

Corporate Credit Provision

Nina Boyarchenko and Philippe Mueller

Federal Reserve Bank of New York, CEPR and Warwick Business School

Non-financial bank intermediation conference

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The views expressed here are those of the authors and do not necessarily reflect those of the Federal Reserve Bank of New York or the Federal Reserve System



Motivation



The screenshot shows the Financial Times website interface. At the top, there is a navigation bar with a hamburger menu icon on the left, the text "FINANCIAL TIMES" in the center, and the "myFT" logo on the right. Below this is a dark blue header with a light blue line graph icon on the left and the word "ALPHAVILLE" in white text in the center. Underneath the header is a light orange navigation bar with three links: "HOME" (underlined), "MARKETS LIVE", and "LONG ROOM". Below the navigation bar, the text "US Dollar Markets" is displayed in red. The main content area features a large headline: "Since the crisis, a preference for debt markets over bank loans".

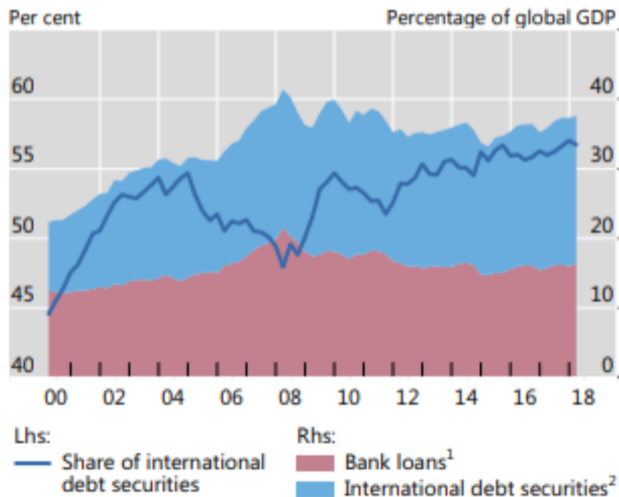
Corporate credit provision takes many forms:

- Loans vs bonds



Motivation

International credit to non-banks by instrument



Motivation



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Corporate credit provision takes many forms:

- Loans vs bonds
- Through banks, insurance companies, mutual funds, ...



This paper

Study how corporate credit provision changes over the business cycle, across countries

- Financial sector procyclical, with procyclical leverage across countries
- Credit provision through loans procyclical across countries
- But cyclicity of intermediated credit varies
- Differences in intermediated credit cyclicity due to financial sector composition
- Not due to differences in cyclicity of financial business sub-sectors



Data

- Flow-of-Funds and GDP data for: United States, Canada, UK, European Union, Norway, Australia, Japan
- Collect data on assets and liabilities of:
 - Non-financial business: users of credit
 - Financial business and sub-sectors: monetary financial institutions (MFIs), insurance and pension funds, others (shadow banks)
 - Households and non-profit institutions serving households: proxy for hedge funds
- “Standardize” across countries by computing changes relative to GDP
 - E.g.: change in total assets

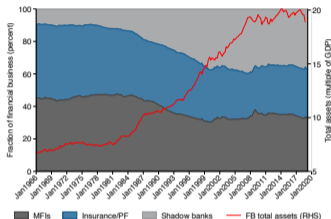
$$\text{Asset growth}_{ct} = \frac{A_{ct} - A_{c,t-1}}{C_{c,t-1}} \equiv \frac{\Delta A_{ct}}{C_{c,t-1}}$$

- Sample through Q2 2019

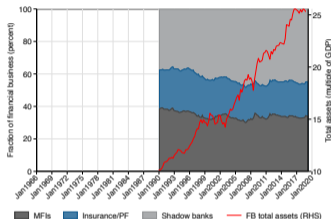


Composition of financial business sector

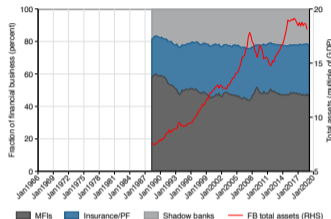
(a) U. S.



