International Currencies and Capital Allocation

Matteo Maggiori
Harvard University

Brent Neiman
University of Chicago

Jesse Schreger
Columbia University

February 2018

Motivation

- 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 to expose key role of currency in borrower and lender behavior
- Rationalize/organize findings in framework with downward sloping demand by currency and fixed costs of foreign currency issuance

Empirical Findings and Implications

1. Investor portfolios exhibit very strong home currency bias

Empirical Findings and Implications

1. Investor portfolios exhibit very strong home currency bias
    - Negative wealth effects of currency depreciation ("Original Sin") pervasive among corporates of AEs, not just EMs
    - Home currency has greater explanatory power for bond portfolios than home country

Empirical Findings and Implications

1. Investor portfolios exhibit very strong home currency bias
   - Negative wealth effects of currency depreciation ("Original Sin") pervasive among corporates of AEs, not just EMs
   - Home currency has greater explanatory power for bond portfolios than home country
2. Currency bias shapes capital allocation

Empirical Findings and Implications

1. Investor portfolios exhibit very strong home currency bias
   - Negative wealth effects of currency depreciation ("Original Sin") pervasive among corporates of AEs, not just EMs
   - 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

Empirical Findings and Implications

1. Investor portfolios exhibit very strong home currency bias
   - Negative wealth effects of currency depreciation ("Original Sin") pervasive among corporates of AEs, not just EMs
   - 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)

Empirical Findings and Implications

1. Investor portfolios exhibit very strong home currency bias
   - Negative wealth effects of currency depreciation ("Original Sin") pervasive among corporates of AEs, not just EMs
   - 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

How We Think About It

- To issue more debt in any currency, firms must pay higher rate
- Want to get lower borrowing cost from FC, but requires fixed cost
- Larger firms issue FC, smaller firms don't, gap in their outcomes depends on global demand for currency (i.e. depth of market)
- Melitz (2003) for firm borrowing

Related Literature

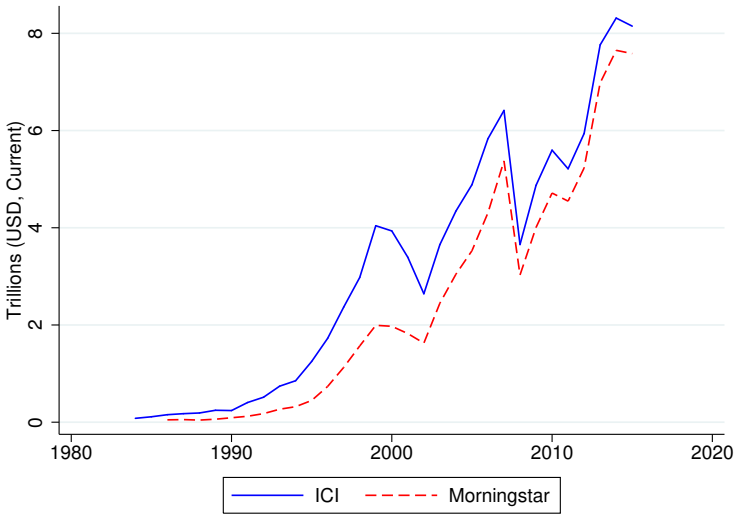
- Country Portfolios with Aggregate Data: Eichengreen and Hausmann (1999,2005) Lane and Milesi-Ferreti (2007), Gourinchas and Rey (2007), Lane and Shambaugh (2010), Curcuru, Dvorak, Warnock (2008), Warnock et al. (2017)
- Cross-Border Mutual Fund Equity Flows/Positions: Chan, Covrig, Ng (2005), Hau and Rey (2004, 2008), Forbes et al. (2011), Raddatz and Schmukler (2012), Rigobon et al. (2013)
- Sectoral (and other) Heterogeneity in Gross Capital Flows: Lane et al. (2016), Kalemil-Ozcan et al. (2017), Koijen et al. (2016)
- Related Implications: French and Poterba (1991), Lewis (1995), Coeurdacier and Rey (2013), Coeurdacier and Gourinchas (2016), Engel and Matsumato (2009), Gabaix and Maggiori (2015), Farhi and Maggiori (2017)

Outline

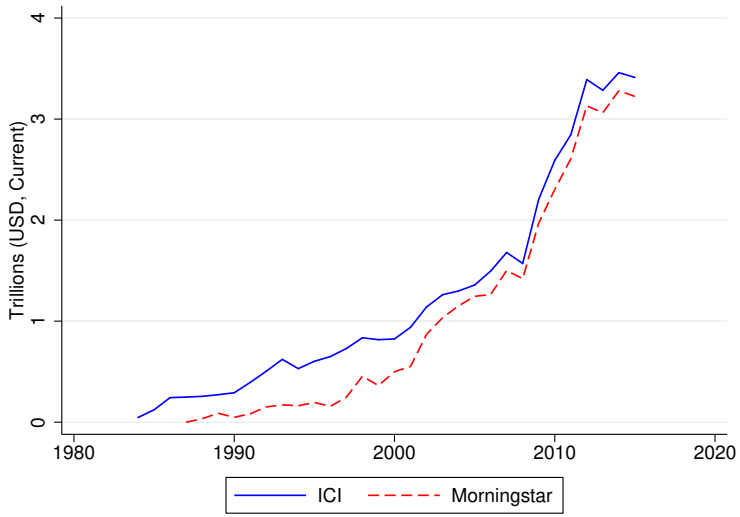
We Assemble Novel Dataset on Global Portfolio Holdings

- $27 Trillion (in 2015) of worldwide mutual fund positions
- CUSIP-level, monthly frequency, from 2003
- Domestic and bilateral positions (including Non-U.S. pairs)
- Use Cusip Global Services 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.

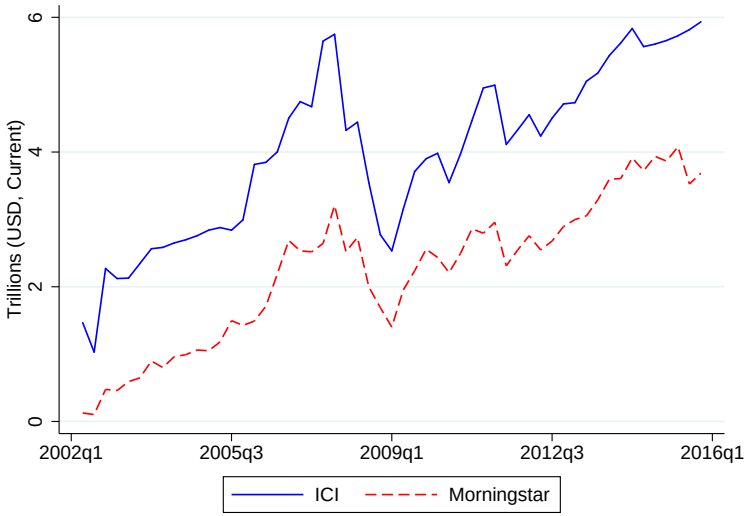
Coverage Relative to ICI



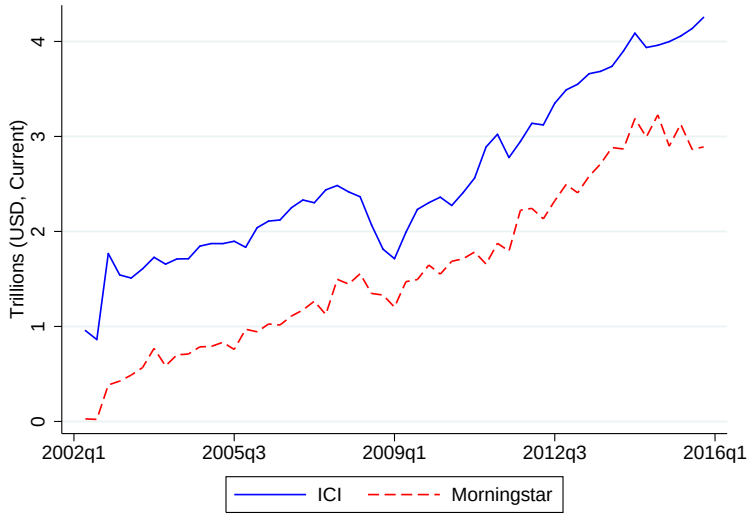
US Equity



US Fixed Income



Non-US Equity

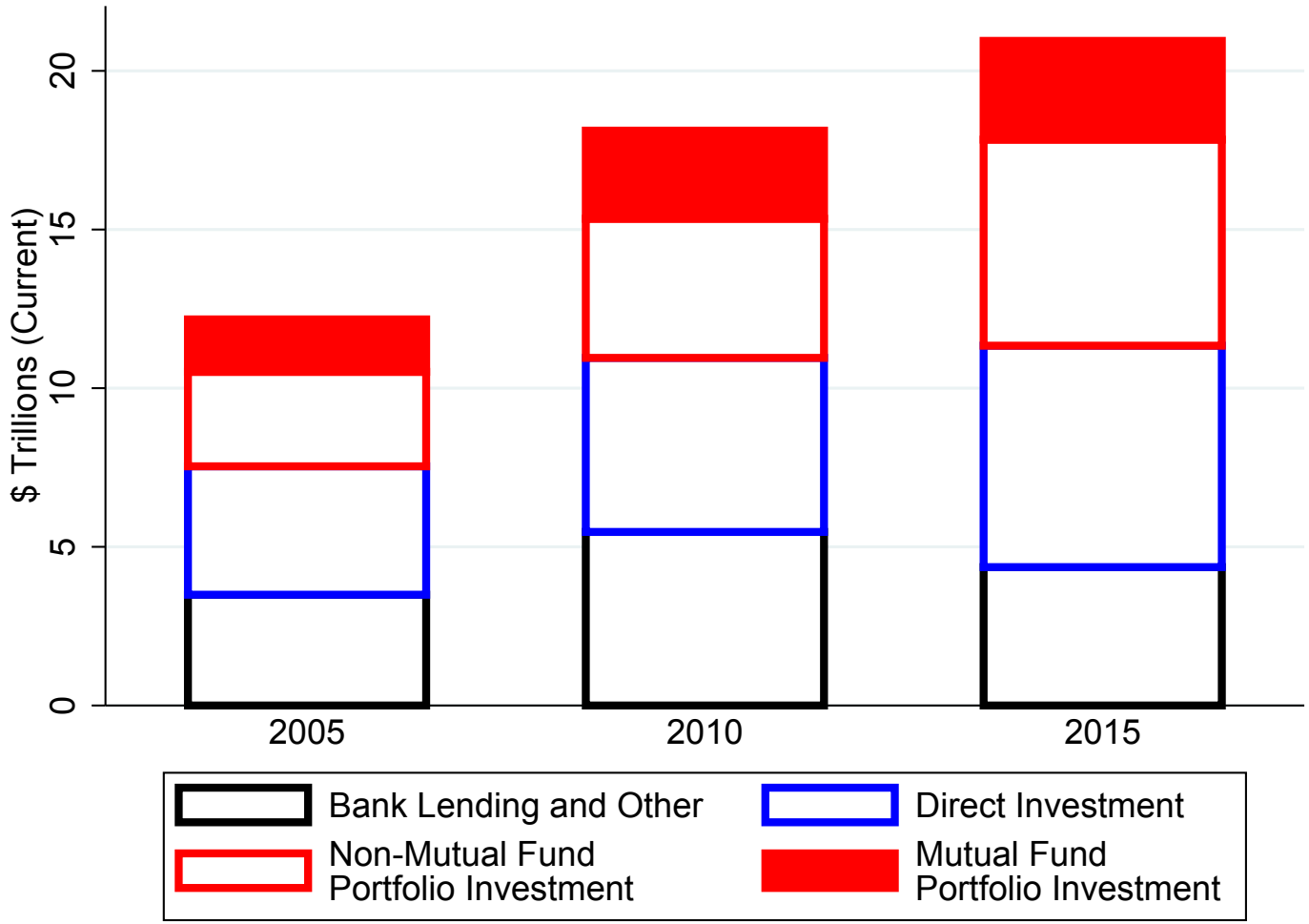


Non-US Fixed Income

Data Quality and Representativeness

- How Does Morningstar Obtain Their Data? ▸ Morningstar Details
- Comparison with TIC ▸ TIC Portfolio Shares
- Mutual Fund Domicile and Nationality ▸ Holding Foreign Mutual Funds
- Tax Havens ▸ Treatment of Tax Havens
- Parent Firm Aggregation ▸ Mapping to Parents

Share of U.S. Gross Foreign Assets

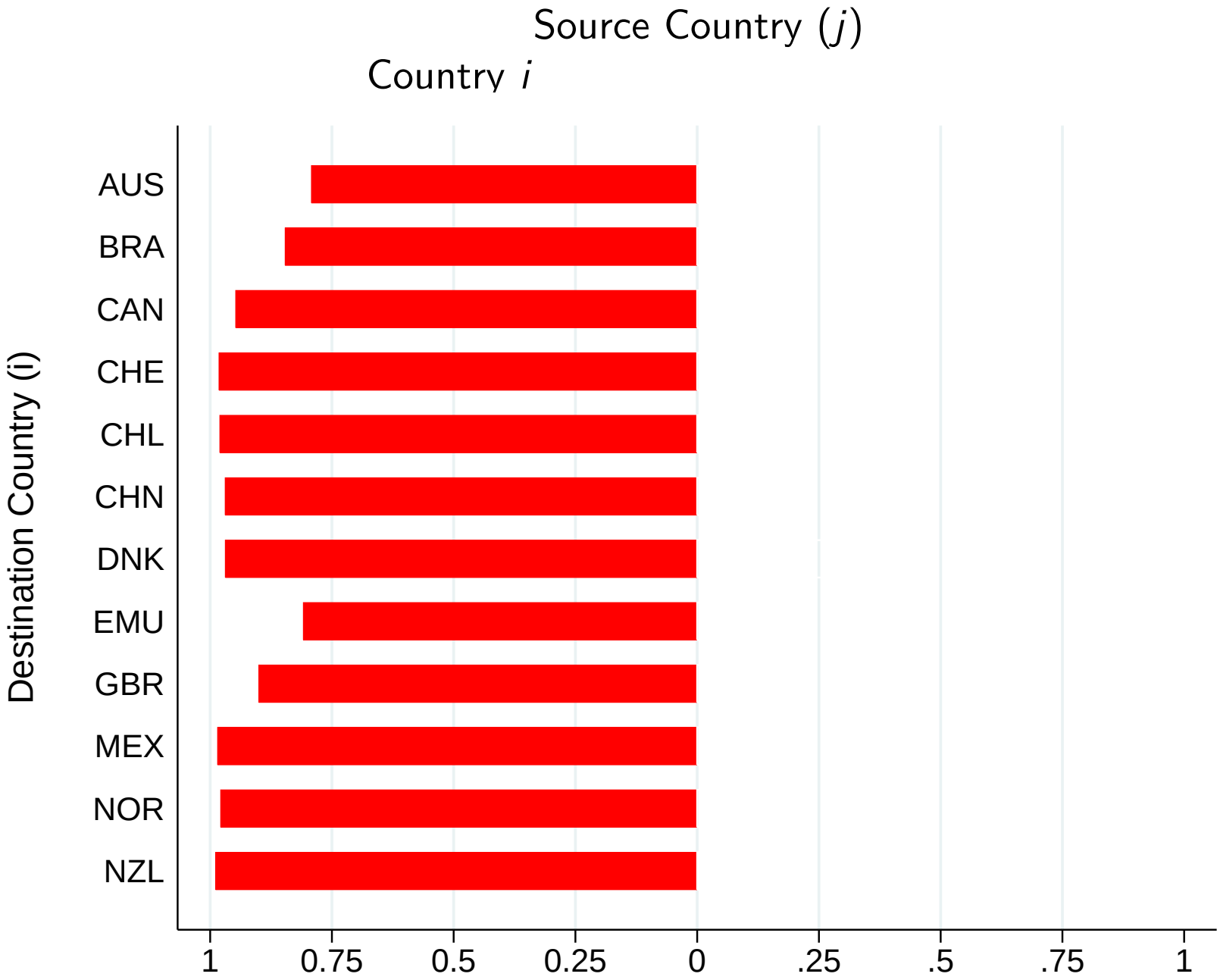


- Steady at 14-15% of U.S. Foreign Assets
- Steady at 30-40% of U.S. Foreign Portfolio Investment

