INFLATION EXPECTATIONS AND CORPORATE BORROWING DECISIONS: NEW CAUSAL EVIDENCE *

Olivier Coibion
UT Austin
and NBER

Yuriy Gorodnichenko
UC Berkeley
and NBER

Tiziano Ropele
Bank of Italy

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Abstract

We match survey data of Italian firms that includes a repeated experiment in which information about inflation is randomly provided to firms over time with detailed credit data that covers the borrowing decisions of firms. This allows us to study how exogenous variation in inflation expectations causally affects the borrowing decisions of Italian firms. We document a number of new results. Firms with exogenously higher inflation expectations end up paying higher interest rates on average but do not change the overall demand of loans. Instead, we find a significant rebalancing of firms' borrowing decisions away from low-interest long-term loans and toward higher-interest short-term loans. In anticipation of rising future interest rates, firms also take on new long-term loans to pay down existing loans, thereby locking in interest rate savings. Firms that are relatively more knowledgeable about financial tools engage in the latter particularly strongly.

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* Coibion: Economics Department, UT Austin, 2225 Speedway, Austin TX 78712 (Email: ocoibion@austin.utexas.edu, Phone: 512-471-3211, Fax: 512-471-3510); Gorodnichenko: Economics Department, UC Berkeley, 530 Evans Hall, Berkeley CA 94720 (ygorodni@econ.berkeley.edu); Ropele: Bank of Italy, via Nazionale 91, 00184 Rome Italy (Tiziano.Ropele@bancaditalia.it). The views expressed here should not be interpreted as representing the views of the Bank of Italy or any other institution with which the authors are affiliated.

1. Introduction

How do firms' inflation expectations affect their financing decisions, if at all? As inflation rates rise around the world, the question of how this inflation parlays into the decisions of economic agents is becoming increasingly pressing. While recent work has studied the role of inflation expectations in shaping households' spending decisions and firms' pricing and employment decisions, little is yet known about the extent to which inflation may affect the financing decisions of firms. This paper sets out to fill this gap.

We do so by matching a firm-level panel survey of Italian firms with administrative data on firms' financing decisions and balance sheet information. The survey provides detailed quantitative and qualitative measures of firms' economic expectations as well as a repeated randomized information treatment that generates exogenous variation in firms' inflation expectations over time, as documented in Coibion, Gorodnichenko and Ropele (2020, CGR henceforth). The administrative data allow us to track firms' volumes of credit from banks in detail, including information on the type of loan and the interest rate on the loan. This combination of data enables us to characterize in unprecedented detail the causal effect of changes in Italian firms' inflation expectations on their financing decisions.

In principle, firms' inflation expectations could affect their financing decisions through a variety of channels. CGR demonstrate, for example, that exogenously higher inflation expectations lead Italian firms to reduce their employment and investment over time. This could naturally reduce the demand for credit on the part of firms since fewer loans are needed to finance capital outlays or meet working capital requirements for labor. In this paper, we find little evidence for this prediction: firms with higher inflation expectations instead accept higher nominal interest rates on their loans, consistent with either an *increase* in demand for financing or a *decline* in the supply of credit. The latter could arise if for example the reduction in production and sales of firms with higher inflation expectations made banks more wary of lending to them. While we do find that the total credit that is granted to firms with higher inflation expectations does decline over time, there is no evidence of an immediate deterioration in the credit scores of firms. The little deterioration that occurs at later horizons is quantitatively small so a supply-side explanation is also at odds with the facts, a point we return to below.

Instead, our evidence suggests that firms who raise their inflation expectations primarily engage in a *rebalancing* in their financing positions consistent with an expectation that higher future inflation will be met with higher future interest rates. As their inflation expectations rise, firms immediately seek out and receive new long-term loans but they use these loans to pay down previously held long-term loans. This likely provides them with some protection against exposure to higher interest rates in the future. In addition,

firms gradually adjust their financing toward short-term loans: outstanding balances of long-term loans decline when inflation expectations rise while balances at short-term credit facilities increase. This is likely driven by a precautionary motive: when Italian firms have higher inflation expectations, they become more pessimistic about the aggregate economic outlook as well as their own. Shorter-term credit facilities, while more expensive, also provide more flexibility to firms in times of duress. Both reallocations push overall interest rates paid by firms up when they expect more inflation. The immediate rise in demand for new long-term credit raises interest rates on this type of credit, as does the more gradual increase in short-term credit lines. The reallocation from long-term credit toward short-term credit also raises average interest rates since short-term credit lines come at higher interest rates.

This rebalancing helps make sense of overall quantities of financing faced by firms. As said above, on the one hand, the total credit granted to firms declines gradually when they have higher inflation expectations, which could in combination with higher paid interest rates suggest a reduced supply of credit. However, a number of results suggest that a reduced supply is not driving the results. First, we find very limited evidence of a deterioration in credit scores of firms with higher inflation expectations. What little deterioration there is both delayed and quantitatively small. Second, the effects of higher inflation expectations on interest rates paid by firms are robust to controlling for ex-post credit supply variables, such as the credit constraints that firms perceive, consistent with a demand-side channel driving the results. Third, we see a rise in loan applications on the part of firms and no decline in the number of loans being accepted, a feature difficult to reconcile with a credit supply explanation. Fourth, results on interest rates and financing decisions by firms are much stronger for "financially sophisticated" firms (those that are relatively more knowledgeable about financial tools), which is again consistent with the results being driven by a desired reallocation of financing by firms. Finally, we do not observe any effect on the total amounts of credit used by firms, consistent with the primary force being one of reallocation across different types of credit facilities.

Our paper blends three literatures that have so far largely been operating in parallel. The first is a growing body of work that focuses on the conditions under which firms borrow from banks and financial markets. Acharya et al. (2014) and Acharya et al. (2019), for example, study the use of credit lines as a source of liquidity for firms. Berg et al. (2017) compare the terms and usage of credit lines and term loans received by American versus European firms. Greenwald, Krainer and Paul (2021) documents that in the U.S. large firms are those able to consistently access credit lines to respond to shocks. We similarly compare the use of credit lines and term loans but do so in response to causally identified variation in inflation expectations. An early literature, spurred on by the Great Inflation of the 1970s, had also investigated the

effects of inflation expectations on some household financing decisions. For example, Taube and MacDonald (1989) studied the choice of mortgage instruments in an inflationary environment using Federal Home Loan Bank data from 1981 to 1987. They found that homebuyers appear to prefer fixed-rate mortgages in the presence of expected inflation.

The second related literature focuses on the role of expectations in determining firms' and financial markets' actions.[1] The role of expectations in driving financial markets has long been recognized but recent work utilizing survey data has provided new evidence on the way in which these expectations matter. Gennaioli, Ma and Shleifer (2016), for instance, documents the predictive power of CFOs' predictions of earnings growth for firms' subsequent investment decisions. Giglio et al. (2020) shows that retail investors' economic expectations' are reflected in their portfolio decisions. Ma, Taligorova and Peydro (2021) focuses on how expectations of banks shape their lending decisions. Ma et al. (2020) isolates forecast errors made by Italian managers and finds that they affect investment decisions. We contribute to this literature by focusing on the inflation expectations of firms and relating them to the composition of their borrowing.

The third literature that we build on utilizes randomized information treatments to survey participants as a way of generating exogenous variation in expectations, which can then be used to characterize how expectations shape beliefs. Coibion, Gorodnichenko and Kumar (2018) and Coibion, Gorodnichenko and Ropele (2020) apply this strategy to study the effect of inflation expectations on firms' pricing, employment and investment decisions. Laudenbach, Weber and Wohlfart (2021) apply randomized information treatments to study how perceptions of aggregate stock returns affect subsequent equity purchases of retail investor. Coibion, Gorodnichenko and Weber (2020) and Coibion et al. (2021) provide different information treatments about inflation and monetary policy to households in the U.S. and the Netherlands respectively to characterize how inflation expectations affect spending decisions. We closely follow this methodological approach but focus on the role that inflation expectations play in shaping the borrowing decisions of firms.

The rest of the paper is structured as follows. In Section 2, we describe the main sources of data and present some preliminary descriptive statistics. In Section 3, we illustrate the randomized information treatment and discuss our empirical methodology. Section 4 presents benchmark results for the causal

[1] Another closely related literature utilizes surveys of households' inflation expectations to study how they relate to spending or perceptions of whether now is a good time to purchase large durable goods. See for example Bachmann, Berg and Sims (2015), Draeger and Nghiem (2021), Burke and Ozdagli (2021), Vellekoop and Wiederholt (2019), and Rondinelli and Zizza (2020).

effects of firms' inflation expectations on their financing decisions while Section 5 contains some robustness analyses. Section 6 concludes.

2. Data Description

We combine four different sources of information to examine how inflation expectations affect the financing decisions of firms. The first source of data is the Survey on Inflation and Growth Expectations (SIGE, henceforth), which allows us to measure firms' inflation expectations and elicit other perceptions and assessments. The SIGE also represents the source of the randomized information treatment that serves to generate exogenous variation in inflation expectations. Second, we match the SIGE with the Italian Central Credit Registry (CCR, henceforth), which is an information system operated by the Bank of Italy that collects granular data supplied by banks and other financial intermediaries on the contract characteristics of loans granted to customers. The third data source is the Analytical Survey of Interest Rates (TAXIA, henceforth), which is a survey operated by the Bank of Italy that, among other things, collects information on the lending rates set by banks and other financial intermediaries. Finally, we match the SIGE with the Company Accounts Data Service (CADS, henceforth), which contains balance sheet information on Italian limited liabilities firms as well as a composite index that measures firms' credit risk. We discuss each of them in turn.

2.1. SIGE

The SIGE is a quarterly business survey run by the Bank of Italy since December 1999.[2] The reference universe consists of firms operating in industry excluding construction and non-financial private services[3] with administrative headquarters in Italy and employing 50 or more workers. Since the first quarter of 2013, construction firms with at least 50 employees have been added. The sample is stratified by sector of economic activity (industry, non-financial private services and construction), geographical area (North-West, North-East, Centre, South and Islands) and number of employees (50-199, 200-999, 1000 and over). In recent years, each wave has about 1,000 firms (400 in industry excluding construction, 400 in non-financial private services and 200 in construction). Over the years, about 2,500 firms have participated in

[2] Until October 2018, the survey was conducted jointly with the economic newspaper *Il Sole 24 Ore*.
[3] The survey excludes the following: financial intermediaries and insurance companies, general government and the educational and healthcare sectors as well as other community, social and personal services.

the survey. The list of firms used to extract the sample is drawn from the Bureau Van Dijk's Aida database and is updated on average every five years. Sampling weights are provided to ensure that the distribution of firms (in terms of employment) in the sample represents the distribution of firms in the reference population.

The survey is carried out by a specialist firm that distributes the questionnaire to company managers who are best informed about the topics covered in the survey. About 90 percent of the data is collected through computer assisted web interviews in the form of an online questionnaire featuring a purpose-designed interface, while the remaining 10 percent are collected through computer assisted telephone interviews. Data are collected in the first three weeks of March, June, September and December. The response rate is about 45 percent on average.

The purpose of the survey is to obtain information on firms' expectations concerning inflation, the general economic situation, own-product prices and demand, investment, and employment. Most of the data - with the exception of own-product prices changes (past and expected), inflation expectations and current number of employees - are qualitative and relate to firms' assessments about their own business activity as well as about macroeconomic matters in the reference quarter and looking ahead. The qualitative questions in the questionnaire typically have three or more possible answers (for example: worse, the same, better). Most of the questions are repeated throughout the various waves. On occasion, the survey contains questions on specific aspects of the economy that warrant further investigation. A typical questionnaire is presented in Appendix 1. More information about the survey is provided in Grasso and Ropele (2018).

2.2. CCR

The CCR is an information system managed by the Bank of Italy that collects information on transactions involving loans and collateral between the financial system (banks, financial intermediaries, securitization companies under Law 130/1999, and collective investment undertakings; henceforth, for simplicity we will refer to these entities as banks) and its customers. By maintaining this database, the Bank of Italy provides the participating banks with a tool that can improve their ability to assess customers' credit worthiness and to manage credit risk. The data from the CCR is also used by the Bank of Italy for supervisory purposes, the valuation of loans used as collateral in monetary policy operations, and in economic and financial analysis and research.