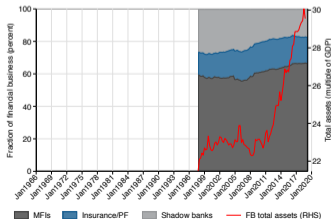
(b) Canada



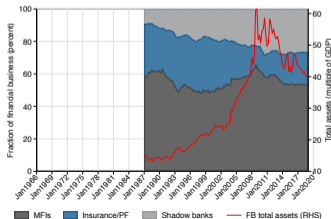
(c) Australia



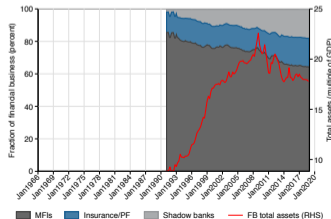
(d) Japan



(e) U. K.

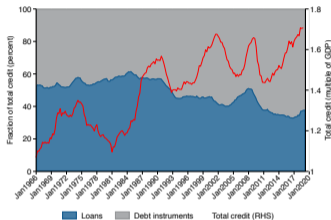


(f) Germany

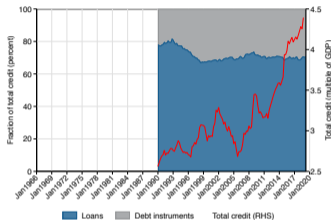


Composition of credit to non-financial corporate business

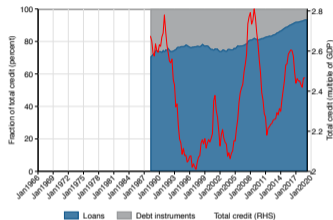
(a) U. S.



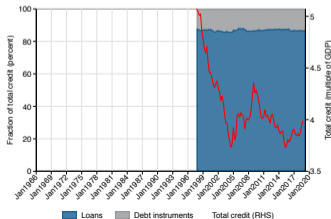
(b) Canada



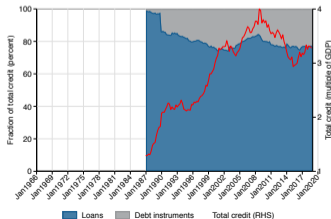
(c) Australia



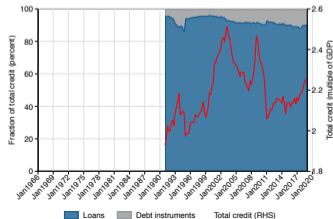
(d) Japan



(e) U. K.



(f) Germany



Aggregate cyclicality



FB sector procyclical across countries

$$\text{Asset growth}_{ct} = \alpha_c + \beta \frac{\Delta \text{GDP}_{ct}}{\text{GDP}_{c,t-1}} + \epsilon_{c,t}$$

	All	G7	EU4	US	Canada	Australia	Japan	UK	Germany	France	Italy	Spain	Other Europe
Real GDP growth	0.068 (0.025)***	0.040 (0.064)	0.114 (0.039)***	0.075 (0.029)***	0.111 (0.040)***	0.121 (0.060)**	0.125 (0.045)***	-0.423 (0.359)	0.041 (0.061)	0.294 (0.054)***	0.002 (0.037)	0.185 (0.083)**	0.072 (0.028)***
Adj. R^2	-0.002	-0.007	0.064	0.119	0.079	0.043	0.089	0.033	-0.009	0.227	-0.023	0.160	-0.003
N. obs	2232	906	377	212	112	119	81	124	106	89	90	92	1326

- $\beta > 0$: financial sector grows as economy expands



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- $\beta > 0$: financial sector grows as economy expands
- Primarily through debt growth

	All	G7	EU4	US	Canada	Australia	Japan	UK	Germany	France	Italy	Spain	Other Europe
Asset growth	0.999 (0.015)***	0.977 (0.007)***	0.968 (0.023)***	0.969 (0.014)***	1.075 (0.047)***	1.034 (0.029)***	0.929 (0.024)***	0.977 (0.008)***	0.982 (0.022)***	0.942 (0.044)***	1.077 (0.087)***	0.957 (0.046)***	1.004 (0.018)***
Adj. R^2	0.961	0.981	0.934	0.985	0.865	0.964	0.971	0.994	0.965	0.933	0.750	0.967	0.958
N. obs	2266	917	381	214	114	121	83	125	107	90	91	93	1349