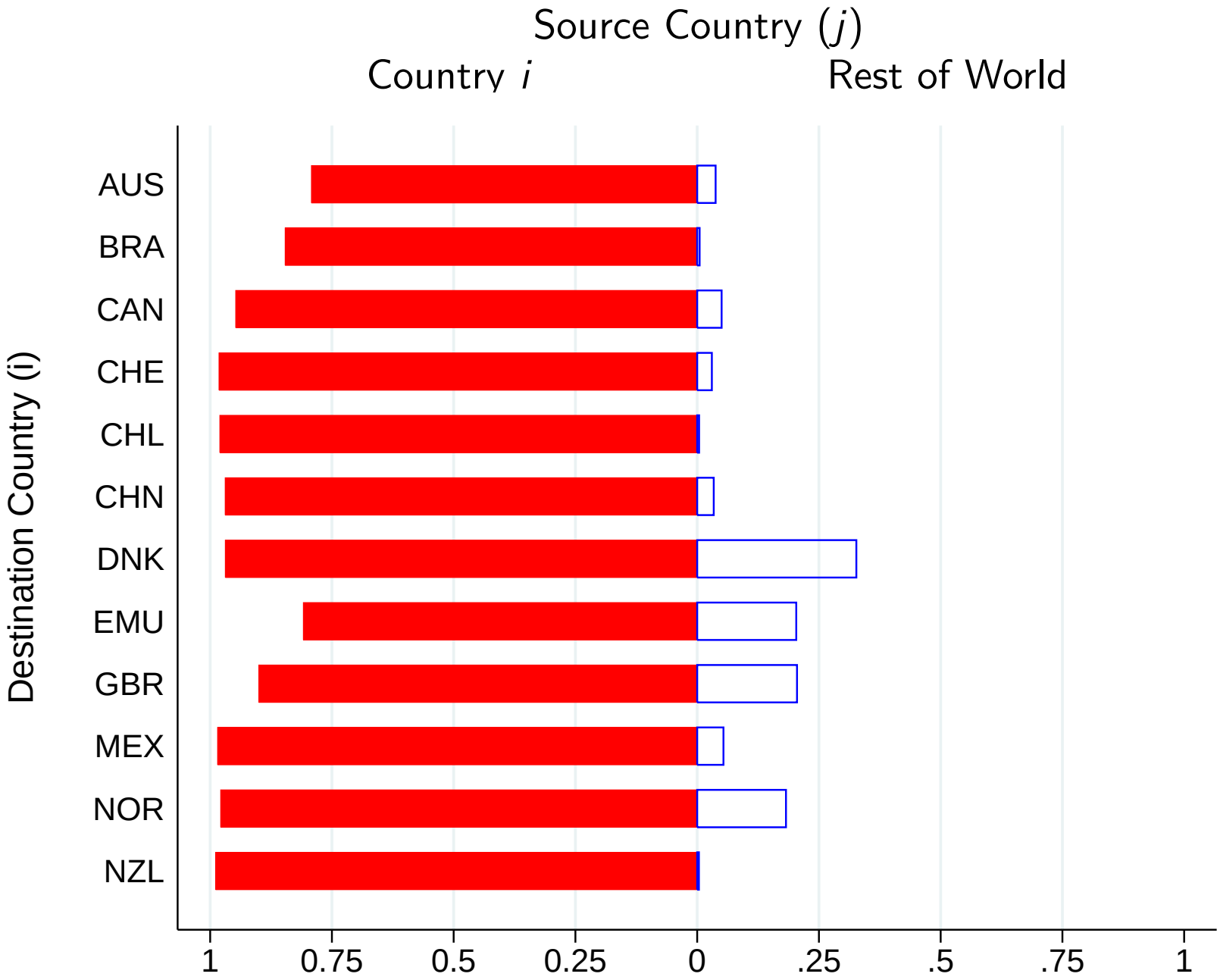
Outline

1. Novel Global Dataset on Mutual Fund Holdings
2. Home Currency Bias
3. Firm-level Heterogeneity and Capital Allocation
4. Rise of Dollar and Fall of Euro
5. Conclusions / Next Steps

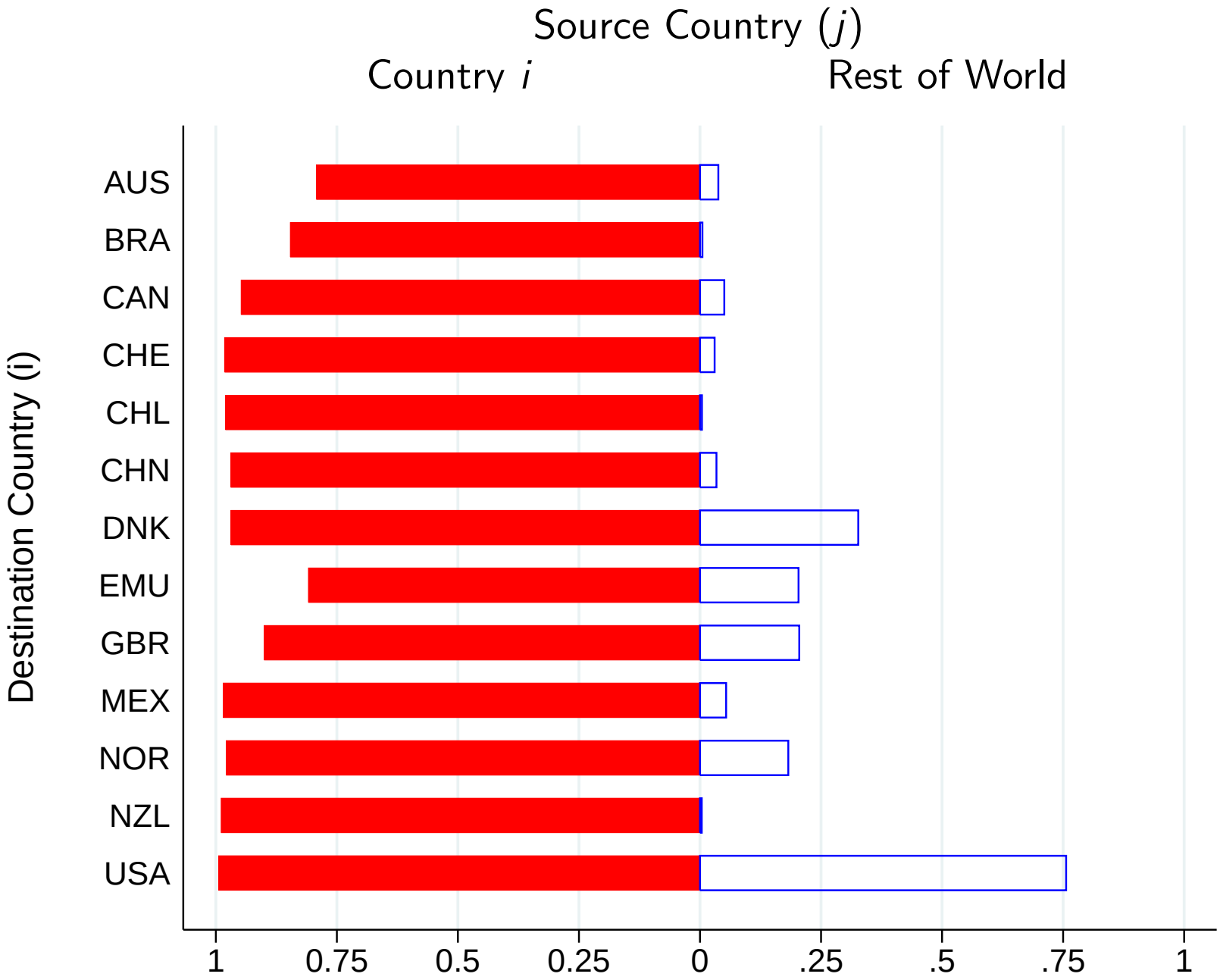
Share of Investment in Country i's Corporate Debt in i's Currency, 2015



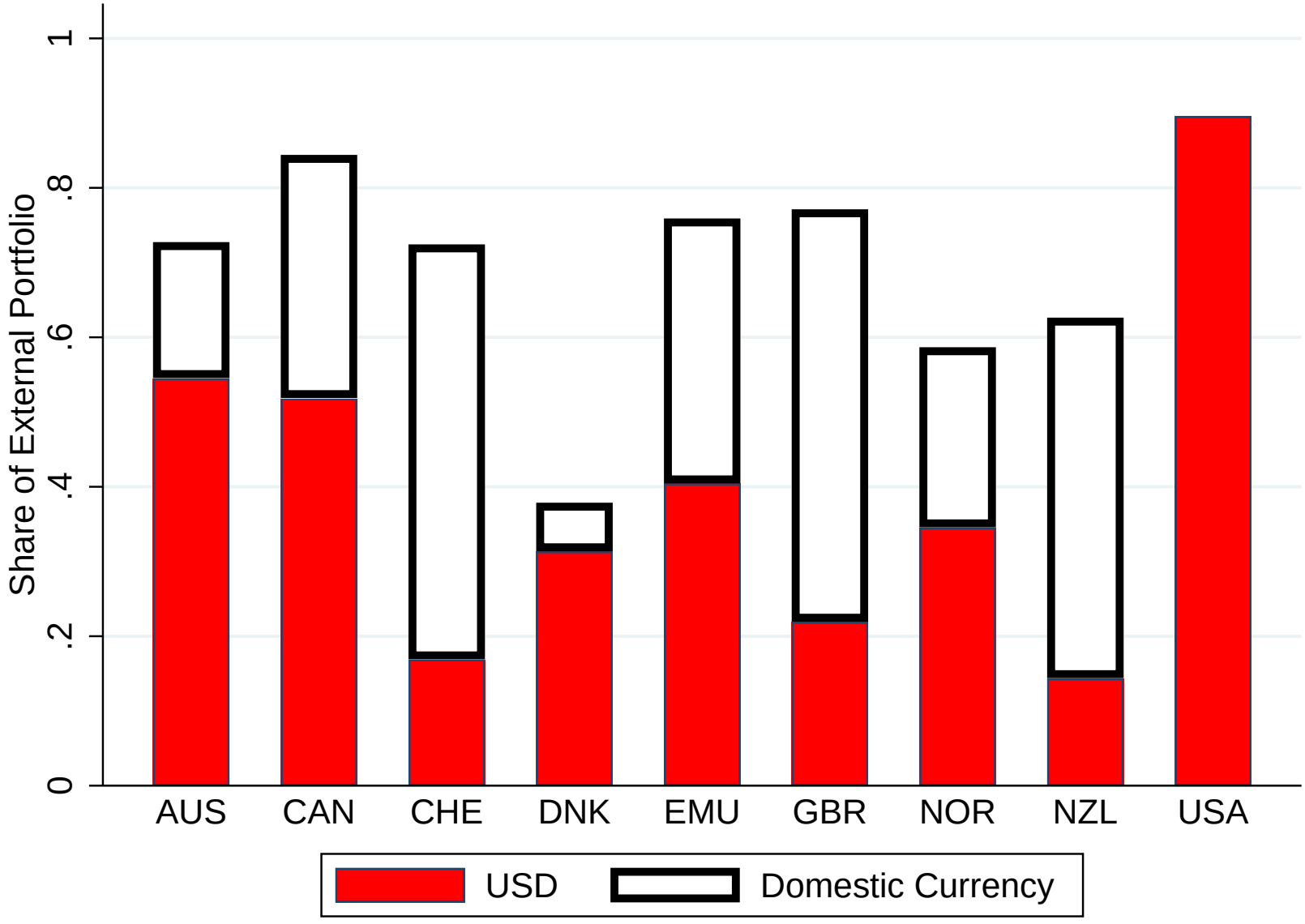
Share of Investment in Country i's Corporate Debt in i's Currency, 2015



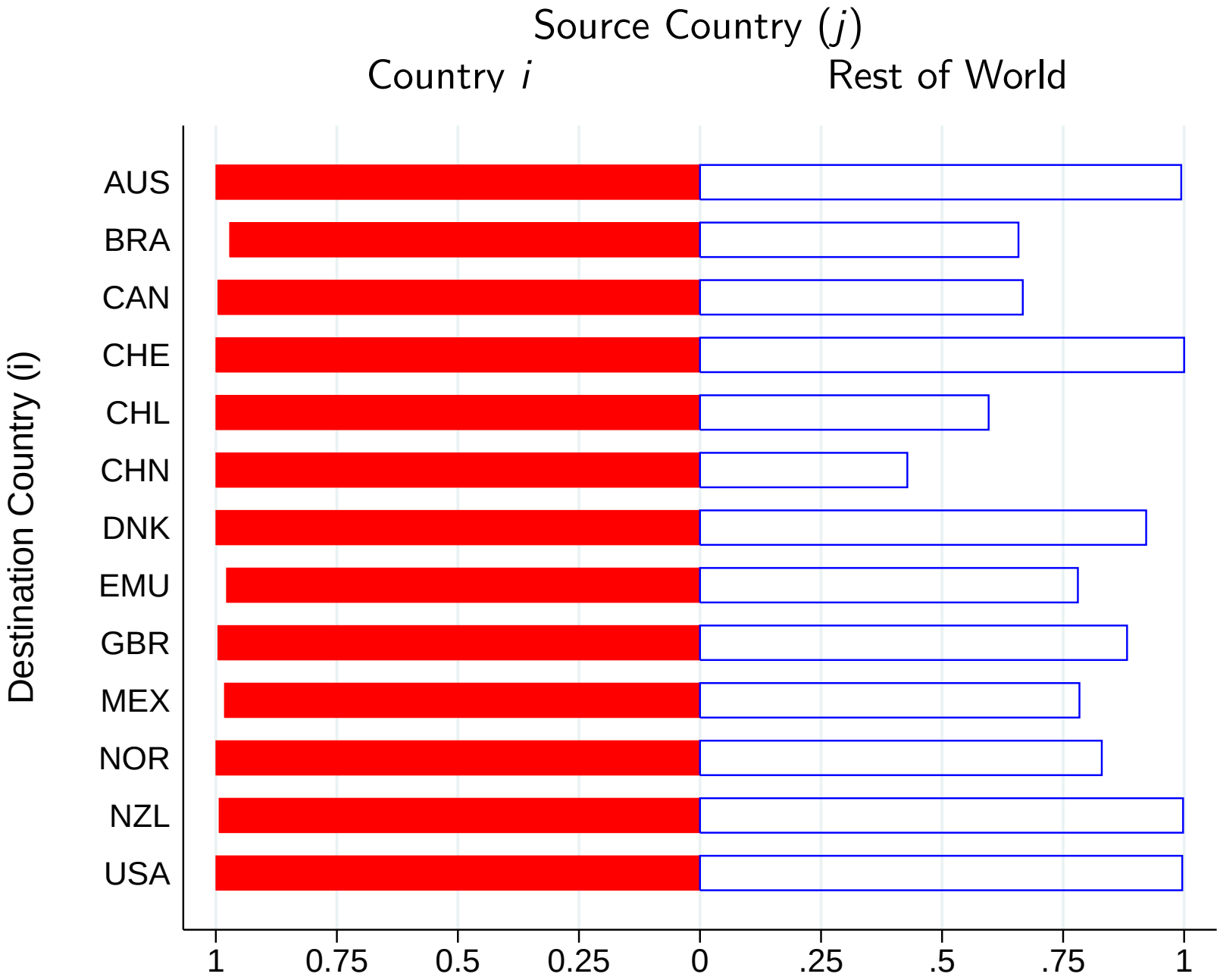
Share of Investment in Country i's Corporate Debt in i's Currency, 2015



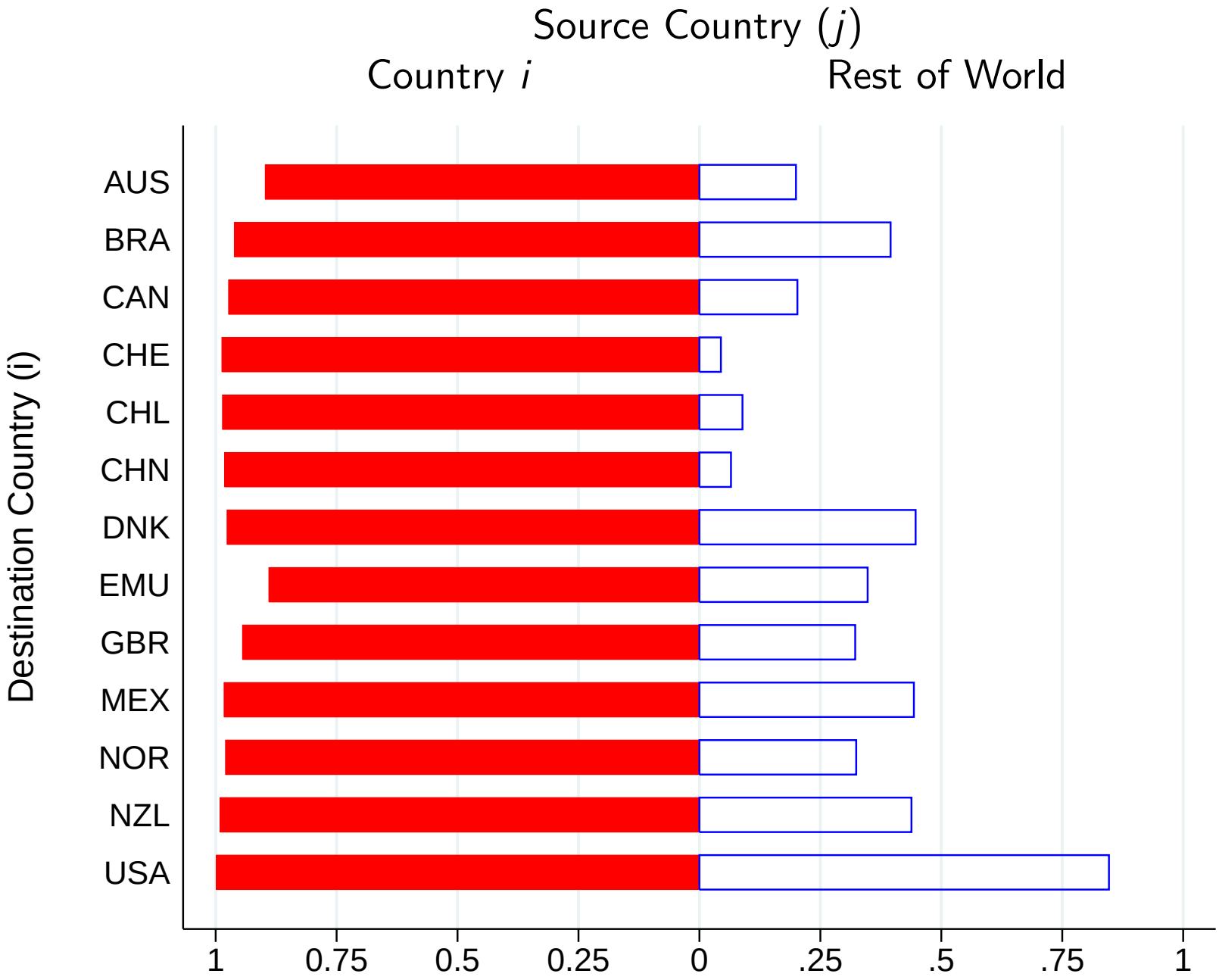
Just USD? Currency composition of (Ex-US) External Investment



