Bank Risk-Taking, Securitization, Supervision, & Low Interest Rates: Evidence from the Lending Standards

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IESE Research Workshop on Industrial Organization and Banking, Barcelona, 9th of March 2010
Disclaimer: the views expressed are those of the authors and do not reflect those of the ECB or the Eurosystem
We are experiencing a strong financial crisis in Europe & US with many bank failures, bail-outs, interbank dry-ups, liquidity assistance…, which possibly lead to the worst economic crisis in the developed countries since the Great Depression.

What are the root causes of this crisis?
Root versus proximate causes

- Allen and Carletti (2009), Diamond and Rajan (2009), and Acharya and Richardson (2009) distinguish between *root* (fundamental) versus *proximate* causes of the current crisis.

- This difference is very well summarized by Emilio Botín:
  
  “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 favorable 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”

  Emilio Botín, Chairman of Bank Santander, *Financial Times*, October 2008
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
Timothy Geithner
(US Secretary of the Treasury & former NY Fed Chairman)

• “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, Charlie Rose’s PBS, May 2009
Summing up

- **Banks took too much risk**, in particular they **softened lending standards** too much, especially in mortgage loans

The contributing key factors:

1. Too low levels of both short- and/or long-term interest rates
2. In conjunction with **high levels of securitization activity & weak supervision regulation standards for bank capital**

(See e.g. Acharya and Richardson (2009), Allen and Carletti (2009), Besley and Hennessy (2009), Blanchard (2008), Brunnemeier (2009), Calomiris (2008), Diamond and Rajan (2009), Engel (2009), Taylor (2007 and 2008), Rajan (2009) and numerous articles since Summer 2007 in *Financial Times*, *The Wall Street Journal*, and *The Economist*)

- **These root causes may have also been interrelated and mutually amplifying** in affecting the risk-taking of financial institutions (Rajan, 2005)
Questions

1. Do low levels of short- and/or long-term interest rates soften bank lending standards?

2. Is this softening more pronounced when securitization activity is high or banking supervision standards are weak?

3. Does the softening imply more loan risk-taking by banks (i.e., is the softening over and above the improvement of borrowers’ creditworthiness)?

4. Did the countries with softer lending standards during 2002-2007:Q2 suffer more ex-post during the crisis?
Identification challenges

1. **Endogeneity:**
   - Monetary policy rates are endogenous to local economic conditions
   - Banking supervision is endogenous to monetary policy, especially if the central bank is responsible for both
   - Securitization depends on monetary policy as this affects loan growth
Identification challenges

2. Data:

- Difficult to obtain data on the pool of potential borrowers approaching a bank, to know their quality, and then to know whether, how and especially why banks change their lending standards.
Identification strategy relies on:

1. **Euro Area data:**
   - Monetary policy rates are identical, but cross-country differences in terms of GDP growth and inflation $\rightarrow$ exogenous cross-sectional variation of Taylor-rule implied rates (Taylor, 2008)
   - Banking supervision is a national responsibility while monetary policy is decided by the Eurosystem
   - Cross-country differences in the regulation of the market for securitization, which gives exogenous variation
Identification strategy relies on:

2. Confidential Bank Lending Survey of the ECB/EuroSystem:
   - National central banks request quarterly information on the lending standards banks apply to customers → we know whether, why and how banks change their lending standards to businesses and households
     - 2002 – 2008 for each of the 12 initial Euro Area countries
   - USA Senior Loan Officer Survey: 1992 – 2008
     - Both largest developed economic areas of the world!!
Preview of main results

- Low short-term interest rates soften lending standards and rates too low for too long soften standards even further
- Weaker banking supervision & higher securitization activity amplify the softening due to low levels of short-term rates
- The softening is over and above an improvement of the borrower’s creditworthiness and all the relevant standards are softened, thus suggesting higher loan risk-taking by banks
- Low short-term rates have a stronger impact than low long-term rates on the softening of standards directly, and also indirectly via higher securitization & weaker banking supervision
- Interesting differences across type of loans and channels
- Countries with softer lending standards before the crisis (especially coming from expansive monetary policy) have ex-post suffered more in GDP growth & public debt CDS spreads
Our contribution to the literature

1. Origins of the current crisis
   • We test the different key contributing factors, finding interactions are key
   • We use very rich info on the lending standards by banks in the Euro Area and U.S. from 2002-2008, which are the key economic areas to analyze the root causes of this crisis

   • Ioannidou, Ongena, and Peydró (2008) and Jiménez, Ongena, Peydró, and Saurina (2008) analyze the impact of low monetary policy rates for risk-taking with business loans in Bolivia and Spain
   • We have both household and business loans for Euro Area & U.S.
   • Identification: we exploit cross-sectional differences in Taylor-rule implied rates, in turn allowing us to analyze too low for too long
   • We find that the impact of short-term rates on lending standards and on loan risk-taking depends on securitization activity & banking supervision standards
Outline

