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Working Paper

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CESifo Working Paper, No. 10958

Provided in Cooperation with:
Ifo Institute – Leibniz Institute for Economic Research at the University of Munich

Suggested Citation: Caporale, Guglielmo Maria; Alessi, Matteo (2024) : Cooperative Credit Banks and Economic Fluctuations: The Italian Case, CESifo Working Paper, No. 10958, Center for Economic Studies and ifo Institute (CESifo), Munich

This Version is available at:
https://hdl.handle.net/10419/296047

CESifo WORKING PAPERS

10958
2024

February 2024

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CESifo

Impressum:

CESifo Working Papers
ISSN 2364-1428 (electronic version)
Publisher and distributor: Munich Society for the Promotion of Economic Research - CESifo GmbH
The international platform of Ludwigs-Maximilians University's Center for Economic Studies and the ifo Institute
Poschingerstr. 5, 81679 Munich, Germany
Telephone +49 (0)89 2180-2740, Telefax +49 (0)89 2180-17845, email office@cesifo.de
Editor: Clemens Fuest
https://www.cesifo.org/en/wp
An electronic version of the paper may be downloaded
· from the SSRN website: www.SSRN.com
· from the RePEc website: www.RePEc.org
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CESifo *Working Paper No. 10958*

Cooperative Credit Banks and Economic Fluctuations: The Italian Case

Abstract

This paper analyses lending behaviour and economic fluctuations in the Italian banking system as a whole and in the case of the Cooperative Credit Banks (CCBs) using time series data from 2000Q1 to 2022Q4. The specified models include the main determinants of loans to households and firms. In the first stage, VECMs are estimated to identify the long-run relationship between credit and economic variables. In the second, on the basis of appropriate exogeneity tests, only the credit variables are treated as endogenous, and all others as exogenous. Specifically. ECMs are estimated for both loans to households and loans to firms at the national level as well as from the CCBs only. The results suggest that lending behaviour is less affected by economic fluctuations in the case of the CCBs, namely these tend to reduce credit by less or not at all during economic downturns. The reason is that relationship lending enables CCBs to gather confidential (non-public) information about their clients, which can aid lending decisions and reduce credit rationing during such phases.

JEL-Codes: G010, G210.

Keywords: cooperative credit banks, bank lending, financial systems, economic cycles.

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February 2024
The authors are grateful to Juan Sergio Lopez, Roberto Golinelli, Silvio Giglio, Giovanni Ferri and Eric Meyer and other participants at the 14th International Eurisce Workshop on "Cooperative Finance and Sustainable Development" for their useful comments. The views expressed are those of the authors and do not necessarily reflect those of Federcasse.

1. Introduction

In recent decades, the financial sector has significantly influenced macroeconomic outcomes in various countries. In particular, its procyclicality appears to have amplified swings in the real economy. A common explanation for this phenomenon focuses on information asymmetries between borrowers and lenders. During economic downturns, when collateral values are low, even borrowers with profitable projects may struggle to obtain funding owing to information asymmetries. By contrast, as economic conditions improve and collateral values rise, these become able to access external finance, thereby contributing to the economic recovery. In this context, Cooperative Credit Banks (CCBs) could play a crucial role in mitigating the effects of the economic cycle on credit supply, especially during recessions, thanks to their distinctive business model and governance. Owing to their long-term relationships with firms, entrepreneurs, households, and local communities, CCBs are able to collect a greater amount of (soft) information about each borrower and their relevant markets. This helps to reduce information asymmetries often resulting in credit rationing, particularly during economic downturns.

This paper analyses lending behaviour and economic fluctuations in the Italian banking system as a whole and in the case of the CCBs using time series data from 2000Q1 to 2022Q4. More specifically, it examines the main determinants of loans to households and firms to evaluate the sensitivity of credit behaviour to the economic cycle. In the first stage, Vector Error Correction Models (VECMs) are estimated to identify the long-run relationship between credit and economic variables. In the second one, on the basis of appropriate exogeneity tests. only the credit variables are treated as endogenous, and all others as exogenous. Specifically, Error Correction Models (ECMs) are estimated for both loans to households and loans to firms at the national level as well as from the CCBs only. The third stage of the analysis focuses on the credit behaviour of the CCBs during economic recessions. The main findings can be summarised as follows: credit appears to be affected by the business cycle and tends to be pro-cyclical; however, the lending behaviour of the CCBs is less responsive to economic fluctuations, namely they tend to reduce credit by less or not at all during economic downturns.

The paper is organised as follows. Section 2 reviews both the theoretical and empirical literature. Section 3 describes the data and presents some preliminary statistics. Section 4 outlines the empirical methodology and discusses the main results. Section 5 offers some concluding remarks.

2. Literature Review

There exists an extensive literature on the procyclical behaviour of banks which focuses on the impact of macroeconomic fluctuations on their performance. The present paper contributes to this strand by examining the response of credit variables to economic fluctuation and also the lending behaviour of the CCBs during economic cycles. Procyclicality is characterised by an underestimation or overestimation of the risks faced by the banking sector. This leads to high growth during the upward phase of the cycle, and to sharp falls during downturns which are characterised by strong risk aversion. This constrains the supply of loans owing to banks' concerns about loan portfolio quality and the probability of default. Thus, the banking sector, rather than being an effective mechanism for allocating funds, exacerbates cyclical fluctuations, hindering the efficient allocation of resources in the economy and adversely affecting credit growth and financial stability. Various theoretical and empirical studies have attempted to explain this behaviour.

Bikker and Hu (2002) found a negative correlation between credit growth and the unemployment rate. Casolaro and Gambacorta (2005) examined the relationship between loans to households and macroeconomic variables in Italy. They found a long-term relationship between loans to households, GDP, the share price index, house prices, and interest rates. Craig et al. (2006) analysed the reaction of various banks' indicators, including real loan growth, interest receipts to assets, and loan loss provisions, to the economic cycle in 11 East Asian countries from 1996 to 2003. Their results suggest a positive correlation between real loan growth and GDP growth. Casolaro and Gambacorta (2006) investigated the lending behaviour of Italian banks from 1988 to 2004 using a cointegration approach. They found a long-term relationship between loans to firms, the capital stock, the ratio of investment to gross operational margin, and the spread between the interest on firm loans and the interbank interest rate. In the long run, the growth of loans to firms appears to be positively associated with the capital stock and the ratio of investment to gross operational margin, and negatively associated with the spread.

