

Expectations and the Functioning of the Credit Market during a Crisis

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Introduction

- ▶ Italy: first European country hit by the COVID-19 virus in 2020
- ▶ Unprecedented shock for type and magnitude of the events
- ▶ March 4: focal point
- ▶ April 8: sizeable government intervention
- ▶ The paper centers on the credit market in the first semester of 2020

Motivation and Preview

Questions:

- ▶ What the credit market can tell us about the COVID-19 shock?
- ▶ What the COVID-19 shock can tell us about the functioning of the credit market?

Insights:

- ▶ Two distinct phases during the first months of the crisis
- ▶ Gov-backed lending to firms partially crowded out household loans

The credit market

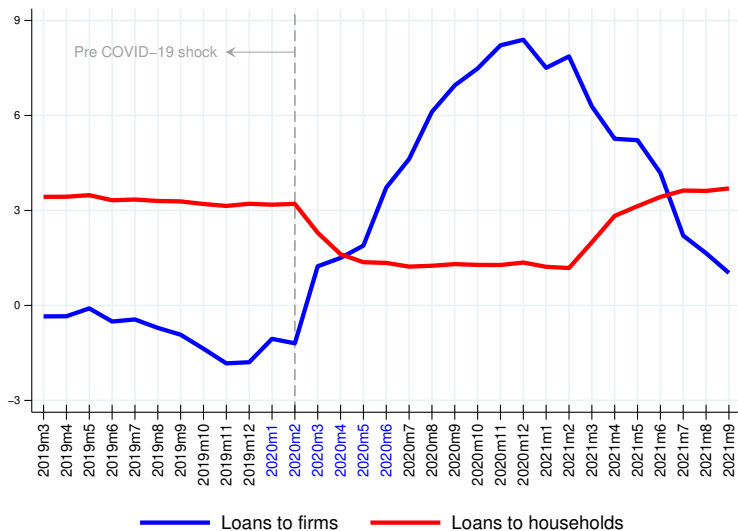


Figure: y-o-y percentage change.

Background

- ▶ Demand/supply neither directly observable nor readily inferable
- ▶ Agent decisions crucially depends on expectations about the future
- ▶ Multiple events in a short space of time → only expectations can track all events
- ▶ Early policy effort adds to the shock

An option:

- ▶ Survey data

Literature Review

- ▶ Bordalo et al. (2020) - health and economic risk perception, consumers
- ▶ Binder (2020) - FED interest rate cut after COVID-19, consumers
- ▶ Baker et al. (2020) - economic impact of COVID-19 uncertainty, firms
- ▶ Ferrando and Ganoulis (2020) - external finance expectations, firms

Contribution:

- ▶ The point of view of loan officers, banks
- ▶ Italy: no anticipatory bias and sharp discontinuity

Data

Regional Bank Lending Survey (Bank of Italy):

- ▶ Large cross section of banks (loan officers), by macro area, 377 observations, 90 per cent of the market
- ▶ Half-yearly: past and expected change of sup/dem (1 ↑; 0 =; -1 ↓)
- ▶ Firm loans, household mortgages, consumer credit
- ▶ February/March 2020 → **expected** first semester 2020
- ▶ August/September 2020 → **realized** first semester 2020

Identification strategy

- ① **Timing of forecasts,**¹ *March 4: Decree 14241/2020, nationwide social distancing measures, closure of all schools*

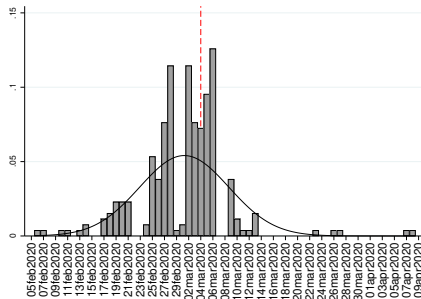


Figure: Timing of forecasts

¹Rodríguez Mora and Schulstad (2007)

Identification strategy

- ② The geography of the pandemic, forecasts are broken down by macro area
- ③ Expectation bias, systematic overoptimism/overpessimism, although relevant, not at core of this work:
 - ▶ Idiosyncratic bias: by bank-region 2009-2019 mean difference b/w expectations and ex-post assessments is netted out

Empirical model

$$\mathbb{E}_{2020h1}[\Delta y_{b,r}^{2020h1}] = \alpha + \beta_1 PostMar4_b + \beta_2 X_{b,r} + \psi_r + \varepsilon_{b,r} \quad (1)$$

- ▶ y is a shorthand for *Demand/Supply* forecasts for the first semester of 2020 by bank b with respect to region r
- ▶ $PostMar4_b$ is a dummy equal to one if bank b formed its expectations after March 4, thus whether expectations incorporated the COVID-19 shock
- ▶ $X_{b,r}$ are bank- and bank-region level controls, as of December 2019, that will be used to test the robustness of the estimates
- ▶ ψ_r are region fixed effects to compare forecasts on the same local credit market

Estimates

Table: Main results.

