Introduction

- Economic activity funded by foreigners far more than before
- Lack of data, unclear how foreign capital allocated (vs. domestic)
- Assemble $27 trillion of positions-level data from global mutual funds from Morningstar to expose key role of currency in borrower and lender behavior
Empirical Findings and Implications

1. Investor portfolios exhibit strong home currency bias
   ▶ (Possible) Negative wealth effects of currency depreciation
   ▶ Home currency has greater explanatory power for bond portfolios than home country

2. Currency bias shapes capital allocation
   ▶ Some firms issue in foreign currency (FC) and borrow from foreigners
   ▶ Most issue only in local currency (LC) and don’t borrow from abroad

3. Novel perspective on “International Currencies” (ICs)
   ▶ US is exception to above patterns – global taste for dollar effectively opens capital account for USD-only issuers
   ▶ IC status less stable than generally thought: Euro collapse post-2008
Related Literature


- **Country Portfolios with Aggregate Data**: Lane and Milesi-Ferreti (2007), Gourinchas and Rey (2007), Lane and Shambaugh (2010), Curcuru, Dvorak, Warnock (2008)


- **Sectoral Heterogeneity in Gross Capital Flows**: Lane et al. (2016), Kalemil-Ozcan et al. (2017), Kojien et al. (2016)
Outline

1. Novel global dataset on mutual fund holdings

2. Home currency bias

3. Currency and capital allocation across firms

4. International currencies over time
Novel Dataset on Global Portfolio Holdings

- $27 trillion (in 2015) of worldwide mutual fund positions from Morningstar
- Position-level: unique CUSIP
- Long time series: USA since 1995, RoW since 2003
- Use Cusip Global Services, SDC, and Capital IQ to match securities to ultimate parent and classify by nationality
- Merged-in securities attributes: currency, sovereign vs. corporate, maturity, coupon, sector, etc.
Novel Dataset on Global Portfolio Holdings

- How does Morningstar obtain their data? ▶ Morningstar Details
- Morningstar coverage of mutual funds ▶ Worldwide AUM
- Comparison with TIC ▶ TIC Portfolio Shares
- Funds’ domicile and investors’ nationality ▶ Domicile
- Tax havens ▶ Treatment of Tax Havens
- Parent firm aggregation ▶ Mapping to Parents
Outline

1. Novel global dataset on mutual fund holdings

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4. International currencies over time
Share of Investment in Country i’s Corporate Debt in i’s Currency, 2015

Source Country (j)

Country i

Issuing Country

- AUS
- CAN
- CHE
- DNK
- EMU
- GBR
- NOR
- NZL
- SWE

1 0.75 0.5 0.25 0 .25 .5 .75 1
Share of Investment in Country i’s Corporate Debt in i’s Currency, 2015

Source Country (j)

Country i

Rest of World

Issuing Country

AUS

CAN

CHE

DNK

EMU

GBR

NOR

NZL

SWE

1 0.75 0.5 0.25 0 0.25 0.5 0.75 1

SWE

NZL

NOR

GBR

EMU

DNK

CHE

CAN

AUS

Issuing Country
Share of Investment in Country i’s Corporate Debt in i’s Currency, 2015

Source Country (j)
Country i
Rest of World

Issuing Country
USA
SWE
NZL
NOR
GBR
EMU
DNK
CHE
CAN
AUS

1 0.75 0.5 0.25 0.25 .5 .75 1
Currency Composition of External Investment

Share of foreign assets (corporate bonds) in each currency, excluding investment in the USA
Run security-level regressions to study how investors in different countries buy the debt of the same firm in different currencies:

\[ s_{j,p,c} = \alpha_j + \delta_{j,p} + \beta_j \mathbf{1}_{\{\text{Currency}_c=LC_j\}} + \text{Controls} + \epsilon_{j,p,c} \]

- \( s_{j,p,c} \) is share of security \( c \) issued by firm \( p \) that is held by country \( j \)
- Home currency dummy: \( \mathbf{1}_{\{\text{Currency}_c=LC_j\}} \)
- \( \delta_{j,p} \) is a firm (ultimate parent) fixed effect
- Controls included for maturity and coupon
Within-Firm Variation, All Issuers

\[ s_{j,p,c} = \alpha_j + \delta_{j,p} + \beta_j \mathbb{1}_{\{\text{Currency}_c = LC_j\}} + \text{Controls} + \epsilon_{j,p,c} \]

