Motivating Banks to Lend? Credit Spillover Effects of the Main Street Lending Program

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Federal Reserve Board of Governors

BCBS/CGFS conference "How effective were policy measures in supporting bank lending during the Covid-19 crisis?"

Basel, Switzerland, May 10-11, 2022

Why the Main Street Lending Program?

1. Innovative emergency lending program aimed at supporting the flow of bank credit to small and medium sized firms affected by the Covid-19 pandemic
2. Unique opportunity to study the effects of government interventions in the private loan market due to several key features:
   - reliance on banks to screen and originate loans
   - 95% of eligible loans are removed from banks' balance sheets
   - different from grant-making programs (PPP), funding-for-lending programs (Bank of England, European Central Bank), government loan guarantee programs
   - key function of **backstop** to the bank loan market amid widespread Fed support

This Paper

The program was intended as a backstop: – *"the facility might be used relatively little and mainly serve as a backstop, assuring lenders that they will have access to funding and giving them the confidence to make loans to households and businesses."* (J. Powell, June 30 2020)

Take-up is not necessarily a gauge for success: – *"In assessing the value of the Fed's liquidity facility, it's important not to assess it on how much it's used but assess it on how much it reassures people and changes the perception of risk."* (W. Dudley, 2020)

Our questions: What effects did the MSLP have on the flow of credit to the real economy? Did the MSLP support the flow of credit more generally? Through what channels?

Preview of Results

1. The MSLP encouraged banks to lend beyond the program, despite low overall takeup—*positive externality*
   - MSLP banks were less likely to tighten lending standards and terms on new C&I loans than other banks
   - More likely to originate and renew large C&I loans, and provided relatively better terms on approved loans
   - Granted relatively more small business loans
2. The main channel was a reduction in banks' levels of risk aversion, as opposed to an easing of immediate balance sheet constraints
3. Estimates based on instrumental variables and falsification tests suggest a causal interpretation of our results

Takeaway: *The MSLP contributed to ease—or at least mitigated against further tightening—financial conditions at participating banks, similar to other Fed programs*

Contribution to Literature

Closely related to literature on central banks' emergency lending programs and unconventional monetary policies during pandemic:

- Bank lending during the Covid-19 crisis Berger and Demirguc-Kunt 2021 *Contribution: Deepen our understanding of bank lending decisions in the face of uncertainty shocks and the role of risk perceptions*
- Effectiveness of bank-intermediated credit support programs during Covid-19 crisis Autor et al 2022; Berger et al 2021a,b; Duchin and Hackney 2021; Granja et al 2021; Bartik et al 2020 *Contribution: Study novel lending program, different from funding for lending, government loan guarantee, and grant-making programs, with low takeup.*
- Effects of emergency lending facilities ("The Fed takes credit risk") on market functioning. Gilchrist Wei Yue Zakrajsek 2020; Kargar et al 2021. *Contribution: Existing evidence is on corporate and municipal bond markets, we analyze the private bank loan market.*
- The effects of Fed communications on investor risk attitudes and the role of Fed facilities as backstop Cox Greenwald and Ludvigson 2020; Vissing-Jorgensen 2020. *Contribution: Focus on banks.*

The Main Street Lending Program

The Main Street Lending Program

- Goal: Facilitate the granting of loans to small and mid-sized firms during the Covid-19 crisis ("bridge loans")
- Target: Firms too large to quality for PPP loans but too small to tap the corporate bond and syndicated loan markets (max firm size: 15k workers, revenues $<$\$5 bn). Loan spread 300bps over LIBOR, 5-year maturity, max firm leverage 6xEBITDA
- Key Feature: Fed's SPV purchased 95% of the participation to MSLP eligible borrowers from banks, which retain 5% ("skin in the game") ▸ Low Takeup

- MSLP opened up for registration from banks on June 15 2020; started accepting loans on July 6 2020; expired on December 31 2020.

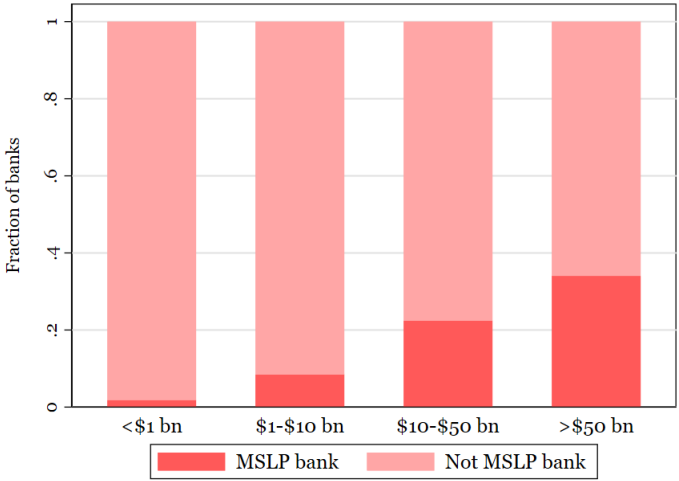
  Our post-MSLP period: $\rightarrow$ 2020:Q3 vs. pre-MSLP: 2020:Q1–2020:Q2

