THE RESILIENCE OF THE U.S. CORPORATE BOND MARKET DURING FINANCIAL CRISES

Bo Becker (Stockholm School of Economics, CEPR, ECGI)
Efraim Benmelech (Kellogg, NBER)

Background

- US corporate bond market proved very resilient in 2020
  - Resilient ≡ high issuance volumes (in crisis period)
- We document extent and properties of issuance
  - IG > HY
  - Bonds > Loan market
  - Similarities with prior crises
- Why?
  - Some evidence

Summary of the main empirical finding

- U.S. corporate bond issuance was very high in 2020:Q1 and Q2
  - 600 bonds vs normal around 300
- Vast majority of bonds issued were Investment Grade
- Loan issuance was low, including IG loans
- Recent crises appear similar

Causes and consequences

- We discuss the evidence for three explanations
  - Bond issuers do better (than loan-financed firms) in crises
  - Banks are subject to (more) frictions (than bond market)
  - Monetary policy has more (faster) impact on bond markets

- Some support for each

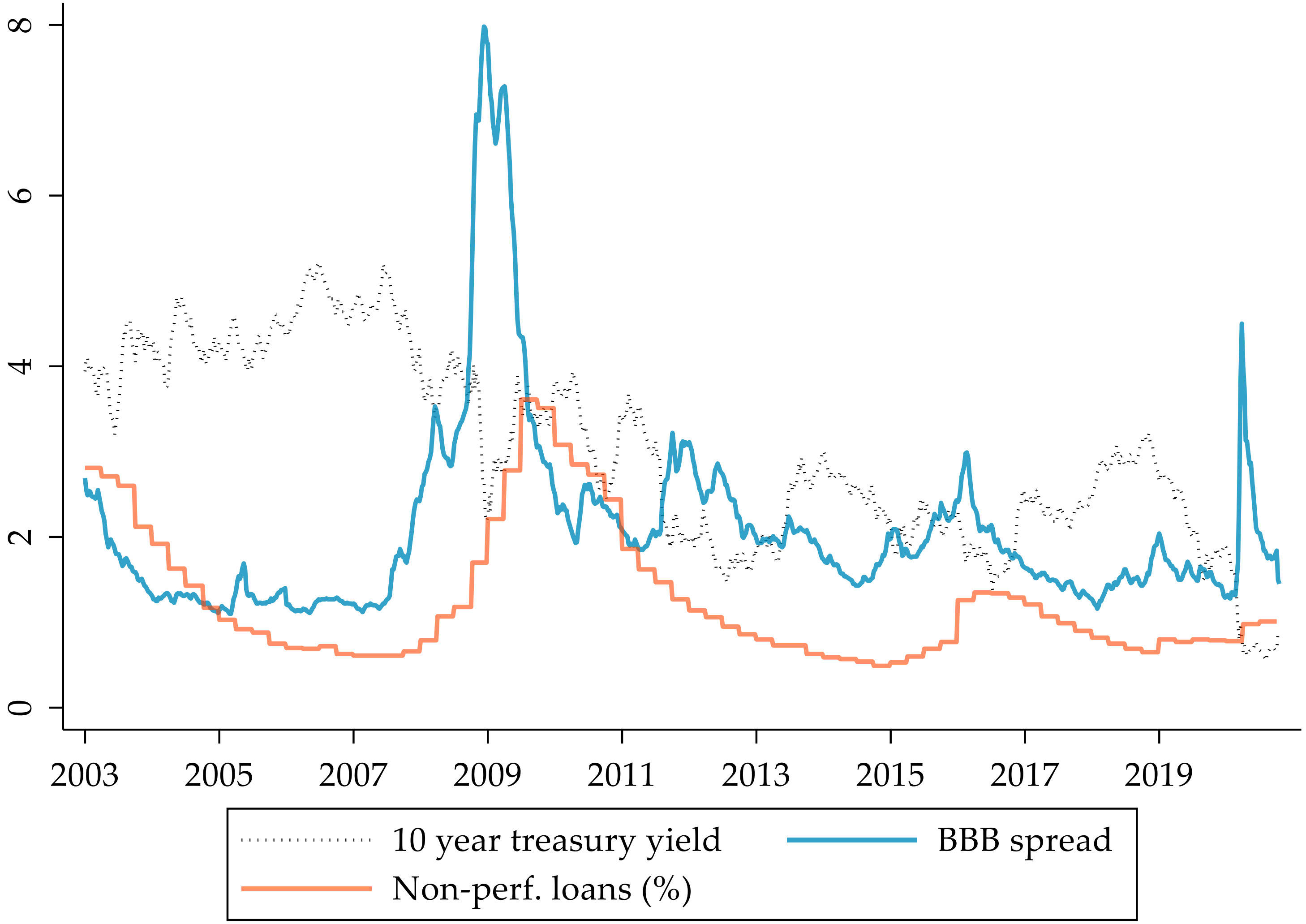
Related literature

- Covid impact on financial markets
  - Halling, Yu and Zechner (2020); Darmouni and Siani (2021); Hotchkiss, Nini and Smith (2020); Acharya and Steffen (2020); Greenwald, Krainer, Paul (2020); Li, Strahan, Zhang (2020)
- Cyclical behavior of different credit markets
  - Kashyap, Stein and Wilcox (1993); Holmström Tirole (1997); Greenwood Hanson (2013); Becker Ivashina (2014); Benmelech and Bergman (2017)
- Bond market's role in corporate finance
  - Becker and Josephson (2016); Crouzet (2020); Berg, Saunders and Steffen (2020); Benmelech, Kumar and Rajan (2021); Scharfstein (2018)
- Unconventional monetary policy impact
  - Krishnamurthy and Vissing-Jørgensen (2012); Stein (2012); Jiménez, Ongena, Peydró and Saurina (2014); Kuttner (2018)
- International flows and corporate bond market
  - Farhi and Gabaix (2016); Caballero, Farhi and Gourinchas (2017); Corsetti and Marin (2020)

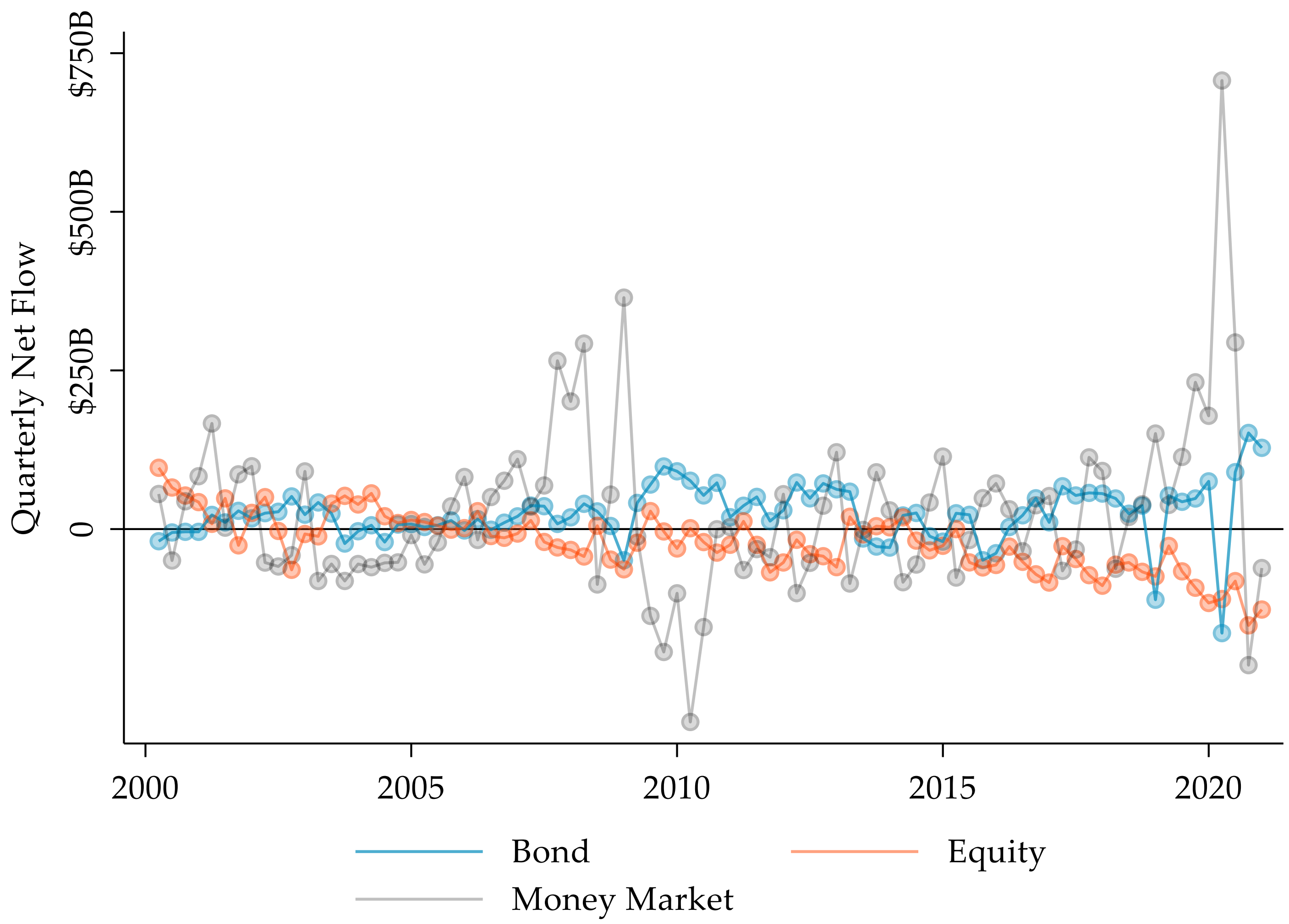
Data

- SDC: bond issues (# and value)
  - Drop convertibles, non-US issues, and financial bonds
- Dealscan (Refinitiv): syndicated/leveraged loans (# and value)
  - Term loans
  - Modifications not counted as loans, but +/- $ added to value
- Time-series variables
  - FRED: 1yr & 10yr treasury rates, credit spread (BBB option-adjusted), non-performing loans
  - ICI: mutual fund flow
- Compustat: issuer data

