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Prof. *Pierpaolo Benigno, LUISS Guido Carli & EIEF*

Prof. *to add*

Prof. *to add*

Abstract

The Global Financial Crisis has been one of the most significant economic shocks since the Great Depression. As the Crisis intensified, there was a large fall in markets' capacity to accept risk. The result was a situation of tight credit conditions and in some cases dysfunctional markets, accompanied by a general loss of confidence. This dissertation explores some of the forces that have been working to mitigate the negative effects in the aftermath of the Crisis.

The first chapter analyses the role played by central bank forward-looking communication in shaping markets' expectation. To this aim, we propose a new index of central bank's verbal guidance, which measures the communication about future based on the frequency of future verbs in monetary policy statements. The purpose is to test whether and the extent to which verbal guidance might be considered an additional policy instrument. We consider the case of the European Central Bank (ECB) and follow a two-steps procedure. First, we analyze the main determinants of our index and estimate the unexpected component. Second, we investigate the effects of the identified innovation of verbal guidance on daily changes of forward money markets rates between September 2007 and December 2015. Our results show that financial markets' expectations on future short-term interest rates react to a shock of communication about future: the effect is negative and larger for higher horizons, after controlling for the standard policy rate shock and the announcement of unconventional monetary policies. This suggests that the verbal guidance may be considered an additional

policy instrument.

The second chapter provides evidence about the tightening credit conditions faced by the private sector in Italy in the aftermath of the Global Crisis and analyses the role played by social capital. Since social capital is a key determinant of trust, it should positively affect the supply of credit, in particular during crises when confidence is under stress, as it was for the financial turmoil of 2008. To investigate whether and the extent to which social capital mitigated the credit rationing following the Crisis, we compare the probability of approving a loan requests lodged by over half a million Italian non-financial corporations before and after the default of Lehman Brothers (from January 2007 to June 2010). We find that firms headquartered in high-social capital provinces suffered less: while during the Crisis the probability of loan approval declined for all firms, for those ones headquartered in high-social-capital areas the decline was half that of low-social-capital areas, indicating that social capital smoothed the impact of the shock. Moreover, consistent with theory, we find that social capital conveys its mitigating effect on credit rationing in cases in which the reciprocal trust, because of the lack of information, matters more.

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Chapter 1

The Effects of Central Bank's Verbal Guidance: Evidence from the ECB¹

1.1 Introduction

After the onset of the Global Financial Crisis, the role of central bank communication has evolved remarkably. The close proximity of the policy rate to the effective lower bound and the impairments to the monetary policy transmission mechanism have risen the need of shaping financial markets' expectations on future short-term interest rates through a forward-looking communication strategy.² In fact world's major central banks have recently introduced or reinforced their guidance on policy inclination, in order to convince firmly the financial markets that the future monetary policy stance will remain accommodative.

In this paper we propose a new index of central bank's verbal guidance,

¹This chapter is co-authored with Cinzia Guerrieri, Luiss Guido Carli

²Please refer to [Bernanke and Reinhart \(2004\)](#) and [Blinder \(2010\)](#) for a discussion of the unconventional monetary policies at the zero lower bound.

which quantifies the forward-looking statements according to the frequency of future verbs used in the monetary policy press releases. To the best of our knowledge, we are the first to adopt this approach for identifying central bank communication about future.³ We exploit the fact that the English language “requires future events to be grammatically marked when making predictions”: according to the typological linguistic literature, English is classified as a *strong future-time reference* language which “requires speakers to encode a distinction between present and future events”.⁴ As a consequence, the identification of central bank communication about future is straightforward: we collect the future markers, namely the future auxiliary and semi-auxiliary verbs *will*, *shall*, *going to*.⁵ Moreover, this approach can be implemented in an automated fashion, which makes our index consistent and easy to replicate.

The purpose of this paper is to test whether and the extent to which the central bank’s verbal guidance might be considered as an additional policy instrument to communicate effectively the future monetary policy stance.⁶ In other terms, we investigate the role of the communication strategy in shaping the financial markets’ expectations on future short-term interest rates, i.e. the signalling channel of the monetary policy transmission mechanism.

We consider the case of the European Central Bank (ECB): in particular, we focus on the verbal guidance released through the press conference which follows the monetary policy meeting of the Governing Coun-

³Karapandza (2016) propose a similar approach to study the relationship between the firms’ information about the future conveyed in the annual report and the stock returns.

⁴On the contrary, the *weak future-time reference* languages (e.g. German) do not necessarily require to mark future events through future markers (Chen (2013)).

⁵Please refer to Szmeccsanyi (2003).

⁶We also exploit the fact that all relevant information released by central banks are often available in the *lingua franca* of international financial markets, English.

cil. As we are interested in the communication about the future policy stance, we restrict the analysis to the first section of the Introductory statement, we call *policy summary*, where the Governor summarizes its policy decision. This choice is motivated by the fact that the verbal guidance is communicated to the public after the explanation of the policy decision, generally in the forms of a policy inclination based on the risks to the primary objective of price stability.

We follow a two-step approach. First, we measure the index from 2002 to 2015. The evidence shows that there has been a positive trend of the words used in the policy summary along with an increase of the future verbs, especially in the aftermath of the financial turmoil, with peaks at the end of 2011 and over 2014-2015. This period coincides with the decrease of the policy rates towards the effective lower bound (as shown in Figure 1.1) and the announcement of several types of unconventional monetary policies, suggesting that the communication strategy has evolved accordingly. We then identify the process of our ECB verbal guidance index given the information set available on the press conference day, in order to estimate the news that could explain financial markets' movements around that event.

In the second part of the paper, we investigate the effects of a shock to verbal guidance on the daily changes of money markets rates, by applying a standard event-study regression methodology on a period that spans from September 2007 to December 2015. In particular, we look at the implied forward three-month Euribor rate at different horizons (Figure 1.2) which reflect the financial markets' expectations on future short-term interest rates. Our results show that the interest rates are negatively affected by an unexpected increase in verbal guidance on the press conference day, after controlling for the monetary policy

shock, and the effect is more significant and larger for higher horizons. Although our verbal guidance index does not detect the tone of the forward-looking statements, we acknowledge that the announcements on future policy intentions have been used mostly to communicate a longer-lasting accommodative stance from the beginning of the financial turmoil to nowadays. We interpret these results as evidence that verbal guidance may be considered as an additional policy instrument for the effectiveness of the ECB monetary policy signalling channel. These results are robust, *inter alia*, to the inclusion of dummy variables for the forward guidance announced on July 2013 and for the other unconventional monetary policies, suggesting that financial markets react not only to the announcement *per se* but also to the way the message is conveyed.

We contribute to the literature on ECB communication in several ways. First, our approach differs from the standard factor analysis proposed by [Gurkaynak et al. \(2005\)](#) for identifying the news shock related to future policy inclination. As an example of application to the ECB, [Brand et al. \(2010\)](#) identify intra day changes in money markets rate occurring during the press conference window as a direct measure of path news. Nevertheless, the factor analysis approach can only investigate the extent to which the communication on policy inclination is relevant for the expectations of financial markets. By their nature, it cannot reveal anything about why financial markets forecast a different forward path for interest rates after the statement release, or which aspect of the statement constitutes the news that changes their beliefs.⁷ On the contrary, in this paper we show the evolution of language to communicate possible future moves and its effects on financial markets' expectations.

⁷The limits of this kind of analysis are amply discussed in [Woodford \(2012\)](#).

Second, our paper contributes to the literature on the semantic content of the central bank communication. Former indicators of the ECB communication have been constructed to measure the direction of the policy stance: [Ehrmann and Fratzscher \(2007\)](#) classify the extracted sentences from inter-meeting speeches held by central bankers based on their interpretation of dovish or hawkish tone; a similar approach has been adopted by [Rosa and Verga \(2007\)](#) to identify the direction of the policy summary. We thus contribute to the semantic literature on the ECB communication, by proposing a new index which does not consider words but only verbal tenses. We exploit the fact that the use of verbal tenses belongs to a precise and stable system of rules (the grammars) which are not dynamic entities as words are.⁸ Moreover, the grammars are not subjective rules and therefore no authors' interpretation is needed to identify the future tenses.

Third, other papers rely on the use of dummy variables to measure the type of information conveyed during the ECB press conference: for example, [Ferrero and Secchi \(2009\)](#) construct several dummies for each type of quantitative and qualitative announcement on the future monetary policy stance;⁹ [Ehrmann and Fratzscher \(2009\)](#) uses Reuters snaps on the economic outlook, inflation, money growth, and interest rates to construct several dummy variables accordingly. However, relying on dummy variables, though widely used, limits the validity of this empirical strategy, because it assumes that the entire announcement was a complete surprise. As pointed out by [Christensen and Rudebusch \(2012\)](#), this is likely to underestimate the interest rate response as, es-

⁸Language is a dynamic entity and words can change meaning according to circumstances. In addition, new words can be introduced.

⁹Namely, numerical interest rate path (quantitative announcement), verbal hints on the future evolution of policy rates (qualitative announcement) with clear timing (clear qualitative announcement) or ambiguous timing (opaque qualitative announcement), and no announcement.

pecially for the later announcements, market participants may have anticipated some actions. This drawback puts a premium on the need to have a measure of news shock, as we show in this paper.

The remainder of the paper is organized as follows. Section 2 introduces our verbal guidance index and its application to the European Central Bank. In this section we also analyze the main determinants of our index and identify the unexpected component. Section 3 presents the empirical strategy and the results; this section includes some robustness analysis too. Finally, Section 4 concludes. The Appendix provides details on the data used in this paper.

1.2 A New Index of Verbal Guidance

In this section we introduce a simple indicator of central bank communication about future based on the frequency of future verbs. We exploit a peculiarity of the English grammar, which allows us to identify the forward-looking statement in a very straightforward way. In general, the human spoken language can be described as a system of symbols and rules (the grammars) by which the symbols are manipulated, and every complete sentence is built around a verb that indicates the time when the action occurs (present, past and future). Particularly, English requires the use of future markers to mark the timing of future events in nearly all circumstances ([Chen \(2013\)](#)). The future markers are the auxiliary and semi-auxiliary future verbs *will*, *shall*, *going to* ([Szmrecsanyi \(2003\)](#)). As defined on the [Oxford Dictionary](#), these verbs refer to actions stated as promises or commitments. In a robustness exercise, we extend the category of future markers to include verbs which convey a future meaning even if less certain: *to expect*, as it refers to something

as likely to happen; *may* and *might*, as they express a possibility.¹⁰

In practice, we compute future markers' frequencies in an automated fashion, through a *search words*-based computer-coded content analysis. This procedure eliminates the risks of possible misclassification due to personal judgments and can be easily replicate.

We then use the word counts to construct an objective indicator, we call the *verbal guidance index*, which is obtained as follows

$$VG_t = \frac{\sum_{i=1}^{M_t} FutureMarker_{i,t}}{N_t}$$

where t refers to the press statement, i denotes the future marker, M_t and N_t stand for the total number of future tenses and words in a given statement, respectively. The denominator reports the total number of words, N_t , to avoid the possibility that the phenomenon captured by the index may reflect the intensity of speaking by the central bank.

One of the main advantage of our indicator is that it does not use glossaries, but verbal tenses. In other terms, it is not contest-dependent, as the use of verbal tenses belongs to a precise and stable system of rules which are not dynamic entities as words are.

1.2.1 Evidence from the European Central Bank

We explore the validity of our approach by considering the European Central Bank as testing case. The means by which information on future monetary policy is transmitted to financial markets can include press releases, press conferences, bulletins, speeches and interviews. To the purpose of our analysis, we consider only the press conferences which

¹⁰As defined on the [Oxford Dictionary](#). Although *may* and *might* represents the present and past tense respectively, this distinction is rarely observed and they are generally acceptable as substitutes.

follow the monetary policy meeting of the Governing Council, as they are held regularly in terms of frequency and are systematic in terms of structure.

Since January 2002 to December 2014 the press conference was held the first Thursday of every month, while starting as of January 2015 the frequency of the monetary policy meetings has been reduced from monthly to every six weeks.¹¹ The timing of the communication strategy is the following: the press release reporting the decision on the key interest rates is issued at 1:45 p.m. CET/CEST; it is followed shortly by the press conference starting at 2:30 p.m., which is divided in two main sessions, i.e. the Introductory statement and the Question and Answer Session.¹² The former reports all the necessary information concerning the ECB monetary policy stance in a simple and systematic way, while the latter is often used to clarify ECB's message.

The structure of the Introductory statement has remained quite the same since the very beginning: (i) the first part summarizes the ECB's monetary policy decision; (ii) the second part discusses both real and monetary developments in the Euro area; (iii) the last part concludes with some considerations on fiscal policy and structural reforms.

As we are interested in the communication about the future policy stance, we restrict the analysis to the first section of the Introductory statement, we call *policy summary*: this choice is motivated by the fact that the verbal guidance is communicated to the public after the explanation of the policy decision, generally in the forms of a policy inclination based on the risks to the primary objective of price stability.

¹¹ Although the first press conference took place on January 1999, our sample starts from January 2002 because only since November 2001 ECB's President monthly press conference has a structure which can be precisely identified.

¹² The Introductory statement read by the Governor is published (almost) simultaneously online at <http://www.ecb.europa.eu/press/html/index.en.html>.

This selection criterion allows us to extract the text of interest properly, and minimize the risks that our index captures the future markers that refer to information other than the monetary policy verbal guidance.

Our sample covers 159 press conferences, starting from January 2002 to December 2015. Figure 1.3 shows the evolution of the ECB policy summary: the top graph plots the length measured by the number of words, while the bottom graph its share with respect to the Introductory statement. In both cases, the figure also reports the moving average over the previous 12 press conferences. Overall, the length of the policy summary has increased from 58 words on January 2002 to 436 words on December 2015, reaching a maximum of 670 words on June 2014. This tendency does not reflect a mere increase of length of the Introductory statement: in fact, also the share has considerably increased from around 7% to around 37%, with a peak of around 47,5% on January 2015. The positive medium-term trends suggest that the ECB has provided over time more information about the monetary policy decision and its possible future path, especially after the beginning of the financial turmoil.

Before exploring the forward-looking content of the policy summary, we perform a series of transformation on the original test. First, we consider only words which have a sparsity lower than 80 per cent, i.e. that appear once in at least 30 policy summaries; second, we remove numbers, stopwords, such as articles, prepositions, conjunctions, and ECB-related words.¹³ Figure 1.4 summarizes our findings: the top panel shows the number of future markers, namely *will*, *shall* and *going to*. We also report *expect*, *may* and *might*, which convey a future message even if less certain. It is evident that the ECB generally uses *will* to

¹³Please refer to Table A.1 in the Appendix.

communicate about future, while in none of the policy summary we could find the other future markers *shall* and *going to*. We observe a concentration of *expect* during November 2009-December 2010, a period characterized by the economic recession. Interestingly, *may* has been used twice in August 2012 to announce the OMT program and in general unconventional measures: “The Governing Council, [...], may undertake outright open market operation of a size adequate to reach its objective. Furthermore, the Governing Council may consider undertaking further non-standard monetary policy measures according to what is required to repair monetary policy transmission”. So far, the OMT has been announced but never implemented, as its activation depends on the country request: the verb *may* refers indeed to a possibility, and not to something certain to happen. Finally, *might* has been used only few times at the very beginning of our sample.

The bottom part of Figure 1.4 plots the number of words of the policy summary versus the number of *will*. The evolution of *will* reflects the trend observed for the number of words, suggesting that there has been a shift towards explicit forward-looking statements over time. This evidence is reinforced by the content analysis provided by Figure 1.5, which reports a visual overview of the most frequent words in four main sub-periods, i.e. 2002-2006, 2007-2009, 2010-2012, 2013-2015. While the frequency of technical terms (e.g. monetary, price stability or inflation) is mostly constant over the four sub-periods, the frequency of *will* has increased.

In our view, these facts are consistent with the increasing need of managing financial markets’ expectations on the future path of short-term interest rates: as policy rates reduce towards the effective lower bound, the signalling channel becomes a critical channel for the mon-

etary policy transmission.¹⁴ In fact, as stated by the ECB President Mario Draghi: “Our response was to *place more emphasis on enhanced communication* - both regarding our commitment to our price stability objective, and regarding our assessment of and response to the rapidly changing economic and financial situation”, [Draghi \(2014\)](#).

As examples, we report the text extracted from three Introductory statements which show clearly how the ECB has increasingly relied on explicit communication about future.

At the very beginning, the policy summary consisted of a very limited number of strings, and an implicit policy inclination was released through key words related to the risks to price stability: e.g. on January 2002 “We also confirmed that the current level of key ECB interest rates remains appropriate for the maintenance of price stability over the medium term”.

Starting as of September 2005, statements on the inflation expectations have been introduced, e.g. on April 2006: “It remains essential to ensure that medium to long-term inflation expectations in the euro area are kept solidly anchored at levels consistent with price stability. Such anchoring of inflation expectations is a prerequisite for monetary policy [...] With interest rates across the whole maturity spectrum still at very low levels in both nominal and real terms, [...], our monetary policy remains accommodative”.

During the crisis, we observe both an increase of wording and *will*, e.g. on June 2014: “[...] the measures will contribute to a return of inflation rates to levels closer to 2% [...] Looking ahead, the Governing Council is strongly determined to safeguard this anchoring. Concerning our forward guidance, the key ECB interest rates will remain at present

¹⁴As pointed out by [Woodford \(2005\)](#) “For not only do expectations about policy matter, but, at least under current conditions, very little else matters.”

levels for an extended period of time in view of the current outlook for inflation [...]Moreover, if required, we will act swiftly with further monetary policy easing”. The future verbal tense is related to ensure that (i) the objective of price stability will be reached according to the measures taken; (ii) the policy interest rates will continue to be low, (iii) the ECB is ready to react by easing further the monetary policy stance. In other terms, to signal and convince financial markets that monetary policy stance will remain accommodative in the future.

Given this evidence, we compute two versions of our indicator of central bank verbal guidance for the ECB policy summary. The former includes only *will*, while the latter also *expect*, *may*, *might*:

$$VG_t = \frac{\sum_{i=1}^{M_t} FutureMarker_{i,t}}{N_t} \quad (1.1)$$

$$VG_t^e = \frac{\sum_{i=1}^{M_t} w * FutureMarker_{i,t}}{N_t} \quad (1.2)$$

where t refers to the press conference day; FutureMarker={will} in eq. 1.1 and FutureMarker={will, expect, may, might} in eq. 1.2.; $w=\{0.5,1\}$ denotes the weights, where 0.5 refers to *expect*, *may*, *might* and 1 to *will*; M_t and N_t represent the total number of future markers and words in each policy summary, respectively.¹⁵ Our weighting scheme is merely arbitrary and it is motivated by the fact that *expect*, *may*, *might*, although convey a future message, refer to something as likely to happen or to a possibility, and therefore their message is less certain. Given that their frequency is very low in our sample, this choice should not have a crucial impact on the computation of the index.¹⁶

¹⁵We disregard *will* when it is preceded by the article *the*, as in this case it denotes a noun and not a verb. Moreover, we control for possible case-sensitive issue, by removing *May* from our counting.

¹⁶As someone could rightly point out, the use of these verbs could introduce more

Figure 1.6 reports the two versions of the index: the main difference occurs during the period November 2009 - December 2010, which was characterized by a larger use of *expect* with respect to *will*. As expected, we observe large values of the index during the peak of the sovereign debt crisis in November 2011 (coinciding with the decrease of the main refinancing rate, few months after the previous increases in April and July). Moreover, the highest values occur in the last part of our sample, during which several unconventional monetary policies have been announced, included the *Quantitative Easing* on January 2015.

