

Bank Risk-Taking, Securitization, Supervision, and Low Interest Rates:

Evidence from Lending Standards

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Abstract

We analyze the root causes of the current crisis by studying the determinants of bank lending standards in the Euro Area using the answers from the confidential Bank Lending Survey, where national central banks request quarterly information on the lending standards banks apply to customers. We find that low short-term interest rates soften lending standards for both businesses and households and, by exploiting cross-country variation of Taylor-rule implied rates, that *rates too low for too long* soften standards even further. The softening is over and above the improvement of borrowers' creditworthiness and all the relevant lending standards are softened, thus implying that banks' appetite for (loan) risk increases. In addition, high securitization activity and weak banking supervision standards amplify the positive impact of low short-term interest rates on bank risk-taking, even when we instrument securitization. Moreover, short-term rates – directly and in conjunction with securitization activity and supervision standards – have a stronger impact on bank risk-taking than long-term interest rates. These results help shed light on the origins of the current crisis and have important policy implications.

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“One (error) was that monetary policy around the world was too loose too long. And that created this just huge boom in asset prices, money chasing risk. People trying to get a higher return. That was just overwhelmingly powerful... We all bear a responsibility for that”... “The supervisory system was just way behind the curve. You had huge pockets of risk built up outside the regulatory framework and not enough effort to try to contain that. But even in the core of the system, banks got to be too big and overleveraged. Now again, here’s an important contrast. Banks in the United States, even with investment banks now banks, bank assets are about one times GDP of the United States. In many other mature countries - in Europe, for example – they’re a multiple of that. So again, around the world, banks got to just be too big, took on too much risk relative to the size of their economies.”

Timothy Geithner, United States Secretary of the Treasury, “Charlie Rose Show” on PBS, May 2009

“The ‘global savings glut’ led to very low returns on safer long-term investments which, in turn, led many investors to seek higher returns at the expense of greater risk... (Monetary policy) interest rates were low by historical standards. And some said that policy was therefore not sufficiently geared towards heading off the risks. Some countries did raise interest rates to ‘lean against the wind’. But on the whole, the prevailing view was that monetary policy was best used to prevent inflation and not to control wider imbalances in the economy.”

Letter to Her Majesty The Queen by Timothy Besley and Peter Hennessy, British Academy, July 2009

I. Introduction

The current financial crisis has had a dramatic impact on the banking sector of most developed countries, it has severely impaired the functioning of interbank markets, and it may have triggered an economic crisis in these same countries.

What are the causes of this crisis? In answering this question, Acharya and Richardson (2009), Allen and Carletti (2009), and Diamond and Rajan (2009a) distinguish between *proximate* and *root (or fundamental) causes*.² The following key elements were mentioned as root causes of an excessive softening of lending standards: too low levels of short- and/or long-term (risk-less) interest rates, a concurrent widespread use of financial innovation resulting in high securitisation activity and weak banking supervision standards.³ Therefore, the crisis that started in

² Emilio Botín, Chairman of Bank Santander, summarizes very well the distinction: “*I believe the causes cannot be found in any one market, such as the US. Nor are they limited to a particular business, such as subprime mortgages. These triggered the crisis, but they did not cause it. The causes are the same as in any previous financial crisis: excesses and losing the plot in an extraordinarily favourable environment. Indeed, some fundamental realities of banking were forgotten: cycles exist; lending cannot grow indefinitely; liquidity is not always abundant and cheap; financial innovation involves risk that cannot be ignored*” (*Financial Times*, October 2008).

³ See for example Allen (2009), Besley and Hennessy (2009), Blanchard (2009), Brunnemeier (2009), Calomiris (2008), Engel (2009), Rajan (2009), Taylor (2007 and 2008), and numerous articles since summer 2007 in *The Financial Times*, *The Wall Street Journal*, and *The Economist*. Nominal monetary policy rates were the lowest in almost four decades and below rates implied by a Taylor rule in many countries, while real policy rates were negative (Taylor, 2008; and Ahrend, Cournède and Price, 2008).

the subprime mortgage market in the US may have been the manifestation of deep rooted problems, which were not peculiar to one financial instrument and/or country but were present *globally*, albeit to different degrees. Moreover, these root causes may have been interrelated and mutually amplifying in affecting the risk-taking of financial institutions (Rajan, 2005). In this paper, we test these hypotheses.

Low (risk-less) interest rates, directly and also in conjunction with weak banking supervision standards and high securitization activity, may imply more loan risk-taking by banks through several channels. One channel relies upon the severe moral hazard problems present in the banking industry, due for example to potential bail-outs and high leverage ratios. In such an environment, abundant liquidity increases the incentives for bank risk-taking (Allen and Gale, 2007).⁴ In the absence of agency problems, excess of liquidity would be given back to shareholders or central banks. However, owing to bank moral hazard, banks may “over-lend” the extra-liquidity and finance projects with negative net present value. Allen and Carletti (2009) and Allen and Gale (2007 and 2004) connect ample liquidity with a low short-term interest rate policy.⁵ In fact, the level of overnight rates is a key driver of liquidity for banks since banks increase their balance sheets (leverage) when financing conditions through short-term debt are more favourable (Adrian and Shin, 2009).⁶ In addition, low levels of both short- and long-term interest rates may induce a *search for yield* from financial intermediaries due to moral hazard problems (Rajan, 2005).⁷ Securitization of loans results in assets yielding attractive returns for investors, but, at the same time, it may induce softer lending standards through lower screening and monitoring of securitized loans or through the improvement of banks’ liquidity and capital position.

⁴ Concerning the link between liquidity and loan risk-taking by banks, it is interesting what Chuck Prince, former Citigroup Chairman, said when describing why his bank continued financing leveraged buyouts despite mounting risks: “When the music stops, *in terms of liquidity*, things will be complicated. But, as long as the music is playing, you’ve got to get up and dance. We’re still dancing.” (*Financial Times*, July 2007).

⁵ Low short-term interest rates also soften lending standards by abating adverse selection problems in credit markets thereby increasing bank competition (Dell’Ariccia and Marques, 2006); by reducing the threat of deposit withdrawals (Diamond and Rajan, 2006); and by improving banks’ net worth thereby increasing leverage (Shin, 2009a; Fostel and Geanakoplos, 2008; Geanakoplos, 2009; and Borio and Zhu, 2008). In addition, current low short-term interest rates may signal low short-term interest rates in the future, thus further increasing loan risk-taking by banks (Diamond and Rajan, 2009b).

⁶ See also Diamond and Rajan (2001 and 2009b); Brunnermeier et al. (2009); Shin (2009b); and Reinhart and Rogoff (2008).

⁷ See also Blanchard (2008).

As a consequence, the impact of low (risk-less) interest rates on the softening of lending standards may be stronger when securitization activity is high (Rajan, 2005). Finally, in this environment, strong banking supervision standards – by limiting the effects of bank agency problems – should reduce the softening impact of low interest rates.⁸

We empirically analyze the following questions: Do low levels of short- and/or long-term interest rates soften bank lending standards? Is this softening more pronounced when securitization activity is high or banking supervision standards are weak? Does the softening imply more risk-taking by banks, i.e. is the softening over and above the improvement of borrowers' creditworthiness?⁹

There are four major challenges to identify the previous questions. First, monetary policy rates are endogenous to the (local) economic conditions. Second, banking supervision standards may be endogenous to monetary policy, in particular when the central bank is responsible for both. Third, securitization activity is endogenous to monetary (bank liquidity) conditions, since those affect the ability of banks to grant loans. Finally, it is very difficult to obtain data on lending standards applied to the *pool of potential borrowers* (including individuals and firms that were rejected or decided not to take the loan), and to know whether, how and, most importantly, *why* banks change these lending standards.

⁸ There are other channels through which low levels of both short- and long-term interest rates may affect bank (loan) risk-taking. First, low (risk-less) rates increase the attractiveness of risky assets in a mean-variance portfolio framework. Moreover, in habit formation models agents become less risk-averse during economic booms because their consumption increases relative to status-quo (Campbell and Cochrane, 1999). Therefore, a more accommodative monetary policy, by supporting real economic activity, may result in lower investors' risk aversion. Second, there could be also monetary illusion associated to low levels of interest rates inducing banks to choose riskier products to boost returns (Shiller, 2000; and Akerlof and Shiller 2009). Third, low short-term interest rates may decrease banks' intermediation margins (profits), thus reducing banks' charter value, in turn increasing the incentive for risk-taking (Keeley, 1990). Fourth, low short-term interest rates by increasing the yield curve slope may induce banks to increase loan supply to exploit the maturity mismatch between assets and liabilities – since banks finance themselves at short maturity and lend at longer maturities (Adrian and Estrella, 2007). Fifth, an environment in which central banks focus only on price stability may result in monetary policy rates which are *too low*, fostering in turn bubbles in asset prices and credit (Borio 2003; Borio and Lowe, 2002). In the context of the current crisis, Acharya and Richardson (2009) argue that the *fundamental causes* of the crisis were the credit boom and the housing bubble. For Taylor (2007), these were largely spurred by *too low* monetary policy rates.

⁹ Throughout the paper we use the term “bank risk-taking” to indicate the risk that banks are taking through their lending activity. There are other ways in which banks may change their risk exposure, for example by changing the composition of other assets and/or liabilities. Since these mechanisms are not the subject of this paper, our analysis of bank risk-taking refers exclusively to the lending activity.

Our identification strategy relies upon the data we use – the answers from the Euro Area Bank Lending Survey. These data address the four identification challenges as follows. First, we use data from Euro Area countries, where monetary policy rates are identical. However, there are significant cross-country differences in terms of GDP growth and inflation, implying in turn significant exogenous cross-sectional variation of monetary policy conditions (e.g. measured by Taylor-rule implied rates (see Taylor, 2008)). Second, banking supervision in the Euro Area is responsibility of the national supervisory authorities, whereas monetary policy is decided by the Governing Council of the ECB.¹⁰ Third, there is significant cross-country variation in securitization activity in the Euro Area partly stemming from legal and regulatory differences in the market for securitization. Fourth, we use the confidential Bank Lending Survey (BLS) database of the Eurosystem. National central banks request banks to provide quarterly information on the lending standards they apply to customers and on the loan demand they receive. We use this rich information set to analyze *whether* banks change their lending standards over time, to *whom* these changes are directed (average or riskier borrowers), *how* standards are adjusted (loan spreads, size, collateral, maturity and covenants) and, most importantly, *why* standards are changed (due to changes of borrower risk, of bank balance-sheet strength, or of bank competition).¹¹

We find that low short-term interest rates soften lending standards directly and also indirectly by amplifying the softening effect on standards of high securitization activity and weak banking supervision. This softening is over and above the improvement of borrowers' creditworthiness – it works through better bank balance-sheets position and stronger banking competition – and the analysis of terms and

¹⁰ Banking regulation on capital follows international guidelines established for example by the Basel Committee, but there is room for discretion, in particular for supervision standards for bank capital (see Laeven and Levine, 2009; and Barth, Caprio and Levine, 2006).

¹¹ The US Senior Loan Officer Survey does not have information for all types of loans on *why* banks change lending standards. The BLS contains this information for all type of loans and for all banks, which is key to identify bank risk-taking, since for example lower interest rates tend to improve borrowers' creditworthiness by increasing the value of collateral (see Bernanke and Gertler, 1995). Therefore, in this case, a softening of standards would not imply more risk-taking. Another advantage stemming from the use of the BLS data compared to the US survey is that banks in the Euro Area are more important than in the US for the overall provision of funds to the economy (see for example Hartmann, Maddaloni, Manganelli, 2003; and Allen, Chui and Maddaloni, 2004). Therefore, a softening of bank lending standards in the Euro Area is likely to have a significantly stronger impact on the economy compared to the United States.

conditions for loans shows that all relevant standards are softened. Hence, the results suggest that banks' appetite for risky loans increases when overnight rates are low. The impact of *short-term* interest rates on lending standards and on bank (loan) risk-taking is statistically and economically significant. Moreover, it is higher than the effect of *long-term* rates – both directly and in conjunction with securitization activity and supervision standards. These results, therefore, help shed light on the root causes of the current global crisis and have important implications for monetary policy, banking regulation and supervision, and for financial stability.

We contribute to the literature in several dimensions. First, as far as we are aware this paper is the first to analyze whether the impact of short-term (monetary policy) and long-term interest rates on lending standards – and especially on loan risk-taking – depends on securitization activity and banking regulation supervision standards. Second, Lown and Morgan (2006) analyze the predictive power of data on lending standards from the US Senior Loan Officer Survey for credit and economic growth. However, that study only considers changes of *total* lending standards. We study changes in total lending standards for the Euro Area and, most importantly for the questions we pursue in our paper, we study also *why* and *how* they change. This makes it possible to analyze loan risk-taking by banks, which is the main issue we address in this paper (i.e. the softening of lending standards due to factors not related to the improvement of borrowers' creditworthiness).¹² Finally, we contribute to the emerging literature on the origins of the current financial crisis in at least two ways. As explained earlier, the “special” setting of the Euro Area (for monetary policy, securitization activity and banking supervision) provides an excellent platform, almost a natural experiment, to identify the potential root causes of the current crisis and their interactions. In addition, the emerging literature on the current crisis has focused primarily on the US market, where the financial crisis was triggered by the collapse of the subprime mortgage market. We analyze the drivers of the crisis in the other major developed market, the Euro Area, by making use of a very rich dataset. We ultimately show that the global nature of the crisis may have resulted not only from spill-over

¹² Lown and Morgan (2006) analyze the predictive power of lending standards for credit and output growth and, as a byproduct, they study the impact of monetary policy changes on *total* lending standards. For the relationship between lending standards and credit and economic growth in the Euro Area, see Ciccarelli, Maddaloni and Peydró (2009).

effects across countries but it may have been due to causes inherent to the functioning of global financial intermediation and to policy choices, which may have affected all markets and countries, albeit with different intensities.

In the rest of this Section we summarize in more detail the results of the paper. In the first part of the analysis we look at the relationship between lending standards and interest rates. First, we find that a softening of lending standards is associated with low overnight rates. This association is more economically significant for business loans.¹³ Second, high GDP growth implies a softening of standards, i.e. standards are pro-cyclical. Our findings are economically relevant: taking into consideration the standard deviation of overnight rates and GDP growth, the impact of a change in the overnight rate is double the impact of a change in GDP growth both for business and consumer credit, while it is similar for loans for house purchase. Third, by exploiting cross-country variation of Taylor-rule implied rates, we find that lending standards are softened even more when short-term rates are *too low for too long* (measured as the number of consecutive quarters in which short-term rates were lower than Taylor-rule implied rates) – and the effect is stronger for loans for house purchase. In addition, when we add time fixed effects to control for common shocks across countries, rates too low for too long soften lending standards only for households, both for house purchase and for consumption.

Fourth, low overnight rates have a stronger direct impact than low long-term rates on the softening of standards – the effect is economically and statistically more significant.¹⁴ Fifth, all terms and conditions of a loan are softened when short-term

¹³ Jiménez, Ongena, Peydró and Saurina (2009a) and Ioannidou, Ongena and Peydró (2009) also investigate the impact of short-term (monetary policy) rates on loan risk-taking by banks. They use comprehensive credit registers for business loans from Spain and Bolivia respectively. They find that low levels of overnight rates increase loan risk-taking. Our results complement these papers by analyzing all type of loans (business loans, loans for house purchase and consumer credit) and also by using data from all Euro Area countries. Moreover, we do not have the comprehensive data from credit registers, but we have information on the *potential pool of borrowers*, a key issue for identification in this type of analysis (see Bernanke and Gertler, 1995). We know whether, how and *why* banks change lending standards, which is key for identifying loan risk-taking. For indirect evidence on short-term interest rates and risk-taking, see Bernanke and Kuttner (2005), Rigobon and Sack (2004), Manganelli and Wolswijk (2009), Axelson, Jenkinson, Strömberg and Weisbach (2007), Den Haan, Sumner, and Yamashiro (2007), and Calomiris and Pornrojngangkool (2006).