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<th>Currency</th>
<th>CAN</th>
<th>CHE</th>
<th>EMU</th>
<th>GBR</th>
<th>SWE</th>
<th>USA</th>
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<tr>
<td></td>
<td>0.925***</td>
<td>0.682***</td>
<td>0.587***</td>
<td>0.526***</td>
<td>0.788***</td>
<td>0.623***</td>
</tr>
<tr>
<td></td>
<td>(0.010)</td>
<td>(0.015)</td>
<td>(0.014)</td>
<td>(0.027)</td>
<td>(0.028)</td>
<td>(0.015)</td>
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<tr>
<td>Firms</td>
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<td>10,555</td>
<td>10,555</td>
<td>10,555</td>
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<tr>
<td>( R^2 )</td>
<td>0.953</td>
<td>0.938</td>
<td>0.833</td>
<td>0.806</td>
<td>0.953</td>
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<td>Controls</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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</table>

Estimates for year 2015, weighted least squares, SE clustered at firm level
Within-Firm Variation, Robustness

\[ s_{j,p,c} = \alpha_j + \delta_{j,p} + \beta_j \mathbf{1}_{\{\text{Currency}_c = \text{LC}_j\}} + \text{Controls} + \epsilon_{j,p,c} \]

<table>
<thead>
<tr>
<th></th>
<th>CAN</th>
<th>CHE</th>
<th>EMU</th>
<th>GBR</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) MC Only</td>
<td>0.924***</td>
<td>0.682***</td>
<td>0.586***</td>
<td>0.521***</td>
<td>0.623***</td>
</tr>
<tr>
<td>(2) Foreign</td>
<td>0.941***</td>
<td>0.664***</td>
<td>0.623***</td>
<td>0.526***</td>
<td>0.583***</td>
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<tr>
<td>(3) Foreign, Int'l</td>
<td>0.972***</td>
<td>0.711***</td>
<td>0.571***</td>
<td>0.545***</td>
<td>0.593***</td>
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<tr>
<td>(4) Financial</td>
<td>0.916***</td>
<td>0.674***</td>
<td>0.590***</td>
<td>0.471***</td>
<td>0.628***</td>
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<tr>
<td>(5) Non-Financial</td>
<td>0.942***</td>
<td>0.704***</td>
<td>0.585***</td>
<td>0.606***</td>
<td>0.617***</td>
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<tr>
<td>(6) Foreign Financial</td>
<td>0.919***</td>
<td>0.666***</td>
<td>0.632***</td>
<td>0.458***</td>
<td>0.587***</td>
</tr>
<tr>
<td>(7) Foreign Non-Fin.</td>
<td>0.966***</td>
<td>0.671***</td>
<td>0.608***</td>
<td>0.606***</td>
<td>0.578***</td>
</tr>
<tr>
<td>(8) SF, SV, LS</td>
<td>0.924***</td>
<td>0.685***</td>
<td>0.604***</td>
<td>0.539***</td>
<td>0.647***</td>
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<tr>
<td>(9) All bonds</td>
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<td>0.675***</td>
<td>0.605***</td>
<td>0.536***</td>
<td>0.637***</td>
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<tr>
<td>(10) Residency ( \beta )</td>
<td>0.909***</td>
<td>0.679***</td>
<td>0.585***</td>
<td>0.525***</td>
<td>0.616***</td>
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<tr>
<td>Residency ( \beta ) Coeff</td>
<td>0.043**</td>
<td>0.036</td>
<td>0.015</td>
<td>0.008</td>
<td>0.046***</td>
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</table>
Home-Country Bias and Home-Currency Bias?

- Similar regression framework, but now consider three specifications:
  1. Home country dummy: \( 1_{\{\text{Country}_{p}=j\}} \)
  2. Home currency dummy: \( 1_{\{\text{Currency}_{c}=\text{LC}_{j}\}} \)
  3. Home country and home currency dummies

\[
 s_{i_{p},j,p,c} = \alpha_{j} + \phi_{j} 1_{\{\text{Country}_{p}=j\}} + \beta_{j} 1_{\{\text{Currency}_{c}=\text{LC}_{j}\}} + \text{Controls} + \epsilon_{i_{p},j,p,c}
\]