Share of Investment in Country i's Sovereign Debt in i's Currency, 2015



Share of Investment in Country i's Total Debt in i's Currency, 2015



Identifying the Importance of Currency: Micro Data

- Run security-level regressions to study how investors in different countries buy the debt of the *same* firm in *different* currencies:

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

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

Within-Firm Variation, All Issuers

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

j	CAN	CHE	EMU	GBR	SWE	USA
Currency	0.922***	0.661***	0.581***	0.528***	0.806***	0.612***
	(0.011)	(0.015)	(0.014)	(0.026)	(0.022)	(0.014)
Obs.	34,237	34,237	34,237	34,237	34,237	34,237
# of Firms	8,879	8,879	8,879	8,879	8,879	8,879
R^2	0.952	0.935	0.824	0.830	0.954	0.851
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Estimates for year 2015, weighted least squares, SE clustered at firm level

Within-Firm Variation, Robustness

- We consider broader sets of issuers and securities:
  - Including structured finance, local gov't, sovranationals ▸ Other Bonds
  - Everything we got ▸ All Bonds
- Multicurrency Issuers Only ▸ MC Issuers
- Domestic and Foreign Financials and Non-Financials:
  - Financials ▸ Financial Firms
  - Non-Financials ▸ Non-Financial Firms
  - Foreign Financials ▸ Foreign Financial Firms
  - Foreign Non-Financials ▸ Foreign Non-Financial Firms
- Accounting for security residency (i.e. NY-law bonds) ▸ Residency
- Removing the firm fixed effects (next)

Within-Firm Variation, Robustness

	CAN	CHE	EMU	GBR	USA
(1) MC Only	0.921***	0.660***	0.579***	0.524***	0.612***
(2) Foreign	0.940***	0.644***	0.612***	0.534***	0.568***
(3) Foreign, Int'l	0.973***	0.487***	0.580***	0.593***	0.577***
(4) Financial	0.912***	0.672***	0.595***	0.476***	0.624***
(5) Non-Financial	0.936***	0.659***	0.581***	0.588***	0.614***
(6) Foreign Fin.	0.917***	0.651***	0.626***	0.452***	0.578***
(7) Foreign Non-Fin.	0.962***	0.644***	0.605***	0.630***	0.576***
(8) SF, SV, LS	0.922***	0.663***	0.598***	0.540***	0.630***
(9) All bonds	0.898***	0.658***	0.590***	0.542***	0.531***
(10) Residency β	0.899***	0.660***	0.580***	0.529***	0.602***

Home-Country and Home-Currency Biases

- Similar regression framework, but now consider three specifications:
  1. Home country dummy: $\mathbf{1}_{\{\text{Country}_p = j\}}$
  2. Home currency dummy: $\mathbf{1}_{\{\text{Currency}_c = LC_j\}}$
  3. Home country and home currency dummies

$$s_{i_p,j,p,c} = \alpha_j + \phi_j \mathbf{1}_{\{\text{Country}_p = j\}} + \beta_j \mathbf{1}_{\{\text{Currency}_c = LC_j\}} + \textit{Controls} + \epsilon_{i_p,j,p,c}$$

- No firm fixed effects to allow for country variation
- Related to Burger, Warnock and Warnock (2017)

Bond Home-Country Bias and Home-Currency Bias

$$s_{i_p,j,p,c} = \alpha_j + \phi_j \mathbf{1}_{\{\text{Country}_p = j\}} + \textit{Controls} + \epsilon_{i_p,j,p,c}$$

	Only Country Indicators			
	ϕ	R^2		
CAN	0.512	0.405		
CHE	0.389	0.246		
EMU	0.387	0.229		
GBR	0.227	0.140		
SWE	0.521	0.495		
USA	0.444	0.343		

Bond Home-Country Bias and Home-Currency Bias

$$s_{i_p,j,p,c} = \alpha_j + \beta_j \mathbf{1}_{\{\text{Currency}_c = LC_j\}} + \textit{Controls} + \epsilon_{i_p,j,p,c}$$

	Only Country Indicators		**Only Currency Indicators**		
	ϕ	R^2	β	R^2	
CAN	0.512	0.405	0.940	0.912	
CHE	0.389	0.246	0.808	0.876	
EMU	0.387	0.229	0.648	0.613	
GBR	0.227	0.140	0.552	0.660	
SWE	0.521	0.495	0.810	0.921	
USA	0.444	0.343	0.646	0.712	

Bond Home-Country Bias and Home-Currency Bias

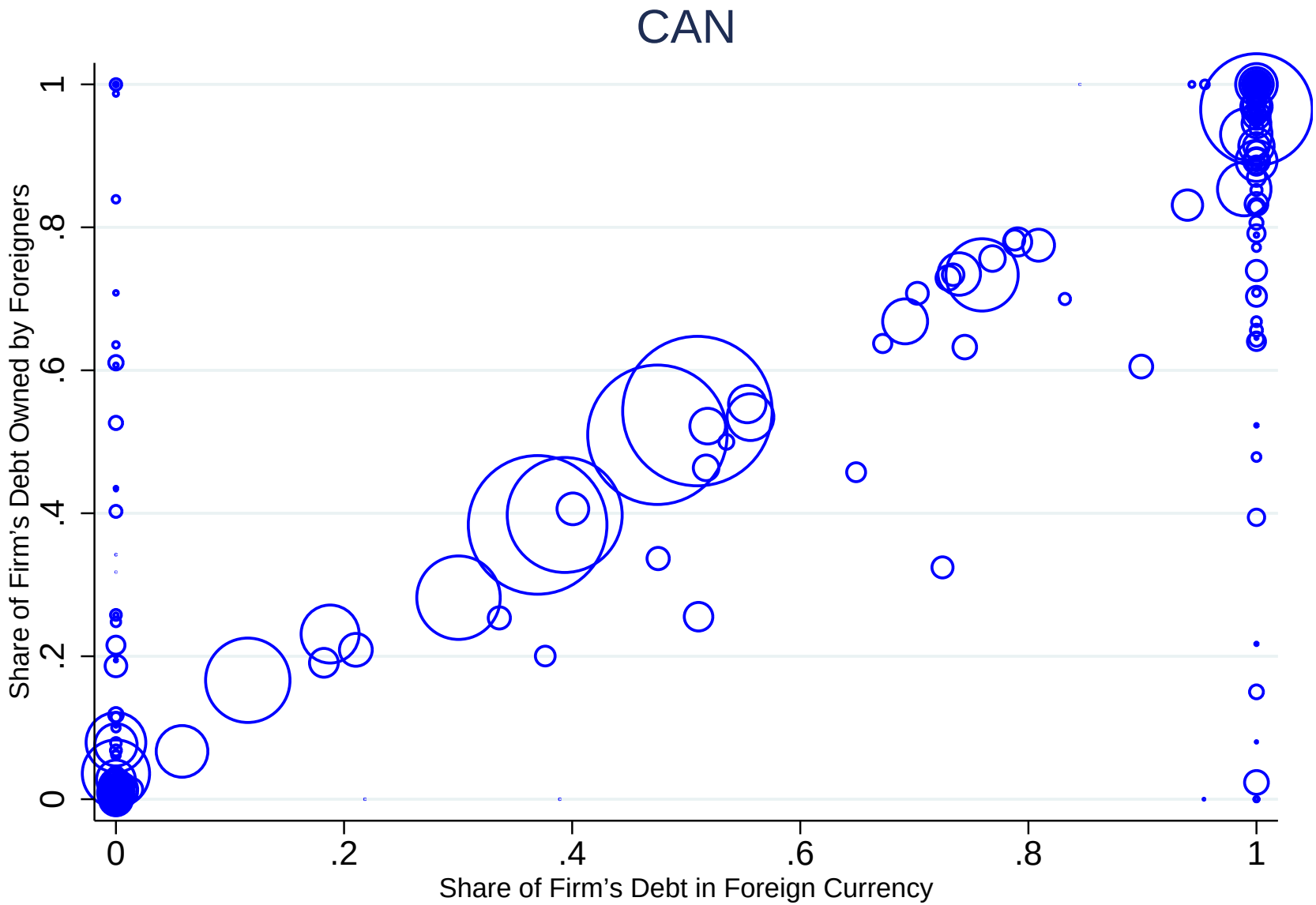
$$s_{i_p,j,p,c} = \alpha_j + \phi_j \mathbf{1}_{\{\text{Country}_p = j\}} + \beta_j \mathbf{1}_{\{\text{Currency}_c = LC_j\}} + \textit{Controls} + \epsilon_{i_p,j,p,c}$$

	Only Country Indicators		**Only Currency Indicators**		**Country and Currency Indicators**		
	ϕ	R^2	β	R^2	ϕ	β	R^2
CAN	0.512	0.405	0.940	0.912	0.038	0.911	0.914
CHE	0.389	0.246	0.808	0.876	0.080	0.770	0.884
EMU	0.387	0.229	0.648	0.613	0.072	0.610	0.619
GBR	0.227	0.140	0.552	0.660	0.037	0.536	0.663
SWE	0.521	0.495	0.810	0.921	0.035	0.781	0.923
USA	0.444	0.343	0.646	0.712	0.133	0.572	0.734

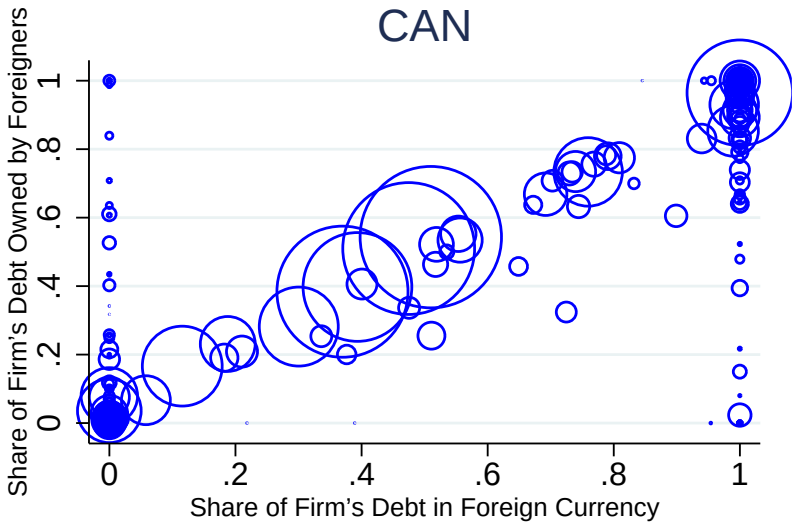
Outline

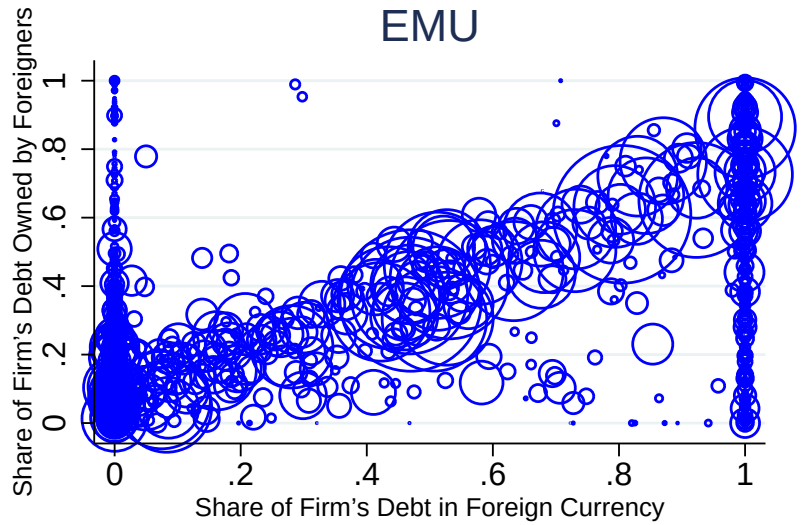
1. Novel Global Dataset on Mutual Fund Holdings
2. Home Currency Bias
3. Firm-level Heterogeneity and Capital Allocation
4. Rise of Dollar and Fall of Euro
5. Conclusions / Next Steps

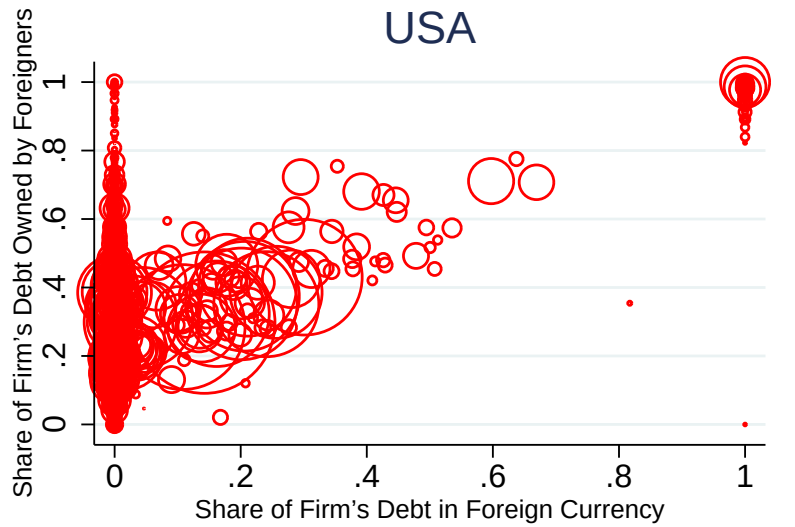
Foreign Currency Issuance Drives Access to Foreign Capital



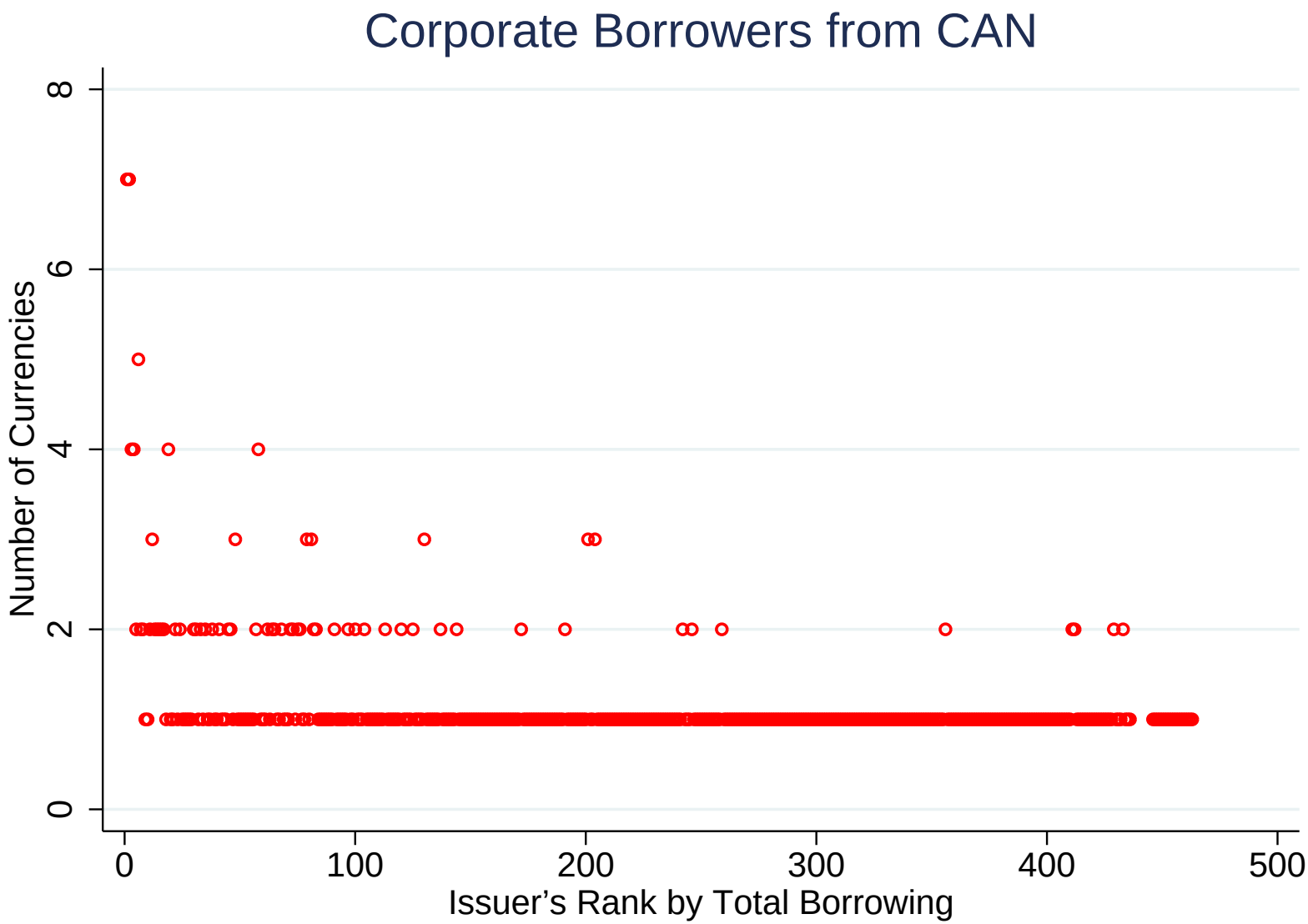
Foreign Currency Issuance Drives Access to Foreign Capital