¹⁴ One of the key root causes of the current crisis may have been the “saving glut and the existence of current account imbalances” building up over the previous years, implying that savers (mainly in emerging economies) were looking for investment opportunities abroad (see Bernanke, 2005; and Besley and Hennessy, 2009). One type of investment often mentioned was US long-term bonds.

rates are low, both for average and for riskier borrowers. Lending standards are relaxed through lower loan margins, lower collateral and covenant requirements, longer loan maturity and larger loan size. Finally, and most importantly, not only is the softening of standards associated to the improvement of borrowers' outlook and collateral risk/ value (this would not imply more risk-taking), but also to less binding constraints to banks' balance-sheets (better liquidity and capital position and better access to market finance) and to stronger banking competition (especially from non-banks and market finance). Therefore, based on the previous results, we conclude that low short-term interest rates imply more bank risk-taking.¹⁵ Moreover, the positive impact of low short-term rates on loan risk-taking is statistically and economically more significant than the effect of low long-term interest rates.

In the second part of the paper we analyze the impact of securitization activity.¹⁶ We find that the softening effect of low short-term rates on lending standards is stronger when securitization activity is high. We do not find a similar result for long-term interest rates. Adding time fixed effects to control for common shocks across countries does not significantly change the results. Similarly the results hold when we instrument securitization activity by the regulation of the market for securitization in each country. In this case the instrument has a t-stat higher than 7 in the first-stage regression and, hence, it does not suffer from weak instrument concerns (Staiger and Stock, 1997).

However, there is also evidence that investors were seeking to buy short-term assets (Gross, 2009) and, in fact, Brender and Pisani (2009) report that about one third of all foreign exchange reserves are in the form of bank deposits. Little is known about the maturity composition of the remainder, most of which is invested in interest-bearing securities. The scarce evidence on the composition of USD foreign exchange reserves that can be gleaned from the US Treasury International Capital data suggests that over half of foreign official holdings of US securities has a maturity of less than three years (see Gross, 2009).

¹⁵ In other words, the effect of low policy rates on the softening of standards is over and above the firm balance sheet channel of monetary policy (Bernanke and Gertler, 1995). Because of imperfect information and incomplete contracts, expansive monetary policy increases banks' loan supply by increasing firm (borrower) net worth, for example through collateral's value (see Bernanke, Gertler and Gilchrist, 1996). See also Kashyap and Stein, 2000; Diamond and Rajan, 2006; Stiglitz, 2001; Stiglitz and Greenwald, 2003; and Bernanke, 2007.

¹⁶ For evidence on the softening of lending standards due to securitization, see for example Keys et al. (2009), Mian and Sufi (2009), and Dell'Ariccia, Igan and Laeven (2008). For an exhaustive analysis of recent financial innovations in banking, see Gorton and Souleles (2006), Gorton (2008), Gorton (2009), and Gorton and Metrick (2009). For a discussion of loan sales by banks, see Gorton and Pennacchi (1995).

Our analysis of the reasons why banks change their lending standards in an environment of low short-term rates and high securitization activity highlights the following mechanisms: (i) the “shadow banking system” may influence bank lending standards by increasing banking competition since we find that competition from non-banks and markets induce banks to soften lending standards. The impact is possibly stemming from the different regulatory and supervisory environment in which banks and other financial intermediaries operate;¹⁷ (ii) bank balance-sheet liquidity and capital position influence the softening of lending standards. Short-term rates in conjunction with securitization affect in turn these balance sheet constraints; and (iii) changes in lending standards due to the risk and value of the collateral are affected by securitization, possibly owing to the fact that securitization allows banks to offload risk from their balance sheet.

The analysis of conditions and terms of the loans suggests that when short-term rates are low *and* securitization activity is high bank margins on loans to riskier firms are not softened while margins on riskier households – both for house purchase and for consumption – are relaxed. This result is consistent with the fact that loans to households represent the largest share of loans underlying securitized assets in the Euro Area.¹⁸ In addition, collateral requirements, covenants, maturity, and loan-to-value ratio restrictions are softened as well.

All in all, the set of results suggests that low short-term interest rates induce banks to take more risk through their lending activity when securitization is high. The same does not hold for low long-term interest rates.

Finally, we study the impact of banking supervision standards on loan risk-taking in conjunction with low interest rates. Since the indicator of banking supervision has almost no time variation, we use differences from Taylor rule-implied rates to fully exploit cross-sectional variation. We find that the softening impact of low monetary policy rates on lending standards due to bank balance-sheet factors is stronger when

¹⁷ See Gorton and Metrick (2009) for the role played by financial intermediaries other than banks in the current crisis.

¹⁸ See Carter and Watson (2006).

supervision standards for bank capital are weak.¹⁹ However, we do not find similar results for long-term interest rates.

The rest of the paper proceeds as follows. Section II describes the data, introduces the variables used in the empirical specifications and reviews the empirical strategy. Section III discusses the results and Section IV concludes.

II. Data and Empirical Strategy

A. The Bank Lending Survey (BLS) dataset

The main dataset used in the paper are the answers from the Euro Area BLS. Since 2002 in each country of the Euro Area the national central banks of the Eurosystem run a quarterly survey on banks' lending practices. The questions asked were formulated on the basis of theoretical considerations related to the monetary policy transmission channels and of the experiences of other central banks running similar surveys, in particular in the US and in Japan. The main set of questions did not change since the start of the survey in 2002:Q4.²⁰

The survey contains 18 questions on past and expected credit market developments. Past developments refer to credit conditions over the past three months, while expected developments focus on the next quarter. Two borrower sectors are the focus of the survey: enterprises and households. Loans to households are further disentangled in loans for house purchase and for consumer credit, consistently with the official classification of loans in the statistics of the Euro Area.

The backward-looking questions cover the period from the last quarter of 2002 to the first quarter of 2009. While the current sample covers the banking sector in the 16 countries comprising the Euro Area, we restrict the analysis to the 12 countries in the

¹⁹ The results, however, suggest that the effect is not very strong. This is consistent with the arguments put forward among others by Allen and Carletti (2009) and Rajan (2009) concerning the need for *good* supervision regulation, which does not necessarily mean more *stringent* supervision. See also Barth, Caprio and Levine (2006).

²⁰ Berg, van Rixtel, Ferrando, de Bondt and Scopel (2005) describe in detail the setup of the survey. Sauer (2009) and Hempell, Köhler-Ulbrich and Sauer (2009) provide an update including the most recent developments and the few changes implemented (e.g. request of additional information via ad-hoc questions).

monetary union as of 2002:Q4, therefore we work with a balanced panel. Over this period we consistently have data for Austria, Belgium, France, Finland, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain. The sample of banks is representative of the banking sector in each country. This implies that it may comprise banks of different size, although some preference was given to the inclusion of large banks.

The questions imply only qualitative answers and no figures are required. The survey is carried out by the national central banks of the Euro Area countries. Typically the questionnaire is sent to senior loan officers, like for example the chairperson of the bank's credit committee. The response rate has been virtually 100% all the time.

Banks provide information on the lending standards they apply to customers and on the loan demand they receive. Concerning the supply of credit, which is the focus of ten different questions, attention is given to changes in lending standards, to the factors responsible for these changes, and to the credit conditions and terms applied to customers – i.e. whether, why, and how lending standards are changed.

Lending standards are defined as the internal guidelines or criteria for a bank's loan policy. Two main questions, each referring to a different borrower sector (enterprises and households, further disentangled in loans for house purchase and consumer loans), ask about changes in lending standards.²¹ The main question is: *“Over the past three months, how have your bank's lending standards as applied to the approval of loans (to enterprises or to households) changed?”* There are five possible replies, ranging from “eased considerably” to “tightened considerably.” (See Appendix A for a detailed description of the questions used in the paper.)²²

The second set of questions gives respondents the opportunity to assess how specific factors affected lending standards. In particular, whether the changes in standards were due to changes in bank balance-sheet strength (bank liquidity, capital,

²¹ In cases when foreign banks are part of the sample, the lending standards refer to the loans' policy in the domestic market which may differ from guidelines established for the headquarter bank.

²² See <http://www.ecb.int/stats/money/lend/html/index.en.html> for all the information related to the BLS.

or access to market finance), to changes in competitive pressures (from other banks, from non-banks and from access to market finance), or to changes in borrowers' creditworthiness (collateral risk/value or outlook, including general economic conditions). We use this information to assess bank risk-taking – by looking at changes of lending standards which are not fully explained by changes in borrowers' creditworthiness.

Finally, the Survey provides information on the changes in the terms and conditions of loans. These are the contractual obligations agreed upon by lenders and borrowers such as the margin (interest rate applied to average and riskier borrowers), the loan collateral, size, maturity and covenants. We use this information to assess how the different conditions are adjusted for the risk taken.

Concerning demand for bank loans, which is the topic of seven questions, the survey addresses various factors related to financing needs and the use of alternative finance. Three questions deal with loan demand from corporations and four with demand from households. Finally, banks can also give free-formatted comments in response to an open-ended question.²³

The Euro Area results of the Survey – a weighted average of the answers received by banks in each Euro Area country – are published every quarter on the website of the European Central Bank (ECB). In very few countries the aggregate answers of the domestic samples are published by the respective national central banks. However, the overall sample including all the answers at the country and bank level is confidential.

For the purpose of this paper we concentrate only on few questions from the BLS described in detail in Appendix A. Since we are interested in actual lending decisions by banks, we analyze the answers related to changes in lending standards over the previous three months. However, the results are broadly unchanged when we use, in non-reported regressions, the answers concerning expected changes of lending standards over the next quarter.

²³ For the purpose of this paper we do not use the answers related to the demand for loans; however, in non-reported regressions we control using the loan demand answers. The results are qualitatively similar.

Following for instance Lown and Morgan (2006), we quantify the different answers on lending standards by using *the net percentage of banks that have tightened* their lending standards over the previous quarter, which is defined as follows: the difference between the percentage of banks reporting a tightening of lending standards and the percentage of banks reporting a softening of standards. Therefore, a positive figure indicates a net tightening of lending standards.²⁴

B. Macroeconomic and financial variables

We regress the BLS variables on several macroeconomic and financial variables, lagged by one quarter. Therefore, we use macroeconomic information from 2002:Q3 to 2008:Q4.²⁵ All the series have quarterly frequency to be consistent with the answers from the BLS.

The main proxy for the monetary policy rate is the quarterly average of the EONIA overnight interest rate, as published by the ECB. To assess the impact of long-term rates, we use 10-year government bond interest rates, different across Euro Area countries. The main macroeconomic controls are the annual real GDP growth rate and the inflation rate, defined as the quarterly average of monthly inflation rates expressed in annual terms.²⁶ Both measures are different across countries.

To assess monetary policy rates against a benchmark, we calculate for each country a Taylor-rule implied rate over the sample period. We then use the difference

²⁴ The use of this statistic implies that no distinction is made for the degree of tightening/easing of lending standards in the replies. This issue can be addressed using diffusion indexes. A simple way of calculating these indexes consists for example in weighting by 0.5 the percentage of banks answering that they have *tightened somewhat* (*eased somewhat*) and in weighting by 1 the percentage of banks that have *tightened considerably* (*eased considerably*). The results obtained using diffusion indexes do not differ qualitatively from the results obtained with net percentages and, therefore, we do not report them since they also imply a certain level of discretion when choosing the weights.

²⁵ See Appendix B for a detailed description of the main variables used in the paper.

²⁶ In non-reported regressions we have used as macroeconomic variables also expectations of GDP growth and inflation from Consensus Forecast or from the ECB projections. The results are qualitatively similar, but these variables are not available for all Euro Area countries and/or with quarterly frequency over the whole period considered. In addition, we have also used variables that proxy for country risk, as for example the difference between the long-term interest rates for each country (based on the 10 year Government bond rate) and the corresponding long-term German rate. We have also controlled in some non-reported regressions for the term spread, calculated as the difference between the 10 year rate and the 3-month rate, for house price growth and for credit (loan) growth. The results are qualitatively similar.

between the 3-month EURIBOR rate and this implied rate as explanatory variable in the regressions (following Taylor, 2008, and Ahrend, Cournède and Price, 2008). A high (positive) value indicates high monetary policy rates (restrictive stance of monetary policy), whereas a low (negative) value indicates low levels of short-term rates (expansive monetary policy). The rule-implied rates are calculated using simple country-specific Taylor rules with coefficients 0.5 for inflation and output gap (see Taylor, 1993). Output gap and inflation are country specific, while the natural rate is set at 2.1 and the inflation target at 1.9.²⁷ We also count the number of consecutive quarters of “expansive” monetary policy, in which the 3-month EURIBOR was below the rate implied by a Taylor rule since 1999:Q1, when the Euro was introduced. We use this as a measure of monetary policy rates *too low for too long*.

One of the most notable innovations in financial markets over the last few years has been the use of securitization. Thus, we also construct a variable measuring securitization activity. It is the ratio between the volume of all the deals involving asset-backed securities and mortgage-backed securities in each quarter, as reported by Dealogic, normalized by the outstanding volume of loans during the previous quarter.²⁸ The securitization variable is country-specific since we have information about the nationality of the securitized collateral.²⁹ The volume of loans is available from the official ECB statistics.

Since securitization is endogenous to the business cycle, in particular to the level of short-term interest rates, for robustness we instrument securitization activity with a time invariant indicator based on the legal environment for securitization in each country. The indicator is constructed from country information contained in the report *Legal Obstacles to Cross-Border Securitization in the EU* (European Financial

²⁷ The estimated output gap for each country is the average of the estimates from the European Commission, the OECD and the IMF. As a robustness check we have also used the Taylor rule specification in Gerdesmeier, Mongelli and Roffia (2007) with interest-rate smoothing. The results are qualitatively similar.

²⁸ It can be presumed that loans are securitized by the banks after they have been granted. Therefore, we lag the numerator of the ratio by one quarter. As a robustness check we use also the ratio of securitization volumes over gross volumes of *new loans* issued. However, the official Euro Area harmonized statistics on new loans are available only since 2003 and, therefore, in this case, we need to shorten consistently the time series of our sample.

²⁹ In doing so, we are taking into account only securitization deals for which the underlying collateral resides in one of the Euro Area countries. Thus, we do not include securitization of loans granted outside the Euro Area by Euro Area banks.

Markets Lawyers Group, 2007). The view taken is that a more regulated environment can be conducive to a framework of “legal certainty” which may be more attractive for investors. Indeed the indicator shows a positive correlation with securitization activity. In addition, it results in ample cross-country variation in the Euro Area. (See Appendix C for details.)

Finally, we also use a *capital stringency* index to assess supervision standards for bank capital. *Capital stringency* is an index of regulatory oversight of bank capital (see Appendix C for details). It does not measure statutory capital requirements but the supervisory approach to assessing and verifying the degree of capital at risk in a bank (Laeven and Levine, 2009).

Table 1 shows the summary statistics of the main variables used, including the correlations of Taylor rates across countries. Table 1 Panel A shows that the average overnight rate (common across countries) was 2.87 with a standard deviation of 0.81, whereas long-term rates had an average of 4.05 and a standard deviation of 0.46. Average GDP growth was 2.42% while its standard deviation was 2.09, showing ample cross-section and time series variability since it ranged from a minimum of -7.98 to a maximum of 8.42. Average inflation was 2.51 with a standard deviation of 0.99. Average Taylor rate differences were -1.23, indicating that on average monetary policy was expansive, with a standard deviation of 1.62, a minimum value of -6.55 and a maximum of 2.67. There is ample variation of Taylor-rule implied rates over the sample as shown in the cross-country correlation table. For example, the correlation between Germany and Spain was 0.32, while it was 0.82 between Germany and Austria.

Securitization had an average of 1.82 ranging from 0 to 9.87. Therefore, on average, the overall volume of securitized loans was small compared with the outstanding amount of total loans. However, there is ample cross-section and time series variation. Capital stringency index ranged from 3 to 7, reflecting mainly cross-country variation, and the securitization instrument based on regulation varied from 1.5 to 14.

In Table 1 Panel B, C and D, average statistics for lending standards are shown. There is ample variation of lending standards applied to non-financial firms and to

households over the sample period and across countries. It is also interesting to note that the average measure of lending standards was positive, which implies average tightening (in particular for business loans). This may signal a possible bias towards tightening. Hence we analyze deviations over the mean values by introducing country fixed effects, reflecting also the fact that the number and the structure of banks as well as the regulatory and supervisory banking environment differ in each country.

C. Empirical strategy

We want to empirically analyze the impact of short-term and long-term interest rates on the softening of lending standards directly and also indirectly in conjunction with securitization activity and banking supervision standards. Moreover, we want to assess whether a softening of lending standards implies more (loan) risk-taking by banks.

