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IS MORE BETTER?
EFFECTIVENESS OF CAPITAL BUFFERS IN TAMING THE SPANISH MACRO-FINANCIAL CYCLES

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Briefly on the outline of the presentation

- **Key results**

- **Motivation**

- **Overview of the Spanish bankign system and regulation**

- **Econometric method**

- **Data description**

- **Results in a snapshot**

- **Time varying estimations**

- **Conditional forecasts over time**

- **Comparison with other studies**

- **Final remarks**

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Key results

We use data from credit registry to estimate the time-varying system-wide effects of capital buffers over the cycle and find that:

- Increases in capital requirements decrease banks' credit supply by more than proportional.

- Elasticity of household credit to increases in capital is *higher* than that of firm credit.

- However, reductions in firm credit have statistically *significant* effects on GDP.

- Reductions in Tier 1 capital have deeper transmission effects on supply of credit.

- Timing in the increase of capital buffer matters. Our results show a lot of variation in impact over time. Increases during times of economic uncertainty or weak recovery may accentuate the fall in the supply of credit.

- Summary: Increases in capital regulation have significant (statistically and economically) effects on credit supply, capital markets and GDP. Moreover, banks view the two credit portfolios as distinct and therefore respond differently in both to changes in capital regulation over the business cycle.

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Key results cont.

- Our conditional forecast exercises show that there are short-run costs (up to 3 years) from having (preventively) higher capital buffers during good times but that the benefits from more robust and stable banking system outweight and therefore lead to higher credit supply in the medium run (3-12 years). **Benefits outweigh the costs.**

- Release of capital during recession eases the contraction in credit during a recession, but only if released during an early phase of the contraction (again timing matters). However, if maintained at a lower level for long, the medium-run benefits don't materialize. Note that the alleviating effects during a recession last for 2-3 years, max 4.

- The lack of these (medium-run) benefits is even more evident for firm credit since credit and GDP contract by (comparatively) over the medium-run in the *lower* capital scenario.

- While qualitatively the same, there are some quantitative differences in the in/out-of-sample forecast between firm and household credit. For instance:
  - **Capital tightening:** Short-run costs as well as benefits are higher and last for longer for household credit. Yet, the benefits and subsequent leveling off kick in sooner for firm credit.
  - **Capital releasing**: Benefit from mitigating the contractionary effects on credit supply lasts longer and is higher for household credit. For firm credit, the mitigating effects from a release are offset sooner.

INTRODUCTION

Why is this study important for Financial Stability?

How does it conform to the existing literature?

Why Spain?

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Motivation

Countercyclical capital buffer (CCyB) is potentially a powerful tool to curb (the risks over) the cycle. But:

How effective is it in (curbing the cycle)? How deep and long-lasting is the transmission?

When is the right time to activate (tighten) it?

When is the right time to release it?

Are the transmission effects symmetric over the cycle?

Do the benefits of using this measure outweigh the costs?

Spain is a good case to examine these questions since it has good historical data on the banking system and credit. In particular, the **credit registry** was implemented very early so one can identify the bank-borrower relation over time. Moreover, one can also identify **credit types**.

How is Spanish micro (credit registry) data used in this study?

- Data on individual credit and borrowers is aggregated across to measure total lending in the economy (bottom-up approach). This improves the accuracy of the measure.

- Because the dataset provides specific information on the characteristics of loans, you can create user-specific (economy-wide) credit variables by filtering or discriminating along these characteristics.

- Total capital buffers are also constructed *bottom-up* by accumulating the (risk-weighted) capital levels of individual banks but adjusting (or correcting) for the bank size in the total banking system.

- Moreover, our study builds on the first generation of micro-level studies on Spain.