Once a month, banks are required to report each customer's debtor position as at the end of the reference month, if it equals or exceeds relevant threshold values[4], for distinct categories of credit, e.g., matched loans, term loans, revocable loans. We discuss these different loan types in section 2.5.

The CCR also collects information on the number of loan applications on the part of customers. Specifically, the CCR keeps track of the requests advanced by banks to obtain preliminary information ("*servizio di prima informazione*") about the credit position of a potential borrower. Banks typically use this service when the borrowing request originates from a *new* applicant, as the CCR regularly updates banks with information on the overall credit position of their existing clients. This preliminary information request can be precisely identified as an actual loan application because the bank lodging the inquiry has to specify the reason for the request.

2.3. TAXIA

The TAXIA is run quarterly by the Bank of Italy since March 2004. The survey collects information on lending rates for each customer while it gathers information on deposit rates on an aggregate basis. In the former case, the survey considers the cost of credit granted by Italian branches of reporting banks in the form of matched loans, term loans and revocable loans. Banks are required to submit the information requested for each customer that, at the end of the reference quarter, has an overall debtor exposure reported to the CCR of at least 75,000 euros.

For all the outstanding loans at the end of each quarter, banks report the products ("*numeri computistici*") and the related amounts ("*competenze*") received by the banks during the reference quarter. The products are computed as the daily balance of credit times the number of days. The amounts received by the banks comprise interest payments, fees and other expenses. On the basis of the collected data, the annualized nominal interest rate effectively charged to a customer during a quarter is calculated using the following formula:

[4] Since January 2006, reports must be submitted if, on the reference date, at least one of the following conditions is met in relation to the holder of the risk position: (*i*) total loans or guarantees amount to at least €30,000 (comprising both those granted and those used); (*ii*) the total value of the collateral received by the intermediary is at least €30,000; (*iii*) the intrinsic value of financial derivative transactions is at least €30,000; (*iv*) the customer's position is classified among bad debts and its nominal value, net of losses, is at least €250; (*v*) transactions carried out on behalf of third parties amount to at least €30,000; (*vi*) the face value of the claims acquired through factoring, non-recourse bill discounting and debt assignment is at least €30,000; (*vii*) a bad debt is completely written off; (*viii*) the face value of the performing loans sold by the bank or other intermediary to third parties amounts to at least €30,000; and (*ix*) the face value, net of losses, of the bad debts sold by the bank or other intermediary to third parties amounts to at least €250.

$$Nominal\ interest\ rate\ (\%) = \frac{Amounts\ received\ \times 365}{Products}.$$

For the new term loans granted in the quarter, the banks report the annual percentage rate of charge and the amount of credit.

2.4. CADS

The CADS is a proprietary database owned by Cerved Group S.p.A., a leading information provider in Italy and one of the major credit rating agencies in Europe. CADS includes detailed information on balance sheet and income statements for almost all Italian limited liability non-financial companies since 1993. Information is drawn from official data recorded at the Italian Registry of Companies and from financial statements filed at the Italian Chambers of Commerce. Companies provide data on a compulsory basis. Each company's financial statement is updated annually. This dataset includes yearly balance sheet information on various assets and liability items (e.g. fixed assets, cash, inventory, financial debt and net equity) as well as yearly income statement information (e.g. sales and profits). Importantly for the scope of our paper, Cerved Group S.p.A. constructs annually for each firm an overall measure of default risk (Altman's Z-score) using balance sheet information. The Z-score is a numerical indicator that ranges from 1 (for firms that are least likely to default) to 9 (for firms that are most likely to default).

2.5. Credit conditions of Italian firms

We provide some summary measures of the credit and financing positions of Italian firms in Table 1. Available sources of credit to Italian firms can be classified in four categories: revocable loans, matched loans, term loans with maturity of less than one year, and term loans with maturity of more than one year. Revocable loans consist of current account overdrafts granted for short-term cash needs for which the bank has reserved the right to withdraw from the contract regardless of the existence of just cause. Matched loans include transactions with a form of predetermined redemption. This form of financing allows customers to obtain immediate access to credit that is not yet past-due and for which the reporting bank has control over the cash flows (this occurs when the bank acquires the credit, has an irrevocable collection order, and the credit is paid by standing order to the same bank). Besides the bank and the customer, a third-party debtor is involved in the transaction. Matched loans include *inter alia* advances on receivables connected to factoring, advances on invoices, other advances on bills and documents representing trade receivables. Term loans consist of credit transactions with a term set by the contract and no form of predetermined redemption. For instance, term loans include leasing, mortgages, personal loans, subordinated loans. These

loans therefore can come with many different time horizons. For simplicity of presentation, we generally group revocable and matched loans into a broader category of short-term loans and refer to term loans as long-term loans. While term loans with durations of less than one year could be considered short-duration loans, we group them with longer-duration term loans because in TAXIA we cannot separately identify interest rates on outstanding balances of term loans of different maturity. Furthermore, because long-duration term loans are used much more than short-duration term ones, the overall category mostly refers to long-term debt.

Our dataset includes several quantitative features of these loans. First, we can observe outstanding balances *used* by firms for the four categories of loans, and therefore also when aggregated into short-term vs. long-term loans as well as into total *used* credit. As illustrated in Table 1, financing used by Italian firms is tilted toward long-term loans but both types of credit are commonly used. We also observe the total *granted* credit available to firms. Note that both *used* and *granted* credit are stock variables. If a firm takes out a new loan that it uses to fully repay the remaining balance on a previous loan of equal size, the total amount of used credit will not change. However, for the category of term loans only, we can also observe the amounts used from *new* loans. With measures of used and granted credit at hand, we can then construct measures of credit utilization, defined as the ratio of used credit to granted credit. Credit utilization of long-term loans is usually higher than credit utilization of short-term credit, owing to the higher interest rates on short-term credit facilities.

Table 1 reports average interest rates on existing used credit for each type of loan. Interest rates are significantly higher on revocable loans than on other types of credit, while long-term loans have the lowest overall interest rates. One limitation of the data is that, as said before, we cannot observe interest rates on outstanding balances of term loans of different durations, e.g. term loans of less than one year vs. term loans of more than one year, but only on the combined outstanding balances. However, for term loans specifically, we can observe interest rates on *newly* issued loans each quarter as well as the quantities of credit used from these new loans.

3. Randomized Information Treatment and Inflation Expectations

As emphasized in CGR (2020), a unique feature of SIGE is the randomized treatment of firms in terms of information received about recent inflation. In this Section, we first describe this information treatment and then briefly present evidence on how this treatment feeds into the inflation expectations of firms, which

provides the basis for our identification strategy to assess the causal effect of inflation expectations on firms' financing decisions.[5]

Before 2012Q3, all firms in the survey received information about recent inflation dynamics before being asked about their economic expectations.[6] In 2012Q3 the survey was redesigned and participating firms were randomly split into two groups that were sent two versions of the questionnaire. One group, corresponding to about one-third of the sample, received the following question about inflation expectations:

"What do you think consumer price inflation in Italy, measured by the 12-month change in the Harmonized Index of Consumer Prices, will be…"

over three different horizons: six-month ahead, one-year ahead, and two-year ahead. We refer to this group of firms as the control group. Since 2014Q1, firms were also asked about their expectation of annual inflation at a two-year horizon two years ahead (that is, average annual inflation rate in three and four years from the date of the survey), which we refer to as the four-year time horizon.

The remaining two-thirds of firms were instead asked the following question:

"In [previous month], consumer price inflation measured by the 12-month change in the Harmonized Index of Consumer Prices was [X.X]% in Italy and [Y.Y]% in the Euro area. What do you think it will be in Italy …"

over the same horizons proposed to the control group. All the other questions in the survey are identical. The treatment therefore consists of giving firms additional, though publicly available, information about the most recent rate of inflation in both Italy and the euro area.[7] Assignment into treatment and control groups was randomly redrawn in 2012Q4 and stayed fixed until 2017Q2. At that point, there was a new randomized assignment of firms across the treatment and control groups, as well as the addition of another information treatment group, which we do not include in our analysis.[8]

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[5] The analyses in this Section largely mirror those in CGR (2020). Here, we use a longer sample period that extends to the fourth quarter of 2019.

[6] The inflation expectations question comes at the beginning of the survey, immediately after asking for industry classification, number of employees and share of exports in revenues.

[7] The treatment provides potentially two different pieces of information: i) inflation rate in Italy and ii) inflation rate in the euro area. However, the correlation between these two series in our sample is above 0.95, so we do not have enough variation to identify the effect of each inflation series separately.

[8] The new treatment involved telling firms about the ECB's inflation target. These data have not yet been cleared by the Bank of Italy for research purposes. In the assignment of firms in 2017Q2, nearly 60 percent of firms from the control group moved into the original treatment group while nearly 20 percent of firms in the treatment group moved to the control group.

Prior to 2012Q3, all firms were in the treatment group, meaning that all firms were receiving the information about the most recent inflation record in Italy and the euro area. As it can be seen in Figure 1, the inflation expectations of both groups of firms closely tracked the actual inflation rate in Italy, which was reported to all firms at that time. Starting in 2012Q3, however, large gaps arose between the inflation expectations of the two groups. As the inflation rate fell sharply from late 2012 through mid-2015 (from 2.5 percent per year to below zero), the average forecast of the treated group fell much more rapidly than that of the control group. Despite starting off with the same average forecast at the end of 2012, the average forecast of the treated group was 0.5 percentage point lower by the end of 2014 than the control group's. This pattern reversed itself when inflation rose sharply in 2017: the average forecast of the treatment group rose rapidly, by more than one percentage point, while the average forecast of the control group rose by about half a percentage point. Panel B of Figure 1 illustrates that the treatment has also a pronounced effect on the cross-sectional dispersion of beliefs: firms in the control group have systematically more dispersed expectations than those in the treatment group after 2012, while no such difference was apparent before the differential treatment was put in place.

To quantify the extent to which the information treatment affects firms' inflation expectations, we first create a dummy variable equal to one if firms are treated and zero otherwise. We then multiply that dummy by the level of inflation associated with that treatment. This creates a time-varying measure of the information treatment given to a firm each quarter, which we denote by T_t^i , with *i* and *t* indexing firms and time (survey waves), respectively.[9] The time-variation reflects the fact that treated firms receive a different treatment each period (as the level of inflation varies over time). To quantify the effect of this time-varying treatment on the reported inflation forecast of firm *i* at time *t* for horizon *h* (i.e., $F_t^i\pi^{(h)}$), we then regress their expectation that quarter on the treatment variable for that quarter:

$$F_t^i\pi^{(h)} = \alpha_h + \beta_h T_t^i + error_{t,h}^i. \qquad (1)$$

We use Driscoll and Kraay (1998) standard errors to account for cross-sectional and time correlation in the errors and include seasonal fixed effects for each sector of economic activity.

[9] There are alternative ways to define the treatment. For example, we can measure the information received by treated firms as the difference between recent inflation and the 2 percent target (or just below 2 percent) of the ECB. Alternative definitions like this one yield almost identical results. Another possible way could be to use a simple 0-1 dummy variable (being zero for the uninformed firms and one for the informed ones) and include in the regression time fixed effects. Using such a specification for the treatment yields the result that, across forecasting horizons, informed firms report lower inflation expectations (on average by about 0.3 percentage points) compared with the uninformed firms (results are available upon request).

The results are presented in Table 2. Being provided with information about recent inflation has a significant and large effect on inflation expectations across horizons. We find that information about inflation being 1 percentage point higher raises the average forecast of firms by 0.56 percentage points at a six-month horizon, 0.54 at a one-year horizon, with effects falling at longer horizons to a low of 0.30 at the four-year horizon. The large weight being assigned to this information is consistent with experimental evidence in CGK, documenting that firms place a lot of weight to information presented to them about recent inflation dynamics. More generally, the fact that inflation expectations respond less than one-for-one to inflation is consistent with the under-reaction of inflation expectations to aggregate information documented in the literature (e.g. Coibion and Gorodnichenko 2012, 2015, Bordalo et al. 2018). As the horizon of expectations increases, the R^2 declines, consistently with the view that it may be harder to move firms' longer-term inflation expectations.[10] In short, these results show that expectations at longer horizons are affected as well, albeit to a smaller extent than at shorter horizons.[11]

Figure 2 plots the distribution of reported forecasts from the two groups for selected quarters. As can readily be seen, the distributions are quite different: beliefs are much more dispersed in the control group that receives no information, with much wider tails of very high or low forecasts of inflation. Together with the results presented in Table 2, this figure supports the idea that information treatments have pronounced effects on the inflation forecasts of firms across horizons but the effect is strongest for short-term inflation expectations.