As we discussed in the introduction, there are four major empirical challenges to overcome. First, monetary policy rates are endogenous to the (local) economic conditions. Second, banking supervision regulation may be endogenous to monetary policy, in particular when the central bank is responsible for both. Third, securitization activity is endogenous to monetary (bank liquidity) conditions, since those affect the ability of banks to grant loans. Fourth, it is very difficult to obtain data on lending standards applied to the pool of potential borrowers, and to know whether, why, and how banks change these standards.

Our identification strategy to tackle the four previous challenges relies upon the data we use, the Euro Area Bank Lending Survey dataset.

First, with regard to monetary policy, there is an identical monetary policy (overnight) rate for all Euro Area countries, which show some significant time variation between 2002 and 2009.³⁰ At the same time, cross-country differences in GDP growth and inflation imply different monetary conditions.³¹ Therefore, we can exploit exogenous cross-sectional variation of the stance of monetary policy. For

³⁰ In Bernanke and Blinder (1992), and in Christiano, Eichenbaum, and Evans (1996), among others, the overnight interest rate is the indicator of the stance of monetary policy. In the Euro Area the Governing Council of the ECB determines the corridor within which the overnight money market rate (EONIA) can fluctuate. Therefore, this rate is a measure of the stance of the monetary policy.

³¹ See for example Camacho, Pérez-Quiros and Saiz (2006).

example, Spain and Ireland have grown at a much higher rate and with a higher inflation rate than Germany and France, the two largest Euro Area countries, over the period 2002-2006 (Taylor, 2008).

Second, banking supervision regulation in the Euro Area is a responsibility of the national supervisory authorities, whereas monetary policy is conducted by the European Central Bank and the Eurosystem as a whole. Therefore, in the Euro Area, differences in banking supervision and regulation standards across countries are exogenous to the conduct of monetary policy. As explained above, we use a country measure of supervision standards for bank capital.

Third, there is significant cross-sectional variation in securitization activity partly arising from cross-country differences in the regulation of the market for securitization. We construct a time-invariant indicator of the regulatory environment for securitization and use it as an instrument in the robustness analysis.

Fourth, we use the confidential Bank Lending Survey dataset of the Eurosystem. As explained earlier, national central banks request banks to provide quarterly information on the lending standards they apply to customers and on the loan demand they receive. We use this rich information set to analyze whether banks change their lending standards for the pool of potential borrowers, to whom these changes are directed (average or riskier borrowers), how standards are adjusted (loan spreads, size, collateral, maturity and covenants) and, most importantly, *why* standards are changed (due to changes in borrower risk, in bank balance-sheet strength and in competition).

Data on lending standards overcome some of the problems inherent to data on actual credit granted. These data do not contain information on the conditions offered to the pool of potential borrowers, including those customers that were either rejected by the banks or that found the terms and conditions of the loan too onerous. In addition, the BLS data contain information on all type of loans (loans for business, for house purchase and for consumption) and on all type of standards (loan spreads for average or riskier borrowers, loan size, maturity, covenants, etc). Finally, and most importantly, the BLS dataset addresses the issue on *why* banks have changed their standards. In particular, whether the decision was triggered by the improvement of the borrowers' creditworthiness, by better bank capital and/or liquidity position, or by higher banking competition (stemming either from the banking sector or from the

non-banking sector, e.g. the “shadow banking system”).³² All this rich information helps us to tackle the identification issue related to differences in borrowers’ quality – the sample selection problem – and to analyze banks’ appetite for (loan) risk – changes in lending standards over and above changes in borrowers’ creditworthiness.

The empirical strategy relies on a series of panel regressions where the basic equation is the following:

$$BLS_{t,i} = \alpha_i + \beta \times SRate_{t-1,i} + \gamma \times LRate_{t-1,i} + \delta \times CONTROLS_{t-1,i} + \varepsilon_{t,i}$$

where $BLS_{t,i}$ is the net percentage of banks which have tightened credit standards in quarter t and country i (either total standards, or standards related to specific factors, or the different loan conditions) in the 12 Euro Area countries over the period 2002:Q4-2009:Q1. $SRate_{t-1,i}$ is the short-term interest rate at time $t-1$ in country i and $LRate_{t-1,i}$ is the long-term interest rate. $CONTROLS_{t-1,i}$ are the other macroeconomic and financial variables used in the analysis.

In the benchmark regressions we compare directly the impact of short-term (EONIA) and long-term (10-year) nominal interest rates, controlling for GDP growth and inflation. We also assess their indirect effect by looking at the interaction with securitization activity. In an alternative specification, we use differences from Taylor-rule implied rates to assess whether the softening of standards may be related to *too low for too long* monetary policy rates (in this case GDP growth and inflation rates are not included in the regressions but are used to calculate the Taylor-rule implied rates). We also analyze the interaction of these differences with banking supervision standards to fully exploit the cross-sectional variation of supervision standards and monetary policy rates.

The nature of the data used – (1) from economically integrated but different countries with a common monetary policy and (2) serial correlation of lending standards – implies that the errors of the regressions are heteroskedastic and correlated across countries, and serially correlated within countries. Since we have 26 quarters of data and only 12 countries, we run a series of GLS panel regressions with

³² This is a very important difference compared to the US Senior Loan Officer Survey where no information is reported on *why* banks change lending standards for real estate and consumer loans.

country (and when possible time) fixed-effects where we allow the residuals to be correlated *both* cross-sectionally and serially (within correlation).³³ We implement a test for serial correlation of order one following Wooldridge (2002) and Drukker (2003) and because of evidence of autocorrelation, the residuals of the regressions are modeled as an autocorrelated process of order one.³⁴ We also check the residuals for evidence of higher order autocorrelation; in addition, we replicate all the main results using LS panel regressions with country (and when possible time) fixed effects and errors clustered by country to correct for serial correlation (see Appendix D).³⁵ It should be noted that clustering at the same time by country and time is likely to produce biased estimates because of the limited number of countries and also the relatively short time series of the data we use (see Petersen, 2009).

III. Results

The results are shown as follows. First, we analyze the impact of monetary policy (short-term interest) rates on lending standards and bank risk-taking (Table 2). Then, we compare the impact of short-term and long-term interest rates on lending standards and loan risk-taking directly (Table 3), and indirectly through the interaction with securitization activity (Table 4), and banking supervision standards (Table 5).

Short-term interest rates

Table 2 Panel A analyzes the impact of overnight rates (EONIA) on lending standards applied to business loans, mortgage loans and consumer loans (Questions 1 and 8 of the BLS, see Appendix A). From Columns 1 to 6, the dependent variable *total credit standards* is the net percentage of banks reporting a tightening of lending

³³ We introduce country fixed effects since the number and the structure of banks as well as the regulatory and supervisory environment differ in each country; moreover, as shown e.g. by Laeven and Levine (2009), the banking structure, regulation and supervision affect bank (loan) risk-taking. In addition, whenever possible, we introduce time fixed effects to control for common shocks across countries in order to further exploit the cross-sectional implications of the hypotheses we are testing.

³⁴ The coefficient of the lagged value of lending standards is generally lower than 0.5.

³⁵ This is a common approach adopted by researchers to address two sources of correlation at the same time (see Petersen, 2009; and Angrist and Pischke, 2009). If the time effect were fixed, time dummies would completely remove the correlation between panels and then clustering by country would yield unbiased standard errors (but it would not adjust the coefficient of the regressions as when using GLS). Moreover, adding time fixed effects implies that we cannot compare the effect of short- and long-term nominal interest rates, a key question that we want to address in the paper.

standards over the previous quarter. In column 1, the coefficient of overnight rates is equal to 24.889***.³⁶ Therefore, higher overnight rates imply tighter lending standards for non-financial firms. In column 2, controlling for real GDP growth and inflation rate at the country level – the main determinants of overnight rates if monetary policy were decided in each country – results are still highly statistically significant: the coefficient on overnight rates is 22.157***. The coefficient on GDP growth is negative and equal to -3.151***. Higher GDP growth softens lending standards applied to non-financial firms. Hence, lending standards are pro-cyclical. On the other hand, the coefficient on inflation is 5.268***, which indicates that a higher inflation rate implies a tightening of lending standards to non-financial firms, maybe as a consequence of expected increases in overnight rates in the near future.

In Columns 3 to 6 we report the results of the same regressions for lending standards to households, either for loans for house purchase or for consumption. The direction of the impact is similar for all the regressions. However, the size of the coefficient of overnight rates indicates that the impact of short-term rates on lending standards is stronger for loans to non-financial corporations than for loans to households (22.157***, 11.507*** and 8.172*** respectively).

Results are also highly economically significant: the softening of standards for business loans due to the impact of a one standard deviation decrease of overnight rates is more than double the impact of a comparable increase of real GDP growth (almost 18 and 7 respectively). Following a similar line of reasoning, our results imply that the impact of overnight rates and GDP growth is comparable for mortgage loans (approximately 9.5), while overnight rates have a stronger impact than GDP growth for consumer loans (approximately 6.5 and 4 respectively).

Banks may soften lending standards when overnight rates are low because of improvements in borrowers' net worth and in the quality of their collateral as shown by Matsuyama (2007), Bernanke and Gertler (1995) and Bernanke, Gertler, and Gilchrist (1996 and 1999). In the previous regressions we have used GDP growth to control for improvements of borrowers' net worth. In Columns 7 to 12 we make a further identification step. The left hand side variable is now defined as the tightening

³⁶ *** denote significant at 1% level, ** significant at 5%, and * significant at 10%.

of lending standards due to changes in banks' balance sheet constraints (bank capital, liquidity and access to market finance), which are changes in lending standards not associated to changes in borrowers' creditworthiness (answers to Questions 2 and 9 of the BLS, see Appendix A).

In Columns 7 to 12 we see that low overnight rates also softens lending standards because of less stringent banks' balance-sheet constraints. In this case, lending standards are relaxed because of *pure* bank-supply factors and, hence we can interpret these changes as reflecting more bank risk-taking. Results are statistically and economically significant. Moreover, the impact of EONIA is stronger than that of GDP growth for all type of loans, including loans for house purchase (the coefficients in this case are respectively 5.488*** and -1.125***).

In Table 2 Panel A, controlling for GDP growth and inflation we have used the level of overnight rates as an indicator of monetary policy. The next step is to assess the level of short-term rates against a benchmark. One way to do it, following other examples in the literature, is to calculate the difference between a nominal short-term interest rate and the rate implied by a country-specific Taylor-rule.³⁷ Note that this measure provides exogenous cross-sectional differences of monetary policy stance since the deviation from the Euro Area average for a country at a given point in time is due to both the common monetary policy rate and the domestic inflation and GDP growth.

In Table 2 Panel B, Columns 1 to 3 show that a low value of Taylor-rate differences (i.e. more expansive monetary policy) implies a softening of standards for all type of loans. Moreover, in Columns 4, 7 and 10 we show that the softening is over and above the improvement of borrowers' creditworthiness – the softening also stems from pure bank-supply factors, measured by bank balance sheet constraints.

The next step is to introduce an additional variable measuring the persistence of expansive monetary policy in each country by counting the number of consecutive quarters in which nominal short-term rates were lower than Taylor-rule implied rates.

³⁷ Another way to do it is through short-term real interest rates. In this case, negative rates are low. In non-reported regressions, we find similar results when using real rates.

Also this measure is country-specific. As we can see in Columns 5, 8, and 11, (short-term) rates *too low for too long* imply an even further softening of lending standards. Results are significant for all type of loans but are stronger for loans for house purchase. Finally, as shown in Columns 6, 9 and 12, when we add time fixed effects to control for common shocks across countries, rates too low for too long soften lending standards only for households, both for house purchase and for consumption.

Short-term versus long-term interest rates

Table 3 shows the results of the regressions including long-term interest rates. In Panel A, we analyze the impact of short- and long-term nominal interest rates on total lending standards. In Panel B we analyze why the lending standards are changed in order to assess bank risk-taking, while in Panel C we study how banks adjust their terms and conditions for loans. The results reported in Panel B and C, therefore, are crucial to assess the effects of short- and long-term interest rates on banks' (loan) risk appetite.

In Table 3 Panel A, Columns 1, 3 and 5, we find that low long-term rates soften lending standards for all type of loans. However, once we control for overnight rates in Columns 2, 4 and 6, the statistical and economical significance of long-term rates disappear except for mortgage loans, possibly reflecting the long maturity feature of these loans. Overnight rates, instead, continues to be statistically and economically significant for all type of loans. For loans for house purchase, as Column 4 shows, short- and long-term interest rates have a similar (economic) impact on lending standards (the coefficients are 7.998*** and 11.311*** respectively, but the standard deviation of overnight rates is 0.81 whereas it is 0.46 for long-term interest rates).

The next step is to assess the impact on loan risk-taking. Table 3 Panel B shows the results of panel regressions where the left hand side variable is the tightening of standards due to the following factors: expected economic conditions, borrowers' collateral risk/value and outlook (i.e. creditworthiness), bank capital and liquidity position and market access to finance (i.e. bank balance-sheet strength) and, finally, competitive pressures stemming from the banking system or from non-banks.

Panel B for non-financial firms shows that low short-term interest rates soften lending standards through all the factors considered. Lending standards are relaxed

because of the improvement of borrowers' creditworthiness (Columns 8, 9 and 10), but also owing to stronger bank balance-sheets (Columns 1 to 4), higher competition from other banks (Column 5), from the non-banking sector (Column 6) and from market finance (Column 7). Therefore, these results suggest that banks take more risk when short-term rates are low. Banks increase risk-taking through easier lending standards because of both better balance-sheet positions (as shown by Allen and Gale, 2007, and Diamond and Rajan, 2006) and higher competition (as shown by Dell'Ariccia and Marquez, 2006).

The results concerning long-term rates have a much weaker statistical and economical significance. It is worth noting that the changes in lending standards linked to the liquidity position of banks are more affected by short-term rates than by long-term rates (through mechanisms shown by Adrian and Shin, 2009). At the same time, the coefficient linked to risk of collateral is higher for long-term rates, reflecting probably the longer term nature of assets used as collateral, as for example real estate.

Panel B for households shows the results of similar regressions for mortgage and consumer loans. Short-term rates significantly affect lending standards for households. However, the coefficients of the factors related to competition are smaller, suggesting that short-term rates (in the Euro Area) increase competition in banking mainly for loans with shorter maturity (business loans as compared to loans for house purchase). On the other hand, low long-term rates do not seem to imply more risk-taking by banks (as Columns 1 to 3 and 6 to 8 suggest) except for factors linked to bank competition. Finally, low long-term rates soften lending standards by affecting borrowers' creditworthiness through better housing market prospects and the reduction of collateral risk (as Columns 5 and 11 suggest).

In Table 3 Panel C we report the results of panel regressions where the left hand side variables are the conditions and terms of loans. We find that low short-term rates soften all standards (price and non-price terms) for all type of loans. It is interesting to note that the softening of standards applied to average and riskier borrowers is similar for loans for house purchase. On the contrary, for business loans and consumer credit the impact of low overnight rates is stronger for margins applied to average borrowers than to riskier borrowers (first two columns for each type of loans). Moreover, low

long-term rates soften standards significantly for riskier firms but not for average firms (see Column 1 and 2 of the non-financial firms' table).

All in all, the results in Table 3 suggest that low short-term rates imply more banks' appetite for risk. Banks soften the standards not only because of the improvement of borrowers' creditworthiness but also because banks' balance-sheet constraints are relaxed and banking competition is increased; in addition, all the terms and conditions are softened. Moreover, the analysis suggests that the positive impact of low short-term rates on bank risk-taking is statistically and economically stronger than the effect induced by low long-term interest rates.

Securitization

In the regression reported in Table 3 we have analyzed the *direct* impact of short- and long-term nominal interest rates on lending standards. In Table 4 we show the *indirect* impact via securitization activity. Results are reported as in the previous section. First, Panel A shows the coefficients of the regressions with total credit standards. Panel B reports the results when the left hand side variable is the tightening due to factors related to changes in standards (i.e. why banks change them) and, finally, Panel C shows the analysis of the terms and conditions of loans (i.e. how banks adjust lending standards).

