IFC-ECB-Bank of Spain Conference: "External statistics in a fragmented and uncertain world"

12-13 February 2024

Globalization and the reach of multinationals implications for portfolio exposures, capital flows and home bias[1]

Carol Bertaut and Stephanie Curcuru,
Board of Governors of the Federal Reserve System;

Beau Bressler,
University of California, Davis

[1] This contribution was prepared for the conference. The views expressed are those of the authors and do not necessarily reflect the views of the European Central Bank, the Bank of Spain, the BIS, the IFC or the other central banks and institutions represented at the event.

Globalization and the Reach of Multinationals
Implications for Portfolio Exposures, Capital Flows, and Home Bias

Carol Bertaut, Beau Bressler, and Stephanie Curcuru[1]

This version: August 10, 2021

Abstract

The growing use of low-tax jurisdictions as locations for firm headquarters, proliferation of offshore financing vehicles, and growing size, number, and geographic diversity of multinational firms have clouded the view of capital flows and investor exposures from standard sources such as the IMF Balance of Payments and the Coordinated Portfolio Investment Survey. We use detailed, security-level information on U.S. cross-border portfolio investment to uncover the extent of distortions in the official U.S. statistics. We find that roughly $3 trillion – nearly a third of U.S. cross border portfolio investment – is allocated to a country different from its primary economic exposure by standard reporting conventions. Expanding to consider global implications, we estimate that the geographic exposure of roughly $10 trillion – about one-fourth – of the stock of global cross-border portfolio investment is similarly distorted, and that exposures to emerging markets are likely understated by about a third. Estimates of the international exposures of U.S. investors are even larger when we distribute the exposure from holdings of domestic and foreign firms according to the geographic distributions of firm-level sales. Our results have implications for conclusions we draw about the factors influencing capital flows, in particular those to emerging markets.

Keywords: Balance of payments, capital flows, financial globalization, foreign assets, international financial data, home bias

JEL classification: F30, F32, G15

---

[1]Bertaut and Curcuru are in the Division of International Finance at the Board of Governors of the Federal Reserve System, Bressler is at University of California, Davis. We thank seminar participants at the International Monetary Fund, the Bank for International Settlements, the Federal Reserve Bank of San Francisco, the European Financial Management Association 2021 Meetings, and the Federal Reserve Board for helpful comments. The views expressed are solely the responsibility of the authors and should not be interpreted as reflecting the views of the Board of Governors of the Federal Reserve System or of any other person associated with the Federal Reserve System. An earlier version of this paper including data files is available at https://www.federalreserve.gov/econres/notes/feds-notes/globalization-and-the-geography-of-capital-flows-20190906.htm

I. Introduction

The residence-based framework of measuring international exposure is increasingly less informative, as a growing number of firms locate in low-tax jurisdictions and issue securities through offshore subsidiaries. This has clouded the view of capital flows and investor exposures from standard sources such as the IMF Balance of Payments and the Coordinated Portfolio Investment Survey. Recent work has taken steps to address this issue: Bertaut, Bressler, and Curcuru (2019) map security-level data on U.S. investors' cross-border holdings from a residence-basis (where the issuing subsidiary is incorporated, or "resident") to a nationality-basis (reflecting the country of the parent firm) and find that 30% of the market value of long-term foreign portfolio securities held by U.S. investors in 2017 reflected exposures to countries other than as reported in the official U.S. statistics. Coppola et al. (2020) map the universe of traded securities to their parent companies and subsidiaries and provide adjustment factors for converting residence-based statistics to a nationality basis. These studies underscore the limitations of the residence-based statistical framework used in official datasets of cross-border positions and capital flows.

However, in a globalized economy even these nationality-based statistics cannot fully capture the true economic exposures of investors. Securities issued by firms with operations around the world will provide exposure to countries other than the country of nationality or residence, as discussed in Cai and Warnock (2012). Indeed, stock prices of internationally-exposed U.S. firms certainly respond to foreign shocks and developments such as dollar appreciation or announcements about potential changes to trade policy such as tariff increases (see, for example, Amiti, Kong, and Weinstein 2020). In this note we combine security-level data on U.S. holdings

of common stock with firm-level geographic revenue data to get a fuller picture of the economic exposure of U.S. investors. We then briefly examine some of the implications of this remapping for our understanding of home bias, which is one important driver of cross-border investment.

II. Data and Methodology

Our estimates of the geographic exposure of U.S. equity investors consider the full equity portfolio of U.S. investors, including equity of U.S. companies. We start with the annual surveys collected as part of the Treasury International Capital (TIC) system. These data are collected on a legal residence basis for construction of the U.S. International Investment Position. The data on U.S. holdings of stock issued abroad comes directly from the "U.S. Residents Portfolio Holdings of Foreign Securities" survey. U.S. investor holdings of stock issued domestically is inferred from the difference between the total stock market capitalization for each firm (from Worldscope) and the total the amount held by foreign investors as reported in the "Foreign Residents' Portfolio Holdings of U.S. Securities" survey. We then reassign each firm from country of residence to country of nationality using the remapping algorithm of Bertaut, Bressler, and Curcuru (2019).[2]

We then take this remapping of equity holdings from the country of residence to nationality one step further and remap equity holdings based on the geography of firm revenue. Our data on firms' geographic revenue distribution comes from Worldscope.[3] This is a challenging exercise,

[2] For this exercise focusing on the U.S. investor equity portfolio, our residence-to-nationality remapping only affects equity of foreign firms, as all of the common stock equity identified as "U.S." in the TIC system is also identified as "U.S." by standard benchmarks such as the MSCI. The mapping would be less straightforward if we were to extend our analysis to the U.S. bond portfolio, because debt issued by U.S.-resident financing subsidiaries with foreign parents are included as "U.S." bonds by TIC.

[3] Worldscope defines their geographic sales variable as "represents the total revenues from the geographic region updated in the respective description."

because geographic segment descriptions reported to Worldscope are non-standardized and often refer to regions rather than individual countries. When revenue is allocated to a region, we allocate revenue to the component countries of each region based on each country's GDP weights in each region.[4] Overall, Worldscope coverage for firms in the U.S. equity portfolio (especially for U.S.-listed firms) is quite good, and improves over time. We are able to classify market capitalization and U.S. portfolio holdings for December 2003 through 2018. By 2018, we have data on nearly 9,200 firms with market capitalization at end-2018 of $68 trillion.[5]

III. Revenue-based Estimates of U.S. Equity Exposure

Figures 1a, 1b, and 1c compare total U.S. portfolio holdings on a residence, nationality, and revenue basis. On a residence basis, holdings of domestic equities amount to about $21 trillion in December 2018 (Figure 1a), roughly 80 percent of the total equity holdings of U.S. investors of about $27 trillion. Domestic holdings are slightly higher on a nationality basis, increasing to $21.8 trillion (Figure 1b), reflecting our reclassification of $800 billion in holdings of equity of U.S. multinationals incorporated in offshore centers. Holdings of emerging market equity are also slightly larger, in large part reflecting the reclassification of financial center equity to China (see Bertaut et al 2019).

Our remapping using the geography of firm revenue presents a much different picture of U.S. investor exposure. On a revenue basis, domestic equity holdings remain the largest portion of the

[4] This methodology for allocating geographic revenue is similar in spirit to Amenc et al. (2015) and also to Morningstar's "Revenue Exposure by Region." See Appendix for more details on methodology. For firms not reported in Worldscope or with incomplete information, we use data from Bloomberg and from company annual reports where possible to determine market capitalization and sales revenue allocations.

[5] By comparison, the World Bank's World Development indicators lists global equity market capitalization for 2018 at $68.6 trillion. In terms of foreign-issued equity held by U.S. investors, we are able to match more than 80% of the market value of foreign common stock held in the early 2000s, increasing to more than 90% by 2009.

total portfolio but fall to $18 trillion (figure 1c). This smaller U.S. exposure reflects the fact that large-cap U.S. firms have substantial revenue from global sources and thus holding their shares provides U.S. investors with considerable exposure to other countries. Of course, the reduced exposure to the United States and increased exposure to the rest of the world is partially offset by a reallocation of some of the holdings of foreign equity: Foreign multinationals often generate significant revenue from U.S. sales, and thus U.S. investors acquire some U.S. exposure through their holdings of foreign stocks. The differences in geographic allocations between the revenue-based statistics and the residence- and nationality-based statistics are shown in figures 2a and 2b, respectively. In the early part of our sample, most of the reallocation from domestic to foreign exposure was to other developed countries. In more recent years, however, most of the remapping has been to emerging market economies.

Two particularly striking facts stand out from the revenue-based holding estimates. First, we find that U.S. investors may have as much indirect foreign exposure from their holdings of equity of U.S. multinationals as from direct holdings of foreign equity. The sources of the domestic and foreign exposures of U.S. investors are shown in Figure 3. In December 2018, U.S. investors had $4.6 trillion of foreign exposure from their holdings of U.S. equity, almost as much as their $4.8 trillion of foreign exposure from their direct foreign equity holdings.

Second, we find that U.S. investors have about as much exposure to emerging markets as they do to advanced foreign economies, as multinational firms generally have significant exposures to emerging markets. In 2018, U.S. investors had $4.6 trillion in emerging market exposure, including $2.5 trillion through U.S. holdings of domestic multinationals, versus $4.9 trillion of advanced economy exposure.

IV. Implications for Home Bias

Our results have implications for a wide range of topics of interest to global policy makers and academics. These include conclusions we draw about the factors influencing capital flows, in particular those to emerging markets, and the drivers of international investment allocations more generally. For instance, one long-standing puzzle in the international finance literature is investor "home bias"; in other words, the lack of diversification of international investors relative to the optimal holdings implied by the International Capital Asset Pricing model (ICAPM). The ICAPM predicts that in a world with frictionless markets the optimal asset allocation is the world portfolio; in other words, investors should spread their wealth among global equities according to each asset's share of global market capitalization. For example, since U.S. equities currently make up about 40 percent of global market capitalization, about 40 percent of U.S. investors' equity holdings should be in U.S. stocks.

The usual estimate for the degree of home bias in investor portfolios compares portfolio allocations in foreign (to the investor) equity to shares in global market capitalization:

$$Home\ Bias = 1 - \frac{\frac{(holdings\ of\ foreign\ equity)}{(total\ equity\ portfolio)}}{\frac{(foreign\ equity\ market\ cap)}{(world\ equity\ market\ cap)}} \quad (1)$$

Note that if portfolio shares are close to or equal market capitalization shares, the ratio in the second term of equation (1) will be close to one. Thus, the ratio is typically subtracted from 1 to measure “home bias”, so that the larger this resulting calculation, the greater the extent of home bias. A home bias of 0.5 means that investors hold half as much foreign stock (or twice as much domestic stock) as implied by the ICAPM.