4. Inflation Expectations and Financing Decisions

In this section, we study the *causal* effect of firms' inflation expectations on their financing decisions exploiting the random information treatment to generate exogenous variation in inflation expectations.

4.1 Empirical Strategy

[10] Similar results arise using a common sample (since 4-year ahead forecasts are available for a shorter sample).

[11] There is little evidence indicating that firms respond differently to the signals provided. Specifically, we reproduce estimates of equation (1) for different subsets of firms, breaking them into groups based on observable characteristics. Because information about firms in the survey is somewhat limited, we restrict our attention to four specific dimensions along which firms can differ: sector (manufacturing, services, construction), size (based on average number of employees), exposure to other economies (exports as a share of revenues), and location (North vs Center vs South and Islands). We find very little variation in how information treatments affect inflation expectations.

We follow CGR (2020) and rely on the following empirical approach. Letting y_{t+k}^{i} be the outcome variable for firm i at time $t+k$, we regress economic outcomes on inflation expectations formulated at time $t-1$ ($F_{t-1}^{i}\pi^{(12m)}$):

$$y_{t+k}^{i} = \alpha_k + \gamma_k F_{t-1}^{i}\pi^{(12m)} + controls_{t-2}^{i} + error_{t-1,t+k}^{i}, \quad (2)$$

where $controls$ is a vector of firm-level controls. One control is the firm's credit score from the previous calendar year, as these scores are only available annually. The vector of controls also includes the expectations of other economic variables, such as firm *i*'s expectations about firm-specific business conditions over the next three months, firm-specific employment growth in the following three months, firm-specific expected liquidity in the following three months, perceptions about current Italy's general economic situation, and perceptions about the probability of improvement in Italy's general economic situation over the following three months. These variables help us control for firms' expectations so that the coefficient γ may be interpreted as a response of the outcome variable y to a surprise movement in inflation expectations. Note that controls are taken from wave $t-2$. We use this timing of the controls because these expectations and perceptions are elicited *after* the information treatment in each wave and thus the contemporaneous expectations and perceptions can respond to changes in inflation expectations, which in turn react to the provided information. Because, in general, it is difficult for firms to modify their financing decisions contemporaneously in response to the information treatment, inflation expectations $F_{t-1}^{i}\pi^{(12m)}$ are taken from wave $t-1$ as we vary k from zero to horizon K.[12] We instrument for the inflation expectations at time $t-1$ using the information treatment at time $t-1$, which is equal to zero for the control group and to the most recent inflation for the treatment group. We focus on 12-month ahead inflation expectations since we do not have enough instruments to control for the term structure of inflation expectations. We winsorize the outcome variable y at bottom and top 5 percent. As in equation (1), we use Driscoll and Kraay (1998) standard errors to account for cross-sectional and time correlation in the errors and include seasonal fixed effects for each sector of economic activity. We conduct our empirical analysis over the sample period 2012Q3-2019Q4.

What is the interpretation of the estimated coefficient γ_k? One channel that this coefficient will immediately capture is the direct effect of inflation expectations on the dependent variable. However, to

[12] In reality, in the case of granted credit but only partially used, the borrower could instantaneously vary her financing decision. Hence, we explored the robustness of our results by letting the inflation expectations and the controls enter specification (2) at time *t* and *t-1*, respectively. We found very little variation in the estimates.

the extent that inflation expectations may induce firms to change other expectations as well (e.g. if they associate high inflation with times of economic duress or booms), the resulting effect of changes in these additional expectations on the dependent variable will also be captured by the coefficient γ_k. These estimated coefficients should therefore be interpreted as capturing the *total* effect of inflation expectations on the dependent variable across multiple potential channels. It is important to emphasize that one should generally expect there to be multiple channels present. Unless agents perceive inflation as a purely exogenous process, news about inflation should lead agents to revise their views about the *underlying* drivers of inflation (i.e. the fundamentals) and these drivers should generally matter for other economic expectations as well. As emphasized in CGR (2020), Italian firms seem to perceive inflation as a supply-shock driven process, so higher inflation expectations also lead them to anticipate worse economic conditions in the future, both for themselves and for their firm, along with higher uncertainty. This helps explain the key result of CGR (2020) that exogenously higher inflation expectations on the part of Italian firms are followed by a rise in own prices and a pronounced and persistent decline in both employment and investment.

4.2 Effect of Inflation Expectations on Overall Interest Rates Paid and Credit Used by Italian Firms

We begin by considering how an exogenous variation in inflation expectations is related to subsequent overall interest rates paid by firms. Panel A of Table 3 presents results from estimating specification (2) with average interest rates paid by firms as the dependent variable. Higher inflation expectations lead to a gradual and persistent rise in the average interest rates paid by firms: when inflation expectations rise by 1 percentage point, the average interest rate is about 0.3 percentage points higher one year later. While large, the coefficient is less than one, implying that firms perceive a decrease in real interest rates.

One possible driver behind firms paying higher interest rates is greater demand for credit on their part. A second driver is lower supply of credit to firms. Even though banks do not observe the inflation expectations of firms, and therefore should not be responding directly to those expectations, firms with higher inflation expectations could be engaging in visible behavior, which makes banks less willing to lend to them, such as if their sales fall as documented in CGR (2020). Yet, another potential explanation is a reallocation of financing toward higher-interest rate loans.

To discern between these explanations, we first consider how overall quantities of credit granted and used by firms change as their inflation expectations rise. Panel B of Table 3 presents the response of used credit to higher inflation expectations: we find no evidence that firms either increase or decrease their

total *used* credit as their inflation expectations rise. However, as illustrated in Panel C, the total credit *granted* to firms declines over time when they have higher inflation expectations. When inflation expectations rise by 1 percentage point, the amount of granted credit one year later is reduced by around 1.4 points. Given an unchanged usage of credit but a reduced credit line, one would therefore expect that credit utilization rates would rise with inflation expectations: Panel D documents that this is indeed the case.

4.3 Effect of Inflation Expectations on Different Forms of Credit

The decline of total credit granted to firms combined with higher interest rates when they have higher inflation expectations is suggestive of a supply-side explanation. However, these aggregate results could also mask underlying composition effects as firms could reallocate their credit across different forms. To delve deeper into this issue, we first estimate the effect of inflation expectations on the average interest rates paid by firms on their outstanding balances of short-term vs long-term debt separately. The results are presented in Panels A and B of Table 4. We find that average interest rates increase for both types of debt, albeit somewhat more for short-term debt, when firms' inflation expectations increase. The magnitude of the increase is quite close to that observed for the interest rate on total outstanding balances.

Panels C and D present the estimated effects of inflation expectations on the usage of credit by firms separated into short-term vs. long-term credit. Here, the effects are very different for the two types of credit. Firms with higher inflation expectations subsequently increase their use of short-term credit while significantly reduce their use of long-term credit. While the estimated magnitudes are larger for short-term credit than for long-term one, as the latter represents a larger share of overall used credit, these differential effects are consistent with the fact that total credit usage does not change with higher inflation expectations. Thus, despite the absence of an effect of inflation expectations on total credit usage as documented in Table 3, we uncover a significant reallocation of used credit toward short-term loans and away from long-term ones as inflation expectations rise.

We also consider the response of granted credit by types to inflation expectations and present results of these regressions in Panels E and F of Table 4. We again find sharp differences: as with used credit, firms with higher inflation expectations are granted less long-term credit in subsequent quarters, with the orders of magnitude being very similar to those found for long-term credit used. As a result, the utilization rate of long-term credit is largely unchanged. With short-term credit, however, we find little effect of inflation expectations on granted credit. Given the fact that firms with higher inflation expectations use

more short-term credit, credit utilization strongly increases for short-term credit as firms' inflation expectations rise: in other words, firms draw more heavily on existing credit lines.

A potential supply-side interpretation of these results could be that, as firms increase their inflation expectations, they engage in behavior that makes bank less willing to lend to them long-term. This would explain the reduction in total granted long-term credit as well as the increase in interest rates on these loans. In this situation, firms would naturally respond by switching to shorter-term facilities, and the corresponding increase in their demand for that type of credit would lead the interest rates they pay to rise if the supply of credit to a firm was not perfectly elastic. Such an explanation would imply that not just outstanding balances of long-term credit should decline with higher inflation expectations, but also the usage of new term loans, since this reduction in supply would be the driving force. Because we observe information for new term loans, we can directly assess whether this prediction holds true in the data.

We therefore present additional results in Table 5 that focus on *new* term loans issued. Panels A and B present results for the response of interest rates to inflation expectations for term loans with maturity below and above one year respectively, while Panels C and D present equivalent results for used credit from new loans. Because many firms do not receive new term loans each quarter, the sample size is now significantly smaller. While the results for interest rates on new shorter-term loans of less than one year are similar to those for interest rates on outstanding balances, the increase in interest rates for new term loans of more than one year is significantly larger after inflation expectations rise than for interest rates on outstanding term loans. Even more striking is the response of credit usage from new loans: we find an immediate and large *increase* in credit usage from new term loans of duration exceeding one year when inflation expectations rise as well as a milder but more persistent rise in usage of term loans of horizons less than one year. This finding contradicts the supply-side interpretation, which relied on a decline in credit supply and usage at longer term horizons.

Why would firms significantly increase their usage of *new* long-term loans when their inflation expectations rise? One interpretation is that if firms expect higher inflation in the future, they should also expect interest rates to rise in the future. This would induce them to seek out new long term loans now to pay off existing loans that would need to be rolled over in the future, thereby locking in interest rate savings. The immediate rise in the use of new long-term credit combined with the decline in overall usage of long-term credit indicates that such a mechanism is likely at work. This demand mechanism is also consistent with the large increase in interest rates on long-term loans.

The dominant effect from the new loans acquired by firms is to shorten the overall maturity across all term loans held by firms. To see this, we construct a measure of the share of outstanding used terms

loans for firms that are of a maturity less than one year. We then regress the ex-post dynamics of this share on inflation expectations using equation (2). As shown in Panel E of Table 5, we find that the share of outstanding debt in term loans of residual maturity below one year rises with inflation expectations. Hence, within the category of term loans, firms reallocate their borrowing away from longer-term loans and toward shorter-term credit, implying a preference for a borrowing structure of shorter residual maturity overall.

4.4 Effect of Inflation Expectations on Loan Applications and Outcomes

Next, we turn to study the effects of inflation expectations on the extensive margin of firms' borrowing decisions. We consider five outcome variables: i) the number of loan applications, ii) the outcome of loan applications, iii) the granting of new term loans, v) the granting of new term loans distinguishing by maturity and type of interest rate, and iv) the number of credit relationships.

As discussed previously, the CCR keeps track of the number of inquiries that banks lodge to the CCR itself to acquire information on the credit history of potential new borrowers. Using this information, we examine whether firms' loan applications to banks vary in response to changes in their inflation expectations. To this end, we estimate specification (2) with the cumulative number of loan applications submitted between time t and time $t + k$ as the dependent variable. The results are presented in Panel A of Table 6. First, we find statistically significant positive effects of inflation expectations on firms' loan demand over the various horizons. In other words, higher expected inflation leads firms to increase the applications for credit to new potential lenders. The estimates point toward persistent effects of inflation expectations: an exogenous increase in firms' inflation expectations of 1 percentage point leads to an increase in loan applications by 0.04 percentage points after one quarter and a cumulative increase by 0.3 percentage points after six quarters. As from the CCR we do not observe the loan applications to current lenders, we cannot directly identify whether this response reflects an increase in loan demand to finance investment or whether it is more precautionary in nature, e.g. due to concerns that current lenders are likely to restrict their supply of credit to the firm or that firms might experience a shortage of liquidity. It could also reflect an endogenous response of firms to a reduced willingness of their existing bank lenders to extend them credit. So by itself, the increase in loan applications is at best suggestive evidence of a demand channel.