In Table 4, Panel A, Columns 1 to 6, the coefficient of securitization is negative, implying that higher securitization activity tends to soften lending standards for all type of loans. Most importantly for the research questions that we address in the paper, the coefficient of the interaction between securitization and overnight rate is positive and statistically significant, implying that the impact of low *short-term* rates on the softening of lending standards is amplified when securitization is high. The results are similar for all type of loans. However, the same does not hold when studying the interaction of *long-term* rates and securitization.

The results are robust to the introduction of time fixed effects to control for common shocks across countries, as shown in Columns 2, 4, and 6. In this case, the overnight rate is dropped from the regression since it is common across countries and the identification entirely arises from the interaction of interest rates and securitization

(for identification, in all the Panels of Table 4 and in Table 5 we present also the results with time fixed effects).

The securitization activity in each country depends on the regulation and development of the financial system of that specific country, but presumably also on short-term rates and on the business cycle. Monetary policy affects loan volume, affecting in turn the securitization of loans. Therefore, securitization activity is endogenous to monetary policy. To address this issue, we instrument securitization with an indicator of the relevant regulatory environment in each country (see Section II and Appendix C for a detailed description of the instrument). As shown in Panel A, Column 7 above, the securitization regulation instrument is highly significant (the t-statistic in the first stage regression is 7.44), thus the instrument does not suffer from weak instrument concerns (Staiger and Stock, 1997). Moreover, the estimates from the second-stage regression (Columns 7 to 12) suggest that the impact of low short-term rates on the softening of standards is stronger when the component of actual securitization predicted by securitization regulation is high. As in Columns 1 to 6, the results are similar for all type of loans. Finally, we do not find similar results when we analyze the interaction of *long-term* rates and (the predicted) securitization.

In Table 4, Panel B, we analyze the tightening of lending standards due to specific factors. For loans to non-financial firms, we find that higher securitization activity amplifies the impact of low overnight rates on the softening of standards due to: (1) higher competition from the non-banking sector (Columns 11 to 14); and (2) lower risk of collateral and better firm outlook (Columns 15 to 20). Since one of the significant factors is stronger competition, the results imply that banks soften lending standards also for reasons not related to improvements of borrowers' creditworthiness, thus suggesting more bank risk-taking in business loans in an environment of high securitization activity and low short-term interest rates.

For loans to households, we find that the effect of high securitization activity *and* low overnight rates on the softening of lending standards is due to stronger bank balance-sheet position (Columns 1, 2, 11 and 12) and to improvements of borrowers' creditworthiness for both mortgages (Columns 7 to 10) and consumer loans (Columns 17 to 22). For loans for house purchase, non-bank competition has a significant coefficient as well (Columns 5 and 6). The results suggest that banks take more risk in

lending to households when securitization activity is high and overnight rates are low, in particular because bank balance-sheet constraints are relaxed.

In this environment of low short-term interest rates and high securitization activity, our results highlight: (i) the “shadow banking system” may induce a softening of bank lending standards through competition (since competition from non-banks and from market finance is a significant mechanism in the analysis). The impact presumably stems from the different regulatory and supervisory environment in which markets and financial intermediaries other than banks operate; (ii) the importance of bank balance-sheet strength in affecting the softening of standards (low overnight rates and high securitization improve balance-sheet liquidity and capital positions); and (iii) the effect of securitization as a risk transfer device. Our results suggest that lending standards related to collateral risk and value are softened more as banks are able to offload the risk from their balance sheets.

In Table 4 Panel C the terms and conditions of loans are analyzed. We find that more securitization in conjunction with low short-term rates has an impact on the following standards: (i) for business loans: margins for average borrowers, collateral requirements, and maturity; (ii) for mortgage loans: margins on both average and *riskier* loans, collateral requirements, and loan-to-value ratio restrictions; (iii) for consumer credit: margins on both average and *riskier* loans, collateral requirements, maturity, and non-interest rate charges.

It is interesting to note that lending standards are relaxed for riskier, lower rated households, but not for riskier firms (see Column 3 and 4 for business loans), consistently with the evidence showing that loans to households represent the largest share of loans underlying securitized assets in the Euro Area.

All in all, the analysis suggests that the impact of short-term rates on bank risk-taking through securitization is statistically and economically stronger than the effect induced by long-term interest rates.

Banking regulation and supervision standards

The last part of the analysis is devoted to the inclusion of supervision standards for bank capital. In Table 5 we introduce the *capital stringency* index which is a

measure of regulatory oversight of bank capital (see Laeven and Levine, 2009). This measure has some cross-sectional variation but very little time variation (see Section II and Appendix C), hence to fully exploit the cross-sectional variation, we use differences from Taylor rule implied rates as a proxy for low short-term interest rates. In Panel A and B, we find in general that the impact of low monetary rates on the softening of lending standards due to bank balance sheet constraints is higher when supervision standards are weak. This effect is stronger (statistically and economically) for consumer credit. However, we do not find similar results for long-term interest rates.

All in all, the results suggest that the effect on loan risk-taking of low monetary policy rates in conjunction with weak supervision standards is not very strong. This may hinge on two (non exclusive) possible explanations. First, the indicator may not reflect enough variation of banking supervision across Euro Area countries. Second, it may be difficult to capture the *goodness* of regulation or supervision with measures based on the *stringency* of banking supervision. This is consistent with the arguments made by Allen and Carletti (2009) and Rajan (2009) concerning the need for “*good*” supervision regulation standards, which do not necessarily mean more stringent.³⁸

IV. Conclusions

Many commentators have suggested that low levels of short and/or long-term interest rates induced more bank risk-taking over the period preceding the financial crisis. This view is summarized for example in the letter to Her Majesty the Queen on the origins of the current crisis written by the British Academy (see Besley and Hennessy, 2009). In this paper we have addressed empirically this issue.

Using a rich dataset on lending standards from the Euro Area, we find that low short-term rates affect more than low long-term interest rates the softening of lending standards. The impact works both directly and indirectly in conjunction with high securitization activity and weak banking supervision standards. The softening of lending standards is over and above the improvement of borrowers’ creditworthiness, and the analysis of the terms and conditions of loans shows that all relevant standards

³⁸ See also Barth, Caprio and Levine (2006).

are softened. Therefore, the results suggest that banks' appetite for (loan) risk increases when overnight rates are low; high securitization and weak banking supervision amplify this effect even more. The same, however, does not hold for low long-term interest rates.

A low level of short-term interest rates has preceded many financial crises over the last centuries (Calomiris, 2008). However, in the current juncture, the impact of low interest rates may have been *even* stronger than in the past for at least two reasons: First, because short-term interest rates were low in both nominal and real terms (or similarly as compared to Taylor-rule implied rates). We analyze the impact of both on lending standards and find that they both contribute to the softening of lending standards. Second, perhaps most importantly, because in the years previous to the crisis short-term interest rates were low for an extended period of time – too low for too long – *in conjunction with* high securitization activity and possibly weak banking supervision standards. The concurrency of these factors may have enhanced the effects of low short-term interest rates on loan risk-taking by banks, an hypothesis that is supported by the results of this paper.^{39 40}

We contribute significantly to the current debate on the origins of the financial crisis. The special setting of the Euro Area with identical monetary policy rates but important differences of GDP growth, inflation and securitization activity provides an excellent platform to identify the potential root causes of the current crisis and their interactions (Allen and Carletti, 2009; Diamond and Rajan, 2009a; Rajan, 2005; Acharya and Richardson, 2009).⁴¹ Differently from the emerging literature on the current crisis focusing primarily on the US market, we analyze the drivers of the crisis in the other major developed market – i.e. the Euro Area – by making use of a very rich dataset on lending standards. By using this dataset we can assess whether banks

³⁹ Another reason can be that short-term rates may be more important nowadays for banks' leverage (see Adrian and Shin, 2009).

⁴⁰ We would like to thank Tobias Adrian, the discussant of this paper at the RFS-Yale Conference on The Financial Crisis, for showing that our results related to monetary policy and securitization also hold when using US lending standards. This suggests that low monetary policy rates in the US not only softened lending standards directly, but also indirectly through high securitization activity.

⁴¹ See also Allen (2009), Besley and Hennessy (2009), Blanchard (2009), Brunnemeier (2009), Calomiris (2008), Engel (2009), Rajan (2009), Taylor (2007 and 2008), and numerous articles since summer 2007 in *The Financial Times*, *The Wall Street Journal*, and *The Economist*.

change lending standards for potential borrowers, how they do it (by changing terms and conditions) and most importantly *why*, a key piece of information to assess risk-taking.

We ultimately show that the global nature of the crisis may have resulted not only from spill-over effects across countries and banks but it may have been due to causes inherent to the functioning of financial intermediation at large (including the “shadow banking system”) and policy decisions, which worked in all the markets and countries, albeit with different intensities.⁴² These results, therefore, help shed light on the origins of the current crisis and have important policy implications for monetary policy, banking regulation and supervision, and for financial stability.

⁴² Bank risk problems may transmit through the system through interbank contagion and other mechanisms, see Iyer and Peydró (2009) and Bandt, Hartmann and Peydró (2009). Once the banking system is in trouble, a credit crunch stemming from low bank capital and liquidity is more likely to happen (see Jiménez, Ongena, Peydró and Saurina, 2009b) in turn affecting the real economy (see Ciccarelli, Maddaloni and Peydró, 2009).

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Table 1, Panel A: summary statistics of macroeconomic and financial variables

Variable	Mean	Std. Dev.	Min	Max
Overnight rate	2.87	0.81	2.02	4.25
10-year rate	4.05	0.46	2.94	5.22
Taylor-rate difference	-1.23	1.62	-6.55	2.67
GDP growth	2.42	2.09	-7.98	8.42
Inflation	2.51	0.99	-0.17	5.58
Securitization	1.82	1.66	0	9.87
Capital stringency	5.26	1.20	3	7
Securitization regulation	8.08	3.81	1.5	14

Cross-country correlation of Taylor rates

	Austria	Belgium	Germany	Spain	Finland	France	Greece	Ireland	Italy	Luxembourg	Netherlands	Portugal
Austria	1											
Belgium	0.7709	1										
Germany	0.8232	0.7203	1									
Spain	0.1812	0.3951	0.3256	1								
Finland	0.8803	0.8074	0.8335	0.3264	1							
France	0.405	0.455	0.6687	0.7368	0.4102	1						
Greece	0.3883	0.1044	0.3613	-0.0712	0.1733	0.3036	1					
Ireland	0.0387	0.2732	0.2571	0.9077	0.2941	0.6832	-0.1228	1				
Italy	0.1355	0.2475	0.4067	0.838	0.3262	0.8317	0.0559	0.8892	1			
Luxembourg	0.7263	0.7768	0.7575	0.6097	0.728	0.6134	0.1256	0.4493	0.3671	1		
Netherlands	0.4057	0.544	0.5241	0.6119	0.6928	0.5514	-0.0658	0.7292	0.7432	0.3997	1	
Portugal	0.0892	0.2378	0.271	0.7568	0.3652	0.5732	-0.1558	0.8534	0.8561	0.2481	0.8786	1

Table 1, Panel A shows the summary statistics of the macroeconomic and financial variables used in the analysis and the cross-country correlation of the rates implied by a country specific Taylor rule. The statistics are calculated over the period 2002:Q3-2008:Q4. The overnight rate is the quarterly average of the daily overnight rate (EONIA). The 10-year rate is the long-term government bond interest rate in each country. Taylor-rate difference is the difference between the 3-month Euribor (common across countries) and a country specific Taylor-rule implied rate. GDP growth is the annual growth rate of real GDP for each country. Inflation is the quarterly average of inflation rates for each country. Securitization is defined as the total securitization activity in each country divided by the outstanding amount of loans. Capital stringency is an index of stringency of capital requirements in each country. Securitization regulation is a country indicator constructed using the regulation surrounding the market for securitization. See Section II, Appendix B and C for a detailed description of the variables and the data sources.

Table 1, Panel B: summary statistics of credit standards for loans to firms

	Mean	Std. Dev	Min	Max
Credit standards (Q1)	21.60	33.74	-50	100
<i>Factors affecting credit standards (Q2)</i>				
Balance sheet constraints	10.04	18.48	-25	86.67
Capital position	13.89	20.78	-25	100
Liquidity position	6.13	17.97	-40	80
Market financing	10.12	23.71	-50	100
Bank competition	-14.04	22.03	-75	50
Non-bank competition	-1.00	9.49	-40	33.33
Market financing competition	-0.44	10.32	-40	40
Economic conditions	25.28	38.06	-80	100
Industry/firm outlook	30.94	34.77	-40	100
Risk on collateral	14.78	22.46	-50	100
<i>Terms and conditions of the loans (Q3)</i>				
Margin on average loans	9.80	45.40	-100	100
Margin on riskier loans	39.37	36.57	-50	100
Non-interest rate charges	10.67	21.85	-50	100
Loan or credit line size	13.67	24.86	-50	100
Collateral requirements	16.99	28.88	-50	100
Loan covenants	14.04	24.74	-33.33	100
Loan maturity	9.95	26.85	-50	100

Table 1, Panel B shows the summary statistics of the answers reported in the Bank Lending Survey (BLS) concerning changes in credit standards for loans to enterprises from 2002:Q4 to 2009:Q1. See Section II and Appendix A for a detailed description. They are the answers to questions 1, 2 and 3 of the survey.

Table 1, Panel C: summary statistics of credit standards for house purchase

	Mean	Std. Dev	Min	Max
Credit standards (Q8)	6.06	31.05	-100	100
<i>Factors affecting credit standards (Q9)</i>				
Balance sheet constraints	6.46	17.70	-66.67	100
Bank competition	-12.33	19.46	-80	40
Non-bank competition	-1.12	6.11	-33.33	20
Economic conditions	15.49	26.64	-40	100
Housing market prospects	14.74	28.02	-40	100
<i>Terms and conditions of the loans (Q10)</i>				
Margin on average loans	-2.57	38.79	-100	100
Margin on riskier loans	15.54	27.60	-33.33	100
Collateral requirements	6.40	16.40	-40	90
Loan to value ratio	7.02	25.82	-40	100
Loan maturity	-5.59	17.20	-66.67	60
Non-interest rate charges	0.28	15.58	-100	75

Table 1, Panel C shows the summary statistics of the answers reported in the Bank Lending Survey (BLS) concerning changes in credit standards for loans to households for house purchase from 2002:Q4 to 2009:Q1. See Section II and Appendix A for a detailed description. They are the answers to questions 8, 9 and 10 of the survey.

Table 1, Panel D: summary statistics of credit standards for consumer loans

	Mean	Std. Dev	Min	Max
Credit standards (Q8)	9.03	25.31	-35.71	100
<i>Factors affecting credit standards (Q11)</i>				
Balance sheet constraints	5.70	18.07	-33.33	100
Bank competition	-8.53	16.03	-66.67	33.33
Non-bank competition	-2.77	8.57	-40	33.33
Economic conditions	13.64	25.75	-33.33	100
Credit worthiness consumer	17.07	24.34	-25	100
Risk on collateral	8.39	17.91	-33.33	80
<i>Terms and conditions of the loans (Q12)</i>				
Margin on average loans	1.20	27.77	-75	83.33
Margin on riskier loans	14.45	23.88	-33.33	100
Collateral requirements	4.16	14.92	-33.33	80
Loan maturity	0.83	15.38	-66.67	66.67
Non-interest rate charges	1.88	13.45	-66.67	75

Table 1, Panel D shows the summary statistics of the answers reported in the Bank Lending Survey (BLS) concerning changes in credit standards for consumer loans from 2002:Q4 to 2009:Q1. See Section II and Appendix A for a detailed description. They are the answers to questions 8, 11 and 12 of the survey.