Micco and Panizza (2006) analysed a large sample of 119 countries from 1995 to 2002, including macro and bank-specific explanatory variables. Their empirical results suggest a positive association between the change in loans and GDP growth. Further, the association with macro indicators appears to be weaker for domestic banks compared to foreign and state-owned banks. Bouvatier and Le Petite (2008) obtained similar results; specifically, using annual data from 1992 to 2004 for 15 European countries they found a positive association between loan growth and GDP growth, as did Aydin (2008) for 10 CEE countries. Fritzer and Reiss (2008) analysed the determinants

of the stock of bank credit in Austria between 1981 and 2007 by estimating a VECM; they concluded that real GDP fluctuations are the main determinant of credit behaviour.

Goodhart (2008) investigated the drivers of credit growth in the US and the UK between 1995 and 2005. He found that changes in house prices have a significant positive effect on credit growth in the UK, but not in the US. Aisen and Franken (2010) estimated the main determinants of bank credit growth during the 2008 financial crisis for a sample of over 80 countries. Their study reveals that the most significant factors contributing to the post-crisis bank credit slowdown were larger bank credit booms before the crisis and the lower GDP growth of trading partners. Olivero et al. (2011) found a positive correlation between changes in loans and GDP growth in 10 Asian and 10 Latin American countries. Goodhart and Hoffman (2008) provided cross-country evidence of a long-term relationship between bank credit, GDP, and residential property prices. Gambacorta and Marques-Ibanez (2011) analysed data for the US and 14 European Union member states from 1999 to 2009. They found that changes in banks' business models and market funding patterns had altered the monetary transmission mechanism in Europe and the US before the 2008 crisis, which led to further structural changes. Sanfilippo-Azofra et al. (2018) and Beutler et al. (2020) argued that monetary policy is the primary determinant of banks' credit supply. Specifically, expansionary monetary policies stimulate loans, thereby increasing access to banks' loanable funds; conversely, contractionary policies decreasing banks' loan supply hinder borrowers' access to banks' loanable funds (Sanfilippo-Azofra et al., 2018).

Our analysis is also related to the literature on the lending behaviour of CCBs, and focuses in particular on the impact of economic downturns. De Mitri et al. (2010) analysed the impact of relationship lending variables on credit growth for firms and found that they mitigate credit contractions. Barboni and Rossi (2012) demonstrated that firms financed by local banks have a lower probability of being credit rationed during a crisis. Gobbi and Sette (2013) showed that firms benefited from closer bank lending relationships after the 2008 crisis, which resulted in higher credit growth and lower interest rates. Presbitero et al. (2014) concluded that firms operating in credit markets with a strong presence of 'functionally close banks' experienced less credit rationing compared to those in functionally distant credit markets. Deloof and La Rocca (2015) found that the presence of CCBs is associated with a reduction in the demand for trade credit – a lower dependency on trade credit was crucial in avoiding a credit crunch during the crisis.

3. Data and Descriptive Analysis

3.1 Data Sources and Definitions

The dataset consists of 10 quarterly series covering the period from March 2000 to December 2022, for a total of 92 observations in each case The sources are the Bank of Italy, Istat (the Italian Office for National Statistics), and the OECD (see Table 1 for a full list of the series and the corresponding source).

The data can be divided into two subsets. The first includes the bank's loan behaviour variables, such as loans to households and loans to firms, at the national level (LOAN_HOU_ITA, LOAN_FIR_ITA), and also for the subset of Italian Cooperative Credit Banks (LOAN_HOU_CCB, LOAN_FIR_CCB). The second includes macroeconomic and financial variables, namely: real GDP (GDP - if the lending behaviour of banks is procyclical, a positive association between loans and real GDP growth is expected); real consumption expenditure (CONS - following Casolaro and Gambacorta (2005), loans to households are expected to be influenced by the level and dynamics of private consumption, which could drive the demand for loans); the real house price index (HOUSE), which is the average price per quarter set equal to 100 in Q4 2015 (an increase in this index may lead to higher demand for loans, particularly for mortgages). The additional variables, which relate to the cost of financing, are the following: the interest rate on loans to households (IR_HOU, which is expected to have a negative relationship with loans to households); the difference between the interest rate on loans to firms and the interbank 3-month interest rate (SPREAD - following Casolaro et al. (2006), this variable can be seen as an indicator of the cost for the firm of financing investment plans through the banking channel compared to other financing options, such as bond issues).

3.2 Descriptive Analysis

Figure 1a displays the annual rate of change of loans to households at the national level and for the CCBs from 2001 to 2022. Both series experienced high growth rates in the early 2000s. The average annual growth rate for the period 2001-2007 (prior to the Lehman Brothers Crisis) was approximately 9.8% at the national level and over 10% for the CCBs. Growth became negative during the sovereign debt crisis of 2012. During the Covid period of 2020-2022, state guarantees stimulated loans. Figure 1b shows the annual rate of change of loans to firms at the national level and for the CCBs. It can be seen that growth rates became negative from 2012, indicating that the sovereign debt crisis severely affected loans to private firms. State financial support during the Covid-19 pandemic appears to have sustained credit to non-financial institutions in the period 2020-2021.

Figure 2 shows the annual rate of change of real GDP and consumption. The sample period covers three major recessions that hit the Italian economy. The first followed the collapse of Lehman Brothers. In 2009, Italian real GDP fell by 5.3%, compared with a fall of 0.9% in the previous year. The sovereign debt crisis also hit European countries hard. In Italy, the fall in real GDP in 2012 was 3 percentage points. In 2013 the decline was 1.8%. In the following years, macroeconomic performance was weak, although GDP growth was still positive. In 2020, the Covid-19 pandemic affected the world economy dramatically. In that year Italian real GDP fell by 9%. Figure 3 shows the dynamics of real house prices in Italy. These exhibited an upward trend in the early 2000s and peaked in 2008. They started to fall after the Lehman crisis, before stabilising from 2013.

Finally, Figure 4 displays the interest rate variables. From 2000 to 2009, the average value of interest rates on loans to households (firms) was around 6.4% (5.2%), whilst from 2010 to 2022 it was 3.5% (2.7%). From 2015 the interbank interest rate became negative as a result of the ECB's highly expansionary monetary policy. Both interbank and lending rates started to increase in 2022, when monetary policy became restrictive in response to the high inflation.

Table 2 presents some descriptive statistics. At the national level, loans to households ranged from 219 to 672 million euro, while loans to enterprises averaged 711 million euro. The index for real house prices reached a maximum of 136.3 in 2007. The average interest rate on loans to households was around 4.7%, while the spread between the interest rate on loans to firms and the three-month interbank interest rate averaged 2.4%.