Time series variables



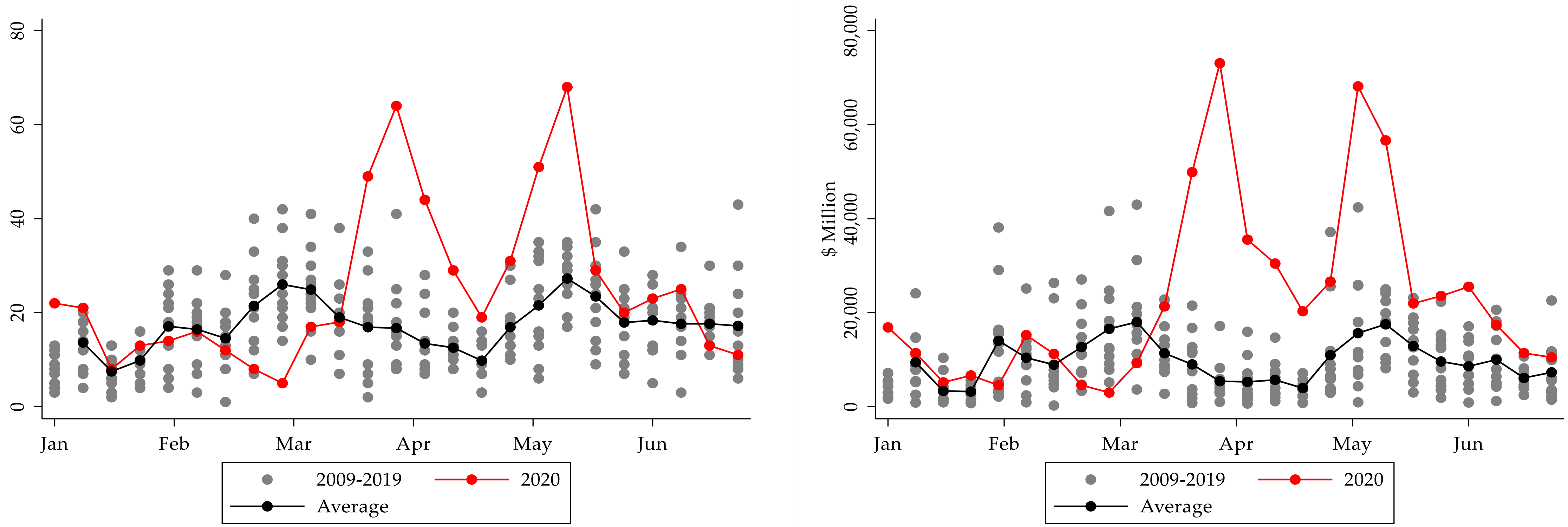
Mutual fund flows



Total net flows 2020 ($B):

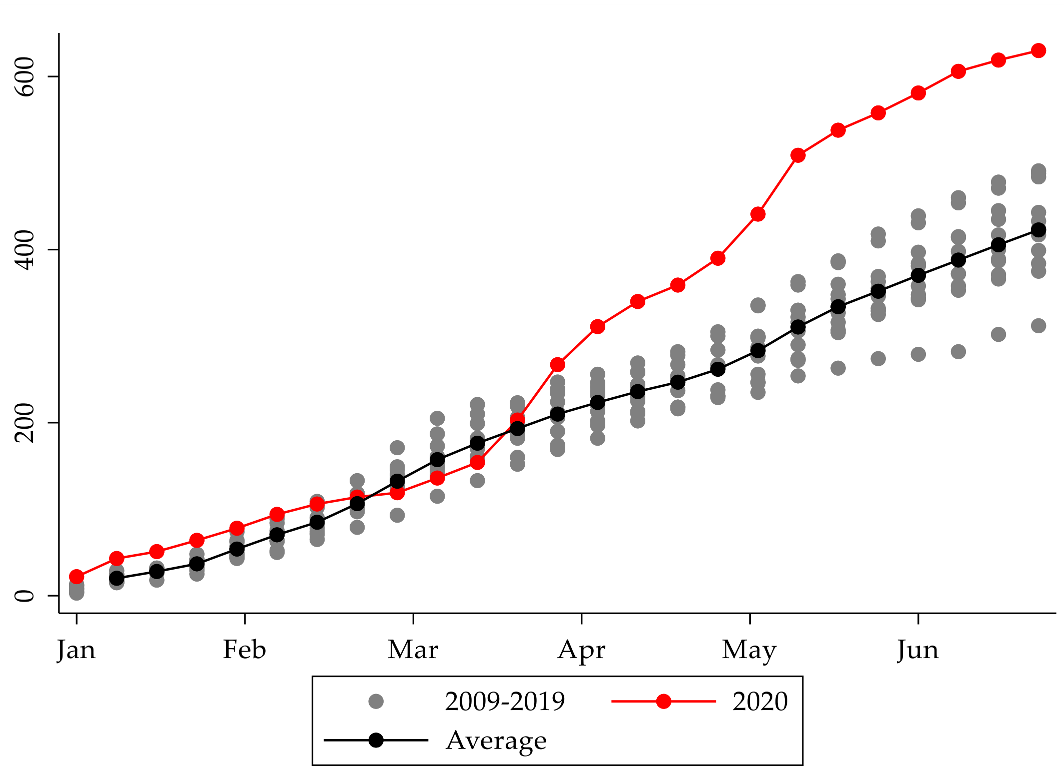
Bond	205
Equity	-471
MM	725
World	-15
Muni	40
MuniMM	-33
Hybrid	-84

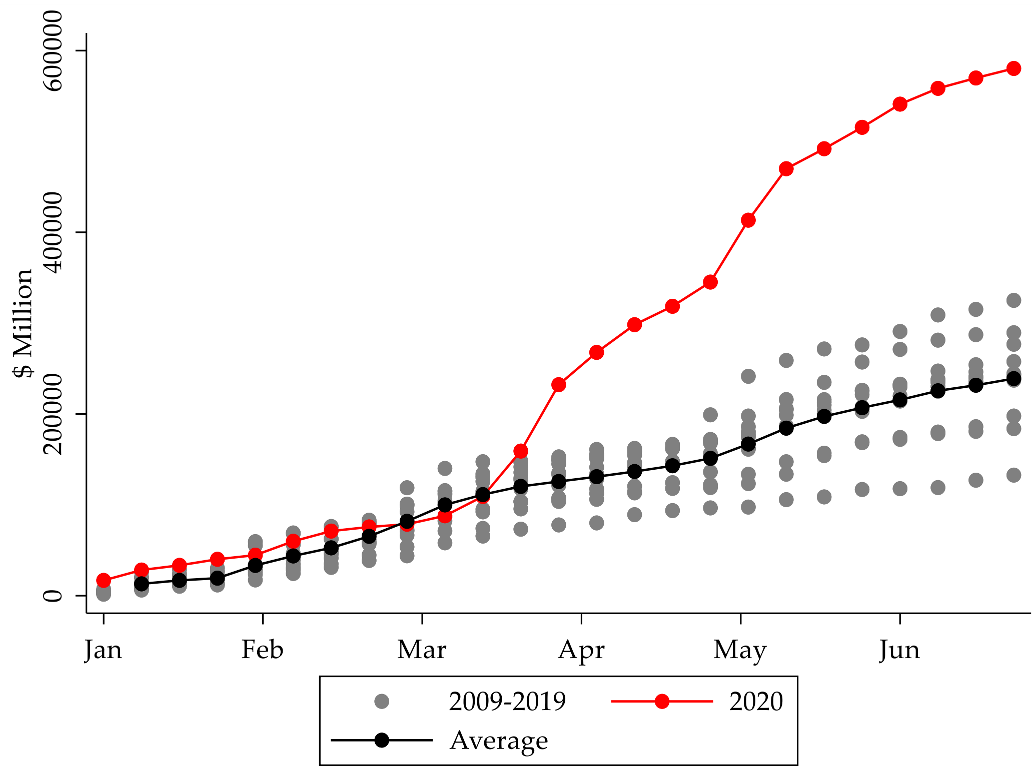
Bond issuance in 2020Q1-2



Number on the left (Fig 1 A), value on the right (Fig 1 B)

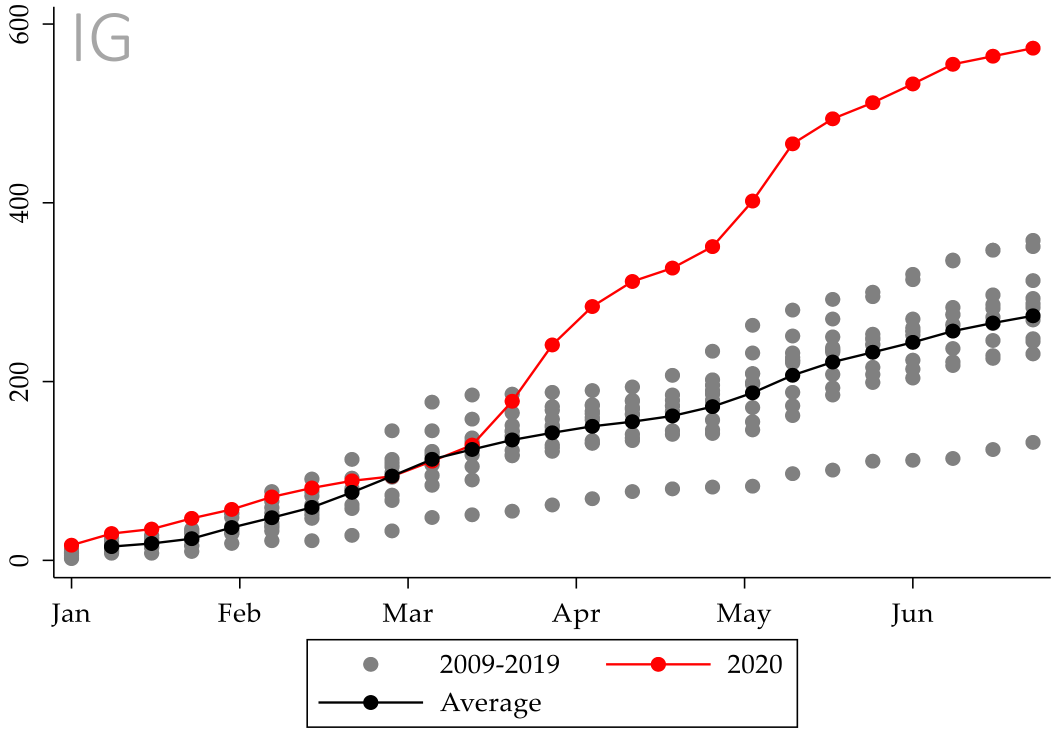
2020 bond issuance (cumulative)