1.2.2 The identification of the ECB verbal guidance shock

As emphasized by Kuttner (2001), in a forward-looking environment financial markets should react only to the surprise element of the monetary policy announcements. Therefore, in order to assess the market response to communication about future, we need to identify the unexpected component. To this purpose, we explore the process underlying the ECB verbal guidance index;¹⁷ our hypothesis is that the financial markets participants form their prediction based on the following augmented autoregressive process:

$$E[VG_t|I_{t^*}] = \alpha + \sum_{i=1}^n \beta_i VG_{t-i} + \gamma \Delta i_t \quad (1.3)$$

where t stands for the press conference day, the frequency of VG_t reflects the timing of the ECB meetings and n refers to the past values;

uncertainty about future and therefore have a negative effect on the volatility of financial markets. As we do not investigate this issue here, we leave this question open to further research.

¹⁷As defined in eq. 1.1. Results are consistent when we consider the verbal guidance index as defined in eq. 1.2.

E denotes the expectation conditional on the information available on the day of the ECB monetary policy meeting before the press conference takes place, t^* ; Δi_t controls for the change of the key policy rate announced on the same day that, as shown in Appendix A.2, reflects expectations about the future economic developments.

We estimate eq. 1.3 under three specifications: i. we only consider the autoregressive components. According to both Akaike and Schwarz Bayes information criteria, we include two lags;¹⁸ ii. we control for the change in the policy rate using the Main Refinancing rate;¹⁹ iii. we instrument the policy rate as described in Appendix A.2. Table 1.1 reports the results for the ECB verbal guidance index for the period January 2002 - December 2015. The first two columns show the OLS estimates with robust standard errors: the two lags are statistically significant and large, while the change of the policy rate is negative but small and not statistically significant. The results are robust to the IV estimation reported in the third column. Moreover, the instruments are valid and correctly excluded from the estimated equation as the Hansen statistic suggests.²⁰

To conclude, the first specification better describes the process: the estimated persistence of the verbal guidance index is consistent with the findings of Amaya and Filbien (2015) which show that the content of the ECB press conference is similar over time.²¹

¹⁸Since higher lags turn out to be statistically insignificant.

¹⁹Alternatively, we also use the Eonia rate on the day preceding the press conference. As motivated in the literature on this field, the Eonia rate approximates the accommodative monetary policy stance after the crisis: as shown in Figure 1.1, the Eonia stands systematically below the ECB Main Refinancing Rate starting as of 2009.

²⁰When the instruments are included in the estimation, their coefficients are not statistically significant.

²¹The authors follow the methodology proposed by Tetlock (2011) and measure the similarity of two successive ECB statements based on the proportion of textual information overlapping in both statements.

In order to have a measure of real-time news, we re-estimate eq. 1.3 under the first specification:

$$\hat{VG}_t = \hat{\alpha} + \hat{\beta}_1 VG_{t-1} + \hat{\beta}_2 VG_{t-2} \quad (1.4)$$

by following a recursive approach to compute the one-period ahead forecast, where the starting sample is composed by the first 30 observations and at each iteration the window increases by one unit. The unexpected component of the ECB verbal guidance index, we call verbal guidance shock (henceforth, VGS), is given by the difference between the actual and the predicted values (Figure 1.7).

1.3 Empirical Analysis

1.3.1 Data and Methodology

In this section we investigate whether and the extent to which an unexpected change in the communication about future may affect financial markets' beliefs. To this purpose, we look at daily changes of the Euribor rate after the press conference takes place. The Euribor (Euro Interbank Offered Rate) is a daily reference rate, determined and published at about 11:00 CET/CEST each working day, as the filtered average interbank interest rate at which European banks are prepared to lend to one another.²² Our choice is motivated by the fact that the Euribor represents the benchmark rate of the large euro money market and reflects the expectations of financial markets on future short-term interest rates. Specifically, we use the spot rates for the three-month ($3M$), six-month ($6M$), nine-month ($9M$) and twelve-month ($12M$) maturities

²²For more information, please refer to the official website <http://www.emmi-benchmarks.eu/euribor-org/euribor-rates.html>.

that were obtained from Thomson Reuters-Datastream. As the spot rate (e.g. 12M) implicitly incorporates the expectations on *all* short-term interest rates over a specific horizon (e.g. 12 months), for our analysis we compute the implied k -month forward rate for the three month ahead, where $k = \{3, 6, 9\}$, as a measure of expectations on the three-month rate in k months (Figure 1.2).

Our hypothesis is that the communication about future could play an important role in affecting the Euribor term structure, especially at longer horizons. We proceed as follows. We apply a standard event-study regression approach, by restricting our empirical analysis to the days of the ECB Governing Council monetary policy meetings. In particular, we focus on the period spanning from September 2007 to December 2015. This period was characterized by the decrease of the policy rates towards the effective lower bound (Figure 1.1) and the announcement of several types of unconventional monetary policies to signal an accommodative monetary policy stance. Therefore, we expect that a positive shock to our index (an unexpected increased use of future markers) might have a negative instantaneous effect on financial markets' expectations. Conditionally on the assumption that financial markets are efficient and respond only to news that could affect their belief about the future, we assume that: i. on meeting days the relevant news concerns the policy rates (the main refinancing rate and the standing facilities rates) and the ECB press conference; ii. the expectation hypothesis holds; iii. and the term premium is constant during a one-day window.²³

The first assumption implies that we need to control for the news related to the monetary policy rates. We use as proxy the difference between

²³Nonetheless, we acknowledge that someone could question the validity of this assumption after the onset of the crisis. It is a testable hypothesis and we leave the answer to it to future research.

the main refinancing rate and its market expectations, measured through the mean response of a Bloomberg survey among market participants.²⁴ Given that the ECB has started to announce several non-standard measures in the aftermath of the financial turmoil, we also control for the announcements on the press conference day.²⁵ In particular, we distinguish between two broad categories of non-standard measures. The former comprises the policies aimed at improving the liquidity conditions of the interbank markets, which were severely impaired by the financial crisis. Precisely, we include a dummy which takes value 1 when one of the following measures are announced: i. the unlimited provisions of liquidity through fixed rate tenders with full allotment for the main refinancing operations (FRFA); ii. extension of maturity for the long-term refinancing operations (LTRO); iii. extension of the list of eligible collateral assets for refinancing operations; iv. liquidity provision in foreign currencies through swap lines with other central banks (FOR);²⁶ v: the outright purchases of covered bonds (CBPP1 and CBPP2). The second category covers the asset purchases carried out in order to activate other channels of the monetary policy transmission mechanism, i.e. the *portfolio rebalancing channel* and the *bank lending channel*. In practice, we include a dummy which takes value 1 on the days the ECB announces: i. purchases of government bonds carried out under the Outright Monetary Transactions (OMT); ii. the extended

²⁴As robustness check (non reported), we measure the monetary policy shock as daily difference of the Eonia overnight rate.

²⁵Please refer to Table A.3 in the Appendix for a list of all unconventional monetary policies covered in this paper. Our list is very similar to [Falagiarda and Reitz \(2015\)](#) up to 2012.

²⁶Even if the main goal of the swap lines is to provide foreign currency liquidity to domestic banks, this instrument should mitigate the negative spillovers effects by protecting the euro area interbank market from external tensions, as discussed in the article "Experience with foreign currency liquidity-providing central bank swaps", Monthly Bulletin, August 2014.

asset purchases programme (APP);²⁷ iii. the targeted longer-term refinancing operations (TLTRO).²⁸

We also include a dummy which takes value 1 when the forward guidance has been first announced on July 2013. Finally, we include a set of control variables that could affect the dynamics of the Euribor rate other than the ECB policy news: i. the surprise related to the ECB forecasts for the GDP growth and inflation, defined as the difference between the ECB and the Survey of Professional Forecast (SPF) projections;²⁹ ii. changes in the Euro Stoxx volatility as a measure of financial turmoil;³⁰ iii. three dummies corresponding to three main phases of the crisis that started in August 2007, namely the financial turmoil from 9 August 2007 to the collapse of Lehman Brothers, the Great Recession phase from 15 September 2008 until 7 May 2010, and the Eurozone sovereign debt crisis from May 2010 until November 2012;³¹ iv. a dummy which takes value 1 if Mario Draghi is the ECB's President in charge.³²

Specifically, we estimate the following equation using ordinary least

²⁷This programme also covers the asset-backed securities purchase programme (AB-SPP) and the covered bonds purchase programme (CBPP3) previously announced as of June 2014.

²⁸We include the TLTRO among these measures as they have been introduced mainly to affect the economy through the *bank lending channel*.

²⁹Starting as of June 2004, the ECB has released the macroeconomic projections on the press conference day, while the SPF projections are released around one week before. Both projections are released on a quarterly frequency; we then assume that the surprise is zero when there are no releases. Finally, as both projections refer to current and next year, we compute the fixed horizon forecast using a slightly version of eq. A.2.

³⁰As in [Arghyrou and Kontonikas \(2012\)](#), [Glick and Leduc \(2012\)](#) and [Falagiarda and Reitz \(2015\)](#). As robustness check, we control also for changes in market volatility the day before the press conference.

³¹A similar identification of the crisis periods has been suggested by [Drudi et al. \(2012\)](#).

³²In a (non-reported) robustness exercise we also include the surprise of U.S. initial jobless claims, defined as the difference between the actual release and market expectations measured through the mean response of a Bloomberg survey among market participants. The release is issued every Thursday at 2:30 pm CET/CEST, contemporaneously with the ECB press conference. As the effect is almost null, we exclude it for parsimony.

squares with robust correction of standard errors:

$$\Delta r_{k,t'} = \alpha + \beta_1 VGS_t + \beta_2 MPS_t + \beta_3 FG + \beta_4 REF_t + \beta_5 UMP_t + \gamma' Z_t + \varepsilon_t \quad (1.5)$$

where the time index t' refers to the day after the press conference.³³

The dependent variable, $\Delta r_{k,t'} = r_{k,t'} - r_{k,t}$, represents the first difference of the 3-month implied forward rate, where $k = \{3, 6, 9\}$; VGS is the verbal guidance shock, as defined in Section 1.2.2; MPS stands for the monetary policy shock; FG refers to the forward guidance dummy; $REF = [FRFA, LTRO, COLL, FOR, CBPP]$; $UMP = [OMT, APP, TLTRO]$; Z is the vector of control variables; and ε_t denotes the error term.

1.3.2 Main results

We estimate eq. 1.5 under three specifications. First, we estimate a baseline version of the model, which excludes the announcements of all non-standard measures, namely FG, REF and UMP. Table 1.2 reports the results. As expected the effect of a monetary policy shock on expectations on future short-term interest rates is positive; moreover it is statistically significant for all the horizons analyzed. In line with our hypothesis, the coefficients for the verbal guidance shock are all negative and significantly different from zero too. In other terms, our findings suggest that i. the ECB communication about future influences expectations about future money market interest rates; ii. an unexpected increase of future markers induces a reduction in the expected money markets rates. In addition, the effect is larger (in absolute

³³Given that the Euribor is fixed at 11:00 am CET/CEST, we compute the difference from the day of the Governing Council meeting (t) to the day after (t').

value) for longer horizons. This result can be explained by the fact that the verbal guidance aims at convincing firmly the financial markets participants that the monetary policy stance will remain accommodative in the medium term. Consistently with the theory suggesting that when the standard monetary policy instrument, i.e. the policy rate, reduces towards its effective lower bound, central banks' communication has to be enhanced to shape expectations about future interest rate policy.

In order to quantify the magnitude of the effect of the *VGS*, we normalize by considering the impact of one standard deviation shock: the effect of the *VGS* has been around 1 basis point across the horizons. This effect can be relevant, given that the average (of the absolute value) of the change of forward money market rate on the press conference day is around 2 basis points in our sample. In specific days the effect is much larger, e.g. on June 2014, when several non-standard measures have been announced, the *VGS* has been around 0.086, corresponding to an impact between 2 and 3.37 basis points. Interestingly, the coefficient on the dummy which takes value 1 if the President in charge is Mario Draghi is negative and statistically significant for all three horizons. The magnitude of the effect is on average around 3 basis points. This result is consistent with the literature highlighting the importance of the central bank governors, according to which the reputation of the central bank president is relevant for shaping markets' expectations.³⁴

In the second specification, we estimate the full model as defined in eq. 1.5. Table 1.3 reports the results. As expected, the forward guidance (FG) announced on July 2013 had a relieving impact in reducing money market rates of almost 4 basis points for all horizons, while the money markets have been not affected by the announcements of uncon-

³⁴See [Sørensen \(2014\)](#), [Neuenkirch et al. \(2013\)](#)

ventional monetary policies, as shown by other researches.³⁵ This can be due to several reasons. For example, [Brunetti et al. \(2011\)](#) show that during crisis long term refinancing operations are not effective in reducing prices and interbank market uncertainty due to the crowding-out effect that dominates the intervention news effect. Moreover, programs such as the SMP and OMT were oriented to alleviate the increasing tensions in the sovereign debt market, while the TLTRO to stimulate the bank credit to the economy. Even after controlling for the announcements of unconventional monetary policies, the coefficients of verbal guidance shock are all negative and statistically significant for $k = 6, 9$. Actually, they are now bigger in magnitude: the effect is larger (in absolute value) than the baseline model, suggesting that omitting variables result in downwards biased estimation of the VGS. Finally, we estimate eq. 1.5 by dropping the dummy variables for the non-standard measures, REF and UMP, which result to be not statistically relevant for explaining money market rates movements around the press conference day. In other terms, we estimate an extended version of the baseline model, by controlling for the announcement of forward guidance. Table 1.4 reports the results, which are fully consistent with the baseline model.

To conclude, our findings suggest that communication in the form of verbal guidance may be considered as an additional policy instrument once central bank is constrained by the lower bound on key policy rate. The main advantage of including our variable is that it is continuous in time, as opposite to the dummy for the FG, and it is thereof able to capture the effect of the evolution of language. As amply discussed in Section 1.2.1, our index captures the future markers used to communicate

³⁵See [Cecioni et al. \(2011\)](#), for a review of the effects of unconventional monetary policies in the US and euro area interbank market until mid-2011.

information on several but complementary aspects that signal the future monetary policy stance, namely forward guidance, announcements of asset purchases and monetary policy objective. While the announcement on non-standard measure is not effective *per se*, our results suggest that financial markets' expectations react to the way the message is conveyed.

1.3.3 Robustness checks

In this section, we perform a series of robustness exercises and discuss the results for the extended model.³⁶ Our econometric analysis has been carried out in two steps. First, we determine the market prediction of the verbal guidance index immediately before the start of the press conference in order to estimate the news shock; second, we investigate the extent to which the identified innovation in communication about future can explain forward rate movements around event-days. In other words, we use a generated regressor in the second step. This fact may give rise to underestimated standard errors and hence to spurious significant regressor coefficients.³⁷ In order to account for the generated-regressor problem when computing coefficient estimates' standard errors, we check the robustness of our conclusions by using a bootstrap approach to statistical inference (see, e.g., [Efron and Tibshirani \(1993\)](#)). More specifically, we apply a sampling-with-replacement raw residuals bootstrap scheme with 1,000 repetitions. In [Table 1.5](#) we report the estimation results: the coefficients of the verbal guidance shock are qualitatively very similar to those obtained in the previous section where White-robust standard errors are used. This fact confirms that commu-

³⁶The results remain valid for the other specifications too.

³⁷See [Pagan \(1984\)](#) for more details on the generated regressors issue.

nication about future is indeed effective in moving money markets rates. Moreover, we have run an event-study analyses measuring changes in expectations in a one-day window around the press conference meeting. As it has been stressed out in the literature, a limitation of the event-study approach is that it relies on the assumption that financial markets are informationally efficient, i.e. it assumes that the majority of the impact of ECB communication occurs immediately. Hence, the choice of the event window length is crucial, since it involves a trade-off between keeping the interval narrow to avoid the noise produced by extraneous information, and choosing a wider window to identify potential delayed and/or anticipated reactions of market participants. In order to capture possible anticipated reactions to news by market participants, here we extend our event window to two days, namely the day before and the the day after the press conference. The results are reported in Table 1.6. The coefficients of our variable of interest, the VGS, are larger in absolute value for all the horizons analyzed, the significance level increases and even the measure of the goodness of fit for the whole model rises. The results indicate that ECB news have been subject to anticipation effect, as there has been an increase quantitatively (in absolute value) and qualitatively in comparison to a one-day window. On the one hand, the results obtained using a two-day window are less accurate in comparison to those obtained using a one-day window, as extending the event window inevitably increases the noise in the estimates of the announcement effect. On the other hand, they are able to capture market reactions that are incorporated with anticipation in money markets rates.

To further assess the robustness of our results, we estimate eq. (1.5) using the surprise in the Verbal Guidance Index computed following equation (1.2). The Verbal Guidance Index we use here is computed

adding as future markers *expect*, *may* and *might* to *will*. For this index we apply a weighting scheme that associates the weight 1 to *will* and 0.5 to the others. On the one hand, the new index captures a broader range of shades about the use of future tenses in communication. On the other, the inclusion of different future markers and the use of an arbitrary weighting scheme inevitably increase the noise in the index. The results reported in Table 1.7 show that the coefficients of VGS^e are, as well as those of VGS all negative, increasing in absolute value with horizons and statistically significant.

Table 1.8 summarizes our results for the extended model for the horizon $k = 9$ in three cases, namely one-day window, one-day window with alternative index, and two-day window. Specifically, we report the effects of the verbal guidance and the monetary policy shocks, which are normalized by their standard deviation. Overall, the effect of a shock to verbal guidance is on average 1 basis point, and much higher than the monetary policy shock.

1.4 Concluding remarks

This paper has focused on the signalling channel of the European Central Bank communication strategy. As discussed in the descriptive analysis, the ECB has emphasized what it will do in the future in order to steer expectations. Our results have showed that using a future tense that is perceived by the public as a commitment in pursuing a particular monetary policy stance is indeed effective in shaping future short-term interest rates expectations. In particular, the stronger is the surprise in speaking about future, the stronger is the effect on interest rates, especially for longer horizons.

It is worth highlighting that our measure of surprise covers news on several but complementary aspects that signal the future monetary policy stance, namely forward guidance, announcements of asset purchases and monetary policy objective. While it is clear the role of forward guidance, it is less evident why the last two factors should have an impact on financial market expectations on short-term interest rates. In fact, communication on the price stability target is generally oriented to anchor the inflation expectations (and thereof to influence more effectively the real long-term interest rates), and asset purchases programs should have a direct impact on the term premium. We argue that a particular language used to communicate asset purchases and inflation objective, in addition to forward guidance, may contribute to signal the will of the European Central Bank to do whatever it takes to ease further the monetary stance and to halt the decline in economic activity.

To conclude, we have performed our analysis during a period characterized mostly by a dovish attitude, and thereof the results are valid in a context of accommodative monetary policy stance. Although it is not possible to state if these implications apply also in a hawkish context, it remains essential to carefully choose the verbal tenses to signal the exit strategy.

Chapter 2

Credit Supply and Uncertainty: The Role of Social Capital¹

2.1 Introduction

A large number of papers have investigated how banks have passed the shocks due to the recent crisis through the credit market.² However, the literature is still silent on the role played by social capital during the crisis even though it is a key factor affecting the functioning of financial markets ([Guiso et al. \(2004\)](#)). A range of evidence shows that in the aftermath of the 2008 global financial crisis there was a relevant jump in uncertainty ([Bloom \(2014\)](#) and [Stein and Stone \(2013\)](#), among the others). Greater uncertainty appears to reduce the willingness of firms to hire and invest and consumers to spend. Furthermore, uncertainty also increases the probability of default, by expanding the size of the left-

¹This chapter is co-authored with Maurizio Lozzi (Banca d'Italia) and Paolo Emilio Mistrulli (Banca d'Italia). The opinions are those of the authors and do not involve the Banca d'Italia and the European Central Bank.