Key Identification Issues

- Exposure measure ("Treatment"): MSLP lending bank ("MSLP bank")
- Key issue: MSLP participation is a decision variable, likely correlated with bank characteristics, including unobservables (especially *credit demand*, e.g., MSLP banks may have faced better local demand conditions)
  - Balancing tables: "Treatment" uncorrelated with demand proxies
  - Control for key bank characteristics (pre/post)
  - Control for credit demand shifts with firm$\times$quarter and bank$\times$firm FE in the microdata; direct measures of credit demand in survey data
- Solutions:
  - Instrumental variables
  - Battery of falsification tests

Bank Participation in the MSLP

Share of Lending Banks by Size



Balancing Table (1): Bank Characteristics by MSLP Participation

▸ Regression Evidence

	MSLP bank *N=101*	Non-MSLP bank *N=791*	p-value coeff (1)=(2)	
Total assets (USD bn)	63.50	16.66	0.003	***
Loans/Assets	72.2%	68.9%	0.043	**
C&I Loans/Loans	30.0%	21.2%	0.000	***
Capital (CET1) ratio	12.1%	14.4%	0.008	***
Voluntary excess CET1 capital	5.0%	7.3%	0.008	***
Core Deposits/Liabilities	48.3%	50.2%	0.162	
Credit line drawdowns (2019:Q4 vs 2020:Q1)	0.3%	0.1%	0.168	
Credit line drawdowns (2020:Q1 vs 2020:Q2)	-1.0%	-0.8%	0.065	*

The table reports average balance sheet characteristics for banks with more than $1 bn in total assets, by MSLP participation status. Credit line drawdowns are defined as the negative of changes in off-balance sheet unused C&I loan commitments between two quarters, divided by total assets in the initial quarter (such as that a positive figure represents drawdowns and a negative figure represents repayments, net of new originations and expired credit lines.)

Balancing Table (2): Bank Demand Conditions by MSLP Participation

	MSLP bank *N=101*	Non-MSLP bank *N=791*	p-value
COVID cases (Mar 1–Dec 15)[1]	0.040	0.041	0.650
COVID cases (Mar 1–Dec 15)[2]	52.06	52.93	0.602
COVID cases (Mar 1–Aug 30)[2]	17.38	17.38	0.996
COVID cases (Mar 1–Oct 30)[2]	27.54	28.05	0.562
Unemployment insurance claims (Jan-Nov)	0.21	0.21	0.672
Unemployment rate, max (Jan-Nov)	14.7%	14.7%	0.958
Unemployment rate, change (Jan-Nov)	3.07	2.98	0.520
% Small firms missed loan payments	16.6%	16.6%	0.977
% Small firms unmet demand through PPP	8.9%	8.5%	0.188
% Small firms affected by COVID	84.6%	85.0%	0.433
% Small firms experienced revenue drop	54.4%	54.8%	0.428
% Small firms permanently closed	27.6%	27.9%	0.712
% Small firms temporarily closed	75.2%	75.7%	0.444

The table reports average bank exposure to local economic conditions for banks with above $1 bn in total assets, by MSLP participation status. Bank exposure is calculated by weighting local economic conditions by the bank's geographic footprint (% deposits in mid-2019) in each location (where location is county[1] or state[2]).

Instrumentation Strategy

- Goal: Address the issue of nonrandom selection into program participation ("treatment")
- Three instruments: Strong predictors of participation but orthogonal on lending decisions. Exploit the idea of familiarity with Fed facilities and processes ▸ IV Relevance
  - A dummy for banks that cited burdensome/costly registration process as a very important reason for not registering
  - Two dummies for banks that are ready to borrow from the discount window — pledged loans *or* securities as collateral (Anbil, Carlson, and Styczynski, 2020)

The Data

- "U.S. credit register"
  - Loan-level data for large business loans (Y-14Q, H.1), large BHCs
  - Loan-portfolio segment data for small business loans (Y-14Q, A.9), large BHCs
- Bank-level survey data on C&I lending standards and terms (Senior Loan Officer Opinion Survey—SLOOS) ▸ Reliability
- Data on program participation (Boston Fed, FRB webpages)
- Bank balance sheet data from the Call Report; macro data on pandemic intensity, labor market conditions, small business conditions, syndicated loan data from Dealscan, etc.