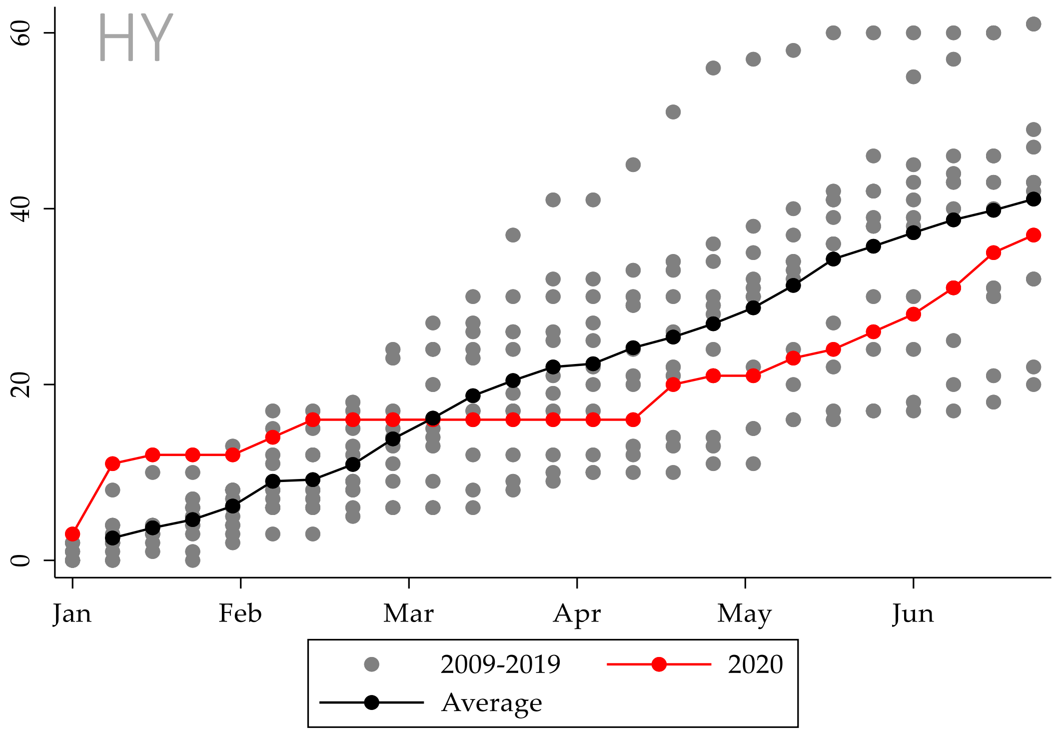




Number on the left (Fig 2 A), value on the right (Fig 2 B)

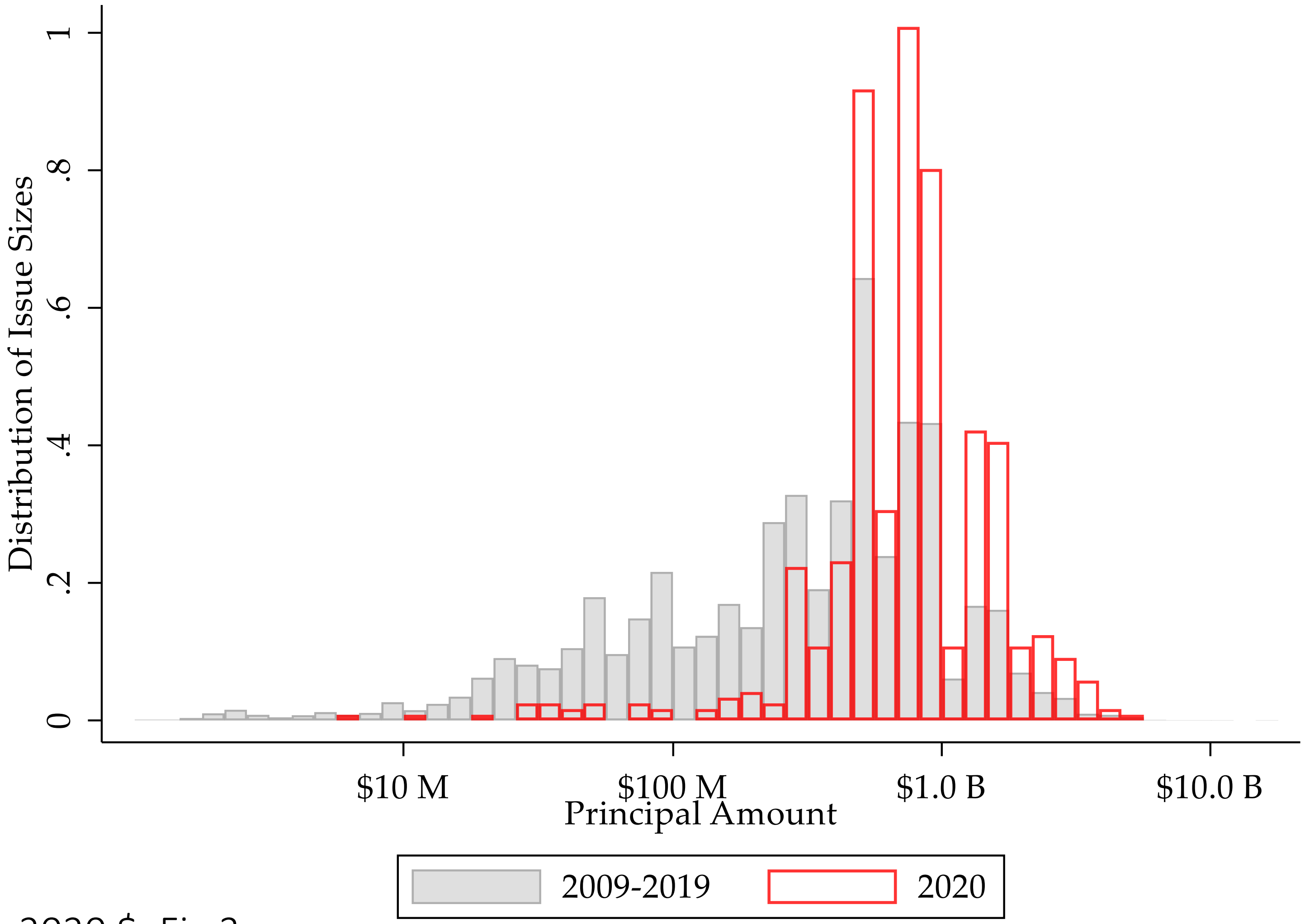
IG dominated bond issuance (cumulative)





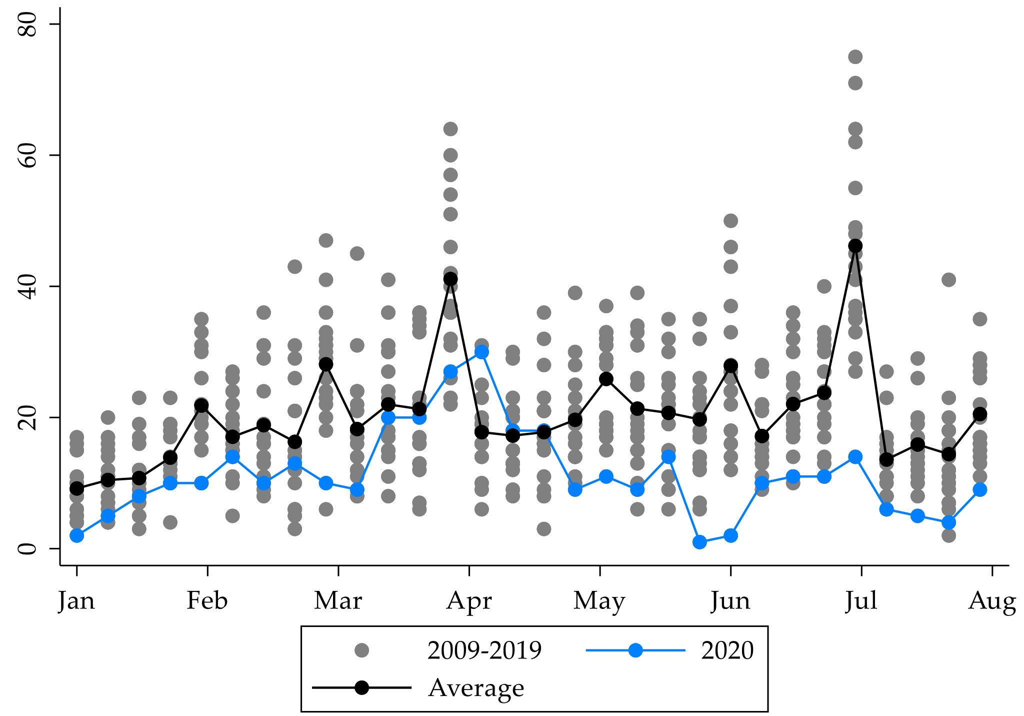
Number of bonds. IG on left (Fig 3 A), HY on the right (Fig 3 B). NB around a quarter of bonds are unrated.