In practice, investors in the U.S. hold larger shares of their wealth in domestic securities than predicted by the ICAPM, and this is true for investors around the globe. There is a large literature on the potential causes of home bias, which include hedging motives arising from exchange rate and other risks, and frictions such as transactions costs as well as easier access to and better information about domestic markets. Coeurdacier and Rey (2013) provide a comprehensive survey of this literature. This literature focuses on factors that affect investor demand for exposure, and the associated characteristics of investment in different countries. But how these portfolio shares – and market capitalization shares – are constructed can lead to markedly different measures of home bias, which in turn can confound our interpretation of what drives portfolio preferences.

Figure 4 shows our home bias estimates for U.S. investors. When holdings are measured by residence, home bias in common stock is quite high. That said, it has trended down slightly from about 0.75 in the early 2000s to about 0.65 after the global financial crisis, and it has remained around that level for the past several years. When instead holdings measured on a nationality basis, home bias is even higher, largely due to holdings of firms in financial centers that we remap to the United States. Home bias estimates are notably lower when holdings are revenue-based, generally below 0.5. This lower level of home bias largely reflects the additional exposure to foreign countries that U.S. investors achieve through their holdings of equity of U.S. multinationals.

The marked differences in home bias magnitudes and trends across measures suggests caution is needed when constructing home bias estimates using aggregate data such as the IMF's Coordinated Portfolio Investment Survey (CPIS). The CPIS is collected on a residency basis, and

as our analysis shows, holding shares of multinational firms can considerably increase the measured global exposure of a country's investors. Our investigation of the U.S. portfolio indicates that U.S. home bias clearly still exists, but estimates of the magnitude of the bias are notably lower when calculated on a revenue-exposure basis.

We can further illustrate the portfolio diversification effects of investment in multinational firms using the relative portfolio weight measure introduced in Ahearne et al (2004):

$$Relative\ Portfolio\ Weight_i = \frac{\frac{(holdings\ of\ country\ i\ equity)}{(total\ equity\ portfolio)}}{\frac{(country\ i\ equity\ market\ cap)}{(world\ equity\ market\ cap)}}. \qquad (2)$$

Table 1 presents descriptive statistics for the relative portfolio weights of the U.S. investor foreign portfolio with country holdings estimated alternatively by residence, nationality, and revenue-exposure. Averaged across foreign countries, country weights are about 0.25 on both a residence and nationality basis, but there is considerable heterogeneity: For both measures, estimates range from close to zero, indicating almost full "country bias", to more than 1, indicating that U.S. investors actually hold *more* than the market capitalization share in a few countries. Consistent with our finding of lower overall home bias on a revenue-exposure basis, revenue-based portfolio weights are generally larger than are either the residence- or nationality-based weights, though these too show considerable heterogeneity. The residence- and nationality-based weights are highly correlated with each other, as would be expected given that the nationality reassignments primarily affect the handful of financial center countries. Their correlations with the revenue-exposure based weights are notably lower.

These ICAPM-based measures of home bias omit factors widely acknowledged to also influence portfolio preferences. To capture some of these other factors we estimate a gravity model which includes many of the factors shown by the literature to drive portfolio allocations (see Portes and Rey 2005 and Fidora, Fratzscher and Thimann 2007) in the form:

$$Relative\ Portfolio\ Weight_{i,t} = \alpha_i + \beta \boldsymbol{X}_{i,t} + \varepsilon_{i,t} \quad (3)$$

where $\boldsymbol{X_{i,t}}$ represents a vector of country-level controls. The regressions are estimated over our entire sample period of 2004-2017. Control variable definitions are in Appendix B.

Alternative constructions of relative portfolio weights generate different conclusions about factors that influence portfolio preferences. Column 1 of Table 2 shows the coefficients from the estimation of equation (3) when the portfolio weights are constructed on the standard residence basis as in the CPIS. As is typical in the literature, variables proxying for frictions such as country familiarity and financial development are generally significant and with the expected signs: U.S. investors have higher portfolio weights in countries where English is the official language and where broad-band internet access is higher, and lower weights in countries that are more geographically distant.[6] U.S. investors also have somewhat higher weights in countries with a larger share of equity market capitalization owing to firms in consumer or industrial sectors (the financial sector is the omitted dummy). The "financial center" dummy variable adds a nontrivial 0.4 to the estimated portfolio weight, an effect larger in size than the combined effects of having internet access one standard deviation higher than average, geographic location

[6] Similar results (not shown) hold for alternative measures of financial development or if the share of U.S. trade in country *i* is substituted for distance. Variables capturing aspects of portfolio returns (such as the correlation of country equity market returns with U.S. market returns, or GDP growth with U.S. growth) are generally insignificant in these regressions.

one standard deviation closer, and using English as an official language. The size and significance of this dummy variable highlights that country-level characteristics of financial centers likely have more to do with the choice of firm incorporation than they do to explaining investor preferences.

Column 2 repeats the exercise using portfolio weights constructed on a nationality basis. Results are largely similar to the residence-based results, although the financial center dummy is a bit smaller, and the consumer sector share of market capitalization is no longer significant.

Our understanding of the drivers of portfolio allocation changes when we measure holdings on a revenue-exposure basis. Relatively few of the country-level explanatory variables remain meaningful in explaining portfolio weights (column 3), although distance remains significant at roughly the same magnitude. The consumer sector share also remains significant. However, the overall explanatory power of the regression variables as measured by the R^2 drops noticeably.

What does matter is the presence of U.S. multinationals, as suggested in Table 3. Activities of multinationals can provide an additional channel for information about a country, and investor familiarity with "home country" firms specifically provides a further informational advantage. A variable that captures the share of sales revenue generated in a country that owes specifically to U.S. firms has a highly significant and materially important effect in explaining U.S. investor portfolio allocations (column 1). This measure, which is only applicable to the revenue-exposure basis, contributes on average about half of the estimated revenue-exposure portfolio weight, and the size of this effect is about 50 percent higher if the U.S. sales revenue share is one standard deviation higher. The significance of this variable holds in a panel regression with country fixed effects (column 2) and in a panel regression when both country and time effects are included

(column 3). These results at the country level are consistent with our findings in Figure 3, which showed that U.S. investors gained considerable *indirect* overall foreign exposure through their holdings of U.S. multinationals.

These results suggest that country-level characteristics that matter for investor portfolio allocations may additionally enter indirectly, through the choices multinational firms make about which markets to enter and where to concentrate their activities, and the informational advantages that investors gain through activities of multinational firms, especially those of firms from the same home country. They also suggest that country-level aggregate measures of portfolio returns and correlations may be insufficient to explain investor portfolio allocations across countries. Richer analysis that takes into account firm-level characteristics, returns, and correlations are likely to be more informative.

V. Conclusion

In this paper we demonstrated the weaknesses of standard measures of cross-border portfolio investment as a proxy for geographic exposure. Our findings have important implications for any work in international finance which relies on these data and should be of interest to academics, policy makers, and global investors. Our improved exposure measures could possibly change our understanding of the drivers of capital flows, exchange rate movements, and global asset returns more generally. In future work we will use our improved exposure measures to explore these and other important topics.

References

Ahearne, Alan G., William L. Griever and Francis E. Warnock (2004). "Information costs and home bias: an analysis of US holdings of foreign equities." *Journal of International Economics* 62:2, 313-336.

Amenc, Noël, Felix Goltz, Sivagaminathan Sivasubramanian and Ashish Lodh (2015). "Robustness of Smart Beta Strategies." *The Journal of Index Investing, 6*(1), 17-38.

Amiti, Mary, Sang Hoon Kong and David Weinstein (2020). "The Effect of the U.S.-China Trade War on U.S. Investment." NBER Working Paper No. 27114.

Bertaut, Carol C., Beau Bressler and Stephanie Curcuru (2019). "Globalization and the Geography of Capital Flows." FEDS Notes 2019-09-06. Board of Governors of the Federal Reserve System (U.S.).

Cai, Fang and Francis E. Warnock (2012). "Foreign exposure through domestic equities," *Finance Research Letters*, 9(1), 8-20.

Coppola, Antonio, Matteo Maggiori, Brent Neiman, and Jesse Schreger (2020). "Redrawing the Map of Global Capital Flows: The Role of Cross-Border Financing and Tax Havens." Working Paper.

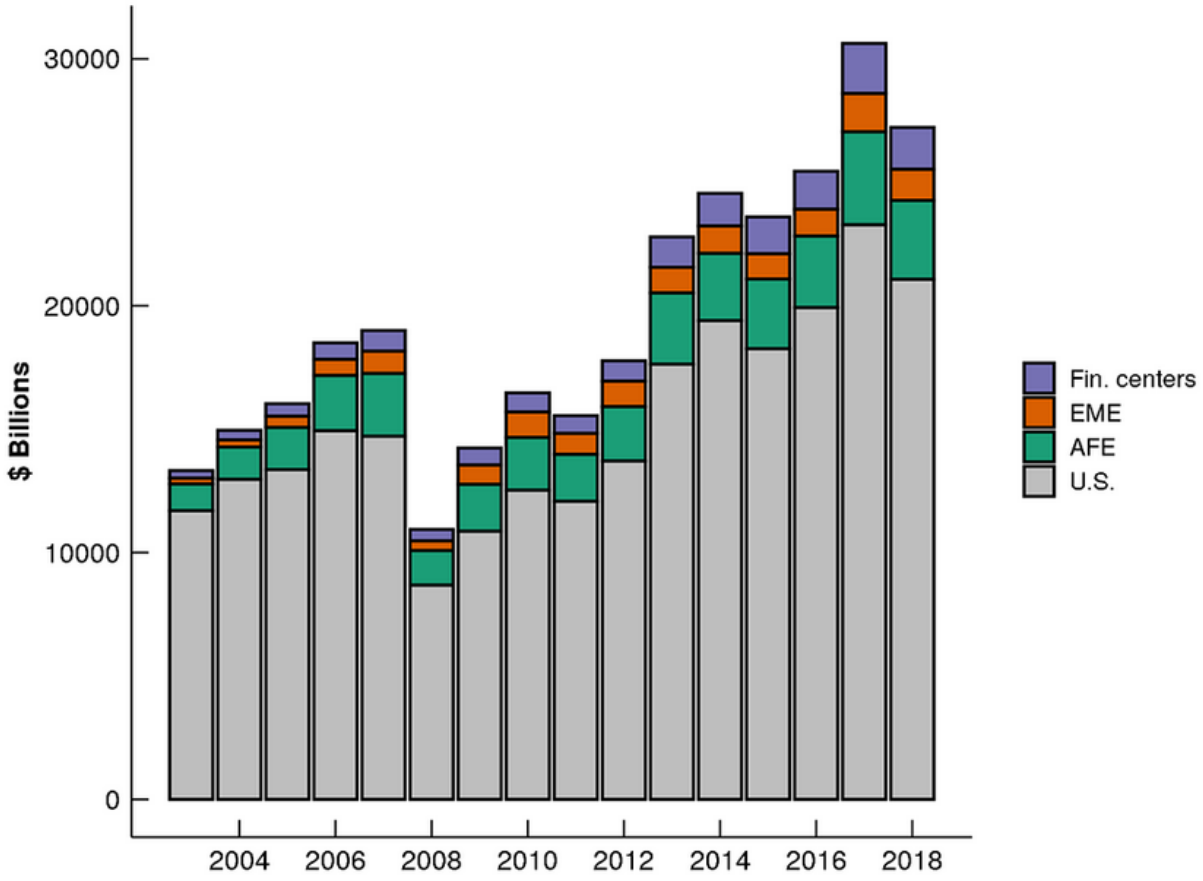
Coeurdacier, Nicolas and Hélène Rey (2013). "Home Bias in Open Economy Financial Macroeconomics." *Journal of Economic Literature, 51*(1), 63-115.