² See among others, [Ivashina and Scharfstein \(2010\)](#), [Carvalho et al. \(2015\)](#), [Puri et al. \(2011\)](#) and, more specifically for Italy, [Gambacorta and Mistrulli \(2014\)](#), [Bolton et al. \(2016\)](#), [DeMitre et al. \(2010\)](#) and [Sette and Gobbi \(2015\)](#).

tail default outcomes ([Christiano et al. \(2014\)](#), [Arellano et al. \(2010\)](#)). From the credit market perspective this means that uncertainty reduces both demand and supply of credit. This paper is the first to empirically study whether social capital mitigates the effect of uncertainty shock on credit supply.

One of the mechanisms through which social capital impacts economic efficiency is by enhancing the prevailing level of trust. Therefore, credit market is one of the best candidates for testing its effect on the economy. Indeed, trustworthiness and creditworthiness are closely related concepts ([Glaeser et al. \(2000\)](#)) since bank lending is based on trust-intensive contracts: credit is ultimately an exchange of a sum of money today for a promise to pay back the loan in the future. Whether a loan is granted depends also on the extent to which the lender trusts the borrower. Since social capital is a key determinant of trust, it should positively affects the supply of credit, in particular during a crisis when confidence is under stress and the level of uncertainty rises.

The mechanism by which this happens is at least twofold. First of all, wherever internalized norms or social discipline are stronger, i.e. wherever social capital is higher, borrowers might be less prone to opportunistic behaviors (i.e. moral hazard), since that would be contrary to their moral values or because they anticipate the consequences of a sort of social stigma ([Coleman and Coleman \(1994\)](#)). Second, trust make people more prone to establish a widespread network of social relations, thus overcoming the *amoral familism*, as [Banfield \(1958\)](#) labelled the lack of generalised social trust. A widespread network of social relations may help banks overcome adverse selection problems since, in a highly interconnected community, information is more easily shared within and, as long as banks are part of the network, they may collect

soft information more easily.

Therefore, since a high level of social capital mitigates both moral hazard and adverse selection phenomena, the probability of approval for a loan request should be greater in those areas where social capital is more developed.

To investigate the relation between social capital and credit rationing some identification challenges need to be addressed. First, we need to disentangle the supply of credit from its demand to precisely identify the effect of uncertainty shock on the decision of granting a loan request. Second, since the probability that a loan is denied is affected by economic conditions, we need an exogenous variation in the level of trust. We analyse the effects of social capital on the granting of loans with individual loan application records controlling for observed and unobserved firm heterogeneity with firm fixed effect and time-varying observed and unobserved characteristics using quarterly fixed effects. Furthermore, to better identify the effect of social capital, we introduce area-quarter dummy variables. And, as exogenous variation in the level of trust, we exploit the unexpected increase in uncertainty due to the Lehman Brothers' default in October 2008, an uncertainty shock fairly exogenous for Italy .

The data are from Italy, a country where most firms are bank dependent and the within country variability of social capital is well known, Italy is the country where sociologists first turned to study trust and social capital ([Banfield \(1958\)](#) and [Putnam et al. \(1994\)](#)).

As amply explained in [Guiso et al. \(2004\)](#), the most contentious issue in the literature about social capital is how to measure it. Since the concept itself is complex, most of the measures used are contaminated by other factors. Because of this, they focus on electoral participation and blood

donation. In this paper we add as proxy for social capital the percentage of recyclable waste. In Italy, until 2003, households sorting waste have not legal obligation or direct benefit from it, the action is driven by the moral obligation of leaving a healthy planet to future generations. Therefore, waste sorting is driven by social pressure and internal norms, i.e., the fundamental components of social capital, as well as electoral participation and blood donation are.

The reason why the heterogeneity in the level of social capital may result in a heterogeneous response of loan supply to the Lehman Brothers' collapse is that the crisis implied an unexpected increase in the level of uncertainty and informational asymmetries, and it also led to an increase in banks' risk aversion.³ This in turn has affected the reciprocal trust between lenders and borrowers and lowered the willingness to lend beyond the effects due to the consequences of the crisis for the banks' soundness.

Social capital, that is one of the most important determinants of trust, has been reasonably little affected by the crisis, being the result of past events going far back in the history and, by making the level of local trust (i.e. the level of environmental trust specific to each Italian province) more resilient, it has contrasted the effects of global shock. As a consequence, in those provinces where the level of social capital is higher we expect that the effect of the crisis on trust is less pronounced, compared to other provinces, and then banks have better shielded their borrowers from the crisis.

The empirical analysis supports that view. The main finding of our paper is that firms headquartered in provinces where social capital is high were better shielded from the crisis. Indeed, while during the crisis

³ See [Acharya and Naqvi \(2012\)](#).

the probability of loan approval declined for all firms, for those ones headquartered in high-social-capital areas the decline was half that of low-social-capital areas (respectively around 3 and 6 per cent), indicating that social capital smoothed the impact of uncertainty shock.

We obtain these results by using as measure of social capital percentage of recyclable waste in 2003 at the province level. The results are confirmed using social capital measures adopted by [Guiso et al. \(2004\)](#). Our results are robust to the inclusion of additional time varying controls both at the province and firm level. Furthermore, to examine the causal nature of these correlations, we explore whether the magnitude of the impact of social capital varies as theory predicts. Consistent with theory, we find that the mitigating effect of social capital is stronger for firms that need to rely more on trust to obtain new loan. Classifying firms depending on their risk, we find that social capital is effective for medium scored firms and for those which are not scored, i.e. more opaque firms. Moreover, our findings suggest that social capital conveys its mitigating effect on credit rationing for firms which are not already known to the bank they are asking credit and in cases in which the reciprocal trust, because of the lack of information, matters more.

Our paper contributes to two main strands of literature. First, it is related to the literature investigating the effects of social capital on financial development ([Guiso et al. \(2004\)](#)). Second, it is related to a growing literature on the effects of the recent crisis on credit markets (e.g. [Ivashina and Scharfstein \(2010\)](#); [Carvalho et al. \(2015\)](#); [Puri et al. \(2011\)](#); [Bolton et al. \(2016\)](#); [Gambacorta and Mistrulli \(2014\)](#)). However, we combine these two strands of literature and, to our best knowledge, this paper is the first one that investigates whether social capital plays a role in mitigating the effects of a crisis on credit rationing. In a much related paper,

Mistrulli and Vacca (2015) obtain similar results indicating that social capital smoothed out the effects of the crisis on the cost of credit.

This paper is also related to Jiménez et al. (2012) and Jiménez et al. (2014), studying how monetary policy shocks affect the probability of loan approval, and Albertazzi et al. (2014) investigating whether the probability of approval is affected by denials/approval occurred in the period preceding a loan request.

The rest of the paper is organised as follows. Section 2.2 describes the data and the econometric strategy. Section 2.3 comments the results of the econometric analysis and Section 2.5 concludes.

2.2 Data and econometric setup

2.2.1 Data

Our main data source is the Credit Register (CR) of Banca d'Italia, which is the supervisor of the Italian banking system. The CR contains confidential and very detailed information at the loan level on all loan contracts granted to each borrower whose total debt from a bank is above 30,000 euros (75,000 euros until December 2008) and, more importantly from our perspective, the CR contains information about loan requests since December 1995. In particular, the CR records all the requests lodged by banks on borrowers they are not currently lending to (the so-called *servizio di prima informazione*, preliminary information service). Contrary to other countries Credit Register as the Spanish one used by Jiménez et al. (2012) and Jiménez et al. (2014), the inquiries in the Italian CR can be precisely identified as an actual loan application because the bank lodging the request has to report the reason of the

preliminary information request.⁴

Between January 2005 and December 2011, we observe about 6,000,000 loan applications placed by more than 900,000 non financial firms (potential borrowers) to about 800 banks (potential lender).⁵ Note that the CR regularly updates banks with information on the overall credit position of their existing borrowers, therefore requests for information on firms that are currently borrowing from the requesting bank would yield information that is already known to this bank. Consequently, the loan applications we analyse are placed to bank other than the incumbent ones. For each request we also observe whether the loan is accepted and granted, or not, by matching the loan application database with the CR database which contains the stock of all loans granted, similarly to [Jiménez et al. \(2012\)](#) and [Jiménez et al. \(2014\)](#). As mentioned, the CR reports data about the amount of credit granted to borrowers whose total debt from a bank exceeds 75,000 euro until December 2008 and 30,000 thereafter. To analyse an homogeneous sample we impose the threshold of 75,000 on the whole sample. Then we match the loan applications lodged from January 2005 to December 2011 with data on more than 4,500,000 loans granted from the first quarter of 2005 to the last of 2012. We obtain a monthly dataset of loan applications that uniquely link a borrower with a bank: loan applications at the firm-bank level.⁶

⁴ By law banks are allowed to request information, through the preliminary information service, about actual and potential borrowers in order to manage credit risk. By instance, the information request can also concern the guarantor of a loan and in this case the bank has to report that the request does not refer to a potential borrower. The possibility to precisely identify information requests lodged about potential borrower makes us confident that we truthfully capture loan applications. Furthermore, lodging a request to the CR is a service for payment, this foster the idea that banks require such service only if necessary.

⁵ Mergers and acquisitions among banks have been taken into account by assuming that all mergers occurred since the first month of our estimation sample.

⁶ Non performing loan are excluded.

We observe that on average a firm applies to more than one bank at the same time, therefore, if a bank requests information about a firm but does not grant the loan, either the bank denied the firm credit or the firm refused the offer by the bank because it eventually took credit from another bank. Firms apply for the same loan to different banks since they want to maximize the probability of obtaining a loan and, eventually, get the best loan conditions. Differently from [Jiménez et al. \(2012\)](#) and [Jiménez et al. \(2014\)](#), where approval is defined at firm-bank level, we define it at the loan level. More precisely, we consider loan application lodged by the same firm to different bank with no more than three months between each request as a unique credit application, assuming that the firm is shopping around for the same loan. Firm's search for a loan last on average two months and it takes three months from the application to actually grant the loan (Table B.1). There are pros and cons in using a definition at the loan level. On the one hand, we tend not to overestimate rejections: most of loan requests might have been approved by banks but the borrower declined them for a better offer. On the other, we may tend to underestimate rejections from the bank perspective: the borrower get credit from a bank but, at the same time, her-his request has been rejected by another bank. Since in this paper we are interested in the ability of the borrower of obtaining the credit, considering the first type of error is worthwhile. Therefore, the loan-level definition best fit for the purpose of our analysis. Since we are interested in the effect of the global crisis on credit supply, we focus on information requests lodged from January 2007 to June 2010 about non financial firms that asked some banks for a loan both before and after Lehman Brothers collapse. Our sample of analysis then consists

of 656,311 loan-level applications placed by 226,315 firms.⁷

To account for environmental heterogeneity we use data on GDP and inflation at the regional and national level, export and legal enforcement at the province level. As in [Kashyap and Stein \(2000\)](#) and [Jiménez et al. \(2014\)](#), to control for changes in the monetary policy stance we employ an overnight interest rate, that is, the Euro Overnight Index Average rate (EONIA), which is targeted by the European Central Bank (ECB) and the Eurosystem. To control for firms characteristics we rely on data from Cerved group a private company providing a database for a large sample of Italian firms (more than 1,000,000) which contains detailed information about firms' activity, balance sheets and risk, reported on a yearly basis. Table [B.2](#) reports descriptions and sources of the variables used.

One of the most critical issue of the literature on social capital is how to measure it. Since the concept itself is complex, most of the measures used are outcome based, e.g., the level of trust or level of economic cooperation. One problem with these measures, as amply emphasized by [Guiso et al. \(2004\)](#), is that they are contaminated by other factors. For example, the level of trust people exhibits in their economic behavior could be the result of good law enforcement. Here we propose an outcome-based measure that is free from this criticism: waste sorting. In Italy, regulation that provides mandatory quotas for the waste sorting have been partially implemented only after 2003. Therefore, in 2003, people spending their time in sorting waste have not legal obligation or direct benefit from it, the action is driven only by the moral obligation of leaving a healthy planet to future generations, by social pressure and internal norms, i.e., the fundamental components of social capital.

⁷Loan searches started before October 2008 and ended after are excluded.

Households sort their rubbish in three main categories: non-recyclable waste, recyclable waste and organic waste. We use as measure of social capital percentage of recyclable waste at the province level in 2003.⁸ Since in Italy waste sorting is managed at the local level, we control for differences in the quality of the collection infrastructures using quality weights at the province level.⁹

Being social capital the result of past events going far back in the history, measures of it that refer to different points in time, even to more than ten years ago, should be related. Therefore, to corroborates the results obtained using waste sorting, we rely on the measures already used by [Guiso et al. \(2004\)](#): electoral turnout in referenda that occurred in Italy between 1946 and 1989 and blood donation in 1995, the only year for which a complete dataset is available at the province level.

Figure 2.1-2.3 show how our three measures of social capital varies within Italy. Social capital is higher in the North of Italy, weaker in the Center, and very weak in the South.¹⁰ However, even within these areas there is variation.

2.2.2 Econometric strategy

The aim of the econometric analysis is to verify whether social capital had a role in mitigating the effects of the global crisis on the supply

⁸Nowadays in Italy, regulations exist that provide mandatory quotas for the waste sorting but those are not yet completely implemented: in 2009 law stated that at least 35 per cent of municipality waste was recycled and 65 per cent within 2012. However, in 2013 only around 43 per cent of the Italian rubbish was sorted.

⁹ Typically, rubbish is collected by a waste disposal company contracted to the municipal authority. The collection of waste can happen in two ways: door-to-door collection, where the garbage truck picks up the trash from individual bins; and central collection, where people have to place their garbage at a central drop off area. We use as quality weights the percentage of population served by infrastructures for the collection of sorted waste.

¹⁰North of Italy is the north of the Apennines, the Center the area from the Apennines to Rome, and the South that at south of Rome.

of credit to non-financial corporations. Through the loan search, loan demand is in a sense given and observed, and the lender has to decide only on the granting of each loan, i.e., the credit supply, knowing the firm. Since in addition to the loan searches, we have firm and environmental characteristics, we are able to disentangle the role of social capital on credit supply. To analyse the role of social capital we exploit the cross-sectional implications of the sensitivity of credit availability to the global crisis according to the strength of trust, i.e. social capital, at the province level. To measure social capital we propose waste sorting since this decision in 2003 was driven only by social pressure and internal norms, i.e., the fundamental components of social capital. To corroborate the results we obtain using this new proxy we also report estimations in which we include the measures of trust used by [Guiso et al. \(2004\)](#). We fully control for observed and unobserved characteristics of firms by including firm fixed effects and for observable and unobservable time-varying effects by using quarter dummy variables. Such model analyse the success of loan searches made by the same firm before and after the Lehman Brothers collapse. We run our regressions on a balanced panel of firms such that, for each of them, we observe at least one loan search before and one after the Lehman's collapse. We exclude loan search over the Lehman Brothers collapse, i.e., starting before the crisis and ending after. The uncertainty shock studied is fairly exogenous for Italy and social capital has been reasonably little affected by the crisis, being the result of past events going far back in the history. However, we also check whether our results are robust to the inclusion of time varying control both at the firm and at the province level. Moreover, we study how the uncertainty shock affects credit supply depending on the level of social capital within a set of

loan searches launched by firms with the same risk and headquartered in provinces characterized by the same economic performance and legal enforcement. Last but not least, to fully convincingly identify the effect of social capital we focus on a model that includes both firm fixed effects and area-quarter combination to control for all the observable and unobservable time-varying traits of the geographic area in which the firm is headquartered.¹¹ Finally, we cluster errors at the province-month level.¹² Since banks loans supply will likely respond to changes in the monetary policy rate, we include an overnight interest rate, that is, the Euro Overnight Index Average rate (EONIA). To complete our specifications we include quarterly GDP growth, inflation, or quarter fixed effects that control for other macroeconomics factors. In any model analysed we use firm fixed effects. The inclusion of firm fixed effects in a logit or probit model naturally restricts the sample to those firms that filed at least one loan search that did result in a loan granted and one that did not.¹³ To avoid this selection problem we employ linear probability models in the main regressions but study logit models in robustness. An additional advantage of employing linear probability models is that for the interaction terms, the main focus of the analysis, the estimated coefficients are directly interpretable and the standard errors require no corrections.

¹¹We use a partition of the territory into five macro-areas: North East, North West, Center, South and Islands

¹²We cluster errors at the level at which our variables of interest vary. See [Petersen \(2009\)](#) for a discussion about how to tackle residual correlation.

¹³ Moreover probit estimates are known to be biased when there is a large number of fixed effects [Lancaster \(2000\)](#).

2.2.3 Specifications

The specifications we estimate are at the loan search level: we check whether non financial firms searching for a loan, for which we are able to observe at least one loan search before and after the Lehman Brothers collapse (October 2008), was successful (loan granted) or not (loan denied) in obtaining a new credit. More specifically, we define the loan granted as the case in which the loan search by a firm concludes with at least one of the banks asking the CR for information on that potential borrower grants him/her a loan in the quarter following the information request. As explained in section 2.2.1, this approach differs from the one used by [Jiménez et al. \(2012\)](#) and [Jiménez et al. \(2014\)](#), where approval/denial has been defined at the borrower-lender level. We prefer the loan-level setup because, at least for Italy, we observe that firms tend to shop around for the same loan. Since the aim of this paper is to investigate the role of social capital in smoothing the effect of uncertainty shock on the probability of getting a loan, a definition of the credit granting at the loan level best fit the purpose. However, we also do some robustness check on this issue by running regressions at the borrower-lender level.

We match any loan search outcomes (whether the loan is granted or not) with the associated firm, province, and macroeconomic information. That is, we control for, and exploit, the level of social capital of the province where the firm associated with each loan search is headquartered. Our empirical specifications assessing the probability a loan search is successful are broadly structured as follows:

$$\begin{aligned} I(LoanGranted_{it}) = & \alpha + \beta SocCap_p * Crisis_t + \gamma Crisis_t + \\ & + Overnight_{t-1} + firm_i + time_{aq} + other_{t-1} + u_{it} \end{aligned} \quad (2.1)$$

where $I(LoanGranted_{it})$ is an indicator variable that equals 1 if the search for a loan started in month t by firm i ends with the granting of a loan within the following quarter, and zero otherwise. $Crisis_t$ is a dummy variable that equals 1 after October 2008, and 0 otherwise. $Overnight_{t-1}$ is the change in the Euro Overnight Index Average rate (EONIA). $SocCap_p$ is the level of social capital in the province p where the firm is headquartered. The sets of *firm*, *time*, and *other* variables will be replaced consecutively by appropriate combinations. In particular, firm features firm fixed effects, then additively introduce quarter fixed effects, and, finally, introduce area and quarter fixed effects multiplicatively.

We expect that higher short-term interest rates and the global crisis contract credit availability while social capital, contrasting the effect of the uncertainty shock, positively affects the supply of credit.

What is social capital and how to measure it is still debatable. Here we use three different variables to measure it: waste sorting and the two measures used by [Guiso et al. \(2004\)](#), that is blood donations and voter turnout in referenda. Using continuous measures of social capital allows us to fully capture heterogeneity across provinces, however the role of social capital as buffer against shocks is not directly interpretable.¹⁴ Therefore, to precisely identify the gain a firm could get by moving from a low to a high social capital province we use a second model with categorical variables. In particular, for each alternative measures, we identify those provinces where the level of social capital is high, that is it ranks within the fourth quartile of the province distribution, and low in case it ranks within the first quartile. Accordingly, we compute a dummy variable, $HiSocCap_p$, that equals 1 in case the bor-

¹⁴Moreover, different measures for social capital are also differently distributed and social capital could be reasonably affected by measurement errors.

rower is headquartered in a province where social capital is high, and 0 otherwise. Similarly we define a dummy for provinces where social capital is low, $LoSocCap_p$. Then we estimate the following model:

$$I(LoanGranted_{it}) = \alpha + (\beta_{hi}HiSocCap_p + \beta_{lo}LoSocCap_p) * Crisis_t + \gamma Crisis_t + \\ + Overnight_{t-1} + firm_i + time_{aq} + other_{t-1} + u_{it} \quad (2.2)$$

In this way we verify whether the probability of approval was affected by the crisis in a different way conditioning on the level of social capital in the province where the firm is headquartered being high, intermediate or low. We expect that β_{lo} is negative and β_{hi} positive indicating that, with respect to intermediate values for social capital, firms based in high-social capital communities are better shielded from the crisis than those based in province with intermediate and, in particular, low social capital. The difference between β_{hi} and β_{lo} is directly interpretable as the benefit a firm might in theory gain, in terms of mitigation of the effects of shocks, should it be able to move from a low-social capital province to a high-social capital one. Another advantage of this approach is that, differently from equation 2.1, we are not constraining the effect of social capital on credit supply to be linear.

