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Stefano Costa and Marco Malgarini and Patrizia Margani

ISTAT, Italian National Institute of Statistics, ANVUR and
Fundacao Getulio Vargas, ISTAT, Italian National Institute of
Statistics

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Access to credit for Italian Firms:
New Evidence from the ISTAT Confidence Business Surveys

Stefano Costa (*)

ISTAT, Italian National Institute of Statistics
Via Cesare Balbo 16, 00185
Rome, Italy
mailto: scosta@istat.it

Marco Malgarini¹ (*)

ANVUR, National Agency for the Evaluation of Universities and Research Institutes
Piazza Kennedy 20, 00144
Rome, Italy
FUNDACAO GETULIO VARGAS, Rio de Janeiro, Brazil
mailto: malgmarco@gmail.com

Patrizia Margani (*)

ISTAT, Italian National Institute of Statistics
Via Tuscolana 1788, 00173
Rome, Italy
mailto: pmargani@istat.it

Abstract

The paper aims at investigating on the credit conditions experienced by Italian firms during the recent business cycle. In doing so, we use a novel dataset on firms' opinions derived from the ISTAT Business Confidence surveys. The dataset allows us to add to existing literature in three different ways: first of all, the availability of a very rich set of information on firms' perceptions enables us to study a number of factors possibly influencing credit conditions at the firm level; secondly, the analysis may be extended beyond the Manufacturing sector, considering also the Construction, Retail and Services sectors; thirdly, the high frequency of the data helps in shedding light into the most recent period following the sovereign debt crisis, for which available evidence is still scarce. Starting from these considerations, three different panel data model are estimated, relating the probability of being credit constrained to various individual characteristics of the firms and of the sector in which they operate.

Obtaining credit for Italian firms results to be easier in the North and being a Medium-Large firm. Moreover, access to credit is also found to crucially depend on individual credit worthiness; in Manufacturing, productive internationalization is found to have a negative effect on access to credit. Over time, credit conditions are particularly negative during the financial crisis, progressively recovering in 2009-2010. A new deterioration has been perceived by Italian firms since mid-2011, with the emerging of the sovereign debt crisis; this assessment is progressively translating into an effective credit rationing towards the end of last year and in the first months of 2012.

JEL: C23, E44, E51, G21

Keywords: panel data, business surveys, credit crunch

¹ Corresponding author.

1. Introduction

The fear that any possible contagion on the inter-banking market could worsen bank's loans to the productive system has recently been particularly severe in Italy², generating a lively debate on the eventual existence of a credit crunch hitting the entire economy (see, among others, Paolazzi and Rapacciuolo, 2009; Del Giovane *et. al.* 2011, Presbitero, Udell and Zazzaro, 2012).

The literature is lacking a shared definition of “credit crunch”: it has been alternatively identified as “a significant contraction in the supply of credit reflected in a tightening of credit conditions” (Udell, 2009), or “a significant leftward shift in the supply curve for bank loans, holding constant both the safe real interest rate and the quality of potential borrowers” (Bernanke and Lown, 1991), or also “a situation in which the supply of credit is restricted below the range usually identified with prevailing market interest rates and the profitability of investment projects” (Council of Economic Advisors, 1991). Also due to such difficulties in defining the phenomenon, some authors have proposed a multidimensional approach³. Moreover, the boundary between credit crunch and rationing is quite fuzzy⁴, considering that three different forms of credit rationing are likely. The first one calls a “pure rationing” definition, identified when some borrowers are denied credit; the second one implies a “divergent views rationing”, identified when borrowers would like to borrow at prevailing rates - feeling their loans do not present a serious credit risk, e.g. because their liquidity is considered adequate- , but lenders refuse to lend or impose too costly conditions on the loan, so that borrowers fail to obtain credit and feel rationed. The last one considers a “sector rationing” view, when credit standards are applied in a sense that shut off the credit to certain classes of borrowers or types of borrowing, because lenders cannot distinguish between good and bad credits and choose to make no loans at all.

In any case, theoretical and empirical studies emphasized the difficulty to disentangle the demand and supply causes of worsening conditions in credit markets (see for example, Panetta and Signoretti, 2010, Del Giovane *et. al.*, 2011; Albareto and Finaldi Russo, 2012). In principle, the latter may be the result of an increase in the riskiness of the firms as well as the result of changes in banks' balance sheet conditions. Analogously, a loan slowdown may stem from macroeconomic

² According to Bank of Italy (2011), bank credit and short-term financial debt accounted, respectively, for 67% and 37% of the Italian firms' financial debt in 2010, whit respect to a much lower 27 and 43% respectively in the UK and the US.

³ For instance, analysing the 1997-98 East Asian crisis, Domaç and Ferri (2002) point out that one or more out of the following nine phenomena are observed during a credit crunch: i) a disproportionate drop in loans to SMEs; ii) an increase in rejection rate of loan applications (a clue of credit rationing); iii) a sharp slowing down in the loans growth rate; iv) flight to quality by depositors, across national banks and from national to foreign banks; v) flight to quality by banks (e.g. to central bank deposits and/or Treasury securities); vi) shortening maturity of loans; vii) an increase in real interest rate; viii) a rising spread loan rate vs. risk free rate; ix) a drop in “pre-committed” credit lines.

⁴ In particular, the relationship between credit availability and interest rates may be affected mainly in two forms: a leftward shift of the credit supply curve at a given interest rate level (*price mechanism*); and/or a rationing of the credit volume, independently of interest rates (*non-price mechanism*).

forces that reduce firms' credit demand or rather from a tightening of banks' credit supply standards. Moreover, most of the analysis on credit conditions have traditionally based on macroeconomic data on bank loans (see among the others, Bernanke and Blinder, 1992, Ding, Domaç and Ferri, 1998, Borensztein and Lee, 2002). However, approaches using aggregate data have been strongly criticized for not having adequately isolated loan demand from loan supply shocks⁵. As a consequence, a better explanation of the phenomenon may be obtained through qualitative statistics, originating from surveys on banks' credit standards or firms' perceptions.

In this respect, according to an analysis based on firm-level data, Paolazzi and Rapacciuolo (2009) argue that a significant and widespread worsening in credit conditions has taken place in Italy during the recession, without any reduction in the firms' credit needs. Similar results are found in Presbitero, Udell and Zazzaro (2012), according to which a credit crunch has indeed hit the Italian economy in 2007-2008. These authors find that the crunch depends upon, among other things, the territorial structure of bank branches and firms being located in district characterised by the presence of distantly-managed banks. On the other hand, combining qualitative information from the Bank Lending Survey (BLS) with micro-data on loan quantities and prices, Del Giovane *et al.* (2011) find that in Italy both demand and supply have played a relevant role in shaping the credit evolution during the 2007-09 crisis.

Building on this strand of literature, in this paper we follow Rottmann and Wollmershauser (2013) and propose a micro-data approach to the identification of a credit crunch in Italy, basing our analysis on firms' perception about the banks' credit behaviour during the recent crisis. More precisely, this paper aims at estimating the probability that a "sound" firm (i.e. one with healthy current business conditions and good outlook for the future, in terms of volume of orders and demand, or assessment about liquidity and level of production) may report restrictive lending policies by banks. In doing so, data extracted from the ISTAT Confidence Surveys on the main Italian business sectors are used. Controlling for other relevant firm's characteristics and business cycle proxies, we look for evidence of a "leftward shift in the supply curve for loans" which is - as already mentioned - one of the proof of a credit crunch.