4. Econometric Analysis

The empirical investigation is divided in three parts. In the first one (Baseline Model), all variables are treated as endogenous. In the second, four separate equations are estimated in which the credit variables are treated as endogenous and all others as exogenous given the results of the exogeneity tests. The third part focuses on the credit behaviour of the CCBs during economic recessions.

4.1 The Baseline Model

Table 3 shows the four different specifications we estimate. The first two models include loans to households at the national level (LOAN_HOU_ITA) and from the CCBs (LOAN_HOU_CCB) as well as real consumption expenditure (CONS), the house price index (HOUSE) and the interest rate on loans to households (IR_HOU). Models 3 and 4 include, respectively, loans to enterprises at the national level (LOAN_FIR_ITA) and from the CCBs (LOAN_FIR_CCB) in addition to real GDP

(GDP) and the interest rate spread (SPREAD). All the variables, with the exception of IR_HOU and SPREAD, are in logarithmic form. The VAR model can be represented as follows:

$$y_t = \mu + \sum_{i=1}^{p} \phi_i y_{t-i} + \varepsilon_t \qquad t = 1, \dots, T \tag{1}$$

Univariate time series analysis suggests that all series are I(1). Tables 4 and 5 summarise the results of the ADF and Phillips-Perron unit root tests for all series. Since all of them are non-stationary, the next step is to test for possible cointegration relationships linking them. The Johansen trace test implies that there is a single cointegrating vector in each of the four different models (see Table 6). [1] Therefore a VECM can be estimated in each case. The lag orders (p) are chosen on the basis of the Schwarz information criterion as well as the autocorrelation analysis of the residuals. The latter also suggests the inclusion of impulse dummy variables.

The results for models 1 and 2 are shown in Table 7. In order to be able to provide an economic interpretation for the long-run relationships, the two cointegrating vectors corresponding to those two models are rewritten in the following way:

$$LOG(LOAN\_HOU\_ITA) = 0.68 * LOG(CONS) + 0.98 * LOG(HOUSE) - 0.14 * IR\_HOU \tag{2}$$

and:

$$LOG(LOAN\_HOU\_CCB) = 2.41 * LOG(HOUSE) \tag{3}$$

In model 2, the coefficient on LOG(CONS) in the cointegrating vector was not found to be significant in the first round of estimation, so the model was estimated again with a zero restriction on this coefficient. [2] The loading factors were also found not to be significantly different from zero for all equations, with the exception of those on ΔLOG(LOAN_HOU_ITA) and ΔLOG(LOAN_HOU_CCB). In the long run, CCB loans to households do not seem to be affected by consumption, while house prices play a significant role. The sign of the coefficient associated with the interest rate is negative and significant only at the national level.

Table 8 shows the results of the VECM estimations for models 3 and 4. The corresponding cointegrating vectors can be rewritten as:

$$LOG(LOAN\_FIR\_ITA) = 1.07 * LOG(GDP) - 0.74 * SPREAD \tag{4}$$

[1] Due to the presence of dummy variables, the critical values of the test are to be considered indicative.
[2] A LR test for binding restrictions was performed.

and

$$LOG(LOAN\_FIR\_CCB) = 0.84 * LOG(GDP) - 0.33 * SPREAD \quad (5)$$

Loans to firms granted by the CCBs are related in the long run to GDP growth and the interest rate spread. However, the cointegrating coefficient on GDP appears to be smaller than at the national level. Also, in this case the credit behaviour of the CCBs seems to be less sensitive to the business cycle.

It is interesting to carry out a variance decomposition for each of the four models (see Figures 5 to 8). As can be seen from Figure 5, for model 1 a large percentage of the variance in the medium to long term is explained by the house price index and the interest rate on loans to households. Real final consumption expenditure accounts for a higher percentage of the variance in model 1 compared to model 2 (see Figures 5 and 6). As for the variance of loans to households from CCBs, a large percentage is associated with the house price index, while the role of the interest rate and real consumption expenditure is rather limited. Figures 7 and 8 show the variance decomposition for models 3 and 4. One can see that the variance explained by real GDP is higher for loans to enterprises at the national level. This is not surprising given the VECM results discussed above.

4.2 Single equation estimation

In the previous sub-section, all variables were treated as endogenous. In the present one, the credit variables are treated as endogenous and all other variables as exogenous given the results of the exogeneity tests carried out (see Table 9). This allows us to estimate four single equations in which loans to households at the national level (LOAN_HOU_ITA), loans to households from the CCBs (LOAN_HOU_CCB), loans to firms at the national level (LOAN_FIR_ITA) and loans to firms from the CCBs (LOAN_FIR_CCB) are treated as endogenous in turn and the other variables as exogenous (see Table 10). In order to identify possible long-run relationships, we specify the four equations as ECMs, namely:

$$\Delta Y_t = \mu + \sum_{i=1}^{n-1} \alpha_i \Delta Y_{t-i} + \sum_{i=0}^{m-1} \sum_{j=1}^{p} \gamma_{j,i} \Delta X_{j,t-i} - \pi \epsilon_{t-1} + \varepsilon_t \quad (6)$$

where (6) is a generalization for p number of covariates $X_{j,t}$ and π is the error correction coefficient. All four equations are estimated using the Two Stage Least Square method. Again, a set of impulse and step dummies are included in the regressions. The number of lags is chosen as to avoid serial correlation. All variables, except IR_HOU and SPREAD, are in logarithmic form.

The estimates for Equations 1 and 2 are reported in Table 11. The results for Equation (1) indicate a long-term relationship between loans to households at the national level and the other variables. The loading coefficient, though highly significant, is small (0.03), which implies a slow adjustment process towards the long-term equilibrium in response to exogenous shocks. The long-term coefficient associated with real consumption is 0.702, a value similar to those estimated for the VECM. The variable IR_HOU has an effect both in the short and long run, while the house price index is significant only in the cointegrating relationship. The error correction term was not found to be statistically significant in the equation for CCB loans to households. It appears that changes in the house price index are the only factor influencing the short-run dynamics of this variable, together with the autoregressive component.

Table 12 shows that the error correction term is significant in both equations (3) and (4). The long run coefficient for GDP in Equation (3) is 1.07, which is higher than the value estimated for the Equation (4) concerning the CCBs (0.84). This suggests that the credit behaviour of the CCBs is less sensitive to the business cycle, which confirms the VECM results. There is also a lower (and negative) long- term coefficient associated with the SPREAD.