Credit Spillovers: Main Results

Empirical Approach

Examine the effect of MLSP participation on loan outcomes in a diff-in-diff framework. Unit is the bank-firm-quarter:

$$\textit{Loan outcome}_{ijt} = \alpha + \beta \textit{MSLP}_i \textit{ bank} \times \textit{Post}_t + \gamma' \textit{Bank characteristics}_{it} + \delta' \textit{Bank characteristics}_{it} \times \textit{Post}_t + \zeta_{jt} + \eta_i + \theta_{ij} + \epsilon_{ijt}$$

- $\textit{Loan outcome}_{ijt}$: % of renewals, % originations (within bank-borrower pair), # small business loans (log)
- $\textit{MSLP bank}_i \times \textit{Post}_t$: dummy for MSLP banks after program start in 2020:Q3
- $\textit{Bank characteristics}_{it}$: size, loans/assets, C&I loans/loans, capital, and core deposits
- *Fixed effects*: firm$\times$quarter and bank$\times$firm

Credit Spillovers: Evidence from the Credit Register

MSLP banks were more likely to renew maturing loans, originate new loans, and increased the # of small business loan accounts ▸ Full 2020

	(1)	(2)	(3)	(4)	(5)
Dependent variable:	**Renewals** (% loans)		**Originations** (% loans)		**No. small business loans (log)**
	OLS	2SLS	OLS	2SLS	OLS
MSLP bank × Post	0.0166***	0.0273**	0.0140***	0.0267**	0.1734***
	(0.00339)	(0.012)	(0.00331)	(0.013)	(0.048)
No. of observations	78,081	77,172	78,099	77,188	4,458
R^2	0.517	-	0.566	-	0.629
F-stat first stage		2033.8		2031.1	
Hansen over-identification test		0.000		0.008	
Bank controls	Yes	Yes	Yes	Yes	Yes
Bank controls × Post	Yes	Yes	Yes	Yes	Yes
Borrower × quarter FE	Yes	Yes	Yes	Yes	
Bank FE	Yes	Yes	Yes	Yes	Yes
Loan segment × quarter FE					Yes

OLS and 2SLS regressions using credit register data from the Y-14Q H1 and A9 schedules. The data are at the bank-firm-quarter level (cols 1-4) or bank-loan segment-quarter level (col 5) over 2020:Q1–2020:Q3. Standard errors are clustered on bank-firm (col 1-4) or bank-quarter (col 5). *** 1%, ** 5%, * 10%, # 15%.

Credit Spillovers: Evidence from Survey Data

MSLP banks were less likely to report tightening C&I lending standards

	(1)	(2)	(3)	(4)
Dependent variable	**Bank reports tightening C&I lending standards**			
	OLS	OLS	2SLS	2SLS
MSLP bank × Post	-0.1473**	-0.1542**	-0.6652*	-0.6043*
	(0.017)	(0.019)	(0.383)	(0.376)
MSLP bank	-0.0283	-0.0214	-0.6267	-0.6877*
	(0.017)	(0.018)	(0.383)	(0.376)
Post	-0.0552		-1.2682***	
	(0.531)		(0.328)	
Observations	405	405	405	405
R^2	0.121	0.162	-	-
F-stat first stage MSLP bank × Post			14.38	14.02
Hansen over-identification test			0.0995	0.0995
Bank controls	Yes	Yes	Yes	Yes
Bank controls × Post	Yes	Yes	Yes	Yes
Loan demand	Yes	Yes	Yes	Yes
Loan demand × Post	Yes	Yes	Yes	Yes
Survey FE		Yes		Yes
Firm size FE	Yes	Yes	Yes	Yes

OLS and 2SLS regressions using SLOOS survey data. The data are at the bank-borrower size-survey (quarter) level over 2020:Q1–2020:Q3. Standard errors are clustered on survey. *** 1%, ** 5%, * 10%, # 15%.

Credit Spillovers: Intensive Margin Results for Syndicated Loans

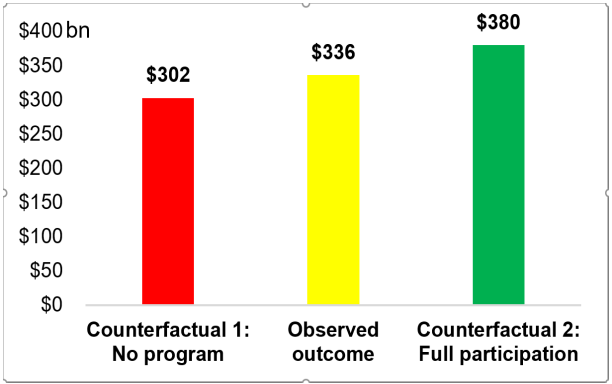
Intensive margin results for syndicated loan data from Dealscan, which offers external validity and larger sample of banks.

