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Francis E. Warnock

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Abstract: That foreign equities are underweighted but overtraded has become a stylized fact of international finance. Since stylized facts drive research, theoretical models have been developed to explain the puzzling coexistence of home bias and high turnover, and researchers have dismissed transaction costs as a plausible explanation of home bias. I show, however, that part of the puzzle—very high turnover rates on foreign equity portfolios—is based on inaccurate estimates of cross-border holdings. Foreign turnover rates calculated using information from comprehensive benchmark surveys on cross-border holdings are much lower than previously reported and comparable to domestic turnover rates. Thus, researchers should no longer develop theoretical models to explain the coexistence of home bias and high turnover, and the relationship between transaction costs and home bias warrants reexamination. On the latter point, the basic intuition from Tesar and Werner (1995) that transaction costs do not help explain the observed home bias is confirmed using actual data on transaction costs in 41 markets.

JEL Classification: G15, G11
Keywords: transaction costs, international portfolio diversification, foreign equity holdings

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1. Introduction

It is well known that foreign equities comprise only a small portion of investors' portfolios. For example, as shown in Figure 1(a), foreign equities are now about 12 percent of U.S. investors' equity portfolios, a substantial increase from their one percent share two decades ago, but far smaller than their relative size in world market capitalization. Figure 1(b) condenses this information into a measure of equity home bias, defined as one minus the ratio of the share of foreign equities in the U.S. and world portfolios. As the graph shows, the home bias in U.S. equity portfolios has decreased substantially over the past two decades, but remains quite high.[1]

This paper focuses on another stylized fact of international finance, the high turnover rates on foreign equity portfolios, attributable to the striking evidence presented in Tesar and Werner (1995). In particular, Tesar and Werner showed that in 1989 Canadians turned over their foreign equity portfolio ten times faster than their domestic equity portfolio, and that U.S. residents turned over their foreign portfolio more than twice as fast as their domestic portfolio. This created a new puzzle for the theory of international portfolio choice, and ruled out high transaction costs associated with trading foreign securities as a plausible explanation of home bias.

The Tesar-Werner findings on foreign turnover rates have been extremely influential. Their evidence against the plausibility of transaction costs as a factor in home bias is cited as reason to dismiss transaction costs in a discussion of models incorporating barriers to international investment by Kang and Stulz (1995), and by Brennan and Cao (1997) in motivating a portfolio flow model with information asymmetries. Not surprisingly, since stylized facts drive research, models are now designed to produce high turnover on cross-border positions. For example, the home bias and high turnover puzzle led to Rowland

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[1] See Lewis (1999) for an excellent survey of the home bias literature.

(1999), a model designed explicitly to address the puzzle, and figures prominently in Coval (1999) and Guidolin (2001).

The Tesar-Werner findings, however, were based on data published before reliable cross-border holdings data were available. Estimates of cross-border positions—the denominator in the turnover rate on foreign holdings—were constructed from cumulated capital flows and estimated valuation adjustments. However, as shown in Warnock and Mason (2001), capital flows data are poorly designed for estimating positions in foreign securities. Since a large component of the position is due to past valuation adjustments, and returns can vary substantially across markets, the geography of the flows are a vital component of holdings estimates. But this is exactly where the capital flows data fail us, because they capture only the country the transaction goes through, not the country of the issuer.

Comprehensive benchmark surveys of residents' holdings of foreign equities, available for a handful of countries, show the inaccuracies of past holdings estimates. The United States was one of the first countries to conduct a benchmark survey in the post-war period when it did so in 1994.[2] Based on the results of that survey, the Bureau of Economic Analysis (BEA) increased their end-1993 estimate of U.S. holdings of foreign equities by $241 billion, or 80 percent. Such underestimations led to the Tesar-Werner result. Once estimates based on benchmark survey data are used, foreign turnover rates decrease substantially and are roughly comparable to domestic turnover rates. This is shown for the United States and Canada for 1989, the year of the Tesar-Werner data, in the next section, and for 1997, the year of the IMF-led Coordinated Portfolio Investment Survey (CPIS), in Section 3.

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[2] France and Austria began conducting such surveys in the early 1990s. The United States conducted its first benchmark survey of holdings of foreign securities in 1943, 51 years before its second.