DEP. VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				BENCH.			
Δ Supply Firms	-0.010 [0.0375]	0.013 [0.0398]	0.013 [0.0538]	0.003 [0.0522]	-0.019 [0.0655]	0.012 [0.0536]	0.004 [0.0524]
Δ Supply h'hold mortg.	-0.067** [0.0331]	-0.055 [0.0357]	-0.055* [0.0326]	-0.083** [0.0379]	-0.083* [0.0479]	-0.070* [0.0383]	-0.073* [0.0377]
Δ Supply h'hold consum.	-0.108*** [0.0336]	-0.100*** [0.0362]	-0.100 [0.0625]	-0.159*** [0.0564]	-0.175** [0.0693]	-0.151*** [0.0581]	-0.165*** [0.0580]
Δ Demand Firms	-0.242*** [0.0753]	-0.273*** [0.0803]	-0.273** [0.1204]	-0.341*** [0.1172]	-0.340** [0.1385]	-0.342*** [0.1201]	-0.351*** [0.1200]
Δ Demand h'hold mortg.	-0.254*** [0.0714]	-0.252*** [0.0769]	-0.252** [0.1204]	-0.220* [0.1252]	-0.216 [0.1513]	-0.219* [0.1271]	-0.230* [0.1282]
Δ Demand h'hold consum.	-0.106 [0.0647]	-0.106 [0.0694]	-0.106 [0.1108]	-0.116 [0.1150]	-0.077 [0.1305]	-0.110 [0.1168]	-0.116 [0.1171]
Area FEs	No	Yes	Yes	Yes	Yes	Yes	Yes
S.E. bank clustered	No	No	Yes	Yes	Yes	Yes	Yes
Bias correction	No	No	No	Yes	Yes	Yes	Yes
Time elapsing control	No	No	No	No	Yes	No	No
Bank exposure control	No	No	No	No	No	Yes	No
Without March 4	No	No	No	No	No	No	Yes

Standard errors in parenthesis. Firm: 365 obs. H'hold mortg: 349 obs. H'hold consum.: 340 obs. Time elapsing control: days elapsing from March 4. Bank exposure control: province level infections weighted by bank-province total loans. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Phase 1 (shock): household supply ↓, firm demand ↓

Raw forecasts

Table: Distribution of banks' forecasts for the first half of 2020

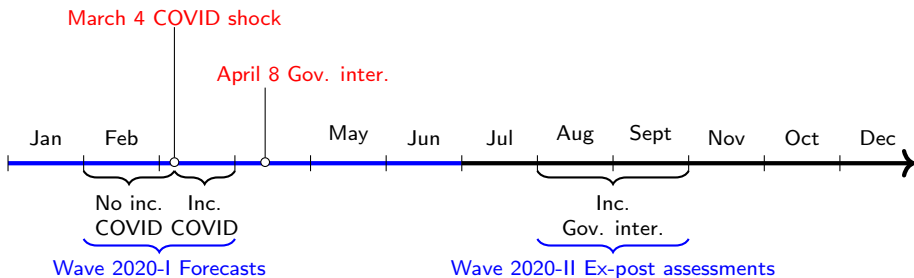
VALUES	SUPPLY			DEMAND		
	Firms	H'hold mortg.	H'hold consum.	Firms	H'hold mortg.	H'hold consum.
DECREASE (-1)	0.08	0.03	0.04	0.23	0.15	0.09
UNCHANGED (0)	0.88	0.91	0.91	0.49	0.54	0.62
INCREASE (1)	0.04	0.06	0.05	0.28	0.31	0.29
NET PERCENTAGE	-0.04	0.03	0.01	0.05	0.16	0.22
MEAN	-0.04	0.03	0.01	0.05	0.16	0.22

Raw data. The net percentage is the simple difference between the share of banks reporting an easing of supply and of those reporting a tightening (or between the share of banks reporting an increase in demand and the share of those reporting a decrease). Positive values for the indicator are a proxy for an easing of supply (increase in demand). Negative values for the indicator are a proxy for a tightening of supply (decrease in demand). More details are available in Appendix A.