Fidora, Michael, Marcel Fratzscher and Cjristian Thimann (2007). "Home Bias in Global Bond and Equity Markets: The Role of Real Exchange Rate Volatility." *Journal of International Money and Finance*, 26(4), 631-635.

Portes, Richard and Hélène Rey (2005). "The Determinants of Cross-Border Equity Flows." *Journal of International Economics*, 65. 269-296.

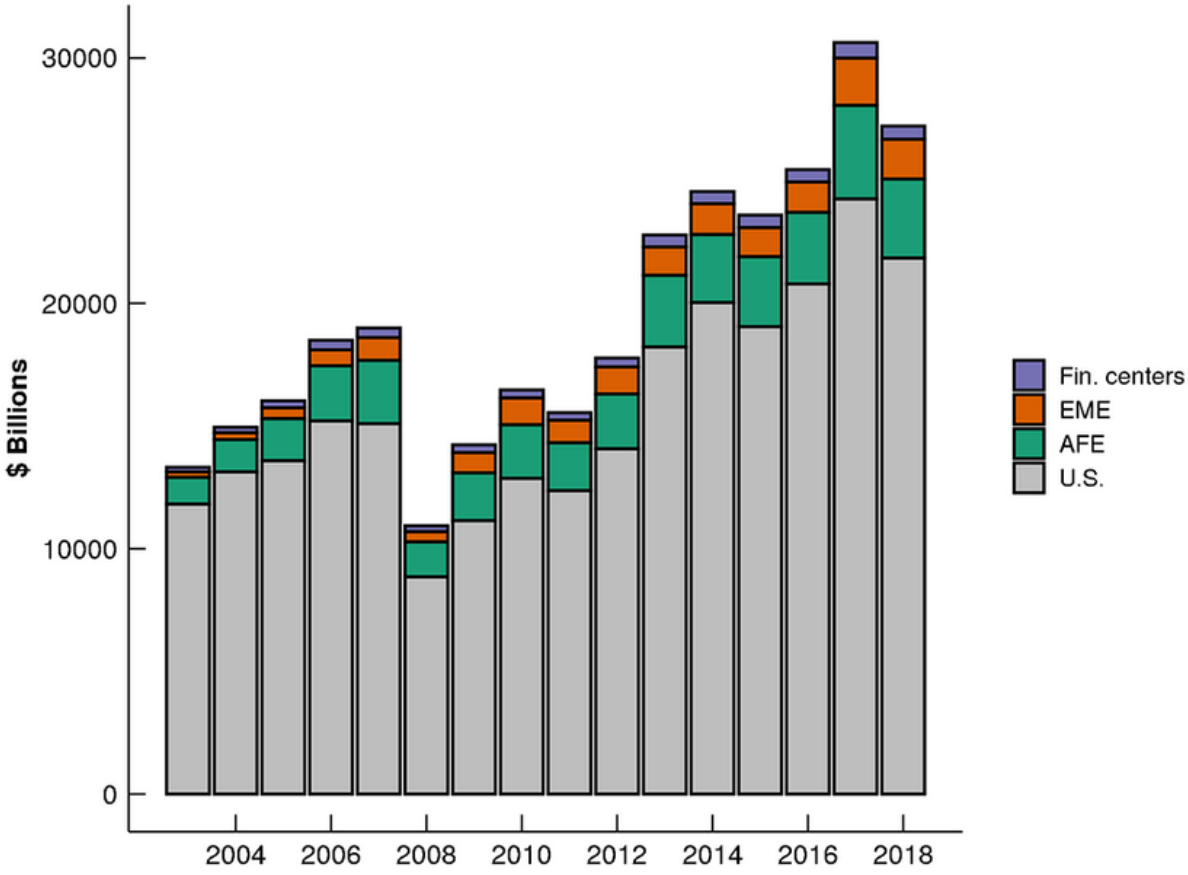
U.S. Department of Treasury, annual reports on U.S. Portfolio Surveys of Foreign Securities, various years. https://www.treasury.gov/resource-center/data-chart-center/tic/Pages/shcreports.aspx

Figure 1a. U.S. holdings of common stock, Residence basis



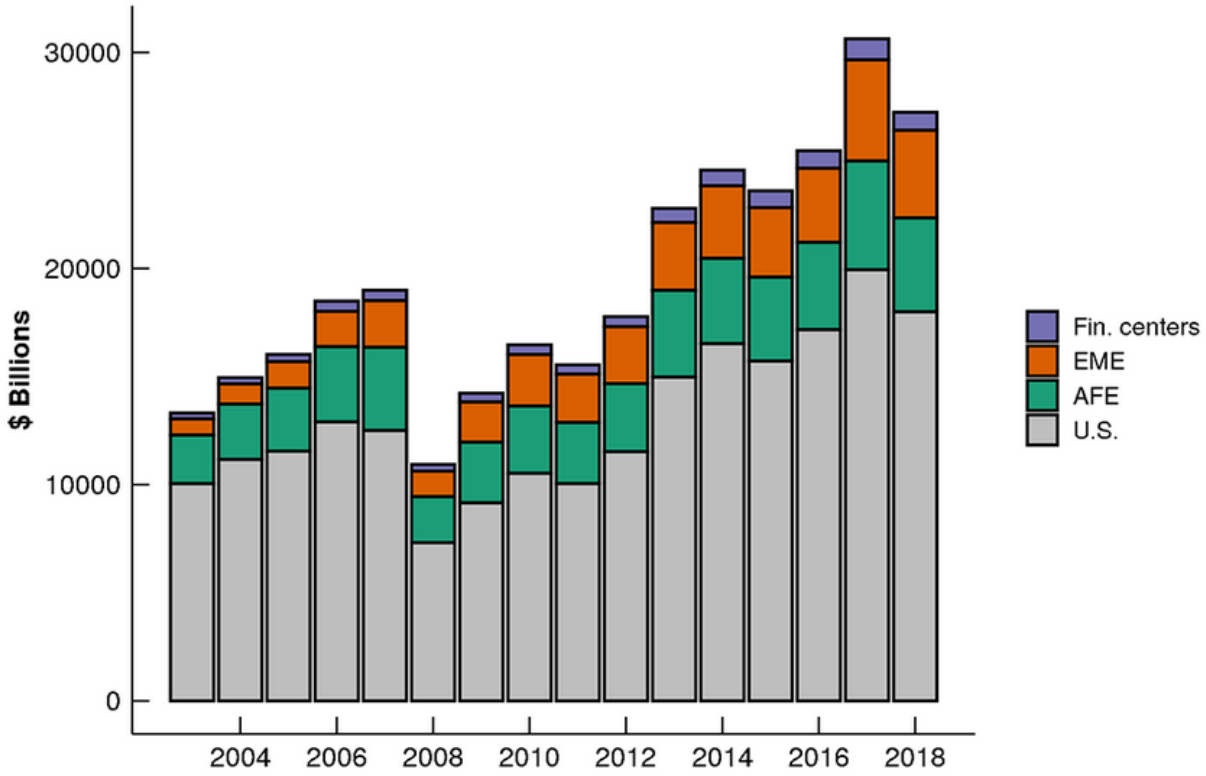
Source: Treasury International Capital System; Bloomberg; Refinitiv Worldscope Fundamentals; Authors' calculations.