The empirical setup we are using allows us to identify the role of social capital as a buffer against shocks. Indeed, the Lehman Brothers was largely unexpected and, due to historical reasons, the level of social capital varies a lot across Italian provinces (see among others, [Banfield \(1958\)](#), [Putnam et al. \(1994\)](#) and [Guiso et al. \(2004\)](#)). Furthermore, by using firm fixed effects we are able to control for all, time invariant, observable and unobservable characteristics of firms, including all the characteristics of the province where the firms are headquartered. How-

ever, we also check whether our results are robust to the inclusion of time varying control both at the firm and at the province level.

2.3 Results

In this section, we first discuss the estimated impact of the Crisis (*Crisis*) and, second, and more important, the estimated coefficients of the interactions between the *Crisis* and the level of social capital proxied, alternatively, by percentage of recyclable waste, blood donation and voter turnout in referenda. To examine the causal nature of the role of social capital as a buffer against uncertainty shocks, we explore whether the magnitude of its impact varies across local markets and firms heterogeneity.

2.3.1 Credit Supply and The Crisis

The first two columns of table 2.1 report the results for the baseline specification that excludes the measures of social capital. Model (1) includes only firm fixed effects while Model (2) includes both firms and quarter fixed effects. In Model (1), consistent with the theory modeling how monetary and economic conditions affect loan supply, we find that short-term interest rate hikes reduce loan granting, while GDP growth spurs loan granting. In Model (2), quarter fixed effects capture the changes in economywide conditions, such as current and future expectations of GDP growth, inflation and general shocks affecting the economy. Hence, all the country level variables at the quarterly frequency are dropped from the empirical model. In both model, the estimated coefficient for the variable *Crisis* is negative as expected, confirming that after Lehman the probability for a loan request of being

approved was lower compared to the pre-crisis period.

2.3.2 The Role of Social Capital

Model (3) and (4) analyse the impact of the Global Crisis on loan granting through the level of social capital. Therefore those models include the interactions between the dummy variable *Crisis* and our three measures of social capital, alternatively. The estimates in Model (3) and (4) suggest that the negative effect of the uncertainty shock due to the Global Crisis on the probability of granting a loan was mitigated by social capital. The coefficient of the interaction term $Crisis * SocCap$ is positive and significant for all the three different measures of social capital we use: percentage of recyclable waste, blood donation and voter turnout in referenda.

In the estimations reported in Table 2.2 we control, alternatively, for the regional GDP annual growth, the province quarterly growth of export, the credit standards applied by banks operating in the province and finally we run a regression including the time varying risk for the non financial firm searching for the loan. The coefficient estimated for social capital are robust to the inclusion of time varying control both at the firm and at the local level.

In the third column we check whether the results found for social capital are robust to the inclusion of a control for the effect of Lehman default on the credit standards applied by banks operating in the province credit market. To this aim we obtain information at the province level from the semi-annual Regional Bank Lending Survey (RBLs) conducted by the Banca d'Italia's regional branches on a sample of about 400 banks. In particular we interact the dummy *Crisis* with the change in the supply conditions in the 2 semesters following Lehman default. And our re-

sults are confirmed for all the measures of social capital.

Finally, in the last column of Table 5 we report the estimates we get when we add to the equation the time varying risk of the potential borrower. We use as measure of risk a synthetic indicator used to predict corporate defaults: the Z-scores computed by the private company Cerved Group S.p.A..¹⁵ In particular, for each firm, we control for the latest available Z-score. The estimates show again that the coefficients for social capital are little affected by the inclusion of this control.

2.3.3 Local Markets Heterogeneity

In Table 2.3, we compare the results across different sample splits that are based on the economic performance and the legal enforcement in 2007 of the province in which the potential borrower is headquartered. All the estimates show that areas with high economic performance and efficient legal system before the crisis were less affected by the uncertainty shock, suggesting that this local markets are more resilient to economic downturns.

Economic Performance - Since other studies ([Knack and Keefer \(1997\)](#); [Zak and Knack \(2001\)](#)) show that the level of social capital is positively correlated with economic development, in the first column we report the estimates for a subsample of firm headquartered in provinces characterized by high GDP growth rate before the crisis (belonging in the fourth quartile in 2007) and in the second column the results for firms headquartered in the remaining provinces. In this way, we check whether our results were driven by some spurious correlation

¹⁵Following [Altman \(1968\)](#), to each firm is assigned a value from 1 to 9 where values from 7 upwards indicate sensible riskiness.

between social capital and economic development. The effect of social capital on loan approvals is confirmed only for provinces without high GDP growth rate before the Crisis; therefore, if any, the previous estimates were driven by provinces with medium-low GDP growth rate. In fact, social capital has no statistically significant impact among firms headquarter in highly economic developing provinces for all the three measures of social capital used.

The third column reports the estimations referred to the set of provinces that were highly export oriented before the crisis (the export to GDP ratio was over the fourth quartile in 2007) and the fourth column reports the results for provinces with export orientation below the fourth quartile in 2007. In this way, we check whether the greater capacity of firms headquartered in high-social capital provinces to respond to the crisis shock was due to some unobserved factors affecting both social capital and export orientation. Indeed, several studies (e.g. [Bentivogli et al. \(2013\)](#), for Italy) have suggested that areas that are more oriented to export their products are also most resilient to economic downturns. Social capital results to be effective in mitigating the effect of the uncertainty shock in both the subsample when we use waste sorting as proxy. If we use as measures of social capital blood donation or voter turnout in referenda, the mitigating effect is confirmed only for those provinces which are medium-low export oriented.

Legal Enforcement - Since lending is the exchange of a sum of money today for the promise to return more money in the future. Whether such an exchange can take place could depend on the legal enforceability of contracts. If it takes more than two years to enforce a contract, the willingness to grant a loan could be lower. We then also

test whether the impact of social capital on loan approval depends on the local legal enforcement. To this aim, we split the sample into two subsamples on the base of the regional percentage of trials closed in two years prior to the crisis: Efficient legal system if the percentage belongs to the fourth quartile and others if it is below. The importance of social capital in enhancing trust results significant both in areas where law enforcement is efficient and where it is not, using both as proxy for social capital waste sorting or blood donation. When we rely on voter turnout in referenda as measure for the level of social capital the effect is significant only for areas where law enforcement is not prompt and the lender need to rely more on social pressure and internal norms. However, from all the estimates result that whether the financing take place depends not only on the legal enforceability of the contracts, but also on the extent to which the lender trusts the borrower. The willingness to grant a loan is likely to be lower in areas where the average rejected payments is relatively high and at the same time rejected payments are likely to be higher in areas where social capital is weaker. To check if our results were driven by this correlation, we split the sample into two sub-samples according to the level of rejected payments before the crises: the low ratio of rejected payments (fraction in the first quartile) and others (above the first quartile). In provinces with lower rejected payments, social capital measured by waste sorting does not have a statistically significant impact on the probability of granting a loan. By contrast, in areas with higher level of unpaid debts the effect is ten times as large and statistically significant. The last two columns of Table 2.3 show that for all the three measures of social capital we use, in provinces where the level of rejected payments is medium-high, the willingness to grant a loan will depend even more

crucially on the possibility of imposing moral sanctions and/or the existence of moral norms in a given community.

2.3.4 Firms Heterogeneity

Our results so far have shown a remarkable and pervasive correlation between the level of social capital in an area and the probability of granting a loan. To gain more confidence on the causal nature of this correlation, we explore whether the magnitude of this effect varies according to what theory predicts: the effect of social capital is stronger for firms who need to rely more on soft information. The extent to which a lending decision requires trust should also depend on the risk and the opaqueness of the firm involved in the transaction. For example, we compare two firms, a transparent one, whose information is completely available to the potential lender, and an opaque one, whose available information is limited. The inability to fully grasp all the details about the potential borrower makes it harder for the potential lender to decide if granting or not a loan request. Therefore, the bank will require greater trust to fund opaque firms. Equally, if we compare two firms one less and one more risky, the potential lender requires greater trust to fund the risky one.

Firms Risks - To classify firms depending on their risk we rely on information from Cerved Group S.p.A. (Cerved from now onward). By using the annual information on the probability of default, i.e. the Z-score, estimated by Cerved, we divide firms into three groups depending on the Z-score they were assigned on the base of their 2007 balance-sheets: low (Z-score=1,2,3), medium (4,5,6) and high (7,8,9)

risk.¹⁶ Finally, since Cerved includes only part of the firms reported to the CR, we identify a fourth sub-sample made of firms that were not assigned a score by Cerved in 2007 (unscored).¹⁷ To precisely identify the gain a firm could get by moving from a low to a high social capital province we use now specification 2.2.

First of all, we find (see Table 2.4) that, on average, the probability of loan approval declined more intensively during the crisis for those firms whose default probability was already high before Lehman default and for more opaque firms, i.e., firms whose balance-sheet information was not complete or not available. On the contrary, low default risk firms result to be not statistically significant affected by the Crisis.¹⁸ Interestingly, we find that, within all the sub-samples made of, respectively, high, medium, low risk and unscored firms, the bank lending channel of monetary policy (through changes in short-term interest rates) is at work.

More importantly from this paper perspective, we find that the impact of the uncertainty shock on the credit supply to unscored firms and to firms with medium default risk was mitigated by social capital. The results reported in the first panel of Table 2.4 show that for medium default risk firms headquartered in provinces endowed with a level of social capital beyond the 75th percentile (*HighSocCap * Crisis*) the decline in the probability of approval was lower (3.8 per cent) compared to firms headquartered in provinces where social capital level was low, i.e. below the 25th percentile (*LowSocCap * Crisis*). For

¹⁶Refer to Altman (1968) for more details on firms risk classification.

¹⁷Cerved defines firms risk principally by using data from the balance-sheet Italian firms submit to the Italian Chambers of Commerce. Therefore, a firm is unscored if it has not submitted its balance-sheet to the Italian Chambers of Commerce or if the information in the balance-sheet is not complete.

¹⁸This result has to be interpreted with caution since the sub-sample of low default risk firms asking for a loan represents around 8 per cent of the overall sample of loan requests.

unscored firms headquartered in provinces endowed with high level of social capital the decline in the probability of approval was 2.7 per cent lower compared to unscored firms headquartered in provinces where social capital level was low. The main results hold for both blood donations and referenda voter turnout. This confirm that whether firms are informationally-opaque the willingness to finance them depends even more crucially on the possibility of imposing moral sanctions and/or the existence of moral norms in a given community, i.e., on the level of social capital.

Search Strategy - The probability of loan approval may also depend on the search strategy adopted by firms. We explore this issue and the way the search strategy interacts with social capital by investigating different aspects of the way firms look for a loan. In the first two columns of Table 2.5, we report the estimates for, respectively, the firms that asked for a loan at least from one bank that had lent some money in the previous three years and for those firms that did not. This strategy may have both pros and cons. The former might be due to the fact that the banks already know the firm and then informational asymmetries are less severe and the probability of loan approval is higher. On the other hand, the previous lending relationship might have ended because the borrower had some difficulties in paying back the loan. In this case, the probability of getting a loan is obviously lower. The results show that having a previous relationship with a bank is beneficial to loan approval prospects: The coefficient for *Crisis* is three times smaller when the borrower is known to the bank compared to the case in which he is not known. Informational asymmetries seem to be mitigated by previous relationship. Furthermore, social capital

has a role in smoothening the crisis shock that is more pronounced for firms not known: the probability of approval was (3.9) 1.6 per cent higher for firms (not) known headquartered in provinces endowed with high level of social capital compared to those headquartered in provinces where social capital level was low.

However, the mitigating effect of social capital only partially compensates the adverse effect of a more severe informational asymmetry between banks and borrowers, due to a not pre-existing relationship between them: The whole effect of the uncertainty shock is -2.4 per cent for borrower already known and -7.7 per cent for borrower not known.

Another dimension we explore in relation with the firms' search strategy is whether they ask for a loan a bank that has at least one branch in the province where the firms are headquartered or not. In the first case, we say that the loan request has been lodged *inside the local market*, while in the second one we say it has been lodged *outside the local market*. Similarly to the previous case, we argue that this strategy may lead to pros and cons. Banks that have some branches in the province are better informed than banks that have no branches at all, as the former are closer to the local community.¹⁹ On the other hand, one reason to look for a loan inside the market is that firms might be little able to diversify their sources of funding and getting loans outside the local market since they are particularly opaque. The results reported in the third and fourth column indicate that social capital partly shielded firms from the crisis shock in case they lodged loan request inside the local market. This seems to suggest that the social capital is beneficial to mitigating asymmetric information problems connected to opaque

¹⁹See Degryse and Ongena (2005) for a paper on the effects of the distance between bank branches and borrowers.

firms.

In the last two columns we test whether the crisis mitigation role of social capital differed between types of lending relationships (single vs. multiple lending relationships) the borrower searching for a loan had before the crisis. [Bolton et al. \(2016\)](#) show that the negative effects of Lehman's collapse have been smoothened by close lending relationships as when the relationship is exclusive. The loan applications we analyse here are placed to outside banks (as discussed in Section [2.2.1](#)), therefore the estimated results in the last two columns of Table [2.5](#) refer to borrowers who had an exclusive relation with a bank and were trying to switch. These borrowers face a main disadvantage: the establishment of an exclusive relationship with one bank has originated an asymmetric evolution of the information between that bank and the others lenders ([Kane and Malkiel \(1965\)](#)) and the ending of this exclusive relationship is likely to convey a negative signal about the borrower quality to outside banks ([Von Thadden \(2004\)](#)). Consistent with theory, our results point to the view that firms borrowing from only one bank (single lending) searching for a new lending relationship were, on average, more affected by the crisis - the coefficient for *Crisis* is higher compared to that obtained for the multiple lending case - but social capital had a significant role in smoothening the shock.

This seems to suggest that social capital is particularly relevant in mitigating shocks in those cases in which reciprocal trust, because of the lack of information, matters more.

2.3.5 Geographic Area Effects

In studies by [Banfield \(1958\)](#) and [Putnam et al. \(1994\)](#), the South of Italy is the prototypical area deficient in social capital, while the North

is richer. Consistent with these findings, Figure 2.1-2.3 show that social capital is higher in the area at the north of Rome and weaker in that at south of Rome. This might generate the suspicion that the effect we are capturing is due to some other differences between the North and the South of Italy, that just happen to be correlated with our measures of social capital.

To alleviate the suspicion that some environmental variables other than social capital might be driving our results we include area-quarter combination of effects to control for all the observable and unobservable traits of the geographic area in which the firm is headquartered.

Table 2.6 reports the estimation results using first a partition of the territory in two areas, North and South, and then finer grid of geographic area effects into five macro-areas: North East, North West, Center, South, and Islands, according to Italian National Statistics geographical classification. The results confirm the previous findings. The parameters associated to our variables of interest, the interactions between social capital and the uncertainty shock, keep their sign and achieve high significance levels independently by the macro-area effects introduced in the model. We take this as evidence that the differences between the North and the South of Italy do not *per se* account for the role of social capital on credit supply we find in this paper.

2.3.6 A Quasi-Natural Experiment

Until now we have used several specifications to convincingly identify our model but obviously those could not rule out any possible objections. The only way to do this is to implement an ideal experiment. In such setting, (i) the potential borrowers have all the same characteristics and differ only for the level of social capital in their environment and

(ii) the potential lender is the same for all the borrowers so that credit supply changes only because of the social capital level of the borrower. The econometricians can therefore estimate the effect of social capital on bank credit supply by simply using the heterogeneity across different social capital environments as a source of variation.

In our setting condition (i) is almost satisfied since through the loan search and firm fixed effect, loan demand is in a sense given and observed, and the lender has to decide only on the granting of each loan, i.e., the credit supply. In this section, to meet condition (ii) as well, we focus only on firms that apply for a loan to banks that have at least one branch in each Italian province and include bank fixed effects such that heterogeneity in the credit supply depends only on the level of social capital of the province in which the potential borrower is headquartered. This choice allows us to get closer to the ideal experiment but reduces the sample to 193,541 loan searches. Table 2.7 reports the estimation results for this quasi-natural experiment that confirms the previous findings.

2.4 Robustness Checks

There are two common ways to estimate the model we presented in this paper: conditional fixed effects logit, or a fixed effects linear probability model (LPM). We prefer the LPM to simplify interpretation of the coefficients, and because it allows us to not restrict the sample only to those firms that filed at least one loan search that did result in a loan granted and one that did not (see discussion in Section 2.2.2), an advantage that outweighs the minor gains from limited dependent variable techniques (Beck (2011)). However, here we examine conditional

fixed effects logit as well. We show results in Table 2.8 and the findings obtained using LPM are qualitatively and quantitatively confirmed. The parameters associated to our variables of interest, the interactions between social capital and the uncertainty shock, keep their sign and achieve high significance levels.

Another possible objection to our results can concern the period chosen to assess whether loan applications were approved or not, 1 quarter, that can be considered too short or too long. Here we analyse both issues in Table 2.9 and 2.10.

Table B.1 reports 3.32 as the average period in months before the loan is granted and show that the probability of approval increases along time: on average a bank takes three months to make a decision but for robustness longer periods need to be considered. Table 2.9 reports the estimation results obtained extending the decision period to 2, 3 and 4 quarters: The dependant variable is an indicator that equals 1 if the search for a loan started in month t by firm i ends with the granting of a loan within the following 2, 3 or 4 quarters, alternatively. The findings about the role played by social capital in mitigating the effects of the Lehman default are confirmed.

As described in Section B.1, differently from other papers analysing loan granting (Jiménez et al. (2012), Jiménez et al. (2014) and Albertazzi et al. (2016)) which use a definition of the loan application at the firm-bank level, here we use an identification at the loan level. Particularly, since we are interested in the ability of a firm to get a new loan independently of the bank that is granting it, we consider loan applications lodged by the same firm to different banks with no more than three months between each request as a unique credit application, assuming that the firm is shopping around for the same loan. This

means that we are less interested in a single loan request and more on the ability of a firm to obtain a loan after having started looking for it. Then, while it is reasonable to assume that each bank takes a few months to make a decision, it is also reasonable to argue the whole loan search process goes beyond the time a bank needs to process all the information about the borrower and make a decision.

However, for robustness purposes and also for making our results comparable with those obtained in other papers, in Table 2.10 we re-estimate our main model assuming that only loan applications lodged in the same month by the same firm refer to the same loan search, and find little substantive difference. What we observe is that the previous results are confirmed for all our measures of social capital except voter turnout in referenda.

2.5 Concluding remarks

In this paper we have investigated whether social capital may smooth the effects of a macroeconomic shock on the credit market. To this aim, we have employed detailed data from the Italian Credit Register relative to a large sample of non-financial corporations (more than half a million) for which we are able to observe their loan requests lodged to bank in the period 2007.Q1-2010.Q2.

By using firm fixed effects, we look at the effect of the Lehman Brothers' collapse on the probability of establishing lending relationships with new lenders. To this aim, we select a sample of borrowers applying for a loan both after and before Lehman's default.