- Implies procyclical leverage growth



Total credit provision procyclical across countries

$$\frac{\Delta \text{Credit}_{c,t}}{C_{c,t-1}} = \alpha_c + \beta \text{Asset growth}_{ct} + \epsilon_{c,t}$$

■ Total credit:

	All	G7	EU4	US	Canada	Australia	Japan	UK	Germany	France	Italy	Spain	Other Europe
Asset growth	0.057 (0.015)***	0.032 (0.010)***	0.130 (0.028)***	0.030 (0.018)*	-0.004 (0.027)	0.135 (0.023)***	0.068 (0.027)**	0.016 (0.007)**	0.026 (0.015)*	0.027 (0.013)**	0.070 (0.039)*	0.279 (0.023)***	0.062 (0.018)***
Adj. R^2	0.041	0.081	0.282	0.046	-0.017	0.372	0.118	0.088	0.055	0.010	0.052	0.688	0.040
N. obs	2266	917	381	214	114	121	83	125	107	90	91	93	1349

■ Loans:

	All	G7	EU4	US	Canada	Australia	Japan	UK	Germany	France	Italy	Spain	Other Europe
Asset growth	0.053 (0.014)***	0.032 (0.009)***	0.134 (0.028)***	0.033 (0.014)**	-0.017 (0.021)	0.113 (0.020)***	0.060 (0.022)***	0.016 (0.005)***	0.021 (0.012)*	0.037 (0.015)**	0.077 (0.043)*	0.284 (0.023)***	0.057 (0.017)***
Adj. R^2	0.080	0.087	0.294	0.062	-0.003	0.354	0.103	0.119	0.038	0.042	0.062	0.692	0.080
N. obs	2266	917	381	214	114	121	83	125	107	90	91	93	1349

■ Bonds:

	All	G7	EU4	US	Canada	Australia	Japan	UK	Germany	France	Italy	Spain	Other Europe
Asset growth	0.004 (0.003)	-0.000 (0.002)	-0.004 (0.004)	-0.003 (0.009)	0.013 (0.011)	0.022 (0.007)***	0.008 (0.007)	-0.000 (0.003)	0.005 (0.005)	-0.010 (0.012)	-0.007 (0.009)	-0.005 (0.001)***	0.005 (0.004)
Adj. R^2	-0.012	-0.010	-0.006	-0.006	0.007	0.126	0.025	-0.016	-0.005	-0.002	-0.001	0.186	-0.015
N. obs	2266	917	381	214	114	121	83	125	107	90	91	93	1349



(Bank) Intermediated credit provision has different cyclicity across countries

$$\text{Intermediated credit}_{ct} = \frac{\text{Loans}_{ct}}{\text{Loans}_{ct} + \text{Bonds}_{ct}}$$

$$\frac{\Delta \text{Int. Credit}_{c,t}}{C_{c,t-1}} = \alpha_c + \beta \text{Asset growth}_{ct} + \epsilon_{c,t}$$

	All	G7	EU4	US	Canada	Australia	Japan	UK	Germany	France	Italy	Spain	Other Europe
Asset growth	0.037 (0.017)**	0.127 (0.061)**	0.184 (0.103)*	1.194 (0.515)**	-0.365 (0.264)	0.318 (0.179)*	0.029 (0.118)	0.107 (0.071)	-0.179 (0.205)	0.374 (0.244)	0.439 (0.317)	0.260 (0.081)***	0.018 (0.016)
Adj. R^2	-0.012	0.004	0.003	0.058	0.013	0.020	-0.023	0.011	-0.011	0.035	0.038	0.139	-0.016
N. obs	2266	917	381	214	114	121	83	125	107	90	91	93	1349



Potential explanations

1. Cross-country structural differences in how each financial (sub)sector provides credit
 - ⇒ Sector-level cross-country differences in credit provision
2. Cross-country differences in prominence of different financial subsector but subsectors similar across countries
 - ⇒ Sector-level credit provision is similar across countries but sector cyclicalities are different across countries
3. Combination of (1) and (2)



Sectoral cyclicality



Financial subsectors

Separate financial business into: MFIs, insurance and pension funds, shadow banks