Table 2, Panel A: the impact of short-term interest rates on credit standards

	loans to non-financial firms		loans to households for house purchase consumption				loans to non-financial firms		loans to households for house purchase consumption			
	total credit standards						credit standards due to bank balance sheet constraints					
	1	2	3	4	5	6	7	8	9	10	11	12
Overnight rate t-1	24.889 [7.16]***	22.157 [8.92]***	13.066 [6.25]***	11.507 [7.43]***	8.237 [4.23]***	8.172 [5.54]***	9.038 [6.42]***	9.084 [8.31]***	5.316 [4.69]***	5.488 [5.05]***	3.568 [4.03]***	4.04 [5.36]***
GDP growth t-1		-3.151 [4.98]***		-4.459 [6.36]***		-1.861 [3.71]***		-1.999 [5.79]***		-1.125 [4.56]***		-0.561 [3.31]***
Inflation t-1		5.268 [3.31]***		3.628 [2.72]***		2.754 [2.34]**		2.571 [2.91]***		2.469 [3.38]***		2.579 [4.70]***
country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
# of observations	312	312	312	312	312	312	312	312	312	312	312	312
# of countries	12	12	12	12	12	12	12	12	12	12	12	12
Wald Chi ²	71.35***	193.71***	96.08***	190.96***	63.33***	122.66***	51.6***	133.8***	37.62***	80.43***	34.03***	99.52***

Table 2, Panel A, shows the results of a GLS panel regression where the dependent variable *total credit standards* (columns 1 to 6) is the net percentage of banks in each country reporting a tightening of credit standards in the Bank Lending Survey (BLS) for the approval of loans or credit lines to enterprises and households. They are the answers to Questions 1 and 8 of the BLS (see Appendix A). Columns 7 to 12 show the results of a GLS panel regression where the dependent variable *credit standards due to bank balance sheet constraints* is the net percentage of banks in each country reporting a tightening of credit standards due to bank balance sheet constraints. They are the answers to Questions 2, 9 and 11 of the BLS (see Appendix A). The overnight rate is the quarterly average of the daily overnight rate (EONIA). GDP growth is the annual growth rate of real GDP for each country. Inflation is the quarterly average of inflation rates for each country. See Section II and Appendix B for a detailed description of the variables and the data sources. All the explanatory variables are lagged by one quarter. The panel includes data for 12 euro area countries (Austria, Belgium, France, Finland, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain). The test statistics are in brackets. *, ** and *** denote statistical significance at the 10%, 5% and 1% level respectively. All the panel regressions include country fixed effects and standard errors corrected for autocorrelation and correlation across countries.

Table 2, Panel B: the impact of differences in monetary policy stance on credit standards

	loans to non-financial firms	loans to households for house purchase	loans to households for consumption	loans to non-financial firms	loans to households for house purchase	loans to households for consumption						
	total credit standards			credit standards due to bank balance sheet constraints								
	1	2	3	4	5	6	7	8	9	10	11	12
Taylor-rate difference t-1	5.046 [3.53]***	8.22 [6.19]***	4.757 [5.67]***	4.508 [7.58]***	4.652 [7.92]***	2.596 [3.34]***	2.41 [4.88]***	2.895 [5.71]***	0.333 [0.41]	1.281 [4.87]***	1.653 [4.42]***	-0.516 [0.85]
# of expansive periods t-1					-0.174 [2.09]**	-0.157 [1.53]		-0.336 [7.53]***	-0.444 [5.62]***		-0.267 [7.60]***	-0.378 [6.27]***
country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
time fixed effects	no	no	no	no	no	yes	no	no	yes	no	no	yes
# of observations	312	312	312	312	312	312	312	312	312	312	312	312
# of countries	12	12	12	12	12	12	12	12	12	12	12	12
Wald Chi ²	24.7**	101.55***	86.41***	70.28***	78.73***	17458***	42.25***	82.85***	16343***	39.95***	83.76***	32256***

Table 2, Panel B, shows the results of a GLS panel regression where in Columns 1 to 3 the dependent variable *total credit standards* is the net percentage of banks in each country reporting a tightening of credit standards in the Bank Lending Survey (BLS) for the approval of loans or credit lines to enterprises and households. They are the answers to Questions 1 and 8 of the BLS (see Appendix A). In Columns 4 to 12 the dependent variable *credit standards due to bank balance sheet constraints* is the net percentage of banks in each country reporting a tightening of credit standards due to bank balance sheet constraints. They are the answers to Questions 2, 9 and 11 of the BLS (see Appendix A). Taylor-rate difference is the difference between the 3-month Euribor (common across countries) and a country specific Taylor-rule implied rate. The number of expansive periods is a proxy for periods of expansive monetary policy. See Section II and Appendix B for a detailed description of the variables and the data sources. All the explanatory variables are lagged by one quarter. The panel includes data for 12 euro area countries (Austria, Belgium, France, Finland, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain). The test statistics are in brackets. *, ** and *** denote statistical significance at the 10%, 5% and 1% level respectively. All the panel regressions include country fixed effects and standard errors corrected for autocorrelation and correlation across countries.

Table 3, Panel A: the impact of short- and long-term interest rates on total credit standards

	loans to non-financial firms		loans to households for			
			house purchase	consumption		
	total credit standards					
	1	2	3	4	5	6
Overnight rate t-1		20.562		7.998		8.589
		[7.61]***		[6.66]***		[5.06]***
10-year rate t-1	12.685	4.913	14.774	11.311	3.666	-1.243
	[3.34]***	[1.35]	[8.56]***	[6.12]***	[1.78]*	[0.54]
GDP growth t-1	-3.026	-3.22	-4.599	-4.616	-1.901	-1.843
	[4.56]***	[5.14]***	[8.06]***	[8.07]***	[3.95]***	[3.67]***
Inflation t-1	7.82	5.283	4.58	3.78	4.113	2.788
	[4.69]***	[3.31]***	[4.39]***	[3.83]***	[3.56]***	[2.36]**
country fixed effects	yes	yes	yes	yes	yes	yes
# of observations	312	312	312	312	312	312
# of countries	12	12	12	12	12	12
Wald Chi ²	90.7***	210.51***	248.93***	362.71***	96.96***	122.59***

Table 3, Panel A shows the results of a GLS panel regression where the dependent variable *total credit standards* is the net percentage of banks in each country reporting a tightening of credit standards in the Bank Lending Survey (BLS) for the approval of loans or credit lines to enterprises and households. They are the answers to Questions 1 and 8 of the BLS (see Appendix A). The overnight rate is the quarterly average of the daily overnight rate (EONIA). The 10-year rate is the long-term government bond interest rate in each country. GDP growth is the annual growth rate of real GDP for each country. Inflation is the quarterly average of inflation rates for each country. See Section II and Appendix B for a detailed description of the variables and the data sources. All explanatory variables are lagged by one quarter. The panel includes data for 12 euro area countries (Austria, Belgium, France, Finland, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain). The test statistics are in brackets. *, ** and *** denote statistical significance at the 10%, 5% and 1% level respectively. All the panel regressions include country fixed effects and standard errors corrected for autocorrelation and correlation across countries.

Table 3, Panel B: the impact of short- and long-term interest rates on credit standards depending on different factors

Non-financial firms

	balance sheet constraints	capital position	liquidity position	market financing	bank competition	non-bank competition	market fin competition	economic conditions	industry/firm outlook	risk on collateral
	1	2	3	4	5	6	7	8	9	10
Overnight rate $t-1$	7.805 [7.53]***	6.102 [4.55]***	8.226 [7.74]***	10.206 [6.96]***	10.6 [5.24]***	2.177 [3.44]***	3.877 [5.75]***	22.94 [6.71]***	17.599 [4.38]***	6.859 [4.38]***
10-year rate $t-1$	3.369 [2.57]**	4.74 [2.41]**	2.106 [1.40]	3.245 [1.81]*	6.492 [2.28]**	0.088 [0.09]	0.734 [0.71]	-0.226 [0.06]	5.742 [1.43]	8.447 [3.74]***
GDP growth $t-1$	-2.063 [5.99]***	-2.373 [5.08]***	-1.847 [5.09]***	-1.981 [4.49]***	-2.146 [3.86]***	-0.284 [1.21]	-0.535 [2.54]**	-3.393 [4.45]***	-4.963 [8.75]***	-3.695 [7.99]***
Inflation $t-1$	2.481 [3.04]***	0.303 [0.32]	2.481 [3.03]***	3.901 [3.64]***	-1.288 [1.00]	-0.936 [2.25]**	-1.824 [4.60]***	5.671 [2.97]***	3.249 [2.05]**	1.969 [2.03]**
country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
# of observations	312	312	312	312	312	312	312	312	312	312
# of countries	12	12	12	12	12	12	12	12	12	12
Wald Chi ²	161.33***	137.35***	163.57***	136.8***	127.49***	34.38**	98.69***	138.6***	245.96***	169.37***

Households

	for house purchase					for consumer loans					
	balance sheet constraints	bank competition	non-bank competition	economic conditions	housing mkt prospects	balance sheet constraints	bank competition	non-bank competition	economic conditions	credit worthiness	risk on collateral
	1	2	3	4	5	6	7	8	9	10	11
Overnight rate $t-1$	5.167 [4.38]***	3.699 [3.04]***	0.777 [3.72]***	8.304 [4.61]***	7.783 [5.10]***	4.262 [5.11]***	1.654 [2.33]**	0.834 [3.21]***	9.298 [5.08]***	8.854 [5.71]***	5.28 [6.07]***
10-year rate $t-1$	0.854 [0.67]	3.225 [1.91]*	0.526 [1.78]*	1.511 [0.70]	5.94 [2.99]***	-0.563 [0.58]	2.649 [2.56]**	0.073 [0.19]	-2.67 [1.31]	-5.071 [2.50]**	1.993 [1.73]*
GDP growth $t-1$	-1.106 [4.48]***	-1.922 [4.10]***	-0.072 [2.23]**	-4.109 [9.12]***	-3.101 [7.82]***	-0.571 [3.36]***	-1.751 [6.28]***	0.005 [0.09]	-2.954 [7.80]***	-3.157 [7.19]***	-1.886 [7.46]***
Inflation $t-1$	2.429 [3.30]***	-0.981 [0.98]	-0.144 [2.83]***	4.556 [4.19]***	3.939 [4.01]***	2.582 [4.67]***	0.245 [0.38]	-0.18 [1.16]	2.564 [2.68]***	0.645 [0.64]	1.629 [2.42]**
country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
# of observations	312	312	312	312	312	312	312	312	312	312	312
# of countries	12	12	12	12	12	12	12	12	12	12	12
Wald Chi ²	79.55***	106.15***	91.69***	214.26***	351.72***	98.79***	121.21***	90.4***	144.83***	183.94***	205.36***

Table 3, Panel B shows the results of a GLS panel regression where the dependent variable is the net percentage of banks in each country reporting a tightening of credit standards in the Bank Lending Survey (BLS) for the approval of loans or credit lines to enterprises and households due to the specific factor reported in the heading. They are the answers to Questions 2, 9 and 11 of the BLS (see Appendix A). The overnight rate is the quarterly average of the daily overnight rate (EONIA). The 10-year rate is the long-term government bond interest rate in each country. GDP growth is the annual growth rate of real GDP for each country. Inflation is the quarterly average of inflation rates for each country. See Section II and Appendix B for a detailed description of the variables and the data sources. All explanatory variables are lagged by one quarter. The panel includes data for 12 euro area countries (Austria, Belgium, France, Finland, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain). The test statistics are in brackets. *, ** and *** denote statistical significance at the 10%, 5% and 1% level respectively. All the panel regressions include country fixed effects and standard errors corrected for autocorrelation and correlation across countries.

Table 3, Panel C: the impact of short- and long-term interest rates on terms and conditions of loans

Non-financial firms

	margin on		non-interest rate	loan	collateral	loan	loan
	average loans	riskier loans	charges	size	requirements	covenants	maturity
	1	2	3	4	5	6	7
Overnight rate t-1	21.505 [4.85]***	15.227 [3.87]***	4.932 [3.88]***	9.215 [4.51]***	9.19 [5.56]***	10.357 [7.28]***	9.67 [3.62]***
10-year rate t-1	8.254 [1.44]	11.805 [2.24]**	3.583 [1.91]*	9.528 [3.55]***	8.811 [4.04]***	5.099 [2.61]***	5.56 [1.63]
GDP growth t-1	-5.843 [7.24]***	-5.203 [7.23]***	-2.884 [8.20]***	-3.425 [6.46]***	-3.559 [7.40]***	-3.886 [7.57]***	-2.166 [4.10]***
Inflation t-1	3.702 [1.76]*	3.543 [1.93]*	2.307 [2.36]**	3.621 [3.09]***	3.848 [2.85]***	1.482 [1.67]*	2.097 [1.48]
country fixed effects	yes	yes	yes	yes	yes	yes	yes
# of observations	312	312	312	312	312	312	312
# of countries	12	12	12	12	12	12	12
Wald Chi ²	168.43***	239.81***	160***	206.34***	222.96***	246.22***	74.51***

Households

	for house purchase						for consumer loans				
	margin on		collateral	loan	loan	non-interest rate	margin on		collateral	loan	non-interest rate
	average loans	riskier loans	requirements	to value ratio	maturity	charges	average loans	riskier loans	requirements	maturity	charges
	1	2	3	4	5	6	7	8	9	10	11
Overnight rate t-1	13.352 [4.49]***	12.303 [5.82]***	6.291 [8.41]***	9.55 [5.53]***	5.071 [5.26]***	0.614 [0.79]	14.028 [7.65]***	8.635 [4.23]***	3.611 [4.82]***	3.432 [4.72]***	2.019 [2.92]***
10-year rate t-1	5.035 [1.32]	2.105 [0.80]	0.941 [0.89]	-0.102 [0.04]	1.081 [0.69]	4.345 [3.49]***	0.711 [0.26]	0.827 [0.32]	-1.134 [1.07]	0.009 [0.01]	1.635 [1.46]
GDP growth t-1	-3.352 [4.06]***	-3.406 [6.64]***	-1.531 [7.54]***	-2.761 [5.83]***	-2.074 [6.02]***	-1.305 [5.55]***	-3.365 [6.41]***	-2.518 [6.09]***	-1.358 [6.20]***	-1.621 [7.08]***	-1.231 [5.48]***
Inflation t-1	2.308 [1.14]	0.542 [0.38]	1.13 [2.04]**	0.782 [0.65]	1.044 [1.21]	-0.981 [1.66]*	-0.502 [0.39]	1.864 [1.50]	2.406 [4.55]***	1.986 [3.39]***	-0.241 [0.55]
country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
# of observations	312	312	312	312	312	312	312	312	312	312	312
# of countries	12	12	12	12	12	12	12	12	12	12	12
Wald Chi ²	94.99***	147.6***	257.86***	140.25***	204.81***	89.08***	253.91***	144.31***	148.14***	173.21***	114.05***

Table 3, Panel C shows the results of a GLS panel regression where the dependent variable is the net percentage of banks in each country reporting a tightening of terms and conditions for loans to enterprises and households as reported in the Bank Lending Survey (BLS). They are the answers to Questions 3, 10 and 12 of the BLS (see Appendix A). The overnight rate is the quarterly average of the daily overnight rate (EONIA). The 10-year rate is the long-term government bond interest rate in each country. GDP growth is the annual growth rate of real GDP for each country. Inflation is the quarterly average of inflation rates for each country. See Section II and Appendix B for a detailed description of the variables and the data sources. All explanatory variables are lagged by one quarter. The panel includes data for 12 euro area countries (Austria, Belgium, France, Finland, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain). The test statistics are in brackets. *, ** and *** denote statistical significance at the 10%, 5% and 1% level respectively. All the panel regressions include country fixed effects and standard errors corrected for autocorrelation and correlation across countries.