Figure 1b. U.S. holdings of common stock, Nationality basis



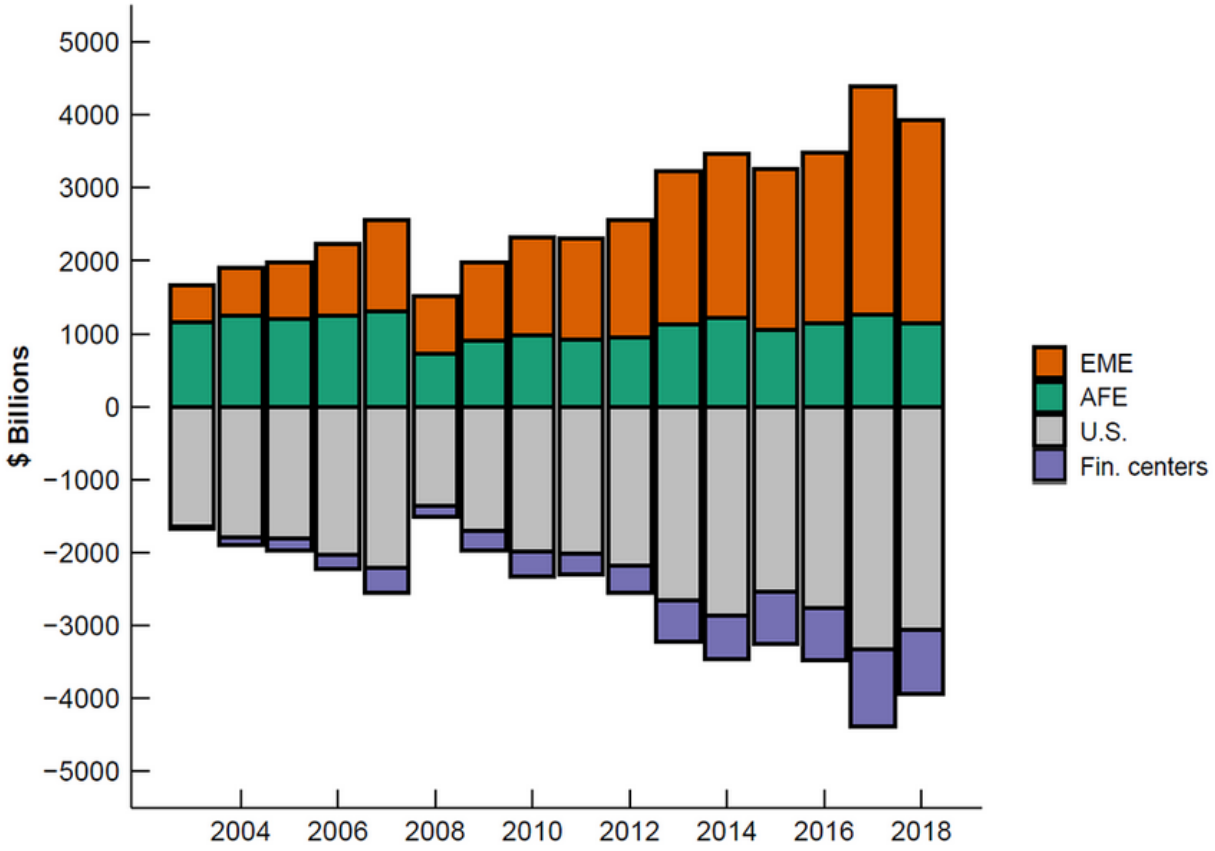
Source: Treasury International Capital System; Bloomberg; Refinitiv Worldscope Fundamentals; Authors' calculations.

Figure 1c. U.S. holdings of common stock, Revenue-exposure basis



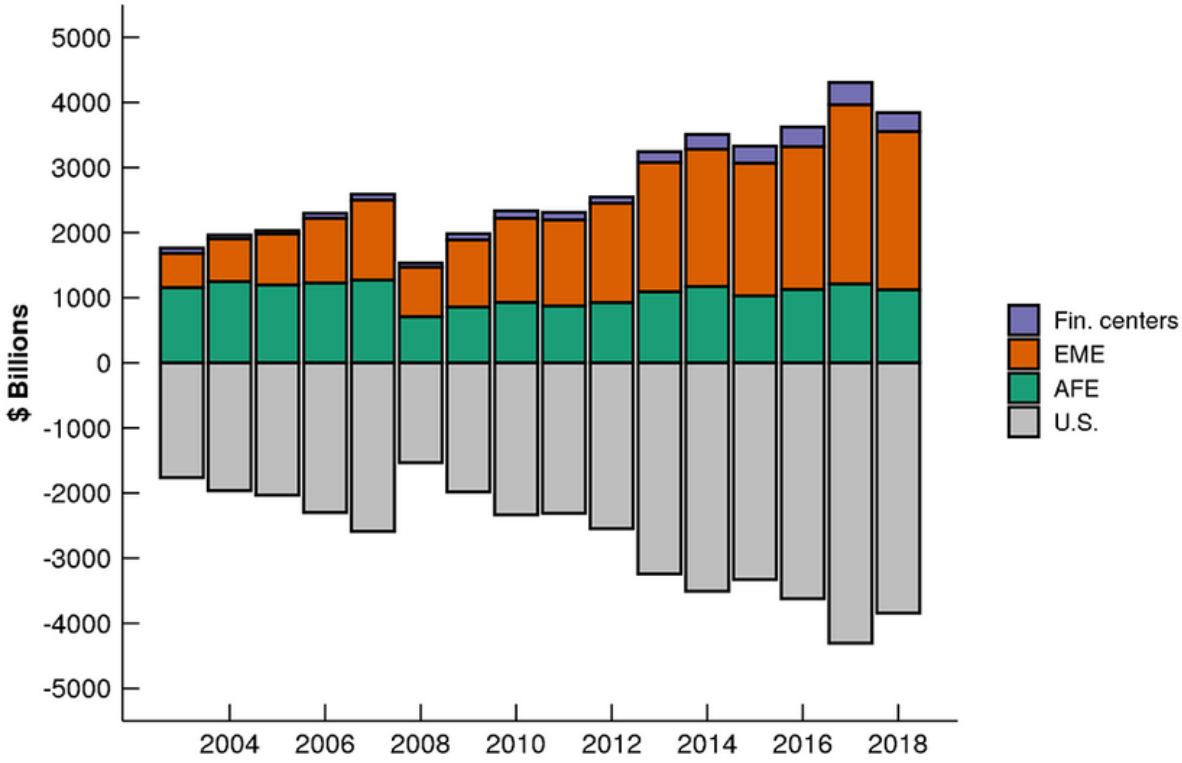
Source: Treasury International Capital System; Bloomberg; Refinitiv Worldscope Fundamentals; Authors' calculations.

Figure 2a. U.S. holdings of common stock, Difference between revenue-exposure and residence basis



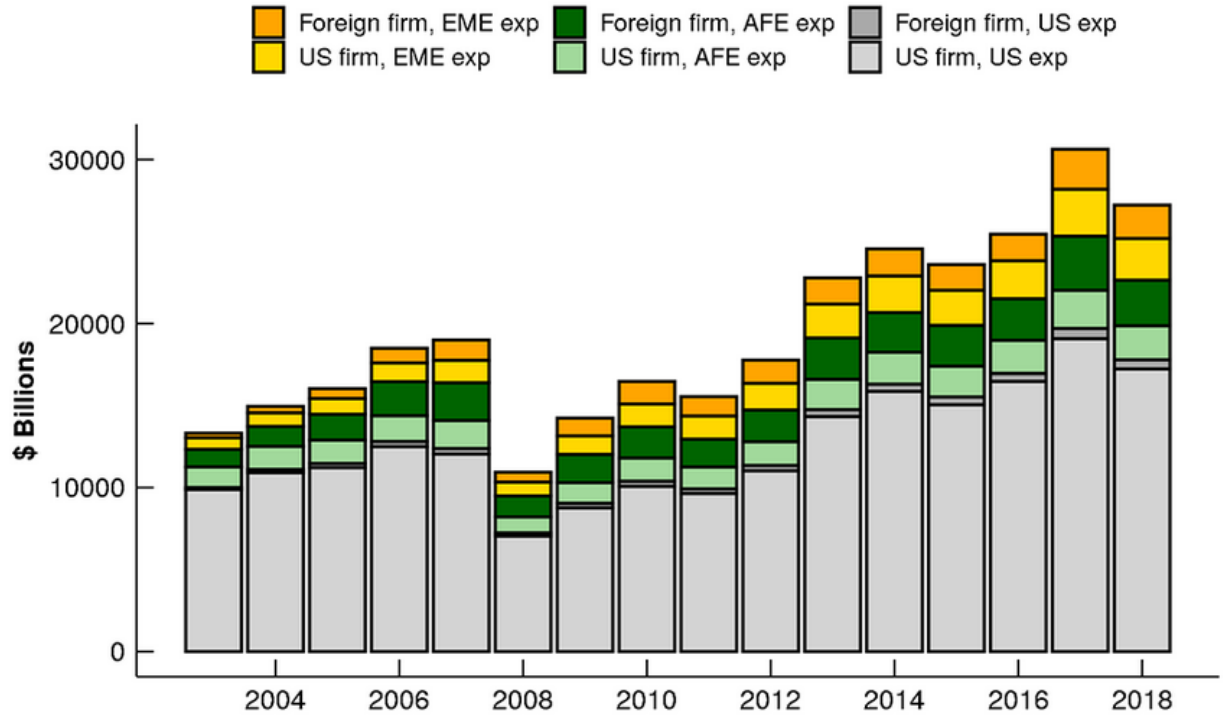
Source: Treasury International Capital System; Bloomberg; Refinitiv Worldscope Fundamentals; Authors' calculations.

Figure 2b. U.S. holdings of common stock, Difference between revenue-exposure and nationality basis



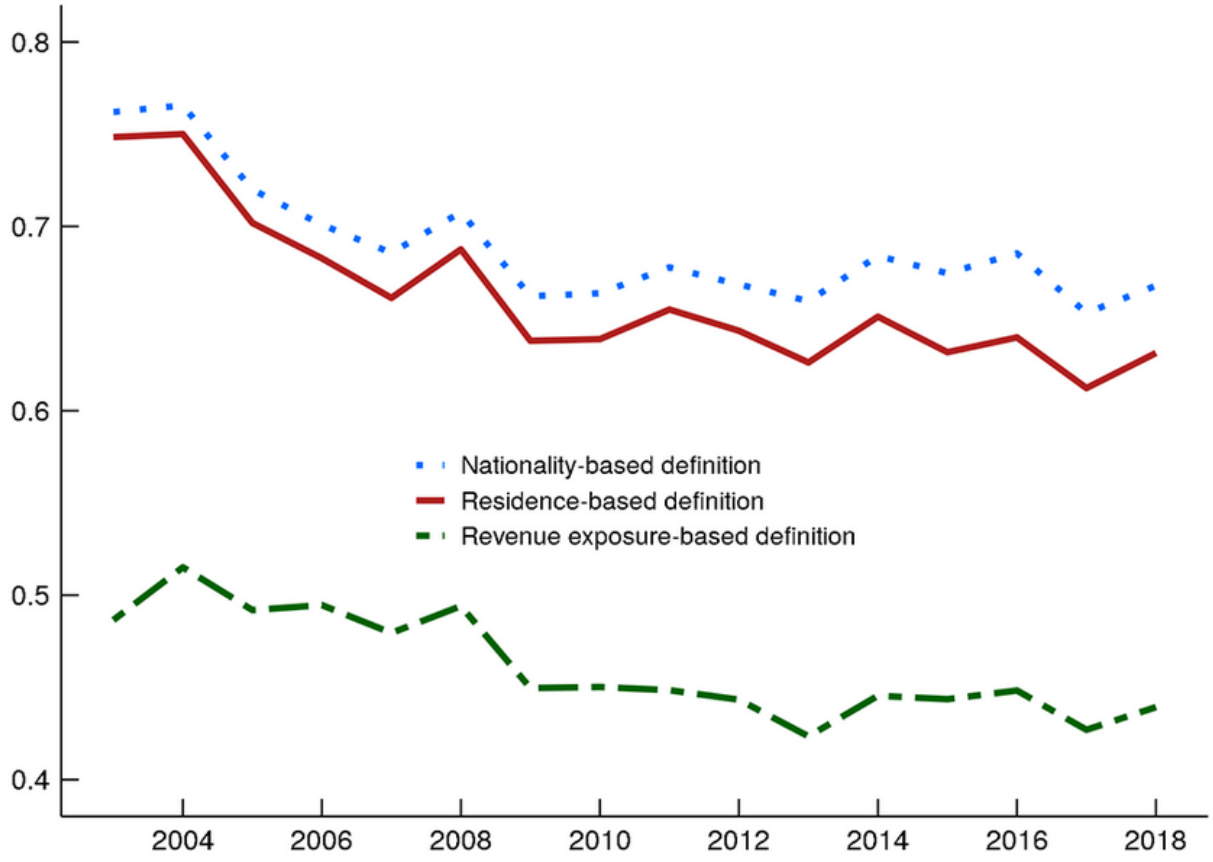
Source: Treasury International Capital System; Bloomberg; Refinitiv Worldscope Fundamentals; Authors' calculations.