- MFIs: depository institutions, broker-dealers, central banks, MMMFs
 - Paper: for some countries, can separate out central banks from MFIs
- Shadow banks: everything in financial sector not classified as an MFI or insurance company/pension fund
 - E.g.: financing companies, ABS issuers, mutual funds,...
- Caveats:
 1. Hedge funds balance sheets part of the household sector
 - ⇒ Include households as a “subsector”
 2. Except for ECB, assets list e.g. total loans, not loans to non-financial corporate business
 - ⇒ Impute which fraction of loans held is loans to non-financial corporate business; verify that results reasonable using ECB data



Cyclicality of sectoral prominence

$$\Delta \text{Sector share}_{s,c,t} = \alpha_c + \alpha_s + \alpha_{c,s} + \sum_{i=1}^4 \beta_i \text{Asset growth}_{c,t} \times \mathbb{1}_{s=i} + \epsilon_{s,c,t}$$

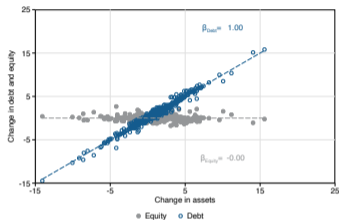
	All	G7	EU4	US	Canada	Australia	Japan	UK	Germany	France	Italy	Spain	Other Europe
MFI × Asset growth	-0.099 (0.056)*	0.140 (0.080)*	0.010 (0.179)	-0.790 (0.336)**	-1.238 (0.204)***	-0.845 (0.433)*	-0.158 (0.281)	0.268 (0.065)***	0.764 (0.204)***	-0.285 (0.355)	-0.219 (1.010)	-0.231 (0.254)	-0.115 (0.057)**
Insurance and Pens. Fund × Asset growth	-0.097 (0.021)***	-0.329 (0.036)***	-0.465 (0.055)***	-0.824 (0.152)***	0.073 (0.153)	0.431 (0.305)	-0.276 (0.101)***	-0.288 (0.037)***	-0.605 (0.074)***	-0.261 (0.123)**	-0.548 (0.201)***	-0.425 (0.044)***	-0.064 (0.017)***
Shadow Banks × Asset growth	0.059 (0.051)	0.137 (0.067)**	0.339 (0.150)**	1.614 (0.251)***	1.165 (0.184)***	0.414 (0.165)**	0.434 (0.206)**	0.020 (0.042)	-0.159 (0.162)	0.546 (0.245)**	0.767 (0.883)	0.656 (0.246)***	0.058 (0.060)
Households × Asset growth	-0.286 (0.048)***	-0.625 (0.080)***	-1.720 (0.223)***	1.351 (0.765)*	0.095 (0.390)	-0.724 (0.286)**	-1.000 (0.301)***	-0.560 (0.058)***	-1.898 (0.101)***	-0.835 (0.182)***	-3.878 (1.135)***	-2.074 (0.355)***	-0.247 (0.047)***
Adj. R ²	0.029	0.091	0.151	0.067	0.188	0.068	0.183	0.328	0.475	0.098	0.089	0.341	0.024
N. obs	9064	3668	1524	856	456	484	332	500	428	360	364	372	5396

- Shadow banks become a bigger fraction of financial business during expansions
- At the expense of MFI and insurance and pension fund sectors

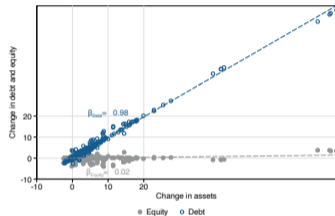


MFIs most procyclical leverage; HH (HFs) least procyclical leverage

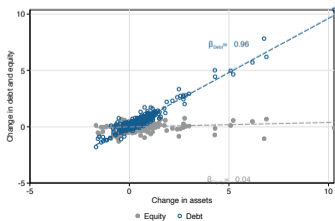
(a) MFI



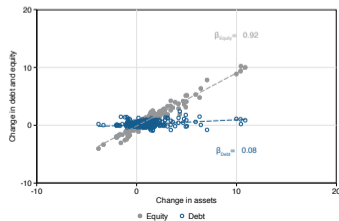
(b) Shadow banks



(c) Insurance and Pension Funds



(d) Households



Loan provision cyclicity across countries

$$\text{Loan growth}_{sct} = \alpha_c + \alpha_s + \alpha_{sc} + \sum_{i=1}^N \beta_i \text{Asset growth}_{ict} \times \mathbb{1}_{s=i} + \epsilon_{sct}$$

