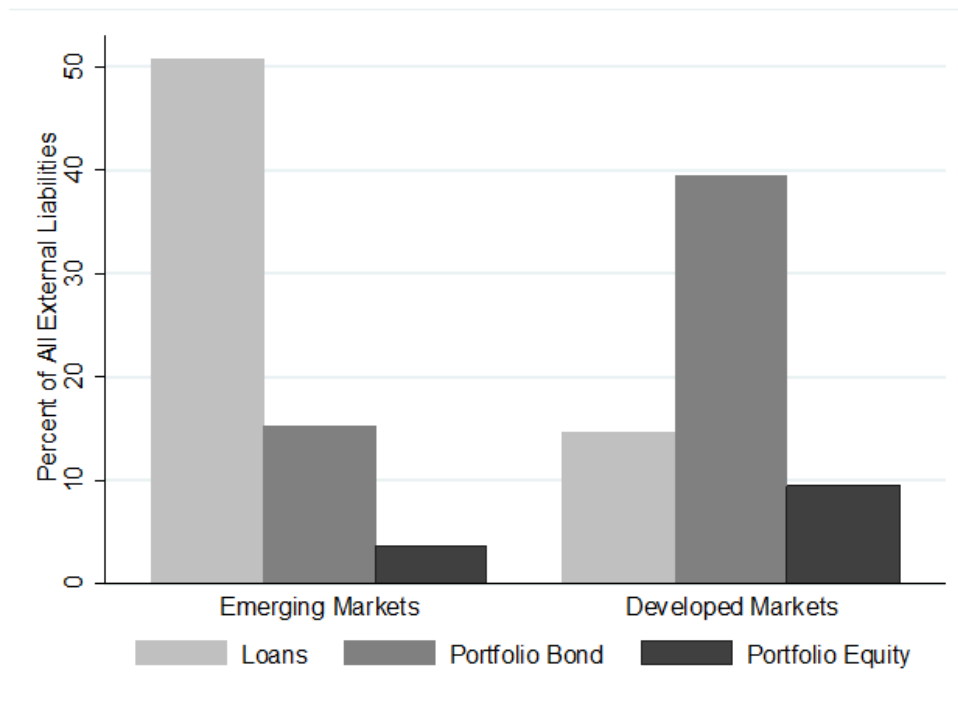


U.S. Monetary Policy and Emerging Market Credit Cycles

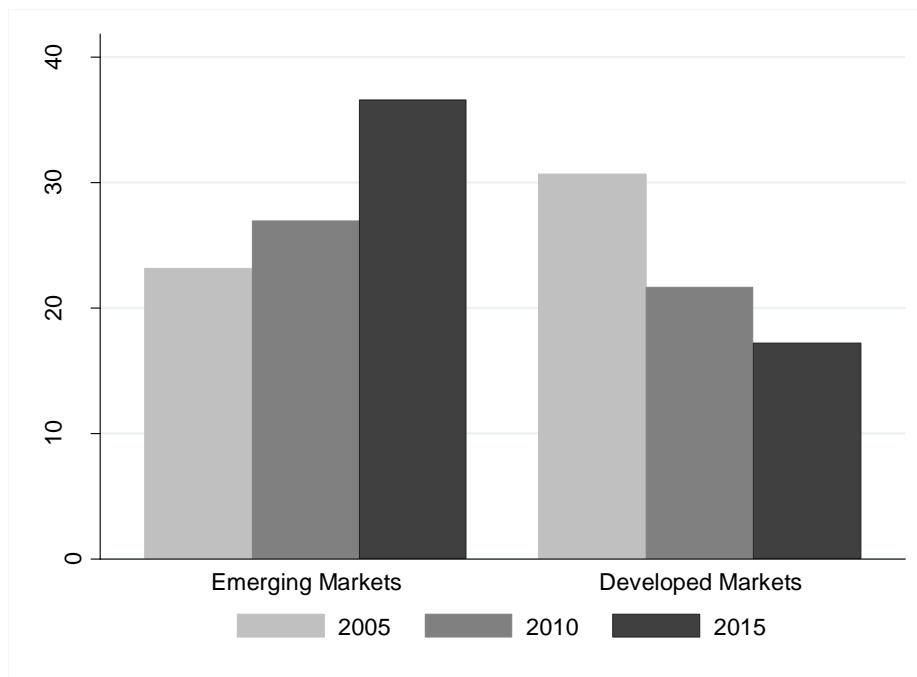
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The views expressed in this paper are those of the authors and do not necessarily represent the views of the Federal Reserve Bank of Boston or the Federal Reserve System.