	(1)	(2)	(3)	(4)
Dependent variable:	**Log-amount**	**Spread over LIBOR**	**Log-amount**	**Spread over LIBOR**
	OLS	OLS	2SLS	2SLS
MSLP bank × Post	0.1127**	-0.1351***	0.2818***	-0.3817#
	(0.048)	(0.043)	(0.104)	(0.302)
Observations	4,858	4,232	4,297	3,886
R^2	0.563	0.616	-	-
First-stage	-	-	14.02	7.53
Hansen over-identification test	-	-	0.000	0.224
Bank controls	Yes	Yes	Yes	Yes
Bank controls × Post	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Borrower cluster × quarter FE	Yes	Yes	Yes	Yes

OLS and 2SLS regressions using Dealscan data on new syndicated loan originations. Sample limited to lead arrangers. The data are at the bank-borrower cluster-quarter level over 2020:Q1–2020:Q3. Borrower clusters comprise all borrowers in the same industry (two-digit NAICS) and U.S. state. Standard errors are clustered on bank-quarter. *** 1%, ** 5%, * 10%, # 15%.

Economic Interpretations

Back of the envelope calculations on our estimates indicate that:



- **Counterfactual #1**: Without the program, in the Y-14Q sample (assets $>$ 100bn), total loan renewals and originations in 2020:Q3 would have been **10%** lower than they were.
- **Counterfactual #2**: If all the Y-14Q banks had participated in the program, total loan renewals and originations in 2020:Q3 would have been **13%** higher than they were.
- **Similarly**, in the SLOOS sample (assets $>$ 2bn), without the program, the share of banks that would have tightened credit standards in 2020:Q3 would have been higher by close to 5 ppts than what it was (37.5%). If all banks had participated, the share of banks that would have tightened credit standards in 2020:Q3 would have been lower by almost 10 ppts.

Mechanisms

Two Mutually-Nonexclusive Mechanisms Behind Our Results

Risk aversion mechanism:

- The monetary authority's credible commitment to provide a liquidity backstop can change market participants' risk perceptions and boost willingness to take risk
- Evidence from the stock market suggests Fed communications early in the pandemic helped market turnaround by improving sentiment rather than substance (Cox Greenwald and Ludvigson 2020)

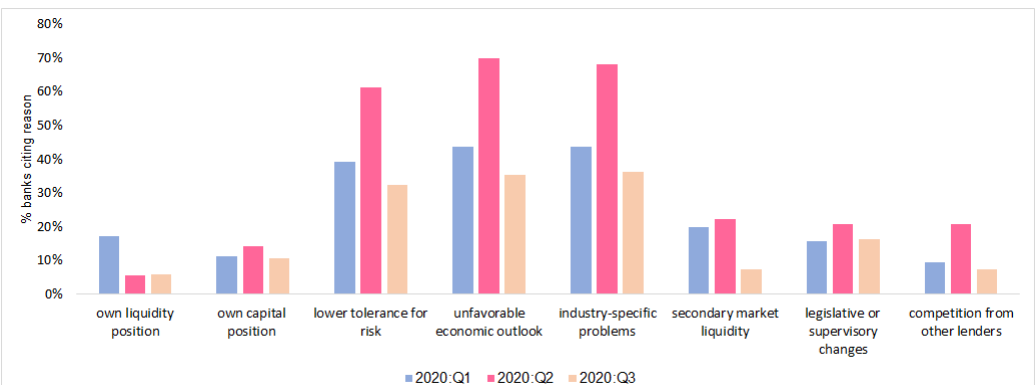
Balance sheet constraints mechanism:

- MSLP eases lending constraints directly by removing 95% of credit exposure from the lenders' balance sheet
- MSLP eases future lending constraints by providing the option to originate C&I loans in the future (and remove risk from balance sheet)

Empirical tests: Exploit indicators of risk management practices and balance sheet constraints, and survey data on reasons for tightening credit standards

Mechanisms: Why Were Banks Tightening Credit Standards in 2020?

Most banks cited a lower tolerance for risk, an unfavorable economic outlook, and industry-specific problems (with written comments about COVID-sensitive industries)



The figure shows the fraction of domestic banks that rated each of six reasons as a "somewhat" or "very important" possible reason for tightening credit standards or terms C&I loans or credit lines. (The banks are asked to rate each possible reason using the following scale: 1=not important, 2=somewhat important, 3=very important.) The survey addresses changes in the standards and terms on bank loans over the quarter. Source: Federal Reserve Senior Loan Officer Opinion Survey, reproduced from Kapan and Minoiu (2020).

Mechanisms: Evidence from SLOOS

MSLP banks were less likely to cite a rise in risk aversion as a key reason for tightening C&I lending standards. No role for *immediate* balance sheet constraints. No evidence that other reasons mattered differentially.