- Studies like Jimenez et al (2016) had looked at the degree of heterogeneity in banks responses to capital increases (dynamic provisions) before and during the crisis, and how that has affected assets, survival rate, and employment decision of firms. Although in good times, most banks don't reduce their supply of credit to firms, they do find that smaller firms and banks are harder hit by the increased requirements because they are more costly to absorb. In bad times, on the other hand, the contraction in credit is wider and more significant. Credit contracts the most for those firms that are (relatively more exposed to banks that are hardest hit. (see also Anguren and Jimenez (2017)

- This study tries to investigate how banks respond to changes in **aggregate** capital regulation, and if these are of **macroeconomic significance**. We also wish to **endogenize the variation in the macro-financial cycle** and therefore study this in a time-series model. Finally we make the **policy-maker's decision of varying buffers over the cycle explicit and examine the endogenous adjustment** in the rest of the economy to that decision.

Spanish banking system

Distribution of total assets by type of institution

Total assets in percentage points of the entire banking sector	2008:12	2016:12
Commercial banks (domestic)	45	55
Commercial banks (foreign)	10	6
Savigns Banks (formerly)	41	33
Credit cooperative banks	4	6

Distribution of credit to other resident sectors by type of institution

Total assets in percentage points of the entire banking sector	2008:12	2016:12
Commercial banks (domestic)	38	48
Commercial banks (foreign)	8	7
Savigns Banks (formerly)	49	38
Credit cooperative banks	5	7

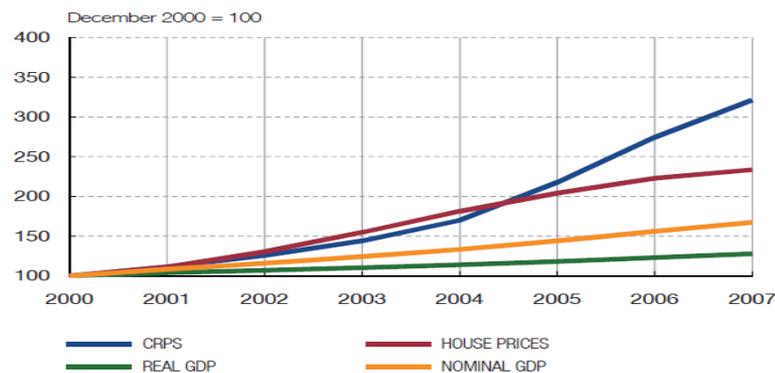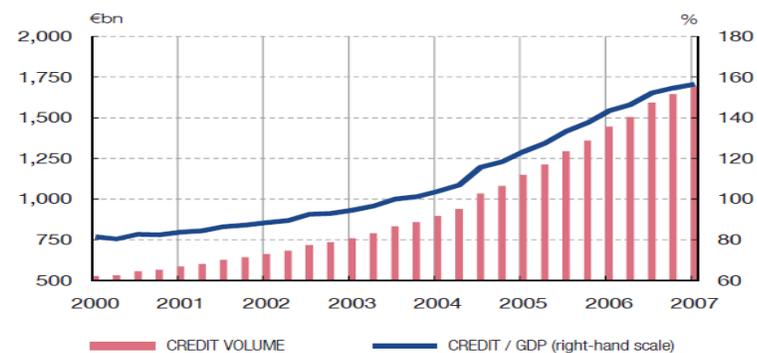CHART 1.4 CUMULATIVE GROWTH IN CREDIT TO THE RESIDENT PRIVATE SECTOR (CRPS), HOUSE PRICES AND REAL AND NOMINAL GDP

CHART 1.5 CREDIT TO THE RESIDENT PRIVATE SECTOR IN SPAIN AND AS A PERCENTAGE OF GDP

Spanish banking system and regulation

• Total consolidated assets of domestic banks represented close to 300% of national GDP as of 2016:Q3 (ESRB Risk Dashboard)

• In contrast, the non-bank financial sector represents a much smaller fraction of GDP.

• Up to the beginning of the 2009 crisis, three types of institutions were the main players: **commercial banks, savings banks** and, to a much smaller degree, **credit cooperative banks**. This structure was the result of a profound liberalization that took place between the 1970s and the 1980s.

• Savings banks were operationally similar to commercial banks, but with more complex and rigid governance structure. They were also affected by structural restrictions that limited their ability to strengthen their capital to only retained earnings.