4.3 Cooperative Credit Banks and recessions

This sub-section focuses on possible asymmetric effects in the CCBs' lending behaviour. Specifically, we investigate the impact of economic recessions on CCB credit, which could cause a reduction in loans and credit rationing. We introduce a dummy variable, DOWNTURN, which takes the value of 1 in quarters with negative GDP growth and 0 otherwise. We then estimate Equation (2) and (4) again, including the variable DOWNTURN (Equation (5) and (6)). The results (see Tables 13 and 14) indicate that the coefficient on the dummy DOWNTURN is not statistically significant for both loans to households and loans to firms. This implies that the CCBs do not tend to reduce credit during economic downturns. Recessions may have a detrimental effect on credit, especially in countries like Italy where bank credit is the primary source of external financing for the productive sector. In this context, Cooperative Credit Banks may have experienced different dynamics in terms of lending, avoiding or limiting credit rationing. This is due to their intermediation model, which is more oriented towards relationship lending, and their informational advantages resulting from their direct knowledge of the business structure and the establishment of long-term credit relationships.

Small cooperative banks, in fact, do not distribute profits and are required by law to provide credit in their area. This business model facilitates proximity to customers, which has been shown by a recent study (Alessandri and Bottero 2017) to reduce uncertainty shocks (often coinciding with periods of

crisis). The large market share of the CCBs in some categories of loans to firms (and in loans to households) makes their countercyclical performance relevant from a macroeconomic point of view. Barone et al. (2016) constructed an innovative credit supply index at the local level to test the relationship between the evolution of this index and the development of local value added over the period from 2008 to 2011. Their results indicate that the decline in credit supply explains about 13 per cent of the reduction in value added that occurred during the crisis. This effect is also present for employment, although the elasticity is less pronounced in this case. It is also worth noting that the effect of the reduction in the supply of credit is more pronounced for small firms and for those sectors (manufacturing and services) and provinces (in the Centre and the North) that are more dependent on external sources of finance. Berton et al. (2017) analysed a granular database containing information on labour contracts, firms and lending banks for the Veneto region for two hundred thousand firms over the period from 2008 to 2012. Their estimates suggest that a 10 percent reduction in credit supply led to a 3.6 percent fall in employment.

5. Conclusions

This study examines the main determinants of loans to households and firms in the Italian banking system as a whole and in the case of the Cooperative Credit Banks (CCBs) using time series data from 2000Q1 to 2022Q4. The analysis involves estimating VECMs to identify the long-run relationship between credit and economic variables. The results indicate that, in the long run, consumption does not affect CCB loans to households, although it has a statistically significant effect at the national level. House prices, on the other hand, play a significant role. The coefficient on the interest rate is negative and significant only at the national level. Loans granted by the CCBs to firms are related in the long run to GDP growth and the interest rate spread. However, the coefficient on GDP in the cointegrating vector is smaller than the corresponding one at the national level. The results from the ECM estimation are consistent with the VECM ones. Finally, the obtained evidence suggests that the CCBs do not tend to reduce credit during economic downturns. One possible explanation is that cooperative banks establish long-term relationships with firms, entrepreneurs, households, and local communities through relationship lending. Over time, they acquire an increased amount of (soft) information about each borrower and their relevant markets. Cooperative banks can use this approach to reduce information asymmetries that often lead to credit rationing, especially during economic downturns.

Our findings have importance policy implications. Specifically, they suggest that policy makers should encourage a diversified banking sector including local banks operating under

cooperative governance, since this reduces the impact of the credit crunch that often characterises economic downturns.

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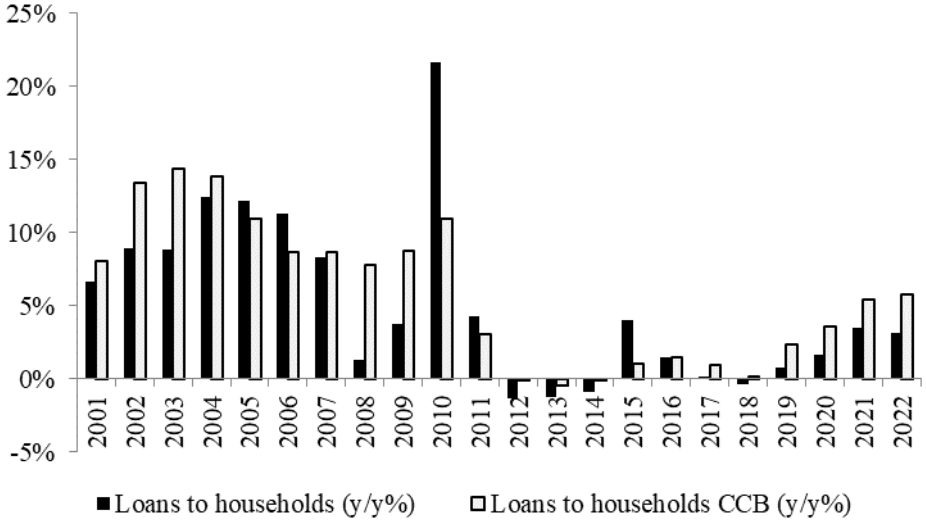
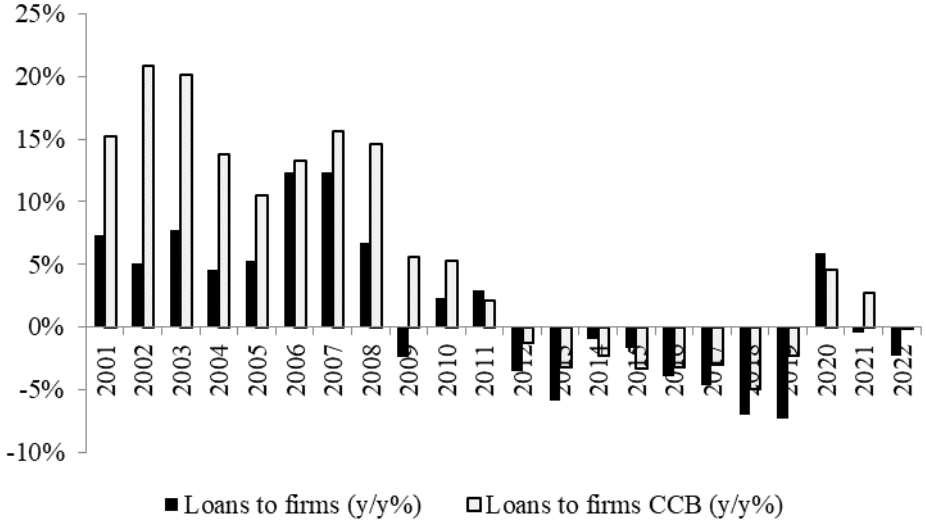
Figures and Tables