	All	G7	EU4	US	Canada	Australia	Japan	UK	Germany	France	Italy	Spain	Other Europe
MFI × Asset growth	0.066 (0.009)***	0.047 (0.010)***	0.118 (0.031)***	0.057 (0.020)***	0.160 (0.040)***	0.243 (0.031)***	0.151 (0.043)***	0.027 (0.005)***	0.010 (0.026)	0.046 (0.014)***	0.092 (0.048)*	0.300 (0.039)***	0.072 (0.011)***
Insurance and Pens. Fund × Asset growth	0.003 (0.009)	-0.002 (0.006)	0.042 (0.019)**	-0.000 (0.000)	-0.005 (0.005)	0.003 (0.002)	0.018 (0.013)	0.001 (0.002)	0.021 (0.020)	0.002 (0.002)	-0.001 (0.001)	-0.004 (0.008)	0.003 (0.010)
Shadow Banks × Asset growth	0.008 (0.002)***	0.020 (0.010)**	0.013 (0.012)	-0.000 (0.004)	-0.003 (0.020)	0.006 (0.018)	0.186 (0.034)***	0.011 (0.014)	0.017 (0.005)***	-0.002 (0.005)	0.047 (0.012)***	-0.014 (0.023)	0.008 (0.002)***
Households × Asset growth	-0.001 (0.003)	-0.002 (0.002)	-0.001 (0.003)	0.002 (0.001)**	0.000 (0.000)	0.000 (0.000)	0.006 (0.003)*	-0.000 (0.000)	0.000 (0.000)	-0.003 (0.003)	0.000 (0.000)	0.000 (0.000)	-0.001 (0.004)
Adj. R ²	0.177	0.147	0.224	0.088	0.129	0.625	0.307	0.254	-0.009	0.048	0.155	0.656	0.186
N. obs	9408	3662	1528	846	456	484	332	500	430	360	366	372	5746

- Loan provision by MFIs procyclical across countries



Loan provision cyclicity across countries

$$\text{Loan share growth}_{sct} = \alpha_c + \alpha_s + \alpha_{sc} + \sum_{i=1}^N \beta_i \text{Asset growth}_{ict} \times \mathbb{1}_{s=i} + \epsilon_{sct}$$

	All	G7	EU4	US	Canada	Australia	Japan	UK	Germany	France	Italy	Spain	Other Europe
MFI × Asset growth	-0.166 (0.038)***	-0.199 (0.042)***	-0.235 (0.187)	-0.088 (0.316)	0.851 (0.743)	1.158 (0.392)***	-0.161 (0.323)	-0.206 (0.037)***	-0.757 (0.263)***	-0.336 (0.121)***	-1.371 (0.390)***	0.673 (0.266)**	-0.156 (0.048)***
Insurance and Pens. Fund × Asset growth	-0.058 (0.031)*	-0.176 (0.070)**	-0.135 (0.305)	0.000 (0.000)	-0.501 (0.140)***	-0.003 (0.092)	-1.144 (0.444)**	-0.117 (0.029)***	-1.036 (1.270)	-0.221 (0.096)**	-0.132 (0.112)	-1.068 (0.796)	-0.039 (0.032)
Shadow Banks × Asset growth	-0.023 (0.017)	-0.725 (0.111)***	-1.964 (0.489)***	-0.191 (0.111)*	-1.502 (0.295)***	-2.360 (0.792)***	-0.381 (0.699)***	-2.380 (0.109)***	-0.623 (1.081)**	-4.629 (0.319)*	-1.883 (0.683)***	0.011 (0.823)**	0.011 (0.019)
Households × Asset growth	-0.034 (0.024)	-0.091 (0.026)***	-0.042 (0.028)	0.003 (0.006)	-0.004 (0.003)	-0.000 (0.000)	0.042 (0.028)	-0.012 (0.004)***	-0.000 (0.000)	-0.085 (0.041)**	-0.024 (0.003)***	-0.000 (0.000)	-0.019 (0.030)
Adj. R ²	0.004	0.076	0.090	-0.000	0.257	0.164	0.239	0.220	0.183	0.011	0.368	0.153	0.001
N. obs	9054	3658	1524	846	456	484	332	500	428	360	364	372	5396