While the results presented in the next two sections should dispel the high turnover part of the puzzle, they do not speak to the larger question of whether the observed home bias is due to high transaction costs. In Section 4, using actual transactions data for 41 countries, the answer seems to be no: Transaction costs are not directly related to home bias. Section 5 concludes.

2. The Tesar-Werner Turnover Results Revisited

Tesar and Werner present three turnover measures. *Domestic turnover* is the ratio of annual transactions on a market to its capitalization. The *turnover rate in foreign equity held by domestic residents* is the ratio of annual transactions in foreign equities to the investment position in foreign equities. Similarly, the *turnover rate in domestic equity held by foreigners* is the ratio of foreigners' annual transactions in domestic equities to their holdings of domestic equities. We focus on the first two measures.

Table 1 shows the impetus for this paper, the original Tesar-Werner turnover rates for 1989 (Panels A and B). The table also shows 1989 turnover rates formed using more up-to-date estimates of cross-border holdings (Panel C). The finding that domestic residents turn over their foreign equity portfolios much faster than their domestic portfolios was clearly due to erroneous holdings estimates. The foreign turnover rate for U.S. investors falls in half to 1.18 using revised data, and that for Canadian investors falls dramatically from 7.7 to 0.83.[3] In both cases, the sharp drop in the turnover rate was due to large upward revisions in estimates of foreign equity holdings. For the United States, these holdings estimates were more than doubled, from $92 billion, reported by Tesar and Werner, to $197 billion. For

[3] Our foreign turnover rates are comparable to those on Korean equities that are implied by summary statistics presented in Choe, Kho, and Stulz (1999).

Canada, the revisions are even more startling, with revised estimates approximately ten times that reported in Tesar and Werner.

The point of this paper is not to fault Tesar and Werner or the international investment position (IIP) data they used. The fact is, at least in the United States and likely elsewhere, capital flows data are ill-suited to estimate positions in foreign equities. The geography is confounded, with far too many transactions going through financial centers, making valuation adjustments—an important component of holdings estimates—guesswork. Short of redesigning the portfolio flow data to capture the foreign country in which the security was issued instead of the country through which the trade was made, accurate estimates of foreign equity positions can only be obtained through comprehensive, benchmark surveys.[4]

That said, the estimates of foreign holdings presented in the bottom panel of Table 1 are not directly from benchmark surveys. The U.S. number is what the BEA now thinks—with the benefit of information from the 1994 U.S. benchmark survey—U.S. holding of foreign equities amounted to in 1989. The survey gave a value as of March 1994; the end-1989 value, calculated by carrying backward position estimates, is an estimate.[5]

The Canadian number is also an estimate. Ironically, it is probably more accurate than the U.S. number because the Canadian authorities formed it with the benefit of the 1989 U.S. benchmark survey of foreigners' holdings of U.S. securities. According to that survey, the market value of Canadian holdings

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[4] Total foreign holdings of *domestic* securities, but not the country-level detail, can be accurately estimated using capital flows data because the valuation adjustment does not depend on correctly identifying the source country of the transaction. That is, whether the purchase originated in the United Kingdom or Germany, a price index for U.S. securities will be used.

[5] See Bach (1997) for a description of the revisions to the U.S. IIP due to the 1994 benchmark survey.

of U.S. stocks at end-1989 was $44 billion, or about C$51 billion. Until 1997, Canadian IIP data for Canadian holdings of foreign stocks were reported only at book value. According to these amounts, the book value of Canadian holdings of non-U.S. foreign equities totaled almost C$5 billion, or, based on a 2.87 price-to-book ratio for non-U.S. securities, about C$14 billion in market value. My estimate of C$65 billion is the market value of Canadian holdings of U.S. equities (given by the U.S. benchmark survey and published by Statistics Canada) plus the market value of Canadian holdings of non-U.S. foreign equities (computed using the book value and price-to-book ratio).[6]

To restate, using information from U.S. benchmark surveys of cross-border holdings, the 1989 turnover rates on the Canadian and U. S. foreign equity portfolios fall sharply from 7.7 and 2.5 to 0.8 and 1.2, respectively. In the next section, more recent turnover rates are examined.