***Figure 1a**. Loan to Households*



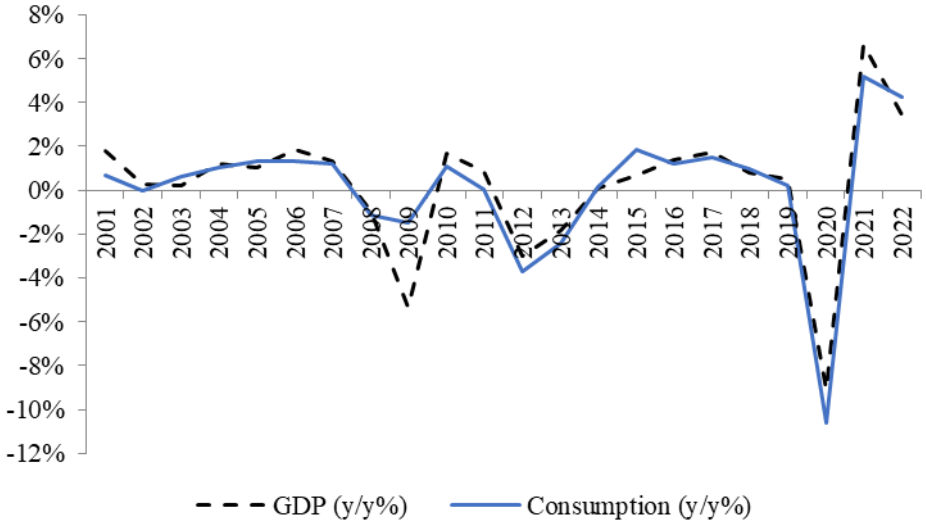
Note. Annual growth of Loan to Households (National Level and CCB)
Source: Authors' calculations using data from Bank of Italy

***Figure 1b**. Loan to Firms*



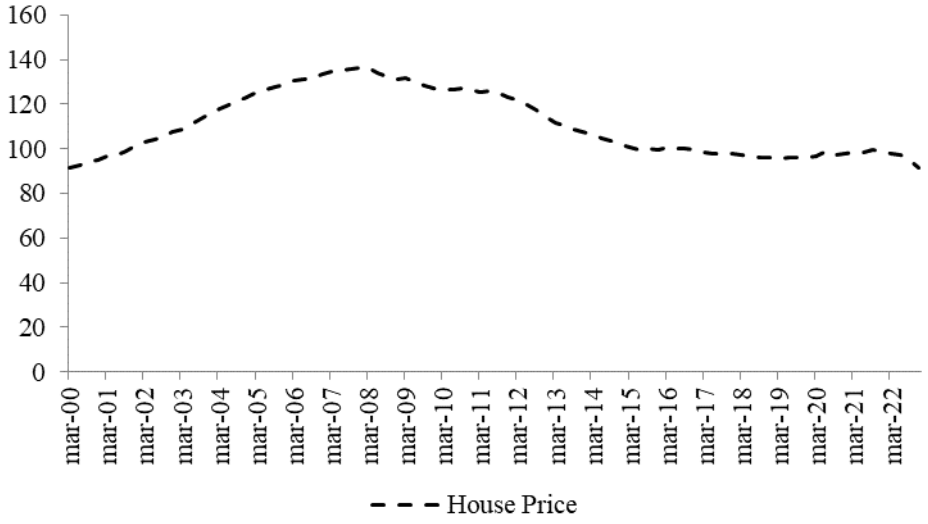
Note. Annual growth of Loan to Firms (National Level and CCB)
Source: Authors' calculations using data from Bank of Italy

***Figure 2**. Real GDP and Consumption*



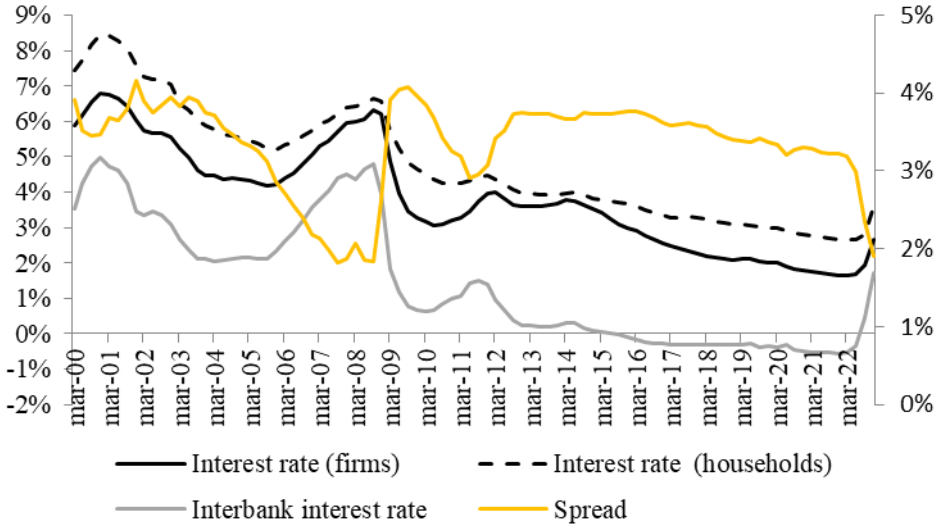
Note. Annual growth of Real GDP and Private Consumption
Source: Authors' calculations using data from ISTAT

***Figure 3**. House Price*



Note. Quarterly data. Index = 100 in 2015
Source: Authors' calculations using data from OECD

***Figure 4**. Interest Rates*



Note. Quarterly data.
Source: Authors' calculations using data from Bank of Italy and Bloomberg