- Fact #1: For EMEs, foreign bank lending is the key component of cross-border capital flows



- Fact #1: For EMEs, foreign bank lending is the key component of cross-border capital flows



Syndicated credit: over 80% of loans are provided by foreign banks in EMEs vs. less than 50% for DMEs (see paper, Figure III)

- Fact #2: Much of the foreign banks' lending is in USD

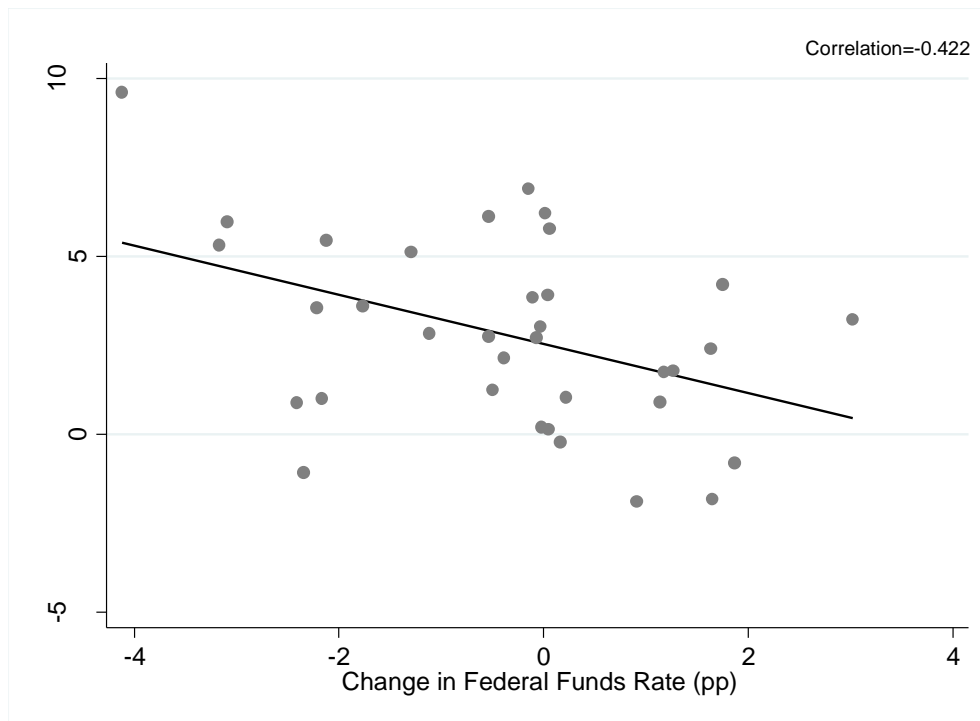
| | Cross-Border Loans (Source: DealScan) | | | | | | Cross-Border "Bank Claims" (Source: BIS) | | | | |
|---------------|--|-------|------|------|-------|--|---|-------|------|------|-------|
| Currency: | USD | EUR | GBP | JPY | Other | | USD | EUR | GBP | JPY | Other |
| Region: | | | | | | | | | | | |
| EME: Africa | 88.8% | 5.3% | 0.1% | 0.8% | 4.9% | | 65.5% | 12.7% | 3.9% | 1.0% | 16.9% |
| EME: Americas | 91.3% | 1.1% | 0.0% | 0.7% | 6.9% | | 75.6% | 4.4% | 0.2% | 1.7% | 18.2% |
| EME: Asia | 69.7% | 1.3% | 0.7% | 4.2% | 24.0% | | 51.9% | 5.0% | 0.3% | 1.3% | 41.5% |
| EME: Europe | 56.0% | 30.9% | 0.0% | 0.6% | 12.5% | | 31.9% | 38.8% | 0.5% | 1.1% | 27.7% |
| DME | 69.8% | 19.7% | 5.0% | 0.7% | 4.8% | | 43.3% | 36.9% | 4.9% | 4.9% | 10.1% |