Figure 3. U.S. holdings of common stock, Revenue exposure basis by type of economy and nationality of firm



Source: Treasury International Capital System; Bloomberg; Refinitiv Worldscope Fundamentals; Authors' calculations.

Figure 4. U.S.home bias in common stock



Home bias estimates from equation (1):

$$1 - \frac{\frac{(holdings\ of\ foreign\ equity)}{(total\ equity\ portfolio)}}{\frac{(foreign\ equity\ market\ cap)}{(world\ equity\ market\ cap)}}$$

for alternative measures of holdings of foreign equity.

Table 1. Descriptive statistics, U.S. investor country-level relative portfolio weights

Portfolio weight	Residence Basis	Nationality Basis	Revenue-Exposure Basis
Mean	0.248	0.238	0.570
Standard deviation	0.240	0.206	0.188
Minimum	0.001	0.001	0.081
Median	0.203	0.205	0.554
Maximum	1.570	1.435	1.370
N	861	861	861
Correlation with Nationality	0.915		
Correlation with Revenue-Exposure	0.419	0.373	

Table reports statistics on relative portfolio weights from equation (2):

$$\frac{\frac{(holdings\ of\ country\ i\ equity)}{(total\ equity\ portfolio)}}{\frac{(country\ i\ equity\ market\ cap)}{(world\ equity\ market\ cap)}}$$

for alternative measures of holdings of foreign equity over 2004-2017.

Table 2. Factors driving U.S. investor country-level relative portfolio weights

	1		2		3	
Portfolio weight	Residence basis		Nationality basis		Revenue-exposure	
Internet use	0.002 **	(0.001)	0.001 **	(0.001)	0.001	(0.001)
English as official language	0.154 ***	(0.041)	0.135 ***	(0.035)	0.007	(0.051)
Common legal framework	0.009	(0.035)	-0.006	(0.031)	0.018	(0.048)
Distance	-0.102 **	(0.043)	-0.111 **	(0.044)	-0.107 ***	(0.041)
Listed companies	0.000	(0.014)	-0.001	(0.013)	-0.032 **	(0.014)
Lagged GDP growth	-0.002	(0.003)	-0.004 *	(0.002)	-0.005 *	(0.003)
Consumer sector share of country market	0.227 **	(0.103)	0.068	(0.084)	0.541 ***	(0.207)
Industrial sector share of country market	0.147 **	(0.058)	0.199 ***	(0.055)	0.198	(0.157)
Financial center	0.437 ***	(0.132)	0.312 **	(0.122)	0.142 **	(0.068)
Constant	0.905	(0.399)	1.022	(0.424)	1.521 ***	(0.458)
N	861		861		861	
F(9, 75)	11.15		17.75		6.12	
Prob > F	0		0		0	
R^2	0.555		0.457		0.310	

$^{*}\ p < 0.10,\ ^{**}\ p < 0.05,\ ^{***}\ p < 0.01$

Table reports estimates of β from equation (3):

$$Relative\ Portfolio\ Weight_{i,t} = \alpha_i + \boldsymbol{\beta X}_{i,t} + \varepsilon_{i,t}$$

Robust standard errors clustered at the country level in parentheses. Estimates from 2004-2017.

Table 3. Divers of U.S. investor country-level relative portfolio weights, revenue-exposure basis

	1		2		3	
Internet use	0.001 *	(0.000)	0.001 **	(0.000)	-0.001	(0.001)
English as official language	0.063 **	(0.026)				
Common legal framework	-0.013	(0.022)				
Distance	-0.050 ***	(0.019)				
Listed companies	-0.001	(0.007)	-0.020	(0.020)	-0.009	(0.014)
Lagged GDP growth	-0.004 ***	(0.001)	-0.001	(0.001)	0.000	(0.001)
Consumer sector share of country market capitalization	0.314 ***	(0.101)	0.373 ***	(0.129)	0.254 *	(0.149)
Industrial sector share of country market capitalization	0.242 ***	(0.082)	0.262 ***	(0.090)	0.141	(0.119)
Financial center	0.109 **	(0.052)				
Share of sales revenue from U.S. firms	1.622 ***	(0.125)	1.322 ***	(0.174)	1.674 ***	(0.253)
Constant	0.525 **	(0.209)	0.213	(0.170)	0.141	(0.137)
N	861		861		861	
	F(10, 75):	55.7	F(6,75):	53.99	F(18,75):	74.68
Prob > F	0		0		0	
R^2	0.765					
R-sq:						
within			0.605		0.734	
between			0.730		0.690	
overall			0.690		0.674	
Country fixed effects	no		yes		yes	
Year fixed effects	no		no		yes	

$^{*}\ p < 0.10,\ ^{**}\ p < 0.05,\ ^{***}\ p < 0.01$

Table reports estimates of β from equation (3):

$$Relative\ Portfolio\ Weight_{i,t} = \alpha_i + \boldsymbol{\beta X}_{i,t} + \varepsilon_{i,t}$$

Robust standard errors clustered at the country level in parentheses. Estimates from 2004-2017.

Appendix A: Description of the geographic segment allocation for firm sales

For each geographic segment provided for location of sales revenue, we calculate the share of total sales revenue attributable to that segment, and then use each share to allocate market capitalization exposures and U.S. portfolio exposures. When geographic segments list individual countries, we assign sales shares to that particular country. When geographic segment data lists regions or combinations of countries, we allocate across countries by GDP shares. If no geographic segment data is listed, we assume all sales are domestic. When sales data is missing in one year, we use the prior year sales shares.

Appendix B: Control variables used in the relative weight estimation

	Mean	Standard Deviation
Internet use: Percentage of individuals using the internet in country i in year t. Source: WDI database.	53.53	27.27
English as official language: Dummy variable indicating whether country i shares an official language with the US. Source: CEPII's Language database .	0.25	0.43
Common legal framework: Dummy variable indicating whether the country has shared legal origins with the US.	0.30	0.46
Distance: Log of geographic distance between New York City and the largest city in country i	9.10	0.40
Listed companies: log of the number of listed companies in country i in year t. Source: World Bank Financial Structure Database	6.98	1.39
Lagged GDP growth: country i's year-on-year GDP growth in year t-1.	3.54	3.70
Consumer sector share of country market capitalization: share of market capitalization from firms in apparel, food & beverages, health care, electronics, pharmaceutical, publishing, retail, recreation, or tobacco industries in country i at time t. Source: Authors' calculations from Worldscope data.	0.18	0.20
Industrial sector share of country market capitalization: share of market capitalization from firms in aerospace, automotive, chemical, construction, electrical, machinery, oil and other commodities, paper production, transportation, and utilities industries in country i at time t. Source: Authors' calculations from Worldscope data.	0.53	0.24
Financial center: Dummy variable for countries Bahamas, Bermuda, British Virgin Islands, Cayman Islands, Curacao/Netherlands Antilles, Ireland, Luxembour, Netherlands, and Switzerland.	0.08	0.27
Share of sales revenue from U.S. firms: share of total sales reported by U.S. (by nationality) firms in country i at time t. Authors' calculations from Worldscope data.	0.17	0.09

Globalization and the Reach of Multinationals: Implications for Portfolio Exposures, Capital Flows, and Home Bias

by Carol Bertaut, Beau Bressler, and Stephanie Curcuru
Federal Reserve Board and U.C. Davis

Banco de España-BIS-ECB Conference on External Statistics

February 12-13, 2024

Challenges with official balance-of-payments, IIP statistics

- Increased efforts to provide more information on "exposures"
- Several post-GFC data gaps:
  - Improvements to IMF CPIS: increased coverage, frequency, sector of issuer/holder
- The problem:
  - BOP framework uses **legal residence** (country of incorporation)
  - Legal residence may not provide useful information on exposures
  - Not a new problem, but getting worse

Growing problem reflects increasing globalization

Multinationals and globalization more generally are contributing to growing problem:

- Multinationals incorporate in low-tax countries
- Emerging market firms issue debt out of financing arms in offshore centers for improved market access
- Investment funds incorporate in financial centers