• **Data**
  – Bank Lending Survey data
  – Interest rates, securitization, & banking supervision
  – Econometric equation

• **Main Results**
  – Short-term rates
  – Short- and long-term rates
  – Banking supervision
  – Securitization
  – Ex-ante softening, ex-post real costs

• **Conclusions**
Main Dataset: the Euro Area Bank Lending Survey

- National central banks request quarterly information on the lending standards banks apply to their customers
- There are 18 regular questions about supply and demand of banks’ loans
- Questions about whether, why, to whom, and how banks change standards
- Data for 12 countries and 90 banks over the period 2002:Q4 to 2009:Q1
- 5 possible answers: from easing to tightening considerably
- We also use the U.S. Senior Loan Officer Survey from 1992, to 2009, quarterly data
  - Next version of the paper
Main BLS question: whether and how much banks change their standards

- “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?”
  (overall, to SMEs, to large enterprises, short-term, long-term)
  
- to households for house purchase?”

- to households for consumer credit?”
Why and how banks change their standards

For each type of loan (business, mortgage and consumer):

• Factors affecting credit standards (WHY):
  – bank balance sheet constraints: bank liquidity, bank capital, and access to market finance
  – pressure from competition: from banks, from non-banks and from the market
  – borrower’s risk: general economic situation, industry/firm outlook, risk of collateral, housing markets prospects, and creditworthiness of consumers
  – This question is not complete in the U.S. survey and it is the key question for analyzing loan risk-taking

• Changes in loan conditions and terms (HOW):
  – margins for average and riskier borrowers, loan size, maturity, collateral, covenants, loan to value ratio, and non interest rate charges
The BLS variables

are defined as the net percentage of banks reporting a tightening of standards = the difference between the banks that tightened minus the ones that softened

How good is this information?
- When banks say they change their lending standards, they really do it (Italian evidence, see del Giovane et al., 2010)
- The central bank/ supervisor request the information
- Predictive power both in U.S. and in Europe (see Lown and Morgan, 2006; de Bont, Maddaloni, Peydró and Scoppel, 2010; Ciccarelli, Maddaloni and Peydró, 2010)
Interest rate variables

• Overnight rates (EONIA)

• Rate on 10-year national government bonds

• Taylor rate differences = Euribor 3m – Taylor-rule implied rates
  – Taylor (2009): “within Europe the deviations from the Taylor rule vary in size because inflation and output data vary from country to country” (see also Ahrend, Cournede and Price, 2008)
  – Allows to analyze whether rates are too low for too long
Securitization data

• The securitization activity is the volume of ABS and MBS deals divided by the outstanding amounts of loans (or gross flows) in each country

• Possible endogeneity problems: for robustness we construct an indicator (instrument) of the regulation for securitization in Euro Area countries
  – the instrument is a measure of the level of legal requirements surrounding securitization transactions
  – from the annex of the EFMLG (2007) Report, where assigns 1 for the questions involving more regulation and 0 otherwise
Banking supervision standards for bank capital

- Capital is an index of the stringency of supervision standards for bank capital (Barth, Caprio and Levine, 2006; and Laeven and Levine, 2009)
## Summary statistics (Table 1)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overnight rate</td>
<td>2.871188</td>
<td>0.8075563</td>
<td>2.015469</td>
<td>4.252712</td>
</tr>
<tr>
<td>10-year rate</td>
<td>4.048321</td>
<td>0.4550735</td>
<td>2.94</td>
<td>5.218</td>
</tr>
<tr>
<td>Taylor rate differences</td>
<td>-1.377051</td>
<td>2.58572</td>
<td>-9.58</td>
<td>3.47</td>
</tr>
<tr>
<td>GDP growth</td>
<td>2.441716</td>
<td>2.090163</td>
<td>-7.39</td>
<td>8.46</td>
</tr>
<tr>
<td>Inflation</td>
<td>2.505609</td>
<td>0.9933568</td>
<td>-0.17</td>
<td>5.58</td>
</tr>
<tr>
<td>Securitisation</td>
<td>1.767321</td>
<td>1.621473</td>
<td>0</td>
<td>10.33487</td>
</tr>
<tr>
<td>Capital index</td>
<td>5.259615</td>
<td>1.199506</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Securitisation regulation</td>
<td>8.083333</td>
<td>3.807605</td>
<td>1.5</td>
<td>14</td>
</tr>
</tbody>
</table>
Estimation

• **LHS variable**: lending standards (net percentage tightening):
  – total
  – due to credit supply factors: **bank balance-sheet strength** or competition
  – (specific) conditions and terms of loans

• **RHS variables**: overnight and long-term rates, Taylor-rate differences, securitization, capital supervision index, and GDPG and inflation

• GLS panel regression with country (& when possible time) fixed effects and standard errors are corrected for heteroskedasticity, correlation between countries and autocorrelation (notice that T=26, N=12(13), thus no double clustering (see Petersen, 2009) and overnight rates are constant across countries) (see Angrist et al, 2009)