▸ Additional ▸ Reliability

	(1)	(2)	(3)
Dependent variable:	**Bank cites reason as "very important" for tightening lending standards:**		
	lower risk tolerance	own capital position	own liquidity position
MSLP bank × Post	-0.3524***	-0.0429	0.0216
	(0.125)	(0.063)	(0.021)
MSLP bank	0.0389	-0.0095	-0.0154
	(0.110)	(0.050)	(0.016)
Observations	103	99	103
R^2	0.171	0.121	0.109
Bank controls	Yes	Yes	Yes
Bank controls × Post	Yes	Yes	-
Loan demand	Yes	Yes	Yes
Loan demand × Post	Yes	Yes	Yes
Survey FE	Yes	Yes	Yes

OLS regressions using SLOOS survey data. The data are at the bank-borrower size-survey (quarter) level over 2020:Q1–2020:Q3. Standard errors are clustered on survey.

Mechanisms: Evidence from Bank Risk Management Index

MSLP banks with stronger risk controls (higher risk management index (RMI))—likely more risk averse—were more likely to renew maturing loans and less likely to tighten lending standards. The RMI reflects the strength of the risk management function (presence of CRO, role and status of the CRO, compensation, experience of risk committee members, and meeting frequency).

	(1)	(2)	(3)
Dependent variable:	**Renewals** (% loans)	**Originations** (% loans)	**Bank tightened C&I lending standards**
MSLP bank × Post × Below-mean risk controls (1)	-0.0099	0.0292***	-0.1952***
	(0.007)	(0.009)	(0.015)
MSLP bank × Post × Above-mean risk controls (2)	0.0176***	0.0091**	-0.2407***
	(0.005)	(0.004)	(0.016)
No. of observations	55,265	55,258	175
R^2	0.641	0.751	0.216
P-value t-test: coeff $\|1\| < \|2\|$	0.000	1.000	0.002
Bank controls	Yes	Yes	Yes
Bank controls × Post	Yes	Yes	Yes
Borrower × quarter FE	Yes	Yes	
Bank × borrower FE	Yes	Yes	
Survey and firm size FE			Yes

OLS regressions using the credit register and SLOOS survey data. The data are at the bank-borrower-quarter level (cols 1-2) and at the bank-borrower size-survey (quarter) level (col 3) over 2020:Q1–2020:Q3. Data on the RMI was generously provided by Ellul and Yerramilli 2013.

Mechanisms: Evidence from Bank Balance Sheets

on balance, constrained banks show relatively larger effects, but the evidence is somewhat mixed. Banks are constrained if they have: below-median excess capital buffers; below-median equity issuance; above-median weighted average cost of liabilities; below-median core deposits as a share of total liabilities; and above-median loan loss reserves.

Dependent variable:	(1) **Excess capital**	(2) **Equity issuance**	(3) **Cost of capital**	(4) **Deposit share**	(5) **Loan loss reserves**
			A. Renewals (% loans)		
MSLP bank × Post × Constrained [1]	0.0250***	0.0089**	0.0183***	0.0110***	0.0214***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
MSLP bank × Post × Unconstrained [2]	0.0088**	0.0216***	0.0128**	0.0280***	0.0043
	(0.004)	(0.004)	(0.006)	(0.005)	(0.005)
No. of observations	78,081	78,081	77,951	78,081	78,081
R^2	0.517	0.517	0.517	0.517	0.517
p-value t-test Ha: $\|1\| > \|2\|$	0.001	1.000	0.176	1.000	0.001
Bank controls	Yes	Yes	Yes	Yes	Yes
Bank controls × Post	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes
Borrower × quarter FE	Yes	Yes	Yes	Yes	Yes

OLS regressions using the credit register data. The data are at the bank-borrower-quarter level over 2020:Q1–2020:Q3.

Falsification Tests and Additional Results

Robustness and falsification tests:

- Control for credit line drawdowns and loan loss reserves ▸ CLDDs
- Control for bank cyclicality ▸ Cyclicality
- Falsification tests for the PPP ▸ PPP 1 ▸ PPP 2
- Placebo tests ▸ Placebo

Additional results:

- Why was takeup so low? ▸ Reasons
- Who were the borrowers? ▸ Borrower analysis

Conclusions

After the MSLP's implementation in mid-2020, participating banks:

- Were more likely to renew maturing loans and grant new loans, and increased the number of small business loan accounts
- Were less likely to tighten C&I lending standards and terms than other banks
- Were less likely to report a reduction in risk tolerance as very important reasons for tightening C&I lending standards—"risk-aversion" channel—suggesting role of "psychological backstop"

- Despite low overall takeup, the MSLP increased banks' willingness to take risk and extend loans to businesses, supporting the provision of credit to the real sector during a crisis, and consistent with the goals of the policy as a backstop.