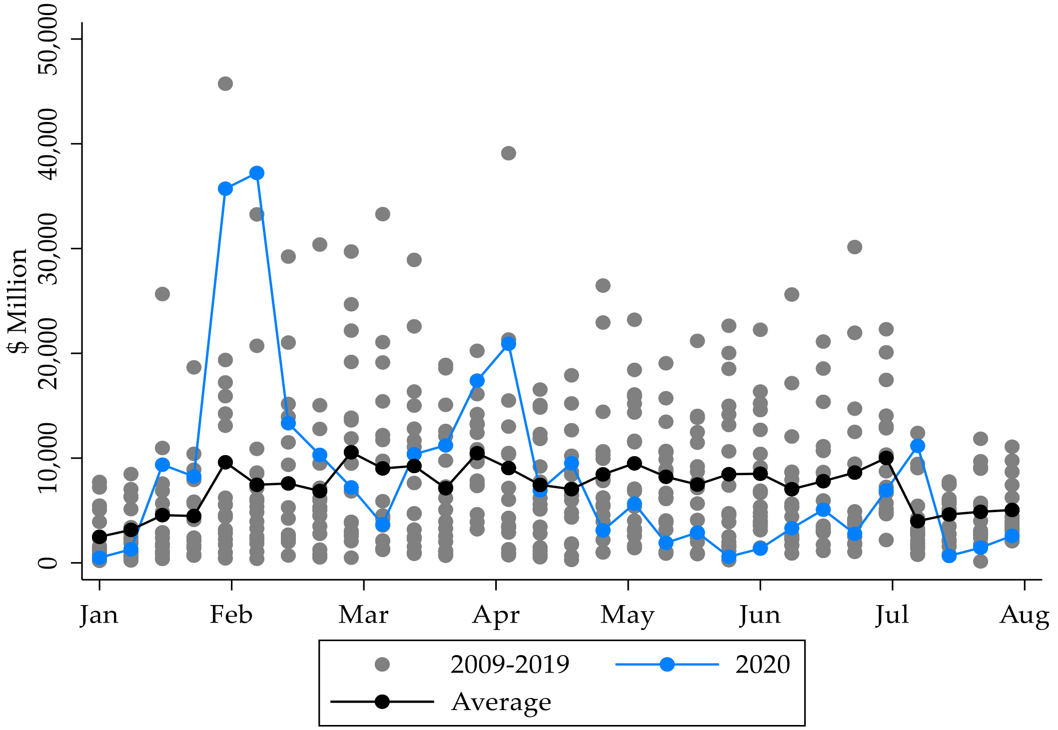
Issue size larger than normal in 2020



Real size, 2020 $. Fig 3

Loans much slower than bonds



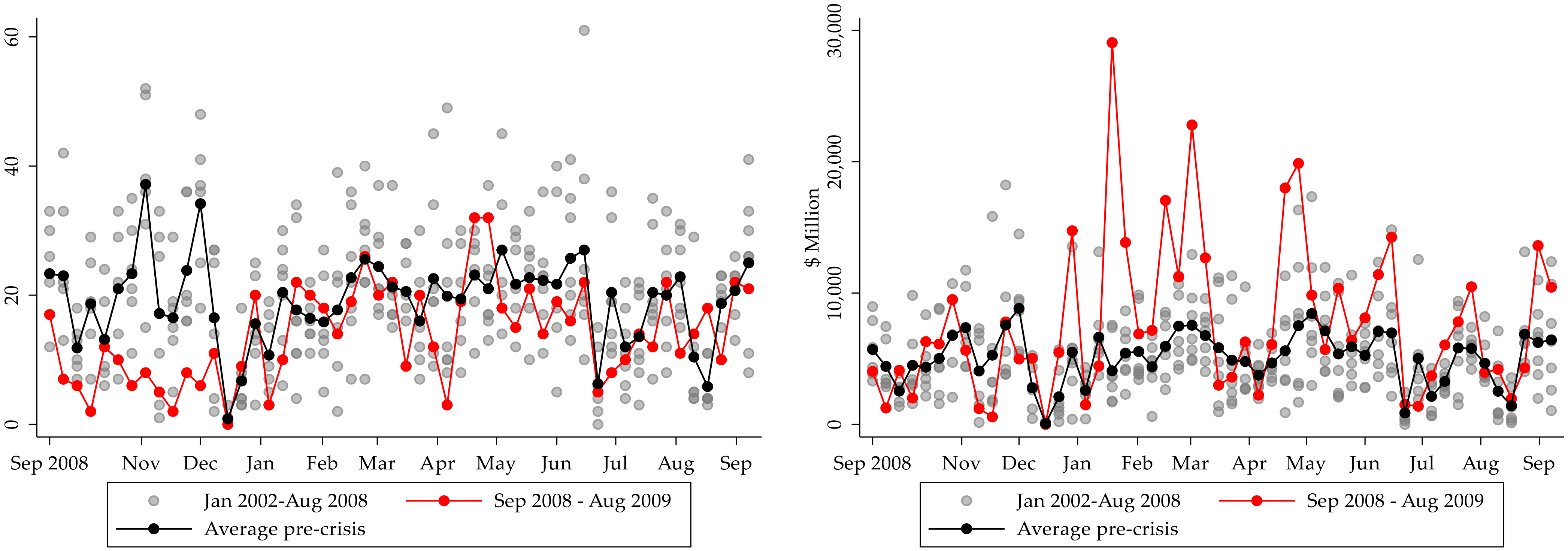


Is 2020 typical?

- Different recessions/crises
  - GFC
    - More protracted financial distress
    - Longer U.S. recession
    - Slower employment recovery
    - Key financial market was structured assets (levered financial institutions)
  - 2001 recession
    - Stock market (retail households)

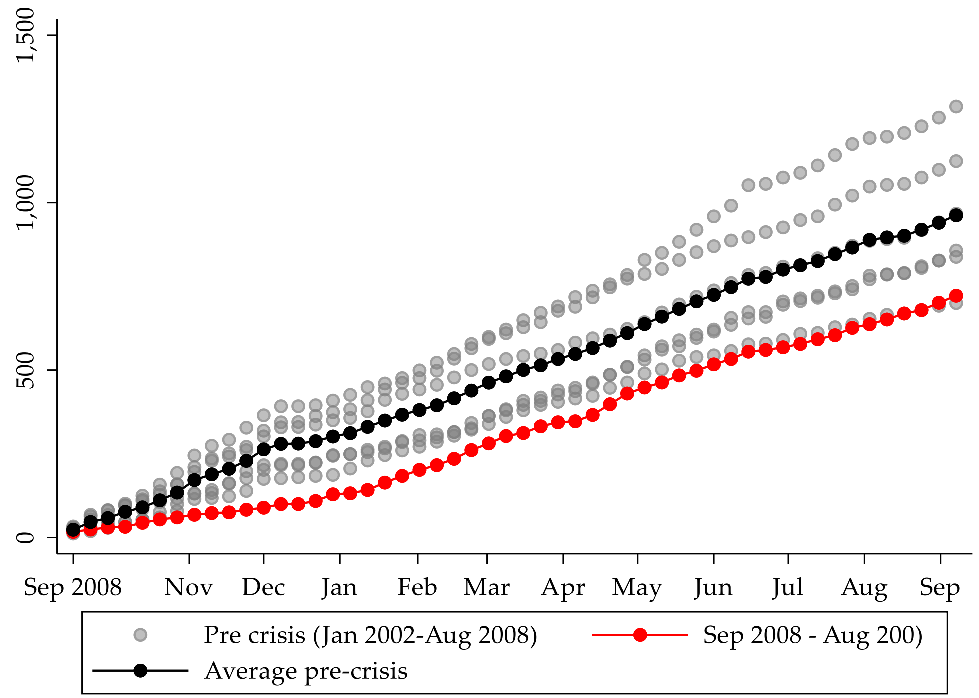
- Different financial structure
  - Bond and loan markets less segmented earlier

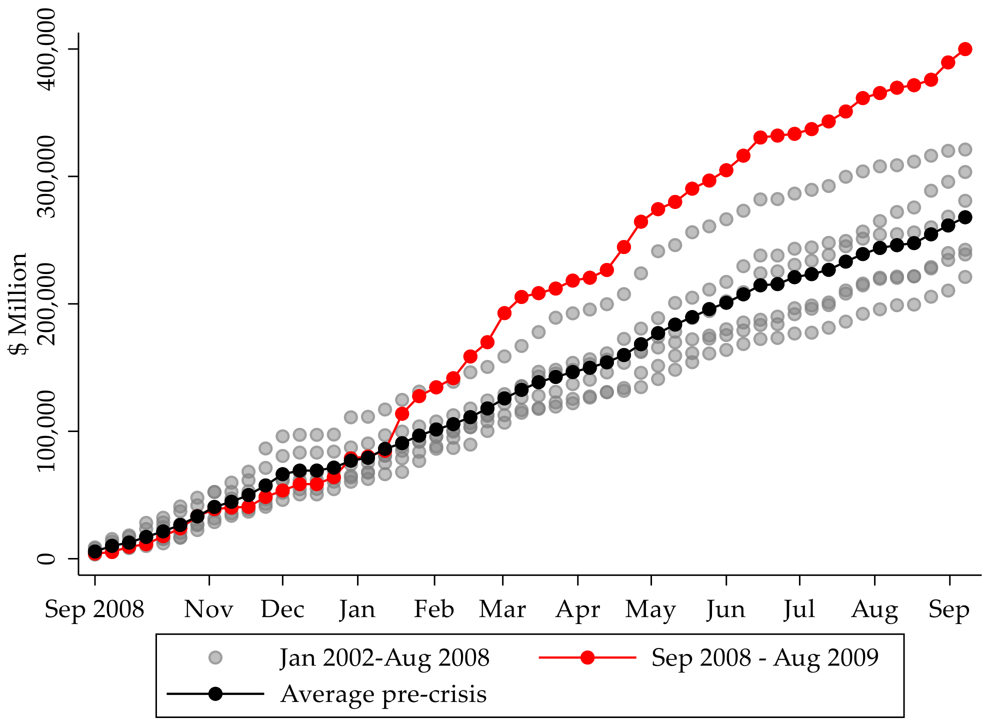
GFC bond issuance



Number on the left (Fig 7 A), value on the right (Fig 7 B)

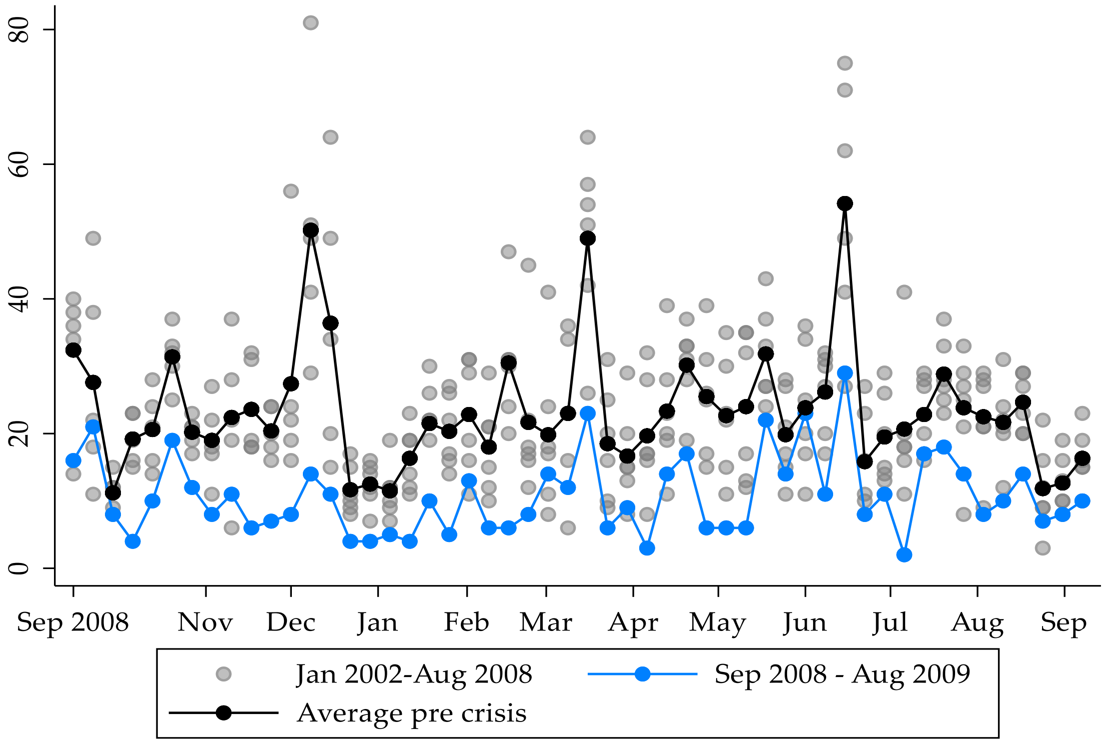
GFC bond issuance (aggregate)