3. Turnover Rates Based on the 1997 CPIS

At the end of 1997, twenty-nine countries participated in the IMF-led Coordinated Portfolio Investment Survey (CPIS), conducting simultaneous surveys to determine their residents' holdings of foreign securities.[7] For many of these countries, this marked a first attempt: Only one-third had previously reported an IIP statement.

Data collection approaches varied by country. The main choices countries had to make were whether to (i) conduct the survey at the aggregate or security-by-security level, (ii) survey end-investors

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[6] Treasury Department (1998), a write-up of the 1994 Survey of Foreign Holdings of U.S. Securities, also contains data from the 1989 U.S. survey. See *Canada's International Investment Position* (1995) for the 1989 Canadian data. The price-to-book ratio corresponds to the MSCI (World ex US) Index.

[7] See IMF (2000) for a discussion of the coordinated surveys.

or custodians, and (iii) make participation in the survey compulsory or mandatory. Surveying custodians (if domestic custodians exist), rather than just large end-investors, provides greater coverage of households' holdings (and retail holdings, in general), while a security-by-security survey is likely to provide more reliable estimates than an aggregate survey. Countries that took the aggregate approach asked the respondents to write down holdings by country. In contrast, in the security-by-security approach, respondents provide security-by-security data on holdings. National authorities then cross-check the data to determine the accuracy of the value and country-attribution of reported positions.

Most countries took an aggregate approach. Of those who conducted security-by-security surveys, very few included data from custodians and obtained commercial databases to aid in their cross-checks. Of those that did, to my knowledge only two, Canada and the United States, also report transactions data (gross purchases and gross sales) in foreign equities, which are necessary to compute turnover rates.

For these two countries—the same two analyzed by Tesar and Werner—Table 2 shows turnover rates on domestic and foreign equity portfolios for 1997. As the top panel of the table shows, domestic turnover rates are low on the Toronto and New York Stock Exchanges, but quite high on the Nasdaq. Panel B shows that while Canadians turned over their foreign equity portfolio 2.1 times in 1997, this was due to a high turnover rate (3.3) on their portfolio of U.S. equities; their turnover rate on non-U.S. foreign equities is under one. U.S. investors turned over their foreign equity portfolio 1.3 times in 1997, comparable to their 1989 turnover rate. Thus, the table shows that investors may well turn over their

foreign portfolios slightly faster than their domestic portfolios, but it also highlights the fact that turnover rates vary greatly across stock exchanges.[8]

4. But Do Transaction Costs Matter?

We have shown that turnover rates on foreign equity portfolios are much lower than previously reported. The question remains, however, whether transaction costs can explain the observed home bias in equity holdings. Recently, researchers have investigated this question using a direct measure of transaction costs faced by institutional investors across many countries. The measure, compiled for markets in 42 countries by Elkins-McSherry Co. and analyzed in Domowitz, Glen, and Madhaven (2000) and Willoughby (1997), is comprised of three components: commissions, fees, and market impact costs. Market impact costs, or liquidity costs, are intended to measure the deviation of the transaction price from the price that would have prevailed had the trade not occurred. In practice, impact costs are measured as the deviation of the transaction price from day's average price; see Willoughby (1998) for a discussion.

Results in Domowitz et al. (2000) suggest that transaction costs cannot explain the home bias in U.S. equity portfolios. Using cost-adjusted returns instead of unadjusted returns tilts the composition of a U.S. investor's global efficient portfolio from North America (which includes the relatively high cost Nasdaq) towards Europe and Latin America, indicating that incorporating costs makes the observed home bias even more of a puzzle.

Rather than working with cost-adjusted returns, Ahearne, Griever, and Warnock (2000) use data from the 1997 benchmark survey of U.S. holdings of foreign equities—the same data used in calculating

[8] Note that the turnover rate for Nasdaq is not directly comparable with the rates for the NYSE and TSE because it is compiled in a different manner; see www.fibv.com.

the turnover estimates in Table 2—to investigate the relationship between transaction costs and home bias. For 41 foreign countries, Figure 2 plots the Elkins-McSherry measure of transaction costs for 1997 (normalized so that costs in the highest cost country, Korea, equals one) against the country's underweighting in U.S. investors' portfolios, where underweighting (or bias) is defined relative to the foreign country's share of worldwide market capitalization. As the figure shows, it is difficult to discern a simple bilateral relationship between trading costs and the measure of bias.