In this sense, the paper adds to the existing literature in many ways: first of all, the availability of a high frequency dataset allows us provide some first insight into the most recent period following the sovereign debt crisis, for which available evidence is still scarce; secondly, we make use of a very rich dataset on firms' perceptions, including not only assessments on credit conditions

⁵ Paolazzi and Rapacciuolo (2009) point out that the evolution of loans – that is the most frequently used indicator to detect possible worsening conditions on credit markets – does not capture the essence of the problem, given that data on the loans are collected and analysed after decisions have been made by banks and firms, so that they cannot capture the process in itself, but only its outcome.

but also firms' perceptions about an effective crunch or rationing behaviour imposed by the banks. Moreover, we extend the analysis beyond the Manufacturing sector, considering also the Construction, Retail and Services sectors; finally, we use a dataset which is very rich also in terms of possible factors influencing the firm credit worthiness⁶.

The rest of the paper is organized as follows. Section 2 describes in full details the data and the variables considered in the analysis and provides descriptive evidence on survey results for the period March 2008-March 2012; section 3 presents the estimation strategy and the quantitative results; section 4 concludes.

2. Data description and survey results

2.1 Data description

Since March 2008, a specific section focusing on the bank-firm relationship has been added to the Manufacturing, Retail Trade and Service sector surveys, asking information on credit access conditions; since May 2009 this section has also been added to the Construction survey⁷. In a first step firms are asked to report their perceptions of credit conditions, with three possible answers arranged on a Linkert scale (getting better, stable, getting worse); additionally, firms have to indicate whether their appraisal on credit conditions is based on a recent formal contact with a credit institution or simply on a generic opinion. In a second step, three further questions are asked to firms declaring a direct contact with a credit institution:

- i. whether the requested credit has been obtained at the same conditions as before (a); at worsening conditions (b); has not been obtained (c); the contact with the bank was only motivated by a request of information (d);
- ii. in case of worsening credit conditions (answer b to the question i), five possible answers about the determinants of the deterioration of the credit situation are additionally considered (higher interest rates, higher collaterals (real or personal guarantees), limits to the amount of loans and other costs);

⁶ A preliminary analysis of the data stemming from the Confidence survey in the Manufacturing sector for Italy is in Costa and Margani (2009).

⁷ The monthly ISTAT Confidence surveys on the Manufacturing, Construction, Retail and Services sectors are respectively based on samples of about 4,000, 500, 1,000 and 2,000 firms and are realised in the framework of the Harmonised Project of the European Commission. The Manufacturing survey covers the whole manufacturing sector; the Construction survey the construction industry, the Retail Trade Survey covers the retail sector while the Service sector survey covers most of market services sectors excluding financial services. These surveys collect qualitative data on the cyclical situation of the firm, together with structural information about the number of employees, sector and location of activity; for Manufacturing only, additional information are also available on firm's production capacity, firm's export share on turnover and firm's degree of productive internationalization (offshoring).

iii. If credit has not been obtained (answer c to question i), a further question asks whether credit rationing has been due to an explicit denial from the credit institution or to unacceptable conditions imposed to the firm.

Three credit conditions indicators may be derived from the surveys⁸. The first is the net percentage of firms declaring that their credit access conditions worsened during the period considered, given by the difference between the share of firms stating that their lending standard worsened and that of those deeming they improved in the recent period. This indicator can be interpreted as a kind of information from the point of view of the firms about the banks' loan supply conditions and is one of the most common indicators for analysing the performance of lending standards (see also on this topic Bank of Italy, 2011 and Rottman and Wollmershauser, 2013). The other two indicators are more proper credit rationing indicators, where firms are considered as "rationed" when they do not obtain the desired amount of credit. More precisely, as we know from the theoretical literature (Domaç and Ferri, 2002), a credit rationing indicator may be calculated both in its "strong" and "weak" version, considering respectively whether the credit is explicitly denied by the credit institution or whether the firm itself refuses the credit because bank's lending conditions are too costly.

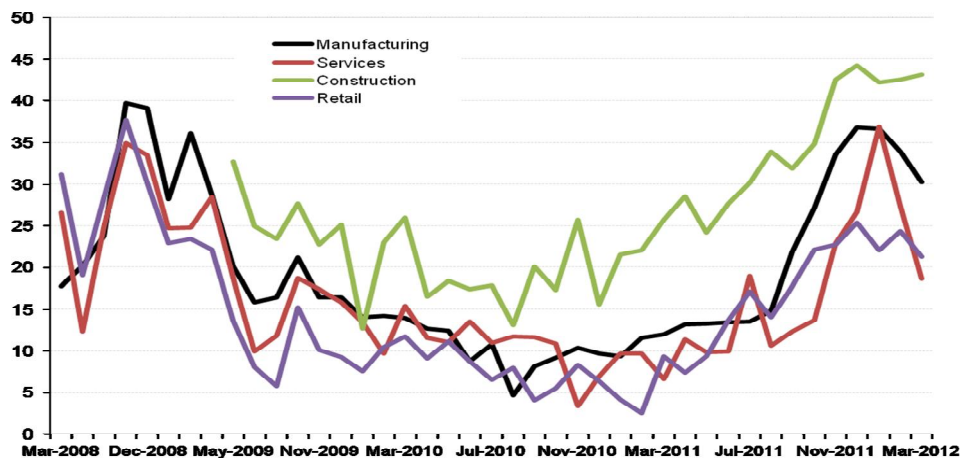
2.2. Survey results

Survey results confirm that credit conditions for Italian firms started to deteriorate since mid-2008⁹ (see fig. 1). Between June and December 2008, the net percentage indicator virtually doubles in Manufacturing, passing from 18 to 40%; similarly, in the Service sector it raises from 27 to 35% between March and November 2008. Starting from the first months of 2009, credit conditions begin to get better with the net percentage slowly stabilising on low levels; similar considerations apply for the Construction sector, for which data are available only since mid-2009. However, since the end of 2010 credit conditions deteriorate again in all sector, with the net percentage indicator reaching a new negative peak in December 2011 and in January 2012, decreasing subsequently in the manufacturing and in the Service sectors.

⁸ Aggregate survey results are calculated using a two-stage weighting scheme: in the first one, individual firm replies are first weighted by the number of the firm's employees within a given stratum (defined on the basis of the firm's industry, geographical location and size); in the second stage, results for each strata are weighted by its economic importance in terms of value added. In this sense, results may be interpreted as an estimator of Italian firms' opinions on credit conditions during the great recession, the following mild recovery and the new sovereign debt crisis. This weighting scheme is the same used in all the Confidence surveys elaborated by ISTAT (for a detailed description of this kind of weighting, see for example Malgarini *et al.*, 2005).

⁹ Similar results are found by the surveys carried by the Bank of Italy and ECB on Italian and European financial institutions; in this sense, results coming both from the supply and the demand side of the financial market have provided similar evidence in the period considered; see also Bank of Italy (2011) and ECB (2011).

Figure 1 – Net percentage of firms whose credit access conditions worsened
(percentage points)



Source: ISTAT

During the recession, tightening of credit conditions goes along with a relevant and widespread increase of the share of rationed firms (table 1); strong rationing generally prevails in the Manufacturing, Construction and Retail sectors, while in Services the share of firms refusing the credit because of tightening conditions is often similar to that of those being strongly rationed.