• From the end of 1992, Basel I was fully incorporated to Spanish banking regulation. One of its main elements was the introduction of a minimum solvency requirement of 8%. Implementation of Basel II in the Spanish regulatory framework ended in 2008, at the same time as the financial crisis began.

• In parallel in 2000, Banco de España introduced dynamic provisions to reduce the procyclicality of credit risk provisions. In 2004, Banco de España adapted the Spanish accounting framework to the new international standards.

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METHOD AND EMPIRICS

A bit on the estimations and data

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Econometric method

<u>Stage 1:</u>

- We estimate the model using a structural VAR approach. We apply Bayesian methods with standard (Jeffrey's) priors.

- We identify the shocks using sign-restrictions based on the cost of bank funding channel identified in Noss and Toffano (2016) (or many bank micro-models or DSGE models). The sign restrictions are only to hold for 1 quarter (for robustness, we extend it to 4 quarters.)

- Our estimation procedure with sign restrictions is based on the rejection method described in Uhlig (2005), with a total of 10.000 Monte Carlo draws that are saved. Based on the optimal lag criteria, we set the lag length to 2. For robustness purposes, we re-estimate all versions using penalty algorithm.

- We use five variables to identify macro-financial effects from a capital supply shock: real GDP, bank credit (to firms and households separately), bonds issued by firms, excess return of banks on stock market, bank capital ratio (risk weighted, non risk-weighted, Tier 1).

- Our statistical significance test is conservative and determined on **95% confidence** interval (+/- 2 std. dev.)

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Econometric method

<u>Stage 2:</u>

- With the structural estimation at core, we then turn forward and make conditional forecast of the Spanish economy, in- and out of sample.

- *In particular*, we ask the question of how the economy would have evolved had the Spanish banking system had *ex ante* 1 p.p. higher capital ratio. Thus what differentiates the conditional from the unconditional is the higher capital buffer.

- To take into account the endogenously evolving business (and credit) cycle, we make these forecasts at different starting points in the cycle: during the **housing boom**, **financial crisis**, brief **stagnation**, **sovereign debt** crises, and **aftermath**.

- We then extend the projections to 3 years (or 13 quarters) beyond the end date of the sample.

- Recognising than tightening is not the same as release of the buffer, we re-do the same projection <u>during the crisis interval</u>, and wonder how a potential recovery from the negative shock would have been if the buffers had been released at the onset, during, or further down the recession.

- We wish to quantify the benefits and costs of tightening/releasing the buffers from a decision-makers point of view, by looking ahead.

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Sign restrictions

To identify a capital supply shock we use the restrictions identified in Noss and Toffano (2016) where an increase in the capital ratio originating from the (loan)-supply side will result in a reduction in credit and excess return, and an expansion in bonds issued by corporates. The rationale is based on **the cost-channel of interest rates**.

More formally, we wish to uniquely identify the column a of matrix A such that the impulse response fuctions of *credit* and *excess return* to a shock a are NOT positive, and for *bonds* NOT negative. The sign restriction scheme is only required to hold **on impact** (at t=1). However, for robustness purposes we extend the horizon to one year (at t=[1:4]).

Noss and Toffano (2016) provide a long discussion on the economic rationale for the sign restrictions. We can summarise them by:

Variable	Sign restriction	Rationale
Bank credit	Negative	Higher capital increases the cost of providing credit and thus reduces overall bank lending.
Non-bank credit to firms	Positive	The demand for credit by firms is unaffected and thus firms shift to capital markets to satisfy their demand.
Excess return	Negative	Banks profitability decreases because banks forego profitable lending opportunities.