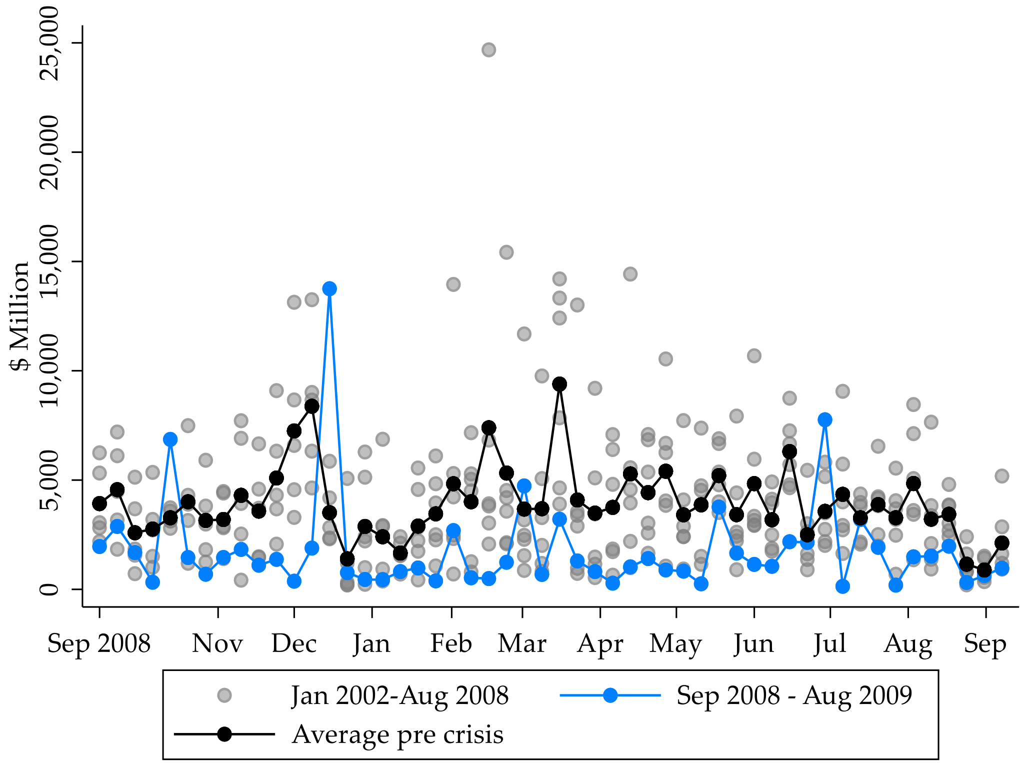




Number on the left (Fig 8 A), value on the right (Fig 8 B)

Loan issuance is low





Bond issue size high in GFC

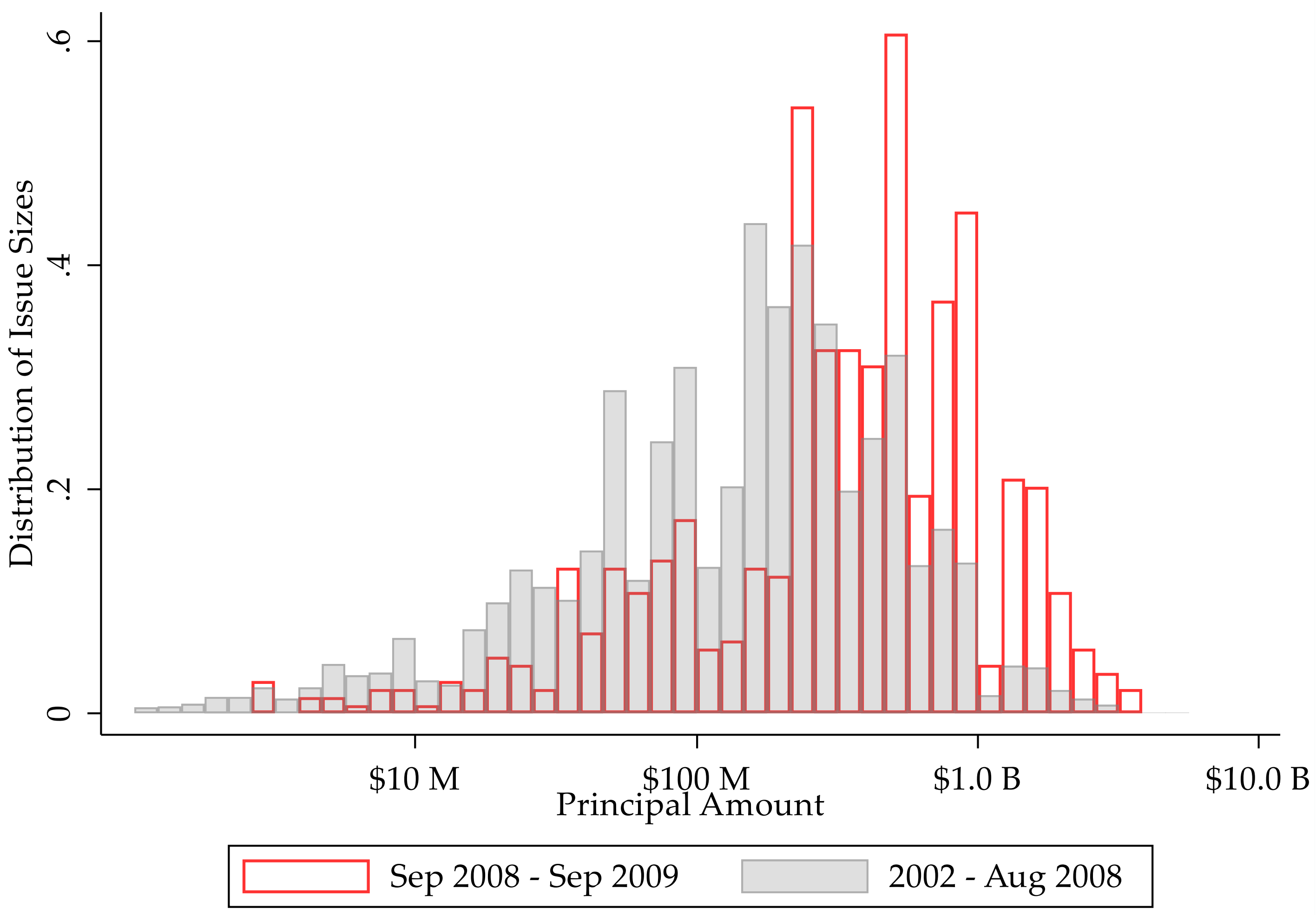


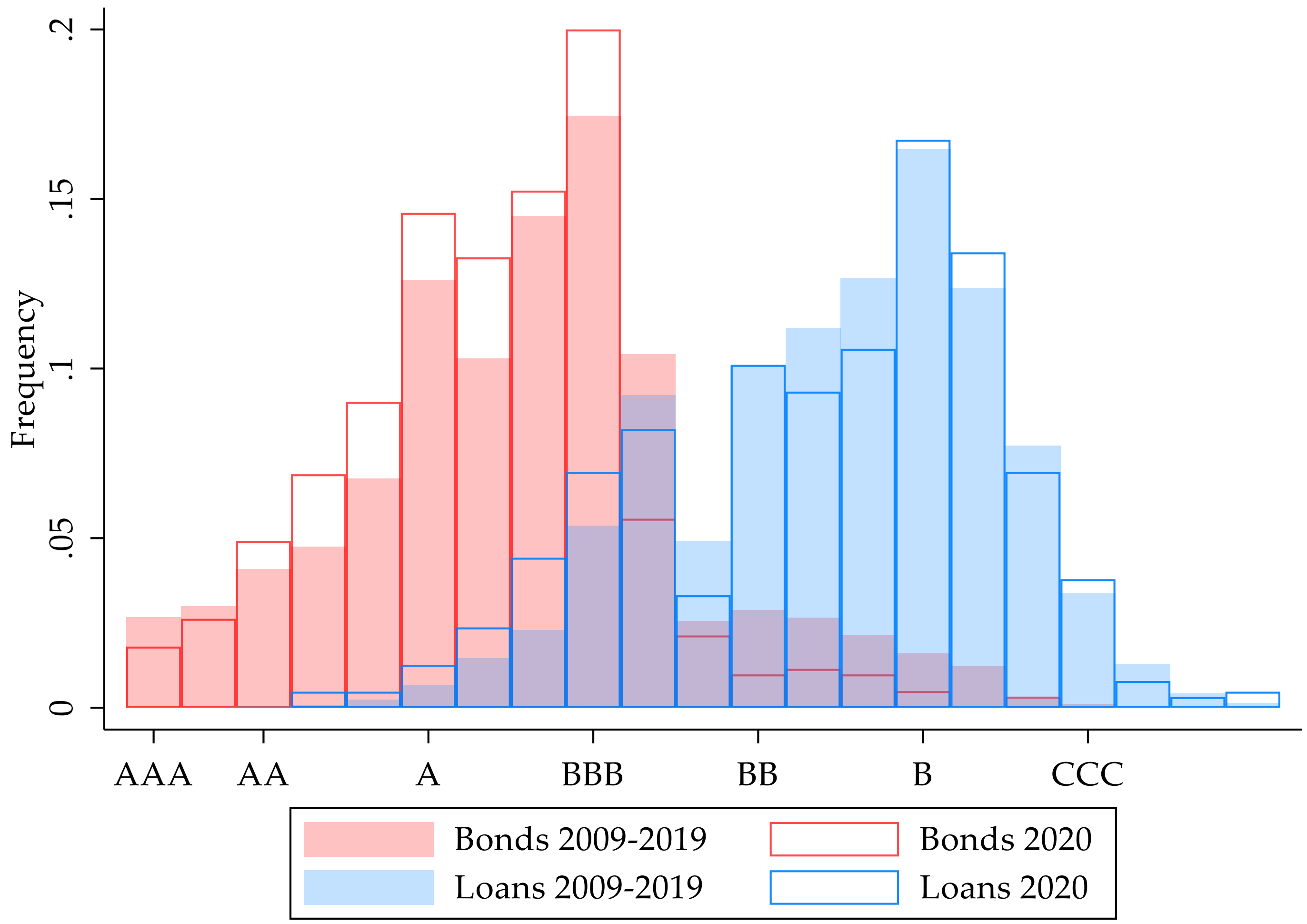
Figure 9

What explains the bond market resilience? The difference with loans?