Table 4, Panel A: the impact of securitization, short- and long-term interest rates on total credit standards

							Securitization					
							1					
							0.177					
							[7.44]***					
Securitization regulation												
country fixed effects							no					
# of observations							312					
# of countries							12					
Wald Chi2							55.32***					
	loans to non-financial firms			loans to households for house purchase			loans to non-financial firms			loans to households for house purchase		
	total credit standards			total credit standards			total credit standards			total credit standards		
	1	2	3	4	5	6	7	8	9	10	11	12
Overnight rate t-1	13.29		1.231		1.71		10.154		-8.987		-8.779	
	[3.96]***		[0.67]		[0.92]		[1.91]*		[1.51]		[2.15]**	
10-year rate t-1	6.174	-13.467	12.516	-0.314	-0.796	-9.156	1.388	-19.099	4.805	-8.15	1.2	-8.763
	[1.32]	[1.43]	[4.46]***	[0.03]	[0.30]	[1.14]	[0.18]	[1.81]*	[0.53]	[0.61]	[0.21]	[0.93]
Securitization t-1	-10.575	-7.521	-9.714	-12.375	-12.603	-9.432	-25.526	-14.216	-41.925	-31.841	-24.915	-18.894
	[2.44]**	[1.78]*	[1.68]*	[1.67]*	[2.64]***	[1.73]*	[1.86]*	[1.04]	[2.80]***	[1.67]*	[2.37]**	[1.72]*
Overnight rate*securitization t-1	4.246	4.387	4.85	4.199	4.282	4.275	5.719	5.912	8.265	8.701	8.992	9.412
	[5.31]***	[5.96]***	[4.49]***	[3.06]***	[4.66]***	[4.27]***	[2.18]**	[2.29]**	[2.94]***	[2.34]**	[4.30]***	[4.07]***
10-year rate*securitization t-1	-0.942	-1.287	-1.756	-0.594	-0.505	-1.088	1.841	0.167	2.985	3.262	-1.735	-2.643
	[0.79]	[1.14]	[1.09]	[0.29]	[0.40]	[0.78]	[0.48]	[0.04]	[0.70]	[0.60]	[0.58]	[0.86]
GDP growth t-1	-3.5	-0.418	-4.448	-2.621	-2.195	0.595	-3.262	-0.817	-4.392	-2.592	-1.867	0.383
	[5.53]***	[0.56]	[9.14]***	[2.66]***	[4.58]***	[0.92]	[5.27]***	[1.04]	[6.99]***	[2.77]***	[3.77]***	[0.40]
Inflation t-1	5.508	1.373	4.489	-0.348	3.779	-0.47	5.764	1.735	4.342	-0.643	3.694	0.873
	[3.56]***	[0.78]	[5.08]***	[0.15]	[3.33]***	[0.25]	[3.65]***	[0.88]	[3.96]***	[0.28]	[3.14]***	[0.45]
country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
time fixed effects	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
# of observations	312	312	312	312	312	312	312	312	312	312	312	312
# of countries	12	12	12	12	12	12	12	12	12	12	12	12
Wald Chi ²	296.09***	10765***	602.91***	7658***	166.52***	10230***	226.39***	6642***	347***	3311***	143.49***	4865***

Table 4, Panel A shows the results of a GLS panel regression where the dependent variable, *total credit standards* is the net percentage of banks in each country reporting a tightening of credit standards in the Bank Lending Survey (BLS) for the approval of loans or credit lines to enterprises and households. They are the answers to Questions 1 and 8 of the BLS (see Appendix A). The overnight rate is the quarterly average of the daily overnight rate (EONIA). The 10-year rate is the long-term government bond interest rate in each country. In Columns 1 to 6 securitization is defined as the total securitization activity in each country divided by the outstanding amount of loans. Columns 7 to 12 show results of the second-stage IV regression where securitization is the component of actual securitization predicted by securitization regulation. The results of the first-stage IV regression are reported above column 7. Securitization regulation is a country indicator constructed using the regulation surrounding the market for securitization. GDP growth is the annual growth rate of real GDP for each country. Inflation is the quarterly average of inflation rates for each country. See Section II, Appendix B and C for a detailed explanation of the variables and the data sources. All the explanatory variables are lagged by one quarter. The panel includes data for 12 euro area countries (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain). The test statistics are in brackets. *, ** and *** denote statistical significance at the 10%, 5% and 1% level respectively. All the panel regressions include country fixed effects and standard errors corrected for autocorrelation and correlation across countries.

Table 4, Panel B: the impact of securitization, short- and long-term interest rates on credit standards depending on different factors

Non-financial firms

	balance sheet constraints		capital position		liquidity position		market financing		bank competition		non-bank competition		market fin competition		economic conditions		industry/firm outlook		risk on collateral	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Overnight rate t-1	7.339 [5.96]***		5.194 [3.18]***		7.954 [6.56]***		10.292 [6.20]***		11.392 [4.41]***		0.823 [0.74]		2.264 [2.59]***		19.123 [4.65]***		15.09 [3.24]***		4.589 [2.53]**	
10-year rate t-1	4.658 [2.80]***	-3.15 [0.71]	5.314 [2.20]**	2.717 [0.36]	4.932 [2.75]***	-13.472 [2.58]***	4.4 [2.03]**	4.374 [0.80]	9.192 [2.44]**	5.252 [0.71]	1.632 [0.98]	-0.683 [0.24]	1.238 [0.94]	0.744 [0.16]	0.53 [0.11]	-21.637 [2.16]**	8.754 [1.65]*	-4.267 [0.65]	6.603 [2.35]**	5.526 [0.85]
Securitization t-1	3.235 [1.35]	6.276 [2.64]***	-0.399 [0.13]	1.935 [0.58]	8.137 [3.21]***	8.592 [3.30]***	3.204 [1.04]	5.397 [1.64]	5.531 [1.23]	7.559 [1.48]	0.104 [0.06]	-0.394 [0.20]	-1.373 [0.78]	-1.062 [0.49]	-7.529 [1.30]	-8.295 [1.38]	-2.069 [0.43]	0.921 [0.19]	-8.05 [2.08]**	-0.642 [0.14]
Overnight rate*securitization t-1	0.092 [0.18]	0.215 [0.46]	0.521 [0.92]	1.003 [1.54]	-0.157 [0.32]	-0.808 [1.66]*	-0.027 [0.04]	0.105 [0.15]	-0.368 [0.44]	0.131 [0.14]	0.659 [1.89]*	1.011 [2.77]***	0.914 [2.81]***	0.733 [1.86]*	2.151 [1.96]**	2.269 [2.02]**	1.187 [1.27]	2.339 [2.66]***	1.351 [1.92]*	2.245 [2.79]***
10-year rate*securitization t-1	-0.722 [1.14]	-1.166 [1.94]*	-0.282 [0.34]	-0.761 [0.87]	-1.527 [2.20]**	-0.845 [1.22]	-0.91 [1.11]	-1.432 [1.63]	-1.189 [1.03]	-2.091 [1.61]	-0.572 [1.10]	-0.852 [1.48]	-0.418 [0.83]	-0.312 [0.50]	-0.056 [0.04]	0.688 [0.44]	-0.766 [0.61]	-1.627 [1.25]	1.024 [1.02]	-0.787 [0.65]
GDP growth t-1	-2.018 [5.76]***	-0.803 [1.62]	-2.354 [4.90]***	-0.586 [0.81]	-1.671 [4.55]***	-1.078 [2.03]**	-2.07 [4.65]***	-1.565 [2.82]***	-2.201 [3.91]***	0.249 [0.31]	-0.358 [1.43]	-0.515 [1.54]	-0.482 [2.17]**	-0.669 [1.58]	-3.694 [4.72]***	-0.728 [0.92]	-5.225 [9.03]***	-3.133 [3.27]***	-3.745 [7.87]***	-0.411 [0.78]
Inflation t-1	2.563 [3.10]***	-0.547 [0.45]	0.333 [0.35]	-3.399 [2.23]**	2.441 [3.02]***	0.205 [0.15]	3.765 [3.53]***	1.044 [0.64]	-1.245 [0.97]	2.829 [1.56]	-0.894 [1.88]*	-0.655 [0.94]	-1.522 [3.80]***	-1.583 [2.25]**	5.785 [3.03]***	0.537 [0.23]	3.325 [2.13]**	-0.394 [0.24]	2.591 [2.57]**	-0.583 [0.41]
country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
time fixed effects	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
# of observations	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312
# of countries	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Wald Chi ²	156***	15892***	139***	9171***	172***	11481***	143***	24655***	138***	8103***	38.97**	5019***	101***	36566***	162***	14254***	279***	10832***	197***	17437***

Table 4, Panel B shows the results of a GLS panel regression where the dependent variable is the net percentage of banks in each country reporting a tightening of credit standards in the Bank Lending Survey (BLS) for the approval of loans or credit lines to enterprises due to the specific factor reported in the heading. They are the answers to Question 2 of the BLS (see Appendix A). The overnight rate is the quarterly average of the daily overnight rate (EONIA). The 10-year rate is the long-term government bond interest rate in each country. Securitization is defined as the total securitization activity in each country divided by the outstanding amount of loans. GDP growth is the annual growth rate of real GDP for each country. Inflation is the quarterly average of inflation rates for each country. See Section II and Appendix B for a detailed explanation of the variables and the data sources. All the explanatory variables are lagged by one quarter. The panel includes data for 12 euro area countries (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain). The test statistics are in brackets. *, ** and *** denote statistical significance at the 10%, 5% and 1% level respectively. All the panel regressions include country fixed effects and standard errors corrected for autocorrelation and correlation across countries.

Table 4, Panel B: the impact of securitization, short- and long-term interest rates on credit standards depending on different factors

Households

	for house purchase										for consumer loans											
	balance sheet constraints		bank competition		non-bank competition		economic conditions		housing mkt prospects		balance sheet constraints		bank competition		non-bank competition		economic conditions		credit worthiness		risk on collateral	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Overnight rate t-1	1.874 [1.47]		1.167 [0.58]		-0.069 [0.53]		-0.656 [0.35]		-1.447 [0.79]		0.235 [0.23]		1.856 [1.66]*		0.607 [2.34]**		3.354 [1.90]*		2.364 [1.51]		0.368 [0.30]	
10-year rate t-1	4.638 [2.95]***	3.359 [0.84]	7.497 [2.66]***	1.35 [0.19]	0.229 [1.27]	-3.405 [1.55]	6.316 [2.59]***	21.007 [3.47]***	9.624 [3.81]***	19.652 [2.63]***	1.792 [1.43]	-1.914 [0.35]	1.53 [0.91]	2.151 [0.50]	0.283 [0.67]	0.363 [0.20]	0.63 [0.28]	8.699 [1.45]	-4.697 [2.10]**	-7.921 [1.11]	0.445 [0.28]	5.83 [1.48]
Securitization t-1	2.398 [1.02]	3.406 [1.40]	5.798 [1.65]*	9.762 [2.46]**	-2.837 [4.03]***	-3.668 [2.76]***	-7.56 [1.68]*	-10.926 [2.35]**	-12.369 [3.03]***	-12.184 [2.52]**	-1.401 [0.67]	-2.39 [0.89]	-3.532 [1.22]	-1.838 [0.50]	0.451 [0.35]	0.89 [0.66]	-2.212 [0.53]	-1.974 [0.40]	-10.966 [2.92]***	-15.38 [3.26]***	-13.071 [4.21]***	-10.836 [2.61]***
Overnight rate*securitization t-1	1.663 [2.90]***	1.753 [2.96]***	0.945 [1.30]	0.308 [0.39]	0.745 [3.66]***	0.728 [2.70]***	5.376 [5.53]***	6.387 [7.00]***	5.537 [6.30]***	5.624 [5.50]***	2.163 [4.77]***	2.252 [3.65]***	-0.016 [0.03]	-0.067 [0.09]	0.382 [1.61]	0.376 [1.55]	4.015 [4.42]***	4.134 [4.02]***	4.25 [5.68]***	4.579 [5.53]***	2.651 [4.11]***	3.154 [3.74]***
10-year rate*securitization t-1	-1.794 [2.95]***	-1.998 [3.13]***	-1.723 [1.88]*	-2.045 [1.93]*	0.099 [0.54]	0.295 [0.81]	-2.286 [1.94]*	-2.438 [2.04]**	-1.431 [1.35]	-1.814 [1.46]	-1.162 [2.11]**	-1.029 [1.43]	0.608 [0.74]	0.229 [0.22]	-0.41 [1.13]	-0.573 [1.53]	-2.459 [2.24]**	-2.829 [2.28]**	-0.667 [0.68]	0.134 [0.11]	1.178 [1.38]	0.616 [0.57]
GDP growth t-1	-1.072 [4.40]***	-0.588 [1.83]*	-1.817 [3.88]***	0.267 [0.42]	-0.057 [1.18]	0.13 [0.68]	-4.227 [8.76]***	-1.738 [2.81]***	-3.738 [9.67]***	-2.291 [3.75]***	-0.644 [3.88]***	0.013 [0.04]	-1.777 [6.26]***	-1.182 [2.68]***	-0.004 [0.07]	0.249 [1.73]*	-3.154 [7.81]***	-0.46 [0.84]	-3.232 [7.00]***	-1.212 [1.77]*	-2.082 [8.26]***	-0.516 [1.27]
Inflation t-1	2.673 [4.03]***	0.873 [0.93]	-0.656 [0.64]	-0.849 [0.51]	-0.001 [0.01]	-0.746 [2.26]**	5.743 [5.46]***	2.733 [1.69]*	4.8 [5.38]***	2.598 [1.66]*	2.901 [4.92]***	0.451 [0.52]	-0.001 [0.00]	0.068 [0.05]	-0.152 [1.02]	-0.61 [1.47]	3.118 [3.48]***	1.616 [1.14]	1.728 [1.81]*	-1.413 [0.91]	2.558 [3.73]***	-1.491 [1.26]
country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
time fixed effects	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
# of observations	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312
# of countries	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Wald Chi ²	99***	13387***	117***	7875***	100***	31317***	328***	7292***	569***	10941***	122***	32989***	125***	10018***	90***	25091***	180***	30257***	283***	17643***	295***	23571***

Table 4, Panel B shows the results of a GLS panel regression where the dependent variable is the net percentage of banks in each country reporting a tightening of credit standards in the Bank Lending Survey (BLS) for the approval of loans to households due to the specific factor reported in the heading. They are the answers to Question 9 and 11 of the BLS (see Appendix A). The overnight rate is the quarterly average of the daily overnight rate (EONIA). The 10-year rate is the long-term government bond interest rate in each country. Securitization is defined as the total securitization activity in each country divided by the outstanding amount of loans. GDP growth is the annual growth rate of real GDP for each country. Inflation is the quarterly average of inflation rates for each country. See Section II and Appendix B for a detailed explanation of the variables and the data sources. All the explanatory variables are lagged by one quarter. The panel includes data for 12 euro area countries (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain). The test statistics are in brackets. *, ** and *** denote statistical significance at the 10%, 5% and 1% level respectively. All the panel regressions include country fixed effects and standard errors corrected for autocorrelation and correlation across countries.

Table 4, Panel C: the impact of securitization, short- and long-term interest rates on terms and conditions for loans

Non-financial firms

	margin on				non-interest		loan		collateral		loan		loan	
	average loans		riskier loans		rate charges		size		requirements		covenants		maturity	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Overnight rate t-1	15.449 [3.26]***		15.184 [3.37]***		4.669 [2.80]***		7.354 [2.57]**		5.16 [2.15]**		7.571 [3.34]***		6.335 [2.01]**	
10-year rate t-1	9.205 [1.41]	-4.003 [0.35]	11.585 [1.80]*	2.475 [0.26]	0.398 [0.17]	-11.07 [1.63]	6.376 [1.63]	1.138 [0.17]	10.481 [3.16]***	-5.011 [0.65]	1.701 [0.53]	-18.314 [1.83]*	3.757 [0.89]	-10.779 [1.53]
Securitization t-1	-6.22 [1.21]	-3.244 [0.52]	-2.628 [0.40]	-0.764 [0.10]	-9.748 [2.42]**	-12.64 [2.19]**	-10.348 [2.42]**	-9.733 [1.84]*	-3.681 [0.83]	-4.211 [0.85]	-11.332 [3.09]***	-11.284 [2.28]**	-12.371 [2.77]***	-8.233 [1.63]
Overnight rate*securitization t-1	3.28 [3.17]***	4.155 [3.55]***	0.054 [0.05]	0.515 [0.33]	0.282 [0.36]	0.578 [0.55]	0.89 [1.14]	0.553 [0.54]	2.775 [3.31]***	3.38 [3.82]***	1.377 [2.08]**	0.975 [1.10]	1.959 [2.23]**	2.758 [2.82]***
10-year rate*securitization t-1	-1.12 [0.81]	-1.95 [1.17]	0.363 [0.21]	0.302 [0.14]	2.154 [1.92]*	3.072 [2.02]**	1.55 [1.36]	1.876 [1.28]	-1.369 [1.16]	-1.137 [0.89]	1.391 [1.41]	2.139 [1.60]	1.24 [1.03]	0.064 [0.05]
GDP growth t-1	-6.137 [7.23]***	-2.667 [2.62]***	-5.473 [7.43]***	-2.307 [2.69]***	-2.818 [7.69]***	-1.435 [2.57]**	-3.774 [6.54]***	-0.614 [0.88]	-3.674 [6.44]***	-1.469 [1.91]*	-3.835 [6.87]***	-1.795 [2.38]**	-2.595 [5.17]***	-0.806 [1.30]
Inflation t-1	3.81 [1.84]*	-0.097 [0.04]	3.376 [1.85]*	1.96 [0.95]	2.173 [2.23]**	-0.701 [0.43]	3.254 [2.64]***	-1.549 [0.89]	4.087 [2.88]***	1.247 [0.67]	1.062 [1.17]	-1.773 [1.13]	2.378 [1.74]*	1.758 [1.09]
country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
time fixed effects	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
# of observations	312	312	312	312	312	312	312	312	312	312	312	312	312	312
# of countries	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Wald Chi ²	181.23***	22668***	239.59***	15093***	174.65***	8568***	241.21***	6974***	231.6***	9515***	290.74***	31929***	118.84***	9038***

Table 4, Panel C shows the results of a GLS panel regression where the dependent variable is the net percentage of banks in each country reporting a tightening of credit standards in the Bank Lending Survey (BLS) for terms and conditions of loans or credit lines to enterprises. They are the answers to Question 3 of the BLS (see Appendix A). The overnight rate is the quarterly average of the daily overnight rate (EONIA). The 10-year rate is the long-term government bond interest rate in each country. Securitization is defined as the total securitization activity in each country divided by the outstanding amount of loans. GDP growth is the annual growth rate of real GDP for each country. Inflation is the quarterly average of inflation rates for each country. See Section II and Appendix B for a detailed explanation of the variables and the data sources. All the explanatory variables are lagged by one quarter. The panel includes data for 12 euro area countries (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain). The test statistics are in brackets. *, ** and *** denote statistical significance at the 10%, 5% and 1% level respectively. All the panel regressions include country fixed effects and standard errors corrected for autocorrelation and correlation across countries.