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Data description

Variable	Definition	Sample period	Sample moments
GDP	Annual growth rate of real GDP	1990:Q1 – 2015:Q3	Mean: 2.069 Std deviation: 2.34
Bank credit	Annual growth rate in real bank credit. We separate here between credit to non-financial firms and household and independently estimate these specifications.	1990:Q1 – 2015:Q3	**Firm credit:** Mean: 5.14 Std deviation: 8.31 **Hshld credit:** Mean: 6.40 Std deviation: 7.83
Bank excess return on the stock market	The difference between stock returns of banks relative to the overall market return. The variable is expressed in quarterly growth rate.	1990:Q1 – 2015:Q3	Mean: -0.72 Std deviation: 5.92
Non-bank credit	Annual growth rate of non-bank credit to non-financial firms.	1990:Q4 – 2015:Q3	Mean: -1.95 Std deviation: 12.27
Capital ratio	Aggregate capital ratio for the entire banking sector. We separate here between total capital and Tier 1 capital.	1993Q3 – 2015:Q3	**Total capital/Tier 1:** Mean: 11.28/9.27 Std deviation: 0.92/1.21

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Data evolution

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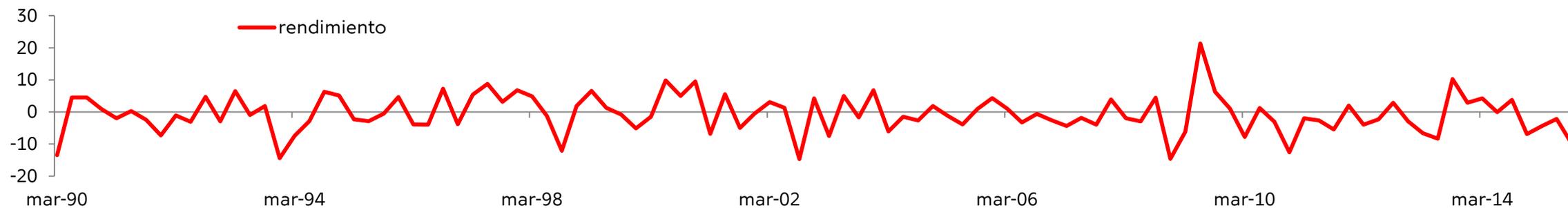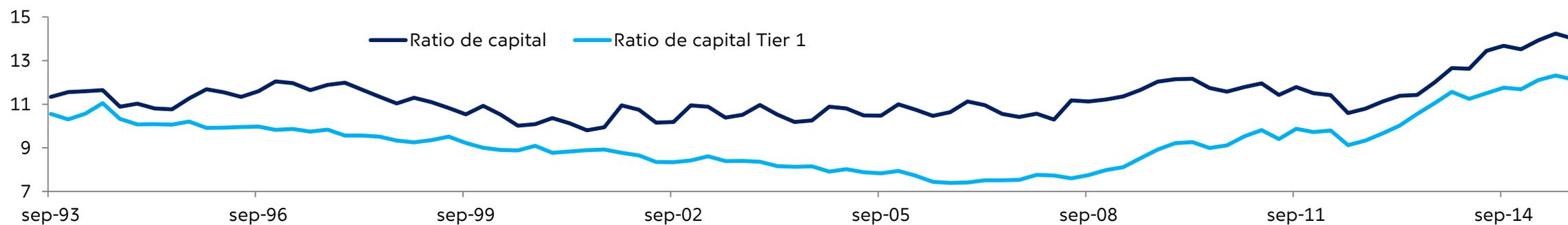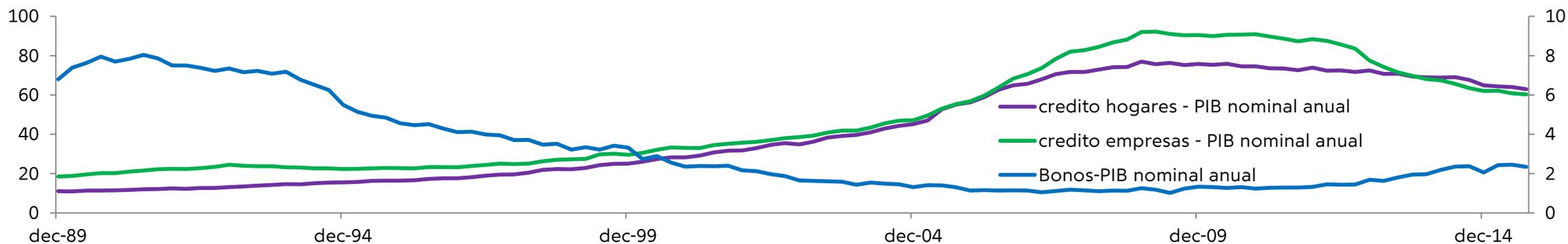
RESULTS