- No firm fixed effects to allow for country variation

- Related to Burger, Warnock, and Warnock (2017)
Bond Home-Country Bias and Home-Currency Bias

\[ s_{i p, j, p, c} = \alpha_j + \phi_j 1_{\{\text{Country}_p = j\}} + \text{Controls} + \epsilon_{i p, j, p, c} \]

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<td>( \phi )</td>
<td>( R^2 )</td>
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<tr>
<td>CAN</td>
<td>0.492</td>
<td>0.403</td>
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</tr>
<tr>
<td>CHE</td>
<td>0.371</td>
<td>0.240</td>
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<tr>
<td>EMU</td>
<td>0.419</td>
<td>0.270</td>
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<tr>
<td>GBR</td>
<td>0.221</td>
<td>0.135</td>
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<tr>
<td>SWE</td>
<td>0.545</td>
<td>0.522</td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>0.482</td>
<td>0.400</td>
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Bond Home-Country Bias and Home-Currency Bias

\[ s_{i_p,j,p,c} = \alpha_j + \beta_j \mathbb{1}_{\{\text{Currency}_c = LC_j\}} + \text{Controls} + \epsilon_{i_p,j,p,c} \]

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Bond Home-Country Bias and Home-Currency Bias

\[ s_{i,p,j,p,c} = \alpha_j + \phi_j 1_{\{\text{Country}_p=j\}} + \beta_j 1_{\{\text{Currency}_c=L_{C_j}\}} + \text{Controls} + \epsilon_{i,p,j,p,c} \]

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<th>Only Currency Indicators</th>
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<tr>
<td></td>
<td>( \phi )</td>
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<td>( \beta )</td>
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<tr>
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<td>0.677</td>
</tr>
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</table>
Outline

1. Novel global dataset on mutual fund holdings

2. Home currency bias

3. **Currency and capital allocation across firms**

4. International currencies over time
Currency Bias and Foreign Capital Allocation

Figure: Share of Foreign Borrowing and Share of FC Debt

(a) CAN
(b) EMU
(c) GBR
(d) USA
Selection into FC Issuance

**Figure: Number of Currencies and Firm Size**

(a) CAN  
(b) EMU  
(c) GBR  
(d) USA
How We Think About It

- Melitz (2003) for firm borrowing: downward-sloping demand by currency and fixed costs of foreign currency issuance

- To issue more debt in any currency, firms must pay higher rate

- Larger firms issue FC, smaller firms don’t, gap in their outcomes depends on global demand for currency (i.e. depth of market)

Implications for international currency issuer

1. LC-only firms attract more foreign financing than in other countries

2. LC-only firms constitute a larger share of total borrowing
Foreigners Avoid Local Currency Issuers

Canada

All Issuers

Only Local Currency Issuers

Issuer’s Rank by Domestic Borrowing

Share of domestic portfolio

Share of foreign portfolio

Domestic Foreign

Domestic

Foreign
Local Currency Only Issuers

CAN

EMU

GBR

Issuer's Rank by Domestic Borrowing

Domestic
Foreign

- Domestic
- Foreign
Local Currency Only Issuers

CAN

EMU

GBR

USA

- Domestic
- Foreign
US LC Issuers Place Debt Similarly at Home and Abroad

LC–only Firms’ Share in Domestic Portfolios (Sum of Red Dots)
LC–only Firms’ Share in Foreign Portfolios (Sum of Blue Diamonds)
Little Difference Observed in Equities

LC-only Firms’ Share in Domestic Equity Portfolios
LC-only Firms’ Share in Foreign Equity Portfolios
Outline

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Changes in International Use of Currency

Corporate Bonds, Cross-Border Positions

USD
EUR

08:Q3

2005q3 2008q1 2010q3 2013q1 2015q3

USD

EUR

0.2

0.4

0.6

0.8

1

Changes in International Use of Currency

Corporate Bonds, Cross-Border, Fixed Effects, Constant FX

USD EUR

2005q3 2008q1 2010q3 2013q1 2015q3
## Pervasive Shift from EUR to USD

<table>
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<tbody>
<tr>
<td></td>
<td>USD</td>
</tr>
<tr>
<td>(1) All Bonds</td>
<td>0.119</td>
</tr>
<tr>
<td>(2) All Bonds Held by Foreigners</td>
<td>0.106</td>
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<td>(3) Govt Bonds Held by Foreigners</td>
<td>0.004</td>
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<td>(4) Corp Bonds Held by Foreigners</td>
<td>0.163</td>
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<td>(5) Financial Corp by Foreigners</td>
<td>0.148</td>
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<tr>
<td>(6) Non-Financial Corp by Foreigners</td>
<td>0.108</td>
</tr>
<tr>
<td>(7) Corp by Foreigners, Ex-USA/EMU</td>
<td>0.036</td>
</tr>
</tbody>
</table>
Conclusion