Our main finding is that social capital has mitigated the transmission

of the shock, due to the Lehman collapse, to the probability of loan approval from new lenders. We interpret this result as follows: the Lehman collapse had a negative impact on bank willingness to lend, not only because of the effects of the shock on bank soundness but also of those on their risk attitude due to the increase in the economic uncertainty. Social capital, which differs a lot among Italian provinces, made trust more resilient to global shocks in those areas where it is relatively higher. As a consequence, firms headquartered in high-social-capital provinces suffered less by the decline in the probability of loan approval which affected all Italian borrowers during the crisis.

We contribute to two different strands of literature: we provide novel evidence about the transmission of a global shock to the credit market, showing that social capital helped banks to shield their borrowers from the effects of the Lehman collapse. Second, we contribute to the existing literature on social capital by looking at different measures of social capital, and investigating the role of social capital in a crisis.

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Appendix A

Appendix to Chapter 1

A.1 Examples of ECB policy summary

Below we provide some examples of the ECB policy summary along with the corresponding Verbal Guidance Index, computed as in eq. 1.1 (VG) and in eq. 1.2 (VG^e).

- i. January 2002: « [...] The Governing Council concluded that recent developments are in line with the interest rate decisions taken in the course of last year. We have therefore decided to keep the key ECB interest rates unchanged. We also confirmed that the current level of key ECB interest rates remains appropriate for the maintenance of price stability over the medium term.»

$VG: 0 \quad VG^e: 0$

- ii. June 2004: « [...] Nevertheless, we are still of the view that the medium-term outlook remains in line with price stability. Accordingly, we left the key ECB interest rates unchanged. The low level of interest rates continues to support the economic recovery. We will remain vigilant with regard to all developments which could

affect the risks to price stability over the medium term.»

VG : 0.0238 VG^e : 0.0238

- iii. October 2006: «[...] Today's decision will contribute to ensuring that medium to longer-term inflation expectations in the euro area remain solidly anchored at levels consistent with price stability. Such anchoring is a prerequisite for monetary policy to make an ongoing contribution towards supporting sustainable economic growth and job creation in the euro area. [...] Our monetary policy therefore continues to be accommodative. If our assumptions and baseline scenario are confirmed, it will remain warranted to further withdraw monetary accommodation. The Governing Council will therefore continue to monitor very closely all developments so as to ensure price stability over the medium and longer term.»

VG : 0.0349 VG^e : 0.0349

- iv. January 2008: «[...] The Governing Council remains prepared to act pre-emptively so that second-round effects and upside risks to price stability over the medium term do not materialise and, consequently, medium and long-term inflation expectations remain firmly anchored in line with price stability. Reflecting its mandate, such anchoring is of the highest priority to the Governing Council. The economic fundamentals of the euro area are sound. [...] We will continue to monitor very closely all developments over the coming weeks.»

VG : 0.0139 VG^e : 0.0139

- v. July 2010: «[...] Based on its regular economic and monetary analyses, the Governing Council views the current key ECB interest rates as appropriate. [...] Our monetary analysis confirms that

inflationary pressures over the medium term remain contained, as suggested by weak money and credit growth. Overall, we expect price stability to be maintained over the medium term, thereby supporting the purchasing power of euro area households. [...] Monetary policy will do all that is needed to maintain price stability in the euro area over the medium term. [...] We remain firmly committed to price stability over the medium to longer term. The monetary policy stance and the overall provision of liquidity will be adjusted as appropriate. Accordingly, the Governing Council will continue to monitor all developments over the period ahead very closely.»

VG : 0.0204 VG^e : 0.0306

- vi. April 2012: « [...] Inflation rates are likely to stay above 2% in 2012, with upside risks prevailing. Over the policy-relevant horizon, we expect price developments to remain in line with price stability. Consistent with this picture, the underlying pace of monetary expansion remains subdued. [...] Medium-term inflation expectations for the euro area economy must continue to be firmly anchored in line with our aim of maintaining inflation rates below, but close to, 2% over the medium term. [...] This combination of measures has contributed to a stabilisation in the financial environment and an improvement in the transmission of our monetary policy. We need to carefully monitor further developments. [...]»

VG : 0 VG^e : 0.0049

- vii. July 2014: « Based on our regular economic and monetary analyses, we decided to keep the key ECB interest rates unchanged.[...] The monetary operations to take place over the coming months will add to this accommodation and will support bank lending. As our measures work their way through to the economy, they will con-

tribute to a return of inflation rates to levels closer to 2%. Concerning our forward guidance, the key ECB interest rates will remain at present levels for an extended period of time in view of the current outlook for inflation. [...]»

VG : 0.1049 VG^e : 0.1049

Table A.1: Stop words

i	them	by	then	than
me	their	for	once	too
my	theirs	with	here	very
myself	themselves	about	there	ecb
we	what	against	when	government
our	which	between	where	governing
ours	who	into	why	council
ourselves	whom	through	how	today
you	this	during	all	year
your	that	before	any	
yours	these	after	both	
yourself	those	above	each	
yourselves	a	below	few	
he	an	to	more	
him	the	from	most	
his	and	up	other	
himself	but	down	some	
she	if	in	such	
her	or	out	no	
hers	because	on	nor	
herself	as	off	not	
it	until	over	only	
its	while	under	own	
itself	of	again	same	
they	at	further	so	

Notes: This table lists the stop words used for the text analysis, i.e. the words which are filtered out when computing the denominator for the Verbal Guidance Index. In content analysis stop words usually refer to the most common words in a language; here we include also the ECB-related words, such as “ECB” and “governing council”.

A.2 ECB Reaction Function

As the policy rate depends on the policy makers' information set, which also incorporates the information accessible to the financial markets participants, we instrument it with a process for the ECB reaction function. Specifically, we follow the model proposed by [Gerlach and Lewis \(2014\)](#) and estimate the following equation for the policy rate, which includes its lagged value and lagged first difference, as measures of smoothness and inertia in the change of rates respectively, and the Consensus Economics forecasts twelve months ahead for the Euro Area GDP growth rate and the CPI inflation rate:¹

$$i_t = \alpha + \beta_1 i_{t-1} + \beta_2 \Delta i_{t-1} + \beta_3 y_t^f + \beta_4 \pi_t^f + \varepsilon_t \quad (\text{A.1})$$

where i_t stands for the Main Refinancing Rate; y_t^f and π_t^f refer to the expected GDP growth and inflation rates; and ε_t denotes the error term.

The Consensus Economics forecasts are released for the current year and the following calendar year. Since the horizon is not constant, we approximate the forecast for the twelve months ahead as average of the forecasts for the current and next years, weighted by their shares in the forecast period. By adopting the same methodology as in [Mehrotra and Yetman \(2015\)](#), we compute the fixed horizon forecast according to this formula (for inflation as example):

$$\pi_t^f = \frac{k}{12} \pi_{t+k|t}^f + \frac{12-k}{12} \pi_{t+12+k|t}^f \quad (\text{A.2})$$

where $k \in \{1, 2, \dots, 12\}$ denotes the k -month ahead forecast hori-

¹The inclusion of the forward-looking macro variables is consistent with several contributions in literature which show that central banks respond to forecasts of future economic variables [Orphanides \(2010\)](#).

Table A.2: The ECB reaction function

Main Refinancing Rate	OLS
L.Main Refinancing Rate	0.9540*** (0.020)
DL.Main Refinancing Rate	0.1188 (0.155)
Expected Inflation	0.0700** (0.027)
Expected GDP growth	0.0605*** (0.021)
Constant	-0.1204*** (0.042)
Observations	157
R-squared	0.989
Adjusted R-squared	0.989

Notes: Monthly observations on days of ECB President's Press Conference, January 2002-December 2015. The econometric method is OLS with Robust standard errors in parentheses. ***, **, * indicate significance at the 99%, 95% and 90% level, respectively.

zon based on information available at time t .

In Table A.2 we report our results for the period January 2002 - December 2015, which are in line with those of Gerlach and Lewis (2014): except the lag first difference of the policy rate, all explanatory variables are statistically significant and the sign of the macroeconomic forecasts is positive as expected. Given that all series are $I(1)$ while the residuals follow a stationary process, our specification well explains the trend of the dependent variable. For our analysis, we drop Δi_{t-1} and take eq. A.1 in first difference to remove the no-stationarity. In the estimation of the verbal guidance index process, we control for the policy rate in first difference and instrument it with its own lag and the first difference of the GDP and inflation forecasts.

A.3 List of the macroeconomic series

1. Euribor rate, Source: Thomson Reuters-Datastream
2. Eonia Overnight Rate, Source: Bloomberg
3. Euro Stoxx Volatility Index, Source: Thomson Reuters-Datastream
4. CPI Inflation and GDP growth rate Expectations Current and Next Year, Source: Consensus Economics
5. ECB Macroeconomic Projections Current and Next Year, Source: ECB-SDW
6. SPF Macroeconomic Projections Current and Next Year, Source: ECB-SDW

Table A.3: The ECB announcements of non-standard measures on press conference days

Date	Type	Description
06/09/2007	LTRO	The GovC has today decided to conduct a supplementary liquidity-providing longer-term refinancing operation with a maturity of three months.
08/11/2007	LTRO	The GovC today decided to renew the two supplementary longer-term refinancing operations.
10/01/2008	FOR	The GovC decided to conduct US dollar liquidity-providing operations.
07/02/2008	LTRO	The GovC decided to renew two outstanding supplementary longer-term refinancing operations.
04/09/2008	LTRO	The GovC decided to renew three outstanding supplementary longer-term refinancing operations.
05/03/2009	FRTFA, LTRO	The GovC decided to continue the fixed rate tender procedure with full allotment for all main refinancing operations, special-term refinancing operations and supplementary and regular longer-term refinancing operations.
07/05/2009	LTRO, CBPP1	The GovC decided to purchase euro-denominated covered bonds issued in the euro area, and to conduct liquidity-providing longer-term refinancing operations with a maturity of one year.
04/06/2009	CBPP1	The GovC decided upon the technical modalities of the CBPP1.
03/12/2009	FRTFA, LTRO	The GovC decided to continue conducting its main refinancing operations as fixed rate tender procedures with full allotment, and to enhance the provision of longer-term refinancing operations.
04/03/2010	FRTFA, LTRO	The GovC decided to continue conducting its main refinancing operations as fixed rate tender procedures with full allotment, and to return to variable rate tender procedures in the regular 3-month longer-term refinancing operations.
10/06/2010	LTRO	The GovC decided to adopt a fixed rate tender procedure with full allotment in the regular 3-month longer-term refinancing operations.
02/09/2010	FRTFA, LTRO	The GovC decided to continue to conduct its main refinancing operations as fixed rate tender procedures with full allotment, and to conduct 3- month longer-term refinancing operations as fixed rate tender procedures with full allotment.
02/12/2010	FRTFA, LTRO	The GovC decided to continue to conduct its main refinancing operations as fixed rate tender procedures with full allotment for as long as necessary, and to conduct 3- month longer-term refinancing operations.
03/03/2011	FRTFA, LTRO	The GovC decided to continue to conduct its main refinancing operations as fixed rate tender procedures with full allotment, and to conduct 3- month longer-term refinancing operations as fixed rate tender procedures with full allotment.
09/06/2011	FRTFA, LTRO	The GovC decided to continue to conduct its main refinancing operations as fixed rate tender procedures with full allotment, and to conduct 3- month longer-term refinancing operations as fixed rate tender procedures with full allotment.
04/08/2011	FRTFA, LTRO	The GovC decided to continue conducting its main refinancing operations as fixed rate tender procedures with full allotment, to conduct 3-month longer-term refinancing operations as fixed rate tender procedures with full allotment, and to conduct a liquidity- providing supplementary longer-term refinancing operation with a maturity of six months as a fixed rate tender procedure with full allotment.
06/10/2011	FRTFA, LTRO, CBPP2	The GovC decided to continue conducting its main refinancing operations as fixed rate tender procedures with full allotment, to conduct 3-month longer-term refinancing operations as fixed rate tender procedures with full allotment, to conduct two liquidity- providing supplementary longer-term refinancing operations with full allotment, to conduct two liquidity- providing supplementary longer-term refinancing operations with a maturity of twelve and thirteen months as a fixed rate tender procedure with full allotment, and to launch a new covered bond purchase program.
03/11/2011	CBPP2	The GovC decided upon the technical modalities of the CBPP2.
08/12/2011	LTRO, COLL	The GovC decided to conduct two longer-term refinancing operations with a maturity of three years, to increase collateral availability.

The ECB announcements of non-standard measures on press conference days (Continued)

Date	Type	Description
09/02/2012	COLL	The GovC approved specific national eligibility criteria and risk control measures for the temporary acceptance in a number of countries of additional credit claims as collateral in Eurosystem credit operations.
06/06/2012	FRTFA, LTRO	The GovC decided to continue to conduct its main refinancing operations as fixed rate tender procedures with full allotment, and to conduct 3- month longer-term refinancing operations as fixed rate tender procedures with full allotment.
02/08/2012	OMT	The GovC stated that it may undertake outright open market operations of a size adequate to reach its objective.
06/09/2012	OMT, COLL	The GovC announced the technical details of OMT and decided on additional measures to preserve collateral availability.
06/12/2012	FRTFA, LTRO	The GovC decided to continue conducting its main refinancing operations as fixed rate tender procedures with full allotment, and to conduct 3- month longer-term refinancing operations as fixed rate tender procedures with full allotment.
07/02/2013	FRTFA	The GovC stated that its monetary policy stance will remain accommodative with the full allotment mode of liquidity provision.
07/03/2013	FRTFA	The GovC stated that its monetary policy stance will remain accommodative with the full allotment mode of liquidity provision.
04/04/2013	FRTFA	The GovC decided to continue with fixed rate tender procedures with full allotment.
02/05/2013	FRTFA, LTRO	The GovC decided to continue the fixed rate tender procedures with full allotment for its main refinancing operations; this procedure applies also on 3-month longer-term refinancing operations.
07/11/2013	FRTFA, LTRO	The GovC decided to continue the fixed rate tender procedures with full allotment for its main refinancing operations; this procedure applies also on 3-month longer-term refinancing operations.
05/06/2014	TLTRO, COLL, FRTFA, LTRO, APP	The GovC decided to conduct a series of Target-LTRO with a maturity of about 4 years and to extend the existing eligibility of additional assets as collateral; to continue conducting the MROs as fixed rate tender procedures with full allotment, to conduct the three-month longer-term refinancing operations to be allotted as fixed rate tender procedures with full allotment. He decided to suspend the weekly fine-tuning operation sterilising the liquidity injected under the Securities Markets Programme and intensified preparatory work for purchases of asset-backed securities.
03/07/2014	TLTRO	The GovC decided upon the technical modalities of the TLTRO.
04/09/2014	APP	The GovC stated that it will purchase a broad portfolio of simple and transparent asset-backed securities under an ABS purchase programme and a broad portfolio of euro-denominated covered bonds under a new covered bond purchase programme.
02/10/2014	APP	The GovC decided upon the technical modalities of the ABSPP and CBPP, including that the programmes will last at least two years.
06/11/2014	APP	Statement on the intention to buy covered bonds and asset-backed securities in order to expand the balance sheet towards the dimension in early 2012.
22/01/2015	APP, TLTRO	The GovC decided to launch an expanded asset purchase programme, encompassing the existing purchase programmes for asset-backed securities and covered bonds, until the end of September 2016. The Governing Council decided to change the pricing of the six remaining targeted longer-term refinancing operations.
05/03/2015	APP	The GovC decided upon the technical modalities of the EAPP, including that the programme will last until the end of 2016.
03/09/2015	APP	ECB signals the possibility of expansion of the EAPP beyond 2016.
03/12/2015	APP, FRTFA, LTRO	The GovC decided to extend the asset purchase programme until the end of March 2017, or beyond if necessary; to reinvest the principal payments on the securities purchased under the APP; to continue conducting the main refinancing operations and three-month longer-term refinancing operations as fixed rate tender procedures with full allotment.

GovC stands for Governing Council of the ECB

A.4 Tables

Table 1.1: The ECB Verbal Guidance Index

	OLS	OLS	OLS	IV
L.Index	0.2422*** (0.0829)	0.2430*** (0.0829)	0.2421*** (0.0835)	0.2295*** (0.0856)
L2.Index	0.4187*** (0.0911)	0.4186*** (0.0915)	0.4176*** (0.0917)	0.4202*** (0.0899)
D.Main Refinancing Rate		0.0015 (0.0060)		-0.0256 (0.0171)
D.Eonia			-0.0030 (0.0049)	
Constant	0.0080*** (0.0022)	0.0081*** (0.0021)	0.0080*** (0.0022)	0.0078*** (0.0022)
Observations	157	157	157	157
R-squared	0.322	0.323	0.323	0.280
Adjusted R-squared	0.314	0.309	0.310	0.266
Hansen test(p-value)				0.590

Notes: Monthly observations on days of ECB President's Press Conference, January 2002-December 2015. The econometric method is OLS with Robust standard errors in parentheses. ***, **, * indicate significance at the 99%, 95% and 90% level, respectively.

Table 1.2: One-day event-study on k forward implied Euribor rate 3 months ahead: Baseline model

	k=3	k=6	k=9
Verbal Guidance Shock	-0.2352** (0.118)	-0.3390** (0.157)	-0.3919** (0.186)
Monetary Policy Shock	0.1376*** (0.032)	0.1344*** (0.039)	0.1427*** (0.051)
Draghi	-0.0279** (0.011)	-0.0312** (0.015)	-0.0356** (0.016)
EuroVIX change	-0.0036** (0.002)	-0.0041* (0.002)	-0.0055*** (0.002)
Financial Turmoil	-0.0264 (0.020)	-0.0199 (0.028)	-0.0335 (0.032)
Great Recession	-0.0398*** (0.012)	-0.0454*** (0.017)	-0.0456** (0.019)
EMU Sovereign Debt Crisis	-0.0329*** (0.011)	-0.0386*** (0.014)	-0.0399*** (0.015)
CPI forecast surprise	0.1072** (0.045)	0.1534** (0.069)	0.1654** (0.081)
GDP forecast surprise	-0.0235* (0.014)	-0.0290 (0.021)	-0.0463* (0.024)
Constant	0.0322** (0.013)	0.0378** (0.018)	0.0410** (0.019)
Observations	96	96	96
R-squared	0.310	0.291	0.243
Adjusted R-squared	0.238	0.217	0.163

Notes: Monthly observations on days of ECB President's Press Conference, September 2007-December 2015. The econometric method is OLS with Robust standard errors in parentheses. ***, **, * indicate significance at the 99%, 95% and 90% level, respectively.

Table 1.3: One-day event-study on k forward implied Euribor rate 3 months ahead: Full model

	k=3	k=6	k=9
Verbal Guidance Shock	-0.2428 (0.166)	-0.4249** (0.193)	-0.4527* (0.230)
Monetary Policy Shock	0.1298*** (0.036)	0.1290*** (0.043)	0.1324** (0.058)
Draghi	-0.0291** (0.012)	-0.0339** (0.016)	-0.0384** (0.018)
EuroVIX change	-0.0036* (0.002)	-0.0040* (0.002)	-0.0053** (0.002)
Financial Turmoil	-0.0272 (0.021)	-0.0222 (0.030)	-0.0351 (0.034)
Great Recession	-0.0416*** (0.013)	-0.0485*** (0.018)	-0.0483** (0.021)
EMU Sovereign Debt Crisis	-0.0331*** (0.011)	-0.0403*** (0.014)	-0.0405** (0.015)
CPI forecast surprise	0.1130** (0.048)	0.1575** (0.072)	0.1718** (0.085)
GDP forecast surprise	-0.0314** (0.016)	-0.0327 (0.021)	-0.0541** (0.024)
Forward Guidance	-0.0359*** (0.007)	-0.0427*** (0.009)	-0.0362*** (0.010)
REF	-0.0067 (0.009)	-0.0011 (0.011)	-0.0050 (0.013)
UMP	0.0055 (0.009)	0.0094 (0.012)	0.0116 (0.013)
Constant	0.0348*** (0.013)	0.0405** (0.018)	0.0439** (0.020)
Observations	96	96	96
R-squared	0.327	0.300	0.251
Adjusted R-squared	0.229	0.199	0.142

Notes: Monthly observations on days of ECB President's Press Conference, September 2007-December 2015. The econometric method is OLS with Robust standard errors in parentheses. ***, **, * indicate significance at the 99%, 95% and 90% level, respectively.