While no direct evidence between transaction costs and home bias exists, there may well be an indirect relationship. Since the NYSE is one of the lower cost exchanges in the world, one way firms from high cost countries can alleviate trading costs in their stocks is by listing on the NYSE, as in the model of Martin and Rey (2000).[9] The general result from Ahearne et al. (2000) is that countries whose firms tend to list on U.S. exchanges are less underweighted in U.S. portfolios. This listing effect is greater for high transaction cost countries, suggesting that transaction costs may well matter, albeit indirectly.

5. Conclusion

The Tesar-Werner home bias and high turnover puzzle, due to inaccurate published estimates of cross-border holdings, is not evident when more up-to-date and higher quality holdings data are used. Turnover rates on foreign equity portfolios are much lower than previously reported, but even so are roughly comparable to domestic turnover rates. New data on transaction costs confirm the main Tesar-Werner conclusion that transaction costs cannot explain the observed home bias.

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[9] See Alaganar and Bhar (2001) for evidence showing that Australian fund managers can lower costs by using ADRs rather than the underlying Australian stock.

Perhaps more important than the findings is the message that estimates of cross-border holdings can be incredibly inaccurate for the simple reason that, at least in the United States, capital flows data are designed to identify the country through which the transaction was made. With *inbound* transactions data—that is, foreigners' net purchases of *domestic* securities—this is not a major obstacle for estimating aggregate positions. To estimate aggregate foreign holdings of U.S. equities, for example, we do not need to know the country of the foreign investor. We should be less confident, though, when estimating bilateral holdings, such as German holdings of U.S. stocks. With *outbound* transactions data—that is, domestic residents' net purchases of *foreign* securities—the country of the issuer of the security is a vital piece of information when estimating aggregate holdings of foreign securities. Since capital flows data do not identify the country of the issuer, we cannot confidently choose a price index to revalue holdings.[10]

The good news is that more and more countries are committing to relatively frequent benchmark surveys of cross-border holdings using harmonized definitions. Twenty-nine countries conducted outbound surveys at the end of 1997. Over 75 countries are on board for an end-2001 survey.[11] Thereafter, it is quite possible that annual surveys will be conducted. Moreover, more countries will likely to be able to conduct a comprehensive, security-by-security survey, which, according to IMF (2000), should provide more accurate results.

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[10] Canada is able to identify its residents' transactions in U.S. securities. For all other countries, though, Canada presents transactions data based on the country of the transactor.

[11] See article in the IMF Survey (www.imf.org/external/pubs/ft/survey/2001/040201.pdf).

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Table 1. Turnover rates in international equities, 1989 ($US billions unless otherwise noted)

A. Domestic turnover rates (from Tesar and Werner, 1995)			
	Total transactions on domestic market (A)	Equity Market Capitalization (B)	Domestic Turnover (A/B)
Canada	117.8	290.1	0.61
US	3223.9	3027.1	1.07
B. Turnover rates in foreign equity held by domestic residents (from Tesar and Werner, 1995)			
	Transactions in foreign equity (C)	Investment positions in foreign equity (D)	Turnover rate (C/D)
Canada	43.1	5.6	7.7
US	232.8	91.7	2.5
C. Turnover rates in foreign equity held by domestic residents (updated data)			
	Transactions in foreign equity (C)	Investment positions in foreign equity (D)	Turnover rate (C/D)
Canada (C$ billion)	54.3	65.4*	0.83
US	232.8	197.4	1.18