Additional Slides

Balance Sheet Predictors of MSLP Participation

MSLP banks were larger, traditional lenders, relatively more funding-constrained.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. var.:	1: MSLP bank							
	Large	Large	Large	Large	Large	Large	Small	All
Size (log-assets)	0.0519***					0.0571***	0.0112***	0.0264***
	(0.011)					(0.010)	(0.002)	(0.003)
Loans/Assets		0.1393***				0.1673***	0.0536***	0.0492***
		(0.047)				(0.065)	(0.013)	(0.015)
C&I Loans/Loans			0.4816***			0.4120***	0.1622***	0.2153***
			(0.087)			(0.082)	(0.031)	(0.030)
CET1 ratio				-0.3452***		-0.3362**	0.0151	0.0075
				(0.077)		(0.161)	(0.028)	(0.029)
Core Deposits/Liabilities					-0.1149	-0.1573**	-0.0648***	-0.0711***
					(0.074)	(0.076)	(0.021)	(0.023)
Observations	892	892	885	892	892	885	4,104	4,989
R^2	0.045	0.005	0.042	0.008	0.008	0.100	0.045	0.087

OLS regressions using data from the Call Report on samples of large banks (with more than $1 bn in total assets, cols 1-5), small banks (with less than $1 bn in total assets, col 6), and all banks (col 7). *** 1%, ** 5%, * 10%, # 15%.

Instrument Relevance

The Instrumental Variables are strongly correlated with the treatment variable in our main regression samples

	Y14-Q H1 sample	SLOOS sample	Dealscan sample
MSLP registration was costly	-0.1290***	-0.1436***	-0.0610***
Pledged securities at discount window	-0.4927***	-0.0426**	-0.4363***
Pledged loans at discount window	0.1149***	0.0870**	0.0703***

Control for Credit Line Drawdowns and Loan Loss Reserves

Controlling for changes in off balance-sheet C&I loan exposures and loan loss reserves leaves our main results unchanged.

	(1)	(2)	(3)	(4)
Dependent variable:	**Renewals** (% loans)		**Originations** (% loans)	
MSLP bank × Post	0.0129***	0.0168***	0.0140***	0.0171***
	(0.003)	(0.004)	(0.003)	(0.003)
Credit Line Exposures	0.5079***		0.2449***	
	(0.138)		(0.079)	
Credit Line Exposures × Post	-3.1443***		-0.0981	
	(0.438)		(0.290)	
Loan loss reserves		0.2076		-1.5261***
		(0.452)		(0.433)
Loan loss reserves × Post		-0.9886**		0.7228**
		(0.415)		(0.355)
No. of observations	78,081	78,081	78,099	78,099
R^2	0.518	0.517	0.566	0.566
Bank controls	Yes	Yes	Yes	Yes
Bank controls × Post	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Borrower × quarter FE	Yes	Yes	Yes	Yes

Control for Bank Cyclicality

Controlling for the degree of bank cyclicality (comovement between the growth of a bank's loan balances and that of loan balances in the entire banking system) leaves our results unchanged.

	(1)	(2)	(3)	(4)
Dependent variable:	**Renewals** (% loans)		**Originations** (% loans)	
MSLP bank × Post	0.0084*** (0.003)	0.0100*** (0.003)	0.0101*** (0.003)	0.0100*** (0.003)
Bank cyclicality[1] × Post	-0.0036*** (0.001)		-0.0019* (0.001)	
Bank cyclicality[2] × Post		0.0216** (0.010)		-0.0148* (0.008)
No. of observations	78,081	78,081	78,099	78,099
R^2	0.516	0.516	0.566	0.566
Bank controls	Yes	Yes	Yes	Yes
Bank controls × Post	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Borrower × quarter FE	Yes	Yes	Yes	Yes

We measure bank cyclicality using quarterly data from the Call Report as the sensitivity of the bank-level C&I loan balances to aggregated banking-system C&I loan balances from two regressions that we run for each bank over the period between 1985:Q1 and 2021:Q2: (1) yearly growth rate of bank-level credit on aggregate credit; and (2) log-log specification of bank-level loan balances on aggregate loan balances. The sample period is 2020:Q1-2020:Q3. *** 1%, ** 5%, * 10%, # 15%.

Control for PPP Loan Balances

Controlling for the intensity of PPP participation in 2020:Q2 or Q3 leaves the main results unchanged.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	**Renewals** (% loans)		**Originations** (% loans)		**No. small business loans (log)**	
MSLP bank × Post	0.0148***	0.0138***	0.0127***	0.0101***	0.1928***	0.1919***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.057)	(0.056)
PPP loans/assets 2020:Q2 × Post	1.1934***		0.8345***		-3.8696	
	(0.258)		(0.233)		(3.332)	
PPP loans/assets 2020:Q3 × Post		1.226***		0.432**		-3.7486
		(0.264)		(0.200)		(3.267)
No. of observations	78,081	75,823	78,099	75,829	4,458	4,458
R^2	0.517	0.688	0.566	0.739	0.629	0.629
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls × Post	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Borrower × quarter FE	Yes	Yes	Yes	Yes		
Loan segment × quarter FE					Yes	Yes

OLS. The data are at the bank-firm-quarter level in cols 1-4 and bank-loan segment-quarter level in cols 5-6, over the period 2020:Q1–2020:Q3. *** 1%, ** 5%, * 10%, # 15%.

