uses a cumulated value of balance sheet constraints (since the start of the series) instead of using the current value, in an attempt to capture better the level of tightness. The result reinforces the role of balance sheet constraints, as it confirms a negative impact on loan developments for the variable lagged one period. In column (5) we test the relevance of the perception of risk indicator, which also appears to have a negative impact on loans at one lag, confirming the expected result. Finally column (6) puts together all relevant variables and lags.

[5] In the absence of an indicator that covers overall loans, we use the indicator of balance sheet constraints derived from credit standards on loans for house purchase, given its weight and the high correlation it shows with that derived from credit standards on consumer credit.

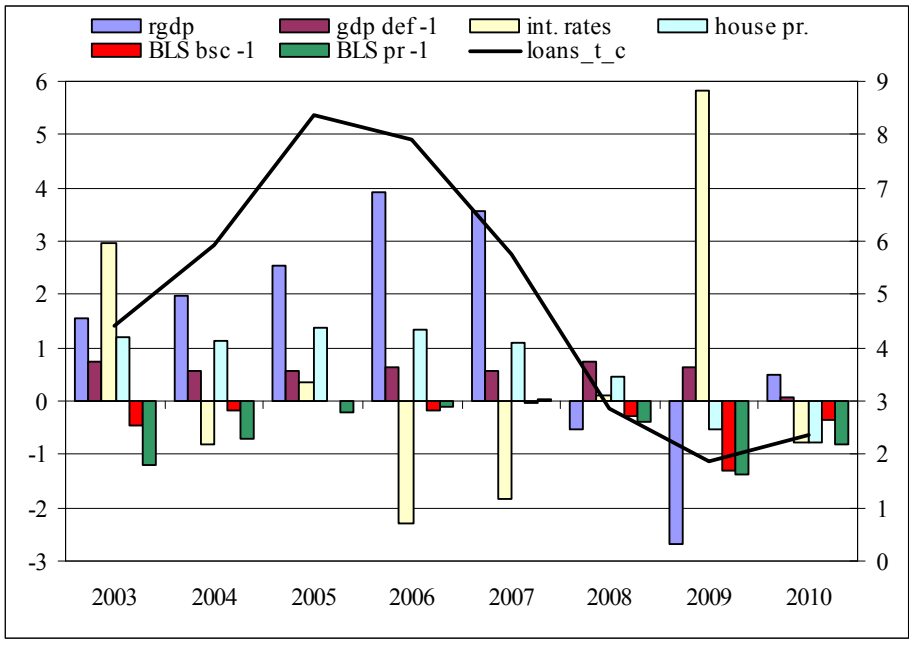
Table 1: Panel data estimates of real loans to households

	(1)	(2)	(3)	(4)	(5)	(6)
rGDP $_{t}$	0.975 (3.38)	0.713 (2.06)	1.173 (4.00)	1.149 (4.72)	0.997 (3.67)	0.795 (2.23)
rGDP $_{t-1}$	0.839 (4.72)	0.713 (3.71)	0.588 (2.69)	0.650 (3.39)	0.682 (3.10)	0.505 (2.45)
GDP deflator $_{t-1}$	0.134 (1.35)	0.262 (1.64)	0.193 (1.47)	0.234 (2.94)	0.219 (1.72)	0.296 (1.76)
Interest rates $_{t}$	-2.835 (3.33)	-2.671 (2.86)	-3.505 (4.09)	-3.616 (3.88)	-3.696 (4.53)	-3.807 (4.13)
Interest rates $_{t-1}$	2.049 (2.24)	1.561 (1.83)	2.665 (2.32)	1.316 (1.55)	2.203 (2.22)	2.030 (1.75)
Real house prices $_{t-1}$		0.299 (2.54)				0.258 (2.77)
BLS – balance sheet constraints $_{t}$			0.006 (1.03)			
BLS – balance sheet constraints $_{t-1}$			-0.020 (1.59)			-0.018 (1.41)
BLS – balance sheet constraints (cumulated) $_{t}$				0.010 (1.48)		
BLS – balance sheet constraints (cumulated) $_{t-1}$				-0.027 (3.16)		
BLS – perception of risk $_{t}$					-0.007 (0.81)	
BLS – perception of risk $_{t-1}$					-0.013 (2.17)	-0.009 (1.93)
Number of observations	108	108	96	96	96	96
Overall R-sq	0.3430	0.3623	0.3169	0.3601	0.3101	0.3313
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Real loans to households are corrected of securitisation activities; the countries included are Austria, Belgium, Germany, Spain, Finland, France, Greece, Ireland, Italy, Luxembourg, the Netherlands and Portugal; the equations are estimated using fixed-effects. Time dummies are included.