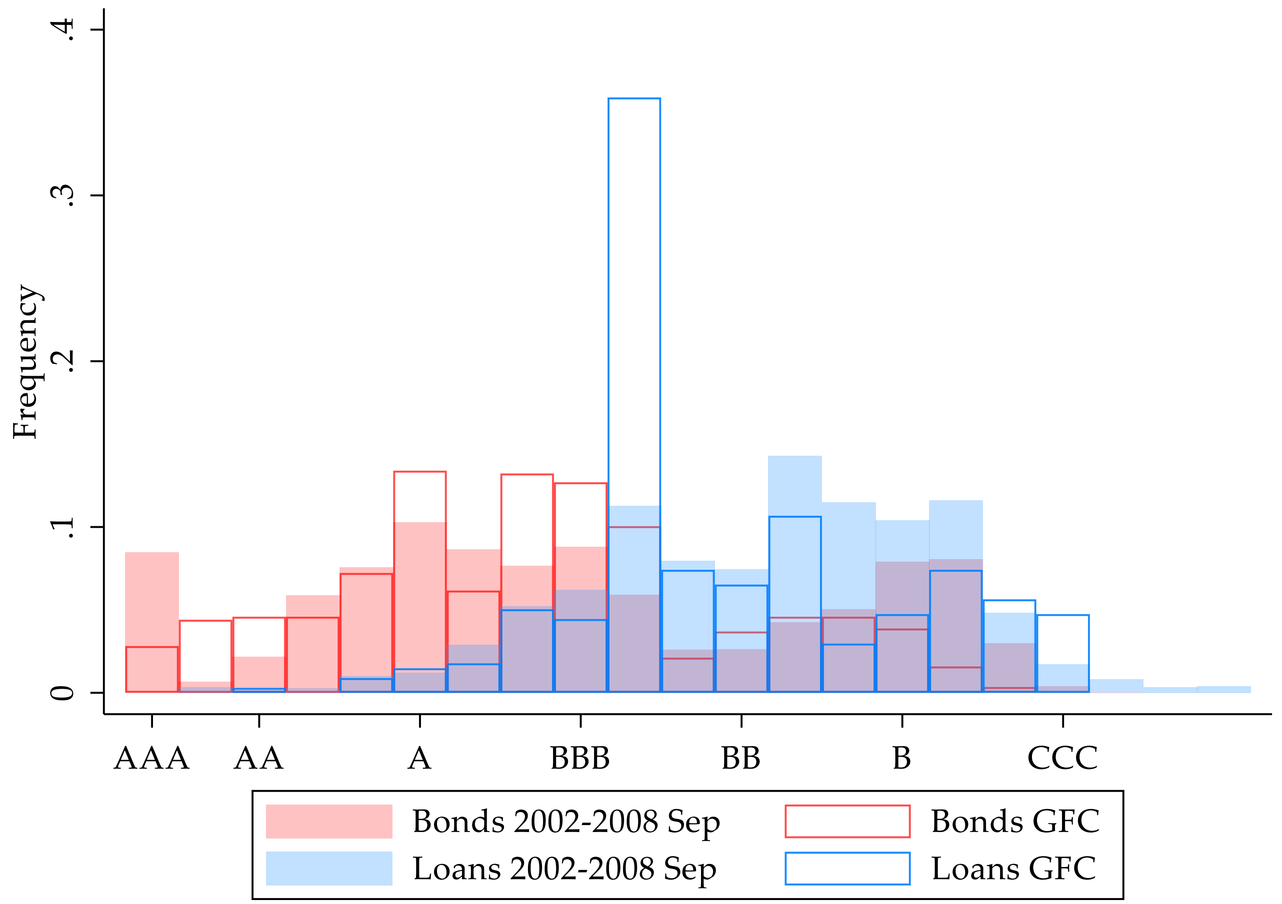
Three (groups of) hypotheses

1. Issuer differences
2. Financial frictions in intermediation
    - Banks ‘freeze’ for various reasons
    - Flight to quality
3. Monetary policy (QE)

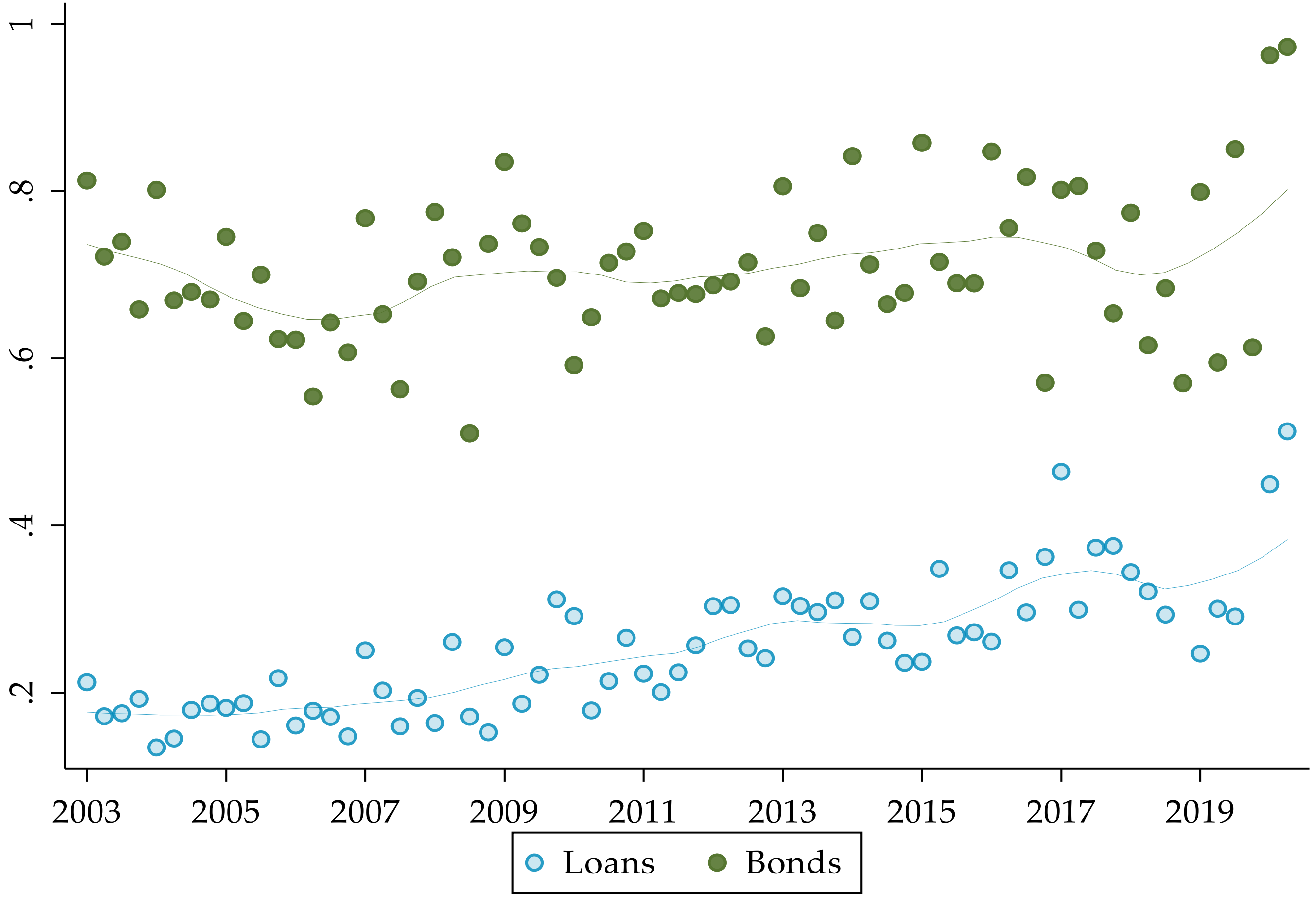
Bond and loan credit quality



Segmentation already in 2008



Rated share of issues was high in 2020

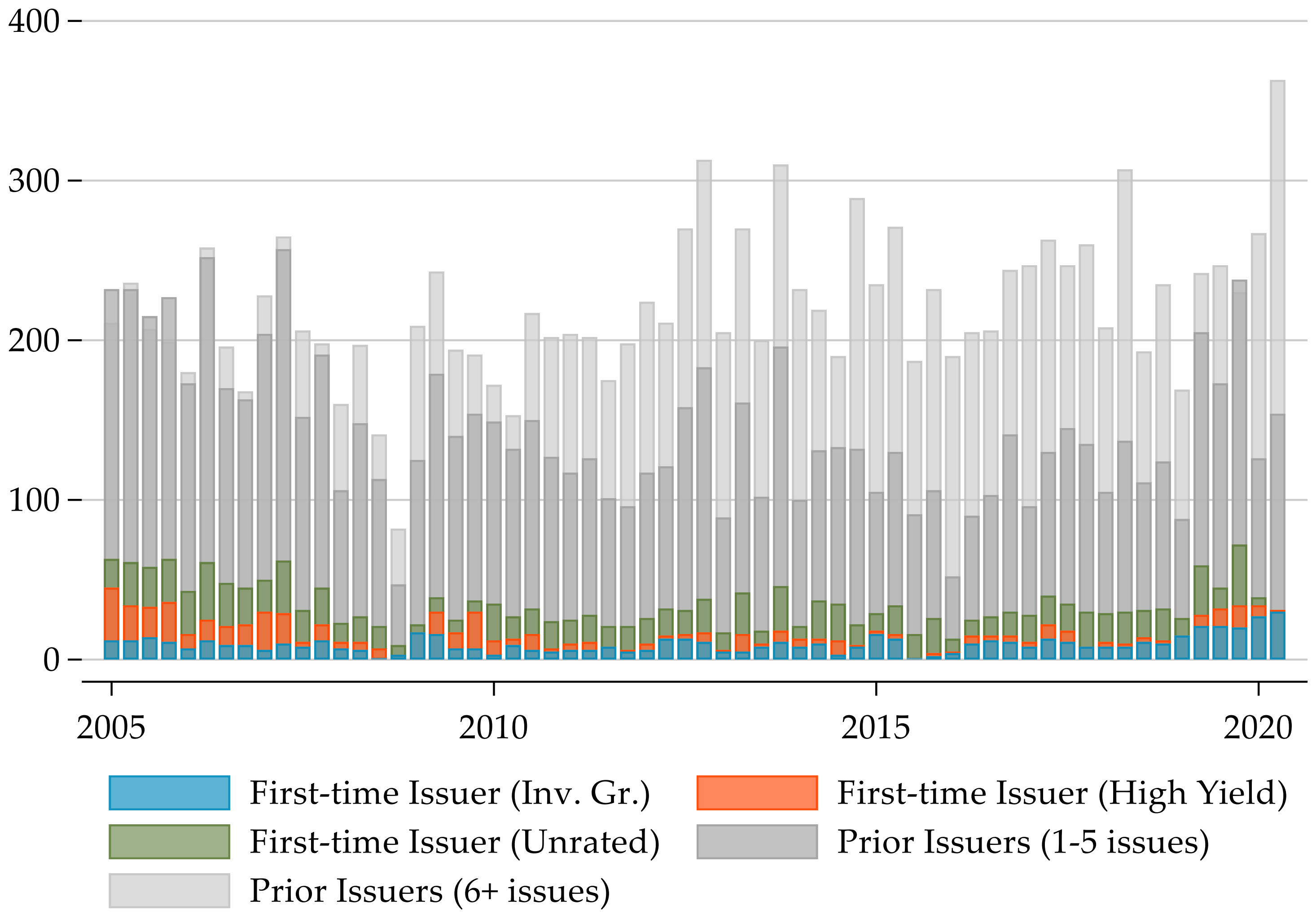


Issuer characteristics in recessions

	(1)	(2)	(3)	(4)	(5)
Dependent variable	Sales (log)	Assets (log)	Employees (log)	Book Leverage	EBITDA to sales
Mean	7.740	8.295	1.884	0.510	0.109
2001 Recession	**0.583*** **	**0.514*** **	**0.397*** **	**-0.007**	**0.024** **
	(0.132)	(0.128)	(0.150)	(0.23)	(0.009)
GFC Recession	**0.669*** **	**0.564*** **	**0.568*** **	**-0.032***	**0.020** **
	(0.109)	(0.099)	(0.113)	(0.018)	(0.008)
Covid Recession	**0.456** **	**0.405** **	**0.403** **	**0.009**	**0.001**
	(0.183)	(0.205)	(0.170)	(0.024)	(0.009)
Linear time trend	**0.089*** **	**0.087*** **	**0.006**	**-0.001**	**0.002** **
	(0.018)	(0.018)	(0.018)	(0.003)	(0.001)
Quadratic time trend	**-0.001**	**-0.000**	**0.001**	**0.000**	**-0.000***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Observations	9,104	9,145	8,704	9,084	9,108
R-squared	0.196	0.187	0.181	0.005	0.062
Fixed effects	FF12	FF12	FF12	FF12	FF12
Clusters	Issuer	Issuer	Issuer	Issuer	Issuer