Table 4, Panel C: the impact of securitization, short- and long-term interest rates on terms and conditions for loans

Households

	for house purchase												for consumer loans									
	margin on average loans		margin on riskier loans		collateral requirements		loan to value ratio		loan maturity		non-interest rate charges		margin on average loans		margin on riskier loans		collateral requirements		loan maturity		non-interest rate charges	
	1	2	3	4	5	6	7	8	9	10	11	12	11	12	13	14	15	16	17	18	19	20
Overnight rate t-1	6.512 [1.67]*		7.345 [2.98]***		3.945 [3.55]***		5.549 [3.16]**		3.822 [2.46]**		0.212 [0.16]		11.717 [5.57]***		4.696 [1.98]**		1.371 [1.37]		2.206 [1.83]*		-2.192 [2.38]**	
10-year rate t-1	13.5 [2.56]**	12.128 [1.08]	3.244 [0.96]	-4.493 [0.62]	-1.508 [1.03]	-7.476 [1.41]	-2.949 [1.14]	-12.933 [1.54]	-3.105 [1.31]	-20.485 [2.82]***	4.583 [2.36]**	-3.674 [0.92]	-0.477 [0.15]	-5.945 [0.69]	-0.62 [0.20]	-4.141 [0.69]	0.983 [0.69]	-5.359 [1.18]	-0.18 [0.10]	8.953 [2.26]**	5.105 [3.45]***	-5.286 [1.35]
Securitization t-1	8.355 [1.19]	6.652 [0.86]	-4.603 [0.94]	-6.284 [1.17]	-12.138 [4.21]***	-10.579 [3.06]***	-16.418 [3.22]***	-13.78 [2.53]**	-11.373 [2.94]***	-10.839 [2.56]**	-1.348 [0.44]	-1.022 [0.29]	-7.859 [1.91]*	-5.098 [1.10]	-11.047 [2.14]**	-10.39 [1.82]*	0.651 [0.22]	-0.326 [0.09]	-4.363 [1.60]	-6.024 [1.82]*	1.219 [0.57]	-3.733 [1.35]
Overnight rate*securitization t-1	3.334 [2.34]**	3.479 [2.30]**	3.023 [3.01]***	3.691 [3.84]***	1.694 [2.90]***	1.845 [2.75]***	2.488 [2.68]***	2.563 [2.47]**	0.696 [0.94]	-0.047 [0.06]	0.486 [0.76]	0.726 [1.07]	2.14 [2.95]***	1.655 [1.98]**	2.249 [2.24]**	1.941 [1.83]*	1.481 [2.35]**	1.403 [1.90]*	1.277 [2.23]**	1.999 [3.11]***	2.567 [6.29]***	2.557 [4.89]***
10-year rate*securitization t-1	-4.01 [2.21]**	-3.527 [1.77]*	-0.912 [0.74]	-1.054 [0.79]	1.522 [2.00]**	1.049 [1.16]	2.067 [1.57]	1.526 [1.08]	2.234 [2.05]**	2.992 [2.53]**	-0.306 [0.33]	-0.553 [0.55]	0.031 [0.03]	-0.32 [0.25]	0.944 [0.68]	1.172 [0.77]	-1.388 [1.69]*	-1.223 [1.26]	-0.275 [0.37]	-0.456 [0.52]	-2.32 [3.62]***	-1.055 [1.30]
GDP growth t-1	-3.289 [3.98]***	0.616 [0.59]	-3.475 [6.58]***	-1.343 [1.44]	-1.65 [7.31]***	-0.388 [1.14]	-2.879 [5.87]***	-1.005 [1.36]	-1.911 [5.11]***	-0.471 [0.79]	-1.48 [5.49]***	-1.131 [2.71]***	-3.403 [6.37]***	-0.109 [0.15]	-2.592 [5.96]***	-0.803 [1.55]	-1.505 [6.22]***	-0.629 [1.69]*	-1.905 [6.97]***	-0.201 [0.49]	-1.352 [5.93]***	-0.498 [1.49]
Inflation t-1	3.018 [1.50]	-4.497 [1.59]	1.477 [1.05]	-6.443 [3.68]***	1.462 [2.38]**	-0.141 [0.13]	1.485 [1.29]	-3.087 [1.63]	1.338 [1.42]	0.343 [0.25]	-1.041 [1.65]*	-1.035 [0.96]	0.078 [0.06]	-5.293 [2.54]**	2.611 [2.07]**	-3.011 [1.89]*	2.194 [4.05]***	-0.003 [0.00]	1.813 [2.83]***	0.451 [0.47]	0.307 [0.71]	-0.252 [0.32]
country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
time fixed effects	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
# of observations	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312	312
# of countries	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Wald Chi ²	115***	6605***	187***	9377***	317***	7297***	173***	5401***	201***	3411***	83***	3799***	300***	10228***	167***	16357***	131***	21440***	174***	5322***	181***	9240***

Table 4, Panel C shows the results of a GLS panel regression where the dependent variable is the net percentage of banks in each country reporting a tightening of credit standards in the Bank Lending Survey (BLS) for terms and conditions for loans to households. They are the answers to Questions 10 and 12 of the BLS (see Appendix A). The overnight rate is the quarterly average of the daily overnight rate (EONIA). The 10-year rate is the long-term government bond interest rate in each country. Securitization is defined as the total securitization activity in each country divided by the outstanding amount of loans. GDP growth is the annual growth rate of real GDP for each country. Inflation is the quarterly average of inflation rates for each country. See Section II and Appendix B for a detailed explanation of the variables and the data sources. All the explanatory variables are lagged by one quarter. The panel includes data for 12 euro area countries (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain). The test statistics are in brackets. *, ** and *** denote statistical significance at the 10%, 5% and 1% level respectively. All the panel regressions include country fixed effects and standard errors corrected for autocorrelation and correlation across countries.

Table 5, Panel A: the impact of banking supervision standards for bank capital, short- and long-term interest rates on credit standards due to bank balance-sheet constraints

	loans to non-financial firms				loans to households for							
					house purchase				consumption			
	credit standards due to bank balance sheet constraints				credit standards due to bank balance sheet constraints							
	1	2	3	4	5	6	7	8	9	10	11	12
Taylor-rate difference t-1	5.795 [2.35]**	5.871 [2.37]**	7.338 [3.01]***	4.634 [1.80]*	4.524 [2.27]**	3.971 [1.58]	1.543 [0.73]	2.842 [1.08]	6.843 [3.70]***	6.7 [3.14]***	4.046 [2.08]**	5.386 [2.38]**
10-year rate t-1	12.74 [2.32]**	-9.782 [1.33]	12.435 [2.36]**	-0.908 [0.12]	5.219 [0.97]	-5.857 [0.63]	4.473 [0.81]	-2.158 [0.28]	0.673 [0.18]	-5.753 [0.67]	3.046 [0.77]	-3.095 [0.39]
Capital stringency t-1	3.77 [0.94]	0.954 [0.23]	4.46 [1.17]	5.214 [1.18]	-0.816 [0.20]	-3.705 [0.71]	0.171 [0.04]	0.292 [0.06]	-1.264 [0.47]	-0.041 [0.01]	1.442 [0.50]	1.826 [0.41]
TR difference*Cap stringency t-1	-0.277 [0.58]	-0.692 [1.42]	-0.933 [2.01]**	-0.758 [1.57]	-0.365 [0.96]	-0.931 [1.82]*	-0.102 [0.24]	-0.774 [1.45]	-1.066 [3.22]***	-1.399 [3.18]***	-0.668 [1.77]*	-1.173 [2.54]**
10-year rate*Cap stringency t-1	-1.233 [1.33]	-1.002 [1.05]	-1.151 [1.28]	-1.365 [1.28]	-0.178 [0.18]	0.111 [0.09]	-0.121 [0.12]	-0.489 [0.40]	0.238 [0.38]	-0.161 [0.16]	-0.261 [0.38]	-0.478 [0.46]
country fixed effects	yes	yes	no	no	yes	yes	no	no	yes	yes	no	no
time fixed effects	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
# of observations	312	312	312	312	312	312	312	312	312	312	312	312
# of countries	12	12	12	12	12	12	12	12	12	12	12	12
Wald Chi ²	82.54***	12039***	31.43***	10833***	88.47***	23211***	14.61**	6153***	44.98***	20482***	8.84	11928***

Table 5, Panel A shows the results of a GLS panel regression where the dependent variable *credit standards due to bank balance sheet constraints* is the net percentage of banks in each country reporting a tightening of credit standards in the Bank Lending Survey (BLS) due to bank balance sheet constraints for loans or credit lines to non-financial firms and households. They are the answers to Questions 2, 9 and 11 of the BLS (see Appendix A). Taylor-rate difference is the difference between the 3-month Euribor (common across countries) and a country specific Taylor-rule implied rate. The 10-year rate is the long-term government bond interest rate in each country. Capital stringency is an index of stringency of capital requirements in each country. See Section II, Appendix B and C for a detailed explanation of the variables and the data sources. All the explanatory variables are lagged by one quarter. The panel includes data for 12 euro area countries (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain). The test statistics are in brackets. *, ** and *** denote statistical significance at the 10%, 5% and 1% level respectively. All the panel regressions include standard errors corrected for autocorrelation and correlation across countries.

Table 5, Panel B: the impact of banking supervision standards for bank capital and short-term rates on credit standards due to bank balance-sheet constraints

	loans to non-financial firms				loans to households for							
					house purchase				consumption			
	credit standards due to bank balance sheet constraints				credit standards due to bank balance sheet constraints							
	1	2	3	4	5	6	7	8	9	10	11	12
Taylor-rate difference t-1	6.813 [2.86]***	4.602 [1.82]*	6.778 [2.84]***	4.958 [2.08]**	3.809 [3.22]***	2.562 [1.64]	1.676 [1.35]	1.335 [0.90]	4.178 [4.03]***	4.094 [3.07]***	2.093 [1.74]*	3.195 [2.24]**
Capital stringency t-1	-1.687 [2.35]**	-2.56 [2.48]**	-0.44 [0.66]	-0.566 [0.96]	-1.961 [2.64]***	-2.795 [3.41]***	-0.501 [0.74]	-1.396 [1.91]*	-0.191 [0.51]	-0.184 [0.31]	0.648 [1.25]	0.339 [0.56]
TR difference*Cap stringency t-1	-0.431 [0.93]	-0.4 [0.82]	-0.853 [1.86]*	-0.857 [1.77]*	-0.621 [2.79]***	-0.595 [1.90]*	-0.325 [1.33]	-0.393 [1.33]	-0.712 [4.01]***	-0.887 [3.30]***	-0.374 [1.59]	-0.669 [2.38]**
country fixed effects	yes	yes	no	no	yes	yes	no	no	yes	yes	no	no
time fixed effects	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
# of observations	312	312	312	312	312	312	312	312	312	312	312	312
# of countries	12	12	12	12	12	12	12	12	12	12	12	12
Wald Chi ²	77.82***	13647***	18.61***	12170***	33.91**	22153***	2.23	7005***	39.61***	22497***	5.47	13029***

Table 5, Panel B shows the results of a GLS panel regression where the dependent variable *credit standards due to bank balance sheet constraints* is the net percentage of banks in each country reporting a tightening of credit standards in the Bank Lending Survey (BLS) due to bank balance sheet constraints for loans or credit lines to non-financial firms and households. They are the answers to Questions 2, 9 and 11 of the BLS (see Appendix A). Taylor-rate difference is the difference between the 3-month Euribor (common across countries) and a country specific Taylor-rule implied rate. Capital stringency is an index of stringency of capital requirements in each country. See Section II, Appendix B and C for a detailed explanation of the variables and the data sources. All the explanatory variables are lagged by one quarter. The panel includes data for 12 euro area countries (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain). The test statistics are in brackets. *, ** and *** denote statistical significance at the 10%, 5% and 1% level respectively. All the panel regressions include standard errors corrected for autocorrelation and correlation across countries.

Appendix A

The Bank Lending Survey (BLS) dataset

1. Questions on changes to total credit standards (Q1 and Q8)

QUESTION	MARKET SEGMENT	VARIABLE	DEFINITION
Over the past three months, how have your bank's credit standards as applied to the approval of loans...	or credit lines to enterprises changed? (Q1)	Net percentage of banks reporting a tightening of credit standards	Difference between the sum of banks answering "tightened considerably" and "tightened somewhat" and the sum of banks answering "eased somewhat" and "eased considerably" in percentage of the total number of banks.
	to households changed? (Q8)		

2. Questions on factors affecting changes in credit standards (Q2, Q9 and Q11)

QUESTION	FACTORS	VARIABLE	DEFINITION
Q2 Over the past three months, how have the following factors affected your bank's credit standards as applied to the approval of loans or credit lines to enterprises?	A. Costs of funds and balance sheet constraints	Net percentage of banks reporting that each of these factors has contributed to the tightening of standards to enterprises. The variable <i>balance sheet constraints</i> is the average of the answers for the factors included in A.	Difference between the sum of the banks answering "contributed considerably to tightening" and "contributed somewhat to tightening" and the sum of the banks answering "contributed somewhat to easing" and "contributed considerably to easing" in percentage of the total number of banks.
	Costs related to your bank's capital position		
	Your bank's ability to access market financing		
	Your bank's liquidity position		
	B. Pressure from competition		
	Competition from other banks		
	Competition from non-banks		
	Competition from market financing		
	C. Perception of risk		
	Expectations regarding general economic activity		
Q9 Over the past three months, how have the following factors affected your bank's credit standards as applied to the approval of loans to households for house purchase?	Industry or firm-specific outlook	Net percentage of banks reporting that each of these factors has contributed to the tightening of standards to households for house purchase.	
	Risk on the collateral demanded		
	A. Costs of funds and balance sheet constraints		
	B. Pressure from competition		
	Competition from other banks		
	Competition from non-banks		
Q11 Over the past three months, how have the following factors affected your bank's credit standards as applied to the approval of consumer credit and other lending to households?	C. Perception of risk	Net percentage of banks reporting that each of these factors has contributed to the tightening of standards to households for consumer loans.	Difference between the sum of the banks answering "contributed considerably to tightening" and "contributed somewhat to tightening" and the sum of the banks answering "contributed somewhat to easing" and "contributed considerably to easing" in percentage of the total number of banks.
	Expectations regarding general economic activity		
	Creditworthiness of consumers		
	Risk on the collateral demanded		
	A. Costs of funds and balance sheet constraints		
	B. Pressure from competition		