A final exercise, based on the panel estimates, is to produce a decomposition of the recent developments in loans to households into the different components. This allows going one step further than looking at the signs of the variables, while measuring the size of the precise impact. Chart 3 shows an approximation based on the coefficients derived from the panel estimates applied to the euro area level indicators. It indicates that the deceleration in loans to households, which started in 2006, has been correlated with various forces over time. Between 2006 and 2007, the main negative factor appears to be interest rate developments, being reinforced from 2008 onwards by the declining contribution from economic activity and from housing prices, while the decline is partly offset by more favourable developments in interest rates in 2008 and, more significantly, in 2009. More recently, in 2010, loan developments have shown a turning point, which is partly linked to positive economic developments, after a strong negative impact in 2009, while interest rate developments contributed negatively.

Chart 3: Decomposition of real loans developments



Sources: ECB and ECB calculations.

Turning to the impact of BLS related indicators, interestingly, after having remained relatively neutral to loan growth between 2006 and 2007, the tightening of lending standards to households due to balance sheet constraints appears to be also partly linked with the decline in loans in 2008 and, more significantly, in 2009 – the highest negative contribution recorded in the whole sample. At the same time, the tightening of lending standards to households related to the perception of risks also contributed negatively to loan developments in 2008 and, especially, 2009, although in this case it is more in line with previously observed developments. Finally, in 2010, both components slowed down somewhat, mainly the one related to balance sheet constraints, favouring the recovery of loans to the household sector.

Overall, although economic activity and interest rate developments appear to be the main determinants of the pattern of loans to the household sector, the role of credit standards has not been negligible over the period of turbulences in the financial sector.

4.2 Loans to households for house purchase and consumer credit

The last part of the empirical analysis focuses on the two main components of loans to households, i.e. loans for house purchase and consumer credit. Following the same approach than in section 4.1, we estimate a loan demand equation for each of the components in this case, where real GDP and the deflator are unchanged compared to Table 1, but interest rates are those of house purchase and consumer credit (at the euro area level), and balance sheet constraints and perception of risk are derived from the respective questions on credit standards on each type of credit.

Table 2 summarises the panel data estimates of loans to the household sector (in real terms), where columns (1) to (3) report the results for loans for house purchase and columns (4) to (6) for consumer credit. Columns (1) and (4) refer to a standard loan demand equation, according to which both loans for house purchase and consumer credit depend: positively on economic developments – current and lagged – ; also negatively on inflation; and negatively on interest rate developments, although it is not significant for loans for house purchase.[6] In addition, loans for house purchase appear to be highly correlated with house price developments (see column (2)), while it is not the case for consumer credit (see column (5)), although one may think that a significant part of it is linked to the dynamism of the housing market. In other words, the results are broadly in line with the overall loan demand equation.

Table 2: Panel data estimates of real loans to households for house purchase and consumer credit