***Figure 5**. Variance Decomposition: Model 1*

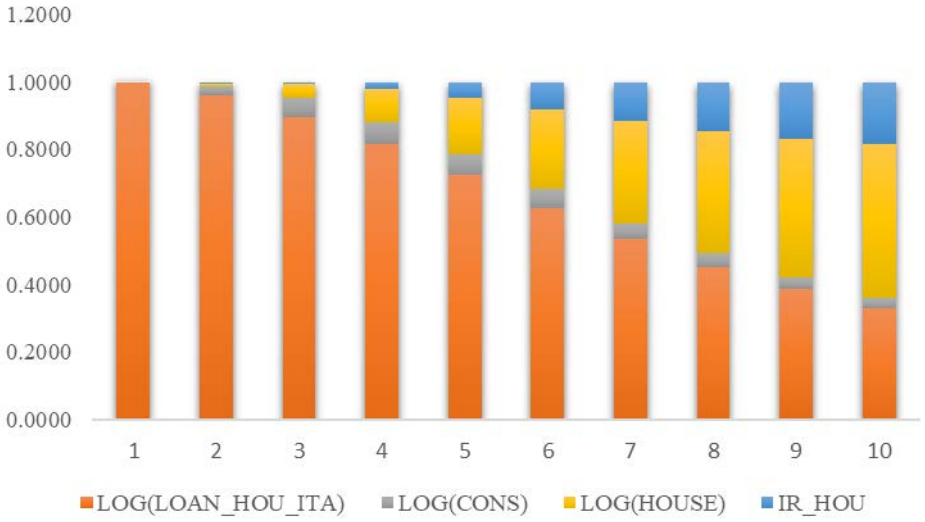


***Figure 6**. Variance Decomposition: Model 2*

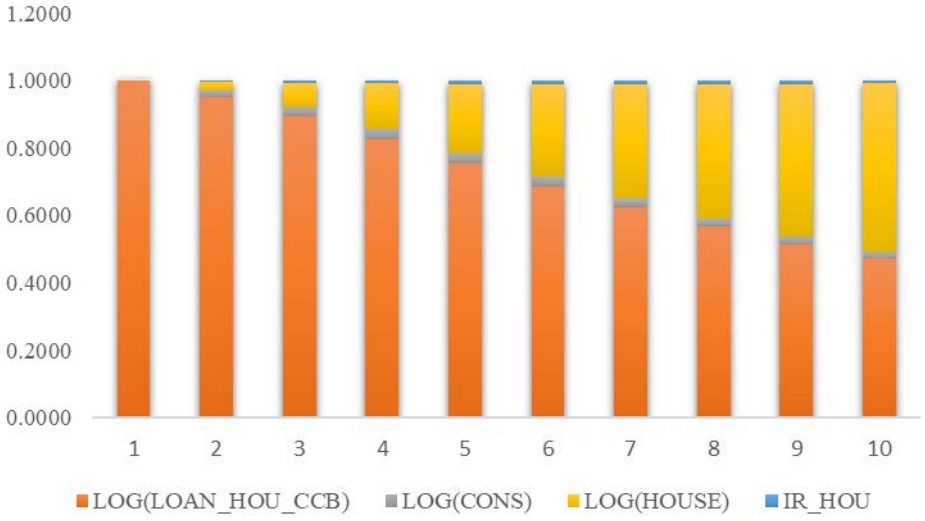


***Figure 7**. Variance Decomposition: Model 3*

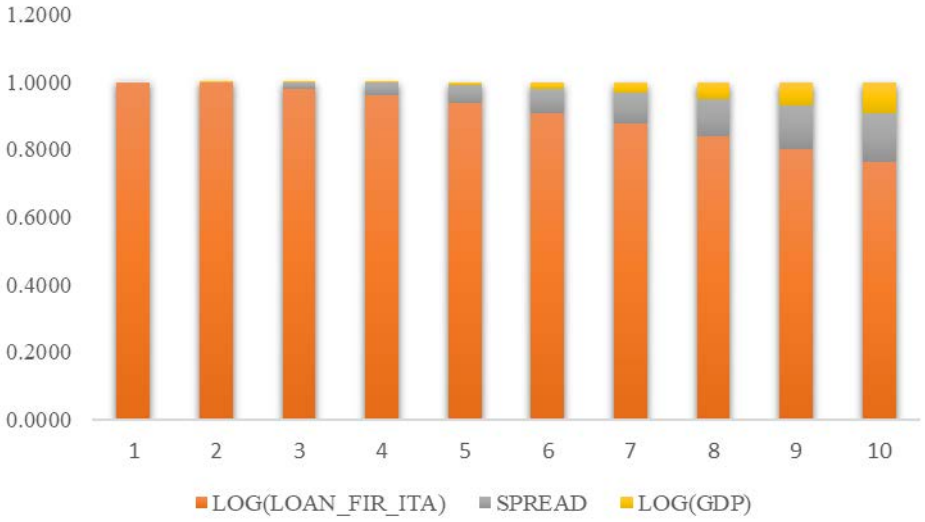


***Figure 8**. Variance Decomposition: Model 4*

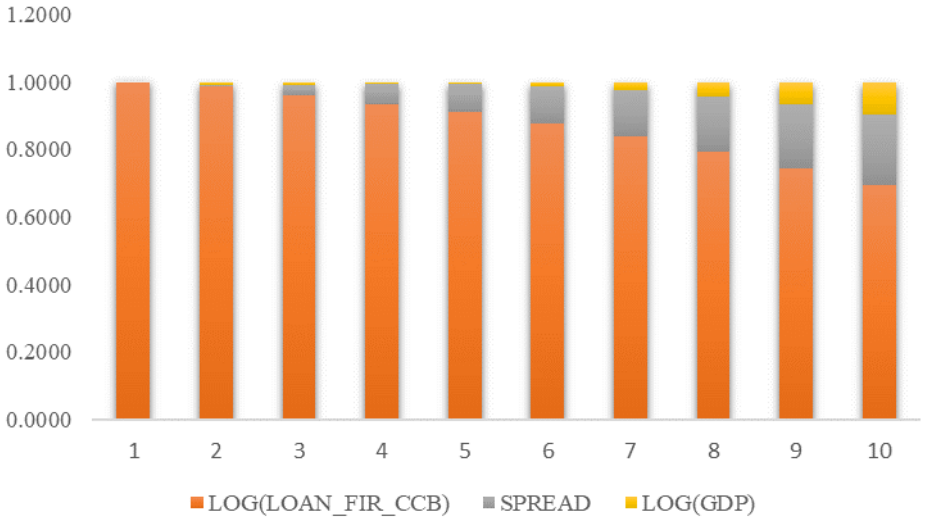


***Table 1**. List of variables*

Variable	Definition	# Observations	Source
LOAN_HOU_ITA	Loans to households – National level	92	Bank of Italy
LOAN_FIR_ITA	Loans to firms -National Level	92	Bank of Italy
LOAN_HOU_CCB	Loans to households – CCB	92	Bank of Italy
LOAN_FIR_CCB	Loans to firms -National Level	92	Bank of Italy
GDP	Annualized quarterly GDP	92	Istat
CONS	Annualized quarterly Private Consumption Expenditures	92	Istat
HOUSE	House Price Index	92	OECD
IR_HOU	Interest rate on loans to households	92	Bank of Italy
SPREAD	Difference between the interest rate on loans to firms and the three months interbank interest rate	92	Bank of Italy and Bloomberg

Note. Istat is the Italian Office of National Statistics.