Table 1.4: One-day event-study on k forward implied Euribor rate 3 months ahead: Extended model

	k=3	k=6	k=9
Verbal Guidance Shock	-0.2655** (0.121)	-0.3753** (0.163)	-0.4229** (0.194)
Monetary Policy Shock	0.1389*** (0.033)	0.1359*** (0.039)	0.1439*** (0.051)
Draghi	-0.0283** (0.011)	-0.0317** (0.015)	-0.0359** (0.016)
EuroVIX change	-0.0037** (0.002)	-0.0042** (0.002)	-0.0055*** (0.002)
Financial Turmoil	-0.0281 (0.020)	-0.0219 (0.028)	-0.0353 (0.032)
Great Recession	-0.0414*** (0.012)	-0.0475*** (0.017)	-0.0474** (0.020)
EMU Sovereign Debt Crisis	-0.0345*** (0.011)	-0.0405*** (0.014)	-0.0415*** (0.015)
CPI forecast surprise	0.1083** (0.045)	0.1547** (0.070)	0.1665** (0.082)
GDP forecast surprise	-0.0239* (0.014)	-0.0294 (0.021)	-0.0467* (0.024)
Forward Guidance	-0.0364*** (0.006)	-0.0436*** (0.009)	-0.0373*** (0.010)
Constant	0.0339*** (0.013)	0.0399** (0.018)	0.0428** (0.020)
Observations	96	96	96
R-squared	0.319	0.298	0.246
Adjusted R-squared	0.239	0.215	0.158

Notes: Monthly observations on days of ECB President's Press Conference, September 2007-December 2015. The econometric method is OLS with Robust standard errors in parentheses. ***, **, * indicate significance at the 99%, 95% and 90% level, respectively.

Table 1.5: One-day event-study on k forward implied Euribor rate 3 months ahead: Extended Model, Bootstrap Estimation

	k=3	k=6	k=9
Verbal Guidance Shock	-0.2655** (0.126)	-0.3753** (0.176)	-0.4229* (0.223)
Monetary Policy Shock	0.1389*** (0.053)	0.1359** (0.055)	0.1439* (0.086)
Draghi	-0.0283** (0.011)	-0.0317** (0.015)	-0.0359** (0.017)
EuroVIX change	-0.0037* (0.002)	-0.0042* (0.002)	-0.0055** (0.002)
Financial Turmoil	-0.0281 (0.020)	-0.0219 (0.028)	-0.0353 (0.033)
Great Recession	-0.0414*** (0.013)	-0.0475*** (0.018)	-0.0474** (0.021)
EMU Sovereign Debt Crisis	-0.0345*** (0.011)	-0.0405*** (0.014)	-0.0415** (0.016)
CPI forecast surprise	0.1083** (0.048)	0.1547** (0.074)	0.1665* (0.085)
GDP forecast surprise	-0.0239 (0.018)	-0.0294 (0.028)	-0.0467 (0.038)
Forward Guidance	-0.0364*** (0.006)	-0.0436*** (0.009)	-0.0373*** (0.011)
Constant	0.0339*** (0.013)	0.0399** (0.018)	0.0428** (0.020)
Observations	96	96	96
R-squared	0.319	0.298	0.246
Adjusted R-squared	0.239	0.215	0.158

Notes: Monthly observations on days of ECB President's Press Conference, September 2007-December 2015. The econometric method is OLS with Bootstrapped standard errors in parentheses. ***, **, * indicate significance at the 99%, 95% and 90% level, respectively.

Table 1.6: Two-day event-study on k forward implied Euribor rate 3 months ahead: Extended Model

	k=3	k=6	k=9
Verbal Guidance Shock	-0.3619*** (0.130)	-0.4595** (0.185)	-0.5419*** (0.203)
Monetary Policy Shock	0.1919*** (0.054)	0.1897*** (0.058)	0.1631*** (0.051)
Draghi	-0.0382*** (0.012)	-0.0441*** (0.016)	-0.0502*** (0.018)
EuroVIX change	-0.0053* (0.003)	-0.0058* (0.003)	-0.0072** (0.003)
Financial Turmoil	-0.0408* (0.021)	-0.0379 (0.030)	-0.0457 (0.033)
Great Recession	-0.0609*** (0.014)	-0.0679*** (0.019)	-0.0659*** (0.020)
EMU Sovereign Debt Crisis	-0.0430*** (0.012)	-0.0522*** (0.015)	-0.0525*** (0.016)
CPI forecast surprise	0.1306*** (0.049)	0.1816** (0.077)	0.1886** (0.083)
GDP forecast surprise	-0.0272 (0.018)	-0.0302 (0.028)	-0.0473* (0.026)
Forward Guidance	-0.0410*** (0.007)	-0.0481*** (0.011)	-0.0430*** (0.011)
Constant	0.0443*** (0.014)	0.0529*** (0.019)	0.0581*** (0.021)
Observations	96	96	96
R-squared	0.402	0.344	0.303
Adjusted R-squared	0.332	0.267	0.221

Notes: Monthly observations on days of ECB President's Press Conference, September 2007-December 2015. The econometric method is OLS with Robust standard errors in parentheses. ***, **, * indicate significance at the 99%, 95% and 90% level, respectively.

Table 1.7: One-day event-study on k forward implied Euribor rate 3 months ahead: Extended model with alternative verbal guidance index

	k=3	k=6	k=9
Verbal Guidance Shock	-0.2934** (0.137)	-0.4266** (0.191)	-0.4861** (0.226)
Monetary Policy Shock	0.1401*** (0.034)	0.1378*** (0.038)	0.1460*** (0.051)
Draghi	-0.0289** (0.011)	-0.0327** (0.015)	-0.0372** (0.017)
EuroVIX change	-0.0036** (0.002)	-0.0041* (0.002)	-0.0054*** (0.002)
Financial Turmoil	-0.0290 (0.020)	-0.0232 (0.028)	-0.0369 (0.032)
Great Recession	-0.0416*** (0.013)	-0.0479*** (0.017)	-0.0479** (0.020)
EMU Sovereign Debt Crisis	-0.0349*** (0.011)	-0.0413*** (0.014)	-0.0424*** (0.016)
CPI forecast surprise	0.1087** (0.045)	0.1552** (0.069)	0.1671** (0.081)
GDP forecast surprise	-0.0236* (0.014)	-0.0290 (0.021)	-0.0463* (0.024)
Forward Guidance	-0.0359*** (0.006)	-0.0432*** (0.010)	-0.0370*** (0.011)
Constant	0.0348*** (0.013)	0.0413** (0.018)	0.0445** (0.021)
Observations	96	96	96
R-squared	0.322	0.302	0.251
Adjusted R-squared	0.242	0.220	0.163

Notes: Monthly observations on days of ECB President's Press Conference, September 2007-December 2015. The econometric method is OLS with Robust standard errors in parentheses. ***, **, * indicate significance at the 99%, 95% and 90% level, respectively.

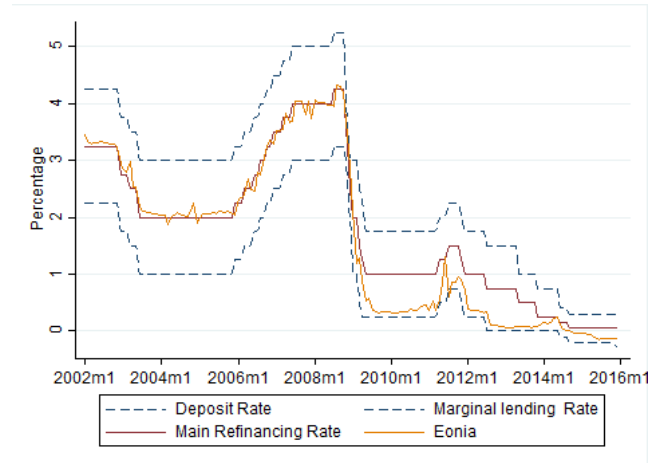
Table 1.8: Order of magnitude of verbal guidance shock and monetary policy shock for $k = 9$ (in basis point)

	(1)	(2)	(3)
$\beta_1 * \sigma_{VGS}$	-0.83	-0.95	-1.06
$\beta_2 * \sigma_{MPS}$	0.69	0.70	0.79

Notes: The table shows the magnitude of the effects for the extended model estimated as: (1) one-day window, (2) one-day window for the verbal guidance index as define in eq. 1.2, (3) two-day window.

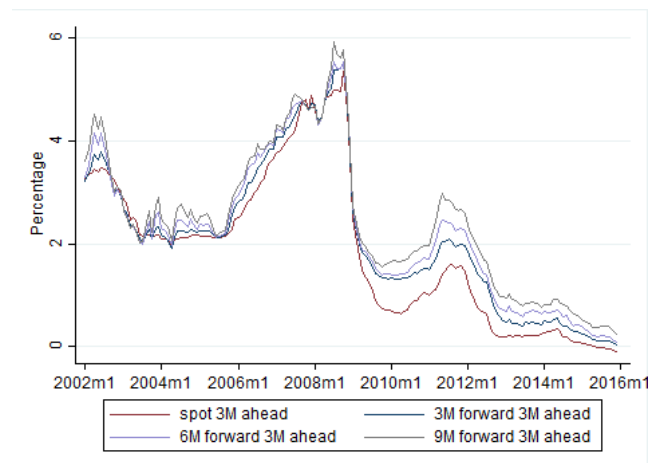
A.5 Figures

Figure 1.1: Evolution of the ECB Policy Rates



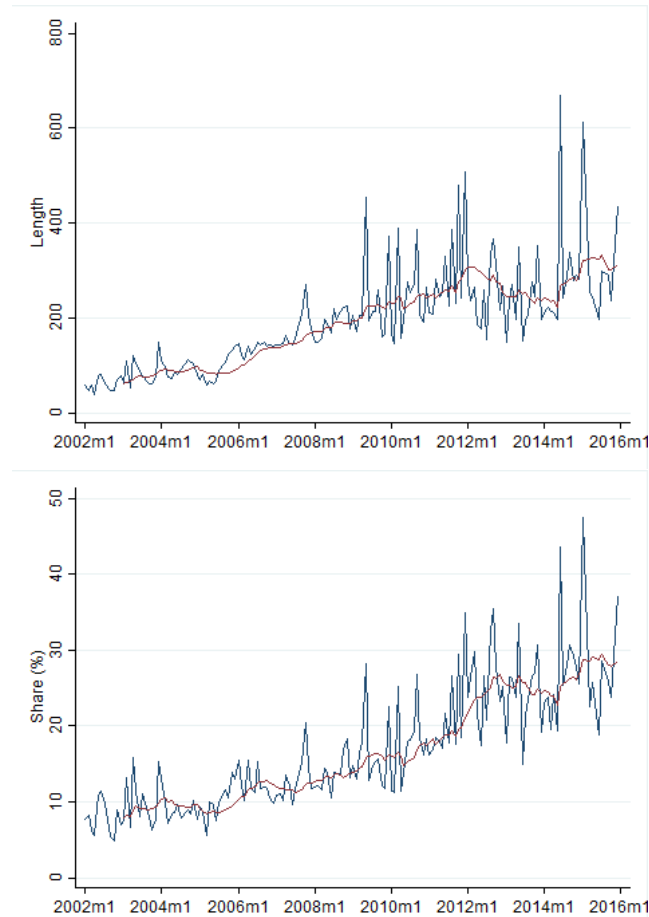
Notes: The graph plots the ECB official policy rates and the Eonia overnight rate. Source: Bloomberg.

Figure 1.2: Evolution of the Implied Forward Euribor Rate



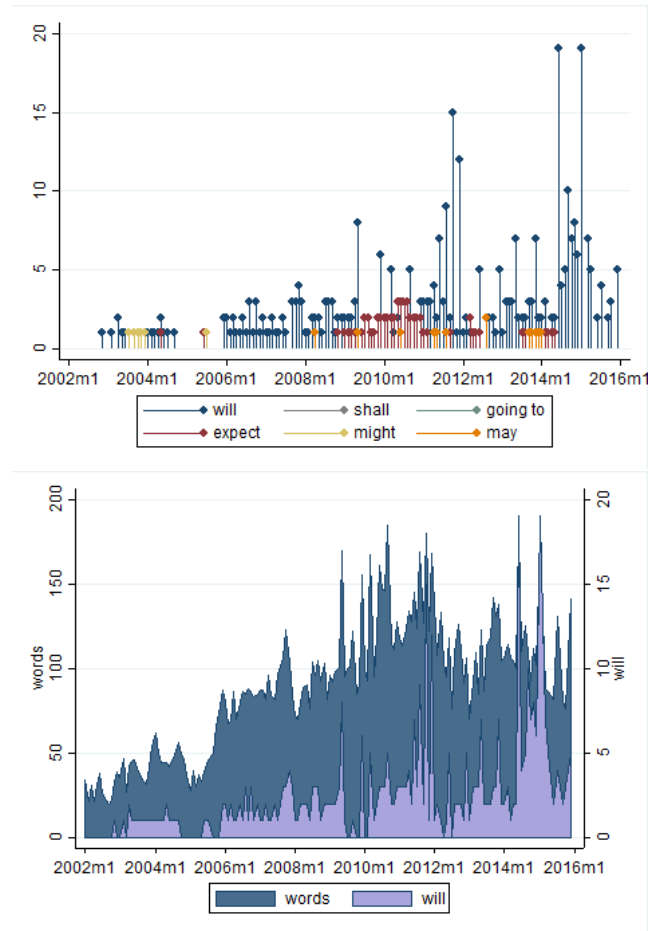
Notes: The graph plots the implied k forward rate and the spot rate three-month ahead on the ECB press conference days. Source: Thomson Reuters-Datastream.

Figure 1.3: Evolution of the ECB policy summary



Notes: The top graph reports the number of words of the ECB *policy summary* (blue line) and a moving average covering the previous 12 press conferences (red line). The bottom graph shows the share of the *policy summary* with respect to the Introductory statement (blue line) and a moving average covering the previous 12 press conferences (red line).

Figure 1.4: Evolution of the future markers

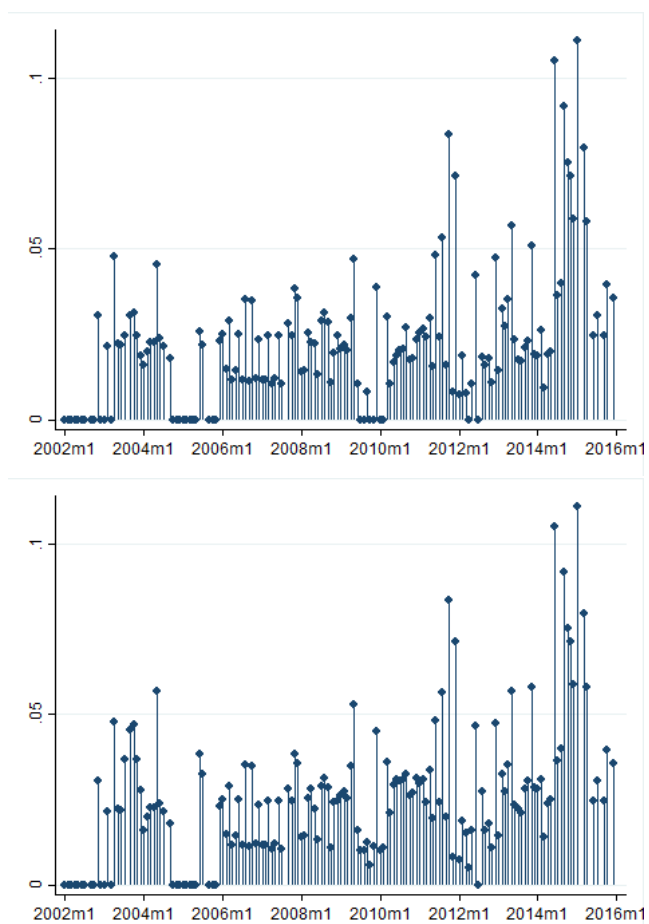


Notes: The top graph shows the number of future markers of the ECB *policy summary*, including *expect*, *may* and *might*. The bottom graph reports the number of words and *will*. The number of words does not include numbers and stopwords. Only words with a sparsity lower than 80% are considered.



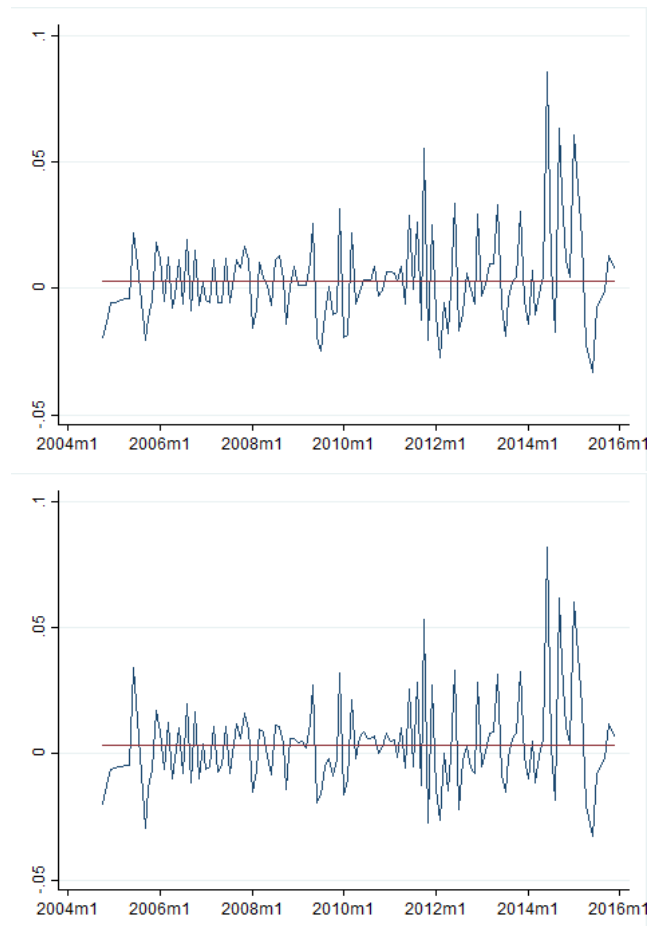
Notes: The 100 most frequent words. The size of each word maps the frequency. The future markers are highlighted in blue for explanatory purpose.

Figure 1.6: The ECB Verbal Guidance Index



Notes: The top graph reports the ECB Verbal Guidance Index as defined in eq. 1.1. The bottom graph shows the ECB Verbal Guidance Index as defined in eq. 1.2.

Figure 1.7: The ECB Verbal Guidance Shock



Notes: The top graph reports the *VGS* (blue line) and its average (red line) when the index is computed as in eq. 1.1. The bottom graph shows the *VGS* (blue line) and its average (red line) when the index is computed as in eq. 1.2.

Appendix B

Appendix to Chapter 2

B.1 Tables

Table B.1: Datasets

	Average value		
	firm-bank level 2005-2011	2005-2011	loan-level 2007m1-2010m6
months of search	1	1.97 (2.853)	1.98 (2.237)
months before the loan is granted	2.57 (3.035)	3.46 (3.372)	3.32 (3.105)
calls for period	1.58 (1.063)	2.53 (6.815)	2.42 (4.113)
<i>Loan Granted</i> in 3 months	0.07 (0.249)	0.16 (0.362)	0.16 (0.367)
in 6 months	0.08 (0.268)	0.18 (0.385)	0.18 (0.387)
in 9 months	0.08 (0.276)	0.19 (0.394)	0.19 (0.394)
in 12 months	0.09 (0.283)	0.20 (0.401)	0.20 (0.400)
N	6167708	2439275	656311

Standard deviations in parentheses. In firm-bank level dataset the search time is 1 month by construction.