- Currency breakdown of syndicated cross-border loans to EME borrowers based on outstanding claims. All claims include also bond and equity holdings. Claims at 2016:Q3. Source: DealScan, BIS, Authors' calculations.

→ Across all industries: see paper Table I (detailed country data) and Table II

→ Stable over time: see paper Figure IV

Focus: Cross-border Loans to EMEs and U.S. Monetary Policy



- Figure shows relationship between cross-border loans to emerging market economies (EMEs) and U.S. monetary policy. Annual data from 1980 through 2015. Source: IMF, Authors' calculations.

Identification of Channel with Loan-Level Data

Syndicated loan data: global issuance, 1990-2016 (119 EMEs)

With loan-level data (as opposed to aggregate macro data) we know:

- the identity of the bank (lender) and firm (borrower)
- the loan conditions (volume, maturity, etc.)
- the currency of the loan

Allows us to better identify the effect of U.S. monetary policy on dollar loan supply by global banks to EME borrowers (credit channel + risk-taking channel)

Related Literature

Macro evidence

- Rey (2013)
- Miranda-Agrippino and Rey (2015)
- McCauley, McGuire and Sushko (2015)
- Takas and Temesvary (2016)

Fund evidence

- Forbes and Warnock (2012)
- Fratzscher (2012)
- Ahmed and Zlate (2013)

Bank evidence

- Baskaya et al. (2017) – Turkey
- Altunok et al. (2017) – Turkey
- Peydro and Ruiz (2015) – Mexico
- Demirguc-Kunt, Horvath and Huinga (2017) – Syndicated data

Cross-border Lending at Bank-Firm Level

Table III: Baseline results (unit of observation: Loan x Lender)

| | (1) | (2) | (4) |
|---|-----------|-----------|-----------|
| U.S. Interest Rate | -0.144*** | -- | -- |
| | (-11.49) | | |
| U.S. Interest Rate * DME | -- | -0.090*** | -- |
| | | (-9.98) | |
| U.S. Interest Rate * EME | -- | -0.194*** | -0.081*** |
| | | (-9.66) | (-7.69) |
| U.S. Term Spread * EME | -- | -- | -- |
| | | | |
| U.S. Shadow Rate * EME | -- | -- | -- |
| | | | |
| EME | -- | -0.951*** | -- |
| | | (13.43) | |
| Fixed Effects | -- | -- | |
| Borrower (D_i) | -- | -- | Yes |
| Bank * Quarter (D_{jt}) | -- | -- | Yes |

From (4), U.S. rate increases by 1 pp →
additional decrease in EME lending by 8 percent

Cross-border Lending at Bank-Firm Level

Table III: Baseline results (unit of observation: Loan x Lender)

| | | | | | Pre-ZLB Period | ZLB Period |
|---|-----------------------|----------------------|----------------------|-----------------------|---------------------|---------------------|
| | (1) | (2) | (4) | (5) | (6) | (7) |
| U.S. Interest Rate | -0.144*** (-11.49) | -- | -- | -- | -- | -- |
| U.S. Interest Rate * DME | -- | -0.090*** (-9.98) | -- | -- | -- | -- |
| U.S. Interest Rate * EME | -- | -0.194*** (-9.66) | -0.081*** (-7.69) | -0.164*** (-12.71) | -0.074** (-3.41) | -- |
| U.S. Term Spread * EME | -- | -- | -- | -0.158*** (-6.80) | -0.092** (-3.08) | -- |
| U.S. Shadow Rate * EME | -- | -- | -- | -- | -- | -0.068** (-2.75) |
| EME | -- | -0.951*** (13.43) | -- | -- | -- | -- |
| Fixed Effects | -- | -- | | | | |
| Borrower (D_i) | -- | -- | Yes | Yes | Yes | Yes |
| Bank * Quarter (D_{jt}) | -- | -- | Yes | Yes | Yes | Yes |