- Loan provision by MFIs procyclical across countries
- But loan growth slower than total asset growth for MFIs



Debt instruments provision cyclicity across countries

$$\text{Debt instruments growth}_{sct} = \alpha_c + \alpha_s + \alpha_{sc} + \sum_{i=1}^N \beta_i \text{Asset growth}_{ict} \times \mathbb{1}_{s=i} + \epsilon_{sct}$$

	All	G7	EU4	US	Canada	Australia	Japan	UK	Germany	France	Italy	Spain	Other Europe
MFI × Asset growth	0.001 (0.001)	-0.001 (0.001)	0.001 (0.003)	0.022 (0.006)***	0.002 (0.017)	0.057 (0.013)***	0.001 (0.004)	-0.002 (0.002)	0.001 (0.006)	-0.003 (0.005)	0.002 (0.003)	0.004 (0.003)	0.003 (0.001)***
Insurance and Pens. Fund × Asset growth	0.006 (0.002)***	0.022 (0.005)***	0.023 (0.015)	0.025 (0.015)*	0.040 (0.019)**	0.002 (0.003)	0.002 (0.011)	0.016 (0.006)**	0.007 (0.008)	0.015 (0.023)	0.039 (0.011)***	-0.052 (0.026)**	0.004 (0.002)**
Shadow Banks × Asset growth	0.001 (0.000)**	0.005 (0.001)***	0.002 (0.002)	0.009 (0.004)**	0.017 (0.006)***	0.012 (0.008)	0.007 (0.003)**	0.003 (0.001)**	0.003 (0.003)	0.001 (0.006)	0.003 (0.001)**	0.000 (0.001)	0.001 (0.000)**
Households × Asset growth	-0.002 (0.001)**	-0.005 (0.002)***	0.001 (0.001)	-0.015 (0.003)***	0.001 (0.002)	-0.000 (0.000)	-0.006 (0.003)**	0.001 (0.000)***	0.001 (0.005)	-0.003 (0.001)**	0.003 (0.002)	0.001 (0.002)	-0.001 (0.001)
Adj. R ²	0.018	0.045	0.004	0.122	0.103	0.233	-0.005	0.037	-0.031	-0.014	0.040	0.037	0.028
N. obs	7700	3360	1216	856	456	484	332	500	253	360	366	237	4340

- Debt instruments provision by non-MFIs procyclical across countries



Debt instruments provision cyclicity across countries

$$\text{Debt instruments share growth}_{sct} = \alpha_c + \alpha_s + \alpha_{sc} + \sum_{i=1}^N \beta_i \text{Asset growth}_{ict} \times \mathbb{1}_{s=i} + \epsilon_{sct}$$

	All	G7	EU4	US	Canada	Australia	Japan	UK	Germany	France	Italy	Spain	Other Europe
MFI × Asset growth	-0.028 (0.008)***	-0.058 (0.014)***	-0.078 (0.029)***	0.046 (0.119)	-0.220 (0.242)	0.232 (0.154)	-0.134 (0.031)***	-0.051 (0.013)***	-0.022 (0.063)	-0.078 (0.037)**	-0.064 (0.038)*	0.007 (0.022)	-0.008 (0.006)
Insurance and Pens. Fund × Asset growth	-0.043 (0.026)*	-0.295 (0.109)***	-1.049 (0.530)**	-0.964 (0.321)***	-0.211 (0.531)	-0.154 (0.095)	-1.105 (0.334)***	-0.192 (0.118)	-0.204 (0.443)	-1.794 (0.758)**	1.237 (0.727)*	-13.796 (4.371)***	-0.007 (0.014)
Shadow Banks × Asset growth	-0.009 (0.003)***	-0.136 (0.032)***	-0.507 (0.195)***	-0.200 (0.058)***	-0.018 (0.094)	-0.050 (0.246)	-0.009 (0.051)	-0.094 (0.031)***	-2.041 (1.581)	-0.637 (0.190)***	-0.038 (0.122)	-0.319 (0.316)	-0.006 (0.003)**
Households × Asset growth	-0.023 (0.007)***	-0.088 (0.019)***	-0.022 (0.033)	-0.166 (0.022)***	-0.050 (0.018)***	-0.007 (0.006)	-0.063 (0.020)***	0.001 (0.001)	-0.091 (0.074)	-0.074 (0.022)***	0.009 (0.025)	-0.026 (0.022)	-0.005 (0.005)
Adj. R ²	-0.002	0.020	0.027	0.106	-0.008	-0.003	0.213	0.050	0.037	0.163	0.011	0.182	-0.007
N. obs	7346	3356	1212	856	456	484	332	500	251	360	364	237	3990