Stage 1 – capital supply shock (one standard deviation increase)

PART 1: Estimation results

Firm credit: Impact IRF coefficients (not accumulated)

Method	IRF – bank credit to firms	IRF- non-bank credit	IRF – excess return	IRF - GDP
Impact sign restrictions	**-1 p.p.**	+2.9 p.p.	**-2.4 p.p.**	**-0.4 p.p.**
Tier 1 capital	**-1.2 p.p.**	+3 p.p.	**-2.3 p.p.**	-0.23 p.p.
Excluding non-bank credit	**-1.3 p.p.**	-	**-2.5 p.p.**	-0.3 p.p.
Penalty method	**-1.1 p.p.**	**+1.7 p.p.**	**-3.3 p.p.**	**-0.4 p.p.**
Cholesky decomposition	not significant	**+1 p.p.**	not significant	not significant

Household credit: Impact IRF coefficients (not accumulated)

Method	IRF – bank credit to households	IRF – excess return	IRF - GDP
Impact sign restrictions	**-1.2 p.p.**	**-2.7 p.p.**	-0.3 p.p.
Tier 1 capital	**-1.5 p.p.**	**-2.6 p.p.**	-0.5 p.p.
Penalty method	**-1.3 p.p.**	**-2.7 p.p.**	**-0.5 p.p.**
Cholesky decomposition	not significant	not significant	not significant

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SOME INSIGHTS

Additional insights

- There is a delay between the financial and macroeconomic impact from a capital supply shock of between 2 and 4 quarters.

- In addition the transmission of credit variation to the real economy is stronger and quicker for firm credit compared to household credit. While the total impact on GDP is very similar, the máximum drop in GDP occurs slightly earlier in the firm credit specification (after 2 years) compared to the household credit (2.5 years).

- In all specifications, capital supply shock explains between 15 and 40% of the total variation in the other model variables. This is a good indicator of the importance of this structural shock for model dynamics.

- The distribution of the IRFs (confidence intervals) matter. While for the 1-quarter restriction, they are more or less symmetric around the median IRF, they become very skewed in the 4-quarter restricted version. Hence, while the median impact is not so different between the two, there is a much higher probability mass in the deeper contraction region in the medium-run for the model with longer restrictions. Hence, if the economic environment is uncertain or the business cycle is passed the peak point, an increase in the capital ratio could lead to sharper drops in credit and GDP beyond the median estimate.

PART 2: Variation over time (firm credit; household credit)

Method	IRF – bank credit to firms	IRF- non-bank credit	IRF – excess return	IRF - GDP
1991:Q1-2007:Q1	-0.6 p.p.	+2.6 p.p.	-2.5 p.p.	-0.3 p.p.
1991:Q1-2007:Q3	-0.5 p.p.	+2.7 p.p.	-2.3 p.p.	-0.25 p.p.
1991:Q1-2009:Q2	-0.6 p.p.	+3.3 p.p.	-2.7 p.p.	not significant
1991:Q1-2010:Q2	-0.5 p.p.	+2.9 p.p.	-2.7 p.p.	not significant
1991:Q1-2013:Q1	-1.4 p.p.	+3 p.p.	-2.5 p.p.	not significant
1991:Q1-2013:Q4	-0.6 p.p.	+2.9 p.p.	-2.2 p.p.	not significant

Method	IRF – bank credit to firms	IRF – excess return	IRF - GDP
1991:Q1-2007:Q1	-0.75p.p.	-2.7 p.p.	not significant
1991:Q1-2007:Q3	-0.9 p.p.	-2.7 p.p.	not significant
1991:Q1-2009:Q2	-1.2 p.p.	-3.3 p.p.	not significant
1991:Q1-2010:Q2	-1.2 p.p.	-3 p.p.	not significant
1991:Q1-2013:Q1	-1.6 p.p.	-2.7 p.p.	-0.6 p.p.
1991:Q1-2013:Q4	-1.3 p.p.	-2.9 p.p.	-0.5 p.p.

