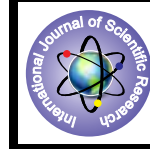


The credit crunch in Italy: a study on the determinants of credit access



Economics

KEYWORDS : Credit crunch, financial crisis, credit supply, credit demand

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ABSTRACT

In the last decade, due to the international financial crisis, banks have tightened lending standards with a relevant increasing of the phenomenon of the credit crunch. The credit crunch represents a restriction of the credit supply by banks to the companies.

The aim of the paper is to investigate the credit crunch in the period 2007-2015 in Italy. The result of the research highlights how the probability of credit rationing has been positively influenced by inflation and by the bank's profitability and negatively by the interest rate on the loans, the real GDP and bonds issued by companies.

Introduction

The lack of credit can cause heavy repercussions on the real economy, leading to a reduction in investment by companies and a fall in consumption by households, and therefore on productive activity and employment.

The paper aims to investigate the credit crunch in the period 2007-2015 in Italy. Although literature and data on credit crunch are very wide, we emphasize that the paper can help to put in evidence how different determinants of demand and supply of credit can influence the probability of credit crunch. The research is developed through a multiple linear regression used to evaluate the demand and supply of credit and a Probit model used to estimate the probability of credit crunch.

Literature Review

In recent years, the attention on credit crunch is more diffuse. Many authors use this term interchangeably with others and to explain a variety of phenomena, such as a financial squeeze caused by a change in monetary policy, a reduction in supply of funds or credit rationing by banks. Also in literature there are different attributions to the definition of credit crunch.

Bernanke and Lown (1991) defined a bank credit crunch as a significant leftward shift in the supply curve for bank loans, and explain that, during a recession, a credit crunch could be the result of reduced demand for credit, contraction in credit supply, or both. In their study of the so-called "capital crunch" in the US in 1990, they demonstrate that both reduced credit supply as well as weak demand effects played a major role in the recession of 1990.

For Berger and Udell (1994) a credit crunch appears if there is a significant reduction in loan supply of credit available to commercial borrowers. According to ECB (2012), the growth of bank credit depends on both supply and demand factors.

Financial crises are usually followed by a reduction in credit and a contraction in gross domestic product (GDP). From this perspective, banks usually reduce the total supply of bank credit after loan losses (Demirguc-Kunt et al., 2006) and shift their loan portfolio towards more creditworthy borrowers (Bernanke et al., 1996). However, it is also nor-

mal for credit demand to fall during a recession, reflecting declines in aggregate demand. Therefore, a demand-side explanation of the fall in lending focuses on the generally weak state of borrowers' balance sheets. This, in turn, leads firms to cut investment and working capital and, ultimately, demand for bank credit (Dell'Araccia et al., 2008; Claessens et al., 2012). Thus, potential borrowers who are more leveraged or possess collateral of lower quality will express lower demand for external finance. Regardless of whether credit supply or credit demand is the constraining factor, the effects of credit rationing (a situation where credit demand exceeds credit supply), especially in times of financial crises, may be serious (Borensztein and Lee, 2002).

Methodology

The methodology used is based on a multiple linear regression and after on a Probit model (Stock and Watson, 2012, p. 146).

Firstly, the method used for the estimation of the coefficients is Ordinary Least Squares (OLS): the coefficients estimators minimize the square of the sum of the prediction errors. For the validity of the estimates the statistic T and the p-value are used. To overcome the problems of heteroskedasticity and autocorrelation standard error Heteroskedasticity and Autocorrelation Consistent (HAC) are used.

Secondly, the Probit model estimate the likelihood of a credit crunch. The predicted probability that $Y = 1$, considering X_1, X_2, \dots, X_k , is obtained by calculating the value-z ($z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k$) and observing the value obtained in the table of the normal distribution. The coefficient β_1 is the variation in the z-value that derives from a unit change in X_1 , maintaining constant X_2, \dots, X_k . The estimator used in these cases is the Maximum Likelihood (ML). The maximum likelihood estimator of the unknown coefficients is given by the value of the coefficients that maximize this function. Through a specific algorithm, ML estimator chooses the value of the parameters to maximize the probability of extracting the data actually observed. Also, the pseudo-R² and the percentage correctly predicted are used to measure the goodness of the model.