	Loans for house purchase			Consumer credit		
	(1)	(2)	(3)	(4)	(5)	(6)
rGDP $_{t}$	0.390 (3.60)	0.725 (2.73)	0.623 (2.21)	1.320 (5.12)	1.129 (3.25)	1.532 (9.05)
rGDP $_{t-1}$	0.796 (2.83)	0.697 (2.38)	0.706 (2.75)	1.443 (2.76)	1.351 (2.55)	1.177 (2.11)
GDP deflator $_{t-1}$	0.110 (0.61)	0.210 (0.98)	0.262 (1.62)	0.198 (2.33)	0.291 (2.36)	0.445 (1.51)
Interest rates $_{t}$	-1.477 (0.85)	-1.367 (0.78)	-1.367 (0.78)	-6.549 (3.43)	-6.450 (3.36)	-7.988 (3.26)
Real house prices $_{t-1}$		0.232 (1.97)	0.181 (1.74)		0.217 (1.10)	
BLS – balance sheet constraints $_{t-1}$			0.008 (0.77)			-0.022 (2.12)
BLS – perception of risk $_{t-1}$			-0.019 (2.52)			-0.011 (1.13)
Number of observations	108	108	108	108	108	96
Overall R-sq	0.3609	0.3872	0.4124	0.3101	0.3018	0.2568
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: Real loans to households are corrected of securitisation activities; the countries included are Austria, Belgium, Germany, Spain, Finland, France, Greece, Ireland, Italy, Luxembourg, the Netherlands and Portugal; the equations are estimated using fixed-effects. Time dummies are included.

More interesting is to look at the results of the credit standards components. While loans for house purchase appear to be negatively affected by the perception of risk component and it is neutral to the balance sheet constraints, consumer credit is negatively affected by balance sheet constraints and is neutral to the perception of risk. What could be the rational for such results? One may think that those banks that face balance sheet constraints may be more inclined to provide loans for house purchase, given

[6] This lack of response to interest rates could be related with the relatively stable level of interest rates for house purchase in the sample of analysis.

that they represent a lower risk for the bank as they are collateralised, than consumer credit. So, in principle, balance sheet constraints may be more harmful for consumer credit. By contrast, the perception of the risk indicator, that captures the expectation of the bank regarding general economic activity and housing market prospects in the case of loans for house purchase, and the expectation of the bank regarding general economic activity, creditworthiness of consumers and risk on the collateral demanded in the case of consumer credit, may be more binding in the first type of loan, especially in a context of very high dynamism in housing prices in some countries.

4.3 Robustness

Aggregate cross-country studies are often criticised on the grounds of lack of robustness with respect to the set of countries included in the analysis. In particular, as regards the BLS data, it is sometimes mentioned that the sample of banks in some countries is relatively small and, therefore, the results may not be fully representative. We perform a sensitivity analysis following the approach proposed by Sala-i-Martin (1997), in the context of growth regressions, focusing on the number of countries included in the regression (see Gomez et al. 2004). In order to do that, we look at the distribution of the estimates of the BLS variables in the preferred loan regressions – presented in column (6) of Table 1 and in columns (3) and (6) of Table 2 – that result from dropping any combinations of three countries in the FE specifications. Taking into account that the full sample of countries is 12, the resulting number of regressions is 220 for each case. Finally, we take averages of the estimated BLS coefficients and their standard deviations across the different regressions, which, under the assumption of normality, allow to calculate the cumulative distributive function (cdf) of the estimates and apply standard confidence levels.

Table 3 presents the results of the sensitivity analysis. According to the normality criterion (CDF column), it can be said that the results are broadly stable independently of the set of countries included in the analysis in the three models considered. In particular, regarding the BLS variables, the high significance of the perception of risk component is confirmed for overall loans (at 90%), while balance sheet constraints are less significant (80%). At the same time, for loans for house purchase, the asymmetric impact of both components is clearer, as the perception of risk component is above 95% significance against only slightly above 50% for balance sheet constraints. By contrast, balance sheet constraints have a significance above 90%, while the perception of risk is slightly below 70%.

Table 3: Sensitivity analysis

	Overall loans to households			Loans for house purchase			Consumer credit		
	Coeff.	STD	CDF_N	Coeff.	STD	CDF_N	Coeff.	STD	CDF_N
rGDP $_t$	0.787	0.367	0.968	0.617	0.307	0.955	1.498	0.230	1.000
rGDP $_{t-1}$	0.500	0.238	0.964	0.700	0.299	0.981	1.117	0.570	0.950
GDP deflator $_{t-1}$	0.294	0.215	0.829	0.219	0.203	0.719	0.508	0.335	0.870
Interest rates $_t$	-3.780	1.092	0.999	-2.079	1.774	0.759	-7.719	2.639	0.997
Interest rates $_{t-1}$	2.038	1.279	0.889	-	-	-	-	-	-
Real house prices $_{t-1}$	0.262	0.106	0.986	0.185	0.124	0.862	-	-	-
BLS – balance sheet constraints $_{t-1}$	-0.018	0.014	0.800	0.008	0.012	0.514	-0.021	0.012	0.903
BLS – perception of risk $_{t-1}$	-0.010	0.006	0.904	-0.020	0.009	0.972	-0.012	0.012	0.686

Notes: Results of the FE regressions presented in Tables 1 and 2 for all the combinations that result from dropping two countries from the sample, the total number of regressions being 66. CDF_N: cumulative distributive function under normality assumption.