Holds across all geographical regions and industries
Quantitatively, similar result if using aggregate BIS data

Cross-border Lending at Bank-Firm Level

Table III: Baseline results (unit of observation: Loan x Lender)

| Banks' Loan Exposure to U.S.: | < 10% | < 5% | < 5% | < 5% | < 5% | < 5% |
|-------------------------------|-----------|---------|-----------------------|-------------------------------|--------------------------------|----------------------------------|
| Borrowers: | | | Non-Tradable Industry | Sectors with Low Export Share | Country with Low Trade Overall | Country with Low Trade with U.S. |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| U.S. Interest Rate * EME | -0.159*** | -0.078* | -0.091** | -0.181*** | -0.092** | -0.348*** |
| | (-5.58) | (-1.79) | (-1.99) | (-2.69) | (-2.09) | (-5.71) |
| U.S. Term Spread * EME | -0.186*** | -0.112* | -0.135** | -0.073 | -0.092 | -0.517*** |
| | (-4.29) | (-1.76) | (-2.02) | (-0.26) | (-1.51) | (-5.97) |
| Fixed Effects: | | | | | | |
| Borrower (D_i) | Yes | Yes | Yes | Yes | Yes | Yes |
| Bank * Quarter (D_{jt}) | Yes | Yes | Yes | Yes | Yes | Yes |

Results are unlikely to be driven by correlated demand with U.S. monetary policy.

Cross-border Lending at Bank-Firm Level

Table IV: EME dummy replaced by country characteristics

| | “High-Yield Market” Defined Using: | | | | | | | |
|---|------------------------------------|------------|----------------------|----------------------|----------------|----------------|----------------|----------------|
| | GDP Growth | GDP Growth | Interest Rate Spread | Interest Rate Spread | Equity Returns | Equity Returns | Country Rating | Country Rating |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| U.S. Interest Rate * High-Yield Market | −0.002** | −0.006*** | −0.003*** | −0.004*** | −0.024* | −0.031 | −0.007*** | −0.014*** |
| | (−2.05) | (−3.00) | (−5.65) | (−3.65) | (−1.68) | (−0.80) | (−6.45) | (−7.92) |
| U.S. Term Spread * High-Yield Market | -- | −0.007* | -- | −0.001 | -- | −0.013 | -- | −0.012*** |
| | | (−1.97) | | (−0.92) | | (−0.20) | | (−4.49) |
| High-Yield Market | 0.014*** | 0.036*** | 0.014*** | 0.019*** | 0.025 | 0.065 | −0.063*** | −0.010 |
| | (2.71) | (3.08) | (5.36) | (2.91) | (0.35) | (0.31) | (−5.23) | (−0.69) |
| Fixed Effects: | | | | | | | | |
| Borrower (D_i) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Bank * Quarter (D_{jt}) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Financial openness (conditional on country rating) magnifies the impact (Table VII)