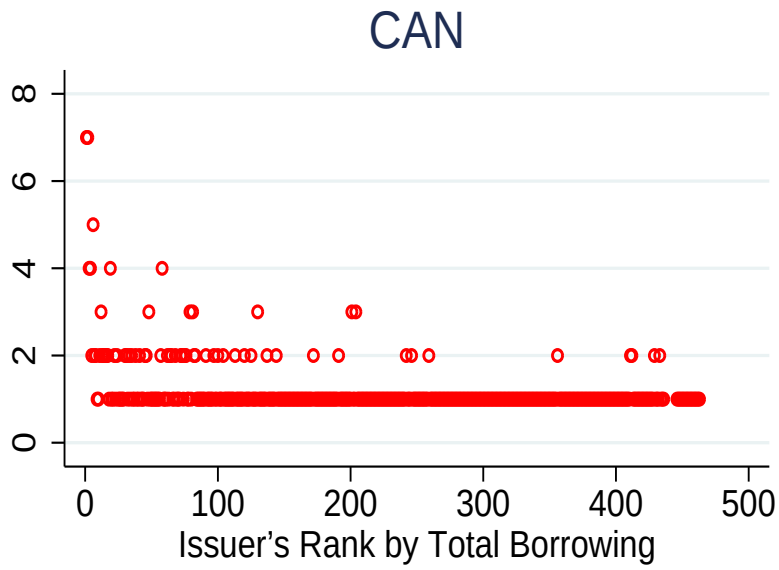


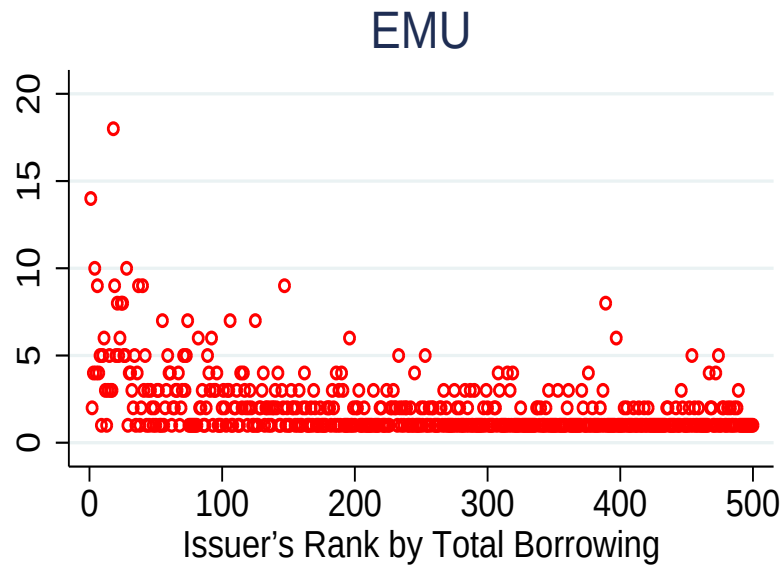


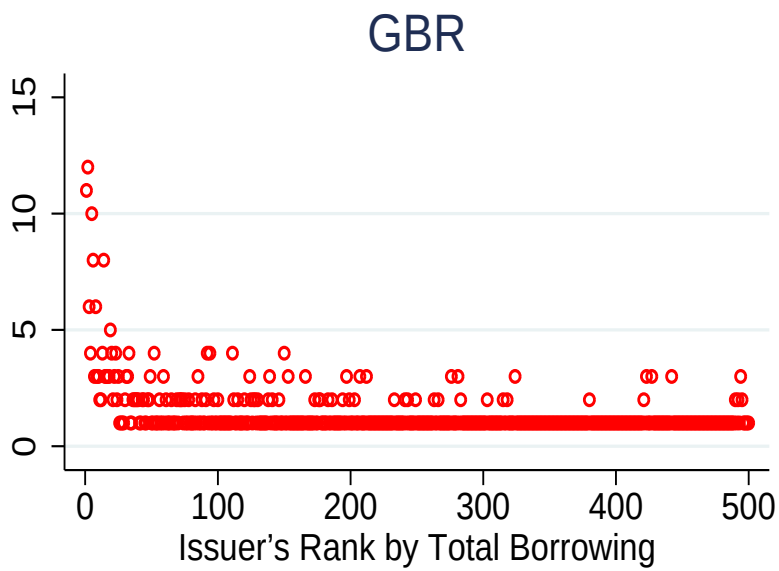
Heterogeneous Ability to Issue in Foreign Currency

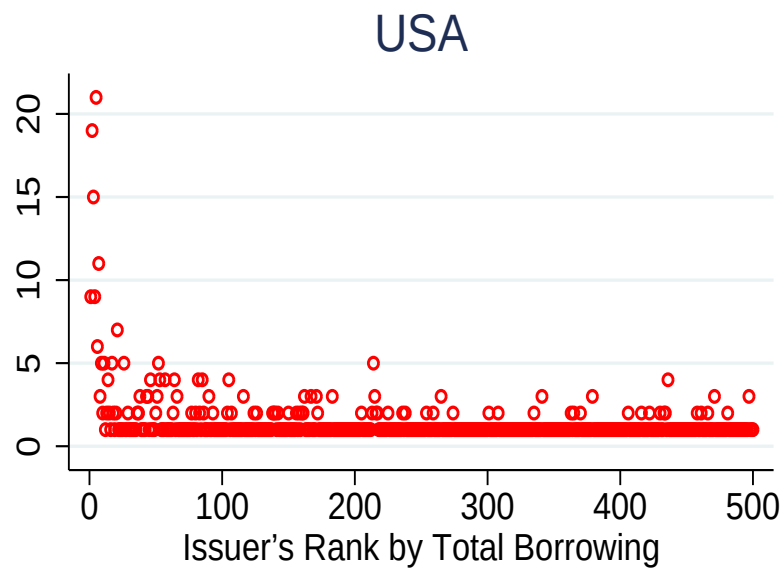


Number of Currencies Used by Corporate Borrowers









Heterogeneity in Selection into MC

$$Pr\left(\mathbf{1}_{\{MC_p\}}\right) = \Phi\left(\alpha + \beta_i Size_p + Industry_p\right)$$

($B)	CAD	CHF	EUR	GBP	SEK	USD
Debt	0.161***	0.014**	0.029***	0.068***	0.356***	0.006***
	(0.043)	(0.006)	(0.004)	(0.021)	(0.075)	(0.001)
EBIT	0.207***	0.169***	0.177***	0.217***	0.497***	0.030***
	(0.055)	(0.058)	(0.027)	(0.053)	(0.121)	(0.005)
Assets	0.063***	0.005***	0.005***	0.002*	0.040***	0.002***
	(0.012)	(0.001)	(0.001)	(0.001)	(0.010)	(0.000)
Revenue	0.406***	0.021***	0.018***	0.096***	0.091***	0.004***
	(0.099)	(0.007)	(0.004)	(0.024)	(0.017)	(0.001)

All specifications include two-digit SIC fixed effects.

Average marginal effects reported.

A Simple Framework to Interpret These Findings

- N countries, each with (invested) wealth W_i
- Assume bond holdings only depend on currency of denomination
- Only bonds are traded
- "Specialist" investors, fully segmented by currency
- Linear demand as in DeLong, Summers, & Shleifer (1990), Gromb & Vayanos (2002), Jeanne & Rose (2002), Gabaix & Maggiori (2015)

Currency-Specific Bond Demand

- Demand for debt of a firm p in each currency k:

$$R_{p,k} = R_f + \Gamma_k Q_{p,k}$$

where $Q_{p,k}$ is dollar value of currency-k debt issued by firm p.

- Slope of demand related to wealth held in k (i.e. market depth):

$$\Gamma_k = \frac{\gamma}{\sum_{j=1}^{N} \theta_{k,j} W_j}$$

where $\theta_{k,j}$ is country j's holdings of bonds in country i's currency

Firm Problem

- Firms differ in productivity A_p, borrow to finance production
- All firms can borrow in LC, fixed cost C required to borrow in FC
- Firm p in EMU (say) solves:

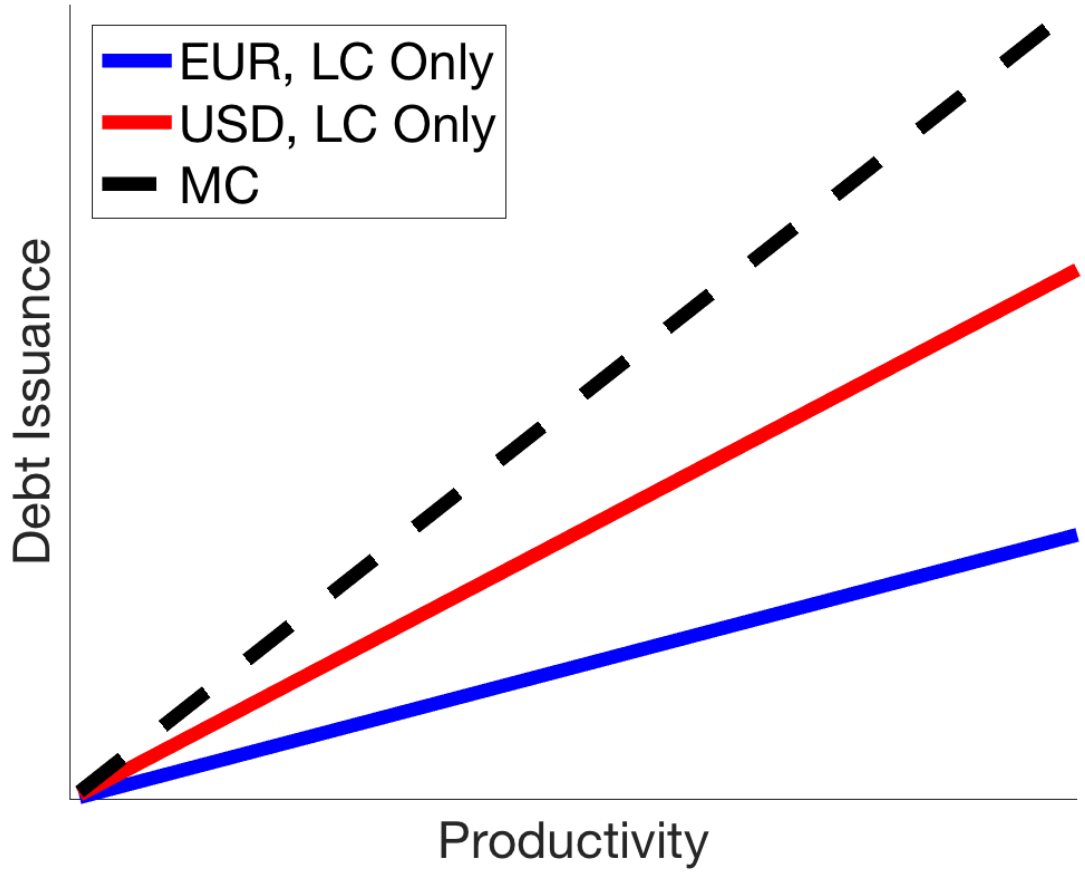
$$\max_{Q_{p,€}, Q_{p,\$}} A_p \left(\sum_k Q_{p,k} \right) - \sum_k R_{p,k} Q_{p,k} - C \mathbf{1}_{\{Q_{p,-€} > 0\}}.$$

- Borrowing cost increases with scale. At some point, worth paying C.
- Firms issuing in multiple currencies (MC) act as if face:

$$R_{p,MC} = R_f + \Gamma_W \left(\sum_k Q_{p,k} \right),$$

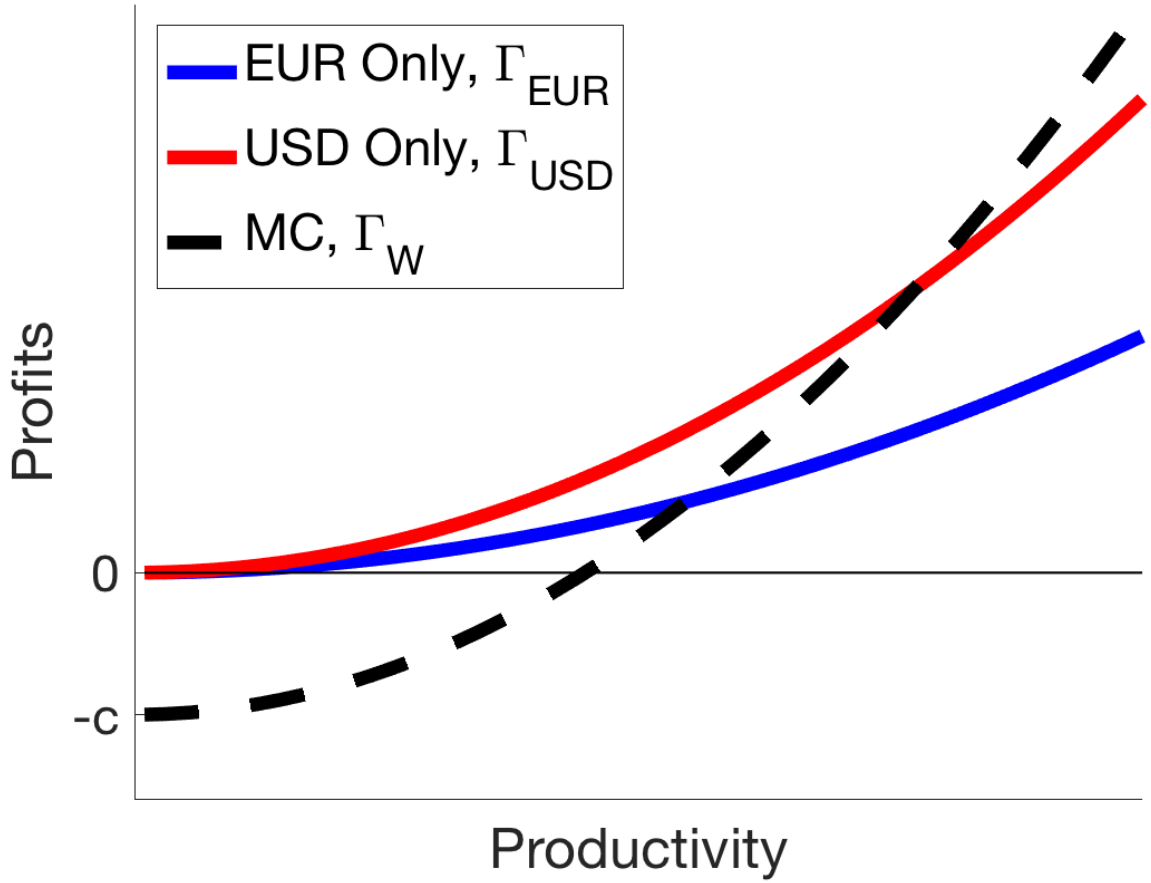
where can solve analytically for $\Gamma_W < \Gamma_k$.

Two-Country Example: Debt Issuance



$$\Gamma_{EUR} > \Gamma_{USD}.$$

Two-Country Example: Profits



$$A_i^* = 2\left(\frac{c}{E}\frac{\Gamma_i \Gamma_W}{\Gamma_i - \Gamma_W}\right)^{1/2}$$

Quantitative Illustration (TBD)

- Assume net productivities $\hat{A} = A - R_f$ in i are distributed Pareto:

$$f_i(\hat{A}) = \alpha_i a^{-(1+\alpha_i)} \hat{A}_i^{\alpha_i}$$

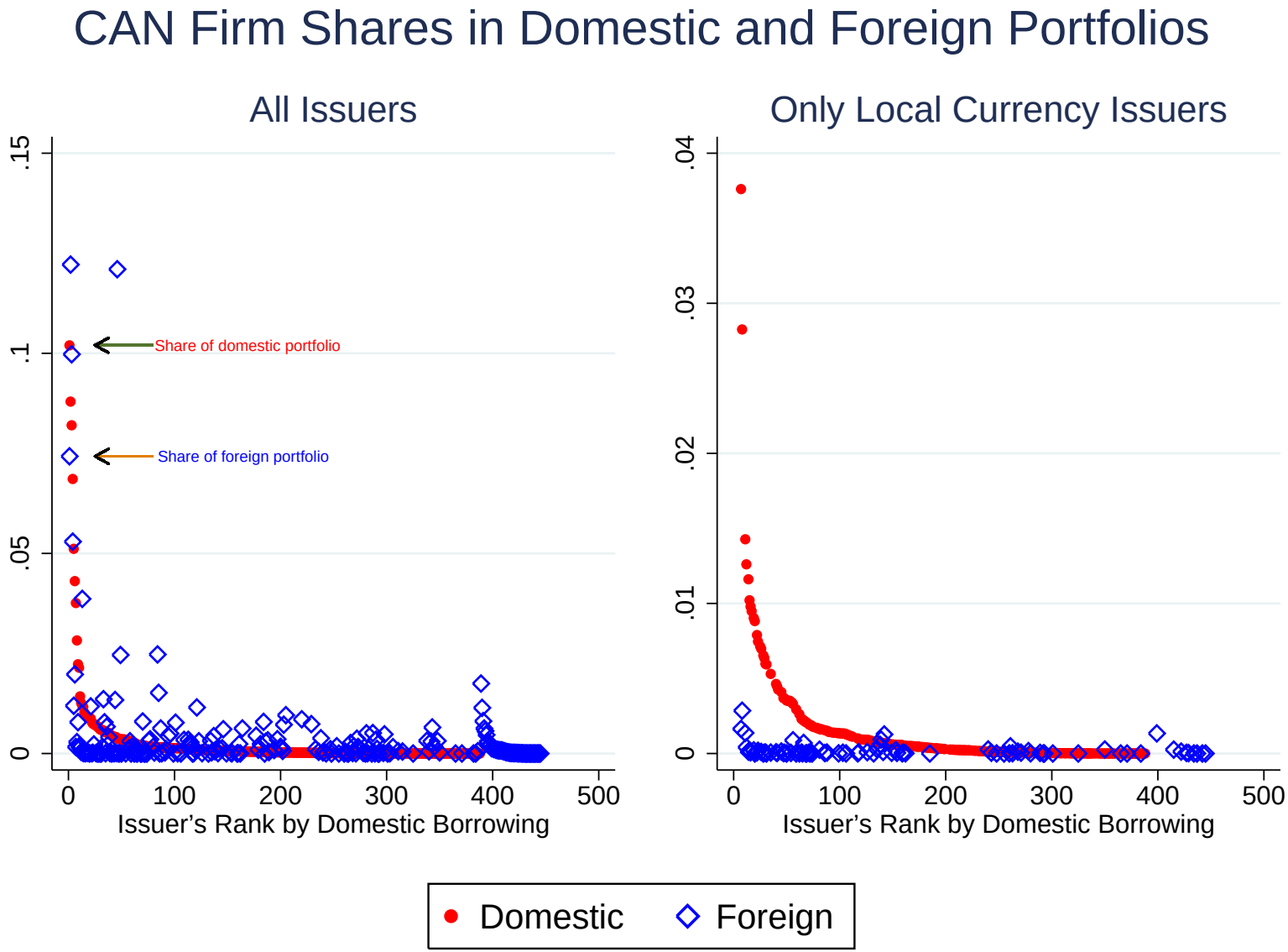
- Leads to solvable (non-linear) system of equations in four unknowns:

$$\begin{aligned}
L_i &= \frac{\alpha_i}{\alpha_i - 1} \frac{\underline{\hat{A}}_i}{2\Gamma_i} \\
X_i &= \frac{\Gamma_W}{\Gamma_i} \\
F_i &= \frac{\alpha_i}{\alpha_i - 1} \frac{\underline{\hat{A}}_i^{\alpha_i}}{2} (4c_i)^{\frac{1-\alpha_i}{2}} \left(\frac{\Gamma_i \Gamma_W}{\Gamma_i - \Gamma_W} \right)^{-\frac{1+\alpha_i}{2}} \\
Y_i &= \frac{\alpha_i}{\alpha_i - 2} \underline{\hat{A}}_i^{\alpha_i} \frac{1}{2} \left[\frac{1}{\Gamma_i} \left(\underline{\hat{A}}_i \right)^{2-\alpha_i} + (4c_i)^{\frac{2-\alpha_i}{2}} \left(\frac{\Gamma_i \Gamma_W}{\Gamma_i - \Gamma_W} \right)^{-\frac{\alpha_i}{2}} \right].
\end{aligned}$$