***Table 2**. Summary statistics for the main variables*

	Mean	*St. Dev*	Minimum	*Maximum*
LOAN_HOU_ITA	496919	144618	219367	672516
LOAN_FIR_ITA	711182	126988	432988	906174
LOAN_HOU_CCB	50225	15442	19939	72261
LOAN_FIR_CCB	55979	17095	18849	75219
GDP	1700059	53927	1413223	1812906
CONS	1021347	32179	858843	1068556
HOUSE	110.94	14.39	91.48	136.30
IR_HOU	0.0476	0.0162	0.0264	0.0844
SPREAD	0.0241	0.0057	0.0096	0.0348

Source: Bank of Italy, Istat, OECD and Bloomberg

Table 3 *Model Specification*

Model (1)			
LOAN_HOU_ITA	*CONS*	*HOUSE*	*IR_HOU*
Model (2)			
LOAN_HOU_CCB	*CONS*	*HOUSE*	*IR_HOU*
Model (3)			
LOAN_FIR_ITA	*GDP*	*SPREAD*	
Model (4)			
LOAN_FIR_CCB	*GDP*	*SPREAD*	

Source: Bank of Italy, Istat, OECD and Bloomberg

Table 4*. ADF Unit Root Test*

	Levels		*First difference*	
	Statistic	*P - value*	*Statistic*	*P - value*
LOAN_HOU_ITA	-1.9041	0.3291	-4.1623	0.0013
LOAN_FIR_ITA	-1.7146	0.4205	-3.4560	0.0115
LOAN_HOU_CCB	-1.5092	0.5243	-3.4260	0.0101
LOAN_FIR_CCB	-2.2997	0.4294	-11.6552	0.0001
GDP	0.1585	0.7298	-11.3010	0.0000
CONS	0.1240	0.7193	-10.5862	0.0000
HOUSE	-1.1546	0.6908	-6.3390	0.0000
IR_HOU	-2.6812	0.0813	-3.4765	0.0109
SPREAD	-1.1938	0.6743	-3.9669	0.0025

Source: Bank of Italy, Istat, OECD and Bloomberg

Table 5*. Phillips- Perron Unit Root Test*

	Levels		*First difference*	
	Statistic	*P - value*	*Statistic*	*P - value*
LOAN_HOU_ITA	-1.8692	0.3453	-6.8195	0.0000
LOAN_FIR_ITA	-2.1978	0.2086	-6.0298	0.0000
LOAN_HOU_CCB	-1.8895	0.3359	-5.2849	0.0000
LOAN_FIR_CCB	-2.7430	0.0708	-4.3571	0.0007
GDP	0.2336	0.7519	-11.3261	0.0000
CONS	0.1776	0.7355	-10.7274	0.0000
HOUSE	-1.0271	0.7408	-2.9341	0.0037
IR_HOU	-1.5032	0.5276	-3.1798	0.0245
SPREAD	-1.1959	0.6735	-5.8755	0.0000

Source: Bank of Italy, Istat, OECD and Bloomberg

Table 6 *Johansen Cointegration test*

	Eigenvalue	*Trace statistic*	*P- Value*
Model (1)			
N° of CE			
None	0.3557	69.5738	0.0017
At most 1	0.1985	30.4375	0.1421
At most 2	0.1088	10.7372	0.4121
At most 3	0.0054	0.4853	0.4860
Model (2)			
N° of CE			
None	0.2850	63.1008	0.0087
At most 1	0.1794	33.2408	0.0765
At most 2	0.1064	15.6412	0.1166
At most 3	0.0612	5.6207	0.1770
Model (3)			
N° of CE			
None	0.4696	77.3344	0.0000
At most 1	0.2009	20.8811	0.0220
At most 2	0.0102	0.9168	0.3383
Model (4)			
N° of CE			
None	0.4712	75.0240	0.0000
At most 1	0.1666	18.3041	0.0515
At most 2	0.0231	2.0823	0.1490

Note. Johansenn trace test critical values of the test are to be considered indicative Due to the presence of dummy variables
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

Table 7: *VECM Results: Model 1 and 2*

	Coint. Eq		St.Error	T - statistic	
Model (1)					
LOG(LOAN_HOU_ITA(-1))	1.000000		-	-	
LOG(CONS)(-1))	-0.689100	***	[0.05368]	[-12.8370]	
LOG(HOUSE)(-1))	-0.942900	***	[0.16322]	[-5.77747]	
IR_HOU(-1)	0.142800	***	[0.01395]	[10.2356]	
Error Correction	ΔLOG(LOAN_HOU_ITA)		ΔLOG(CONS))	*ΔLOG(HOUSE)*	*ΔIR_HOU*
Loading Coeff	-0.040500	***	0.000000	0.000000	0.0237
Model (2)					
LOG(LOAN_HOU_CCB(-1))	1.000000		-	-	
LOG(CONS)(-1))	0.000000		-	-	
LOG(HOUSE)(-1))	-2.411400	***	[0.08310]	[-29.0197]	
IR_HOU(-1)	-0.120700	***	[0.08704]	[-1.38741]	
Error Correction	ΔLOG(LOAN_HOU_ITA)		ΔLOG(CONS))	*ΔLOG(HOUSE)*	*ΔIR_HOU*
Loading Coeff	-0.010400	***	0.000000	0.000000	0.042041

Note. Regression techniques is VECM. *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

Table 8: *VECM Results: Model 3 and 4*

	Coint. Eq		St.Error	T - statistic
Model (3)				
LOG(LOAN_FIR_ITA(-1))	1.000000		-	-
SPREAD(-1)	0.748500	***	[0.35791]	[2.09154]
LOG(GDP(-1))	-1.078500	***	[0.06516]	[-16.5511]
Error Correction	ΔLOG(LOAN_FIR_ITA)		ΔSPREAD	*ΔLOG(GDP)*
Loading Coeff	-0.011100	***	0.000000	0.000000
Model (4)				
LOG(LOAN_FIR_ITA(-1))	1.000000		-	-
SPREAD(-1)	0.331500	***	[0.15028]	[2.20645]
LOG(GDP(-1))	-0.840700	***	[0.02880]	[-29.1931]
Error Correction	ΔLOG(LOAN_FIR_CCB)		ΔSPREAD	*ΔLOG(GDP)*
Loading Coeff	-0.026040	***	0.000000	0.000000