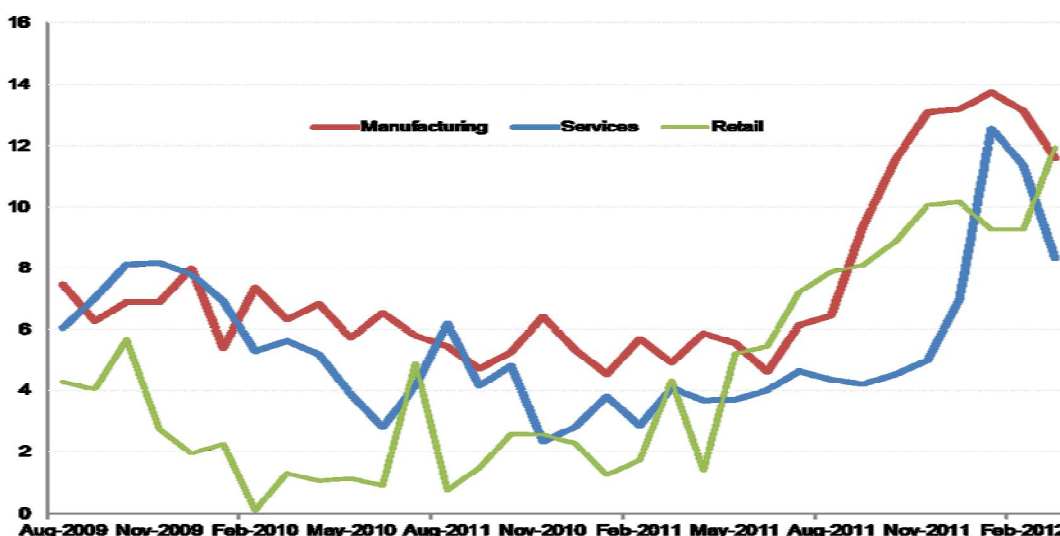
Table 1 – Credit rationed firms
(firms that non obtained the requested credit and strong rationed firms).

Yearly averages	Manufacturing			Construction			Services			Retail		
	Total	strong	weak	Total	strong	weak	Total	strong	weak	Total	strong	weak
2008	5.2	3.4	1.8				3	1.1	1.9	2.0	1.3	0.7
2009	7	5.9	1.1	12.6	9.8	2.8	3.7	2.2	1.5	2.7	2.1	0.4
2010	3.7	3.2	0.4	10.9	8.1	2.9	2.2	1.7	0.4	1.8	1.7	0.0
2011	3.1	2.6	0.6	10.4	7.7	2.7	1.4	1.2	0.3	1.6	1.6	0.0
Months												
January 2011	2.4	2.1	0.3	9.3	6.1	3.2	1.7	1.3	0.4	1.3	1.3	0.0
February 2011	2.9	2.3	0.6	7.2	6	1.1	1.3	1.1	0.2	1.4	1.3	0.1
March 2011	2.5	2.2	0.4	7.9	5.3	2.6	1.1	0.9	0.2	0.7	0.7	0.1
April 2011	2.9	2.3	0.6	11.7	7.6	4.1	1.1	1	0.2	1.0	1.0	0.0
May 2011	2.2	1.9	0.3	13.2	9.4	3.8	2.6	2.1	0.5	1.5	1.5	0.0
June 2011	2.6	2.1	0.5	7.7	5.3	2.4	1.6	1.5	0.2	1.0	1.0	0.0
July 2011	2.9	1.9	1	12.1	9.8	2.3	1.5	1.4	0.2	1.3	1.3	0.0
August 2011	2.8	2.2	0.6	10.7	7.2	3.5	0.9	0.7	0.2	2.0	2.0	0.0
September 2011	2.9	2.6	0.3	9.4	7.3	2.1	0.9	0.7	0.2	1.5	1.5	0.0
October 2011	3.6	2.9	0.7	9.4	6.8	2.6	1.8	1.4	0.4	2.5	2.5	0.0
November 2011	4.5	3.7	0.8	12.9	9.6	3.3	2.8	2.1	0.7	1.5	1.5	0.0
December 2011	5.4	4.7	0.7	13.8	11.9	1.9	0	0	0	3.9	3.8	0.0
January 2012	5.1	4.2	0.9	9.3	7.2	2.1	0	0	0	3.6	3.3	0.3
February 2012	5.1	4.4	0.8	14.3	10.5	3.8	2.8	2.1	0.7	1.9	1.8	0.1
March 2012	4.4	4	0.4	15.9	14.1	1.8	3	2.2	0.8	2.9	2.8	0.1

Source: ISTAT

However, as stated before, absence of rationing does not necessarily rule out the possibility of other tensions in the bank-firm relationship. In this sense, Fig. 2 shows the share of firms obtaining the loan with worsening conditions for three Italian business sectors (Manufacturing, Retail and Services)¹⁰. Data confirm that credit conditions gradually stabilize since Summer 2009, with indeed the share of firms declaring a worsening usually falling below 5%. Towards the end of 2011, tensions seem to emerge again, especially in Manufacturing, with almost 14% of firms declaring a tightening of the conditions in November.

Figure 2 – Share of firms obtaining the loan with worsening conditions



Source: ISTAT

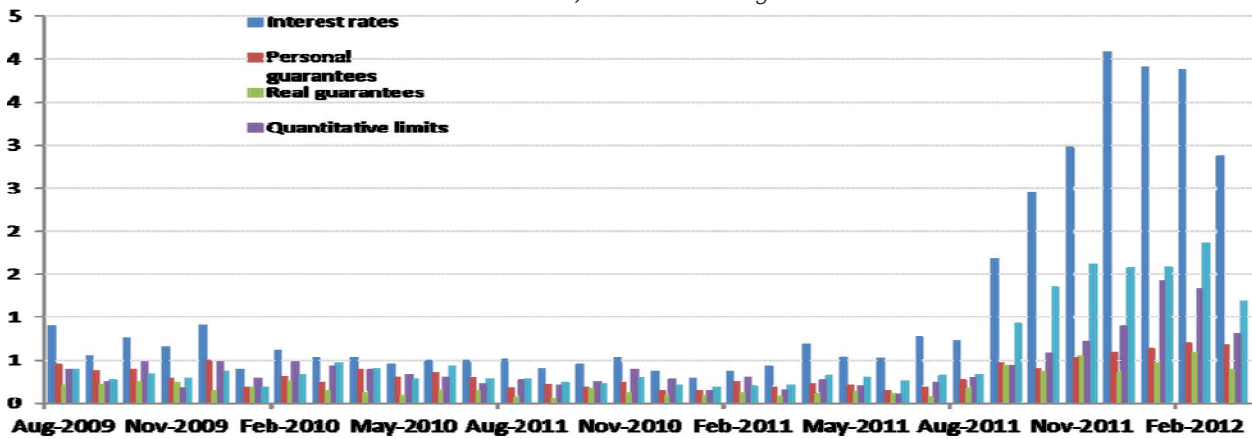
Finally, considering the specific factors determining the tightening of the conditions (rise in interest rates, increase request of collaterals¹¹, quantitative limit to the credit or else a general increase in credit costs), data show that in the recent period firms mostly face an increase in interest rates and more generally in the costs of borrowing (fig. 3).

¹⁰ The question on credit conditions has been added since August 2009 only in Manufacturing, Retail and Service sectors but not in the Construction one..

¹¹ Collaterals may include a set of securities or real assets provided by the debtor or third parties as a partial or total guarantee for a loan (“real” collateral), or all the contractual provisions that require the third parties to pay in case of debtor’s default (“personal” collateral). Another relevant distinction is that between “internal” and “external” guarantee, the former being assets provided by the borrower while the latter are provided by third parties. Therefore, the personal guarantees may be only external, while the real guarantees may be both external and internal. See Carletti *et al.* (2008) and Pozzolo (2004) for analyses of collaterals in banking loans to firms.