Data

For the analysis a dataset including the series of eight variables observed from 2007 to 2015 is used. Data are extract-

ed or processed (in case of monthly data) on a quarterly basis, and the econometric study is conducted on a total of 34 temporal observations. For the dependent variables (demand and supply of credit) the volume of loans granted by Monetary Financial Institutions (excluding the European System of Central Banks) to non-financial companies is used; in particular, the period end balances were taken (stock), considering all the deadlines. The source used is the Statistical Data Warehouse of the European Central Bank, Istat, and Eurostat.

The independent variables used are:

Real gross domestic product (GDP);

NFC Bonds. The period end balances (stock) of securities (different from shares), excluding financial derivatives, issued by non-financial corporation's resident in Italy are used;

Inflation rate;

Lending Interest rate;

Spread (as different between Lending Interest rate and Deposit Interest rate);

Lending capacity (as the sum of volume of deposits and net worth).

The econometric model

The results of the OLS estimates of demand and supply of credit to Italian non-financial firms are shown in Table 1.

Table 1 Estimates of demand and supply of credit to Italian non-financial firms

On the demand side		On the supply side	
Dependent Variable: NFC Loans (ln)		Dependent Variable: NFC Loans (ln)	
Explanatory Variable	Coefficient (Standard Error)	Explanatory Variable	Coefficient (Standard Error)
Const.	3.858** (1.799)	Const.	-
NFC Loans (t-1) (ln)	0.5816*** (0.0722)	NFC Loans (t-1) (ln)	0.843*** (0.0759)
Real GDP (ln)	0.1756* (0.0999)	Real GDP (ln)	0.3513*** (0.0602)
Inflation Rate	0.0094*** (0.0027)	Inflation Rate	0.1643 (0.1032)
L e n d i n g Interest Rate	-0.0083 (0.0050)	L e n d i n g Interest Rate	-0.0952*** (0.0212)
NFC Bonds (ln)	-0.0340** (0.0145)		
R-squared	0.897	R-squared	0.893
SER	0.0135	SER	0.0135
d Durbin-Watson	1.44	d Durbin-Watson	1.82

* Significant at the 0.1 probability level.

** Significant at the 0.05 probability level.

*** Significant at 0.01 probability level.

(-) p-value ≥ 0.15

As regards the demand of credit, the results show the robustness of the model, in fact, all the coefficients have the expected sign and, also, the majority of them are significant.

The choice of using the dynamic model proposed by Schmidt and Zwick (2012) seems to be correct, as the evidence indicates a strong relationship between the demand of credit in the period t and the volume of loans granted in the previous period. The results confirm that the demand of credit depends positively on the rate of inflation and negatively by corporate bonds, reflecting the substitution effect created by this alternative tool to bank credit. The active interest rate charged by banks appears to have a not significant impact on mortgage demands; in fact, the statistical report is weak (10% <p-value <15%). Overall, the independent variables used fit very well with the model, explaining the 89.7% of the total variability in the volume of loans. The low value of the average standard error of regression confirms all this. Finally, the value of the Durbin-Watson statistic indicates a low degree of autocorrelation of the model.

As regards the supply of credit similar observations can be put in evidence. In detail, the positive influence of the Real Value of GDP on the loan supply is even greater than that on the demand. The propensity of banks to grant loans is therefore strongly dependent from the current and perspective economy situation of the country. The regressors used fit very well to the model: in detail they explain the 89.3% of the total variability in the volume of loans. Finally, the trend toward 2 of the statistics Durbin-Watson means low autocorrelation of the model.