5. Conclusions

This paper examines the extent to which supply factors are relevant in explaining developments in loans to households. Based on a panel of euro area countries, the analysis in this paper leads us to the conclusion that the classical loan demand determinants, i.e. economic activity and interest rates, as well as house prices are the main factors in explaining the growth in loans to households, supply-side considerations may have also played a role, especially during the financial crisis period. These supply side factors are proxied by the two main components of banks' credit standards as reported in the Bank Lending Survey (BLS), i. e. balance sheet constraints and perception of risk. The former could be seen as more representative of pure supply restrictions, while the second is also determined by demand conditions.

The results for the overall loans to the household sector indicate that both BLS components may be playing some role, although perception of risk appears as the most significant. When looking at the impact of credit standards on the two main components of loans to households, i.e. loans for house purchase and consumer credit, perceptions of risk appear to weigh on loans for house purchase while balance sheet constraints seem to be the supply-side factor affecting the granting of consumer credit loans. This finding suggests that banks facing balance sheet constraints would have a preference for providing loans for house purchase, these type of loans are better collateralised and therefore banks would perceive them as relatively less riskier than consumer loans. At the same time, the fact that loans for house purchase are affected by variations in the perceptions of risk, which includes the expectations of banks regarding general economic activity, creditworthiness of loan applicants and risk on the collateral demanded, would seem to confirm the notion that this indicator would have a non-negligible demand-side component. The sensitivity analysis performed, to account for the possible lack of representativiness of some countries, appears to confirm the main results.

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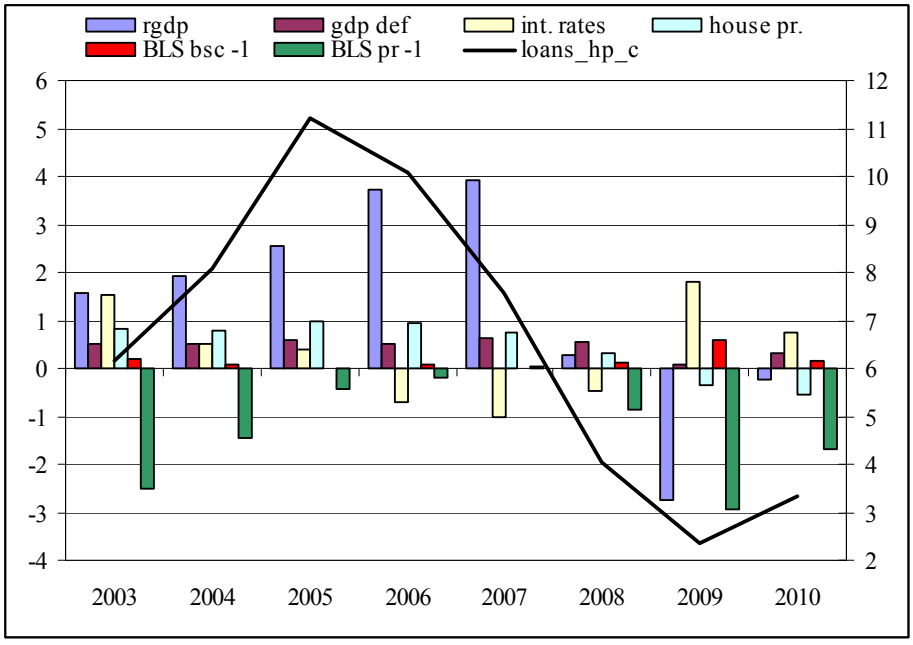
ANNEX 1

Decomposition of real loans for house purchase developments



Decomposition of real consumer credit developments