Next, we turn to the effects of inflation expectations on the outcome of loan applications, identified by considering the variation in firms' debt exposure in the three months after the credit request (see Section

4.1 for further details).[13] In this case, we estimate specification (2) with a dichotomous dependent variable y_{t+k}^{i} that takes value one if at least one loan application submitted at time $t+k$ is accepted in the next three months and zero otherwise. Panel B of Table 6 reports the estimation results obtained using the same identification strategy as before.[14] For the first year, we do not find any statistically significant effect of inflation expectations on the loan application outcome. Hence, firms that anticipate future higher inflation and desire to borrow more do not appear to have higher chances in the short run to obtain the funds compared with other firms.

To explore further the extensive margin of firms' borrowing decisions, we turn to TAXIA and exploit the information related to the interest rate on new term loans. As described earlier, banks that participate in the TAXIA survey report the amount of term loans granted in each quarter and the interest rate. Thus, we know when firms borrow new term loans and the identity of the lender. It turns out that for our sample of firms in the period from the third quarter of 2012 to the fourth quarter of 2019, about 90 per cent of firms received a new term loan from a bank with which a lending relationship was already in place. For estimation purpose, we can construct a dichotomous dependent variable y_{t+k}^{i} that takes value one if a firm at $t+k$ is granted a new term loan and zero otherwise. The results are presented in Panel C of Table 6. As in the previous case, we do not find any significant effect of inflation expectations on the access to new term loans. Next, we slightly modify our dependent variable to assess whether higher inflation expectations affect the preference of firms towards the maturity of term loans, i.e. terms loans with maturity up to versus over 1 year. To this end, we construct a dichotomous dependent variable y_{t+k}^{i} that takes value one if a firm at $t+k$ is granted a new term loan with maturity over 1 year and zero if a firm at $t+k$ is granted a new term loan with maturity up to 1 year.[15] The results are reported in Panel D. Consistent with earlier evidence, we find statistically significant and negative effects of inflation expectations on the maturity composition of new term loans whereby firms that expect higher inflation reduce their overall borrowing at longer maturities. An exogenous increase in firms' inflation expectations of 1 percentage point leads to a decrease the probability of taking up term loans with maturity over 1 year by nearly 0.05 percentage points after one quarter. The effects are persistent and remain remarkably stable across the various time horizons.

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[13] The results (available upon request) are virtually the same if we consider the outcome of loan applications on the 6-month time window.

[14] The number of observations declines significantly, reflecting the fact that we are restricting the sample to firms that request new lending.

[15] There are cases in which firms obtain at the same time term loans of either maturity. In these instances, we construct the 0-1 dummy variable considering the amounts of loans. Hence, if a firm borrows a larger (resp. smaller) amount of term loans with maturity up to 1 year (resp. over 1 year) we let our dependent variable take value 0 (resp. 1).

For term loans that have maturities greater than one year, we can also determine in our data whether interest rates are adjustable within the first year or if they remain fixed for at least the first year, a measure of the extent to which the loans have adjustable or fixed rates. Using an indicator variable for when new term loans of more than one year duration have an adjustable interest rate as the dependent variable in equation (3), Panel E reports estimates of whether firms become more or less likely to have term loans with adjustable rates when they have higher inflation expectations. We find little contemporaneous effect, but over time firms become gradually more likely to borrow at adjustable rates, likely to compensate for the fact that interest rates on these loans are rising for them.

Finally, we consider one last dimension and construct for each firm the number of credit relationships with the banks. We use the percentage change in the number of credit relationships between time $t-1$ and time $t+k$ as the dependent variable in equation (2). The estimation results are reported in Panel F of Table 6. In general, we do not find any significant effect of inflation expectations on the number of credit relationships.

In summary, this analysis of the extensive margin of firm borrowing decisions does not indicate a clear role for either supply or demand channels of inflation expectations. While firms do put in more loan applications with new lenders when they have higher inflation expectations, they are not successful in receiving more loans until many quarters later. Nor do we see banks clearly reducing the number of loans that they supply to firms with higher inflation expectations, as one might expect from a credit supply channel. Instead, we do see some role again for a reallocation of credit, with firms more likely to receive shorter horizon term loans rather than longer horizon term loans. As the latter tend to be larger than the former, this would provide one reason why the outstanding amount of long-term loans declines with inflation expectations.

4.5 Effect of Inflation Expectations on Perceptions of Credit-Worthiness and Credit Supply

Another way to try to distinguish demand from supply forces in credit markets is by assessing perceptions of how credit-worthy borrowers are from the lenders' perspective and perceptions of how easy it is to access credit from borrowers' perspectives. We do so in two ways. The first exploits credit scores available for all borrowing firms in our data and used by banks to evaluate how credit worthy different borrowers are. These credit scores are available on annual basis and are on a 9-point scale (lower values indicate safer borrowers). We estimate our baseline specification equation (2) using credit scores as our dependent variable (we assume they are constant during each quarter of the year). Results from these regressions are presented in

Panel A of Table 7. When firms have higher inflation expectations, there is no discernible impact on their credit score in the first year. This indicates that they are not engaging in behavior which is making them visibly less credit-worthy from the point of view of banks. In other words, there is little reason to think that banks would be curtailing their supply of credit to firms with higher inflation expectations because the latter are displaying worse credit scores. Firms with higher inflation expectations eventually become perceived as riskier, but the quantitative effects are very small.

How do firms perceive their ability to access credit? The survey of firms' expectations includes a question to firms about whether they think their current access to credit has improved relative to the previous quarter, worsened or stayed the same. From this question, we create a variable with three possible values capturing improved access to credit (+1), no change (0) or worsened access to credit (-1). We then use this perception of credit availability as a dependent variable in specification (2), presenting results in Panel B of Table 7. Strikingly, we find that firms with higher inflation expectations immediately report perceiving a worsened access to credit, with the effect dissipating over time. This negative economic perception associated with higher inflation expectations is consistent with other channels through which firms become more pessimistic when they expect higher inflation, such as an expectation of a worsening aggregate outlook, lower sales for their firm, and more uncertainty about future economic conditions, as also documented in CGR (2020). This decline in firms' perceived access to credit when expecting higher inflation provides a "precautionary" rationale for the rise in the number of loan applications found in Table 6 as well as a willingness to "lock in" current long-term loan rates before relying more heavily on short-term credit lines.

How important is this precautionary mechanism in explaining our findings? One way to assess this is to re-estimate our baseline specifications but controlling for the ex-post response of firms' perceived credit availability as follows:

$$y_{t+k}^{i} = \alpha_k + \gamma_k F_{t-1}^{i} \pi^{(12m)} + \delta_k \text{SITCRE}_{t+k}^{\text{i}} + controls_{t-2}^{i} + error_{t-1,t+k}^{i}. \qquad (3)$$

If the effect of inflation expectations on credit positions operates through the channel of perceived credit supply, then controlling for the ex-post dynamics of these expectations should eliminate the predictive power of inflation expectations. We report results from these regressions in Table 8 for different measures of ex-post credit decisions of firms, focusing on the measures that indicate significant reallocation. Overall, we find that including ex-post measures of the perceived ease of access to credit reduces the absolute value of estimated coefficients (γ_k) by 20-30% on average, which indicates that this precautionary channel likely plays some role in driving the reallocation effects that we identify. However, the standard errors are too

large to make precise statements about the importance of the channel relative to other possible drivers, such as an anticipation of higher future interest rates.

5. Heterogeneity

In this section, we consider several ways in which results could differ across firms in ways that speak to the underlying mechanisms at work.

5.1 The role of financial sophistication

All firms are not alike. The reallocative mechanisms that we emphasize, namely firms with higher inflation expectations locking in longer-term loans at existing rates while switching to shorter-term credit for additional financing needs, require some level of financial sophistication and understanding. One might expect that firms who are less knowledgeable about financial tools may be less active in pursuing these kinds of reallocation. To get at this question, we split firms in our sample into a financially "sophisticated" group vs. one for firms that participate less actively in financial maneuvers. Specifically, we allocate them to these groups based on whether, at any point in our sample, they employed financial derivatives. We then re-estimate some of our key regressions for these two groups of firms separately. Results are presented in Table 9.

We find striking differences in the response of these two types of firms depending on their degree of financial sophistication consistent with more financially sophisticated firms reacting much more actively in reallocating across different forms of credit when their inflation expectations change. In particular, for firms that are not financially sophisticated, we find little evidence of any response in credit positions within a year of changing inflation expectations. The interest rates paid on outstanding balances do not change, the total amount of credit used does not change, whether short-run or long-run, and they do not take out any additional long-term loans to lock in existing interest rates. Financially sophisticated firms, on the other hand, significantly increase their use of both short-term and long-term credit, and do so in particular by using new long-duration term loans. This increase in their demand for credit parlays into a pronounced increase in their interest rates. In short, only firms with an understanding of and willingness to utilize financial tools are behind the mechanisms that we describe in the paper. For others, changes in inflation expectations lead to no discernible change in their credit positions for an extended period of time.

5.2 Heterogeneity in demand for credit

Another characteristic that could affect how firms respond to changing inflation expectations in terms of credit use is if they also respond differently in terms of hiring or investment. For example, if some firms reduce their investment or hiring particularly strongly when they expect higher inflation, this could induce them to reduce their demand for credit relative to other firms with similar inflation expectations. Consistent with this, CGR (2020) document several observable characteristics along which firms respond differently to changes in their inflation expectations. For example, they find that firms in the service sector, firms who export little or none, and firms in the South of Italy tend to reduce their employment most sharply for a given increase in inflation expectations.

We revisit whether the effect of inflation expectations on overall credit terms of firms differs along these same dimensions, focusing on overall interest rates paid and total credit used. We report results in Table 10, based on estimating specification (2) for subsets of firms broken down along these observable characteristics. We find little evidence that the way in which firms' credit positions respond to inflation expectations are linked to how strongly their employment and investment decisions respond to those same expectations. For example, firms who do not export at all are those for whom higher inflation expectations have the most negative effects on employment according to CGR (2020). However, Table 10 indicates that the sensitivity of ex-post borrowing rates or used credit to inflation expectations for these firms is no different from firms who export a little or those who export a lot. The same is true for other observable characteristics of firms: there is in general very little variation in terms of overall sensitivities of credit usage or interest rates to inflation expectations across different groups of firms, even though CGR (2020) documents significant differences in the sensitivity of employment and investment to inflation expectations across the same kinds of groups of firms.[16] We interpret this as indicating that firms' responses of employment and investment to inflation expectations are not a primary driver behind the credit response to inflation expectations. Financial sophistication, in contrast, can account for much more of these responses as shown in Section 5.1.

6. Conclusion

[16] Appendix Table X provides more detailed results on the sensitivity of different types of credit (e.g. short-term vs. long-term interest rates and quantities borrowed) to inflation expectations for different groups of firms. We again find relatively little heterogeneity based on these observable characteristics of firms.

The role of expectations on the economic decisions of agents remains a question mark in economics. While theory predicts a key role for forward-looking expectations, assessing this role empirically is a work in progress.

In this paper, we have provided new causal evidence on the role of firms' inflation expectations in shaping their borrowing decisions. Exogenously higher inflation expectations lead Italian firms to tilt their borrowing toward forms with shorter horizons, with little overall effect on their total borrowing although the amount of credit granted to them declines. Inflation expectations therefore affect the relative demand of firms for different types of credit, a previously unexplored mechanism which can affect how these expectations ultimately translate into aggregate conditions.

Inflation expectations are generally thought to affect firms primarily via price-setting, wage-setting as well as employment and investment decisions. Our results indicate that this narrative is insufficient. These expectations matter also for credit demand. The ultimate effect on credit variables will of course depend on credit supply, but little evidence so far exists on how inflation expectations of banks shape their willingness to provide credit, and which kind of credit, to firms. Further work along these lines would therefore help clarify some of the credit channels through inflation expectations affect broader economic outcomes.