Figure 3 – Motives behind the tightening of the conditions

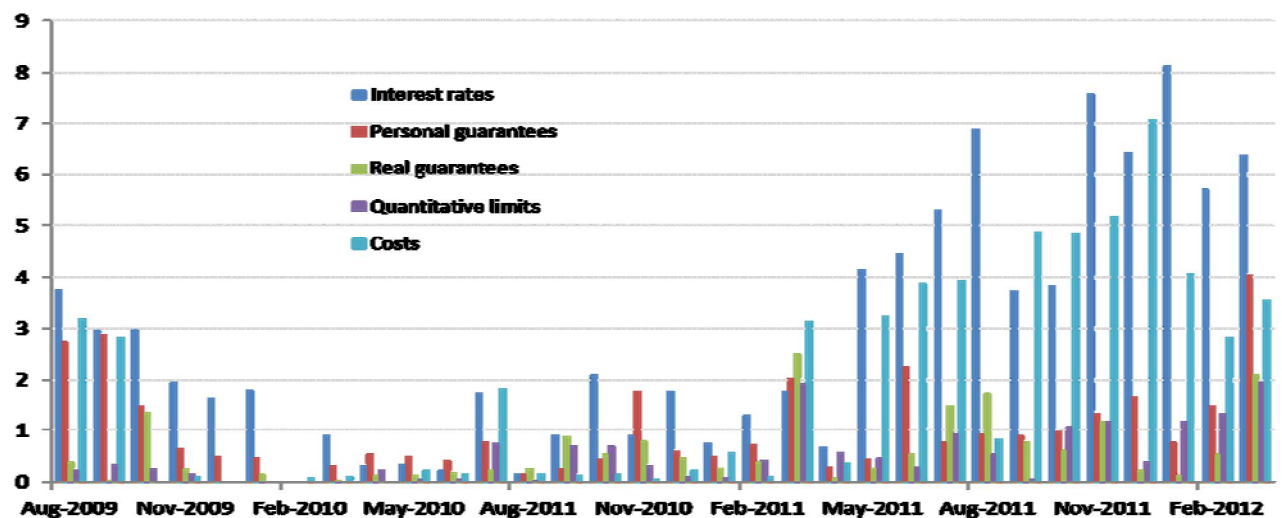
a) Manufacturing



b) Services



c) Retail



Source: ISTAT

3. The estimated models

3.2 The Econometric strategy

The estimation strategy used in this paper allows for a number of robustness checks, both in the form of various possible dependent variables to be used in the estimates and in terms of different estimation methods.

First of all, a binary dependent variable y_{it} is considered, where $y_{it}=1$ if firms' assessments on credit conditions are "worsening" and $y_{it}=0$ otherwise (i.e. if credit conditions are "stable" or "getting better"). Moreover, two different measures of credit constraint are derived from the replies about actual granting of the credit, respectively labeled "credit restriction" and "credit rationing". Considering the first one, an ordinal dependent variable q_{it} taking values from 1 to 5 according to the progressive worsening of credit conditions is build: more specifically, $q_{it}=1$ if the firm receives the credit at the same conditions as before; $q_{it}=2$ if the firm receives the credit, but with worsening conditions due to an increase in cost, interest rates or the demand for a (real or financial) collateral; $q_{it}=3$ if the firm receives only part of the requested amount of credit; $q_{it}=4$ if the firm refuses the credit because conditions are too tight and finally $q_{it}=5$ if the financial institution explicitly refuses the credit. Additionally, a binary dependent variable z_{it} taking values 0 and 1 respectively if the credit has been granted or not to the firm is considered as a proxy for credit rationing. Variables y_{it} and z_{it} are observed from March 2008 to December 2011¹² in Manufacturing, Retail and Services sectors and only since May 2009 in the Construction sector, for a total of respectively 38 and 29 time periods. Variable q_{it} , is not available in the Construction sector and only starts from August 2009, for a total of 29 time periods.

The three following panel data models are estimated for the period considered:

$$\Pr(y_{it} = 1 | x_{it}, \beta, \alpha_i) = F(\beta' x_{it} + \alpha_i) \quad (1)$$

$$\Pr(q_{it} = x | x_{it}, \beta, \alpha_i) = F(\beta' x_{it} + \alpha_i) \quad (2)$$

$$\Pr(z_{it} = 1 | x_{it}, \beta, \alpha_i) = F(\beta' x_{it} + \alpha_i) \quad (3)$$

In equations (1)-(3), F is the cumulative distribution function; in (1) and (3), its form is either the logistic function (Logit model) or the standard normal (Probit model), while model (2) is fitted using a linear regression panel model. We allow y_{it} , q_{it} and z_{it} to possibly vary across firms including firm specific unobserved effects α_i , estimated using either a random or a fixed effect model. In random effects models, the distribution of the individual effect is typically normal, and the individual effects are assumed to be uncorrelated with the x_{it} variables. Relaxing this hypothesis implies the use of a fixed effect model; in this case, however, estimations are based only on intra-

¹² These questions are not performed in April, May, July, August and October 2008 and in March, June and July 2009.

firm variations of the variable, with time invariant differences across firms having no effect. The conditional maximum likelihood estimator is used for the Logit model¹³.

Hence, three possible estimation methods are considered: Probit estimation with a random specification of individual effects and Logit estimations with alternatively random and fixed effects. N is the number of independent firms which are part of the sample and $t = 1, 2, \dots T$ is the month in which the survey has been performed. The set of x_{it} independent variables includes information intended to capture the quality of the potential borrower, credit worthiness at the industry level and the variation of lending policies over the business cycle.

In the first group, structural and cyclical information can be distinguished (see table 2), considering surveys' information about the macro-region of activity of the firm and on its size. In this sense, small firms may be thought to be potentially more severely affected by the tightening of credit standards, because of their relatively more fragile financial structure. Similarly, differences may emerge also at the local level, with firms operating in the Southern regions of Italy which may be possibly more severely hit because of weaker starting financial and market conditions. Business Confidence surveys also provide qualitative information on the current level and expectations on activity/demand and employment. These kind of qualitative information may be considered to provide useful insides into the profit situation of the firm and on its economic conditions, hence representing a potentially good proxy of its balance sheet situation (see on this topic, Abberger, 2011 and Wood, 2011). In this sense, estimates allow to test whether relatively "bad" firms experienced a higher probability of being hit by the crisis with respect to those in a rosier situation. Along these basis, proxies available for the balance sheet situation of the firm are particularly rich in the Manufacturing survey, where firms have also to report on unit labor costs growth and, on a quarterly base, the level of capacity utilization and whether production is obstructed or not. In this sense, credit conditions may be better the lower unit labor costs; also, a high level of production capacity and absence of obstacles to production may be interpreted as a further proxy of a relatively sound balance sheet, and may be negatively correlated with the probability of experiencing credit restriction and/or rationing. Moreover, Manufacturing firms have also to report about their productive presence on international markets; information available concerns the share of export turnover (in percentage points), evaluations on the level of competitiveness on domestic and international markets and delocalization activity. The latter is represented by two variables, a binary variable assuming value of 1 if the firm has productive capacity abroad and a discrete variable reporting an estimate of the number of employees abroad. Competitiveness variables are interpreted

¹³ Solution being not viable for the Probit model (see on this topic, Rottman and Wollmershauser, 2013). All the models are estimated using the econometric software STATA.

in the sense that they provide information about the soundness of the overall economic situation of the firm; hence, these variables may be negatively correlated with the probability of experiencing credit difficulties. The sign of the internationalization variables is potentially more ambiguous: they may proxy the capability of the firm of being active on international markets, and as such are expected having a negative effect on the probability of a tightening of credit conditions. Alternatively, internationalized firms may be perceived as more “risky” by financial institutions, given the international nature of the recent crisis and so, in this case, internationalization may be positively correlated with the probability of experiencing a tightening of credit conditions.