Table B.2: Variable Description

Variable	Units	Description	Source	Obs.	Mean	Std.Dev
<i>Social Capital</i>						
Waste Sorting	%/w	Percentage of recyclable waste in 2003 at the province level. In 2003 the national legal obligation to sort rubbish was not implemented. Nowadays in Italy, regulations exist that provide mandatory quotas for the waste sorting but those are not yet completely implemented: in 2009 law stated that at least 35 per cent of municipality waste was recycled and 65 per cent within 2012. However, in 2013 only around 43 per cent of the Italian rubbish was sorted. Since in Italy waste sorting is managed at the local level, we control for differences in the quality of the collection infrastructures using quality weights at the province level (w).	Istat	110	1.2	0.9
Blood Donations	bags	Number of blood bags (each bag contains 16 ounces of blood) per million inhabitants in the province collected by AVIS, the Italian association of blood donors, in 1995 among its members.	Guiso et al. (2004)	110	28.2	20.9
Participation in Referenda	%	Voter turnout at the province level for all the referenda on the period between 1946 and 1987. For each province turnout data were averaged across time.	Guiso et al. (2004)	110	79.9	8.2
<i>Dependent Variable</i>						
$I(LoanGranted_t^3)$	0/1	A dummy variable, which equals 1 if the search for a loan started in month t firm i is successful and the loan is granted within 3 months, and equals 0 otherwise.	Bloomberg	656311	0.16	0.367
$I(LoanGranted_t^6)$	0/1	A dummy variable, which equals 1 if the search for a loan started in month t firm i is successful and the loan is granted within 6 months, and equals 0 otherwise.		656311	0.18	0.387
$I(LoanGranted_t^9)$	0/1	A dummy variable, which equals 1 if the search for a loan started in month t firm i is successful and the loan is granted within 9 months, and equals 0 otherwise.		656311	0.19	0.394
$I(LoanGranted_t^{12})$	0/1	A dummy variable, which equals 1 if the search for a loan started in month t firm i is successful and the loan is granted within 12 months, and equals 0 otherwise.		656311	0.20	0.4
<i>Independent Variables</i>						
<i>Macro-Level Variables</i>						
Crisis	0/1	A dummy variable which equals 1 after Lehman Brothers Default in October 2008.	Bloomberg	656311	0.5	0.5
$\Delta Overnight_{t-1}$	%	Monthly change at $t - 1$ in the Euro overnight index average rate (EONIA), which is the target interest rate for monetary policy in the Eurosystem.				
ΔCPI_{t-1}	%	Quarterly change of Italian Consumer Price Index at $t - 1$.		Istat		
ΔGDP_{t-1}	%	Quarterly change of Italian gross domestic product in real terms at $t - 1$.		Istat		
<i>Additional controls for Local Markets</i>						
GDP growth	%	Annual growth of regional gross domestic product in real terms at $t - 1$.	RBLs			
Export growth	%	Quarterly growth of export at the province level in $t - 1$.				
Credit Standards	%	Change at the province level in the supply conditions in the 2 semesters following Lehman default. Data comes from the semi-annual Regional Bank Lending Survey (RBLs) conducted by Banca d'Italia's regional branches on a sample of about 400 banks.	Istat			
Legal Enforcement	%	Percentage of first-degree trials completed within 2 years by the courts located in a province. It has been computed using courts-level data on the length of trials and then averaged at the regional level.				
<i>Local Credit Market Concentration</i>						
<i>Firm-Level Credit Risk Variables</i>						
Z-score	1/9	Z-scores are synthetic indicator used to predict corporate defaults. We use z-score computed by the private company Cerved. Following Altman et al. (1994), each firm is assigned a value from 1 to 9 where values from 7 upwards indicate sensible riskiness.	Cerved Group S.p.A	313974	5.1	1.8
Low Default Risk	0/1	A dummy variable which equals 1 if the Z-score is between 1 and 3.	Cerved Group S.p.A	656311		
Medium Default Risk	0/1	A dummy variable which equals 1 if the Z-score is between 4 and 6.	Cerved Group S.p.A	656311		
High Default Risk	0/1	A dummy variable which equals 1 if the Z-score is between 7 and 9.	Cerved Group S.p.A	656311		

Table B.3: Loan Granting and Social Capital

<i>Loan Granted in</i>	Low Social Capital Provinces				High Social Capital Provinces			
	Pre-Crisis		Crisis		Pre-Crisis		Crisis	
	Obs	Mean	Obs	Mean	Obs	Mean	Obs	Mean
Waste Sorting								
3 months	32571	0.219	32368	0.163	116921	0.172	115214	0.144
6 months	32571	0.250	32368	0.190	116921	0.195	115214	0.165
9 months	32571	0.263	32368	0.199	116921	0.205	115214	0.174
12 months	32571	0.272	32368	0.208	116921	0.211	115214	0.181
Blood Donation								
3 months	47690	0.208	46926	0.158	134990	0.158	133909	0.132
6 months	47690	0.239	46926	0.183	134990	0.181	133909	0.152
9 months	47690	0.250	46926	0.193	134990	0.189	133909	0.160
12 months	47690	0.259	46926	0.202	134990	0.195	133909	0.168
Voter Turnout in Referenda								
3 months	37368	0.218	36854	0.165	95498	0.172	94072	0.134
6 months	37368	0.251	36854	0.192	95498	0.194	94072	0.154
9 months	37368	0.264	36854	0.201	95498	0.203	94072	0.162
12 months	37368	0.273	36854	0.211	95498	0.209	94072	0.170

Notes: Low Social Capital Provinces refers to provinces where social capital beyond the 75th percentile while Low Social Capital Provinces to province below the 25th percentile. Pre-Crisis refers to the period from January 2007 to September 2008. Crisis refers to the period from October 2008 to June 2010.

Table B.4: Pre-Crisis and Crisis Descriptive Statistics

	Pre-Crisis		Crisis	
	Obs	Mean	Obs	Mean
$I(LoanGranted_{ti}^3)$	330129	0.178	326182	0.142
$I(LoanGranted_{ti}^6)$	330129	0.203	326182	0.163
$I(LoanGranted_{ti}^9)$	330129	0.213	326182	0.172
$I(LoanGranted_{ti}^{12})$	330129	0.220	326182	0.180
Kg of sorted waste	330129	24.79	326182	24.82
Percentage of sorted waste	330129	0.263	326182	0.263
Population served by sorted waste collection	330129	96.26	326182	96.27
Blood donation	330129	35.04	326182	35.13
Voter turnout if referenda	330129	83.25	326182	83.25
$\Delta Overnight_{t-1}$	330129	0.001	326182	-0.007
ΔGDP_{t-1}	330129	1.256	326182	-3.544
ΔCPI_{t-1}	330129	2.571	326182	1.494
GDP growth	320954	3.049	316252	-1.128
Export growth	319949	8.559	316057	-9.342
Credit Standards	330129	0	326182	0.0367
Time varying Zscore	152068	5.108	147685	5.053
% of Trials in 2 years	330129	0.705	326182	0.705
Rejected Payments	319949	3.086	316057	3.092
Borrower already known	330129	0.382	326182	0.410
Single lending	330129	0.603	326182	0.461
Loan requests inside the market	317633	46.80	314291	47.71

Notes: Pre-Crisis refers to the period from January 2007 to September 2008. Crisis refers to the period from October 2008 to June 2010.

Table 2.1: Global Crisis and Social Capital: Baseline models

VARIABLES	Baseline		Waste Sorting		Blood Donation		Voter turnout in Referenda	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Crisis*Social capital			0.119*** (0.020)	0.117*** (0.018)	0.048*** (0.009)	0.047*** (0.008)	0.096*** (0.025)	0.094*** (0.021)
Crisis	-0.007* (0.004)	-0.091*** (0.004)	-0.034*** (0.006)	-0.118*** (0.005)	-0.024*** (0.005)	-0.108*** (0.005)	-0.087*** (0.021)	-0.170*** (0.018)
$\Delta Overnight_{t-1}$	-0.548*** (0.115)	-0.443*** (0.099)	-0.545*** (0.111)	-0.440*** (0.096)	-0.547*** (0.114)	-0.442*** (0.098)	-0.547*** (0.114)	-0.442*** (0.099)
ΔCPI_{t-1}	-0.000 (0.001)		-0.000 (0.001)		-0.000 (0.001)		-0.000 (0.001)	
ΔGDP_{t-1}	0.008*** (0.001)		0.008*** (0.001)		0.008*** (0.001)		0.008*** (0.001)	
Constant	0.172*** (0.003)	0.203*** (0.003)	0.172*** (0.003)	0.203*** (0.002)	0.172*** (0.003)	0.203*** (0.002)	0.172*** (0.003)	0.203*** (0.003)
Observations	656311	656311	656311	656311	656311	656311	656311	656311
Adjusted R^2	0.065	0.069	0.066	0.069	0.065	0.069	0.065	0.069
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	No	Yes	No	Yes	No	Yes	No	Yes

Notes: The dependent variable equals 1 if the search for a loan started in month t by firm i ends with the granting of a loan within the following quarter, and zero otherwise. Data refer to a panel of nonfinancial firms that asked for a loan before and after Lehman Brothers collapse. Standard errors clustered at the province-month level are reported in brackets.

Table 2.2: Global Crisis and Social Capital: Extended models

VARIABLES	GDP growth (1)	Export growth (2)	Credit standards (3)	Time varyng Zscore (4)
Waste Sorting				
Crisis*Social capital	0.114*** (0.018)	0.113*** (0.018)	0.122*** (0.019)	0.117*** (0.018)
Crisis	-0.112*** (0.006)	-0.116*** (0.006)	-0.119*** (0.006)	-0.117*** (0.005)
$\Delta Overnight_{t-1}$	-0.448*** (0.099)	-0.449*** (0.098)	-0.440*** (0.096)	-0.442*** (0.096)
Adjusted R^2	0.069	0.069	0.069	0.070
Blood Donation				
Crisis*Social capital	0.047*** (0.008)	0.044*** (0.008)	0.050*** (0.009)	0.047*** (0.008)
Crisis	-0.103*** (0.005)	-0.106*** (0.005)	-0.109*** (0.005)	-0.107*** (0.005)
$\Delta Overnight_{t-1}$	-0.450*** (0.101)	-0.450*** (0.100)	-0.442*** (0.098)	-0.444*** (0.098)
Adjusted R^2	0.069	0.069	0.069	0.069
Voter turnout in Referenda				
Crisis*Social capital	0.091*** (0.021)	0.090*** (0.021)	0.109*** (0.030)	0.094*** (0.021)
Crisis	-0.163*** (0.018)	-0.165*** (0.018)	-0.183*** (0.026)	-0.169*** (0.018)
$\Delta Overnight_{t-1}$	-0.449*** (0.101)	-0.450*** (0.101)	-0.442*** (0.099)	-0.444*** (0.099)
Adjusted R^2	0.069	0.068	0.069	0.069
Observations	637206	636006	656311	656311

Notes: The dependent variable equals 1 if the search for a loan started in month t by firm i ends with the granting of a loan within the following quarter, and zero otherwise. Data refer to a panel of nonfinancial firms that asked for a loan before and after Lehman Brothers collapse. All the regressions include the intercept, firm fixed effects and quarter fixed effects. Standard errors clustered at the province-month level are reported in brackets.

Table 2.3: Local Markets Heterogeneity

VARIABLES	Economic Performance				Legal Enforcement			
	GDP growth High (1)	Others (2)	Export Orientation High (3)	Others (4)	% of Trials in 2y Efficient (5)	Others (6)	Rejected Payments Low (7)	Others (8)
Waste Sorting								
Crisis*Social capital	-0.021 (0.031)	0.139*** (0.020)	0.064** (0.031)	0.125*** (0.020)	0.109*** (0.034)	0.070*** (0.018)	0.012 (0.042)	0.130*** (0.019)
Crisis	-0.073*** (0.009)	-0.126*** (0.006)	-0.091*** (0.011)	-0.124*** (0.006)	-0.105*** (0.011)	-0.116*** (0.006)	-0.103*** (0.012)	-0.120*** (0.006)
$\Delta Overnight_{t-1}$	-0.164* (0.091)	-0.549*** (0.127)	-0.701*** (0.223)	-0.305*** (0.083)	-0.837*** (0.190)	-0.134* (0.074)	-0.382** (0.178)	-0.449*** (0.107)
Adjusted R^2	0.071	0.067	0.063	0.071	0.072	0.068	0.074	0.068
Blood Donation								
Crisis*Social capital	0.008 (0.009)	0.079*** (0.012)	-0.009 (0.018)	0.049*** (0.011)	0.059*** (0.021)	0.022*** (0.007)	0.054* (0.032)	0.048*** (0.009)
Crisis	-0.082*** (0.006)	-0.121*** (0.006)	-0.068*** (0.009)	-0.115*** (0.006)	-0.098*** (0.010)	-0.111*** (0.005)	-0.111*** (0.011)	-0.108*** (0.005)
$\Delta Overnight_{t-1}$	-0.164* (0.092)	-0.551*** (0.130)	-0.700*** (0.223)	-0.308*** (0.085)	-0.838*** (0.194)	-0.134* (0.076)	-0.382** (0.179)	-0.452*** (0.110)
Adjusted R^2	0.071	0.067	0.063	0.071	0.072	0.068	0.074	0.068
Voter turnout in Referenda								
Crisis*Social capital	-0.076 (0.053)	0.157*** (0.027)	-0.207*** (0.076)	0.093*** (0.023)	-0.128 (0.118)	0.063*** (0.020)	0.008 (0.073)	0.102*** (0.022)
Crisis	-0.012 (0.046)	-0.224*** (0.022)	0.105 (0.065)	-0.176*** (0.019)	0.036 (0.101)	-0.156*** (0.017)	-0.108* (0.059)	-0.175*** (0.019)
$\Delta Overnight_{t-1}$	-0.164* (0.091)	-0.552*** (0.131)	-0.701*** (0.222)	-0.308*** (0.086)	-0.841*** (0.192)	-0.134* (0.076)	-0.382** (0.178)	-0.452*** (0.110)
Adjusted R^2	0.071	0.067	0.063	0.071	0.072	0.068	0.074	0.068
Observations	192538	463773	222485	433826	277022	379289	84346	571965

Notes: The dependent variable equals 1 if the search for a loan started in month t by firm i ends with the granting of a loan within the following quarter, and zero otherwise. Data refer to a panel of nonfinancial firms that asked for a loan before and after Lehman Brothers collapse. All the regressions include the intercept, firm fixed effects and quarter fixed effects. Standard errors clustered at the province-month level are reported in brackets.

Table 2.4: Firms Heterogeneity: Risk

VARIABLES	Time varyng Zscore (1)	Low Default Risk (2)	Medium Default Risk (3)	High Default Risk (4)	Unscored (5)
Waste Sorting					
Crisis*Low social capital	-0.021*** (0.004)	-0.007 (0.013)	-0.021*** (0.008)	-0.010 (0.010)	-0.018*** (0.005)
Crisis*High social capital	0.013*** (0.005)	0.008 (0.007)	0.017** (0.007)	0.011 (0.008)	0.009** (0.004)
Crisis	-0.093*** (0.004)	0.003 (0.008)	-0.051*** (0.007)	-0.110*** (0.008)	-0.130*** (0.005)
$\Delta Overnight_{t-1}$	-0.444*** (0.097)	-0.474*** (0.173)	-0.511*** (0.152)	-0.441** (0.173)	-0.402*** (0.093)
Adjusted R^2	0.069	0.068	0.060	0.070	0.078
Blood Donation					
Crisis*Low social capital	-0.011** (0.005)	-0.021* (0.011)	-0.015* (0.008)	-0.012 (0.009)	-0.008 (0.005)
Crisis*High social capital	0.015*** (0.004)	0.001 (0.007)	0.009 (0.006)	0.004 (0.007)	0.017*** (0.004)
Crisis	-0.096*** (0.004)	0.007 (0.009)	-0.049*** (0.007)	-0.108*** (0.009)	-0.134*** (0.005)
$\Delta Overnight_{t-1}$	-0.444*** (0.099)	-0.475*** (0.174)	-0.510*** (0.154)	-0.443** (0.173)	-0.403*** (0.094)
Adjusted R^2	0.069	0.068	0.060	0.070	0.078
Voter turnout in Referenda					
Crisis*Low social capital	-0.022*** (0.005)	-0.014 (0.013)	-0.021** (0.008)	-0.013 (0.010)	-0.020*** (0.006)
Crisis*High social capital	-0.005 (0.004)	-0.002 (0.007)	-0.008 (0.006)	-0.001 (0.007)	-0.001 (0.004)
Crisis	-0.087*** (0.004)	0.007 (0.008)	-0.043*** (0.007)	-0.106*** (0.008)	-0.126*** (0.005)
$\Delta Overnight_{t-1}$	-0.444*** (0.098)	-0.474*** (0.174)	-0.508*** (0.153)	-0.443** (0.173)	-0.403*** (0.094)
Adjusted R^2	0.069	0.068	0.060	0.070	0.078
Observations	656311	53671	168460	91843	342337

Notes: The dependent variable equals 1 if the search for a loan started in month t by firm i ends with the granting of a loan within the following quarter, and zero otherwise. Data refer to a panel of nonfinancial firms that asked for a loan before and after Lehman Brothers collapse. All the regressions include the intercept, firm fixed effects and quarter fixed effects. Standard errors clustered at the province-month level are reported in brackets.

Table 2.5: Firms Heterogeneity: Search Strategy

VARIABLES	Borrower already known (1)	Borrower not known (2)	Loan request lodged inside the market (3)	Loan request lodged outside the market (4)	Single Lending (5)	Multiple Lending (6)
Waste Sorting						
Crisis*Low social capital	-0.016* (0.008)	-0.022*** (0.007)	-0.045*** (0.007)	0.001 (0.007)	-0.017*** (0.005)	-0.008 (0.008)
Crisis*High social capital	0.003 (0.005)	0.017** (0.007)	0.019*** (0.007)	0.006 (0.006)	0.008* (0.004)	0.011 (0.007)
Crisis	-0.040*** (0.007)	-0.116*** (0.006)	-0.097*** (0.007)	-0.051*** (0.007)	-0.077*** (0.005)	-0.031*** (0.006)
$\Delta Overnight_{t-1}$	-0.096 (0.107)	-0.652*** (0.158)	-0.436*** (0.146)	-0.385*** (0.113)	-0.299*** (0.088)	-0.588*** (0.154)
Adjusted R^2	0.193	0.028	0.121	0.094	0.171	0.020
Blood Donation						
Crisis*Low social capital	0.001 (0.007)	-0.011 (0.007)	-0.024*** (0.008)	0.000 (0.007)	-0.004 (0.005)	-0.011 (0.009)
Crisis*High social capital	0.004 (0.005)	0.021*** (0.006)	0.028*** (0.006)	0.016*** (0.005)	0.014*** (0.004)	0.006 (0.007)
Crisis	-0.042*** (0.007)	-0.120*** (0.006)	-0.104*** (0.007)	-0.055*** (0.007)	-0.081*** (0.005)	-0.029*** (0.006)
$\Delta Overnight_{t-1}$	-0.096 (0.107)	-0.654*** (0.161)	-0.437*** (0.149)	-0.385*** (0.113)	-0.299*** (0.087)	-0.588*** (0.155)
Adjusted R^2	0.193	0.028	0.122	0.095	0.171	0.020
Voter turnout in Referenda						
Crisis*Low social capital	-0.011 (0.008)	-0.025*** (0.007)	-0.049*** (0.008)	-0.009 (0.008)	-0.011** (0.005)	-0.021** (0.009)
Crisis*High social capital	-0.006 (0.005)	-0.006 (0.006)	-0.006 (0.006)	-0.009* (0.005)	0.000 (0.004)	-0.018*** (0.007)
Crisis	-0.038*** (0.007)	-0.108*** (0.006)	-0.088*** (0.007)	-0.044*** (0.006)	-0.075*** (0.005)	-0.021*** (0.006)
$\Delta Overnight_{t-1}$	-0.095 (0.107)	-0.654*** (0.160)	-0.435*** (0.148)	-0.384*** (0.113)	-0.299*** (0.088)	-0.585*** (0.154)
Adjusted R^2	0.193	0.028	0.121	0.094	0.171	0.020
Observations	259850	396461	362039	269885	349453	306858

Notes: The dependent variable equals 1 if the search for a loan started in month t by firm i ends with the granting of a loan within the following quarter, and zero otherwise. Data refer to a panel of nonfinancial firms that asked for a loan before and after Lehman Brothers collapse. All the regressions include the intercept, firm fixed effects and quarter fixed effects. Standard errors clustered at the province-month level are reported in brackets.