- Debt instruments provision by non-MFIs procyclical across countries
- But debt instruments growth slower than total asset growth



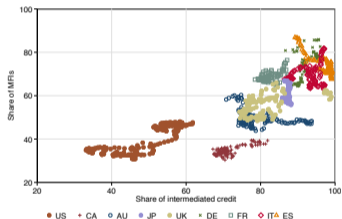
Intuition

- Loans primarily held by banks; bonds primarily held by non-banks
- ⇒ Cyclicalities of intermediated credit determined by combination of cyclicalities of providers of credit and cyclicalities of credit instruments
- ⇒ Countries more reliant on bank-credit have more pro-cyclical total credit, less procyclical intermediated credit

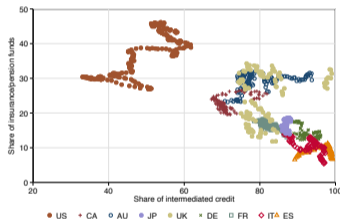


Intermediated credit and sector prominence

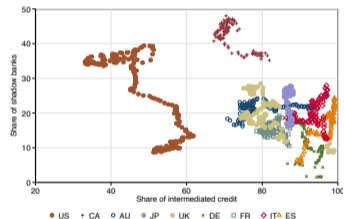
(a) MFIs



(b) Insurance and pension funds

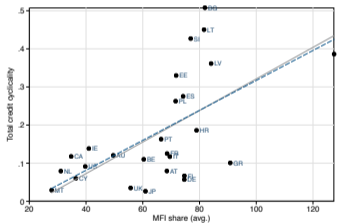


(c) Shadow banks

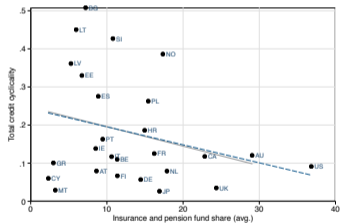


Total credit cyclicality is bigger in economies more reliant on bank funding...

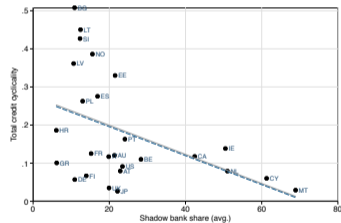
(a) MFIs



(b) Insurance and pension funds

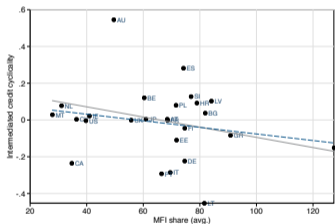


(c) Shadow banks

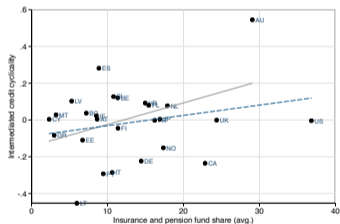


... while intermediated credit cyclicality is smaller in economies more reliant on bank funding

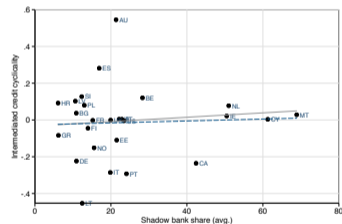
(a) MFIs



(b) Insurance and pension funds



(c) Shadow banks



Conclusion

- BIS 2018: post-financial-crisis expansion of corporate credit globally due to debt instruments issuance
- Through the lens of this paper:
 - Natural consequence of growth of non-MFIs across the world
 - Could lead to less cyclicity in aggregate credit provision
 - But more volatile share of intermediated credit
- Cross-country differences in total and intermediated credit cyclicity due to differences in financial sector composition