Table 2 - Firm-Specific Regression variables

	Manufacturing	Construction	Retail trade	Services
<i>Structural information on the firm</i>				
Firm location (macro-areas)	X	x	x	X
Firm Size	X	x	x	X
<i>Firm-specific opinions on activity/demand and employment</i>				
Level of orders	x	x	x	X
Order expectations	x	x	x	X
Employment expectations	x	x	x	X
Assessments on Unit labour costs	x			
Obstacles to production: yes	x			
Capacity utilisation	x			
<i>Firm-specific opinion on competitive position and internationalization</i>				
Export turnover (in % of total turnover)	x			
Competitive position	x			
Delocalized abroad: yes	x			
Number of employees abroad	x			

Confidence Climate Indicators (CCIs) for the Manufacturing, Services, Retail and Construction sectors are also calculated to proxy sector-specific business situation¹⁴; business sectors are defined according to the Italian version (ATECO 2007) of the standard Classification of Economic Activity adopted at the European level (NACE Rev. 2). Hence, CCIs are the same for all the firms of a given sector, but vary across sectors; they are considered to represent credit worthiness at the sector level (see Table 3), which is expected to positively influence the probability of obtaining credit. Finally, a set of T-1 time dummies is included in the regressions, where T is the number of time periods considered in the analysis; time dummies are intended to capture additional macroeconomic or specific factors determining credit conditions for each firm.

¹⁴ In Manufacturing, Confidence is obtained as the average of the balances on demand and inventories assessments (with negative signs) and production expectations; in Services, it is calculated as the average of the balances on demand assessments and business expectations; in Retail, the indicator averages out the balances of assessments and expectations on business conditions and stocks (with negative signs); finally, in Construction balances on activity assessments and employment expectations are considered in the calculation of the indicator.

Table 4 finally reports the structure of the survey and of the panel with respect to business sectors. Overall, over 262,000 observations on 11,185 firms distributed in the 20 business sectors are considered in the analysis; some of the firms (around 5% of them) however do change sector of activity during the sample period, for a total of 11,802 cases. Fifty percent of the firms are observed 28 times or less, while almost a quarter of the panel is observed for 37 times (or less).

Table 3 – Sector-Specific Confidence Indicators

Sectors	Average	SD
Food, beverages and tobacco	-2,9	5,1
Textile, clothing, footwears	-11,9	9,4
Wood, paper	-10,3	6,3
Coke, refined petroleum	1,6	11,8
Chemicals	-0,5	13,1
Pharmaceuticals	2,4	14,3
Rubber and plastic products	-14,6	10,1
Fabricated metal products (excluding machinery and equipment)	-9,8	12,2
Computers and optical equipments	-4,5	17,1
Electrical equipments	-11,7	11,1
Machinery and equipments NEC	-13,7	13,5
Transport equipments	-18,2	10,1
Not elsewhere classified	-11,2	6,8
Construction	-35,5	3,7
Wholesale and retail trade and repair of motor vehicles and motorcycles	-7,7	13,0
Retail trade (except of motor vehicles and motorcycles)	-5,0	7,0
Transportation and storage	-9,3	9,4
Tourism	-7,7	14,1
Information and communication	-4,6	10,4
Business services and other services	-11,9	8,3

Table 4 – The structure of the panel with respect to business sectors

Sectors	Number of firms	Number of obs.
Food, beverages and tobacco	465	13544
Textile, clothing, footwears	1320	30541
Wood, paper	567	15071
Coke, refined petroleum	23	606
Chemicals	167	4374
Pharmaceuticals	29	748
Rubber and plastic products	229	5550
Fabricated metal products (excluding machinery and equipment)	1411	35573
Computers and optical equipments	105	2013
Electrical equipments	259	6110
Machinery and equipments NEC	487	11236
Transport equipments	200	4861
Not Elsewhere classified	784	14971
Construction	1562	11287
Wholesale and retail trade and repair of motor vehicles and motorcycles	196	5496
Retail trade (except of motor vehicles and motorcycles)	1025	30355
Transportation and storage	445	11171
Tourism	604	14580
Information and communication	474	10555
Business services and other services	1450	35260
TOTAL BUSINESS SECTORS	11802	262904

3.2 Estimation results for Model (1)

In Model (1) the probability of expressing a negative evaluation on credit conditions is considered as the dependent variable; table 5 reports the results for the whole sample. Columns 1, 2 and 3 respectively report coefficients and their significance probability levels, assuming different shapes of the cumulative distribution function (i.e., logistic and normal distribution, to which correspond the Logit and Probit models) and of the unobservable individual effects α_i (i.e., fixed and random effects for the Logit and random effects for the Probit model). Data are available for the period June 2008 – December 2011 (Construction sector entering the sample only in August 2009). Estimations are based on over 221,000 observations on 11,033 firms in the case of the random effect models; dropping time-invariant individuals in the case of the fixed effect Logit model reduces the sample to 201,714 observations on 8,414 firms.

Table 5 – Regression results for Model 1, total business sector

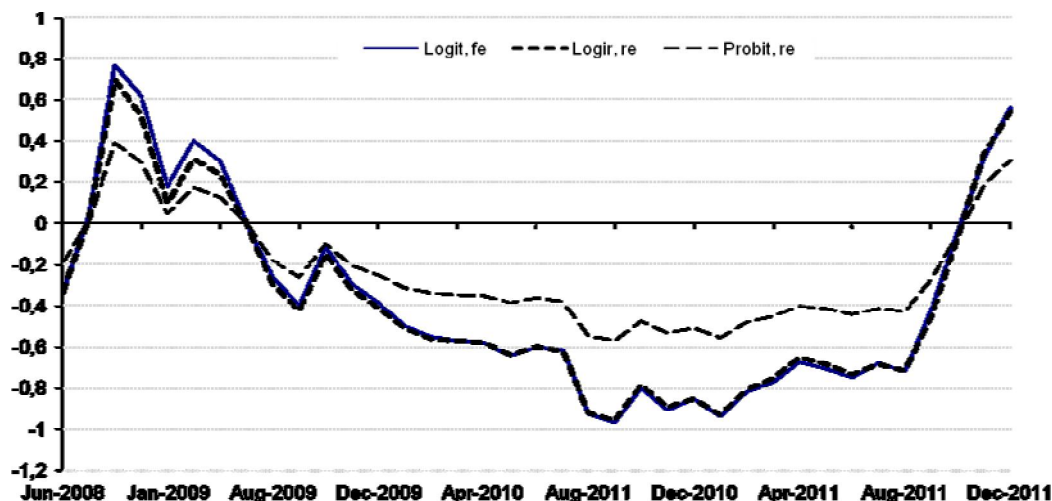
<i>Total business sectors</i>						
	Logit fixed effects		Logit random effects		Probit random effects	
	Coeff	z prob	Coeff	z prob	Coeff	z prob
<i>Firm location</i>						
North West			-0.187	0.000	-0.106	0.000
North East			-0.116	0.004	-0.067	0.004
Centre			-0.047	0.179	-0.027	0.175
<i>Firm size</i>						
Log (employees)	-0.195	0.04				
Medium size firms			-0.180	0.000	-0.106	0.000
Large size firms			-0.363	0.000	-0.213	0.000
<i>Firms opinions on economic situation</i>						
Level of activity/demand: negative	0.510	0.000	0.557	0.000	0.322	0.000
Expectations on activity/demand: neg.	0.330	0.000	0.369	0.000	0.219	0.000
Expectations on employment: neg	0.478	0.000	0.538	0.000	0.313	0.000
Confidence Climate	0.005	0.000	0.000	0.000	0.000	0.000

Results seem to be quite robust across different assumptions on the cumulative distribution function and on the specification of individual effects. If the latter is assumed to be normally distributed and uncorrelated with the set of explicatives, the probability of having a negative opinion on credit conditions is lower in the North and Centre with respect to the South. Medium and large size firms are always found to report better opinions on credit conditions with respect to those with less than 50 employees. When the model is estimated allowing for individual fixed effects, time-invariant location and dimensional factors disappear; however, size is still significant

if the log of the number of employees is considered as a possible explicative¹⁵. Moreover, opinions on credit conditions deteriorate in keeping with those on the situation of current and expected demand/activity and expected employment. Business sector cyclical situation is found to be positively correlated with the probability of having a negative opinion on credit conditions, albeit the estimated coefficient is very close to zero: this result is rather counter-intuitive, and its robustness should be checked with the estimation of models (2) and (3). A possible explanation may call for a role of increasing competition for obtaining credit in a more buoyant sector, resulting in a possible increase in negative opinions on credit conditions for individual firms; it is also possible that firms' opinion on the situation of the sector (as represented by the Confidence indicator) may not coincide with that of the bank, especially in times characterized by high uncertainty.