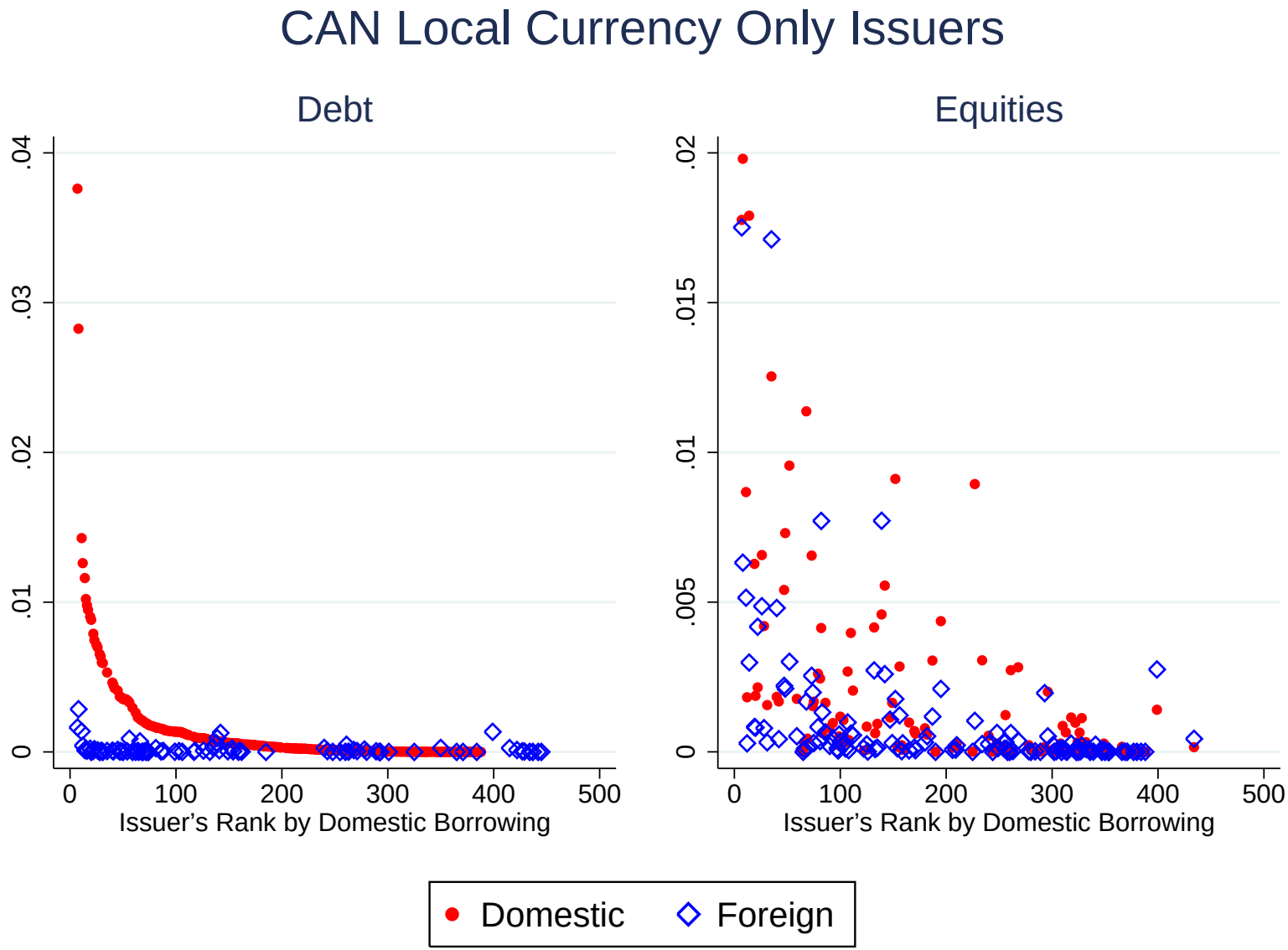
Key Characteristics of the Environment

- We interpret USD as international currency (most used to denominate bonds, flattest demand curve, deepest market)
- There is benefit of being IC issuer (e.g. USA in 2015), LC firms' funding cost reduced by accessing foreign capital
- Feature of simple framework is in 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

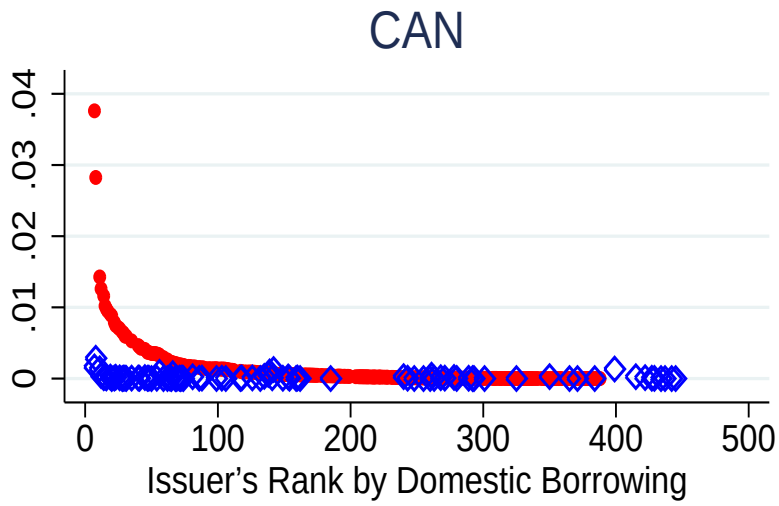
Foreigners Avoid Local Currency Issuers

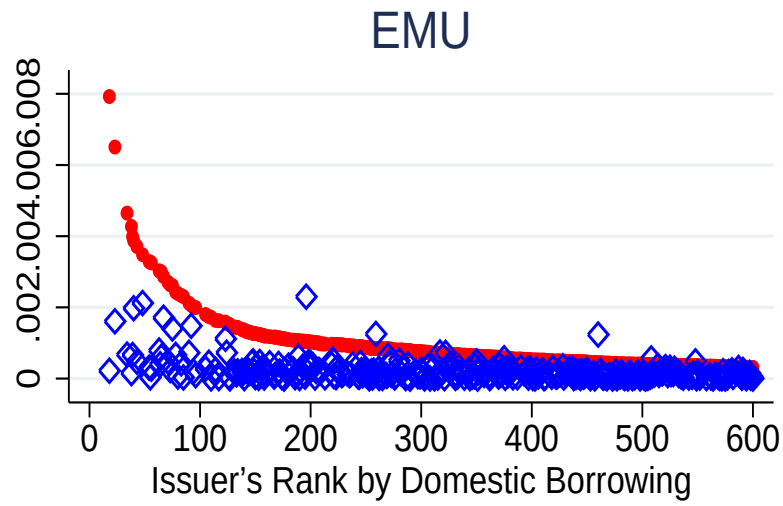


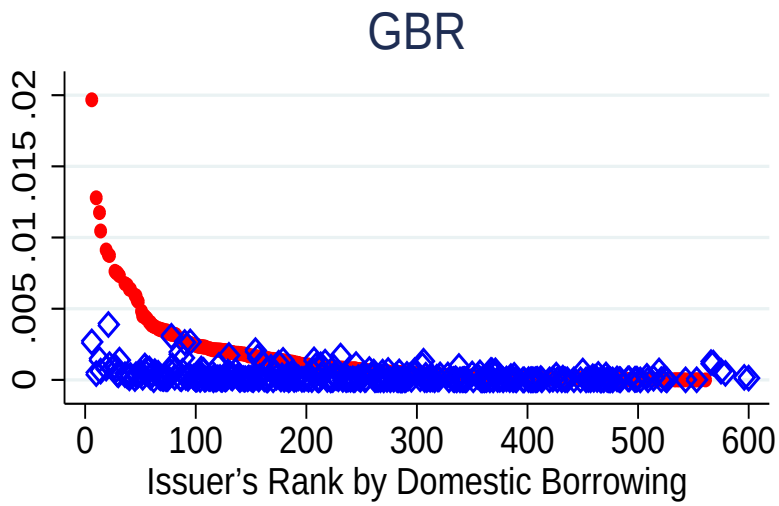
Foreigners Avoid LC Issuers Debt, Not Their Shares

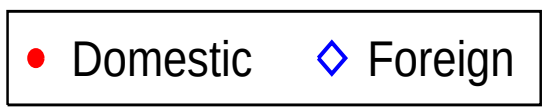


Local Currency Only Issuers

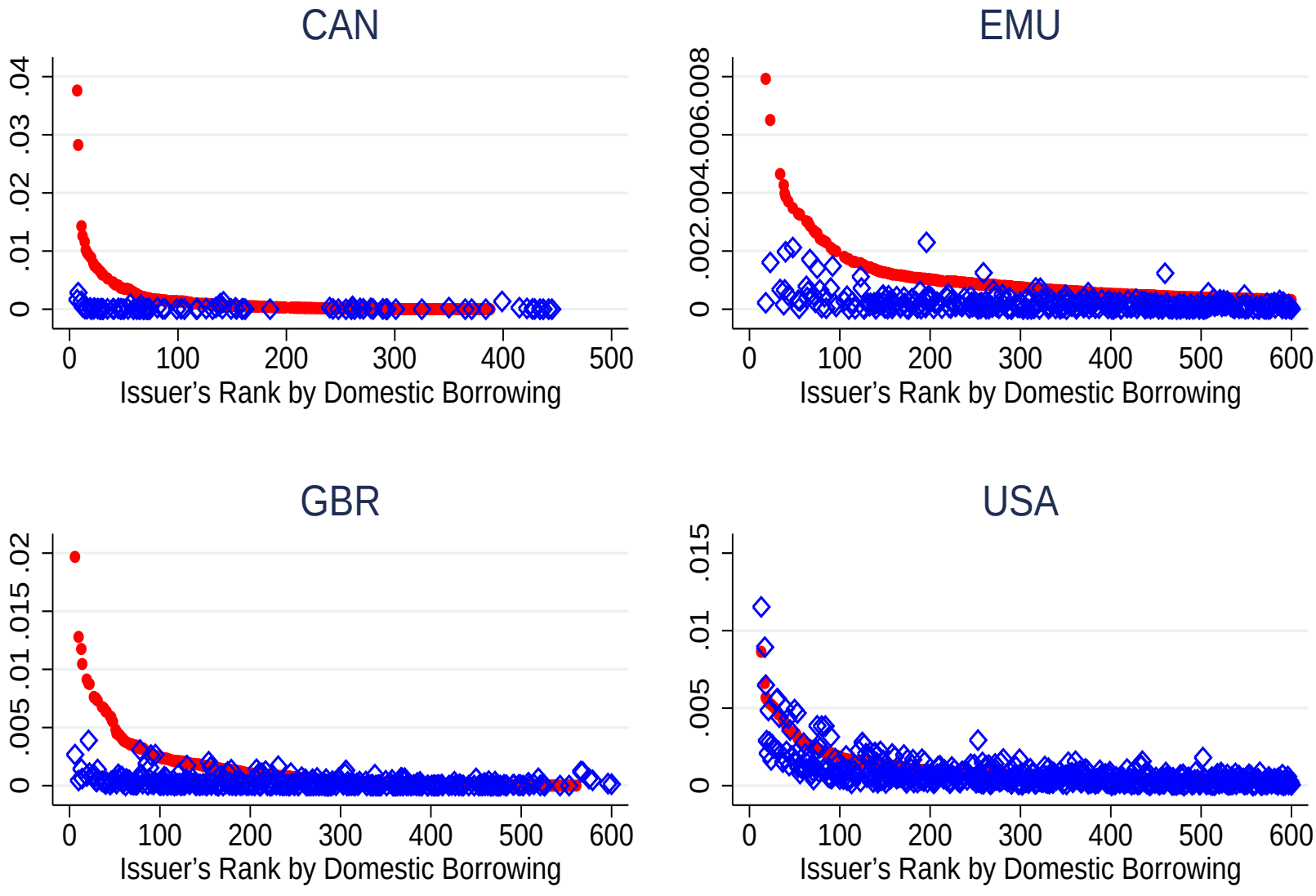




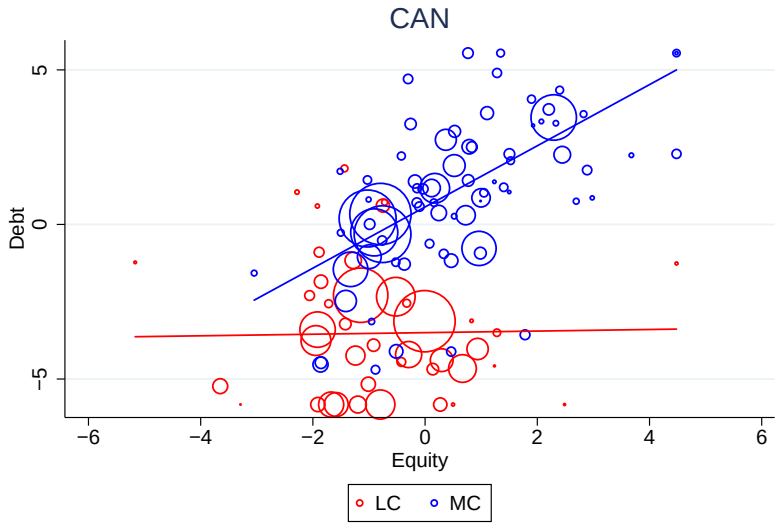




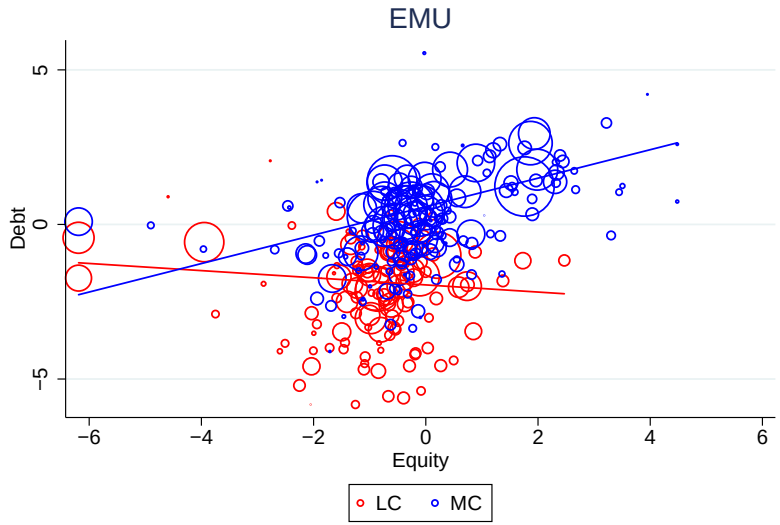
Local Currency Only Issuers



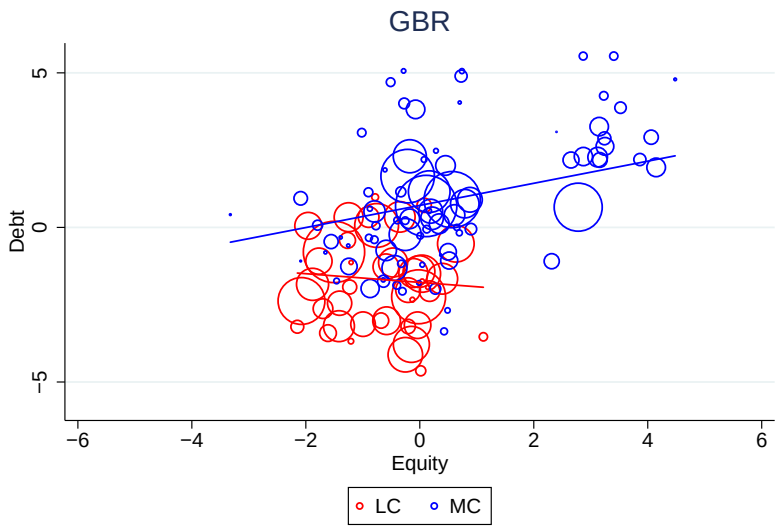
Equities and Bonds, LC vs. MC



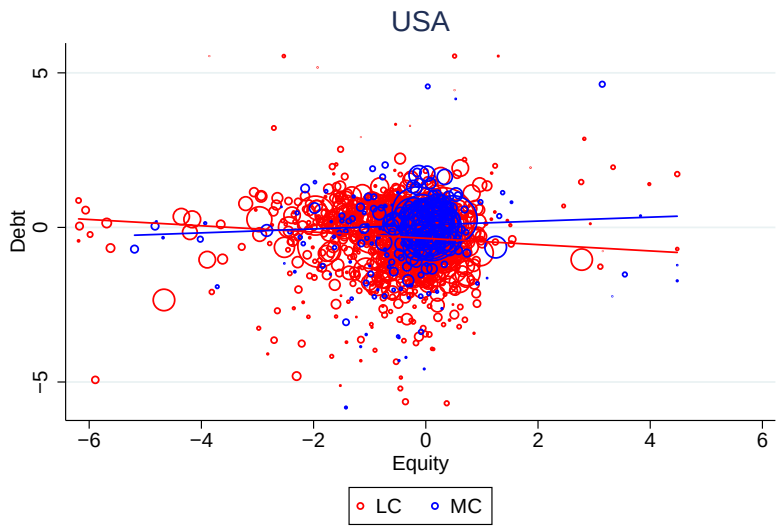
LC: Slope=.026, R2=0; MC: Slope=.99, R2=.466