Awareness is growing

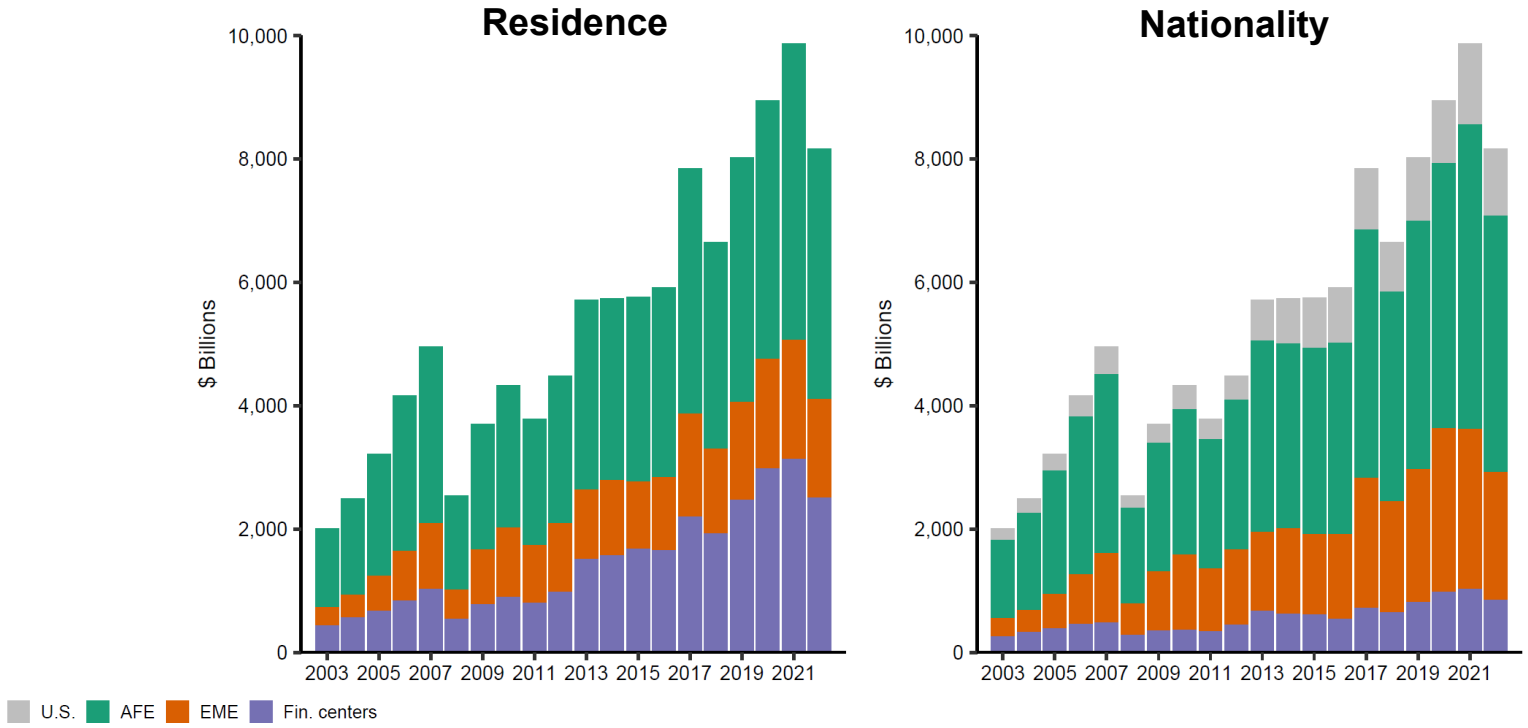
- BIS produces international debt securities on both residence & nationality basis
- Recent papers address distortions:
  - Lane & Milesi-Ferretti (2018): financial center intermediation
  - Avdjiev, Everett, Lane, Shin (2018): complexity of multinational firms and effect on economic statistics
  - Coppola, Maggiori, Neiman & Schreger (2019): restate cross-border investment positions based on global mutual fund allocations (about half of the US foreign holdings portfolio)
  - Beck, Coppola, Lewis, Maggiori, Schmitz & Schreger (2023): restate euro area investment positions by disentangling intermediation by euro area "onshore offshore financial centers"

Recasting US investor exposures

- Bertaut, Bressler and Curcuru (2019)
  - Exploit our access to underlying security-level data on U.S. foreign portfolio investment
  - Combine security-level data with commercial data sources (MSCI) for country assignments
  - Recast portfolio holdings to reflect how standard investment benchmarks view country exposures
    - TIC Team at the Federal Reserve Board produces residence to nationality reallocation as a standard policy product
    - annually updated files are available on Board's website at link to our FEDs note as well as Treasury's TIC website

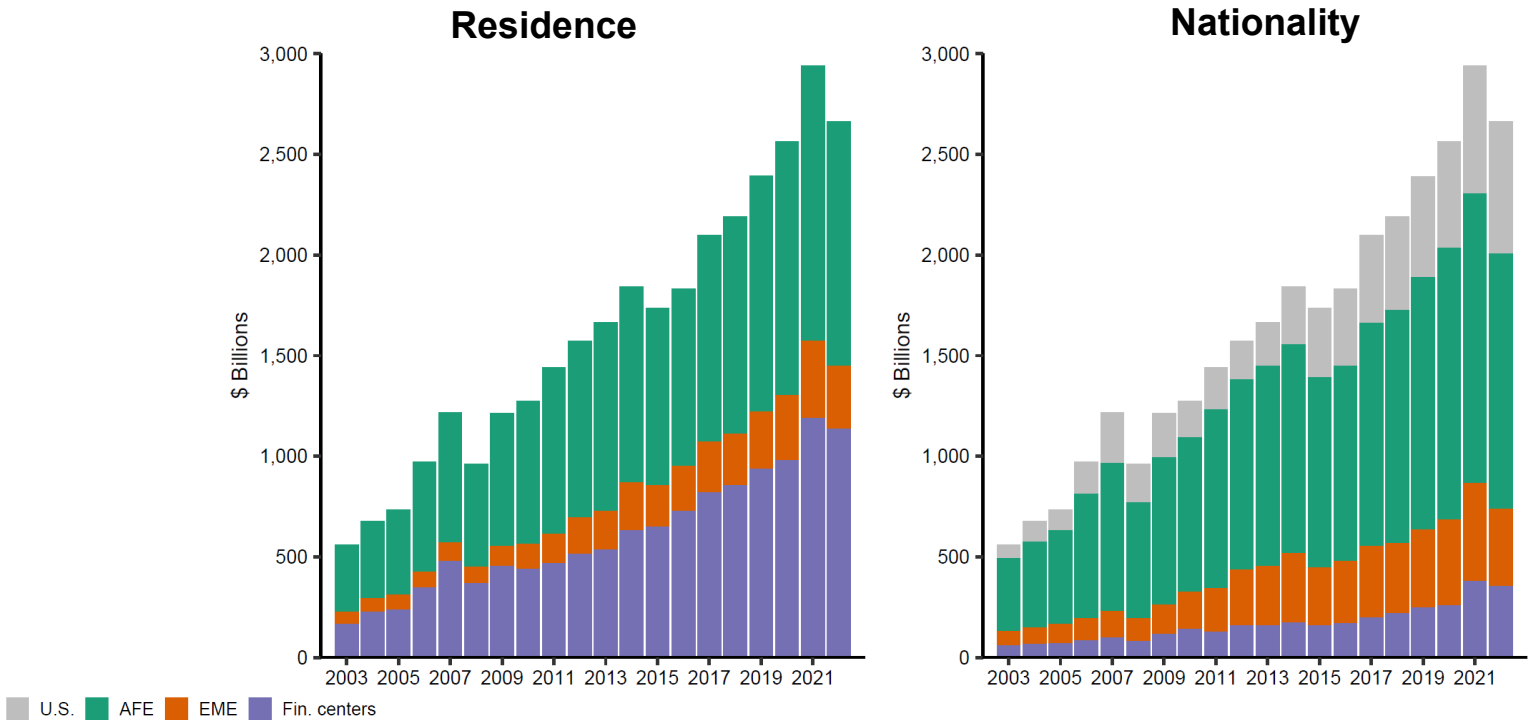
Common stock reallocations

- Reallocation to US: multinationals incorporated abroad; includes high-profile US corporate “inversions” in Ireland
- Reallocation to EMEs: includes large-cap Chinese firms incorporated in the Caymans



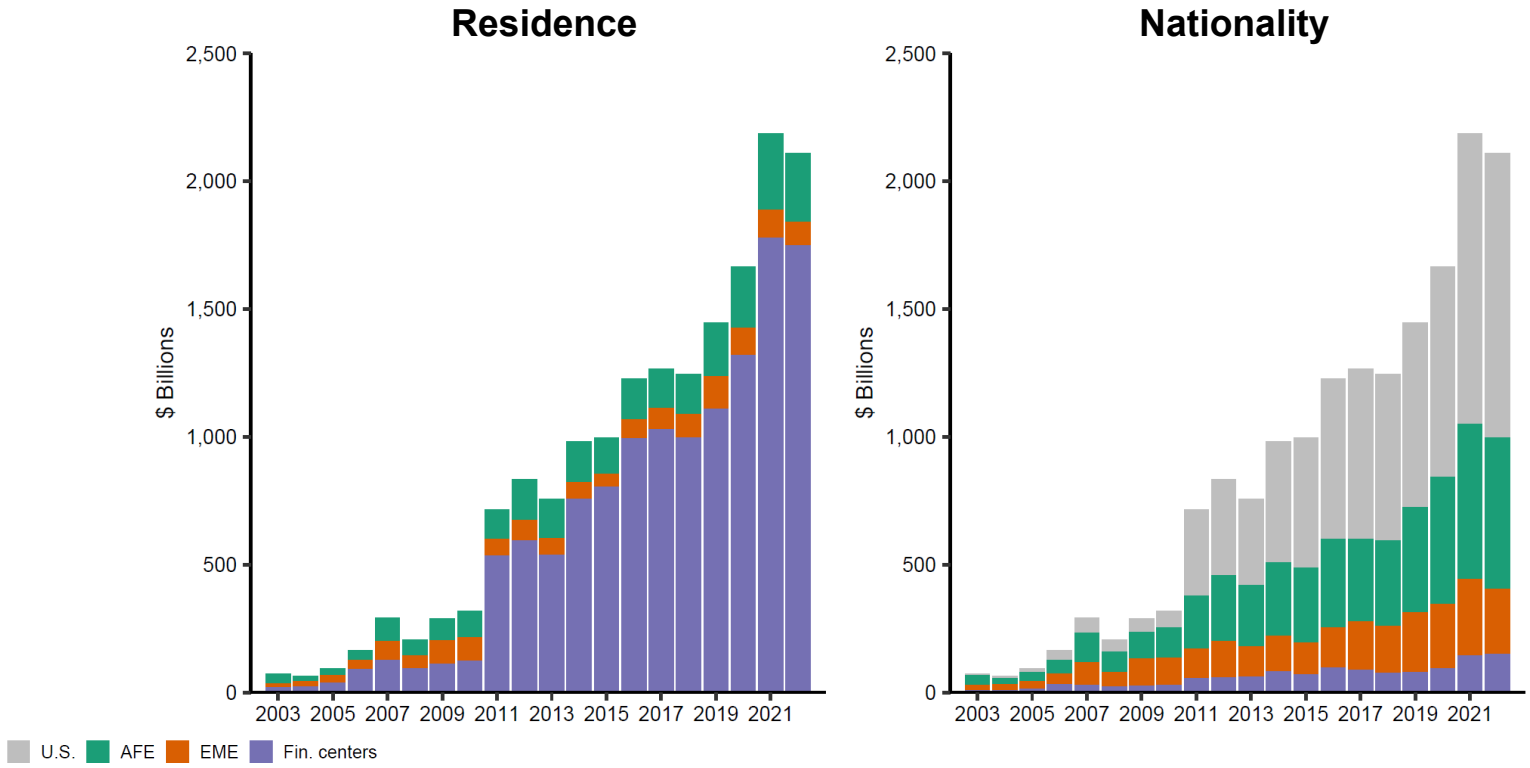
Corporate bond reallocations

- Reallocation to US: primarily from SPVs in the Caymans issuing CLOs, other ABS
- Reallocation to EMEs: bonds issued via financing vehicles in offshore centers