Considering the coefficients of the time dummies (fig. 4), they are significantly different from zero and follow a clear cyclical pattern, reaching a peak in mid-2008 and then declining steadily until the end of 2010. Since the first months of 2011, a new rise of the time dummies coefficients is observed, with a particularly relevant surge at the end of 2011, when the indicator approaches the peak reached in early 2008.

Figure 4 – Coefficients on time dummies – Model (1), total business sector



¹⁵ In this case we are not able to identify the effect connected to the belonging to different size classes, but only a negative relationship between firm size and the probability of having a negative evaluation on credit conditions.

Similar results also emerge when sectors are considered separately (table A in the appendix)¹⁶. Looking in particular at the Manufacturing sector, for which a larger number of controls is available, it is more probable for a firm to have a negative opinion on credit conditions if the firm is also experiencing higher unit labor costs; similarly, credit access conditions are perceived more negatively if there are obstacles to production activity (either for a scarcity of demand or employment, or because of various other restrictions) and if production capacity is lower. Finally, credit opinions deteriorate in keeping with those on the competitive position of the firm and – quite surprisingly - the higher is the share of exports on total turnover¹⁷; on the other hand, delocalizing abroad does not seem to have a significant impact on credit perceptions.

3.2 Regression results for Model (2)

Let now consider the Linear regression estimation of Model (2), evaluating the probability of a progressive restriction of credit conditions (table 6). In this case, data are available only for Manufacturing, Retail Trade and Services sectors, and only since August 2009; considering these three surveys together more than 50,000 observations on 7,188 firms are available for estimation.

Table 6 – Regression results for Model 2, total business sector

	Linear re		Linear fe	
	Coeff	z prob	Coeff	z prob
<i>Firm location</i>				
North West	-0.21	0.00		
North East	-0.18	0.00		
Centre	-0.09	0.00		
<i>Firm size</i>				
Medium size firms	-0.10	0.00	-0.07	0.15
Large size firms	-0.16	0.00	-0.15	0.18
<i>Firms opinions on economic situation</i>				
Level of activity/demand: negative	0.26	0.00	0.18	0.00
Expectations on act./demand: neg.	0.18	0.00	0.14	0.00
Expectations on employment: neg	0.28	0.00	0.21	0.00
Confidence Climate	0.00	0.20	0.00	0.00

If we consider the random effect specification, coefficients are usually significant and with the expected sign: the probability of experiencing some form of credit restriction is higher in the South, for small firms and for those with negative opinions on the firm' business situation; the sector

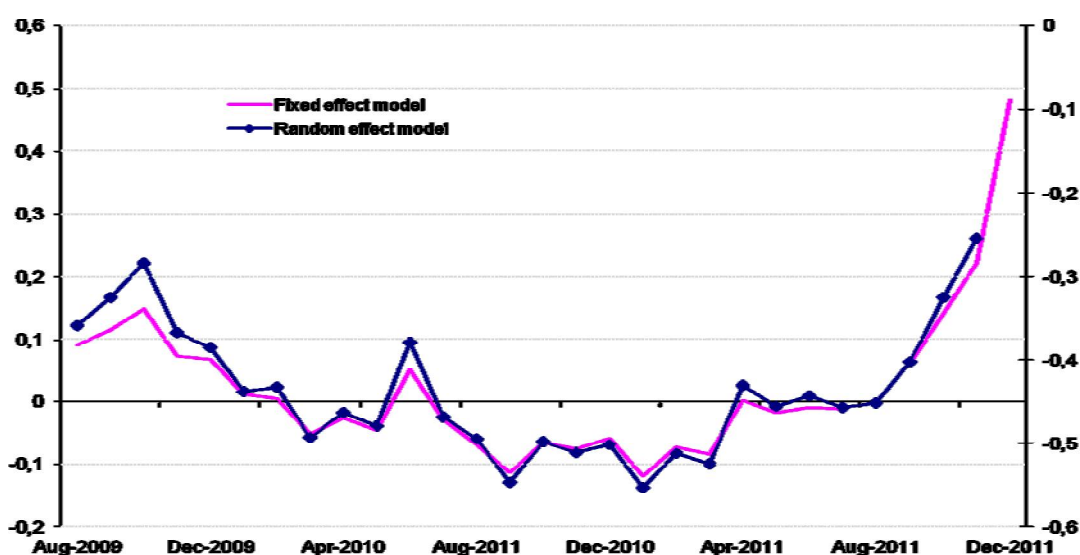
¹⁶ In this case we only report the coefficients estimated assuming a normal form of the cumulative distribution function and random distribution of individual effects. Results of the Logit estimations (with either fixed or random effects) are however rather similar and available with the authors upon request.

¹⁷ We allow for possible non-linear relationship among export activity and credit worthiness using a transformation of the original series, taking the natural log of (1+export share on total turnover).

specific cyclical situation does not result to be statistically significant. Results are however not always robust with respect to the method of estimation used: indeed, location and size effects disappear if the model is estimated assuming individual fixed effects uncorrelated with the x_{it} . Now the sector specific business situation has a positive relationship with credit restrictions, possibly due to increased competition among firms for obtaining the credit or to divergence among firms' and banks' views on the cyclical situation of the sector.

Looking at the evolution of firms perceptions on credit restrictions over time (fig. 5), an increase of the incidence of firms experiencing some form of restriction in credit is observed: indeed, time dummies coefficients on firms' perceptions are increasing since the first months of 2011, reaching a peak towards the end of last year.

Figure 5 – Coefficients on time dummies – Model (2), total business sector



Results across business sectors are also in this case not reported here but available in the appendix (table B and figure B). In Manufacturing, it is less probable for a firm to be credit constrained when it is not experiencing obstacles to production and with higher levels of capacity utilization. Also, firms are less affected by tighter credit conditions if they have a higher export turnover; on the other hand, having delocalized part of their activity abroad has a negative impact on credit conditions.

3.3 Regression results for Model (3)

Table 7 reports estimation results for Model (3), in which the dependent variable is the probability of being credit rationed. In this case, data are available for all the four business sectors; considering all the surveys together, if individual effects are assumed to be random than 256,000 available observations on 11,157 firms are considered; in the case of the Logit fixed effect estimator over 88,000 observations available on 3,234 firms are analysed. Results are robust across the specification of either a normal or logistic distribution, but do vary according to the specification of the form of individual effects. Indeed, if individual effects are randomly distributed, the probability for a firm of not receiving the credit is significantly higher in the South and for Small firms, declining the more favorable is the current and expected stance of the cyclical situation of the firm and of the sector in which it operates. However, if individual effects are possibly correlated with x_{it} variables, and estimated with a fixed effect model, size is not significant, but the probability of experiencing the crunch is still influenced by the perceived cyclical stance of the firm, which may be interpreted as a proxy of its balance sheet situation. Also, sector specific business conditions are negatively correlated with the probability of being credit constrained in the random effects estimations, but not according to the fixed effects model.