- New dataset to examine global capital flows at the micro level
- Striking importance of currency in portfolio determination

Leads to:

- Different take on home bias
- Novel benefits of issuing an international currency: akin to opening capital account for LC-only borrowers
- Implications of rise of the Dollar and fall of the Euro
How Does Morningstar Obtain Their Data?

- Surveys required to obtain research coverage by Morningstar
- Reporting is voluntary, but clears various quality checks:
  - Cross-referenced with publicly available realized returns
  - Cross-referenced with regulated positions disclosures
  - Informally checked by clients with positions
- Fund managers often request omission of sensitive positions. After quarter, Morningstar back-fills the data.
- By end of sample, roughly three-quarters (weighted by value) of funds report monthly. Nearly all report quarterly.
Coverage Relative to ICI

(e) US Equity

(f) US Fixed Income

(g) Non-US Equity

(h) Non-US Fixed Income
Luxembourg and Ireland are big mutual-fund investment centers representing a combined $6 Trillion

Unlike other Domiciles, these clearly attract foreign investors

Allowed by UCITS, but rules distinguish EU and Non-EU

Given focus on currencies, pool Eurozone as “EMU”

CPIS shows > 70% of Luxembourg funds held by “EMU”
Aggregating Securities to the Ultimate Parent Firm

Several challenges in international securities data

- **CUSIP Aggregation**
  - Large firms and government issue using multiple 6-digit codes
  - Solution: use CUSIP Global Services Associated Issuer dataset

- **Layers of Ownership**
  - Multiple layers of vertical ownership structure, often crossing country lines
  - Solution: use SDC New Issues and Capital IQ corporate structure dataset

- **Nationality and Residency Principle**
  - National statistics most often based on residency, economics closer to nationality
  - Solution: use above datasets and Morningstar to find:
    - Ultimate parent firm nationality
    - Security level residency
**Domicile and Nationality**

- Investing in foreign funds often illegal, not offered (concerns about foreign law), or tax disadvantageous.
- TIC reports U.S. resident holdings of foreign funds shares (including all funds) and vice-versa:

<table>
<thead>
<tr>
<th></th>
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<tr>
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<td>0.1</td>
<td>5.3</td>
<td>2.4</td>
<td>6.8</td>
</tr>
<tr>
<td>BRA</td>
<td>0.0</td>
<td>0.4</td>
<td>2.6</td>
<td>0.9</td>
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<tr>
<td>CAN</td>
<td>1.3</td>
<td>1.4</td>
<td>10.4</td>
<td>10.7</td>
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<tr>
<td>CHE</td>
<td>0.0</td>
<td>0.2</td>
<td>9.7</td>
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<td>CYM</td>
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<td>47.9</td>
<td>3.7</td>
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<td>EMU</td>
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<tr>
<td>Rest of World</td>
<td>0.8</td>
<td>6.6</td>
<td>Rest of World</td>
<td>4.5</td>
</tr>
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Inward and Outward Portfolio Shares

(i) US Outward

(j) US Inward
Larger Firms More Likely to Be Multi-Currency

\[ Pr \left( 1_{MC_p} = 1 \right) = \Phi \left( \alpha_j + \beta_j Size_p + \gamma_j Industry_p \right) \]

<table>
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<tr>
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<tr>
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<td>0.049**</td>
<td>0.051**</td>
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<td>0.053***</td>
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<td>0.116***</td>
<td>0.096***</td>
<td>0.156***</td>
</tr>
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<td>NZL</td>
<td>0.078***</td>
<td>0.204***</td>
<td>0.170***</td>
<td>0.100***</td>
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<td>0.064***</td>
<td>0.100***</td>
<td>0.056***</td>
<td>0.052***</td>
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<tr>
<td>USA</td>
<td>0.011***</td>
<td>0.031***</td>
<td>0.013***</td>
<td>0.013***</td>
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All specifications include two-digit SIC fixed effects. Average marginal effects reported.