LC: Slope=−.116, R2=.024; MC: Slope=.46, R2=.281

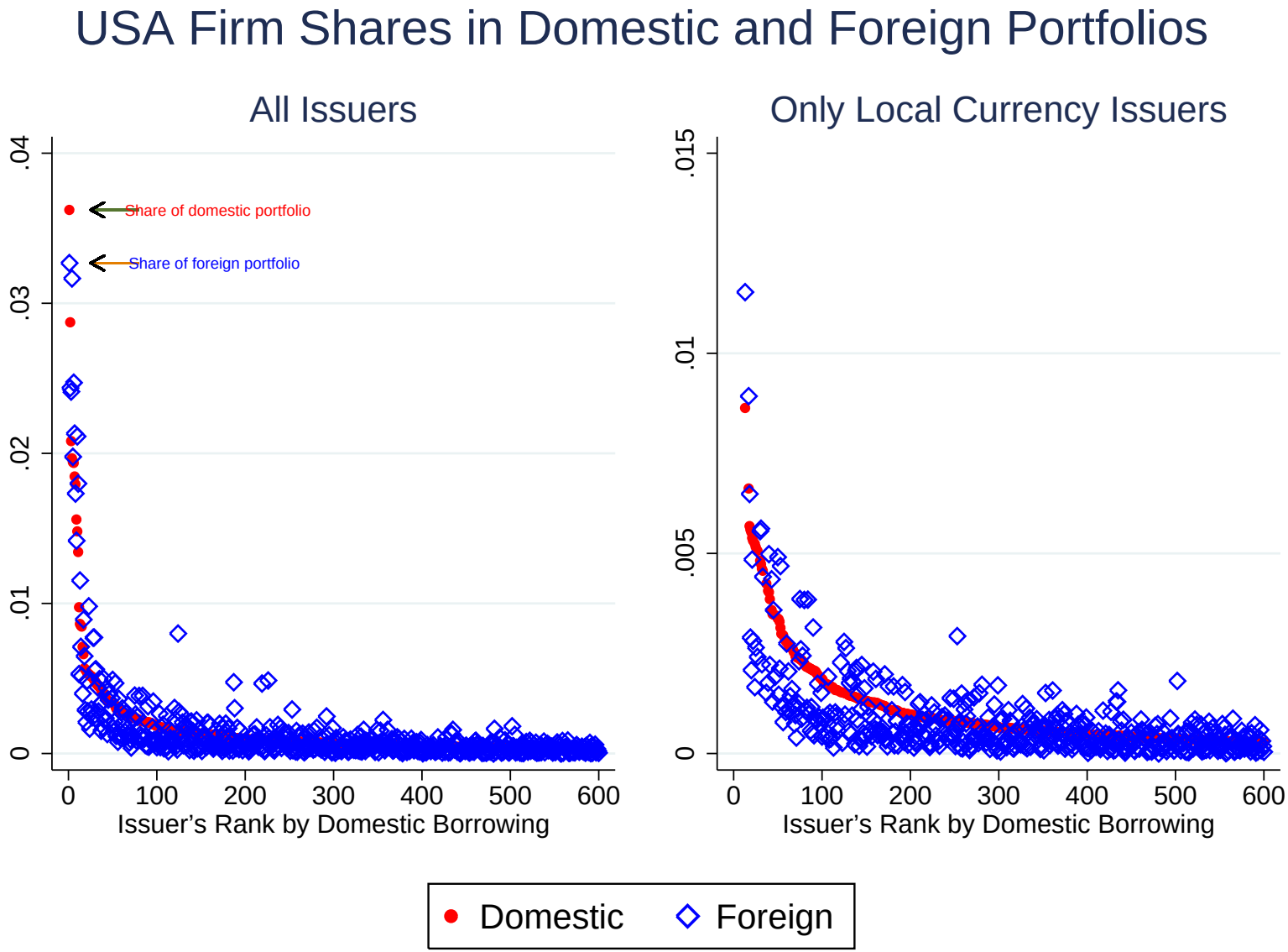


LC: Slope=−.141, R2=.008; MC: Slope=.358, R2=.14

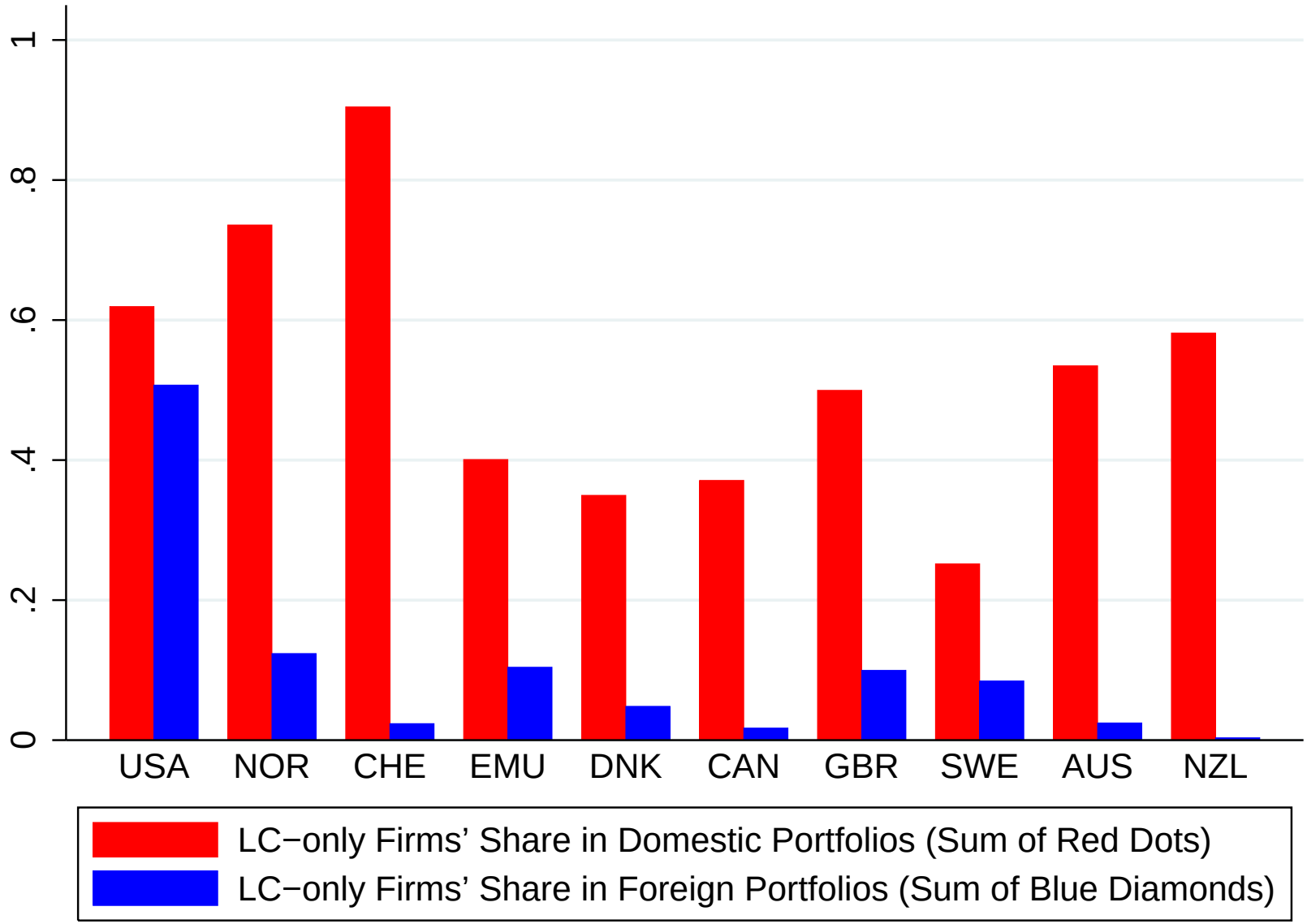


LC: Slope=−.102, R2=.012; MC: Slope=.064, R2=.003

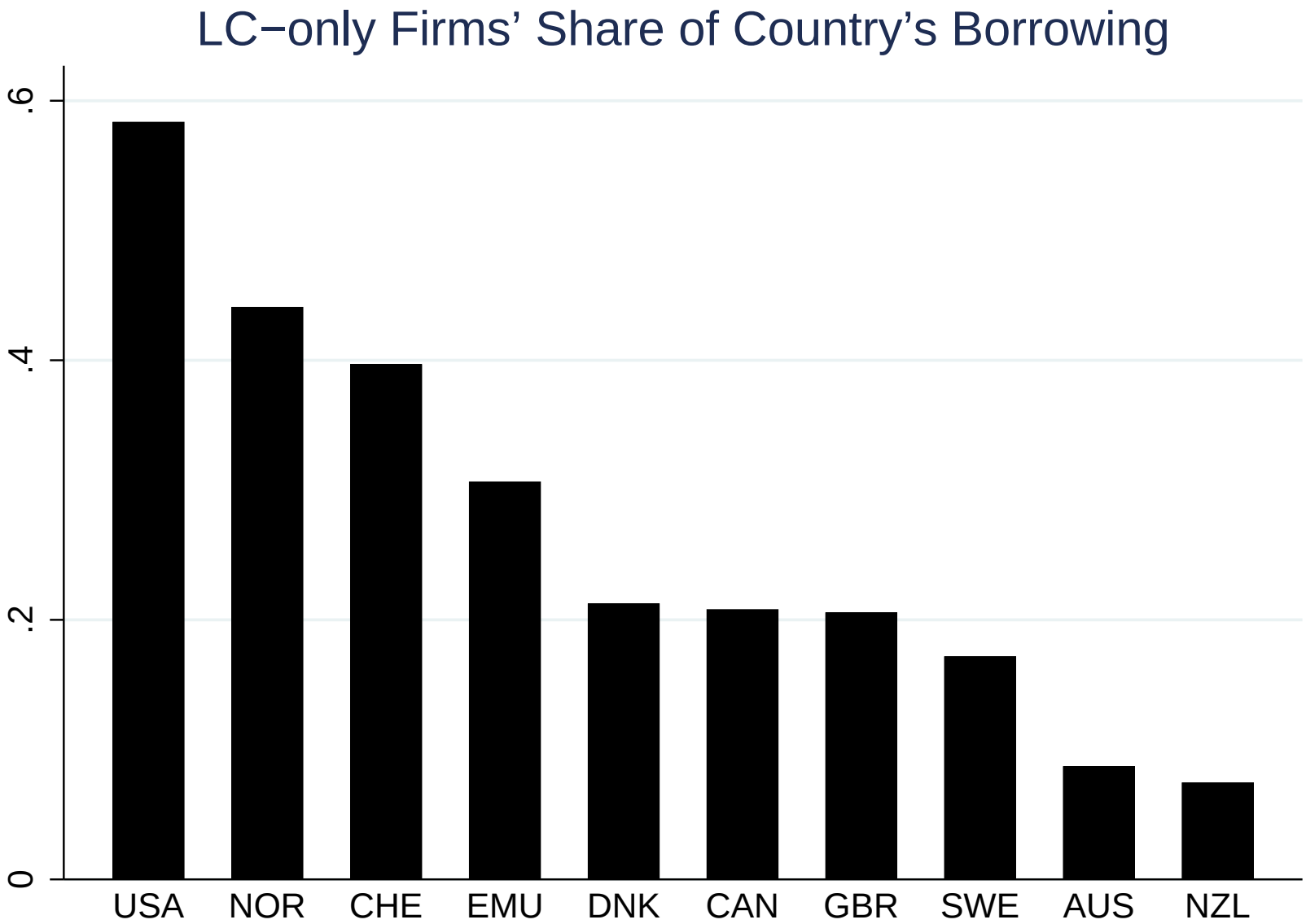
Foreigners Avoid Local Currency Issuers ... Except for USD