Correlation of MSLP Participation Status and PPP Lending Outcomes

MSLP participation status does not predict PPP lending outcomes, suggesting no spillover effects via PPP participation.

Dependent variable:	(1)	(2)
	Amount of government guaranteed small business loans (log)	
	Sample: 2020:Q3	*Sample: 2020:Q4*
MSLP bank	0.0497	0.0358
	(0.074)	(0.043)
No. of observations	915	1,918
R^2	0.690	0.724
Bank controls	Yes	Yes
Segment FE	Yes	Yes

OLS. The data are at the bank-loan portfolio segment level for 2020:Q3 or Q4. Standard errors are clustered at the bank-quarter level. *** 1%, ** 5%, * 10%, # 15%.

Placebo Test

Placebo test that centers the analysis on 2018 (or 2019, not shown) shows no evidence that bank unobservables are driving the association between MSLP participation status and lending outcomes.

Dependent variable:	(1) **Renewals** (% loans)	(2) **Originations** (% loans)	(3) **No. of small bus. loans (log)**	(4) **Bank reports tightening C&I lending standards**	(5)
MSLP bank × Post	0.00389	0.00128	-0.0678	-0.0095	-0.0096
	(0.00480)	(0.00472)	(0.084)	(0.022)	(0.022)
MSLP bank				-0.0214	-0.0213
				(0.023)	(0.023)
Post				-0.6924*	
				(0.207)	
No. of observations	71,018	71,033	4,723	373	373
R^2	0.676	0.771	0.695	0.070	0.070
Bank controls	Yes	Yes	Yes	Yes	Yes
Bank controls × Post	Yes	Yes	Yes	Yes	Yes
Survey FE					Yes
Firm size FE				Yes	Yes
Borrower × quarter FE	Yes	Yes	Yes		
Bank × borrower FE	Yes	Yes			
Segment × quarter FE			Yes		

OLS. The data are at the bank-firm-quarter level in cols 1-2, bank-loan segment-quarter level in col 3 and at the bank-borrower size-survey (quarter) level in cols 4-5, over the period 2018:Q1–2018:Q3. *** 1%, ** 5%, * 10%, # 15%.

Robustness to Extending Sample Period to 2020:Q4

Results are robust to extending the sample period through end-2020 but coefficient magnitudes are lower than in the baseline, suggesting diminished effects in 2020:Q4 when it was announced the program would expire.

	(1)	(2)	(3)
Dependent variable:	**Renewals (% loans)**	**Originations (% loans)**	**No. small business loans (log)**
MSLP bank×Post	0.00815***	0.0168***	0.1093#
	(0.00283)	(0.00286)	(0.080)
No. of observations	103,851	103,821	5,971
R^2	0.578	0.520	0.635
Bank controls	Yes	Yes	Yes
Bank controls×Post	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
Borrower×quarter FE	Yes	Yes	
Loan segment×quarter FE			Yes

OLS. The data are at the bank-firm-quarter level in cols 1-2 and bank-loan segment-quarter level in col 3, over the period 2020:Q1–2020:Q3. *** 1%, ** 5%, * 10%, # 15%.

Mechanisms: Additional Evidence from SLOOS

MSLP banks were no more likely to cite a less favorable economic outlook, secondary market illiquidity, industry-specific problems, and legislative & regulatory changes as key reasons for tightening C&I lending standards. Back

	(1)	(2)	(3)	(4)
Dependent variable:	**Bank cites each reason below as very important for tightening C&I lending standards:**			
	less favorable economic outlook	*secondary market illiquidity*	*industry specific problems*	*legislative & regulatory changes*
MSLP bank × Post	-0.0990	-0.1108	0.0084	-0.1681
	(0.198)	(0.085)	(0.157)	(0.117)
MSLP bank	0.0786	0.0520	0.0977	-0.0202
	(0.067)	(0.060)	(0.103)	(0.072)
Observations	104	104	104	103
R^2	0.098	0.149	0.122	0.165
Bank controls	Yes	Yes	Yes	Yes
Bank controls × Post	Yes	Yes	Yes	Yes
Loan demand	Yes	Yes	Yes	Yes
Loan demand × Post	Yes	Yes	Yes	Yes
Survey FE	Yes	Yes	Yes	Yes

OLS regressions using SLOOS survey data. The data are at the bank-borrower size-survey (quarter) level over 2020:Q1–2020:Q3. Standard errors are clustered on survey. *** 1%, ** 5%, * 10%, # 15%.

Are SLOOS Survey Data Reliable?