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SOME FURTHER INSIGHTS

RESULTS

Stage 2 – counterfactuals (conditional sample forecasts)

GUIDELINES ON HOW TO INTERPRET THE TABLE:

- We report forecasts for 3 key variables in the model: **Capital ratio**, **bank credit**, and **GDP**. Condition on forecast is ONLY imposed on capital ratio, however.

- Numbers in the table represent the difference in impacts between conditional and unconditional forecast for that period (i.e. *conditional-unconditional*).

- In the conditional projection, the level of capital is *ex ante* 1 p.p. higher.

- Numbers in GREEN are those when the value of conditional is higher.

- Numbers in BLUE are those when the value of conditional is lower than unconditional.

- Values in brackets show when the projections are within the negative territory (contraction). For instance, during crises periods, cedit growth for both forecasts is negative (albeit temporary), which we mark with (-).

- We run projections with 7 different cut-off dates.

- However, no matter, when our projections start, they ALL end in 2018:Q4.

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TIGHTENING – EXPECTED EFFECTS ON FIRM CREDIT OVER THE CYCLE

Conditional forecast – capital tightening (firm credit)

Capital ratio	2004q3	2006q3	2009q3	2010q4	2011q3	2014q4	2015q4
2004q4	1	-	-	-	-	-	-
2007q4	0.23	0.78	-	-	-	-	-
2009q4	0	0.26	0.82	-	-	-	-
2011q4	-0.2	0	0.52	0.65	0.8	-	-
2013q4	-0.25	-0.16	0.14	0.33	0.6	-	-
2015q4	-0.19	-0.28	-0.12	0	0.14	0.64	0.77
2017q1	0.13	-0.25	-0.22	-0.11	0	0.45	0.62
2018q4	0	-0.16	-0.25	-0.21	-0.19	0.16	0.31

Credit	2004q3	2006q3	2009q3	2010q4	2011q3	2014q4	2015q4
2004q4	-1.7	-	-	-	-	-	-
2007q4	1.1	-0.4	-	-	-	-	-
2009q4	1.9	1.3	-2 (-)	-	-	-	-
2011q4	1.8	2.2	0 (-)	-1.4 (-)	-1.9 (-)	-	-
2013q4	1.1	1.9	1.6	0.8	0 (-)	-	-
2015q4	0.3	1.2	1.9	1.7	1.7	-1.4 (-)	-1.8 (-)
2017q1	-0.1	0.6	1.7	1.9	1.9	0	-0.8 (-)
2018q4	-0.5	0	1	1.7	1.7	1.3	1

GDP	2004q3	2006q3	2009q3	2010q4	2011q3	2014q4	2015q4
2004q4	0	-	-	-	-	-	-
2007q4	1	0.6	-	-	-	-	-
2009q4	0.74	1.1	0 (-)	-	-	-	-
2011q4	0.4	0.8	1	0.3	0 (-)	-	-
2013q4	0	0.4	0.9	0.9	0.9	-	-
2015q4	-0.19	0	0.6	0.7	0.8	0.4	0
2017q1	-0.26	-0.1	0.4	0.5	0.7	0.8	0.62
2018q4	-0.26	-0.3	0	0.3	0.3	0.8	0.93

TIGHTENING – EXPECTED EFFECTS ON HOUSEHOLD CREDIT OVER THE CYCLE

Conditional forecast – capital tightening (household credit)