3. Questions on terms and conditions of the loans (Q3, Q10 and Q12)

QUESTION	TERMS AND CONDITIONS	VARIABLE	DEFINITION
Q3 Over the past three months, how have your bank's conditions and terms for approving loans or credit lines to enterprises changed?	A. Price		
	Margin on average loans		Difference between the sum of the banks answering "tightened considerably" and
	Margin on riskier loans		"tightened somewhat" and the
	B. Other conditions and terms	Net percentage of banks reporting a tightening of credit conditions to enterprises	sum of the banks answering "eased considerably" and
	Non-interest rate charges		"eased somewhat" in
	Size of the loan or credit line		percentage of the total number
	Collateral requirements		of banks
Q10 Over the past three months, how have your bank's conditions and terms for approving loans to households for house purchase changed?	Loan covenants		
	Maturity		
	A. Price		
	Margin on average loans		Difference between the sum of the banks answering
	Margin on riskier loans	Net percentage of banks reporting a tightening of their credit conditions to households for house purchase	"tightened considerably" and
	B. Other conditions and terms		"tightened somewhat" and the
	Collateral requirements		sum of the banks answering
Q12 Over the past three months, how have your bank's conditions and terms for approving consumer credit and other lending to households changed?	Loan-to-value ratio		"eased considerably" and
	Maturity		"eased somewhat" in
	Non-interest rate charges		percentage of the total number
	A. Price		of banks
	Margin on average loans		Difference between the sum of the banks answering
	Margin on riskier loans	Net percentage of banks reporting a tightening of credit conditions to households for consumer loans	"tightened considerably" and
	B. Other conditions and terms		"tightened somewhat" and the
	Collateral requirements		sum of the banks answering
	Maturity		"eased considerably" and
	Non-interest rate charges		"eased somewhat" in
			percentage of the total number
			of banks

Appendix B

Macroeconomic and financial variables

Variables	Definition	Time span	Data source
Overnight rate	Quarterly average of the EONIA overnight interest rate	2002Q3:2008Q4	ECB
10-year rate	Quarterly average of long-term (10-year) national government bond interest rate	2002Q3:2008Q4	Thomson Financial Datastream
GDP growth	Annual real GDP growth seasonally adjusted	2002Q3:2008Q4	Eurostat
Inflation	Quarterly average of the monthly inflation rate expressed in annual term	2002Q3:2008Q4	Eurostat
Securitization	Ratio between all deals involving asset-backed securities and mortgage-backed securities with collateral from the respective country and the total outstanding amount of loans for the same country	2002Q3:2008Q4	Dealogic and ECB
Taylor-rate difference	Difference between the 3-month Euribor (common across countries) and the rate implied by a country specific simple Taylor rule. The simple Taylor rule has common coefficients equal to 0.5 for all the countries. Output gap and inflation are country specific. Output gap is the average of the estimates provided by the EC, the IMF and the OECD. The equilibrium short-term interest rate is assumed equal to 2.1 and the inflation target to 1.9.	2002Q3:2008Q4	3-month Euribor (ECB). Inflation (Eurostat). Output gap estimates from the European Commission (EC), the IMF and the OECD
Number of expansive periods	Number of consecutive quarters in which the Taylor-rule implied rate has been above the 3-month Euribor rate since 1999:Q1.	2002Q3:2008Q4	Authors' calculation

Appendix C

Regulation indicators

Capital stringency

The index ranges from 0 to 9 with higher values indicating more stringent capital requirements.

The following questions are quantified according to the answers yes=1 and no=0 and then summed up to yield the index:

- 1) Is the minimum capital asset ratio requirement risk weighted in line with the Basel guidelines?
- 2) Does the minimum ratio vary as a function of market risk?
- 3) Are market value of loan losses not realized in accounting books deducted from capital?
- 4) Are unrealized losses in securities portfolios deducted?
- 5) Are unrealized foreign exchange losses deducted?
- 6) What fraction of revaluation gains is allowed as part of capital?
- 7) Are the sources of funds to be used as capital verified by the regulatory or supervisory authorities?
- 8) Can the initial disbursement or subsequent injections of capital be done with assets other than cash or government securities?
- 9) Can initial disbursement of capital be done with borrowed funds?

Data sources: See Barth, Caprio and Levine, *Rethinking Bank Regulation*, 2006, Cambridge University Press, successive updates of the survey and Laeven and Levine, 2009.

Legal environment for securitization

The indicator ranges from 0 to 20 with higher values indicating more legal requirements surrounding securitization transactions.

The information is taken from the questions related to A. Securitization laws, B. SPVs,

and C. Transfer and ring-fencing of assets in the annex of the report *Legal Obstacles to Cross-Border Securitization in the EU*.

The answers are coded =0, 0.5, 1 according to how specific and regulated the legal framework is.

List of questions:

A. Securitization Laws

- 1) Is there specific legislation applicable to securitization?
- 2) Does the law provide any definition of securitization?
- 3) Which securitization techniques are governed by national law (traditional securitization, synthetic securitization etc...) ?
answer=1 if the law specifies securitization techniques
- 4) Are there any limitations in terms of types of securitized assets?

B. SPVs

- 5) Is it possible to effectively segregate or ring-fence the originator's assets?
- 6) What are the types of SPVs available in your jurisdiction for the purpose of securitization transactions?
answer=1 if SPVs can be established as a company
- 7) Does the law provide any specific restrictions regarding the place of establishment of the SPVs?
- 8) Are SPVs considered to be credit institutions?
- 9) What is the authority in charge of supervising SPVs?
answer=1 if SPVs are subject to the supervision of supervisory agency or central bank
- 10) Is it more common to use an offshore SPVs?
- 11) Does the law distinguish between SPVs acquiring receivables and SPVs issuing?
- 12) Does national legislation allow SPVs to engage in a wide range of financing activities?
- 13) Does the law permit the creation of segregated compartments or cells of assets and liabilities?
- 14) Are there any rules imposed by domestic legislation regarding the management of excess cash?
- 15) What are the requirements imposed by law for managing an SPVs?
answer=1 if well defined requirements are specified
- 16) Are there any limitations in terms of shareholdings in management companies or SPVs?

C. Transfer and ring-fencing of assets

- 17) Does the law permit the ring-fencing of assets that are the subject of a securitization?
- 18) Are originators permitted to retain the economic benefits of the transferred assets?
- 19) Is segregation of assets legally possible on the basis of the provision of general characteristics or general information?
- 20) Are there any formalities imposed on transfer of assets? Is there a requirement to use a notary or produce similar evidence...?

Data source: European Financial Markets Lawyers Group, 2007.

Appendix D

The robustness tables are reported in the same order as the main results tables.

Table 2r: the impact of short-term interest rates on total credit standards

	loans to non-financial firms		loans to households for house purchase consumption				loans to non-financial firms	loans to households for house purchase consumption	
	total credit standards						total credit standards		
	1	2	3	4	5	6	7	8	9
Overnight rate t-1	25.472	22.12	16.653	14.476	11.46	8.794			
	[6.96]***	[5.42]***	[4.23]***	[3.25]***	[2.90]**	[2.32]**			
GDP growth t-1		-5.114		-5.002		-3.727			
		[4.61]***		[4.90]***		[2.69]**			
Inflation t-1		6.375		3.189		5.264			
		[2.31]**		[0.97]		[2.10]*			
Taylor-rate difference t-1							9.253	10.253	6.389
							[4.89]***	[4.83]***	[3.06]**
country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
cluster	country	country	country	country	country	country	country	country	country
# of observations	312	312	312	312	312	312	312	312	312
# of countries	12	12	12	12	12	12	12	12	12
R-squared	0.41	0.51	0.32	0.41	0.3	0.4	0.14	0.27	0.25

Table 2r shows the results of a panel regression where the dependent variable *total credit standards* is the net percentage of banks in each country reporting a tightening of credit standards in the Bank Lending Survey (BLS) for the approval of loans or credit lines to enterprises and households. They are the answers to Questions 1 and 8 of the BLS (see Appendix A). The overnight rate is the quarterly average of the daily overnight rate (EONIA). GDP growth is the annual growth rate of real GDP for each country. Inflation is the quarterly average of inflation rates for each country. Taylor-rate difference is the difference between the 3-month Euribor (common across countries) and a country specific Taylor-rule implied rate. See Section II and Appendix B for a detailed description of the variables and the data sources. All the explanatory variables are lagged by one quarter. The panel includes data for 12 euro area countries (Austria, Belgium, France, Finland, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain). The test statistics are in brackets. *, ** and *** denote statistical significance at the 10%, 5% and 1% level respectively. All the panel regressions include country fixed effects and robust standard errors clustered by country.

Table 3r: the impact of short- and long-term interest rates on total credit standards

	loans to non-financial firms		loans to households for			
			house purchase		consumption	
	total credit standards					
	1	2	3	4	5	6
Overnight rate t-1		18.818 [4.08]***		10.07 [2.49]**		7.501 [2.37]**
10-year rate t-1	29.241 [5.04]***	9.02 [1.69]	22.854 [3.35]***	12.034 [2.39]**	11.592 [2.04]*	3.533 [1.09]
GDP growth t-1	-5.089 [5.98]***	-5.054 [4.54]***	-4.94 [6.02]***	-4.922 [4.77]***	-3.718 [2.93]**	-3.704 [2.66]**
Inflation t-1	10.646 [3.23]***	6.405 [2.24]**	5.497 [1.72]	3.228 [0.95]	6.965 [2.53]**	5.275 [2.08]*
country fixed effects	yes	yes	yes	yes	yes	yes
cluster	country	country	country	country	country	country
# of observations	312	312	312	312	312	312
# of countries	12	12	12	12	12	12
R-squared	0.41	0.52	0.39	0.42	0.38	0.4

Table 3r shows the results of a panel regression where the dependent variable *total credit standards* is the net percentage of banks in each country reporting a tightening of credit standards in the Bank Lending Survey (BLS) for the approval of loans or credit lines to enterprises and households. They are the answers to Questions 1 and 8 of the BLS (see Appendix A). The overnight rate is the quarterly average of the daily overnight rate (EONIA). The 10-year rate is the long-term government bond interest rate in each country. GDP growth is the annual growth rate of real GDP for each country. Inflation is the quarterly average of inflation rates for each country. See Section II and Appendix B for a detailed description of the variables and the data sources. All explanatory variables are lagged by one quarter. The panel includes data for 12 euro area countries (Austria, Belgium, France, Finland, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain). The test statistics are in brackets. *, ** and *** denote statistical significance at the 10%, 5% and 1% level respectively. All the panel regressions include country fixed effects and robust standard errors clustered by country.

Table 4r: the impact of securitization, short- and long-term interest rates on total credit standards

	loans to non-financial firms		loans to households for			
			house purchase	consumption		
	total credit standards					
	1	2	3	4	5	6
Overnight rate t-1	11.823 [3.17]***		1.982 [0.80]		-0.063 [0.02]	
10-year rate t-1	6.405 [0.96]	-11.494 [0.48]	10.65 [3.22]***	16.878 [0.86]	-1.977 [0.46]	7.215 [0.61]
Securitization t-1	-19.307 [1.86]*	-12.912 [1.43]	-16.521 [1.96]*	-13.748 [1.67]	-24.449 [2.47]**	-20.195 [2.20]**
Overnight rate*securitization t-1	4.436 [3.56]***	4.704 [3.56]***	4.667 [2.65]**	4.59 [2.82]**	4.308 [1.97]*	4.48 [2.16]*
10-year rate*securitization t-1	0.826 [0.35]	-0.119 [0.06]	0.292 [0.18]	-0.354 [0.24]	2.538 [1.20]	1.617 [1.08]
GDP growth t-1	-5.25 [5.01]***	-0.414 [0.31]	-4.932 [4.86]***	-2.386 [1.57]	-3.65 [2.55]**	-0.529 [0.39]
Inflation t-1	7.541 [2.13]*	1.231 [0.34]	4.816 [1.36]	0.822 [0.20]	7.089 [2.20]**	2.231 [0.64]
country fixed effects	yes	yes	yes	yes	yes	yes
time fixed effects	no	yes	no	yes	no	yes
cluster	country	country	country	country	country	country
# of observations	312	312	312	312	312	312
# of countries	12	12	12	12	12	12
R-squared	0.55	0.67	0.46	0.54	0.47	0.55

Table 4r shows the results of a panel regression where the dependent variable *total credit standards* is the net percentage of banks in each country reporting a tightening of credit standards in the Bank Lending Survey (BLS) for the approval of loans or credit lines to enterprises and households. They are the answers to Questions 1 and 8 of the BLS (see Appendix A). The overnight rate is the quarterly average of the daily overnight rate (EONIA). The 10-year rate is the long-term government bond interest rate in each country. Securitization is defined as the total securitization activity in each country divided by the outstanding amount of loans. GDP growth is the annual growth rate of real GDP for each country. Inflation is the quarterly average of inflation rates for each country. See Section II and Appendix B for a detailed explanation of the variables and the data sources. All the explanatory variables are lagged by one quarter. The panel includes data for 12 euro area countries (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain). The test statistics are in brackets. *, ** and *** denote statistical significance at the 10%, 5% and 1% level respectively. All the panel regressions include country fixed effects and standard errors clustered by country.

Table 5r: the impact of banking supervision standards for bank capital, short- and long-term interest rates on credit standards due to bank balance sheet constraints

	loans to non-financial firms				loans to households for							
					house purchase				consumption			
	credit standards due to bank balance sheet constraints				credit standards due to bank balance sheet constraints							
	1	2	3	4	5	6	7	8	9	10	11	12
Taylor-rate difference t-1	9.969 [3.74]***	7.946 [2.72]**	8.466 [2.55]**	6.566 [2.76]**	9.723 [1.29]	4.855 [0.70]	4.868 [2.37]**	3.354 [1.65]	14.803 [1.72]	10.399 [1.30]	8.388 [5.54]***	6.919 [4.08]***
10-year rate t-1	20.194 [1.59]	-16.36 [1.12]	27.044 [1.78]	1.301 [0.07]	-5.5 [0.42]	-8.16 [0.52]	3.876 [0.27]	-1.026 [0.06]	-11.965 [0.73]	-18.09 [1.28]	-3.629 [0.22]	-9.039 [0.55]
Capital stringency t-1	1.948 [0.19]	-4.653 [0.61]	8.883 [0.88]	5.859 [0.65]	-13.215 [1.25]	-12.351 [1.25]	-5.017 [0.46]	-5.307 [0.50]	-16.617 [1.26]	-16.576 [1.45]	-10.259 [0.75]	-10.704 [0.85]
TR difference*Cap stringency t-1	-0.741 [1.57]	-0.975 [1.97]*	-1.099 [1.87]*	-1.247 [3.00]**	-0.945 [0.65]	-0.863 [0.59]	-0.645 [1.38]	-0.823 [1.95]*	-2.162 [1.38]	-2.131 [1.37]	-1.472 [4.27]***	-1.628 [4.25]***
10-year rate*Cap stringency t-1	-1.517 [0.64]	-0.175 [0.09]	-2.494 [0.90]	-1.798 [0.71]	2.752 [1.01]	2.49 [1.01]	1.396 [0.45]	1.427 [0.48]	3.907 [1.14]	3.827 [1.31]	2.74 [0.74]	2.812 [0.83]
country fixed effects	yes	yes	no	no	yes	yes	no	no	yes	yes	no	no
time fixed effects	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
cluster	country	country	country	country	country	country	country	country	country	country	country	country
# of observations	312	312	312	312	312	312	312	312	312	312	312	312
# of countries	12	12	12	12	12	12	12	12	12	12	12	12
R-squared	0.36	0.61	0.21	0.51	0.28	0.45	0.12	0.37	0.28	0.47	0.14	0.38

Table 5r shows the results of a panel regression where the dependent variable *credit standards due to bank balance sheet constraints* is the net percentage of banks in each country reporting a tightening of credit standards in the Bank Lending Survey (BLS) due to bank balance sheet constraints for loans or credit lines to enterprises and households. They are the answers to Questions 2, 9 and 11 of the BLS (see Appendix A). Taylor-rate difference is the difference between the 3-month Euribor (common across countries) and a country specific Taylor-rule implied rate in each country. The 10-year rate is the long-term government bond interest rate in each country. Capital stringency is an index of stringency of capital requirements in each country. See Section II, Appendix B and C for a detailed explanation of the variables and the data sources. All the explanatory variables are lagged by one quarter. The panel includes data for 12 euro area countries (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain). The test statistics are in brackets. *, ** and *** denote statistical significance at the 10%, 5% and 1% level respectively. All the panel regressions include standard errors clustered by country.