Phase 1 (shock): household supply ↓, firm demand ↓

After the shock

- ▶ Main government intervention on *April 8*: public loan guarantee scheme (by the end of 2020, some 1/5 of all outstanding business loans)
- ▶ Ex-post retrospective assessment in August and September did incorporate last three months



Identification strategy

$$\Delta y_{b,r}^{2020h1} = \beta_1 \mathbb{E}_{2020h1} [\Delta y_{b,r}^{2020h1} | \Omega_{t \leq \text{March4}}] + \beta_2 \mathbb{E}_{2020h1} [\Delta y_{b,r}^{2020h1} | \Omega_{t > \text{March4}}] + \psi_r + \varepsilon_{b,r} \quad (2)$$

- ▶ y is a shorthand for *Demand/Supply*
- ▶ ψ_r are regio fixed effects
- ▶ Residuals from this regression, $\Delta y_{b,r}^{2020h1} - \Delta \hat{y}_{b,r}^{2020h1}$.
- ▶ They mostly reflect the update on the credit market due to the events in the last 3 months of SEM I 2020

Residuals

Table: Residuals.

RESIDUALS	ALL SAMPLE (1)		POST MARCH 4 (2)	
Δ Supply Firms	0.048	[0.0328]	0.107**	[0.0519]
Δ Supply h'hold mortg.	-0.019	[0.0183]	-0.067**	[0.0305]
Δ Supply h'hold consum.	-0.020	[0.0218]	-0.046	[0.0449]
Δ Demand Firms	0.152***	[0.0414]	0.253***	[0.0684]
Δ Demand h'hold mortg.	-0.125***	[0.0402]	-0.262***	[0.0681]
Δ Demand h'hold consum.	-0.124***	[0.0397]	-0.258***	[0.0662]

Standard errors in parenthesis. Firms: 356 obs. Restricted sample 141 obs. H'hold mortg.: 340 obs. Restricted sample 128 obs. H'hold consum.: 330 obs. Restricted sample: 129 obs. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Phase 2 (gov.): firm supply and demand ↑, mortgage supply ↓

Hypothesized mechanism

- ▶ **Complementarity**: Public guarantee scheme on business loans might have generated new lending capacity, free to spill over into the household credit market
- ▶ **Substitution**: The increased size of the business loan market might have diverted funds toward this segment of the credit market

Test

$$\Delta y_{b,r,mort}^{2020h1} - \Delta \hat{y}_{b,r,mort}^{2020h1} = \alpha_1 + \beta_1(\Delta y_{b,r,bus}^{2020h1} - \Delta \hat{y}_{b,r,bus}^{2020h1}) + \psi_b + \varepsilon_{b,r} \quad (3)$$

$$\Delta y_{b,r,cons}^{2020h1} - \Delta \hat{y}_{b,r,cons}^{2020h1} = \alpha_2 + \beta_2(\Delta y_{b,r,bus}^{2020h1} - \Delta \hat{y}_{b,r,bus}^{2020h1}) + \psi_b + \varepsilon_{b,r} \quad (4)$$

Table: Testing supply changes relating to emergency measures.

DEP. VARIABLE	SUPPLY MORTGAGE		SUPPLY CONSUMER	
	(1)	(2)	(3)	(4)
Supply Firms	-0.342*** [0.0260]	-0.342*** [0.0176]	-0.314*** [0.0448]	-0.314*** [0.0273]
N	104	104	104	104
R-squared	0.9977	0.9977	0.9961	0.9961
Bank FEs	Yes	Yes	Yes	Yes
S.E. bank clustered	No	No	Yes	Yes

Dependent variables: residuals from Equation 2 for mortgage and consumer loan supply data. Regressor: residuals from Equation 2 for business loans. Standard errors in parenthesis. * < 0.1, ** p < 0.05, *** p < 0.01.

Mechanism: increase in loan supply to firms partially crowded out household credit

Test - bank-province loan data

$$\Delta L_{b,p,t}^{\%,h'hold} = \alpha + \beta_1 AprOnw_t + \beta_2 \Delta L_{b,p,t}^{\%,firms} + \beta_3 AprOnw_t * \Delta L_{b,p,t}^{\%,firms} + \psi_p + \psi_b + \varepsilon_{b,p,t} \quad (5)$$

Table: Lending growth rates, household loans.