Capital ratio	2004q3	2006q3	2009q3	2010q4	2011q3	2014q4	2015q4
2004q4	1	-	-	-	-	-	-
2007q4	0.77	1	-	-	-	-	-
2009q4	0.5	0.86	0.87	-	-	-	-
2011q4	0.34	0.56	0.81	0.81	0.78	-	-
2013q4	-0.07	0.22	0.61	0.7	0.73	-	-
2015q4	-0.23	-0.07	0.33	0.47	0.54	0.91	0.85
2017q1	-0.29	-0.21	0.15	0.3	0.4	0.86	0.84
2018q4	-0.31	-0.32	0	0.08	0.16	0.67	0.71

Credit	2004q3	2006q3	2009q3	2010q4	2011q3	2014q4	2015q4
2004q4	-2.2	-	-	-	-	-	-
2007q4	-0.6	-2.7	-	-	-	-	-
2009q4	0.9	-0.6	-2.3 (-)	-	-	-	-
2011q4	1.7	1.1	-1.3 (-)	-2.3 (-)	-2.5 (-)	-	-
2013q4	2	2	0.3	-0.6 (-)	-1.2 (-)	-	-
2015q4	1.7	2.2	1.4	0.7	0.2	-2.6 (-)	-2.7 (-)
2017q1	1.4	2	1.7	1.3	0.9	-1.4	-2 (-)
2018q4	0.9	1.6	1.9	1.7	1.5	0.1	-0.5

GDP	2004q3	2006q3	2009q3	2010q4	2011q3	2014q4	2015q4
2004q4	-0.1	-	-	-	-	-	-
2007q4	0.52	0	-	-	-	-	-
2009q4	0.8	0.6	-0.1 (-)	-	-	-	-
2011q4	0.8	0.9	0 (-)	-0.1	0 (-)	-	-
2013q4	0.64	0.9	0.7	0.4	0.1	-	-
2015q4	0.38	0.7	0.8	0.7	0.7	-0.1	-0.1
2017q1	0.21	0.6	0.8	0.7	0.7	0.2	0
2018q4	0	0.3	0.6	0.7	0.7	0.69	0.49

RELEASING – **EXPECTED** EFFECTS ON **FIRM CREDIT** OVER THE CYCLE

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Conditional forecast – capital release during recessions (firm credit)

Capital ratio	2007q3	2008q4	2009q3	2010q4	2011q3
2007q3	-1	-	-	-	-
2008q4	-0.71	-1	-	-	-
2009q3	-0.57	-0.92	-1	-	-
2010q4	-0.32	-0.68	-0.74	-1	-
2011q3	-0.19	-0.5	-0.6	-0.91	-1
2013q4	-0.13	0	-0.15	-0.44	-0.56
2015q4	0.26	0.22	0.13	0	-0.15
2018q4	0.19	0.28	0.26	0.27	0.22

Credit	2007q3	2008q4	2009q3	2010q4	2011q3
2007q3	1.7	-	-	-	-
2008q4	1.3	2	-	-	-
2009q3	0	2.2 (-)	1.7 (-)	-	-
2010q4	-1.1	0.2 (-)	1.3 (-)	1.9 (-)	-
2011q3	-1.6	-0.8 (-)	0 (-)	2.2	-1.8 (-)
2013q4	-1.9	-2.2	-1.8 (-)	-1	-0.2 (-)
2015q4	-1.5	-2.2	-2	-2.2	-1.8
2018q4	-0.3	-0.8	-1.1	-1.8	-1.9

GDP	2007q3	2008q4	2009q3	2010q4	2011q3
2007q3	0	-	-	-	-
2008q4	-0.5	0	-	-	-
2009q3	-0.9	-0.2 (-)	0 (-)	-	-
2010q4	-1.1	-1.1 (-)	-0.5 (-)	0	-
2011q3	-1	-1.2 (-)	-0.9 (-)	-0.24	0
2013q4	-0.6	-1	-0.9	-1.18	-1.1
2015q4	-0.2	-0.5	-0.6	-0.91	-1
2018q4	0.2	0.1	0	-0.29	-0.5