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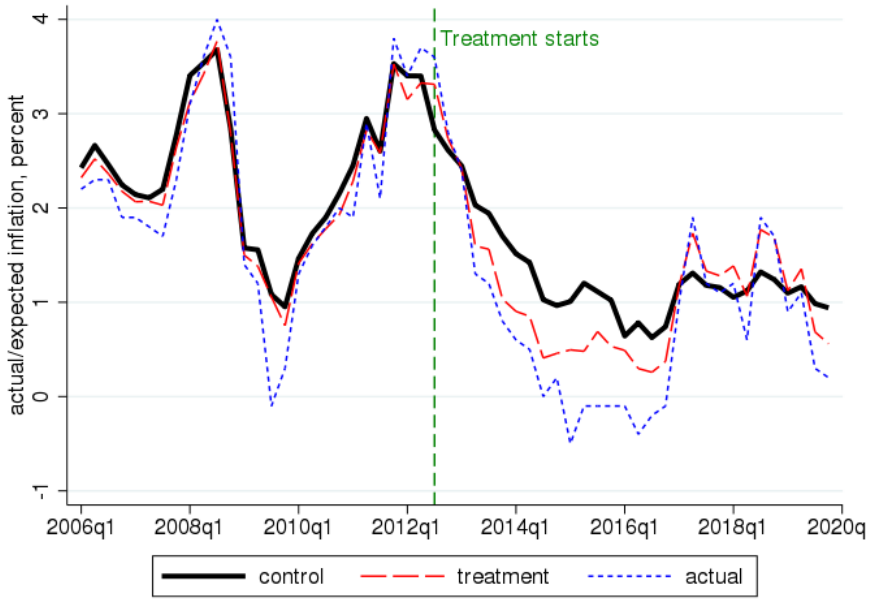
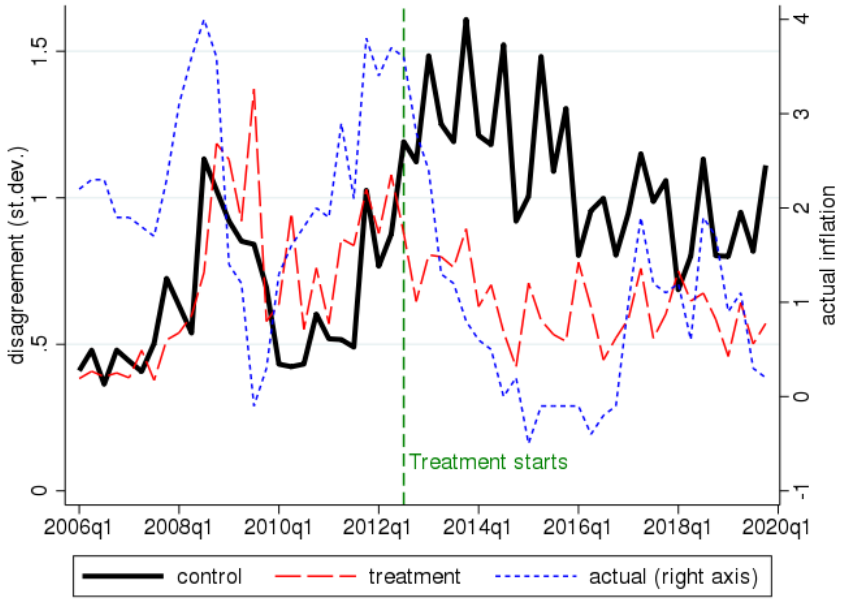
Figure 1. Time series of inflation expectations for treatment and control groups.

Panel A: Average Inflation Expectations

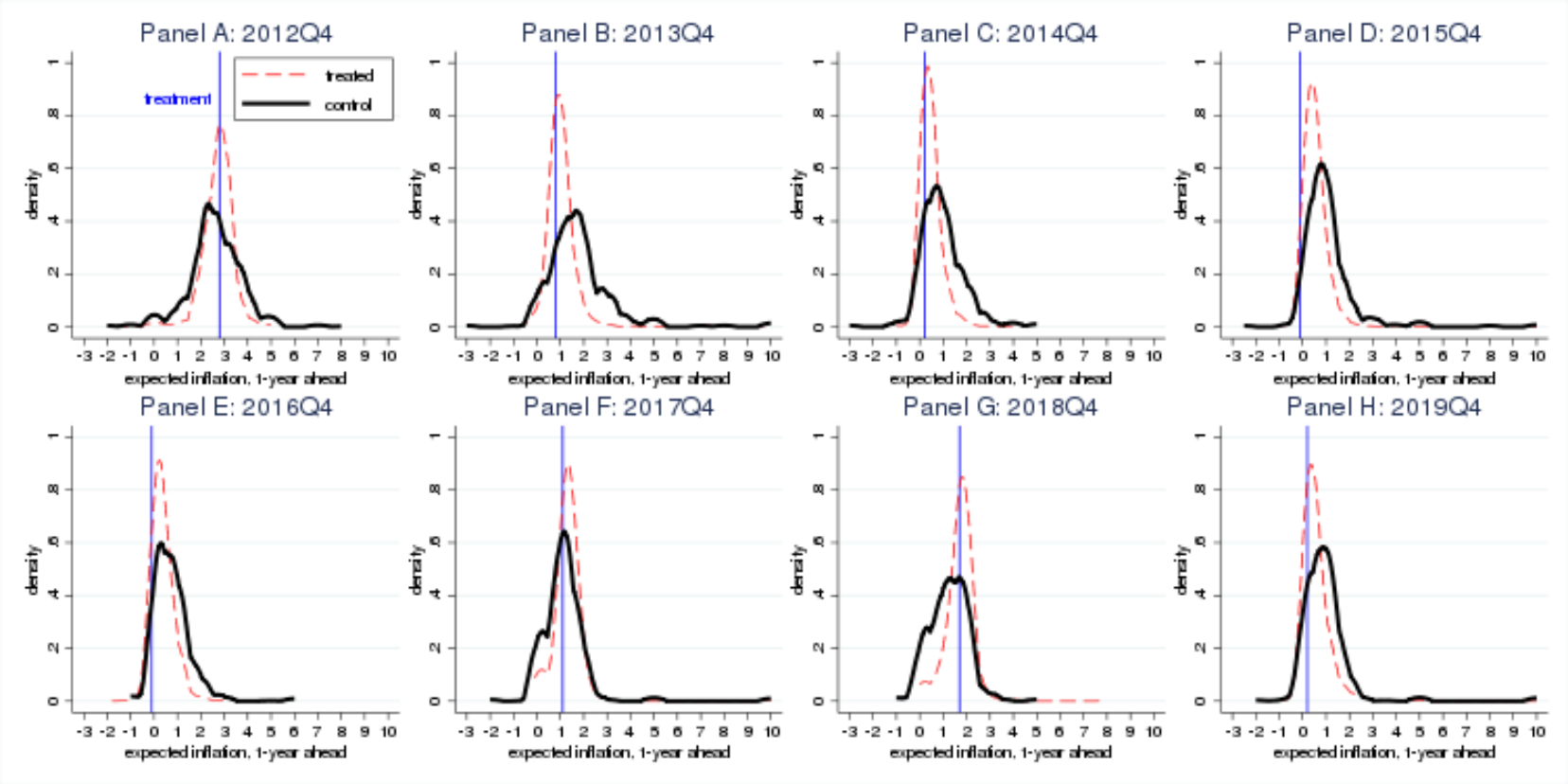


Panel B: Cross-sectional Dispersion in Inflation Expectations



Notes: treated firms are presented with the most recent value of actual inflation, which is shown with blue, short-dash line. We use treatment assignment in 2012Q4 to classify firms into treatment and control groups for the period 2006Q1-2012Q2.

Figure 2. Distribution of inflation expectations for treated and control firms.



Notes: each panel plots kernel density of inflation expectations (one-year ahead) for treated and control firms in specific survey waves indicated in the title of each panel. Bandwidth is 0.2. The vertical, thin, blue line shows the inflation rate given to treated firms. To improve readability of the figure, we exclude a handful of firms reporting inflation expectations less than -3 percent.

Table 1. Descriptive statistics on Italian firms' credit positions.

Variable	Mean	Standard deviation	Observations
Share of *used* short-term loans	0.32	0.32	28,493
Share of *used* revocable loans	0.06	0.11	28,493
Share of *used* matched loans	0.23	0.28	28,493
Share of *used* long-term loans	0.50	0.37	28,493
Share of *used* long-term loans with maturity up to 1 year	0.05	0.10	28,493
Share of *used* long-term loans with maturity over 1 year	0.43	0.37	28,493
Share of *granted* short-term loans	0.53	0.32	28,226
Share of *granted* revocable loans	0.17	0.23	28,228
Share of *granted* matched loans	0.34	0.29	28,474
Share of *granted* long-term loans	0.40	0.31	28,438
Share of *granted* long-term loans with maturity up to 1 year	0.08	0.12	28,481
Share of *granted* long-term loans with maturity over 1 year	0.30	0.28	28,449
Share of new *long*-term loans	0.19	0.19	8,179
Share of new long-term loans with maturity up to 1 year	0.15	0.16	6,136
Share of new term loans with maturity over 1 year	0.16	0.16	4,001
Interest rate on total cash loans (%)	3.19	2.03	20,101
Interest rate on short-term loans (%)	3.86	2.72	18,218
Interest rate on revocable loans (%)	6.38	3.36	15,895
Interest rate on matched loans (%)	3.09	2.13	14,336
Interest rate on long-term loans (%)	2.59	1.38	16,605
Interest rate on new long-term loans (%)	3.13	2.06	8,193
Interest rate on new term loans with maturity up to 1 year (%)	3.21	2.25	6,143
Interest rate on new term loans with maturity over 1 year (%)	2.92	1.69	4,008

Notes. Shares of loans are calculated at the firm level. Mean and standard deviation values are computed using sampling weights. Sample period is from 2012q3 to 2019q4 for shares of loans and from 2012q3 to 2019q1 for interest rates.

Table 2. Effect of the Information Treatment on Inflation Expectations.

	Dependent variable: Inflation expectations by horizon, $F_t^i\pi^{(h)}$			
	6 months ahead	1 year ahead	2 years ahead	4 years ahead
	(1)	(2)	(3)	(4)
T_t^i	0.593***	0.553***	0.476***	0.366***
	(0.0566)	(0.0535)	(0.0467)	(0.0449)
Observations	28,434	28,434	28,434	22,899
R-squared	0.235	0.201	0.144	0.050
Sample	2012Q3-2019Q4	2012Q3-2019Q4	2012Q3-2019Q4	2014Q1-2019Q4

Notes: *i* and *t* index firms and time (survey waves). $F_t^i\pi^{(h)}$ is horizon (h)-ahead inflation expectation of firm *i* in wave t. T_t^i is equal to the most recent inflation rate presented to a firm for treated firms and zero for control firms. Seasonal dummies for each sector are included but not reported. Specification is given by equation (1). Standard errors reported in parentheses are as in Driscoll and Kraay (1998). ***, **, * denote statistical significance at 1, 5 and 10 percent level.