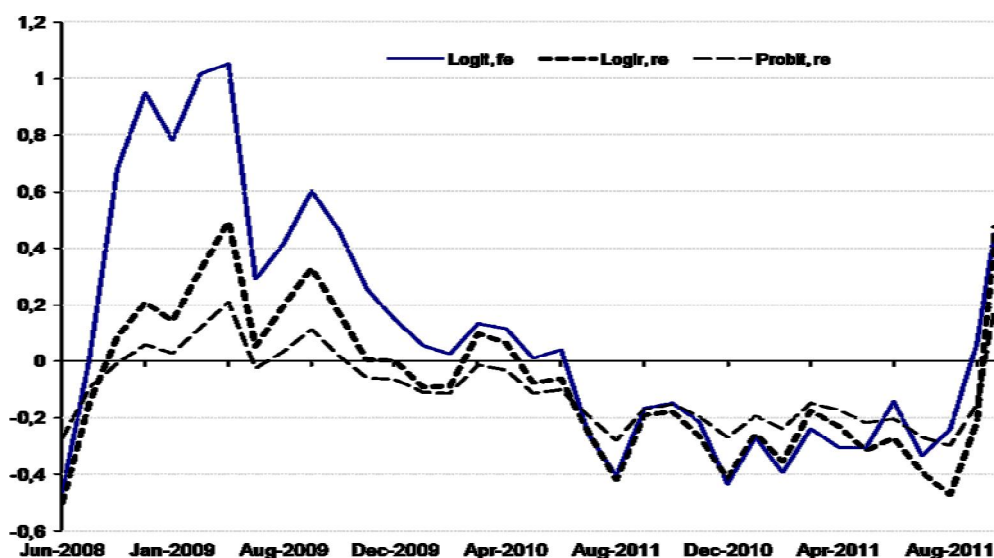
Table 7 – Results of estimation of Model (3), total business sector

	Total business sectors					
	Logit fixed effects		Logit random effects		Probit random effects	
	Coeff	z prob	coeff	zprob	Coeff	z prob
<i>Firm location</i>						
North West			-0.677	0.000	-0.325	0.000
North East			-0.535	0.000	-0.255	0.000
Centre			-0.337	0.000	-0.159	0.000
<i>Firm size</i>						
Log (employees)	-0.016	0.926				
Medium size firms			-0.242	0.002	-0.124	0.001
Large size firms			-0.450	0.002	-0.220	0.002
<i>Firms opinions on economic situation</i>						
Level of activity/demand: negative	0.449	0.000	0.497	0.000	0.252	0.000
Expectations on activity/demand: neg.	0.293	0.000	0.309	0.000	0.161	0.000
Expectations on employment: neg	0.430	0.000	0.563	0.000	0.299	0.000
Confidence Climate	0.016	0.000	-0.011	0.000	-0.006	0.000

Figure 6 shows the coefficients of the time dummies: if they are interpreted as a measure of credit rationing independent from the individual and sector-specific cyclical situation, then credit conditions strongly deteriorate at the beginning of the observation period, gradually getting better

until mid-2011; since last summer, a new tightening of credit conditions occurred, resulting in a dramatic increase in credit rationing for Italian firms.

Figure 6 – Coefficients on time dummies – Model (3), total business sector



In Manufacturing, there is a significant effect (with the expected sign) of unit labor costs and of production capacity (see the Appendix, table C); it is also confirmed that credit access is harder for firms having delocalized abroad and with a higher export turnover.

4. Conclusions

The 2007 financial crisis and, more recently, the sovereign debt crisis, have risen widespread concern that a tightening of credit conditions would contribute to the deterioration of the business cycle situation, eventually resulting in a deep recessions. Prompt policies intervention are evoked in order to prevent this fate: however, in practice the correct identification of a credit crisis is not an easy task. Indeed, most of the analysis is usually based on aggregate macro data on loans, from which it is very difficult to disentangle demand and supply factors in a reduction of credit flows. However, the proper emerging of a “credit crunch” may be identified using microdata on firms’ opinions derived from business surveys. For this reason, starting from March 2008, ISTAT Confidence surveys on Manufacturing, Retail Trade and Services sectors, and later on also on the Construction sector, contain information on access to credit for Italian firms. More specifically, from the surveys it is possible to derive three indicators of credit conditions, referred to the general appraisal on the credit stance, the probability of a credit restriction (i.e. a deterioration of conditions or an explicit denial of credit) and that of an effective credit rationing (i.e., failure in

obtaining the credit). According to our analysis of the data, obtaining credit for Italian firms is easier in the North of the country with respect to the South, and being a Medium-Large firm; results seem to be rather robust with respect to the form of the cumulative distribution function and of individual effects used in the estimation. The size effect is however particularly significant in the Manufacturing and Services sectors. Access to credit is also found to crucially depend on the credit worthiness of individual firms: in fact, firms with a rosier cyclical situation in terms of demand, production and employment are also those with easier access to credit. In Manufacturing, credit conditions are also statistically correlated with the level of the firm' unit labor costs and capacity utilization. On the other hand, internationalization has an ambiguous effect on credit conditions in Manufacturing: the share of exports on total turnover is negatively correlated with good general opinions on the credit market and it is also positively correlated with the probability of experiencing some form of credit restriction. Moreover, firms having delocalized part of the activity abroad seem to be more prone to experience credit restrictions and credit rationing. A possible explanation for the latter result calls for a localization effect, in the sense that firms tend to delocalize especially in Eastern European countries and generally in regions that have been severely hit by the crisis. As for business conditions at the industry level, they positively influence the probability of obtaining credit but have an ambiguous effect on firms' opinions and credit restriction: it may well indeed be possible that in some cases operating in a more buoyant market may increase competition for obtaining credit and hence have a negative effect on individual firms; it is also possible that banks and firms' opinions may have differed during the financial crisis due to the high level of uncertainty.

Finally, our estimates provide evidence on the evolution of the credit stance, net of the individual and sector-specific effects mentioned above: in this sense, "external" credit conditions are particularly negative during the financial crisis, and have become progressively more favorable in 2009-2010. Firms perceive a new deterioration of credit conditions since mid-2011, with the emerging of the sovereign debt crisis; this assessment progressively translates in an effective tightening of the conditions and hence in an increasing rationing of credit towards the end of the year, an evidence that has not been available before on the basis more traditional macro evidence about financial flows. In this sense, our analysis seems to be highly policy-relevant, confirming the importance of business surveys to provide up to date and timely information on the cyclical situation, providing very relevant supportive evidence for policy decisions.

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Appendix

Table A – Estimation results for Model (1), individual sectors

	Manufacturing		Construction		Retail trade		Services	
	Coeff	z prob	Coef	z prob	Coeff	z-p	Coeff	z-p
<i>Firm location</i>								
North West	-0.089	0.011	-0.235	0.062	-0.242	0.000	-0.147	0.000
North East	-0.045	0.141	-0.076	0.551	-0.161	0.020	-0.126	0.009
Centre	0.044	0.157	-0.056	0.672	-0.185	0.015	-0.120	0.009
<i>Firm size</i>								
Medium size firms	-0.051	0.071	0.188	0.296	0.219	0.250	-0.187	0.000
Large size firms	-0.158	0.003	0.199	0.281	0.090	0.684	-0.193	0.017
<i>Firm assessment on economic situation</i>								
Level of activity/demand: negative	0.246	0.000	0.332	0.000	0.290	0.000	0.410	0.000
Expectations on activity/demand: neg.	0.175	0.000	0.276	0.000	0.205	0.000	0.219	0.000
Expectations on employment: neg	0.323	0.000	0.271	0.000	0.359	0.000	0.195	0.000
Assessments on Unit Labour Costs	0.023	0.000						
Obstacles to production: no	0.060	0.000	0.446	0.000				
Capacity utilisation	-0.001	0.000						
<i>Internationalisation</i>								
Export turnover (in % of total turnover)	0.016	0.004						
Competitive position	0.073	0.000						
Delocalised abroad: yes	0.069	0.204						
Number of employees abroad	0.000	0.420						
Confidence climate	-0.003	0.001			0.000	0.845	0.002	0.146