Cross-border Lending at Bank-Firm Level

Table V: Specialness of U.S. monetary policy

| Loan Currency: | USD | USD | USD | USD | EUR |
|---|-----------|-----------|---------------------------------------|-----------|---------------------------------|
| | | | Non-U.S. Banks, Non-U.S. Borrowers | | U.S. Banks, Non-EU Borrowers |
| | (1) | (2) | (3) | (4) | (5) |
| | | | | | |
| Euro Interest Rate * EME | −0.147*** | −0.018 | −0.034 | -- | −0.228** |
| | (−7.82) | (−0.57) | (−0.86) | | (−2.37) |
| Euro Term Spread * EME | −0.036 | 0.030 | 0.046 | -- | −0.136 |
| | (−1.25) | (1.10) | (1.17) | | (−0.71) |
| U.S. Interest Rate * EME | -- | −0.191*** | −0.187*** | −0.196*** | −0.029 |
| | | (−5.64) | (−4.00) | (−4.05) | (−0.21) |
| U.S. Term Spread * EME | -- | −0.223*** | −0.263*** | −0.343*** | −0.136 |
| | | (−5.34) | (−4.42) | (−4.21) | (−0.71) |
| Fixed Effects: | | | | | |
| Borrower (D_i) | Yes | Yes | Yes | Yes | Yes |
| Bank * Quarter (D_{jt}) | Yes | Yes | Yes | Yes | Yes |
| Observations | 113,277 | 113,277 | 51,091 | 16,809 | 210 |
| R-squared | 0.825 | 0.826 | 0.843 | 0.887 | 0.940 |

Borrower-Level Impact

Table VIII: Substitution between local and foreign lenders at firm level

| Dependent Variable: | (Log) Borrowing Amount (USD) | | | | | Interest Rate Spread (bps) | | |
|--------------------------|---|---------------|-------------|-----------|-----------|----------------------------|-----------|-----------|
| | Firm-Quarters with Foreign and Domestic Lenders | | | | | | | |
| | | Foreign Banks | Local Banks | All Banks | All Banks | All Banks | All Banks | All Banks |
| | | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| U.S. Interest Rate * EME | | −0.075*** | −0.085*** | −0.079*** | −0.024*** | −0.036*** | 3.855*** | 9.402*** |
| | | (−4.51) | (−6.61) | (−5.54) | (−2.65) | (−3.10) | (2.72) | (4.61) |
| U.S. Term Spread * EME | | -- | -- | -- | -- | −0.023 | -- | 10.007*** |
| | | | | | | (−1.20) | | (2.82) |
| Fixed Effects: | | | | | | | | |
| Borrower (D_i) | | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Quarter (D_t) | | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | | 24,754 | 24,754 | 24,754 | 40,134 | 40,134 | 30,829 | 30,829 |

Foreign Bank Reliance of EME Firms

Table IX (Sample: EME firms only)

| Dependent Variable: | (Log) Borrowing Amount (USD) | | Interest Rate Spread (bps) | | Probability of Refinancing | |
|---|------------------------------|-------------------|----------------------------|-----------------------|----------------------------|----------------------|
| | (3) | (4) | (5) | (6) | (7) | (8) |
| Past Foreign Bank Reliance | 0.155** (2.10) | 0.200 (1.11) | -6.111 (-0.62) | -75.645*** (-3.57) | 0.044 (1.02) | 0.232*** (2.74) |
| Past Foreign Bank Reliance * U.S. Interest Rate | -0.035* (-1.67) | -0.042 (-1.19) | 2.867 (1.18) | 14.430*** (3.78) | -0.023** (-2.37) | -0.057*** (-3.29) |
| Past Foreign Bank Reliance * U.S. Term Spread | -- | -0.017 (-0.27) | -- | 25.392*** (3.42) | -- | -0.067** (-2.52) |
| Fixed Effects: | | | | | | |
| Borrower (D_i) | Yes | Yes | Yes | Yes | Yes | Yes |
| Quarter (D_t) | Yes | Yes | Yes | Yes | Yes | Yes |

Reliance is fraction of the last loan funded by foreign banks

1 SD (0.32) → \$28 million drop for 25 bps increase in rate

1 SD → 1.2 bps drop for 25 bps increase in rate(vs. 16.3% mean)

1 SD → 0.2 bps drop for 25 bps increase in rate(vs. 16.3% mean)

Conclusions

- We provide new insights into the transmission of U.S. monetary policy to emerging markets credit cycle
 - Channel operates through dominance of U.S. dollar lending of global banks across all EME regions and industries
- A typical U.S. monetary easing cycle, EME borrowers experience a 32-percentage-point greater increase in the volume of loans issued by foreign banks than do borrowers from developed markets, with a similarly large effect upon reversal of the U.S. monetary policy stance