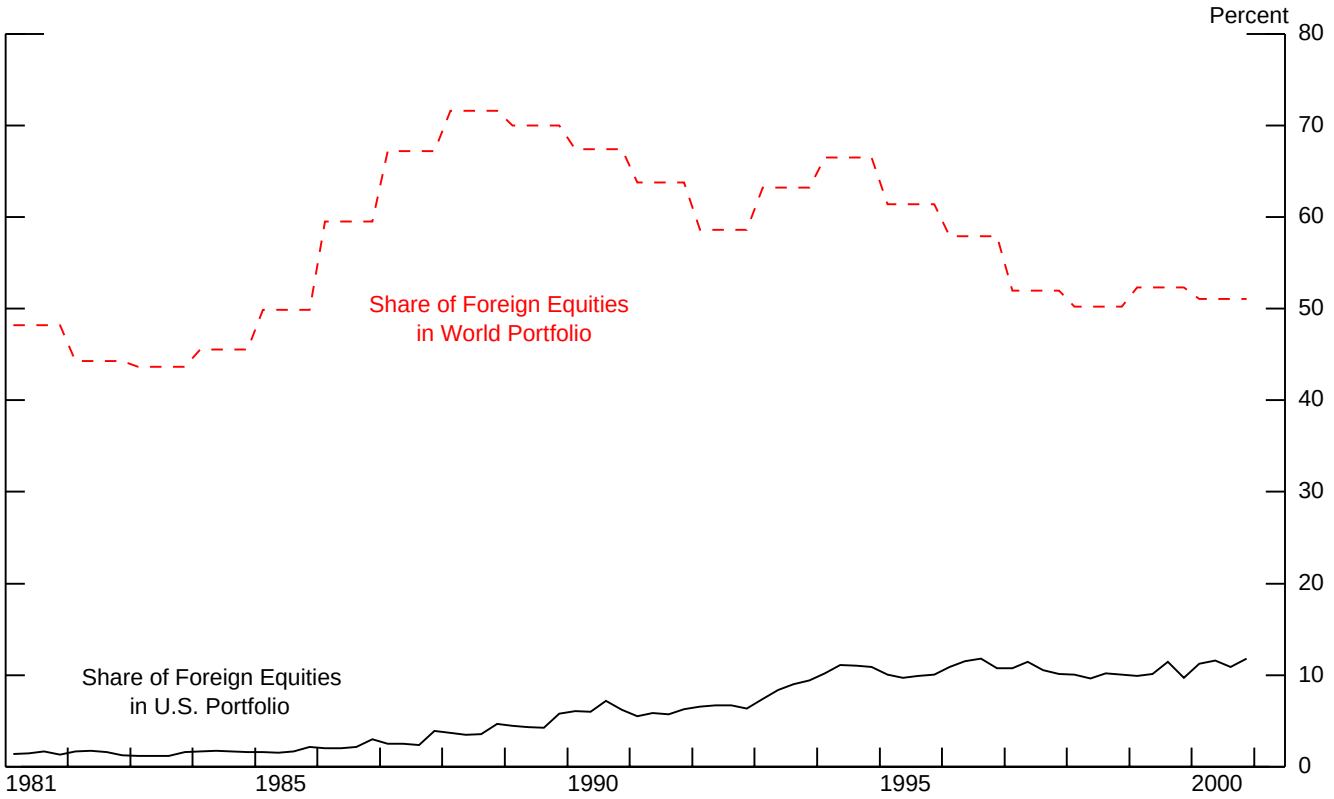
* Estimates for Canadian holdings of foreign equities for 1989 are the author's, based on data from the 1995 edition of *Canada's International Investment Position*. See text for complete discussion.

Table 2. Turnover rates in international equities, 1997 ($US billions unless otherwise noted)

A. Domestic turnover rates			
	Total transactions on domestic market (A)	Equity Market Capitalization (B)	Domestic Turnover (A/B)
Canada (Toronto)	305	568	0.54
US (NYSE)	5778	8880	0.65
US (Nasdaq)	4482	1726	2.60
B. Turnover rates in foreign equity held by domestic residents			
	Transactions in foreign equity (C)	Investment positions in foreign equity (D)	Turnover rate (C/D)
Canada (C$ billion)			
all foreign equities	317	149	2.13
in US equities	255	76	3.34
in non-US equities	62	72	0.86
US	1553	1208	1.29

Notes and Sources: **Panel A:** Data are from the FIBV (www.fibv.com) and are not directly comparable because Nasdaq computes turnover rates differently from NYSE or TSE. The latter exchanges count as turnover only those transactions which pass through their trading systems or which take place on the exchange's trading floor. Nasdaq includes in its turnover figures all transactions subject to supervision by the market authority (transactions by member firms, and sometimes non-members, with no distinction between on- and off-market and transactions made into foreign markets reported on the national market). Transactions include trading in foreign firms listed on these exchanges and thus overstate the turnover rates on domestic equities. Data for 1999 suggest that the degree of overstatement is quite small. **Panel B:** Canadian data are from *Canada's International Transactions in Securities* and *Canada's International Investment Position*; both are Statistics Canada publications. U.S. data are from www.treas.gov/tic/ and http://www.treas.gov/fpis/.