US LC Issuers Place Debt Similarly at Home and Abroad

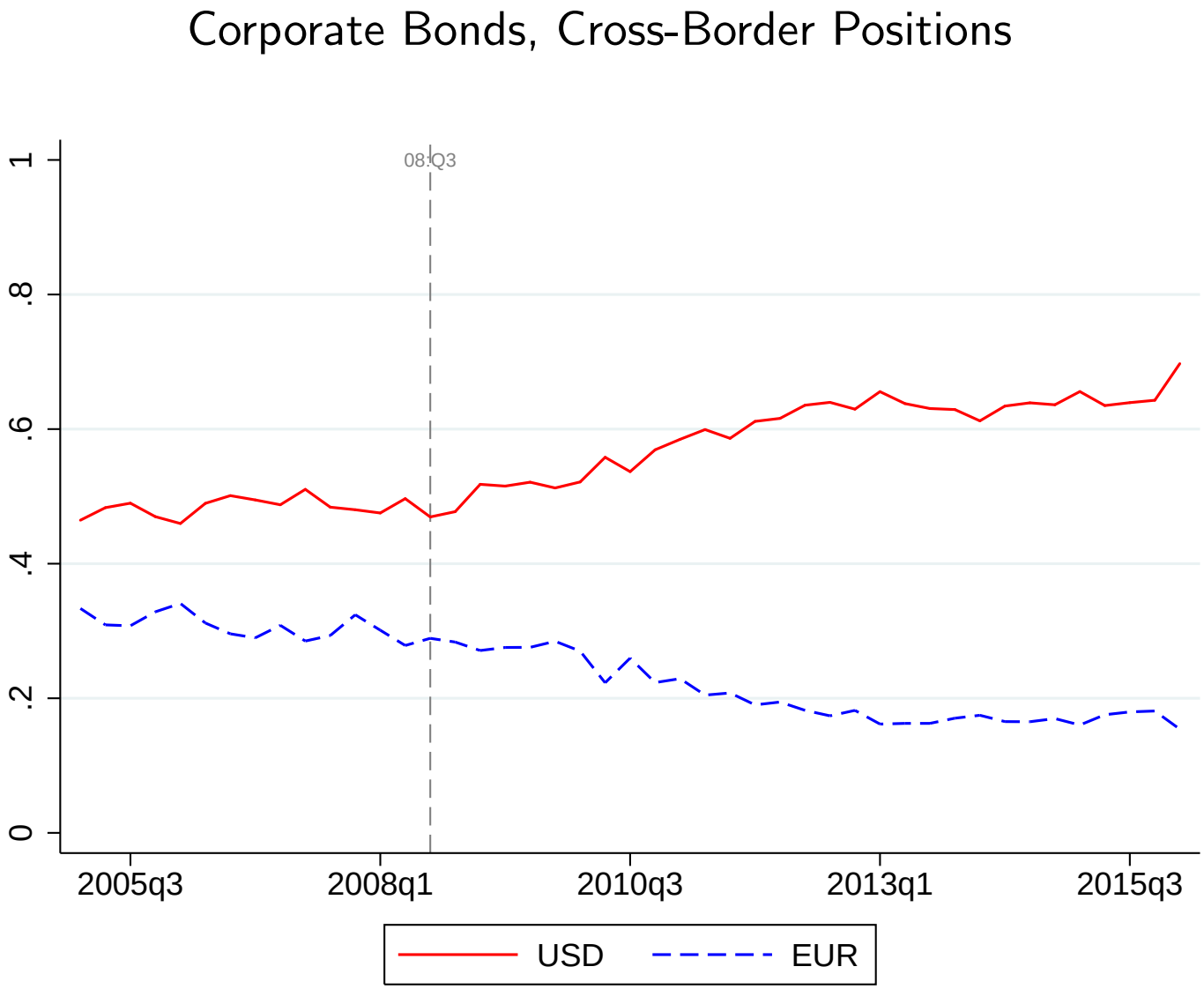


US LC Issuers Account for More Borrowing than Elsewhere

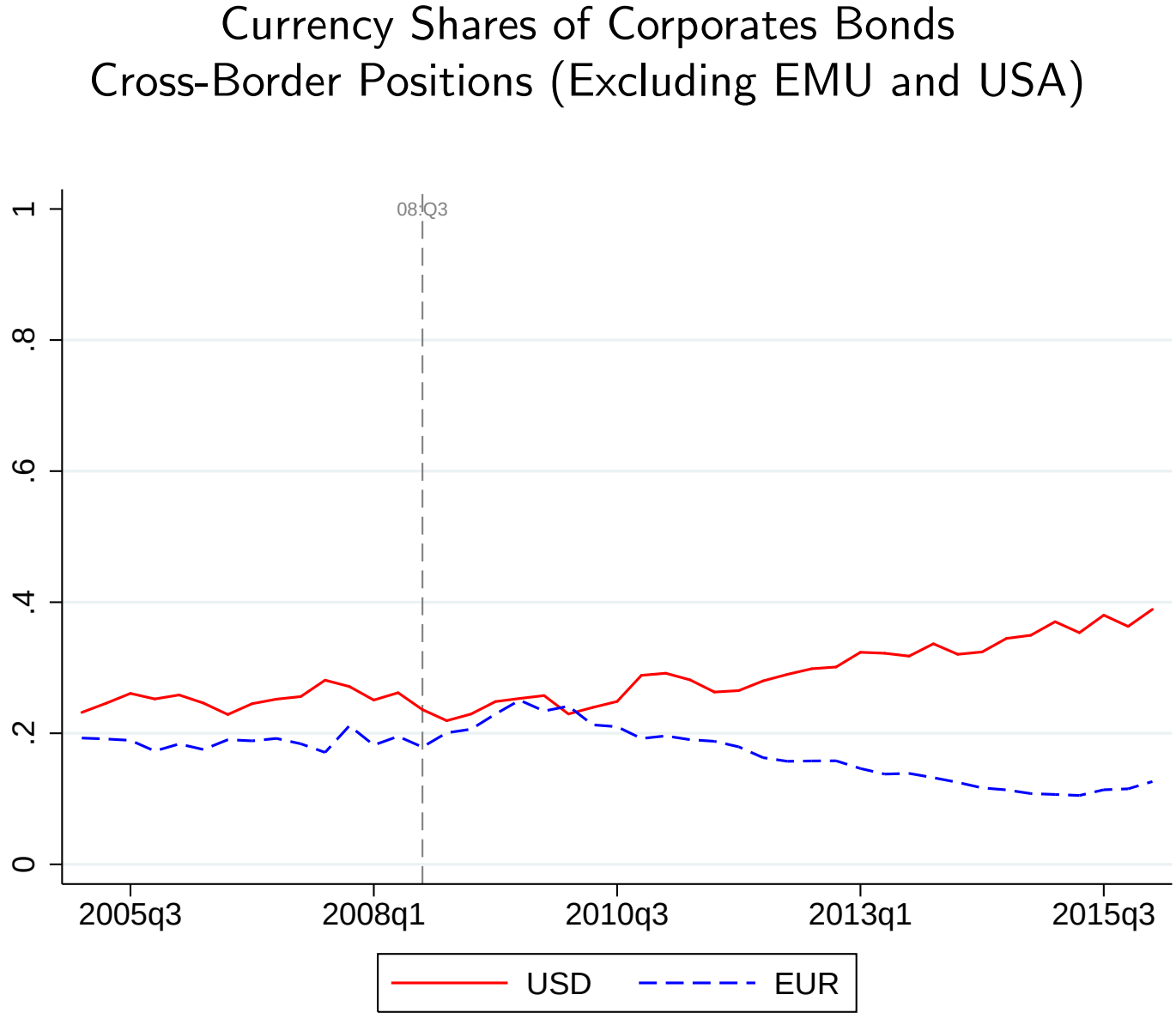


Outline

Has USD Always Been the International Currency?



The Rise of the Dollar and Fall of the Euro



Pervasive Shift from EUR to USD (i.e. $\Theta_{€} \downarrow, \Theta_{\$} \uparrow$)

Specification	2005q1	2008q1	2016q1	Long Difference
(1) *All Bonds*				
USD	0.586	0.590	0.691	0.105
EUR	0.303	0.256	0.115	-0.188
(2) *All Bonds Held by Foreigners*				
USD	0.473	0.466	0.633	0.160
EUR	0.279	0.252	0.135	-0.144
(3) *Govt Bonds Held by Foreigners*				
USD	0.420	0.388	0.475	0.055
EUR	0.226	0.162	0.109	-0.117
(4) *Corp Bonds Held by Foreigners*				
USD	0.501	0.500	0.713	0.211
EUR	0.307	0.290	0.148	-0.159
(5) *Non-Financial Corp Bonds Held by Foreigners*				
USD	0.680	0.658	0.814	0.135
EUR	0.192	0.198	0.094	-0.098
(6) *Corp by Foreigners, Ex-USA/EMU*				
USD	0.226	0.257	0.349	0.122
EUR	0.191	0.174	0.116	-0.076

Composition and FX Changes

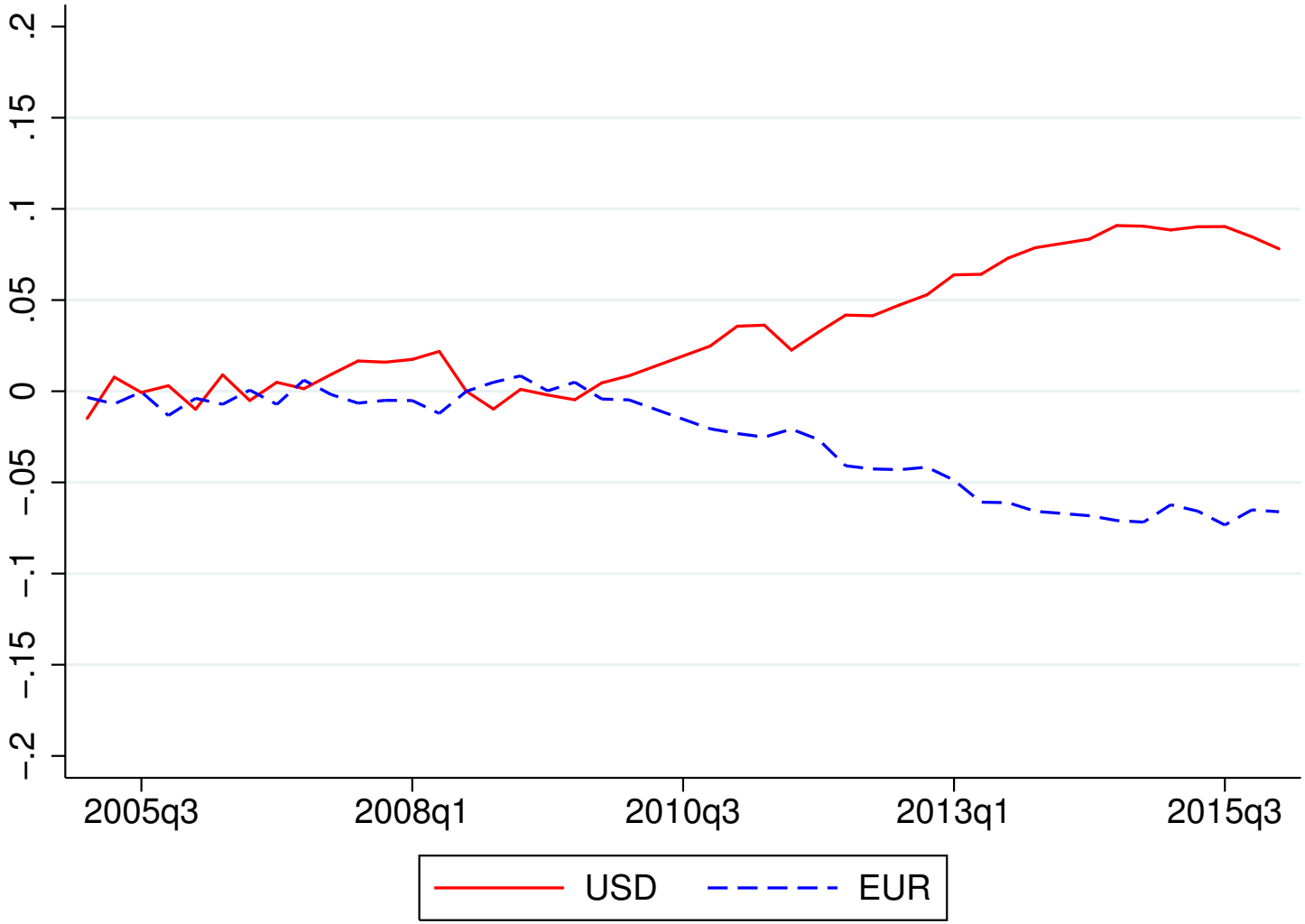
- Could in principle be caused by compositional shifts in data coverage having little to do with currency
- Control for entry/exit by plotting time FE from regressions

$$\left(\frac{\text{Investment of } j \text{ in } i \text{ in currency } x}{\text{Investment of } j \text{ in } i}\right) = \boldsymbol{\phi}_{\boldsymbol{x}}^{\boldsymbol{t}} + \alpha_{i,j} + \epsilon_{i,j,x}^{t}$$

- Control for FX changes by using constant 2005 exchange rates
- Following slide plots $\boldsymbol{\phi}_{\boldsymbol{\in}}^{\boldsymbol{t}}$ and $\boldsymbol{\phi}_{\boldsymbol{\$}}^{\boldsymbol{t}}$

The Rise of the Dollar and Fall of the Euro

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



Conclusion

- New dataset to examine global capital flows at the micro level
- Striking importance of currency in portfolio determination, easily rationalized in model with fixed costs to issue in foreign currency
- Leads to:
  - Very 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

[Extra Slides]

Within-Firm Variation, Multi-Currency Issuers

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

j	CAN	CHE	EMU	GBR	SWE	USA
Currency	0.921***	0.660***	0.579***	0.524***	0.804***	0.612***
	(0.009)	(0.013)	(0.013)	(0.022)	(0.019)	(0.013)
Obs.	5,016	6,927	12,524	9,386	2,627	12,692
# of Firms	111	234	694	363	108	637
R^2	0.959	0.880	0.775	0.770	0.947	0.785
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Estimates for year 2015, weighted least squares, SE clustered at firm level

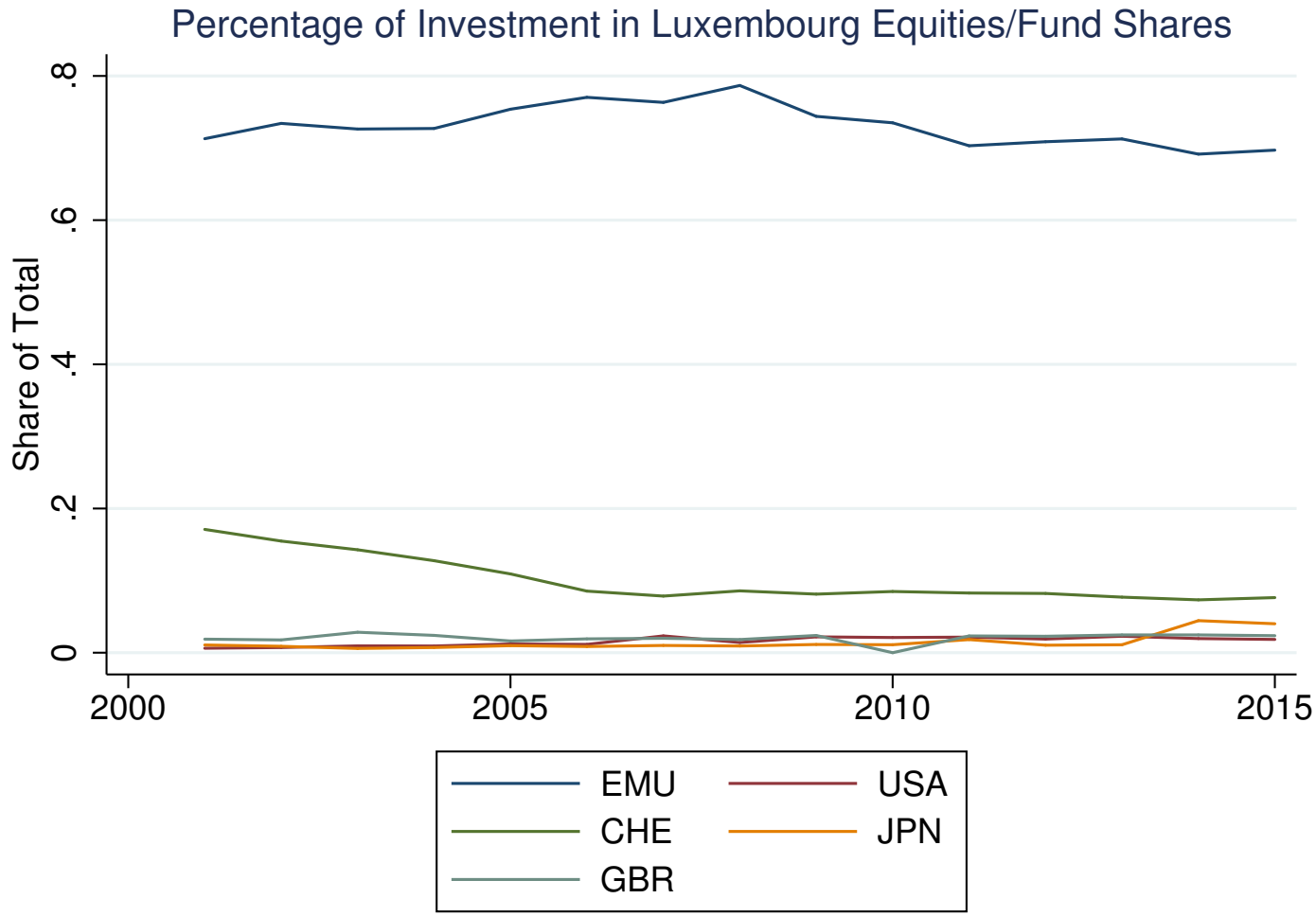
Back

Tax Havens

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"

LUX Mutual Funds: 90% EU Investors



CPIS data on bilateral claims on Luxembourg Funds

Residence of End-Investor

- 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:

Foreign Fund Share of U.S. Outward Investment			U.S. Fund Share of Foreign Inward Investment		
Dest	**2005**	**2015**	**Source**	**2005**	**2015**
AUS	0.1	5.3	AUS	2.4	6.8
BRA	0.0	0.4	BRA	2.6	0.9
CAN	1.3	1.4	CAN	10.4	10.7
CHE	0.0	0.2	CHE	9.7	9.0
CYM	6.0	47.9	CYM	3.7	10.5
EMU	0.8	2.1	EMU	4.7	3.9
GBR	0.2	2.4	GBR	4.6	4.3
JPN	0.2	0.7	JPN	1.5	2.6
MEX	0.3	2.4	MEX	7.4	24.9
ROW	0.8	6.6	ROW	4.5	5.9

Back

Tax Havens

- 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 distinctinguish EU and Non-EU
- Given focus on currencies, pool Eurozone as "EMU"
- CPIS shows $> 70\%$ of Luxembourg funds held by "EMU"

Back

Mapping Subsidiaries to Parents

- Problem: Hard to map subsidiaries to parents (country and industry)
  - Petrobras subsidiary in the Cayman Islands issues debt
  - The subsidiary has a different 6-Digit CUSIP
  - The subsidiary is listed as a finance company
- Solution: Use CUSIP Associated Issuer and Capital IQ datasets to link borrowing to Brazilian energy firm
- Related: Base analyses off parent's nationality (i.e. Telecom Italia $\rightarrow$ Italy), not security's residency (i.e. Telecom NY-law bond $\rightarrow$ USA)

Back

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 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

Back

Within-Firm Variation: All Firms

	CAN	CHE	EMU	GBR	SWE	USA
Currency	0.922***	0.660***	0.580***	0.529***	0.803***	0.611***
	(0.010)	(0.011)	(0.008)	(0.015)	(0.014)	(0.008)
Obs.	34,457	34,457	34,457	34,457	34,457	34,457
R^2	0.952	0.934	0.824	0.830	0.954	0.851
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Estimates for year 2015, weighted least squares Back

Within-Firm Variation: Foreign Firms

	CAN	CHE	EMU	GBR	SWE	USA
Currency	0.940***	0.644***	0.612***	0.534***	0.730***	0.568***
	(0.012)	(0.012)	(0.009)	(0.018)	(0.026)	(0.010)
Obs.	32,387	33,233	26,082	31,926	33,363	23,066
R^2	0.876	0.846	0.756	0.755	0.901	0.786
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Estimates for year 2015, weighted least squares Back

Within-Firm Variation: Foreign Firms, International Issuance

	CAN	CHE	EMU	GBR	SWE	USA
Currency	0.973***	0.487***	0.580***	0.593***	0.713***	0.577***
	(0.005)	(0.075)	(0.023)	(0.041)	(0.063)	(0.024)
Obs.	4,272	4,015	3,578	3,951	4,368	3,757
R^2	0.974	0.808	0.759	0.839	0.944	0.746
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Estimates for year 2015, weighted least squares

Back

Within-Firm Variation: Financial Firms

	CAN	CHE	EMU	GBR	SWE	USA
Currency	0.912***	0.672***	0.595***	0.476***	0.841***	0.624***
	(0.016)	(0.012)	(0.012)	(0.023)	(0.014)	(0.012)
Obs.	10,717	10,717	10,717	10,717	10,717	10,717
R^2	0.950	0.912	0.756	0.767	0.966	0.817
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Estimates for year 2015, weighted least squares Back

Within-Firm Variation: Non-Financial Firms

	CAN	CHE	EMU	GBR	SWE	USA
Currency	0.936***	0.659***	0.581***	0.588***	0.706***	0.614***
	(0.008)	(0.024)	(0.010)	(0.021)	(0.046)	(0.009)
Obs.	15,025	15,025	15,025	15,025	15,025	15,025
R^2	0.954	0.885	0.779	0.803	0.937	0.806
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Estimates for year 2015, weighted least squares Back

Within-Firm Variation: Foreign Financial Firms

	CAN	CHE	EMU	GBR	SWE	USA
Currency	0.917***	0.651***	0.626***	0.452***	0.756***	0.578***
	(0.022)	(0.012)	(0.013)	(0.027)	(0.040)	(0.015)
Obs.	10,013	10,208	8,521	9,809	10,331	7,275
R^2	0.885	0.809	0.704	0.657	0.893	0.727
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Estimates for year 2015, weighted least squares Back

Within-Firm Variation: Foreign Non-Financial Firms

	CAN	CHE	EMU	GBR	SWE	USA
Currency	0.962***	0.644***	0.605***	0.630***	0.694***	0.576***
	(0.006)	(0.025)	(0.013)	(0.021)	(0.057)	(0.011)
Obs.	13,762	14,770	12,650	14,227	14,894	7,530
R^2	0.867	0.809	0.716	0.762	0.880	0.769
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Estimates for year 2015, weighted least squares Back

Including: Structured Finance, Sovranationals, Local Gov.