Table 3: Effect of Inflation Expectations on Overall Financing Positions of Firms

	y_t^i	y_{t+1}^i	y_{t+2}^i	y_{t+3}^i	y_{t+4}^i	y_{t+5}^i
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Average interest rate on outstanding quantity of total cash loans						
$F_{t-1}^i\pi^{(12m)}$	0.047	0.130	0.244***	0.288***	0.379***	0.448***
	(0.135)	(0.105)	(0.085)	(0.089)	(0.079)	(0.067)
Observations	12472	11978	11507	10988	10481	9989
R-squared	0.159	0.162	0.169	0.168	0.164	0.166
1st stage F stat	102.1	106.1	112.5	107.7	106.8	108.3
Panel B: Outstanding quantity of used total cash loans						
$F_{t-1}^i\pi^{(12m)}$	0.087	0.384	0.299	-0.117	0.205	0.282
	(0.351)	(0.439)	(0.514)	(0.876)	(0.804)	(1.030)
Observations	13831	13241	12680	12185	11642	11102
R-squared	0.006	0.014	0.024	0.036	0.041	0.050
1st stage F stat	116.6	106.1	112.7	114.8	116.1	118.7
Panel C: Outstanding quantity of granted total cash loans						
$F_{t-1}^i\pi^{(12m)}$	-0.282*	-0.527	-0.826**	-1.413***	-1.315***	-1.543***
	(0.151)	(0.322)	(0.383)	(0.422)	(0.444)	(0.470)
Observations	15566	15030	14516	14042	13556	13082
R-squared	0.016	0.030	0.044	0.051	0.056	0.061
1st stage F stat	114.4	105.4	106.9	106.1	107.5	110.5
Panel D: Utilization rate of total cash loans						
$F_{t-1}^i\pi^{(12m)}$	0.307**	0.528*	0.640**	0.609**	0.825***	1.001***
	(0.144)	(0.265)	(0.258)	(0.295)	(0.258)	(0.348)
Observations	13857	13275	12716	12218	11692	11176
R-squared	0.003	0.005	0.007	0.010	0.008	0.008
1st stage F stat	116.3	106.1	110.9	112.8	114.5	117.1

Notes: *i* and *t* index firms and time (survey waves). $F_{t-1}^i\pi^{(12m)}$ is one-year-ahead inflation expectation of firm *i* in wave $t-1$. In Panel A the dependent variable is $y_{t+k}^i \equiv r_{i,t+k}$ where r_{it} is the average nominal interest rate on total cash loans that firm *i* pays at time *t*. In Panels B and C the dependent variable is $y_{t+k}^i \equiv \left(b_{i,t+k}/b_{i,t-1} - 1\right) \times 100$ where b_{it} is the quantity of total cash loans (used and granted, respectively) by firm *i* at the end of time *t*. In Panel D the dependent variable is $y_{t+k}^i \equiv ur_{i,t+k} - ur_{i,t-1}$ where $ur_{i,t}$ is the utilization rate of total cash loans by firm *i* pays at the end of time *t*. In all Panels the specification is given by $y_{t+k}^i = \alpha_k + \gamma_k F_{t-1}^i\pi^{(12m)} + controls_{t-2}^i + score_{t-4}^i + error_{t-1,t+k}^i$. Seasonal dummies for each sector are included but not reported. Other controls are included but not reported. Estimates for other controls are available upon request. Estimation sample is 2012Q3-2019Q1 for interest rates and 2012Q3-2019Q4 for quantities and utilization rates. Standard errors reported in parentheses are as in Driscoll and Kraay (1998). ***, **, * denote statistical significance at 1, 5 and 10 percent level.

Table 4: Reallocative Effects of Inflation Expectations on Short-Term vs. Long-Term Borrowing

	y_t^i	y_{t+1}^i	y_{t+2}^i	y_{t+3}^i	y_{t+4}^i	y_{t+5}^i
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: *Interest Rate* on Outstanding Quantity of Short-Term loans						
$F_{t-1}^i\pi^{(12m)}$	0.025	0.101	0.245**	0.264**	0.334***	0.337***
	(0.139)	(0.113)	(0.111)	(0.116)	(0.106)	(0.086)
Observations	10596	10173	9742	9277	8832	8369
R-squared	0.091	0.093	0.098	0.092	0.088	0.087
1st stage F stat	103.5	104.9	103.1	95.28	92.92	97.41
Panel B: *Interest Rate* on Outstanding Quantity of Long-Term loans						
$F_{t-1}^i\pi^{(12m)}$	0.030	0.100	0.187**	0.232***	0.323***	0.418***
	(0.109)	(0.086)	(0.077)	(0.078)	(0.073)	(0.060)
Observations	10564	10159	9762	9322	8887	8470
R-squared	0.133	0.138	0.145	0.150	0.143	0.136
1st stage F stat	112.3	117.5	119.8	121.5	118.3	110.6
Panel C: Outstanding Quantity of *Used* Short-Term Loans						
$F_{t-1}^i\pi^{(12m)}$	2.273*	2.994*	2.483*	3.324**	5.523***	7.652***
	(1.202)	(1.573)	(1.411)	(1.595)	(1.234)	(2.236)
Observations	12947	12356	11796	11357	10808	10283
R-squared	0.001	0.001	0.001	0.003	0.001	-0.005
1st stage F stat	113.9	106.3	114.3	112.6	115.3	118.9
Panel D: Outstanding Quantity of *Used* Long-Term Loans						
$F_{t-1}^i\pi^{(12m)}$	-0.836***	-1.756***	-1.909**	-3.108***	-3.713***	-4.367***
	(0.288)	(0.452)	(0.706)	(0.860)	(0.855)	(1.003)
Observations	14033	13401	12783	12240	11642	11077
R-squared	0.003	0.005	0.008	0.007	0.008	0.009
1st stage F stat	123.6	112.8	116.3	118.5	121.9	120.9
Panel E: Outstanding Quantity of *Granted* Short-Term Loans						
$F_{t-1}^i\pi^{(12m)}$	-0.158	-0.458	-0.511	-0.442	0.587	1.017*
	(0.254)	(0.444)	(0.420)	(0.478)	(0.509)	(0.542)
Observations	16047	15442	14847	14288	13713	13153
R-squared	0.006	0.011	0.014	0.016	0.016	0.017
1st stage F stat	112.1	107.1	111.5	110.0	112.7	113.2
Panel F: Outstanding Quantity of *Granted* Long-Term Loans						
$F_{t-1}^i\pi^{(12m)}$	-0.461	-1.295*	-1.384	-2.377**	-2.445**	-3.493***
	(0.434)	(0.710)	(0.889)	(0.995)	(1.027)	(1.180)
Observations	14974	14327	13697	13142	12569	14974
R-squared	0.004	0.007	0.009	0.009	0.009	0.004
1st stage F stat	114.4	107.6	109.6	110.3	111.3	114.4

Notes: *i* and *t* index firms and time (survey waves). $F_{t-1}^i\pi^{(12m)}$ is one-year-ahead inflation expectation of firm *i* in wave $t-1$. Short-term loans comprise revocable loans and matched loans while long-term loans include term loans. In Panels A and B the dependent variable is $y_{t+k}^i \equiv r_{i,t+k}$ where r_{it} is the nominal interest rate on loans that firm *i* pays at time *t*. In Panels C-F the dependent variable is $y_{t+k}^i \equiv \left(b_{i,t+k}/b_{i,t-1} - 1\right) \times 100$ where b_{it} is the quantity of loans (used or granted) by firm *i* at the end of time *t*. In all Panels the specification is given by $y_{t+k}^i = \alpha_k + \gamma_k F_{t-1}^i\pi^{(12m)} + controls_{t-2}^i + score_{t-4}^i + error_{t-1,t+k}^i$. Seasonal dummies for each sector are included but not reported. Other controls are included but not reported. Estimates for other controls are available upon request. Estimation sample is 2012Q3-2019Q1 for interest rates and 2012Q3-2019Q4 for quantities. Standard errors reported in parentheses are as in Driscoll and Kraay (1998). ***, **, * denote statistical significance at 1, 5 and 10 percent level.

Table 5: Effects of Inflation Expectations on New Term Loans by Duration

	y_t^i	y_{t+1}^i	y_{t+2}^i	y_{t+3}^i	y_{t+4}^i	y_{t+5}^i
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Interest rate on *new* long-term loans with original maturity up to 1 year						
$F_{t-1}^i\pi^{(12m)}$	0.200	0.364**	0.399***	0.478***	0.452***	0.600***
	(0.173)	(0.150)	(0.141)	(0.120)	(0.125)	(0.117)
Observations	3951	3801	3641	3496	3302	3143
R-squared	0.217	0.225	0.220	0.211	0.209	0.168
1st stage F stat	83.55	80.11	79.41	84.10	83.90	73.96
Panel B: Interest rate on *new* long-term loans with original maturity over 1 year						
$F_{t-1}^i\pi^{(12m)}$	0.322	0.569**	0.562***	0.600***	0.670***	0.648***
	(0.217)	(0.216)	(0.182)	(0.109)	(0.128)	(0.084)
Observations	2652	2584	2486	2421	2338	2255
R-squared	0.181	0.152	0.134	0.129	0.101	0.117
1st stage F stat	125.3	229.3	191.4	162.2	168.7	80.05
Panel C: Use of *new* long-term loans with original maturity up to 1 year						
$F_{t-1}^i\pi^{(12m)}$	0.283*	0.398**	0.335*	0.381**	0.363**	0.278*
	(0.155)	(0.168)	(0.165)	(0.161)	(0.143)	(0.139)
Observations	3806	3662	3507	3369	3181	3026
R-squared	0.022	0.025	0.020	0.023	0.022	0.017
1st stage F stat	84.99	81.79	80.12	85.48	86.85	74.52
Panel D: Use of *new* long-term loans with original maturity over 1 year						
$F_{t-1}^i\pi^{(12m)}$	0.953***	0.789***	0.572**	0.147	0.037	-0.200
	(0.303)	(0.204)	(0.273)	(0.320)	(0.290)	(0.269)
Observations	2544	2480	2385	2328	2247	2167
R-squared	-0.016	-0.010	-0.003	0.011	0.008	0.020
1st stage F stat	125.5	226.7	179.7	164.6	163.2	80.57
Panel E: Residual maturity of Outstanding Quantity of Term Loans						
$F_{t-1}^i\pi^{(12m)}$	0.102	0.459**	0.763***	0.849***	0.922***	1.200***
	(0.092)	(0.174)	(0.209)	(0.259)	(0.264)	(0.417)
Observations	14339	13708	13087	12531	11961	11425
R-squared	0.001	0.001	0.001	-0.000	0.001	0.001
1st stage F stat	119.7	108.8	116.0	111.9	113.7	114.5

Notes: *i* and *t* index firms and time (survey waves). $F_{t-1}^i\pi^{(12m)}$ is one-year-ahead inflation expectation of firm *i* in wave $t-1$. In Panels A and B the dependent variable is $y_{t+k}^i \equiv r_{i,t+k}$ where r_{it} is the interest rate on new long-term loans (with maturity up to or above 1 year) that firm *i* pays at time *t*. In Panels C and D the dependent variable is $y_{t+k}^i \equiv \frac{b_{i,t+k}}{\overline{sales_i}} \times 100$ where b_{it} is the quantity of new long-term loans (with maturity up to or above 1 year) obtained by firm *i* in period *t* and $\overline{sales_i}$ is the average sales for firm *i* in the period 2012Q1-2019Q4. In Panel E the dependent variable is $y_{t+k}^i \equiv Residual\_Mat_{t+k}^i - Residual\_Mat_{t-1}^i$, where $Residual\_Mat_t^i$ represents the share (in percentage terms) of the outstanding quantity of term loans with residual maturity below one year of firm *i* at the end of time *t*. In all Panels the specification is given by $y_{t+k}^i = \alpha_k + \gamma_k F_{t-1}^i\pi^{(12m)} + controls_{t-2}^i + score_{t-4}^i + error_{t-1,t+k}^i$. Seasonal dummies for each sector are included but not reported. Other controls are included but not reported. Estimates for other controls are available upon request. Estimation sample is 2012Q3-2019Q1 for interest rates and 2012Q3-2019Q4 for quantities. Standard errors reported in parentheses are as in Driscoll and Kraay (1998). ***, **, * denote statistical significance at 1, 5 and 10 percent level.