Table 6

First-time issuers vs. repeat issuers

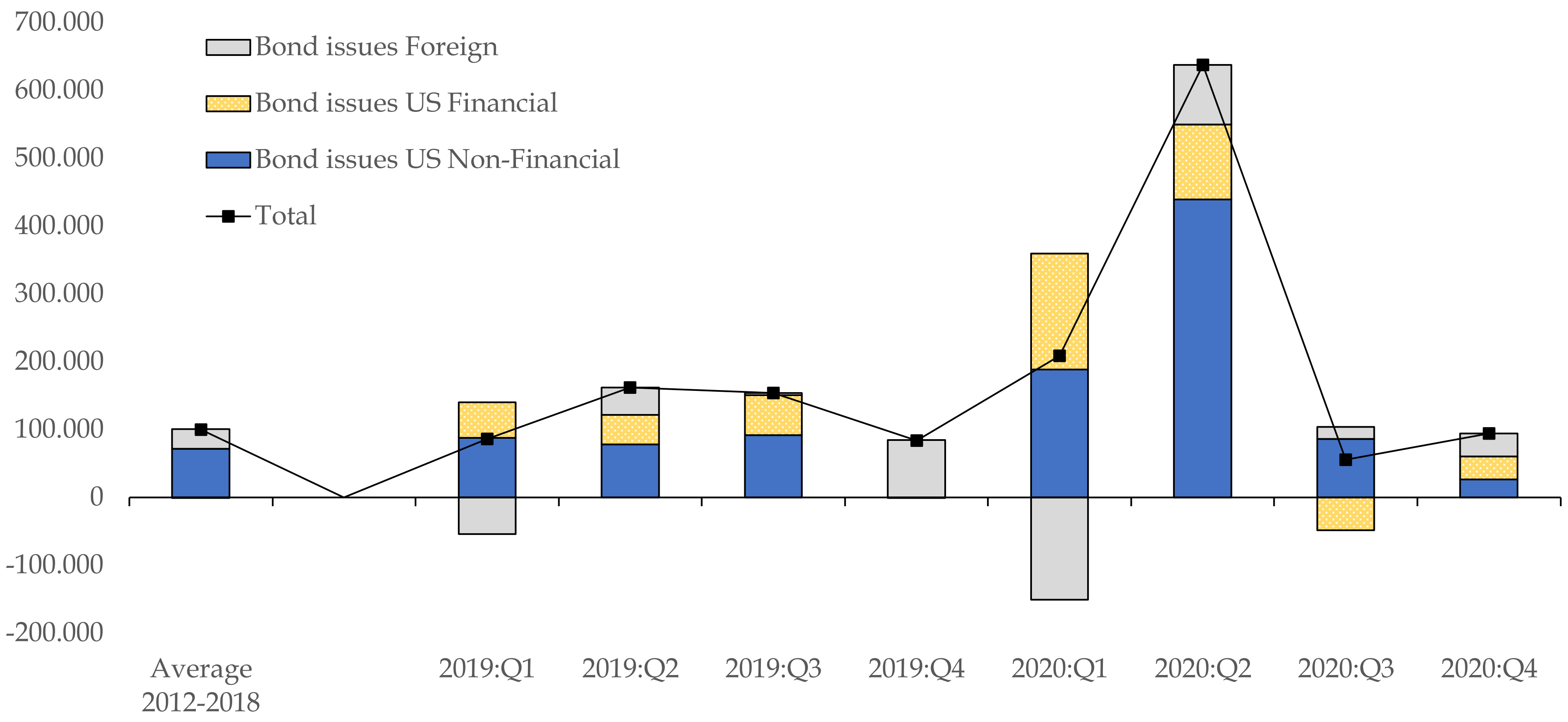


Time series evidence

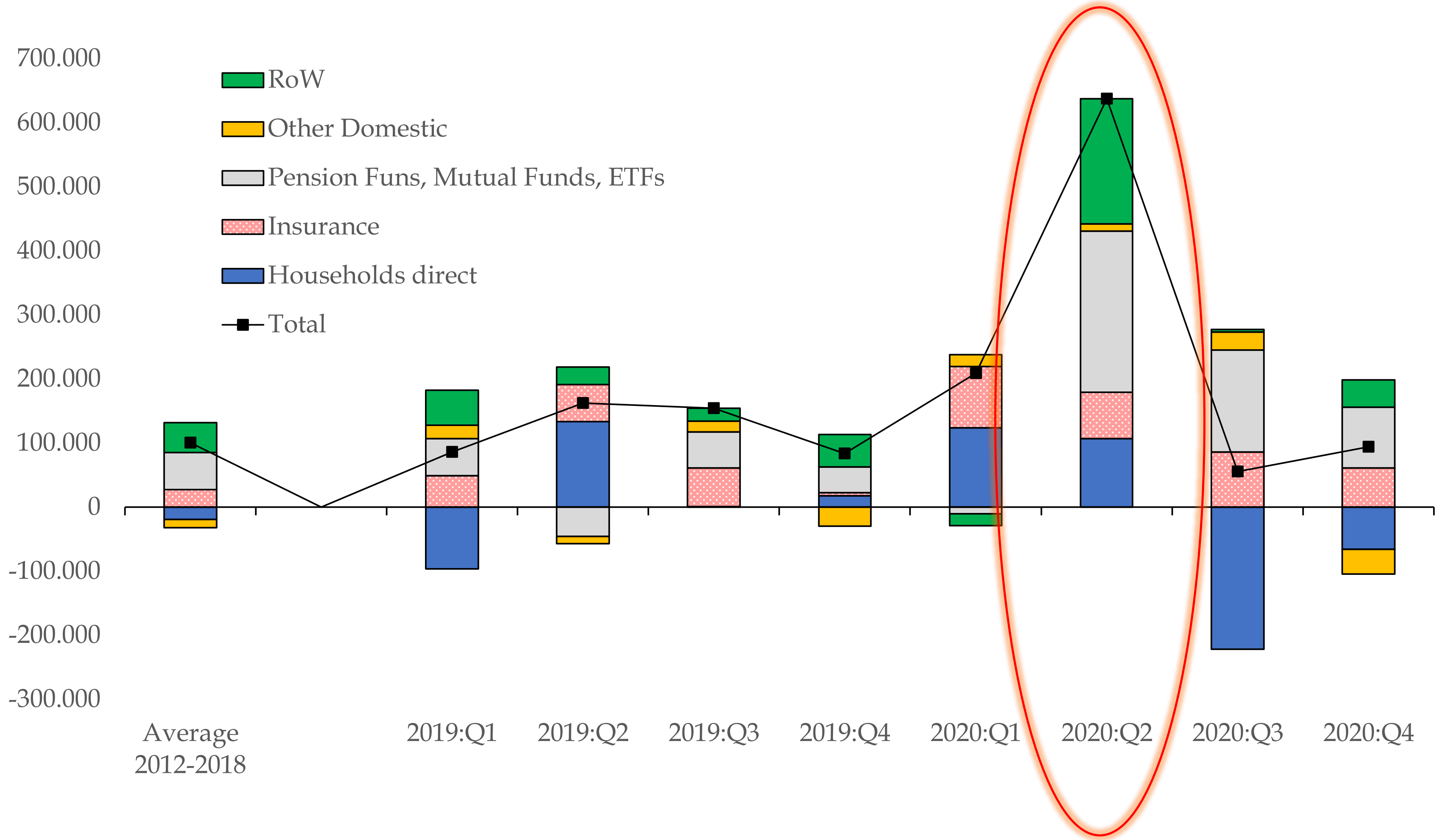
	(1)	(2)	(3)	(4)	Variable
Sample	Full	Full	Full	Full	std. dev.
Dependent variable	Bond Amount	Loan Amount	Bond share	Bond share	
Mean	8.599	8.366	0.61	0.61	
Treasury bond yield, 1yr	**-0.066**	**-0.119***	**-0.001**	**-**	**1.50**
	(0.054)	(0.060)	(0.015)		
Treasury bond yield, 10yr	**-0.123**	**-0.198****	**0.073*****	**-**	**3.06**
	(0.076)	(0.092)	(0.022)		
Credit Spread	**-0.042**	**-0.381*****	**0.065*****	**-**	**2.10**
	(0.063)	(0.080)	(0.016)		
Net Bond Mutual Fund Flow	**0.218*****	**-0.024**	**0.049*****	**-**	**0.40**
	(0.063)	(0.069)	(0.015)		
Non-Performing Loans	**-0.146***	**-0.361*****	**0.038***	**-**	**1.26**
	(0.080)	(0.088)	(0.022)		
Global Financial Crisis	**0.198**	**0.453**	**-0.135***	**0.184*****	**0.06**
	(0.267)	(0.366)	(0.075)	(0.050)	
Federal Reserve 2008 - 2013 Interventions	**0.368***	**0.123**	**0.093***	**0.136****	**0.03**
	(0.186)	(0.352)	(0.056)	(0.057)	
COVID Crisis	**0.904*****	**-1.140*****	**0.289*****	**0.145****	**0.02**
	(0.291)	(0.324)	(0.074)	(0.071)	
Federal Reserve 2020 Interventions	**2.209*****	**1.537****	**0.187**	**0.001**	**0.00**
	(0.493)	(0.662)	(0.117)	(0.085)	
Observations	892	923	892	892	
R-squared	0.094	0.164	0.128	0.045	
Autocorrelation	0.166	0.399	0.269	0.365	
Clusters	Issuer	Issuer	Issuer	Issuer	

Table 5

Net issuance (Flow of Funds)



Investment (Flow of Funds)



Federal Reserve interventions

Program	First Large-Scale Asset Purchases	Second Large-Scale Asset Purchases	Third Large-Scale Asset Purchases	Various	Secondary Market Corporate Credit Facility	Primary Market Corporate Credit Facility
Acronym	QE1	QE2	QE3		SMCCF	PMCCF
Announcement date	Nov 25, 2008	Nov, 3, 2010	Sep 13, 2012	Mar 15-19, 2020	Mar 23, 2020	Mar 23, 2020
Adjustment date	Mar 18, 2009	-	Dec 12, 2012	-	Apr, 9, 2020	-
Maximum amount ($ Billion)	1,650	600	-	200 (Agency Debt) and 500 (Treasuries)	500 (initial) 850 (adjusted)	750
Target assets class	Agency Debt and MBS	Longer-dated Treasuries	MBS	Agency Debt and Treasuries	Corporate bonds and ETFs	Corporate bonds and syndicated loans
Credit rating range	-	-	-	-	BBB- or better at purchase or BB- or better and BBB- or better as of March 22	BBB- or better at purchase or BB- or better and BBB- or better as of March 22
Maturity at purchase	-	-	-	-	Max. 5 years	Max. 4 years
Industry	-	-	-	-	Not bank	Not bank
Purchases commence	Nov 2008	Nov 2010	Sep 2012	-	June 15, 2020	June 29, 2020

Table 3

Federal Reserve programs

Primary Market Corporate Credit Facility

Facility: The Primary Market Corporate Credit Facility ("Facility") will serve as a funding backstop for corporate debt issued by eligible issuers. Under the Facility, the Federal Reserve Bank of New York ("Reserve Bank") will commit to lend to a special purpose vehicle ("SPV") on a recourse basis. The SPV will (i) purchase qualifying bonds directly from eligible issuers and (ii) provide loans to eligible issuers. The Reserve Bank will be secured by all the assets of the SPV. The Department of the Treasury, using the Exchange Stabilization Fund, will make an initial $10 billion equity investment in the SPV in connection with the Facility.