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RELEASING – EXPECTED EFFECTS ON HOUSEHOLD CREDIT OVER THE CYCLE

Conditional forecast – capital release during recessions (household credit)

Capital ratio	2007q3	2008q4	2009q3	2010q4	2011q3
2007q3	-1	-	-	-	-
2008q4	-0.9	-1	-	-	-
2009q3	-0.8	-0.9	-1	-	-
2010q4	-0.8	-0.9	-0.93	-1	-
2011q3	-0.6	-0.9	-0.9	-1	-1
2013q4	-0.3	-0.6	-0.65	-0.8	-0.97
2015q4	-0.1	-0.2	-0.35	-0.58	-0.72
2018q4	0.2	0.2	0.07	-0.09	-0.22

Credit	2007q3	2008q4	2009q3	2010q4	2011q3
2007q3	2.1	-	-	-	-
2008q4	2.3	2.3 (-)	-	-	-
2009q3	1.6	3 (-)	2.2	-	-
2010q4	0.5	1.7 (-)	2.4	2.4 (-)	-
2011q3	0	1 (-)	1.7	3.1 (-)	2.4 (-)
2013q4	-1.4	-0.8	-0.3	0.8 (-)	1.6 (-)
2015q4	-1.9	-1.8	-1.4	-0.8	-0.3
2018q4	-1.6	-2.1	-2	-2.1	-1.9

GDP	2007q3	2008q4	2009q3	2010q4	2011q3
2007q3	0	-	-	-	-
2008q4	0	0 (-)	-	-	-
2009q3	-0.1	0 (-)	0	-	-
2010q4	-0.5	-0.1 (-)	0	0 (-)	-
2011q3	-0.7	-0.3 (-)	0.1	0.1 (-)	0.1 (-)
2013q4	-0.7	-0.8	-0.7	0.3 (-)	-0.3 (-)
2015q4	-0.7	-0.8	-0.8	-0.8	-0.8
2018q4	-0.3	-0.6	-0.7	-0.8	-0.9

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AND THE BROADER PICTURE…..

How do our findings fit with other findings in the literature?

Comparison to other studies – results for Spain

Coefficients/ Models	Reference	IRF-Total credit	IRF-Credit to households	IRF-Credit to firms	IRF-GDP	Sample period used for calibration/ estimation
Structural BVAR	**Gerba and Mencia (2019)**	**-1,1%****	**-1.2%****	**-1 %****	**-0,4%***	**1993-2015**
3D - DSGE	Clerc et al (2015) within OMRTF (ECB)	-1,39%	-1,76%	-1%	-0,32%	2001-2014
Factor Augmented VAR	Buch et al (2012) within OMRTF (ECB)	-2,85%* (cumulative)	-	-	-1,16%* (cumulative)	2000-2015
Linear probability and IV microeconometric models	Anguren and Jimenez (2017)	-7,5% (3-year cumulative)*	-	-	-	2008-2015

** Significant at 95%
* Significant at 90%
Tests of significance are not applicable to the theoretical model (3D)
FAVAR model reports the accumulated IRFs, not the peak or impact IRF.

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Comparison to other studies – cross-country studies

Country	Sample period	Reference	IRF – bank credit to firms	IRF-bank credit to household	IRF – non-bank credit	IRF – excess return	IRF - GDP
Spain	**1993 :Q1 – 2015:Q3**	**Gerba and Mencia (2019)**	**-1%****	**-1.2%****	**+2,9%***	**-2.4%****	**-0,4%***
UK	1986:Q1 – 2010:Q1	Noss and Toffano (2016)	-(0,2 – 0,35%)*		+0,75%*	-3%*	not significant
Euro Area	1999 - 2015	Kanngiesser et al (2016)	-0,6%**	-0,2%**	-	-	-0,25%**

Note that the confidence interval of the estimated IRFs for Euro Area includes the lower estimates for Spain.
** Significant at 95%
* Significant at 90%

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THANK YOU FOR YOUR INTEREST AND ATTENTION