Table 6. Effects of Inflation Expectations on Extensive Margin of Borrowing.

	y_t^i	y_{t+1}^i	y_{t+2}^i	y_{t+3}^i	y_{t+4}^i	y_{t+5}^i
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Loan Applications						
$F_{t-1}^i\pi^{(12m)}$	0.040**	0.074**	0.153***	0.231***	0.268***	0.312***
	(0.019)	(0.035)	(0.050)	(0.062)	(0.074)	(0.093)
Observations	15168	14299	13580	12947	12316	11751
R-squared	0.012	0.016	0.018	0.021	0.023	0.025
1st stage F stat	112.0	104.2	107.2	107.8	109.4	114.3
Panel B: Loan Application Outcomes						
$F_{t-1}^i\pi^{(12m)}$	-0.022	-0.054	0.004	0.046	0.075**	0.080**
	(0.031)	(0.034)	(0.027)	(0.030)	(0.030)	(0.032)
Observations	6694	6437	6164	5924	5684	5474
R-squared	0.022	0.013	0.018	0.017	0.012	0.019
1st stage F stat	115.4	79.60	77.52	87.77	82.10	81.38
Panel C: Obtainment of New Term Loans						
$F_{t-1}^i\pi^{(12m)}$	-0.003	-0.019	-0.030	-0.029	-0.021	-0.021
	(0.013)	(0.017)	(0.025)	(0.027)	(0.022)	(0.022)
Observations	16333	15785	15244	14752	14247	13755
R-squared	0.047	0.047	0.047	0.044	0.043	0.043
1st stage F stat	117.2	106.6	108.8	108.2	110.3	114.3
Panel D: Composition of New Term Loans – Short vs. Long						
$F_{t-1}^i\pi^{(12m)}$	-0.049***	-0.057***	-0.058***	-0.043***	-0.036***	-0.060***
	(0.010)	(0.012)	(0.015)	(0.012)	(0.008)	(0.011)
Observations	5009	4836	4667	4472	4259	4068
R-squared	0.030	0.025	0.027	0.022	0.024	0.011
1st stage F stat	111.6	114.2	119.6	117.3	106.1	76.58
Panel E: Composition of New Term Loans with Maturity Over 1 year: Adjustable Rate vs. Fixed Rate						
$F_{t-1}^i\pi^{(12m)}$	0.009	0.033	0.040	0.065**	0.088***	0.036*
	(0.031)	(0.034)	(0.034)	(0.029)	(0.027)	(0.020)
Observations	2652	2584	2486	2421	2338	2255
R-squared	0.034	0.034	0.026	0.030	0.020	0.036
1st stage F stat	125.3	229.3	191.4	162.2	168.7	80.05
Panel F: Credit Relationships						
$F_{t-1}^i\pi^{(12m)}$	0.039	-0.134	0.014	0.120	0.246	0.396
	(0.152)	(0.256)	(0.234)	(0.186)	(0.219)	(0.337)
Observations	15861	15287	14724	14204	13674	13148
R-squared	0.007	0.016	0.027	0.035	0.042	0.050
1st stage F stat	119.0	108.4	111.5	110.8	112.0	113.6

Notes: *i* and *t* index firms and time (survey waves). $F_{t-1}^i\pi^{(12m)}$ is one-year-ahead inflation expectation of firm *i* in wave $t-1$. In Panel A the dependent variable is $y_{t+k}^i \equiv App_{t+k}^i + \ldots + App_t^i$, where App_t^i is the number of loan applications made by firm *i* at time *t*. In Panel B the dependent variable is $y_{t+k}^i \equiv App\_Outcome_{t+k}^i$, where $App\_Outcome_{t+k}^i$ is a dichotomous variable that takes value 1 if at least one loan application by firm *i* at time *t+k* is accepted in the following quarter and 0 otherwise. In Panel C the dependent variable is $y_{t+k}^i \equiv New\_Term\_Loan_{t+k}^i$, where $New\_Term\_Loan_{t+k}^i$ is a dichotomous variable that takes value 1 if firm *i* at time *t+k* obtains a new term loan and 0 otherwise. In Panel D the dependent variable is $y_{t+k}^i \equiv New\_SvsL\_Term\_Loan_{t+k}^i$, where $New\_SvsL\_Term\_Loan_{t+k}^i$ is a dichotomous variable that takes value 1 if firm *i* at time *t+k* obtains a new long-term term loan and 0 if firm *i* at time *t+k* obtains a new short-term term loan. In Panel E the dependent variable is $y_{t+k}^i \equiv New\_AdjRate_{t+k}^i$, where $New\_AdjRate_{t+k}^i$ is a dichotomous variable that takes value 1 if firm *i* at time *t+k* obtains a new term term loan with adjustable interest rate and 0 if firm *i* at time *t+k* obtains a new term loan with fixed interest rate. In

Panel F the dependent variable is $y_{t+k}^{i} \equiv Num_{t+k}^{i}$, where Num_{t+k}^{i} is the total number of credit relationships that firm *i* at time *t* has with banks. In all cases, specification is given by $y_{t+k}^{i} = \alpha_k + \gamma_k F_{t-1}^{i} \pi^{(12m)} + controls_{t-2}^{i} + score_{t-4}^{i} + error_{t-1,t+k}^{i}$. Seasonal dummies for each sector are included but not reported. Other controls are included but not reported. Estimates for other controls are available upon request. Estimation sample is 2012Q3-2019Q4. Standard errors reported in parentheses are as in Driscoll and Kraay (1998). ***, **, * denote statistical significance at 1, 5 and 10 percent level.

Table 7. Are firms with higher inflation expectations perceived as riskier?

	y_t^i	y_{t+1}^i	y_{t+2}^i	y_{t+3}^i	y_{t+4}^i	y_{t+5}^i
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Risk score						
$F_{t-1}^i \pi^{(12m)}$	0.022	0.035	0.062	0.077*	0.089**	0.098***
	(0.033)	(0.037)	(0.038)	(0.038)	(0.036)	(0.033)
Observations	16127	15518	14917	14358	13798	13259
R-squared	0.225	0.224	0.221	0.214	0.208	0.198
1st stage F stat	117.7	106.5	107.5	106.3	109.4	113.2
Panel B: Firms' perceptions about access conditions to credit						
$F_{t-1}^i \pi^{(12m)}$	-0.080***	-0.081***	-0.080***	-0.069***	-0.042***	-0.045***
	(0.012)	(0.012)	(0.012)	(0.009)	(0.010)	(0.010)
Observations	17719	15079	14130	13262	12463	11658
R-squared	0.134	0.125	0.106	0.085	0.076	0.059
1st stage F stat	119.4	106.6	108.1	102.6	109.5	112.1

Notes: *i* and *t* index firms and time (survey waves). $F_{t-1}^i \pi^{(12m)}$ is one-year-ahead inflation expectation of firm *i* in wave $t-1$. In Panel A the dependent variable is $y_{t+k}^i \equiv Score_{t+k}^i$, where $Score_t^i$ denotes the 9-category risk score of firm *i* at time *t* (which is available at annual frequency). In Panel B the dependent variable is $y_{t+k}^i \equiv Sitcre_{t+k}^i$, where $Sitcre_t^i$ is a trichotomous variable that captures firm *i*'s perceptions about their current access conditions to credit at time *t* compared with previous three months (-1 = "worse", 0 = "about the same", +1 = "better"). In both cases, specification is given by $y_{t+k}^i = \alpha_k + \gamma_k F_{t-1}^i \pi^{(12m)} + controls_{t-2}^i + error_{t-1,t+k}^i$. Seasonal dummies for each sector are included but not reported. Other controls are included but not reported. Estimates for other controls are available upon request. Estimation sample is 2012Q3-2019Q4. Standard errors reported in parentheses are as in Driscoll and Kraay (1998). ***, **, * denote statistical significance at 1, 5 and 10 percent level.

Table 8. Controlling for ex-post perceived ease of access to credit

	y_t^i	y_{t+1}^i	y_{t+2}^i	y_{t+3}^i	y_{t+4}^i	y_{t+5}^i
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Outstanding Quantity of *Used* Short-Term Loans (*benchmark*)						
$F_{t-1}^i\pi^{(12m)}$	2.273*	2.994*	2.483*	3.324**	5.523***	7.652***
	(1.202)	(1.573)	(1.411)	(1.595)	(1.234)	(2.236)
Panel B: Outstanding Quantity of *Used* Short-Term Loans						
$F_{t-1}^i\pi^{(12m)}$	2.331*	2.763*	3.103*	2.365	6.439***	8.971***
	(1.176)	(1.536)	(1.524)	(1.628)	(1.855)	(2.862)
Observations	12151	10183	9463	8888	8267	7632
R-squared	0.002	0.004	0.004	0.009	0.004	-0.002
1st stage F stat	109.4	97.95	100.2	106.5	109.3	115.1
Panel C: Outstanding Quantity of *Used* Long-Term Loans (*benchmark*)						
$F_{t-1}^i\pi^{(12m)}$	-0.836***	-1.756***	-1.909**	-3.108***	-3.713***	-4.367***
	(0.288)	(0.452)	(0.706)	(0.860)	(0.855)	(1.003)
Panel D: Outstanding Quantity of *Used* Long-Term Loans						
$F_{t-1}^i\pi^{(12m)}$	-0.543*	-1.468**	-1.314	-2.032*	-2.863***	-3.180**
	(0.294)	(0.570)	(0.877)	(1.159)	(1.009)	(1.454)
Observations	13035	10943	10173	9499	8828	8169
R-squared	0.009	0.011	0.014	0.016	0.018	0.021
1st stage F stat	116.4	105.5	102.0	109.9	115.0	116.4
Panel E: Outstanding Quantity of *Granted* Short-Term Loans (benchmark)						
$F_{t-1}^i\pi^{(12m)}$	-0.158	-0.458	-0.511	-0.442	0.587	1.017*
	(0.254)	(0.444)	(0.420)	(0.478)	(0.509)	(0.542)
Panel F: Outstanding Quantity of *Granted* Short-Term Loans						
$F_{t-1}^i\pi^{(12m)}$	-0.088	-0.137	-0.362	-0.350	0.510	0.378
	(0.238)	(0.424)	(0.377)	(0.467)	(0.519)	(0.534)
Observations	14856	12595	11802	11072	10381	9698
R-squared	0.014	0.021	0.023	0.028	0.030	0.032
1st stage F stat	107.3	101.2	102.3	98.67	103.7	110.0
Panel G: Outstanding Quantity of *Granted* Long-Term Loans (benchmark)						
$F_{t-1}^i\pi^{(12m)}$	-0.461	-1.295*	-1.384	-2.377**	-2.445**	-3.493***
	(0.434)	(0.710)	(0.889)	(0.995)	(1.027)	(1.180)
Panel H: Outstanding Quantity of *Granted* Long-Term Loans						
$F_{t-1}^i\pi^{(12m)}$	-0.213	-1.147	-1.049	-1.929*	-2.454*	-2.524
	(0.489)	(0.756)	(0.962)	(1.111)	(1.266)	(1.690)
Observations	13854	11661	10876	10165	9489	8832
R-squared	0.013	0.014	0.021	0.022	0.022	0.027
1st stage F stat	107.1	101.5	97.90	99.51	104.9	108.6

Notes: *i* and *t* index firms and time (survey waves). $F_{t-1}^i\pi^{(12m)}$ is one-year-ahead inflation expectation of firm *i* in wave $t-1$. Short-term loans comprise revocable loans and matched loans while long-term loans include term loans. In all Panels the dependent variable is $y_{t+k}^i \equiv \left(b_{i,t+k}/b_{i,t-1} - 1\right) \times 100$ where b_{it} is the quantity of loans (used or granted, short-term or long-term) by firm *i* at the end of time *t*. In Panels A, C, E and G the specification is given by $y_{t+k}^i = \alpha_k + \gamma_k F_{t-1}^i\pi^{(12m)} + controls_{t-2}^i + score_{t-4}^i + error_{t-1,t+k}^i$. In the remaining Panels the specification is given by $y_{t+k}^i = \alpha_k + \gamma_k F_{t-1}^i\pi^{(12m)} + controls_{t-2}^i + score_{t-4}^i + SITCRE_{t+k}^i + error_{t-1,t+k}^i$. Seasonal dummies for each sector are included but not reported. Other controls are included but not reported. Estimates for other controls are available upon request. Estimation sample is 2012Q3-2019Q4. Standard errors reported in parentheses are as in Driscoll and Kraay (1998). ***, **, * denote statistical significance at 1, 5 and 10 percent level.