• Robustness:
  – other controls: credit growth, property prices, Consensus expected GDPG and inflation, yield curve slope, …
  – clustering by country, and country & time fixed-effects
  – Others: dynamic panel, weighted panel by GDP, …
Motivation – Questions & Identification – Data – Results – Conclusions

Net percentage tightening for household loans
Euro Area

Motivation

Questions & Identification

Data

Results

Conclusions

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Net percentage tightening for household loans
U.S.A.

lending standards for mortgages
lending standards to consumer
Distance from Taylor-rule rates (Table 2B) (Monetary policy rates)
Distance from Taylor-rule rates (Table 2B) (Monetary policy rates)
Short-term vs. long-term rates (Table 3 Panel B)
The softening of lending standards is due to all factors considered: improvement of borrowers’ quality, of bank balance-sheet constraints, and an increase of bank competition.

For business loans the softening impact of competitive pressures from other banks and improvements in bank balance sheets position is larger compared to improvements in borrowers’ quality.

All terms and conditions for the loans are softened, but there are differences across types of loans.

All in all, the softening of standards suggest higher loan risk-taking by banks for low monetary policy rates, but not low long-term rates!!

Low monetary policy rates (not low long-term rates) are associated to higher loan risk-taking by banks

(Tables 2 Panels A&B and 3 A, B & C)
Securitization activity (Table 4 Panel B)
The impact of low short-term rates on higher loan risk taking is amplified by securitization (Table 4 A, B & C)

- Key results for factors and standards when securitization activity is high and short-term rates are low:
  - the competitive pressures arising from non-banks and market financing (the “shadow-banking system”) are important
  - balance sheet position of banks is also very important
  - the risk of collateral and borrower may matter less because banks transfer the risk off balance sheet
  - margins on loans are softened for riskier households but not for riskier businesses (possibly because loans for households are more securitized, transferring in turn the risk off balance sheet)

- Instrument:
  - Results are robust when using an instrument for securitization (t-stat higher than 7 in the 1st stage regression, so the IV does not suffer from weak concern instruments, Staiger & Watson, 1997)
Capital supervision standards (Table 5)

<table>
<thead>
<tr>
<th>Balance sheet constraints</th>
<th>Taylor-rate differences t-1</th>
<th>10-year rate t-1</th>
<th>Capital regulation t-1</th>
<th>TR differences*Cap regulation t-1</th>
<th>10-year rates*Cap regulation t-1</th>
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Summary of main results

• Low short-term interest rates soften lending standards and rates too low for too long soften standards even further

• Weaker banking supervision & higher securitization activity amplify the softening due to low short-term rates

• The softening is over and above an improvement of the borrower’s creditworthiness and all the relevant standards are softened, thus suggesting higher loan risk-taking by banks

• Low short-term rates have a stronger impact than low long-term rates on the softening of standards directly, and also indirectly via higher securitization and weaker banking supervision

• Interesting differences across type of loans and channels
Ex-ante softening, ex-post real costs

• We add up the lending standards for each Euro Area country and also for U.S. during the 2002:Q4 – 2007:Q2 period

• Countries with softer lending standards due to bank balance-sheet strength & competition (especially associated to lower Taylor residuals) during the 2002—2007 period have
  – higher costs ex-post in terms of GDP and public debt CDS spreads
  – more tightening of lending standards due to problems in bank capital and liquidity
    • Ciccarelli, Maddaloni and Peydró (2010) find that loan supply restrictions are key to explain low GDP in the Euro Area & U.S. in this crisis
    • Jiménez, Ongena, Peydró and Saurina (2010) identify and quantity credit supply crunch in Spain, and Jiménez, Ongena, Mian and Peydró (2010) showed how ECB liquidity is helping to reduce loan supply restrictions in Spain
Conclusions

• Low short-term interest rates matter for high loan risk-taking, but not low long-term interest rates
  – Directly
  – In conjunction with high securitization and weak banking supervision

• A low level of short-term rates has preceded many financial crises over the last centuries (Calomiris, 2008), but in this crisis the effects may have even been stronger as compared to the past, since the current crisis came after a period of very low for too long short-term rates in conjunction with very high securitization and possibly weaker banking supervision (especially for bank capital)
Thank you
Some theoretical mechanisms

- Overnight rates are key for banks’ leverage (Adrian and Shin, 2009; Shin, 2009; Brunermeier et al., 2009)

- Low levels of monetary policy amplify moral hazard problems in banking thus inducing higher loan risk-taking (e.g. Allen and Gale, 2007; Diamond and Rajan, 2009)

- Weaker bank supervision standards, therefore, make loan risk-taking higher

- Low rates may induce a search for yield from financial intermediaries. Securitization of loans offers attractive returns, but at the cost of lower screening and monitoring of securitized loans. Hence, the impact of low rates on the softening on standards is stronger with higher securitization activity (Rajan, 2005)