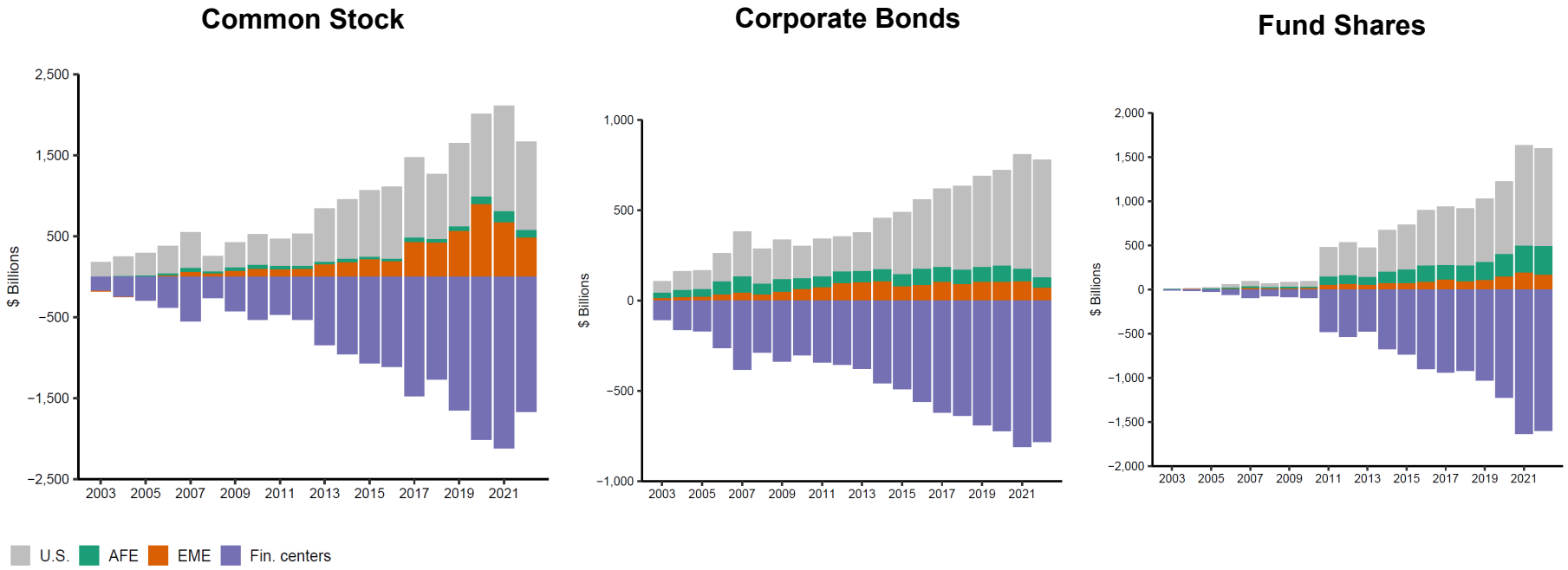
Fund share reallocations

- Reallocation based on “mirror data”: holdings reported for fund industries in financial centers



Overall distortions in US portfolio are large

- Roughly $4 trillion (30 percent) of U.S. cross-border holdings in 2022 ends up getting reallocated to a different country
- In aggregate, EME holdings are ~ 30 % higher

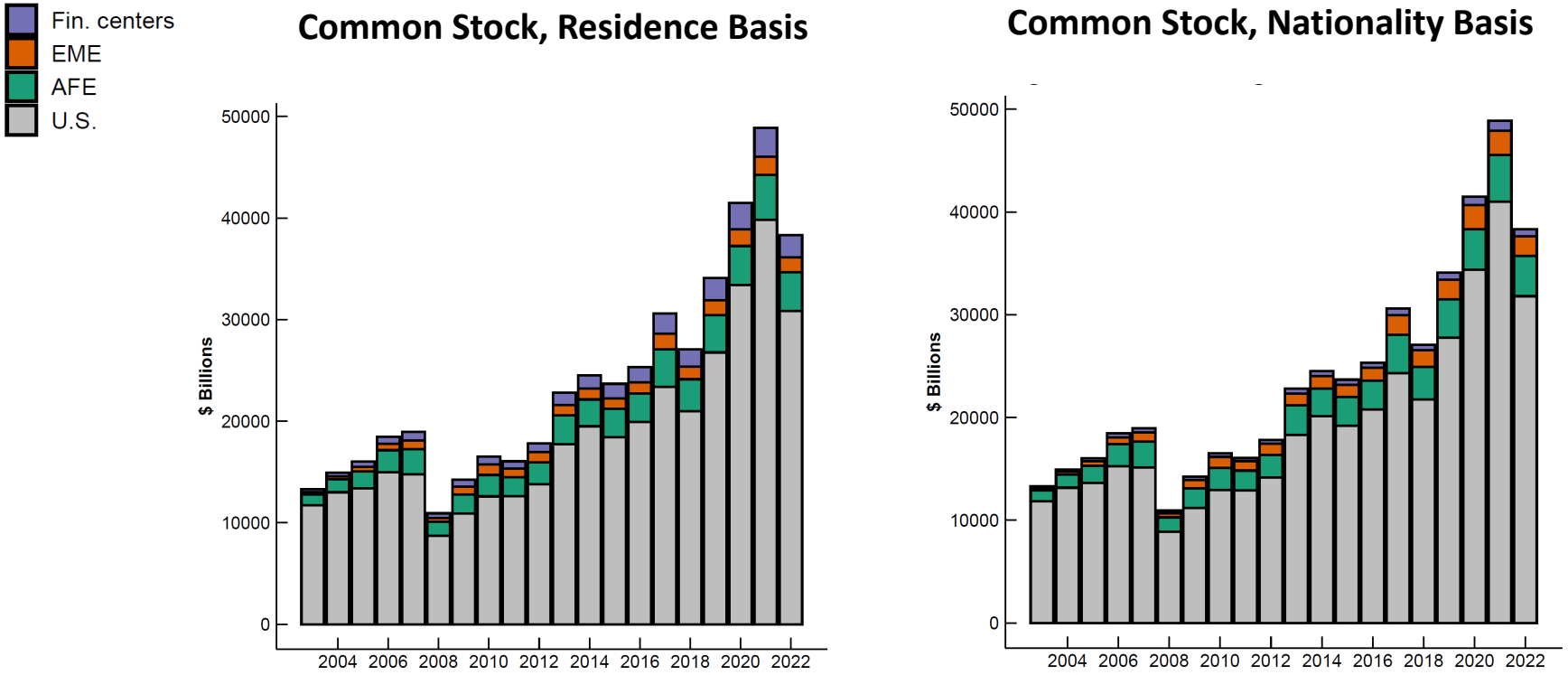


Global portfolios are similarly distorted

- Portfolio distortion is a global phenomenon
- Difficult to assess:
  - drivers of portfolio allocations and capital flows
  - resilience of different types of capital flows
  - effectiveness of capital controls
  - components of and sustainability of current account
  - spillovers of monetary policy
  - many other issues

Broader measure of “exposure”

- Nationality may be improvement over residence, but does it fully capture investor exposures to other countries?
- Bulk of US portfolio is domestic securities, including of US multinationals



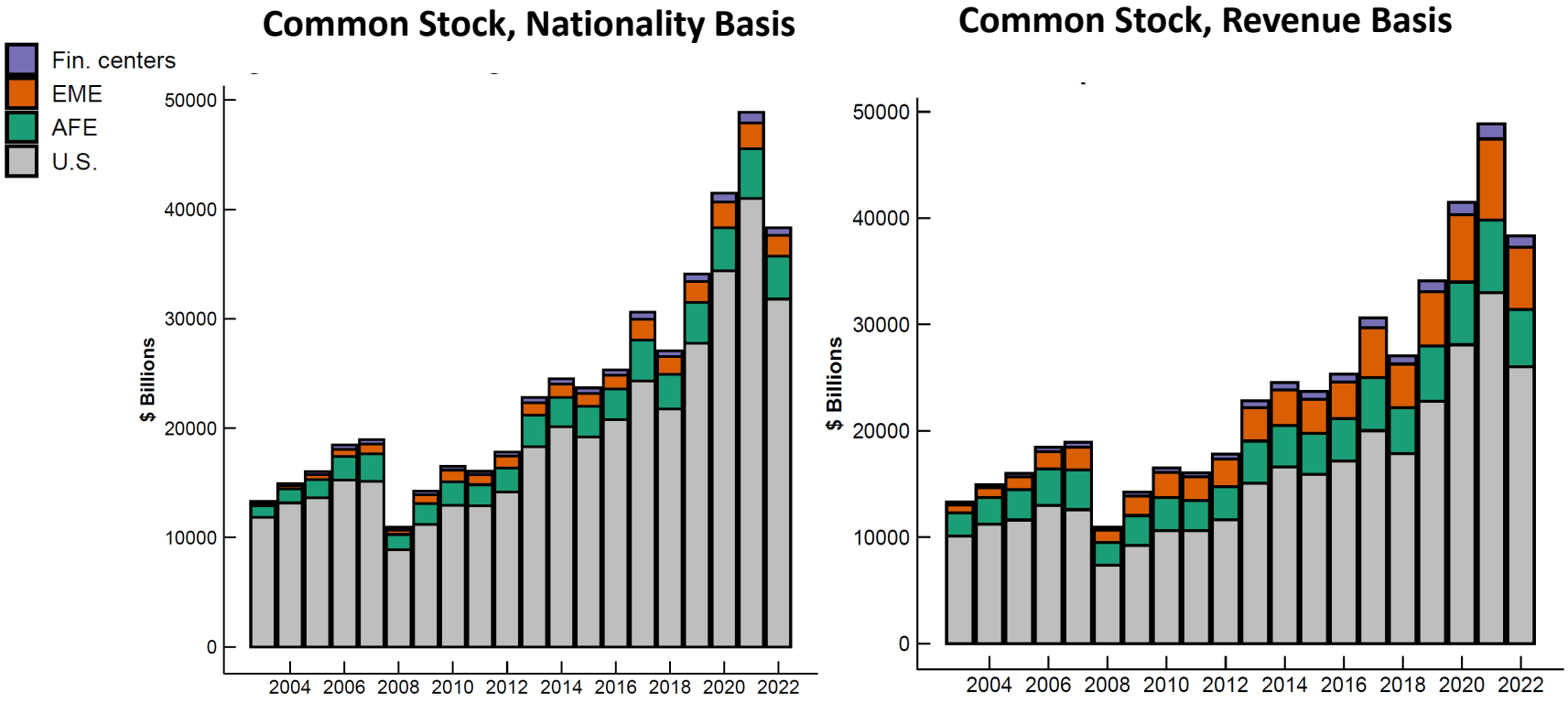
Nationality to revenue-exposure

Bertaut, Bressler, Curcuru (2020, 2021): Nationality to revenue-exposure remap:

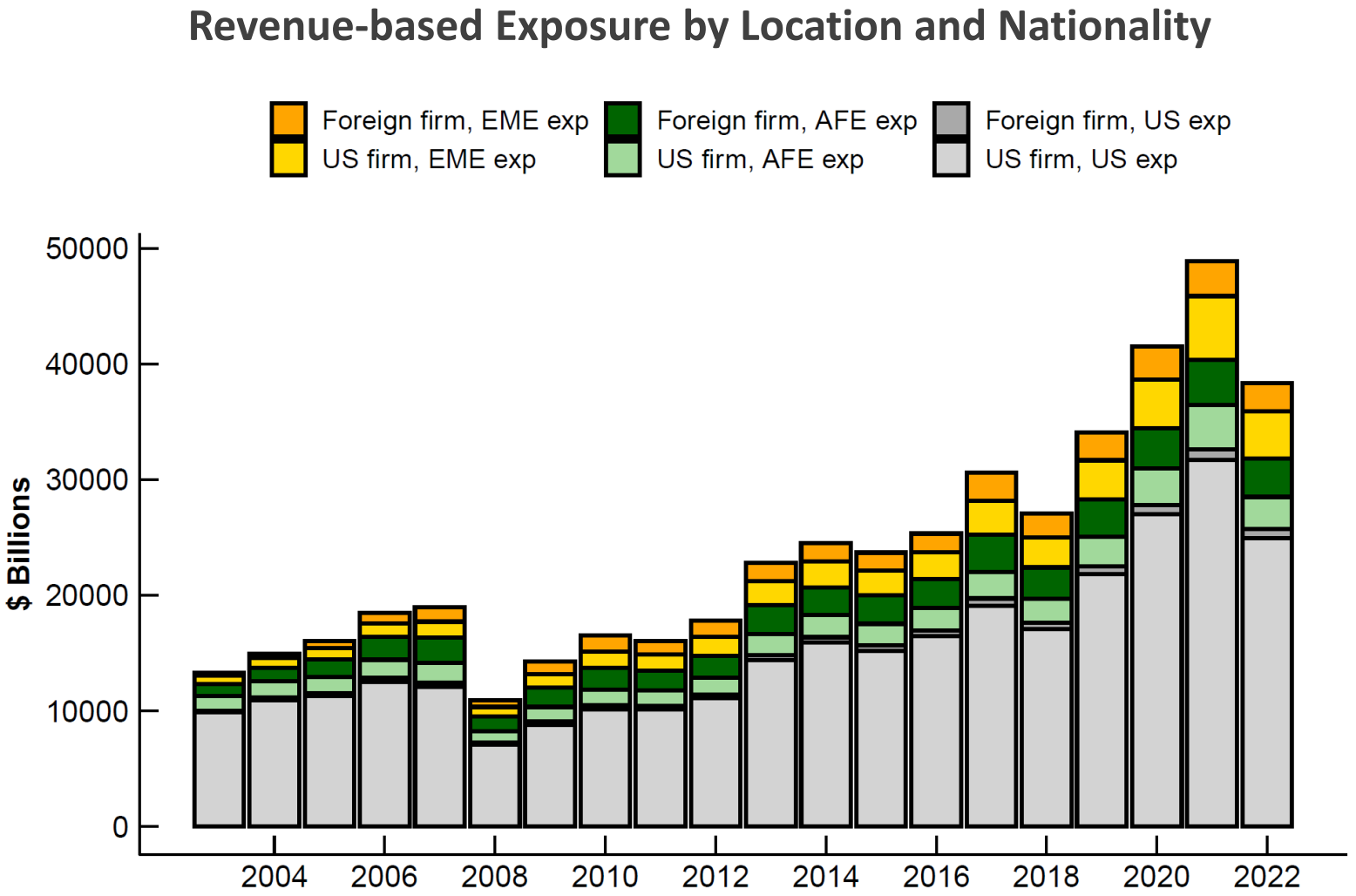
- US investors have substantial exposure to rest of the world through global activities of US multinational firms
- Foreign multinationals are likewise active around the globe
- Match security-level stock holdings (US & foreign) to Refinitiv Worldscope firm-level data
- Use geographic sales revenue information reported in firm disclosures to distribute holdings by country of revenue exposure
  - Very good coverage for US firms (reporting requirement)
  - Good coverage for foreign firms that list on US exchanges

Broader measure of “exposure”

- Revenue basis roughly doubles foreign exposure for US investors
- Exposure to emerging markets comparable to advance economies, in large part because of activities of multinationals



Indirect foreign exposure as large as direct exposure



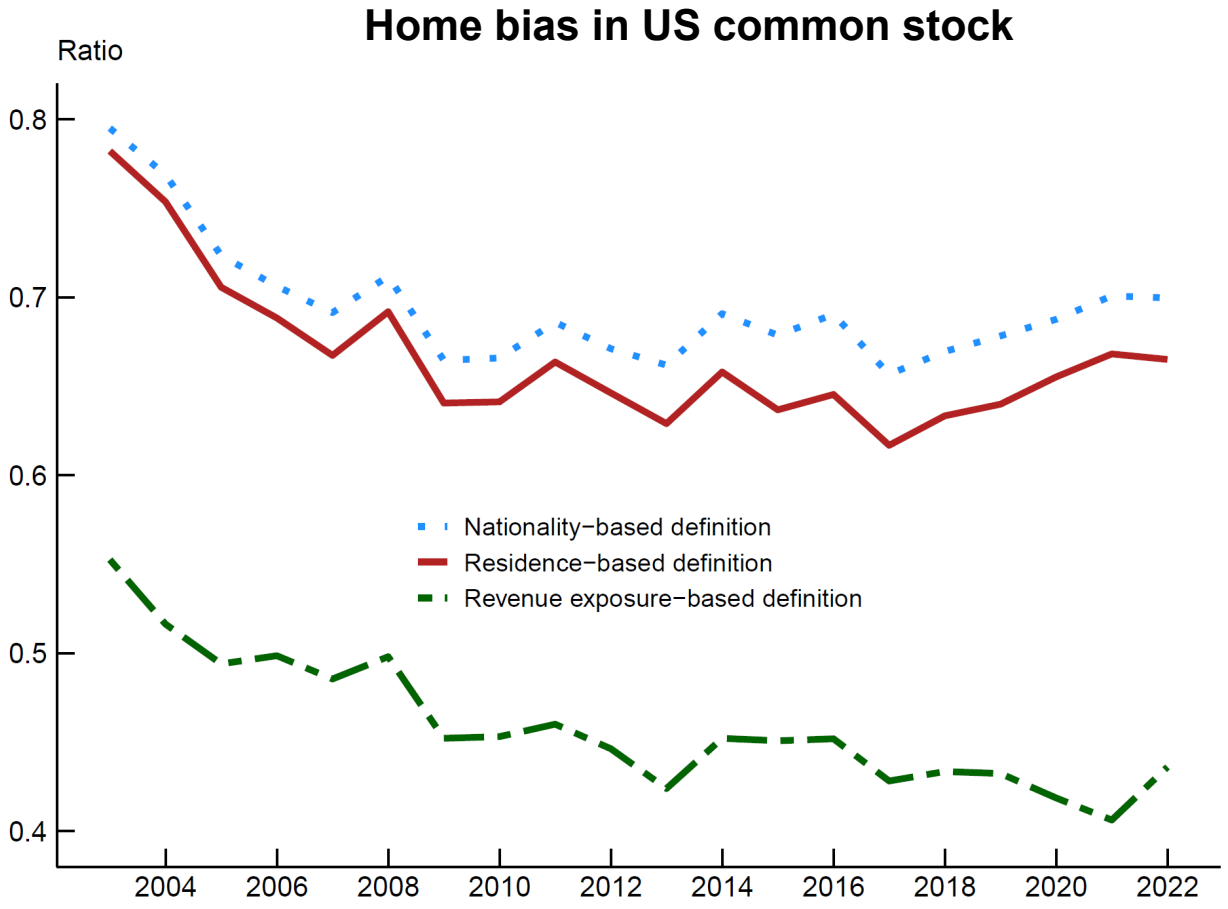
Our findings have implications for "Home Bias"

- ICAPM: in frictionless world, global investors should hold market cap in portfolio:

$$Home\ Bias = 1 - \frac{\frac{(holdings\ of\ foreign\ equity)}{(total\ equity\ portfolio)}}{\frac{(foreign\ equity\ market\ cap)}{(world\ equity\ market\ cap)}}$$

- But investors don't: widespread "home bias"
  - Literature: frictions, hedging costs, market access, information advantages of home country firms
- Country allocation of equity holdings and market cap will affect these calculations

Dramatically different home bias estimates across measures



- **Residence basis:**
  - high home bias; trended down since 2003 but some reversal
- **Nationality basis:**
  - higher home bias, less pronounced trends
- **Exposure basis:**
  - Much lower level of home bias, more stable

Drivers of home bias depend on the measure

- Econometric exercise to compare drivers of US country bias in common stock using different data constructions (residence, nationality, revenue exposure) in standard gravity model
- Very different results for importance of factors such as distance & trade links; common language, access to information
- Has implications for conclusions we draw for drivers of investor allocations
- Ongoing work: exploit match to firm level data to allow for richer exploration of firm characteristics in determining portfolio allocations

Conclusions

- Cross-border statistics are increasingly distorted
- Our results are based on US investors & US portfolios, but global portfolios will be similarly affected
- Our findings have important implications for any work in international finance which relies on these data
- Better exposure measures could possibly change our understanding of the drivers of capital flows, exchange rate movements, and global asset returns more generally