Table 9. The Role of Financial Sophistication

	y_t^i	y_{t+1}^i	y_{t+2}^i	y_{t+3}^i	y_{t+4}^i	y_{t+5}^i
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Outstanding quantity of total cash loans: *Non-Sophisticated* Firms						
$F_{t-1}^i \pi^{(12m)}$	-0.121	-0.044	0.049	0.092	0.187*	0.278***
	(0.127)	(0.117)	(0.117)	(0.117)	(0.096)	(0.091)
Observations	4201	4026	3864	3675	3488	3299
R-squared	0.118	0.119	0.131	0.137	0.141	0.149
1st stage F stat	92.46	92.68	101.0	86.93	89.76	94.37
Panel B: Outstanding quantity of total cash loans: *Sophisticated* Firms						
$F_{t-1}^i \pi^{(12m)}$	0.192	0.264***	0.364***	0.399***	0.490***	0.544***
	(0.116)	(0.093)	(0.082)	(0.087)	(0.079)	(0.067)
Observations	8524	8201	7890	7543	7218	6904
R-squared	0.194	0.199	0.193	0.191	0.173	0.162
1st stage F stat	99.13	102.0	107.9	105.5	100.9	99.83
Panel C: Outstanding Quantity of Short-Term loans: *Non-Sophisticated* Firms						
$F_{t-1}^i \pi^{(12m)}$	-0.096	0.089	0.164	0.149	0.245**	0.333***
	(0.103)	(0.117)	(0.101)	(0.118)	(0.103)	(0.112)
Observations	3783	3623	3477	3298	3130	2944
R-squared	0.113	0.112	0.126	0.130	0.128	0.139
1st stage F stat	91.92	86.24	95.24	77.35	85.44	79.98
Panel D: Outstanding Quantity of Short-Term loans: *Sophisticated* Firms						
$F_{t-1}^i \pi^{(12m)}$	0.274**	0.316***	0.451***	0.460***	0.513***	0.542***
	(0.131)	(0.113)	(0.112)	(0.117)	(0.089)	(0.076)
Observations	7697	7409	7109	6772	6462	6150
R-squared	0.154	0.158	0.144	0.142	0.132	0.111
1st stage F stat	103.0	109.0	104.3	96.30	93.73	100.3
Panel E: Outstanding Quantity of Long-Term loans: *Non-Sophisticated* Firms						
$F_{t-1}^i \pi^{(12m)}$	-0.086	-0.044	0.031	0.073	0.148	0.211**
	(0.121)	(0.114)	(0.115)	(0.115)	(0.101)	(0.080)
Observations	2830	2723	2616	2500	2374	2241
R-squared	0.145	0.140	0.137	0.142	0.145	0.139
1st stage F stat	97.95	103.3	120.2	113.8	116.1	109.4
Panel F: Outstanding Quantity of Long-Term loans: *Sophisticated* Firms						
$F_{t-1}^i \pi^{(12m)}$	0.074	0.152*	0.245***	0.293***	0.393***	0.502***
	(0.108)	(0.082)	(0.069)	(0.071)	(0.070)	(0.061)
Observations	7734	7436	7146	6822	6513	6229
R-squared	0.129	0.139	0.152	0.158	0.145	0.133
1st stage F stat	104.7	109.5	106.9	105.5	102.1	96.12

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Panel G: New quantity of long-term loans: *Non-Sophisticated* Firms						
$F_{t-1}^{i}\pi^{(12m)}$	-0.057	0.099	0.245	0.301	0.319**	0.269
	(0.225)	(0.248)	(0.174)	(0.176)	(0.151)	(0.184)
Observations	1035	990	965	911	870	809
R-squared	0.167	0.148	0.146	0.147	0.165	0.145
1st stage F stat	99.31	128.5	168.1	113.8	98.29	91.40
Panel H: New quantity of long-term loans: *Sophisticated* Firms						
$F_{t-1}^{i}\pi^{(12m)}$	0.357**	0.526***	0.520***	0.605***	0.596***	0.723***
	(0.161)	(0.136)	(0.126)	(0.085)	(0.092)	(0.084)
Observations	4233	4093	3937	3787	3612	3473
R-squared	0.214	0.230	0.212	0.197	0.185	0.144
1st stage F stat	92.92	95.67	95.85	99.25	93.37	69.64

Notes. See notes in Table II. A firm is labelled as sophisticated (non-sophisticated) if in the period 2006-2019 it has at least once (never) used financial derivatives.

Table 10. Heterogeneity along Observable Firm Characteristics

	y_t^i	y_{t+1}^i	y_{t+2}^i	y_{t+3}^i	y_{t+4}^i	y_{t+5}^i
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A. Effects of inflations expectations on average interest rate					
Number of employees: 50-99	0.057	0.155	0.242**	0.272**	0.358***	0.415***
Number of employees: 100-299	0.158*	0.224***	0.336***	0.382***	0.483***	0.550***
Number of employees: 300 or more	0.059	0.113	0.187*	0.233**	0.312***	0.405***
Revenue from exports: 0	0.047	0.145	0.238**	0.251**	0.336***	0.413***
Revenue from exports: 1%-33%	0.027	0.087	0.156*	0.192**	0.283***	0.346***
Revenue from exports: 34% or more	0.135	0.201**	0.327***	0.388***	0.472***	0.524***
Location: North	0.060	0.140	0.214**	0.253***	0.350***	0.435***
Location: Center	0.111	0.146	0.274**	0.286**	0.370***	0.420***
Location: South and Islands	0.027	0.113	0.251***	0.329***	0.445***	0.509***
Sector: Industry	0.114	0.173*	0.281***	0.345***	0.425***	0.496***
Sector: Services	0.066	0.124*	0.193***	0.201***	0.312***	0.375***
Sector: Construction	-0.212	-0.018	0.129	0.139	0.243	0.372
	Panel B. Effects of inflations expectations on use of total cash loans					
# of employees: 50-99	-0.201	0.606	1.278	0.926	1.297	1.617
# of employees: 100-299	0.256	-0.414	-0.953	-0.981	-0.497	-0.959
# of employees: 300 or more	-0.210	0.290	-0.947	-2.294*	-3.410**	-4.015***
Revenue from exports: 0	0.078	-0.257	0.370	0.290	0.931	0.752
Revenue from exports: 1%-33%	-0.019	0.173	-0.785	-1.799	-2.692**	-1.466
Revenue from exports: 34% or more	-0.195	0.795	0.372	-0.031	0.427	-0.290
Location: North	0.139	0.589	0.462	0.081	0.325	0.454
Location: Center	-0.952	-2.138	-1.220	-1.071	-1.475	-1.742
Location: South and Islands	0.164	0.538	-0.103	-0.825	-0.564	-1.070
Sector: Industry	-0.157	0.573	0.458	-0.373	0.253	0.088
Sector: Services	0.087	-0.399	-0.503	-0.440	-1.007	-1.484
Sector: Construction	0.369	0.441	0.891	1.874	3.490	5.982

Notes: *i* and *t* index firms and time (survey waves). $F_{t-1}^i \pi^{(12m)}$ is one-year-ahead inflation expectation of firm *i* in wave $t-1$. Short-term loans comprise revocable loans and matched loans while long-term loans include term loans. In Panel A the dependent variable is $y_{t+k}^i \equiv r_{i,t+k}$ where r_{it} is the average nominal interest rate on total cash loans that firm *i* pays at time *t*. In Panel B the dependent variable is $y_{t+k}^i \equiv \left(b_{i,t+k}/b_{i,t-1} - 1\right) \times 100$ where b_{it} is the quantity of total used cash loans by firm *i* at the end of time *t*. In both Panels the specification is given by $y_{t+k}^i = \alpha_k + \gamma_k F_{t-1}^i \pi^{(12m)} + controls_{t-2}^i + score_{t-4}^i + error_{t-1,t+k}^i$. Seasonal dummies for each sector are included but not reported. Other controls are included but not reported. Estimates for other controls are available upon request. Estimation sample is 2012Q3-2019Q1 for interest rates and 2012Q3-2019Q4 for quantities. Standard errors reported in parentheses are as in Driscoll and Kraay (1998). ***, **, * denote statistical significance at 1, 5 and 10 percent level.

APPENDIX

Appendix A: Randomization across firms and financial variables

One potential problem with our empirical approach is if the randomization of provision of information firms in the survey is not independent of corporate financing positions of firms. Since the financing outcomes that one observes in the data are in many instances the joint result of firms' and banks' decisions, we need to make sure that supply-side forces do not impact differently firms in the control group and those in the treatment group. Otherwise, the IV estimation strategy outlined above would be invalid.

To verify that the random selection of firms into treatment and control groups is uncorrelated with banks' lending decisions, we construct two indicators of credit supply. The first indicator relies on the acceptance/rejection of the requests of credit advanced by firms. Specifically, we construct this indicator by combining the monthly information on loan applications and the outstanding amounts of loans at the end of each month, which are both available in the CCR. A loan application is identified when an intermediary inquiries the CCR to retrieve information on the debt position of a potential borrower, say firm *j*. Enquiries to the CCR can be submitted only when the intermediary formally receives a request for credit. Lodging a request is not free of charge. This implies that intermediaries may decide not to use this service if they already know the applicant. Once a loan application is detected, say in February 2014, we check whether at the end of the next three or six months the overall debt exposure of firm *j* has increased or not with respect to January 2014.[17] In the former (latter) case, we say the bank has accepted (rejected) the loan application. With this information, we construct a quarterly dummy variable that takes value zero if in the reference time window (i.e. the three- or six-month period) the loan requests of a firm are all rejected and value one if at least one loan application is accepted.

The second indicator of credit supply builds on the withdrawals of revocable loans on the part of banks. As detailed in the Bank of Italy Circular No. 139 of 11 February 1991, the class of revocable loans comprises current account overdrafts for which the bank reserves the right to call back, partially or totally, the contract regardless of the existence of just cause. We assume that a loan is partially or totally revoked, if three conditions are met: (*i*) the total amount granted credit and the available margin (i.e. the difference between the total amount of granted credit and used credit) both reduce from one quarter to the next one;(ii)

[17] By overall debt exposure we mean the sum of the outstanding amounts of revocable loans, matched loans and term loans.

the total amount of granted credit does not increase in the following quarter; and (iii) the available margin is negative.[18]

Then, in turn, we regress each of these two indicators on a 0-1 dummy variable for whether a firm is treated and on a vector of other observable characteristics. This vector includes: the size (log of number of employees), the export share (categorical variable with four groups: no export, export share in total sales is 1 to 33 percent, export share is 34 to 66 percent, export share is 67 or more percent), the average absolute size of price changes in the previous 12-month (which are recorded over time in the survey), the Z-score, geographic fixed effects as well as time fixed effects for each industry. The results are reported in Table Appendix Table A1. In either case, being in the treatment group does not statistically significantly correlate with the acceptance-rejection outcome of loan applications (Panel A) or with the withdrawal of revocable loans (Panel B). These results hold true even controlling for several covariates. This evidence thus indicates that the randomized information treatment does not suffer from biases arising from factors not explicitly accounted for in the experimental design, such as, in the present context, credit supply changes.

[18] A more granular way to identify revocations of loans would be to apply these rules to each bank-firm relationship. CHECK robustness.

Appendix Table A1. Credit Supply Variations and Information Treatment.

	Panel A. Dependent variable: Loan acceptance-rejection						Panel B. Dependent variable: Loan revocation		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Information treatment dummy [omitted category "Control group"]									
Treatment group	0.014	0.019	0.016	0.019	0.021	0.020	-0.000	0.001	-0.001
	(0.019)	(0.017)	(0.016)	(0.018)	(0.015)	(0.015)	(0.004)	(0.004)	(0.003)
Log(number of employees)	No	No	Yes	No	No	Yes	No	No	Yes
Average absolute size of price changes	No	No	Yes	No	No	Yes	No	No	Yes
Geographic area	No	No	Yes	No	No	Yes	No	No	Yes
Export share	No	No	Yes	No	No	Yes	No	No	Yes
Score	No	No	Yes	No	No	Yes	No	No	Yes
Fixed effects (time x industry)	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	8,240	8,240	8,240	8,102	8,102	8,102	17,460	17,460	17,460
R-squared	0.00	0.00	0.02	0.00	0.00	0.02	-0.00	-0.00	0.05

Notes: the table reports results for linear regressions where the dependent variable is dichotomous and equal to one if a firm's loan application is accepted and zero if is rejected in the next three months (columns (1)-(3)) or in the next six months (columns (4)-(6)) and dichotomous and equal to one if a firm's revocable loan is withdrawn and zero if is not withdrawn (columns (7)-(9)). Average absolute size of price changes is the average absolute value of responses to the following question: "*In the last 12 months, what has been the average change in your firm's prices?*". Estimation sample is 2012Q3-2019Q3 in Panel A and in 2012Q3-2019Q4Panel B. Estimates of the other controls are reported in Appendix Tables 1B and 2B. ***, **, * denote statistical significance at 1, 5 and 10 percent level.