Note. Regression techniques is VECM. *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

Table 9: *Test for exogeneity*

Variables	χ^2	
Model1		
LOAN_HOU_ITA	23.0803	
CONS	4.1387	***
HOUSE	19.3191	**
IR_HOU	20.5110	**
Model 2		
LOAN_HOU_CCB	24.2801	
CONS	3.8374	***
HOUSE	12.8222	***
IR_HOU	20.1903	**
Model 3		
LOAN_FIR_ITA	18.2762	
GDP	4.4788	***
SPREAD	3.9542	***
Model 4		
LOAN_FIR_CCB	39.2177	
GDP	3.3990	***
SPREAD	4.4963	***

Note. Null Hypothesis: Block exogeneity . *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

Table 10: *Single equations specification*

Equation	**Dependant Variable**	**Regressors**
1	LOAN_HOU_ITA	CONS, HOUSE, IR_HOU
2	LOAN_HOU_CCB	CONS, HOUSE, IR_HOU
3	LOAN_FIR_ITA	GDP, SPREAD
4	LOAN_FIR_CCB	GDP, SPREAD

Source: Bank of Italy, Istat, OECD and Bloomberg

Table 11 *ECM estimation results: Eq 1 and 2*

Dependent variable: *ΔLOG(LOAN_HOU_ITA), ΔLOG(LOAN_HOU_CCB)*				
Regressors	Equation (1)		Equation (2)	
LOG(LOAN_HOU_ITA (-1))	-0.037300	***	-	
LOG(LOAN_HOU_CCB (-1))	-		-0.005600	
LOG(CONS(-1))	0.026200	***	-0.001800	
LOG(HOUSE(-1))	0.034500	***	0.020000	*
IR_HOU(-1)	-0.005700	***	0.000400	
ΔLOG(CONS)	0.069700	**	0.041800	
ΔLOG(HOUSE)	0.173400	*	0.152300	
Δ(IR_HOU)	-0.000600		-0.000300	
ΔLOG(LOAN_HOU_ITA (-1))	0.029400		-	
ΔLOG LOAN_HOU_CCB (-1))	-		0.057300	
ΔLOG(CONS(-1))	0.004100		0.010600	
ΔLOG(HOUSE(-1))	0.041100		0.306200	**
Δ(IR_ HOU (-1))	0.012200	*	-0.007400	
ΔLOG(LOAN_HOU_ITA (-2))	0.069600		-	
ΔLOG(LOAN_HOU_CCB (-2))	-		0.196400	**
ΔLOG(CONS(-2))	0.021900		-0.002100	
ΔLOG(HOUSE(-2))	0.058700		-0.003600	
Δ(IR_ HOU (-2))	-0.012500	**	-0.001700	
Observations	89		89	
Dummies	Yes		Yes	
R^2	0.900300		0.780000	
Instruments rank	17		21	
Durbin - Watson	1.904800		2.013700	
J - statistic	1.592900		0.713500	
Prob(J – Statistic)	0.206900		0.398200	

Note. Regression techniques is Two Stage Least Square. *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

Table 12 *ECM estimation results: Eq 3 and 4*

Dependent variable: *ΔLOG(LOAN_FIR_ITA), ΔLOG(LOAN_FIR_CCB)*				
Regressors	Equation (3)		Equation (4)	
LOG(LOAN_FIR_ITA (-1))	-0.018600	***	-	
LOG(LOAN_FIR_CCB (-1))	-		-0.029500	***
SPREAD(-1)	-0.013400	***	-0.010200	***
LOG(GDP(-1))	0.020000	***	0.024900	***
Δ(SPREAD)	-0.008800		0.006000	
ΔLOG(GDP)	-0.021600		0.066900	
ΔLOG(LOAN_FIR_ITA (-1))	0.153300		-	
ΔLOG LOAN_FIR_CCB (-1))	-		0.200500	***
ΔLOG(LOAN_HOU_ITA (-1))	0.029400		-	
Δ(SPREAD(-1))	-0.000100		-0.003500	
ΔLOG(GDP(-1))	-0.068300	**	-0.102700	
Observations	89		89	
Dummies	Yes		Yes	
R^2	0.424600		0.617300	
Instruments rank	13		13	
Durbin - Watson	2.075000		2.001600	
J - statistic	7.468600		2.819100	
Prob(J – Statistic)	0.113100		0.588500	

Note. Regression techniques is Two Stage Least Square. *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

Table 13 *ECM estimation results: Eq 5*

Dependent variable: Δ*LOG(LOAN_HOU_CCB)*		
Regressors	Equation (5)	
LOG(LOAN_HOU_CCB (-1))	-0.007785	
LOG(CONS(-1))	-0.003380	
LOG(HOUSE(-1))	0.029909	***
IR_HOU(-1)	0.000554	
ΔLOG(CONS)	0.032655	
ΔLOG(HOUSE)	0.184618	
Δ(IR_HOU)	0.000975	
ΔLOG LOAN_HOU_CCB (-1))	0.046996	
ΔLOG(CONS(-1))	0.023156	
ΔLOG(HOUSE(-1))	0.362108	***
Δ(IR_ HOU (-1))	-0.011629	*
DOWNTURN	-0.001811	
Observations	89	
Dummies	Yes	
R^2	0.769022	
Instruments rank	18	
Durbin - Watson	2.010717	
J - statistic	0.950076	
Prob(J – Statistic)	0.329700	

Note. Regression techniques is Two Stage Least Square. *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.

Table 14 *ECM estimation results: Eq 6*

Dependent variable: Δ*LOG(LOAN_FIR_CCB)*		
Regressors	Equation (6)	
LOG(LOAN_FIR_CCB (-1))	-0.029693	***
SPREAD(-1)	-0.010370	***
LOG(GDP(-1))	0.024997	***
Δ(SPREAD)	0.004307	
ΔLOG(GDP)	0.083702	
ΔLOG LOAN_FIR_CCB (-1))	0.193625	***
Δ(SPREAD(-1))	-0.005267	
ΔLOG(GDP(-1))	-0.100500	
DOWNTURN	0.002509	
Observations	89	
Dummies	Yes	
R^2	0.618976	
Instruments rank	14	
Durbin - Watson	2.006496	
J - statistic	2.808621	
Prob(J – Statistic)	0.590346	

Note. Regression techniques is Two Stage Least Square. *, ** and *** indicate statistically significance respectively at 10%, at 5% and at 1%.
Source: Authors' calculations Bank of Italy, Istat, OECD and Bloomberg.