	CAN	CHE	EMU	GBR	SWE	USA
Currency	0.922***	0.663***	0.598***	0.540***	0.800***	0.630***
	(0.010)	(0.010)	(0.007)	(0.014)	(0.013)	(0.007)
Obs.	153,488	153,488	153,488	153,488	153,488	153,488
# of Firms	24,286	24,286	24,286	24,286	24,286	24,286
R^2	0.936	0.935	0.843	0.836	0.956	0.886
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Estimates for year 2015, weighted least squares Back

Including: All Bonds

	CAN	CHE	EMU	GBR	SWE	USA
Currency	0.898***	0.658***	0.590***	0.542***	0.788***	0.531***
	(0.008)	(0.009)	(0.007)	(0.014)	(0.013)	(0.027)
Obs.	206,776	206,776	206,776	206,776	206,776	206,776
# of Firms	24,962	24,962	24,962	24,962	24,962	24,962
R^2	0.940	0.919	0.853	0.841	0.954	0.890
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Estimates for year 2015, weighted least squares Back

Including: Finance

	CAN	CHE	EMU	GBR	SWE	USA
Currency	0.912***	0.670***	0.594***	0.477***	0.833***	0.624***
	(0.016)	(0.012)	(0.012)	(0.023)	(0.015)	(0.012)
Obs.	10,836	10,836	10,836	10,836	10,836	10,836
# of Firms	1505	1505	1505	1505	1505	1505
R^2	0.950	0.910	0.757	0.770	0.965	0.818
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Estimates for year 2015, weighted least squares Back

Including: Non-Financial Corporate

	CAN	CHE	EMU	GBR	SWE	USA
Currency	0.936***	0.659***	0.581***	0.588***	0.706***	0.614***
	(0.008)	(0.024)	(0.010)	(0.021)	(0.046)	(0.009)
Obs.	15,030	15,030	15,030	15,030	15,030	15,030
# of Firms	3187	3187	3187	3187	3187	3187
R^2	0.954	0.885	0.779	0.804	0.937	0.806
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Estimates for year 2015, weighted least squares Back

Including: Foreign Financial

	CAN	CHE	EMU	GBR	SWE	USA
Currency	0.917***	0.649***	0.626***	0.454***	0.756***	0.578***
	(0.022)	(0.012)	(0.013)	(0.027)	(0.040)	(0.015)
Obs.	10,132	10,327	8,556	9,921	10,441	7,392
# of Firms	1414	1469	1272	1393	1471	1025
R^2	0.885	0.810	0.705	0.664	0.893	0.727
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Estimates for year 2015, weighted least squares

Back

Including: Foreign Non-Financial Corporate

	CAN	CHE	EMU	GBR	SWE	USA
Currency	0.962***	0.644***	0.605***	0.630***	0.694***	0.576***
	(0.006)	(0.025)	(0.013)	(0.021)	(0.057)	(0.011)
Obs.	13,767	14,775	12,654	14,231	14,899	7,534
# of Firms	2917	3139	2732	3054	3142	1683
R^2	0.867	0.809	0.716	0.762	0.880	0.769
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Estimates for year 2015, weighted least squares Back

Including: Residency

	CAN	CHE	EMU	GBR	SWE	USA
Currency	0.899***	0.660***	0.580***	0.529***	0.802***	0.602***
	(0.014)	(0.011)	(0.008)	(0.016)	(0.014)	(0.009)
Residency	0.056***	0.027***	0.006	-0.001	0.022	0.072***
	(0.012)	(0.009)	(0.012)	(0.012)	(0.021)	(0.013)
Obs.	34,457	34,457	34,457	34,457	34,457	34,457
# of Firms	8918	8918	8918	8918	8918	8918
R^2	0.952	0.935	0.824	0.830	0.954	0.852
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Estimates for year 2015, weighted least squares Back

Residency and Nationality

	CAN	CHE	EMU	GBR	SWE	USA
Currency	0.857***	0.657***	0.624***	0.510***	0.742***	0.526***
Nationality	0.037*	0.006**	0.027**	0.018***	0.016	-0.020***
Residency	0.023**	0.008	0.108***	0.016***	-0.002***	0.035**
N x R	-0.013	-0.013	-0.014	-0.009	0.010	0.002
N x C	0.072*	0.061	0.008	-0.044	0.239***	0.182***
R x C	0.094***	0.291***	-0.122***	-0.048	0.056	0.104***
N x R x C	-0.128***	-0.056	0.023	0.140	-0.238***	-0.115***
Obs.	34,457	34,457	34,457	34,457	34,457	34,457
R-squared	0.918	0.907	0.650	0.691	0.924	0.751

Back

Share of Firm's Debt that is Foreign-Owned

	CAN	CHE	EMU	GBR	SWE	USA
FC Share	0.875***	0.886***	0.634***	0.621***	0.704***	0.568***
	(0.030)	(0.046)	(0.024)	(0.038)	(0.061)	(0.043)
Equity Share	-0.029	0.106**	0.062	0.047	0.044	-0.252***
	(0.054)	(0.048)	(0.039)	(0.044)	(0.123)	(0.055)
Constant	0.065***	0.009	0.048**	0.322***	0.179***	0.301***
	(0.017)	(0.023)	(0.021)	(0.040)	(0.056)	(0.009)
Obs.	209	74	449	153	62	1,327
R^2	0.908	0.947	0.853	0.812	0.791	0.240

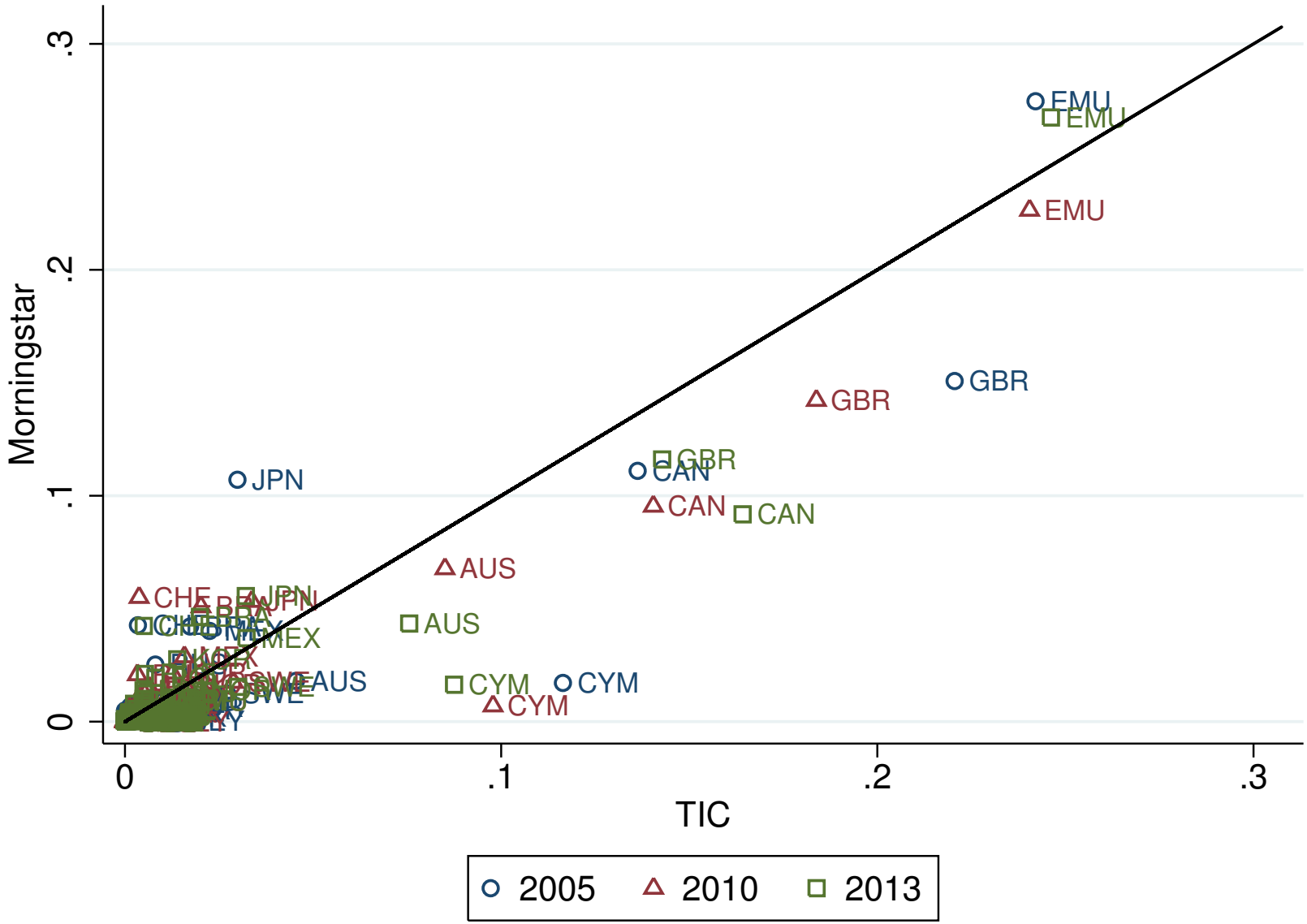
Back

How Does Morningstar Obtain Their Data?

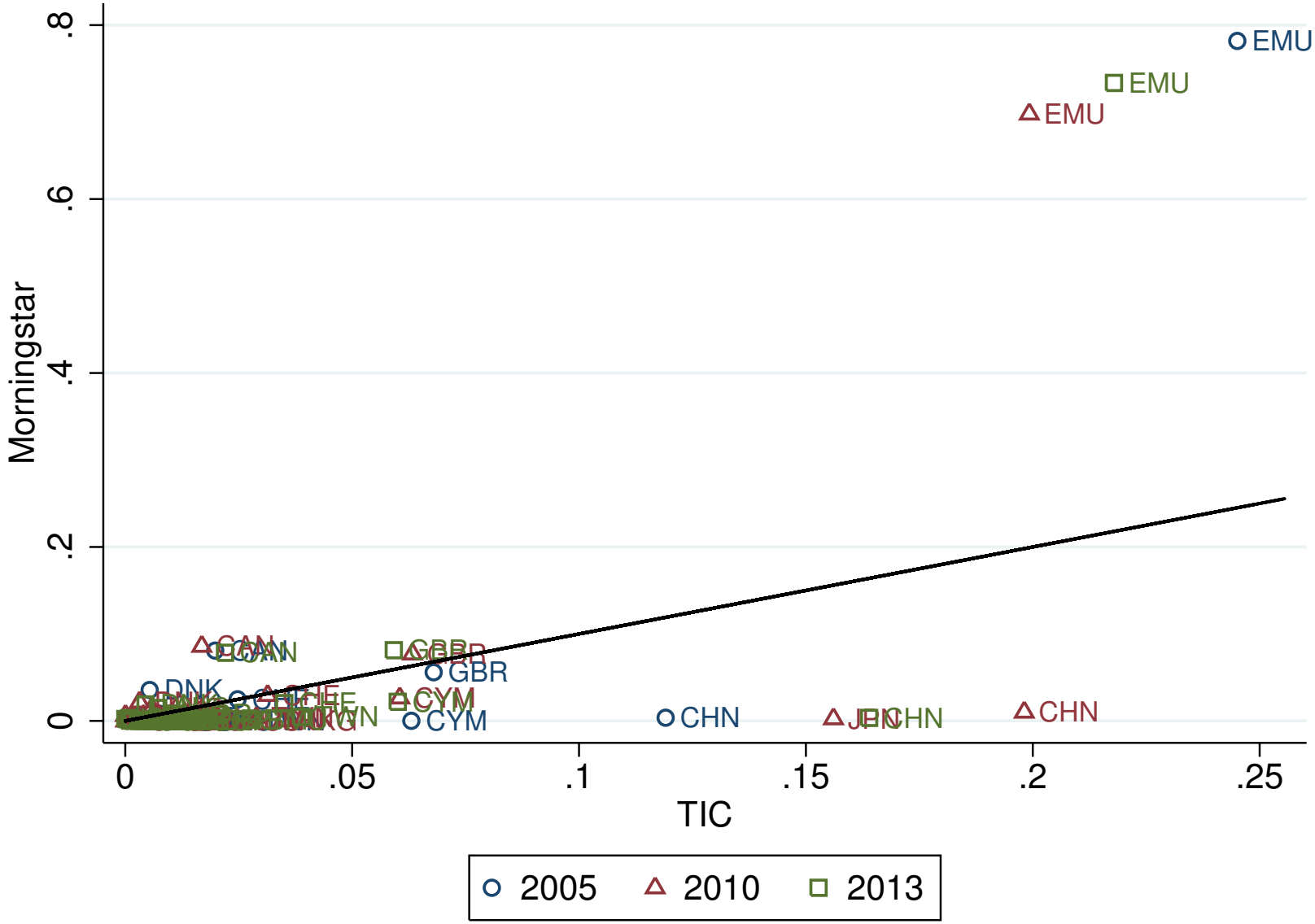
- Surveys required to obtain research coverage by Morningstar
- Reporting is voluntary, but clears various quality checks:
  - Cross-referenced with publicly available realized returns
  - Cross-referenced with regulated positions disclosures
  - Informally checked by clients with positions
- Fund managers 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.

Back

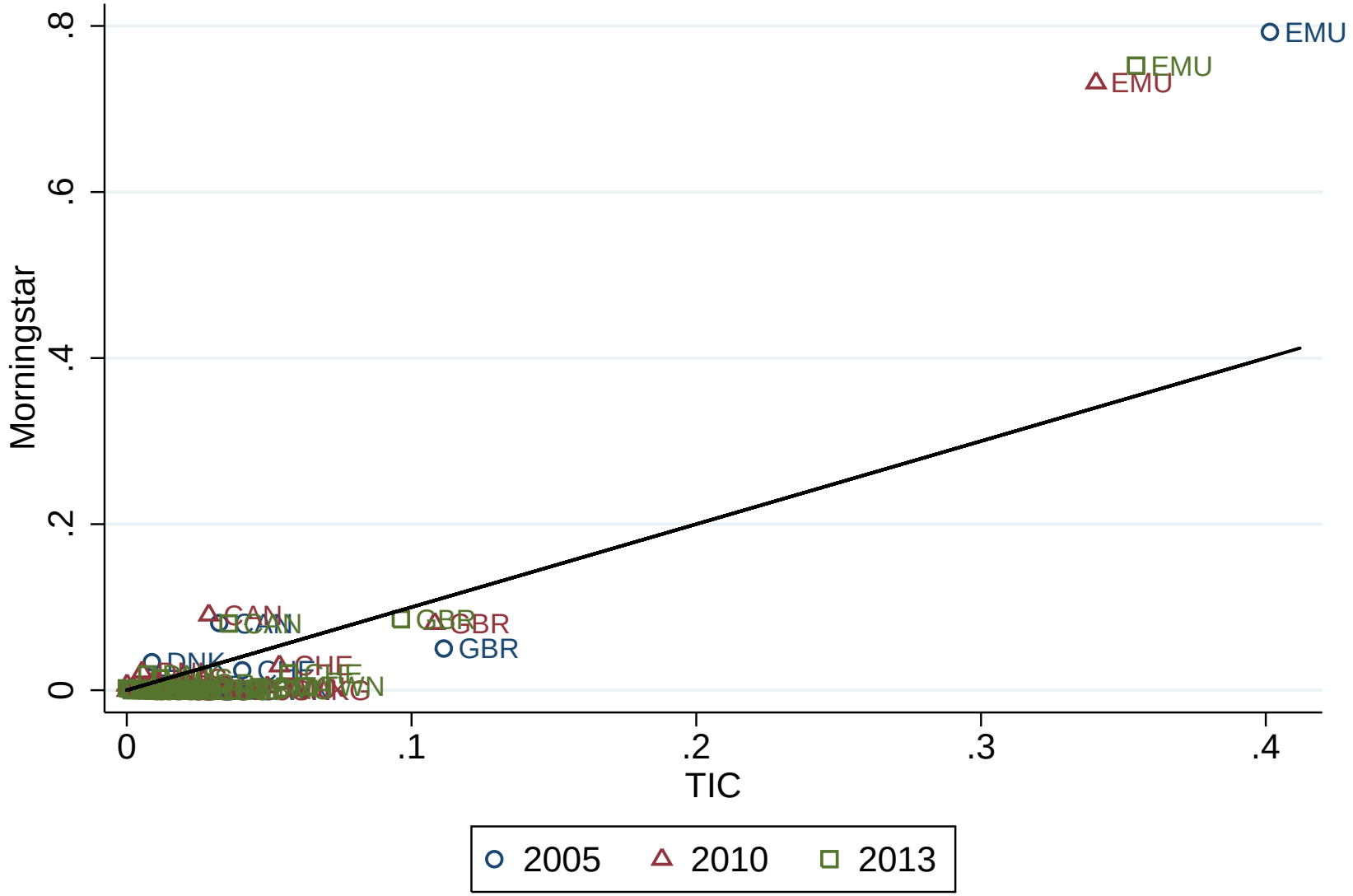
Outward Bond Portfolio Shares Match TIC



Inward Bond Portfolio Shares Don't Match TIC



US Inward Bond Portfolio Shares Don't Match TIC



Note: Excludes Cayman Islands, China, and Japan

Back