Eligible Assets: The Facility will purchase eligible corporate bonds directly from eligible issuers and will make eligible loans to eligible issuers. Eligible corporate bonds and loans must meet each of the following criteria at the time of bond purchase or loan origination by the Facility:

- Issued by an eligible issuer;
- Issuer is rated at least BBB-/Baa3 by a major nationally recognized statistical rating organization ("NRSRO") and, if rated by multiple major NRSROs, rated at least BBB-/Baa3 by two or more NRSROs, in each case subject to review by the Federal Reserve; and
- Have a maturity of four years or less.

Eligible Issuers: Eligible issuers are U.S. companies headquartered in the United States and with material operations in the United States. The scope of eligible issuers may be expanded in the future. Eligible issuers do not include companies that are expected to receive direct financial assistance under pending federal legislation.

Limits per Issuer: The maximum amount of outstanding bonds or loans of an eligible issuer that borrows from the Facility may not exceed the applicable percentage of the issuer's maximum outstanding bonds and loans on any day between March 22, 2019 and March 22, 2020:

- 140 percent for eligible assets/eligible issuers with a AAA/Aaa rating from a major NRSRO;
- 130 percent for eligible assets/eligible issuers with a AA/Aa rating from a major NRSRO;

Secondary Market Corporate Credit Facility

Facility: Under the Secondary Market Corporate Credit Facility ("Facility"), the Federal Reserve Bank of New York ("Reserve Bank") will lend, on a recourse basis, to a special purpose vehicle ("SPV") that will purchase in the secondary market corporate debt issued by eligible issuers. The SPV will purchase eligible individual corporate bonds as well as eligible corporate bond portfolios in the form of exchange traded funds ("ETFs") in the secondary market. The Reserve Bank will be secured by all the assets of the SPV. The Department of the Treasury, using the Exchange Stabilization Fund, will make an initial $10 billion equity investment in the SPV in connection with the Facility.

Eligible Assets:

Eligible Individual Corporate Bonds. The Facility may purchase corporate bonds that meet each of the following criteria at the time of purchase by the Facility:

- Issued by an eligible issuer;
- Rated at least BBB-/Baa3 by a major nationally recognized statistical rating organization ("NRSRO") and, if rated by multiple major NRSROs, rated at least BBB-/Baa3 by two or more NRSROs, in each case subject to review by the Federal Reserve;
- Have a remaining maturity of five years or less.

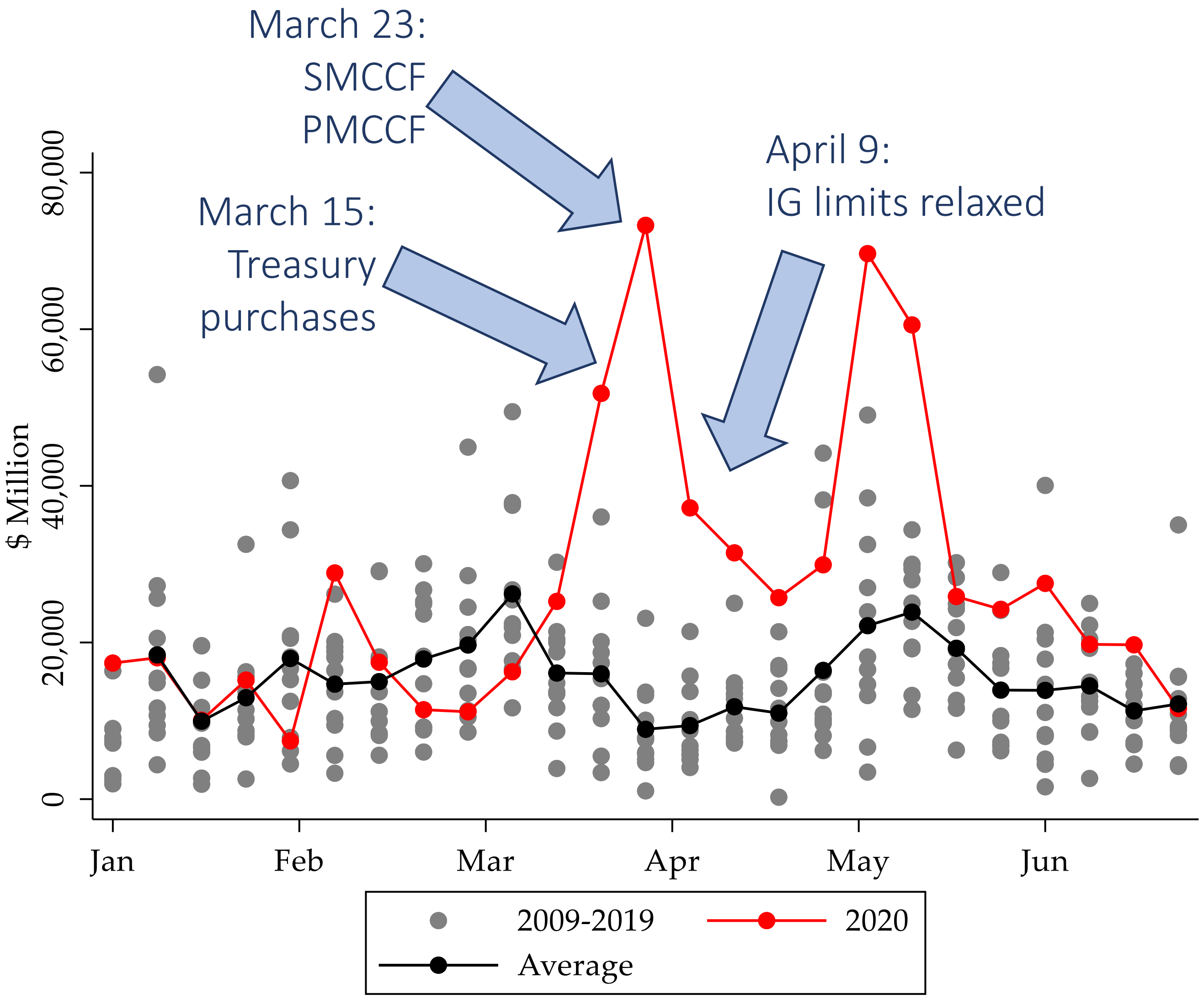
Eligible ETFs. The Facility also may purchase U.S.-listed ETFs whose investment objective is to provide broad exposure to the market for U.S. investment grade corporate bonds.

Eligible Issuers for Individual Corporate Bonds: Eligible issuers for direct purchases of individual corporate bonds on the secondary market are U.S. businesses with material operations in the United States. Eligible issuers do not include companies that are expected to receive direct financial assistance under pending federal legislation.

Limits per Issuer/ETF: The maximum amount of bonds that the Facility will purchase from any eligible issuer

Note: term sheets for PMCCF and SMCCF, issued March 23, 2020

Fed announcements and bond issuance 2020



Bond market impact:
O'Hara, Zhou (2020)
Gilchrist, Wei, Yue, Zakrajsek (2020)

Large increase in issuance around announcements

Panel A. Bond issuance

	(1)	(2)	(3)	(4)
Sample	2009-2020	2009-2020	2009-2020	2009-2020
Dependent variable	Bond number	Bond number	Bond value	Bond value
Dependent variable mean	2.820	2.820	8.829	8.829
Regression	OLS	GLS	OLS	GLS
Federal Reserve 2020 Interventions	**1.191*** **	**1.106*** **	**2.084*** **	**1.692*** **
	(0.351)	(0.143)	(0.600)	(0.281)
Week number F.E.	No	Yes	No	Yes
Year F.E.	No	Yes	No	Yes
Observations	587	587	587	587
Auto-correlation	-	0.01	-	0.01
R-squared	0.019	0.427	0.020	0.500
Clusters	Week	Week	Week	Week

Table 4 Panel A

Increase in issuance around announcements

Panel B. Term Loan issuance

Sample	(1) 2009-2020	(2) 2009-2020	(3) 2009-2020	(4) 2009-2020
Dependent variable	Loan number	Loan number	Loan value	Loan value
Dependent variable mean	2.776	2.776	8.911	8.911
Regression	OLS	GLS	OLS	GLS
Federal Reserve 2020 Interventions	**0.532**	**0.402****	**1.077***	**0.919*****
	(0.447)	(0.187)	(0.601)	(0.235)
Week number F.E.	No	Yes	Yes	Yes
Year F.E.	No	Yes	Yes	Yes
Observations	587	587	587	587
Auto-correlation	-	0.682	-	0.287
R-squared	0.002	0.466	0.006	0.488
Clusters	Week	Week	Week	Week

Table 4 Panel B

Positive coefficient also in "horse race" type regression

Sample	(1) Full	(2) Full	(3) Full	(4) Full	Variable std. dev.
Dependent variable	Bond Amount	Loan Amount	Bond share	Bond share	
Mean	8.599	8.366	0.61	0.61	
Federal Reserve 2008 - 2013 Interventions	**0.368***	**0.123**	**0.093***	**0.136****	**0.03**
	(0.186)	(0.352)	(0.056)	(0.057)	

Table 5

Conclusions

- Bond market is very resilient source of corporate finance
  - Financial stability and welfare implications
- Likely reflects multiple factors
  - Bond issuers remain creditworthy in a crisis (Crouzet Mehrota 2020)
  - Loan market is constrained by frictions in intermediation (Holmström Tirole 1997 etc.)
    - Debt overhang
    - Structural market freezes
  - Policy has more direct impact on markets than on intermediated finance