Banks were more likely to report poor capital and liquidity positions as a reason for tightening C&I lending standards during the Great Recession than the Covid-19 pandemic; equally likely to cite changes in risk tolerance; and less likely to report concerns over worsening of industry-specific problems. Back

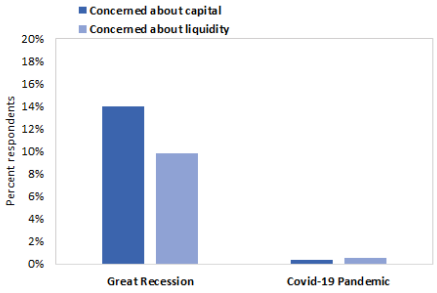


Figure: Capital and Liquidity Positions

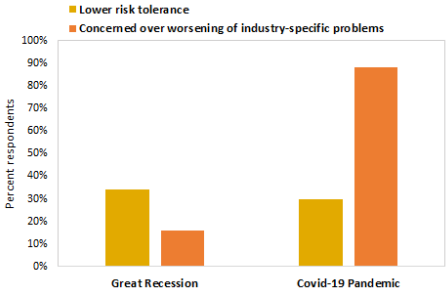


Figure: Risk Tolerance and Sectoral Problems

This figure tabulates bank-level responses to survey questions asked in the 2008:Q3 (October) and 2020:Q2 (July) SLOOS. Panel (a) shows the percentage of banks that reported a deterioration in the current or expected capital position and respectively in the current or expected liquidity position as very important reasons for tightening C&I lending standards. Panel (b) shows the percentage of banks that reported reduced tolerance for risk and a worsening of industry-specific problems as as very important reasons for tightening C&I lending standards. Source: Federal Reserve Senior Loan Officer Opinion Survey.

Why Was Program Takeup So Low?

Both lender terms and borrower terms discouraged participation. Back

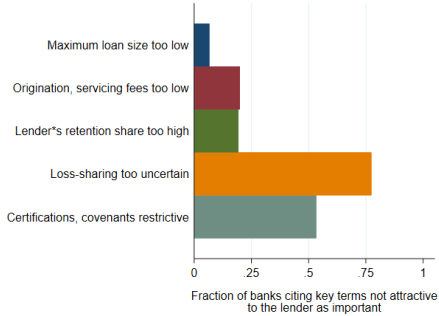


Figure: Banks' Reasons Not to Participate

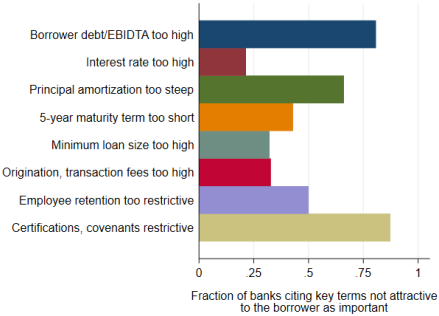


Figure: Firms' Reasons Not to Participate

This figure tabulates bank-level responses to survey questions asked in the September 2020 MSLP SLOOS that examined the determinants of banks' MSLP participation. The panels show the key lender and borrower terms cited by banks as reasons for not registering or lending (pooled across banks that did not register and banks that registered but did not lend as of survey close at end-August 2020). Source: Federal Reserve Senior Loan Officer Opinion Survey.

Borrower Analysis: Who Borrowed Under the Program?

MSLP borrowers are more levered, have lower cash buffers and lower current profitability, and assessed as riskier by banks. But they also significantly higher growth opportunities compared to eligible non-MSLP borrowers. Back

	(1)	(2)	(3)	(4)	(5)	(6)
	MSLP borrowers *(N=159)*		**Eligible non-borrowers borrowers** *(N=26,729)*		**p-value t-tests**	
	Means	Medians	Means	Medians	Means	Medians
Total assets ($mn)	169.47	27.46	909.34	20.49	0.26	0.00
ICR (EBITDA/interest expense)	15.31	6.44	33.88	12.96	0.00	0.00
ROA (EBITDA/assets, %)	18.83	15.66	22.50	16.25	0.04	0.56
Debt-to-asset ratio (%)	40.69	38.00	27.86	22.89	0.00	0.00
Cash-to-asset ratio (%)	9.07	4.84	12.18	6.73	0.01	0.00
Sales growth (%)	24.10	10.26	12.65	7.54	0.00	0.02
Rating (1=AAA, 5=BB, 9=C)	5.40	5.00	4.63	5.00	0.00	0.00

This table reports means and medians for key C&I borrower and loan characteristics for MSLP borrowers and eligible non-borrowers, with p-values for t-tests of equality of means and medians across the two groups using financials data for end-2019. Borrower MSLP eligibility is defined using the following criteria: (i) the firm had 2019 annual revenues of up to $5 billion; (ii) total debt does not exceed 6x the 2019 EBITDA; (iii) internal risk rating equivalent to a "pass" in the FFIEC supervisory rating system (or not worse than BB on the S&P rating scale). We have matched 159 MSLP borrowers from the MSLP loan data release of January 11 with the Y-14Q dataset as of 2019:Q4, using exact and scrubbed matching by the borrowers' name and city-state location. Source: FR Y-14Q H1 schedule, Federal Reserve.