Figure A – Coefficients on time dummies – Model (1), various business sectors

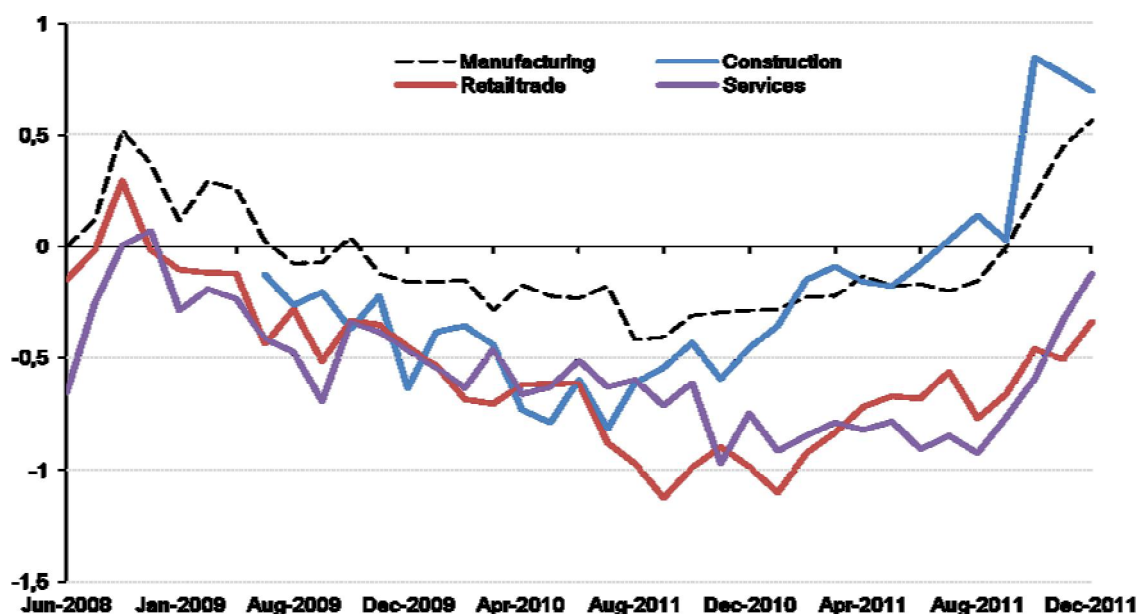


Table B – Regression results for Model 2, various business sectors

	Manufacturing		Retail trade		Services	
	Coeff	z prob	Coeff	z prob	Coeff	z prob
<i>Firm location</i>						
North West	-0.180	0.000	-0.202	0.051	-0.128	0.002
North East	-0.194	0.000	-0.252	0.019	-0.128	0.009
Centre	-0.064	0.093	-0.124	0.215	-0.133	0.004
<i>Firm size</i>						
Medium size firms	-0.088	0.013	-0.152	0.260	-0.153	0.002
Large size firms	-0.157	0.024	0.001	0.692	-0.194	0.023
Firm assessment on economic situation						
Level of activity/demand: negative	0.200	0.000	0.241	0.000	0.315	0.000
Expectations on activity/demand: neg.	0.133	0.000	0.331	0.000	0.214	0.000
Expectations on employment: neg	0.279	0.000	0.064	0.415	0.146	0.000
Assessments on Unit Labour Costs	0.001	0.588				
Obstacles to production: no	0.064	0.000				
Capacity utilisation	-0.001	0.000				
<i>Internationalisation</i>						
Export turnover (in% of total turnover)	-0.015	0.030				
Competitive position	0.025	0.174				
Delocalised abroad: yes	0.224	0.001				
Number of employees abroad	0.000	0.556				
Confidence climate	-0.002	0.178	0.011	0.031	0.003	0.052

Figure B – Coefficients on time dummies – Model (2), total business sector

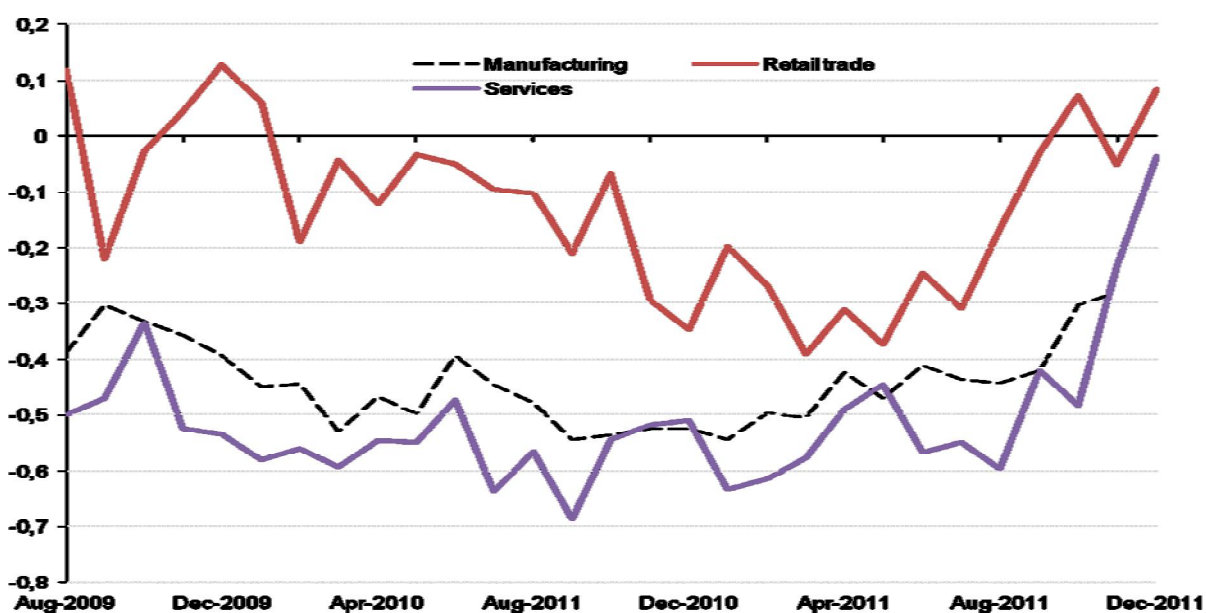


Table C – Results of estimation of Model (3), various business sectors

	Manufacturing		Construction		Retail trade		Services	
	Coeff	z prob	Coeff	z prob	Coeff	Z prob	Coeff	z prob
<i>Firm location</i>								
North West	-0.243	0.000	0.014	0.629	-0.222	0.065	-0.227	0.001
North East	-0.252	0.000	0.055	0.451	-0.397	0.003	-0.175	0.032
Centre	-0.066	0.147	-0.143	0.180	-0.293	0.042	-0.178	0.020
<i>Firm size</i>								
Medium size firms	-0.099	0.044	-0.063	0.372	-0.150	0.356	-0.292	0.001
Large size firms	-0.459	0.000	-0.829	0.000	0.073	0.581	-0.300	0.059
<i>Firm assessment on economic situation</i>								
Level of activity/demand: negative	0.210	0.000	0.156	0.008	0.317	0.000	0.328	0.000
Expectations on activity/demand: neg.	0.144	0.000	0.080	0.128	0.271	0.000	0.213	0.000
Expectations on employment: neg	0.313	0.000	0.262	0.000	0.254	0.020	0.173	0.000
Assessments on Unit Labour Costs	0.018	0.000	0.021	0.525				
Obstacles to production: no	0.046	0.019						
Capacity utilisation	-0.001	0.094						
<i>Internationalisation</i>								
Export turnover (in% of total turnover)	0.014	0.092						
Competitive position	0.058	0.018						
Delocalised abroad: yes	0.207	0.023						
Number of employees abroad	-0.001	0.106						
Confidence climate	-0.004	0.007			0.003	0.205	0.005	0.034

Figure C – Coefficients on time dummies – Model (3), various business sectors