	(1)	(2)	(3)	(4)
$\Delta L_{b,p,t}^{\%,firms}$.036** [.0145]	.031*** [.0111]	.0297*** [.0109]	.0297*** [.0109]
$AprOnw_t$	-.363*** [.1252]	-.446*** [.1327]		
$AprOnw_t * \Delta L_{b,p,t}^{\%,firms}$	-.027** [.0121]	-.026** [.0108]	-.026** [.0107]	-.026** [.0107]
$\Delta L_{b,p,t}^{\%,firms} + AprOnw_t * \Delta L_{b,p,t}^{\%,firms}$				0.004 [0.0036]
N	149.034	149.029	149.029	149.029
R-squared	.0027	.0320	.0339	.0410
Province FEs	Yes	Yes	Yes	No
Bank FEs	No	Yes	Yes	Yes
Time FEs	No	No	Yes	No
Province-time FEs	No	No	No	Yes

Dependent variable: monthly growth rates of loans to households (percentage).
 Standard errors in parenthesis. Standard errors clustered at the bank level.
 Household and firm growth rates outside the 1-99th percentiles are dropped from the sample. * p < 0.1, ** p < 0.05, *** p < 0.01.

Test - bank-province interest rate data

$$\Delta R_{b,p,t}^{\%,h'hold} = \alpha + \beta_1 AprOnw_t + \beta_2 \Delta L_{b,p,t}^{\%,firms} + \beta_3 AprOnw_t * \Delta L_{b,p,t}^{\%,firms} + \psi_p + \psi_b + \varepsilon_{b,p,t} \quad (6)$$

Table: Interest rates, household loans.

	(1)	(2)	(3)	(4)	(5)
$\Delta L_{b,p,t}^{\%,firms}$	-.003 [.0029]	-.003** [.0013]	-.002** [.0013]	-.003* [.0014]	-.002* [.0013]
$AprOnw_t$	-.262*** [.0527]	-.272*** [.0514]			
$AprOnw_t * \Delta L_{b,p,t}^{\%,firms}$.001 [.0030]	.003** [.0012]	.003** [.0012]	.003** [.0014]	.003** [.0013]
$\Delta L_{b,p,t}^{\%,firms} + AprOnw_t * \Delta L_{b,p,t}^{\%,firms}$				0.000 [0.001]	0.000 [0.001]
N	5529	5526	5526	5526	5526
R-squared	.0761	.3362	.3376	.3714	0.4163
Province FEs	Yes	Yes	Yes	No	No
Bank FEs	No	Yes	Yes	Yes	Yes
Time FEs	No	No	Yes	No	No
Province-time FEs	No	No	No	Yes	Yes
Additional controls	No	No	No	No	Yes

Dependent variable: interest rates charged to new household loans (percentage). Standard errors in parenthesis. Standard errors clustered at the bank level. Interest rates and firm growth rates outside the 1-99th percentiles are dropped from the sample. To guarantee data quality, interest rate data must be available at time t and at time t-1. * p < 0.1, ** p < 0.05, *** p < 0.01.

Conclusion

- ▶ Early stage COVID-19 crisis: two distinct phases
- ▶ Phase 1 (shock): firm demand ↓, household supply ↓
- ▶ Phase 2 (gov.): firm supply and demand ↑, mortgage supply ↓
- ▶ The increase in supply to firms partially crowded out household credit

Table: Robustness checks.

DEP. VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Δ Supply Firms	0.007 [0.0519]	0.006 [0.0519]	0.006 [0.0528]	0.006 [0.0555]	-0.002 [0.0564]	-0.000 [0.0545]	-0.008 [0.0535]
Δ Supply h'hold mortg.	-0.082** [0.0392]	-0.082** [0.0378]	-0.093** [0.0404]	-0.078* [0.0399]	-0.066* [0.0394]	-0.078** [0.0394]	-0.082** [0.0387]
Δ Supply h'hold consum.	-0.157*** [0.0560]	-0.155*** [0.0556]	-0.163*** [0.0575]	-0.154*** [0.0508]	-0.139*** [0.0462]	-0.145*** [0.0484]	-0.163*** [0.0580]
Δ Demand Firms	-0.312*** [0.1125]	-0.336*** [0.1174]	-0.320*** [0.1168]	-0.281** [0.1169]	-0.266** [0.1142]	-0.289** [0.1149]	-0.329*** [0.1214]
Δ Demand h'hold mortg.	-0.206* [0.1239]	-0.2223* [0.1241]	-0.253** [0.1199]	-0.157 [0.1275]	-0.195 [0.1220]	-0.169 [0.1251]	-0.224* [0.1272]
Δ Demand h'hold consum.	-0.110 [0.1131]	-0.119 [0.1135]	-0.132 [0.1142]	-0.051 [0.1008]	-0.090 [0.1018]	-0.075 [0.1014]	-0.108 [0.1181]
Capital	Yes	No	No	No	No	No	No
Liquidity	No	Yes	No	No	No	No	No
Profitability	No	No	Yes	No	No	No	No
Size	No	No	No	Yes	No	No	No
Market share	No	No	No	No	Yes	No	No
Presence	No	No	No	No	No	Yes	No
Confounding events	No	No	No	No	No	No	Yes