Figure 1(a): Share of Foreign Equities in World and U.S. Portfolios



Sources: International Finance Corporation, International Federation of Stock Exchanges, and Federal Reserve Board.

Figure 1(b): Home Bias

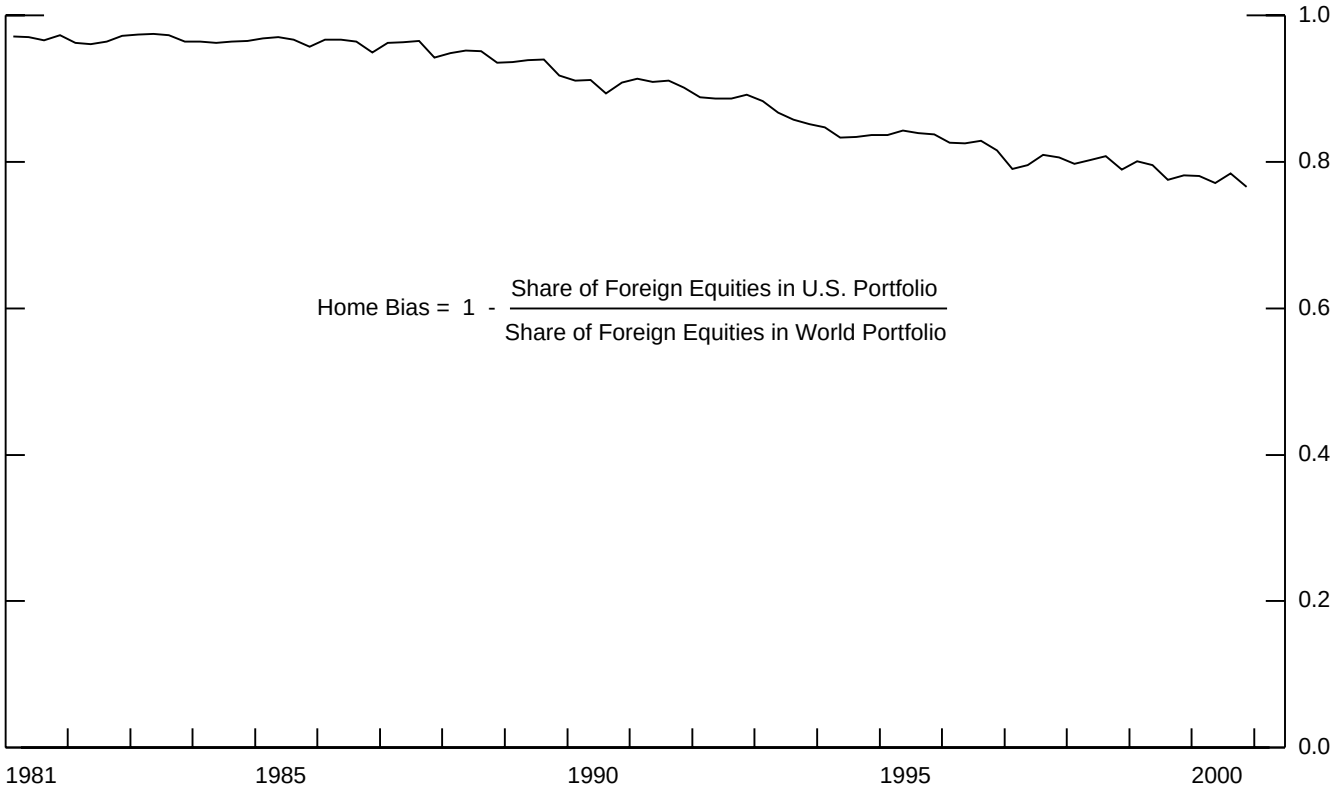
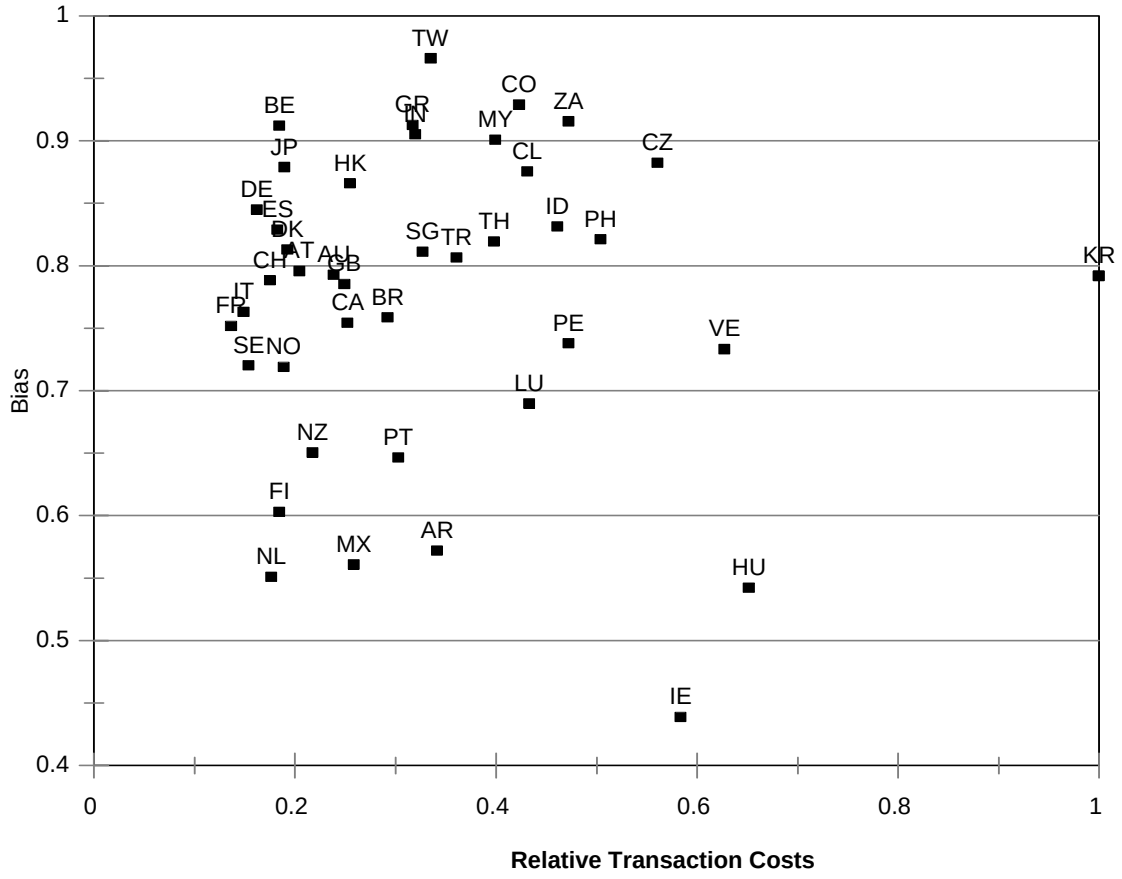


Figure 2: Relative Transaction Costs, 1997



Source: Ahearne, Griever, and Warnock (2000)
Note: Bias, or underweighting in the U.S. portfolio, is one minus the relative weight of a country's equities in the U.S. portfolio to its weight in world market capitalization.

Country Codes

AR	Argentina	DK	Denmark	IN	India	PH	Philippines
AT	Austria	EG	Egypt	IT	Italy	PK	Pakistan
AU	Australia	ES	Spain	JP	Japan	PL	Poland
BE	Belgium	FI	Finland	KR	Korea	PT	Portugal
BR	Brazil	FR	France	LU	Luxumbourg	RU	Russia
CA	Canada	GB	Great Britain	MA	Morocco	SE	Sweden
CH	Switzerland	GR	Greece	MX	Mexico	SG	Singapore
CL	Chile	HK	Hong Kong	MY	Malaysia	TH	Thailand
CN	China	HU	Hungary	NL	Netherlands	TR	Turkey
CO	Colombia	ID	Indonesia	NO	Norway	TW	Taiwan
CZ	Czech	IE	Ireland	NZ	New Zealand	VE	Venezuela
DE	Germany	IL	Israel	PE	Peru	ZA	South Africa