Table 2.6: Geographic Area Effects

VARIABLES	2 Macro-areas		5 Macro-areas	
	(1)	(2)	(3)	(4)
Waste Sorting				
Crisis*Social capital	0.124*** (0.023)		0.091*** (0.021)	
Crisis*Low social capital		-0.017*** (0.005)		-0.009* (0.006)
Crisis*High social capital		0.012** (0.005)		0.008** (0.004)
Crisis	-0.142*** (0.009)	-0.124*** (0.010)	-0.044*** (0.009)	-0.032*** (0.009)
$\Delta Overnight_{t-1}$	-0.438*** (0.095)	-0.439*** (0.097)	-0.428*** (0.089)	-0.429*** (0.090)
Observations	656311	656311	656311	656311
Adjusted R^2	0.070	0.069	0.071	0.071
Blood Donation				
Crisis*Social capital	0.040*** (0.011)		0.033*** (0.011)	
Crisis*Low social capital		-0.006 (0.004)		-0.009** (0.004)
Crisis*High social capital		0.014*** (0.004)		0.009* (0.005)
Crisis	-0.136*** (0.009)	-0.129*** (0.010)	-0.038*** (0.009)	-0.029*** (0.010)
$\Delta Overnight_{t-1}$	-0.440*** (0.098)	-0.440*** (0.098)	-0.428*** (0.091)	-0.429*** (0.091)
Adjusted R^2	0.069	0.069	0.071	0.071
Voter turnout in Referenda				
Crisis*Social capital	0.026 (0.045)		0.095** (0.043)	
Crisis*Low social capital		-0.009 (0.006)		-0.005 (0.006)
Crisis*High social capital		-0.006 (0.004)		0.002 (0.004)
Crisis	-0.151*** (0.033)	-0.080*** (0.004)	-0.102*** (0.032)	-0.032*** (0.010)
$\Delta Overnight_{t-1}$	-0.439*** (0.098)	-0.439*** (0.098)	-0.428*** (0.090)	-0.429*** (0.090)
Adjusted R^2	0.069	0.069	0.071	0.071
Observations	656311	656311	656311	656311

Notes: The dependent variable equals 1 if the search for a loan started in month t by firm i ends with the granting of a loan within the following quarter, and zero otherwise. Data refer to a panel of nonfinancial firms that asked for a loan before and after Lehman Brothers collapse. All the regressions include the intercept, firm fixed effects and area-quarter fixed effects as reported in the columns titles. Standard errors clustered at the province-month level are reported in brackets.

Table 2.7: A Quasi-Natural Experiment

VARIABLES	Baseline (1)	Waste Sorting (2)	Blood Donation (3)	Blood Donation (4)	Waste Sorting (5)	Voter turnout in Referenda (6)	Voter turnout in Referenda (7)
Crisis*Social capital		0.100*** (0.020)		0.038*** (0.012)		0.147*** (0.031)	
Crisis*Low social capital			-0.026*** (0.007)		-0.005 (0.007)		-0.018*** (0.007)
Crisis*High social capital			0.020*** (0.006)		0.017*** (0.005)		0.013** (0.005)
Crisis	-0.102*** (0.006)	-0.124*** (0.007)	-0.104*** (0.006)	-0.115*** (0.007)	-0.108*** (0.006)	-0.223*** (0.027)	-0.103*** (0.006)
$\Delta Overnigh_{t-1}$	-0.486*** (0.124)	-0.482*** (0.124)	-0.484*** (0.123)	-0.487*** (0.125)	-0.486*** (0.126)	-0.487*** (0.125)	-0.487*** (0.124)
Constant	0.227*** (0.004)	0.227*** (0.004)	0.227*** (0.004)	0.227*** (0.004)	0.227*** (0.004)	0.227*** (0.004)	0.227*** (0.004)
Observations	193541	193541	193541	193541	193541	193541	193541
Adjusted R^2	0.077	0.077	0.077	0.077	0.077	0.077	0.077

Notes: The dependent variable equals 1 if the search for a loan started in month t by firm i ends with the granting of a loan within the following quarter, and zero otherwise. Data refer to a panel of nonfinancial firms that asked for a loan before and after Lehman Brothers collapse. All the regressions include the intercept, firm fixed effects and quarter fixed effects. Standard errors clustered at the province-month level are reported in brackets.

Table 2.8: Conditional fixed effects Logit Models

VARIABLES	Baseline (1)	Waste Sorting (2)	Blood Donation (3)	Voter turnout in Referenda (4)
Crisis*Social capital		0.738*** (0.064)	0.255*** (0.037)	0.369*** (0.104)
Crisis (0.023)	-0.730*** (0.027)	-0.893*** (0.026)	-0.816*** (0.089)	-1.035***
$\Delta Overnight_{t-1}$	-4.165*** (0.440)	-4.114*** (0.440)	-4.150*** (0.440)	-4.156*** (0.440)
Observations	254034	254034	254034	254034
Prob>chi2	0	0	0	0
chisquare	4672	4805	4721	4685
Log Likelihood	-89911	-89845	-89887	-89905

Notes: The dependent variable equals 1 if the search for a loan started in month t by firm i ends with the granting of a loan within the following quarter, and zero otherwise. Data refer to a panel of nonfinancial firms that asked for a loan before and after Lehman Brothers collapse. All the regressions include the intercept, firm fixed effects and quarter fixed effects. Standard errors clustered at the province-month level are reported in brackets.

Table 2.9: Different decision periods: 2, 3 and 4 quarters

VARIABLES	Baseline (1)	Waste Sorting (2)	Blood Donation (3)	Voter turnout in Referenda (4)
<i>I(LoanGranted_{it}⁶)</i>				
Crisis*Social capital		0.127*** (0.018)	0.052*** (0.008)	0.112*** (0.022)
Crisis	-0.096*** (0.004)	-0.125*** (0.006)	-0.114*** (0.005)	-0.189*** (0.019)
$\Delta Overnight_{t-1}$	-0.333*** (0.100)	-0.330*** (0.097)	-0.332*** (0.099)	-0.332*** (0.100)
Adjusted R^2	0.072	0.073	0.073	0.073
<i>I(LoanGranted_{it}⁹)</i>				
Crisis*Social capital		0.132*** (0.018)	0.054*** (0.008)	0.121*** (0.022)
Crisis	-0.099*** (0.004)	-0.129*** (0.006)	-0.118*** (0.005)	-0.200*** (0.019)
$\Delta Overnight_{t-1}$	-0.324*** (0.102)	-0.320*** (0.099)	-0.323*** (0.101)	-0.322*** (0.101)
Adjusted R^2	0.074	0.075	0.074	0.074
<i>I(LoanGranted_{it}¹²)</i>				
Crisis*Social capital		0.138*** (0.018)	0.058*** (0.009)	0.127*** (0.022)
Crisis	-0.101*** (0.004)	-0.132*** (0.006)	-0.122*** (0.005)	-0.207*** (0.019)
$\Delta Overnight_{t-1}$	-0.288*** (0.102)	-0.284*** (0.098)	-0.287*** (0.101)	-0.286*** (0.101)
Adjusted R^2	0.076	0.076	0.076	0.076
Observations	656311	656311	656311	656311

Notes: Data refer to a panel of nonfinancial firms that asked for a loan before and after Lehman Brothers collapse. All the regressions include the intercept, firm fixed effects and quarter fixed effects. Standard errors clustered at the province-month level are reported in brackets.

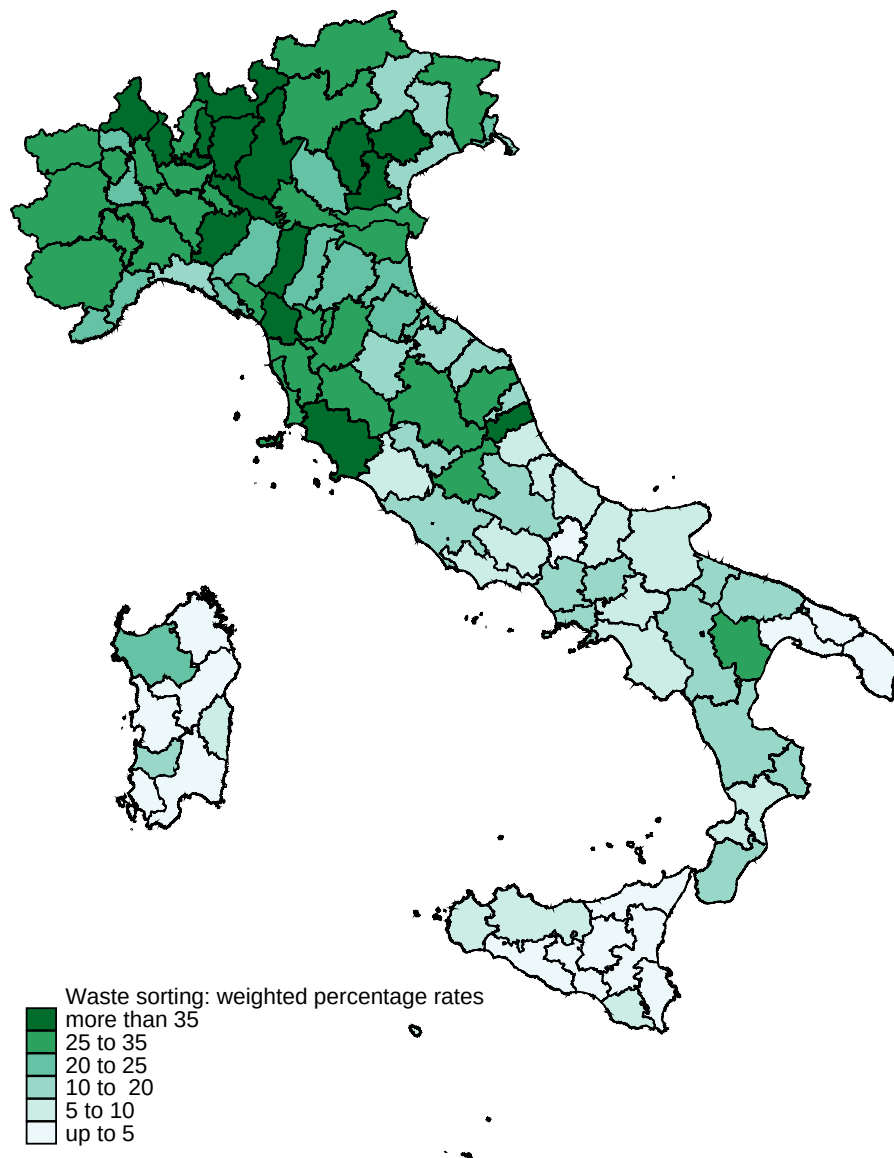
Table 2.10: One month search period

VARIABLES	Baseline (1)	Waste Sorting (2)	Blood Donation (3)	Voter turnout in Referenda (4)
Crisis*Social capital		0.048*** (0.014)	0.018*** (0.006)	0.024 (0.017)
Crisis	-0.052*** (0.003)	-0.063*** (0.004)	-0.058*** (0.003)	-0.071*** (0.014)
$\Delta Overnight_{t-1}$	-0.054 (0.067)	-0.053 (0.066)	-0.054 (0.067)	-0.054 (0.067)
Constant	0.122*** (0.002)	0.122*** (0.002)	0.122*** (0.002)	0.122*** (0.002)
Observations	1244225	1244225	1244225	1244225
Adjusted R^2	0.077	0.077	0.077	0.077

Notes: The dependent variable equals 1 if the loan is granted in quarter following the loan application, and zero otherwise. Data refer to a panel of nonfinancial firms that asked for a loan before and after Lehman Brothers collapse. All the regressions include the intercept, firm fixed effects and quarter fixed effects. Standard errors clustered at the province-month level are reported in brackets.

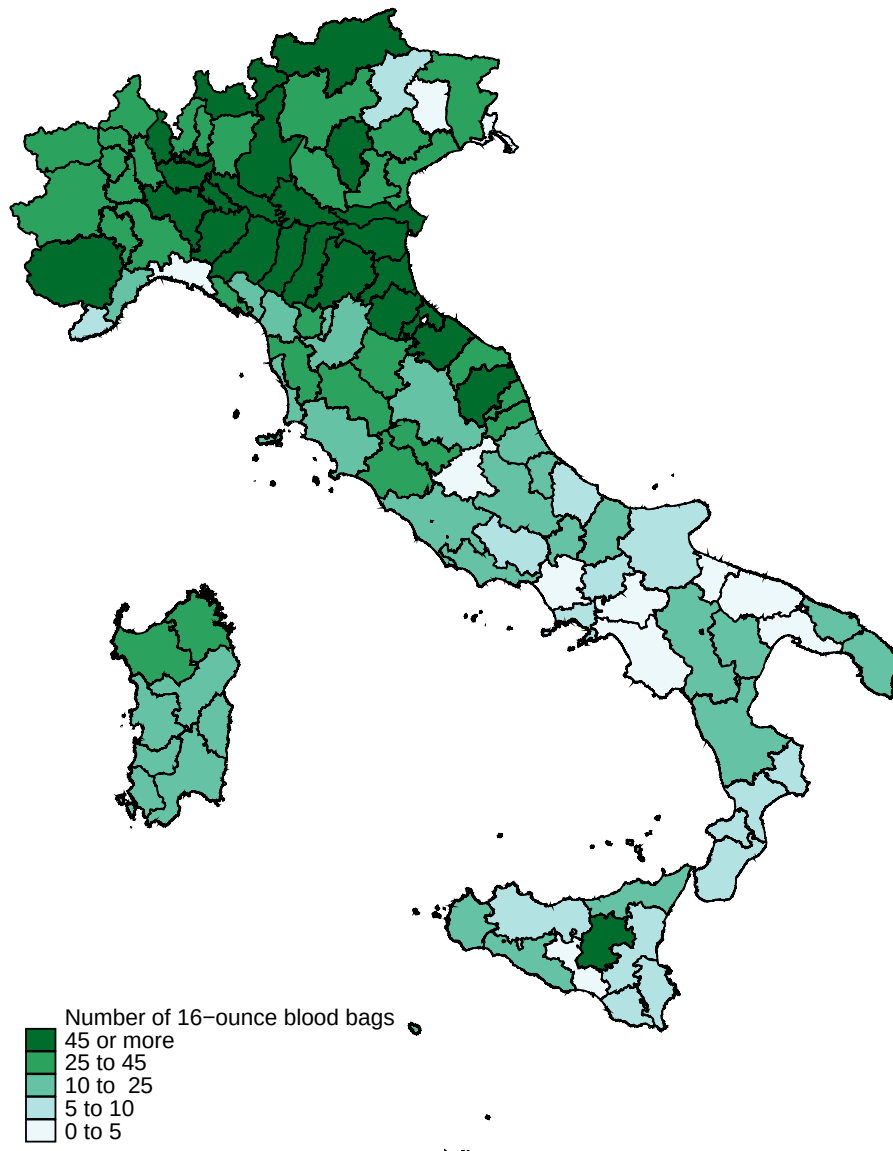
B.2 Figures

Figure 2.1: Trust across Italian Provinces: Waste Sorting



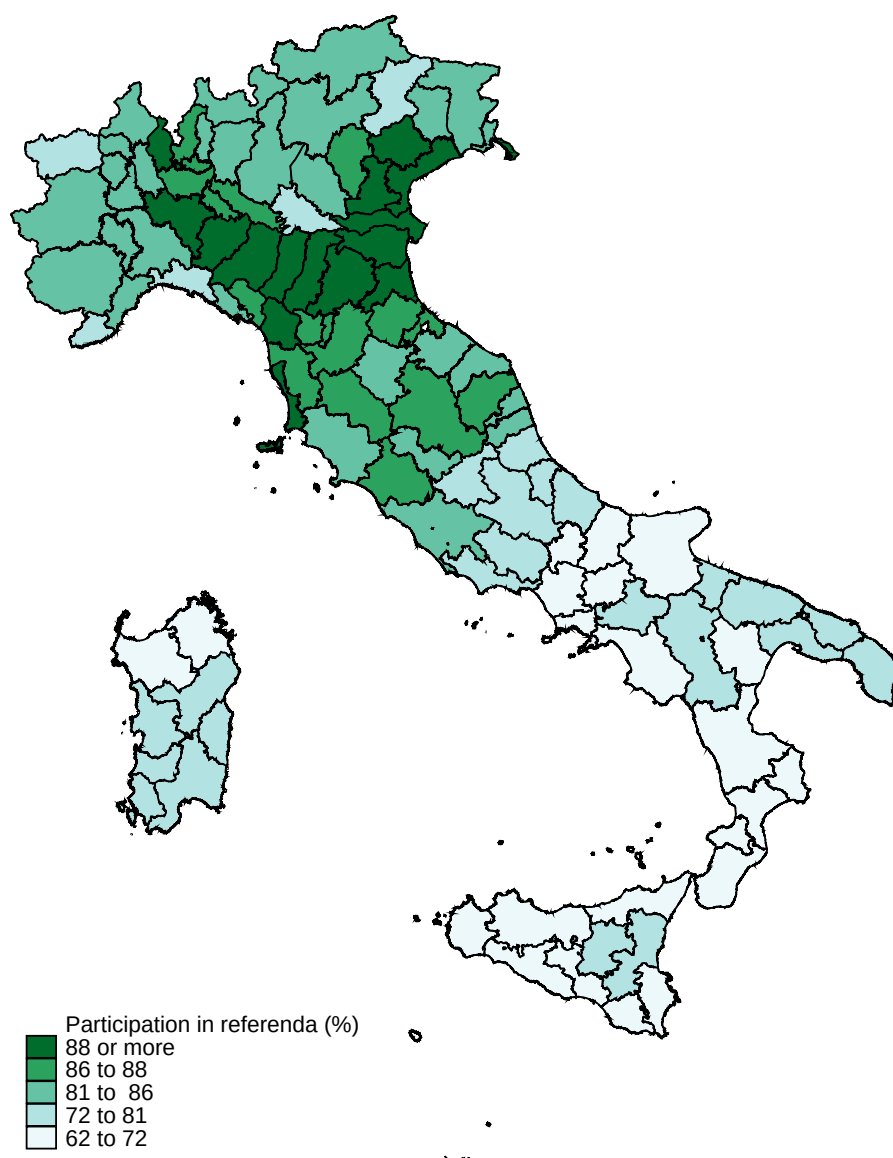
Notes: Darker areas correspond to provinces with higher fraction of waste sorted. The data are weighted for the presence of facilities dedicated to collect sorted waste.

Figure 2.2: Trust across Italian Provinces: Blood Donation



Notes: Darker areas correspond to provinces with higher level of blood donation

Figure 2.3: Trust across Italian Provinces: Participation in Referenda



Notes: Darker areas correspond to provinces with higher participation in referenda

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