Obtained the estimates of the two functions for each quarter is it is possible to understand in which period the demand of credit exceeds supply (credit crunch) and vice versa. This is possible though the difference between demand (D_t) and supply (S_t) of credit. In particular:

If D_t - S_t > 0 => demand

If D_t - S_t < 0 => supply

If D_t - S_t = 0 => balance

The results show that in the pre-crisis period the market of corporate loans in Italy was in a situation of imbalance, and the supply of bank credit exceeded the demand, while during the financial crisis and in particular in some periods (2008-2010 and 2011-2013), except in 2013, is present a situation of credit crunch.

The disequilibrium model used allows determining the existence and the quantification of the credit crunch. However, it is not possible to draw policy implications because the impact of each regressor has on the probability of a credit crunch is not knowable, but how each regressor impacts respectively on supply and demand of credit is knowable.

It is very useful to know how the interest rate on the loans, rather than inflation, affects on the probability that excess demand may experience in the credit market.

So a dummy variable defined "Credit Crunch" is generated, using the following rule:

Credit Crunch = 1, if (D_t - S_t) > 0;

Credit Crunch = 0, otherwise.

The analysis proceeds with a Probit regression of this variable on all the explanatory variables considered for the estimation of demand and supply of credit. The results are presented in Table 2.

Table 2 - Estimates of the probability of credit crunch

Dependent variable: credit crunch		
Explanatory variable	Coefficient	(Standard Error)
Const.	-	
Inflation rate	0.808*	(0.457)
Lending interest rate	-2.122**	(1.008)
Spread	5.553*	(3.052)
Real (GDP) (ln)	-23.101*	(13.524)
Lending capacity (ln)	-	
NFC Bonds (ln)	-6.204**	(2.467)
Log Likelihood	-15.607	
Pseudo R-squared	0.3377	
Perc. Correctly Classified	79.41%	

* Significant at the 0.1 probability level.

** Significant at the 0.05 probability level.

*** Significant at the 0.01 probability level.

(-) p-value ≥ 0.15

The model appears to be robust. In fact, except of lending capacity, the coefficients of all the regressors are significant to at least 10 %. In particular, the probability of occurrence of a credit crunch depends:

Positively, on the inflation and the profitability of the bank;

Negatively, on the interest rate on the loans, the real GDP and the bonds issued by companies.

An increase of the inflation rate causes the increases in demand for credit, and so, the probability of a credit crunch increases considering equal other conditions. The increase of the loan interest rate reduces the requests for loans, and so, the probability that the credit demand exceeds supply reduces considering equal other conditions. A widening of the spread among rates (due, for example, to the increase of the active component of the lending rate linked to the riskiness of the projects financed) reduced, because of the increased risk, the willingness of banks to lend; and so, the probability of a credit crunch increases considering equal other conditions. The growth of the volume of issued corporate bonds (alternative tool to bank credit) reduces the probability of a credit crunch (being equal other conditions) because it satisfy, in whole or in part, the need for financial resources (debt) of companies. Less immediate is rather the interpretation of the coefficient linked to the GDP. The income level of the country, holding constant other factors, affects negatively on the likelihood of a credit crunch. In the previous OLS estimates the GDP affects positively to the demand and supply of credit. Consequently, the total effect on the probability of the credit crunch is the sum of two partial effects, on the demand and on the supply, which, evidently, is greater than the first.

Conclusions

The study shows that the contraction of credit to enterprises in Italy is circumscribed in two specific time intervals (2008-2010 and 2011-2012) and it was mainly caused by the economic downturn that has been recorded since 2007. Particularly, Italian banks have registered significantly an increase of their cost of capital over the medium to long term financing and, at the same time, the deep recession has greatly increased the riskiness of bank assets. The banking

system has responded to this dual shock with a deep contraction of credit to the economy, weakening the economy. Only in the last years an increase of the lending to the non-financial companies is registered, with positive effects on the economic activity.

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