Standard errors in parenthesis. Standard errors clustered at the bank level. Firm: 365 obs. Column (7): 357 obs. H'hold mortg.: 349 obs. Column (7): 344 obs. H'hold consum.: 340 obs. Column (7): 335 obs. H'hold consum. supply: 340 obs. Capital: capital to total assets, dummy equal to one for banks in the top quartile. Liquidity: deposits to total loans, dummy equal to one for banks in the top quartile. Profitability: profits to total assets, dummy equal to one for banks in the top quartile. Size: logarithm of total assets, dummy equal to one for banks in the top quartile. Market share: share of loans in the region, dummy equal to one for banks in the top quartile. Presence: share of provinces in the region where the bank lend to customers, dummy equal to one for banks in the top quartile. Data as of December 2019. Column (7) discards banks that formed their expectations after March 17. * p < 0.1, ** p < 0.05, *** p < 0.01.

Table: Propensity score estimates.

DEP. VARIABLE	(1)	(2)	(3) FALS.
Δ Supply Firms	-0.007 [0.0450]	-0.004 [0.0436]	-0.023 [0.0489]
Δ Supply h'hold mortg.	-0.080** [0.0367]	-0.075 [0.0458]	-0.021 [0.0373]
Δ Supply h'hold consum.	-0.151*** [0.0364]	-0.132*** [0.0341]	-0.071* [0.0401]
Δ Demand Firms	-0.219*** [0.0779]	-0.310*** [0.0886]	0.117 [0.0854]
Δ Demand h'hold mortg.	-0.221*** [0.0812]	-0.259** [0.1054]	-0.011 [0.0836]
Δ Demand h'hold consum.	-0.077 [0.0690]	-0.031 [0.0892]	0.104 [0.0675]

Average treatment effect on treated banks. Adjusted bank forecasts (see Section 3). Standard errors in parenthesis: bootstrapped standard errors with 1000 replications. Propensity score: probit model and stratification matching with capital, liquidity, profitability, size, presence and market share dummies. Dummies equal to one for banks in the top quartile of the sample distribution. Capital: capital to total assets. Liquidity: ratio of deposits to total loans. Profitability: profits to total assets. Size: logarithm of total assets. Presence: number of provinces in the region where a bank do business. Market share: total loans market share of a bank in the region. Data are as of December 2019. For each segment of the credit market, the analysis includes only banks with no missing observations for both supply and demand. The analysis uses Becker and Ichino (2002). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Twitter Data

COVID-19 tweets must contain at least one of these words: 'coronavirus', 'covid-19', 'covid19', 'covid2019'. Tweets about government intervention in the business loan market must contain at least one of these words: 'prestito garantito' (guaranteed loan), 'aiuto imprese' (firm support), 'liquidità' (liquidity) or 'decreto liquidità' (liquidity decree).

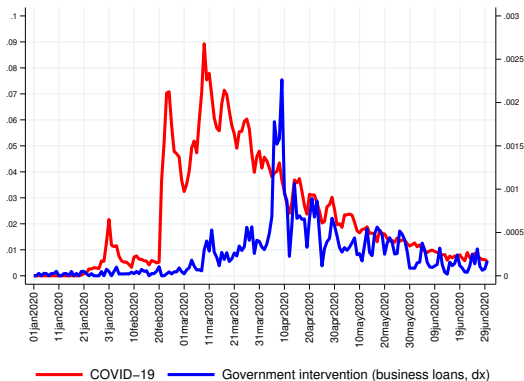


Figure: Tweets, daily data.