

Home bias and high turnover

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This paper documents the available evidence on international portfolio investment in five OECD countries. We draw three conclusions from the data. First, there is strong evidence of a home bias in national investment portfolios despite the potential gains from international diversification. Second, the composition of the portfolio of foreign securities seems to reflect factors other than diversification of risk. Third, the high volume of cross-border capital flows and the high turnover rate on foreign equity investments relative to turnover on domestic equity markets suggests that variable transactions costs are an unlikely explanation for home bias. (JEL G11, G15).

Over the last two decades deregulation of financial markets and the relaxation of capital controls have brought about increased opportunities for international investment. The potential gains from diversification of investment portfolios across national markets have been recognized for some time. Early work by Grubel (1968), Levy and Sarnat (1970) and Solnik (1974a) and more recently by

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Grauer and Hakansson (1987) suggest that the risk of an investment portfolio can be reduced by incorporating foreign securities. On the other hand, De Santis (1993) and Harvey (1994) find that the mean-variance-efficient frontier does not shift significantly when foreign securities are added to a set of domestic securities. This is not necessarily inconsistent with the previous literature. The market-capitalization-weighted portfolio is in practice often found to be located in the interior of the mean-variance-efficient frontier generated by individual securities (or markets). When the benchmark for evaluating the benefits of diversification is taken to be the market portfolio, the gains therefore still appear to be substantial.

On the surface, it would appear that investors have begun taking advantage of these international opportunities. In a recent speech on behalf of the SEC Richard Breeden (1991) cites the following statistics on international investment:¹

- Currently one out of every seven equity trades worldwide involves a foreign party on one side or the other.
- Ten percent of all trading in US equities takes place outside of the USA.
- In the period from 1984 to 1990, gross cross-border equity flows have increased from approximately \$300 billion per year to about \$1.7 trillion, a rate of increase of 34 percent per annum.
- There has also been a dramatic increase in the amount of international business undertaken by US firms in recent years.

We will explore whether this increased activity in international financial markets and the large volume of cross-border capital flows reflects an increase in the fraction of investment portfolios allocated to foreign securities or is simply a reallocation of assets within a fixed foreign portfolio.

This paper presents evidence on long-term international investment patterns in Canada, Germany, Japan, the UK and the USA during the 1970–1990 period. Our study includes investment in corporate equities, and in government and corporate bonds. We examine data on international financial transactions (purchases and sales of securities by non-residents) and estimates of the stock value of domestic securities held by non-residents. The data used in this study are largely gathered from national sources. To our knowledge, this is among the first studies to make use of these time series on cross-border transactions. A complete discussion of the coverage of the various sources and the issues involved in cross-country comparisons of the figures is provided in the appendix. One of the contributions of this research is to identify some of the gaps in the existing data sources and to provide some useful benchmarks for further empirical and theoretical work.

We draw three main conclusions from the data. First, despite the potential gains from investing internationally, there is strong evidence of home bias in the national portfolios of the countries we study. While there has been some increase in international investment positions since the 1970s, the share of foreign assets in investment portfolios is still considerably smaller than standard theories would predict. Second, examination of the bilateral investment data for Canada and the USA suggests that to the extent that investors hold

foreign securities, the composition of the portfolio of foreign assets may reflect factors other than diversification of risk. Finally, despite the low degree of international diversification implied by the investment position data, the volume of transactions in international markets is large and has increased dramatically in the 1980s. In particular, the turnover rate on equities held by non-residents is higher than the overall turnover rate on the domestic market. The level of activity in international markets casts doubt on explanations of home bias which rely on prohibitive transactions costs in undertaking international investments. It also suggests that to the extent investors participate in international markets, they respond to changes in economic conditions by making frequent and sizable shifts in their holdings of foreign securities.

The available evidence on the actual investment positions of investors is presented in Section I. In Section II we discuss several ways of assessing the potential gains which investors forego by not diversifying their portfolios internationally. We find that there remain substantial gains from international diversification for investors choosing a portfolio of stocks and bonds in the 1990s. In Section III we examine the data on international security transactions and compare the turnover rates on foreign and domestic investments. We find that the turnover rates of foreign equity investments is high both when compared to the turnover rate in the investor's home market and when compared to the turnover rate in the market of the foreign security. We argue that for most countries these observations cannot be explained by the investment activity of institutional investors. Our conclusions and a discussion of directions for future research are presented in Section IV.

I. Portfolio allocation: international investment positions

We focus on the international investment behavior of Canada, Germany, Japan, the UK and the USA.² This represents a large percentage of global financial activity. At the end of 1990, the capitalized values of the markets in our five-country sample accounted for roughly 84 percent of the world market for corporate equity and 78 percent of the world bond market.³ Table 1 shows the shares of each of the countries' equity and bond markets as shares of our five-country aggregate. In the 1975–1990 period, the share of the US equity market in the five-country sample fell from a little over 68 percent to 40 percent, while Japan's share increased from about 14 to 40 percent.⁴ The UK's share increased in this time period from about 7 to 12 percent while the shares of Canada and Germany remained fairly constant. Changes in the world bond market have been less dramatic.⁵ The size of the US bond market dominates the sample at roughly 60 percent of the five-country aggregate throughout the 1975–1990 period. Japan's share has risen from 13 to 24 percent while the German and British shares declined.

In this section we document the international investment positions (*i.e.* the estimated stock value of holdings of foreign securities by domestic residents) as reported by official sources in each of the countries in our sample. To place the figures in some perspective, it is worthwhile to explain briefly how they are collected. As part of the system of balance of payments accounting, any

TABLE 1. Equity and bond market shares, 1975–1990.

	1975	1980	1985	1990
<i>A. National stock markets as shares of five-country aggregate</i>				
Canada	5.3	6.4	4.2	3.2
Germany	5.4	4.3	5.1	5.0
Japan	13.7	18.2	25.8	40.2
UK	7.3	9.9	9.3	11.6
USA	68.3	61.2	55.6	40.0
<i>B. National bond markets as shares of five-country aggregate</i>				
Canada	4.0	3.2	2.9	2.8
Germany	15.1	16.6	10.1	13.2
Japan	13.3	21.4	21.4	24.1
UK	6.6	6.8	3.4	2.5
USA	60.9	52.0	62.2	57.4
<i>C. National financial markets (bonds and equities) as shares of five-country aggregate</i>				
Canada	4.5	4.4	3.1	3.0
Germany	11.1	12.1	9.3	9.6
Japan	13.5	20.0	22.1	31.1
UK	6.9	7.9	4.3	6.4
USA	64.0	55.4	61.2	49.8

Notes:

Part A: Figures are the end-of-year capitalized value of each country's equity market as a fraction of the five-country total capitalized value. Data from Morgan Stanley Capital International.

Part B: Figures are the end-of-year capitalized value of each country's bond market as a fraction of the five-country total capitalized value. The bond figures reflect the capitalized value of outstanding government, federal agency, non-agency mortgage securities, municipal and corporate bonds. Data from Salomon Brothers.

Part C: Figures are the sum of end-of-year stock and bond market capitalizations for each country as a fraction of the five-country total.

security transaction involving a non-resident is reported to the central government.⁶ At periodic intervals, the government conducts a 'benchmark' survey of investors, brokerages, banks, and other investment institutions to estimate the current value of domestic holdings of foreign securities. Data on capital flows, or transactions data, are then used to extrapolate the foreign investment positions in the intervening years between the benchmark surveys.

Table 2 reports the stock-value of aggregate portfolio investment abroad as shares of the combined domestic stock and bond market capitalization values. When separate data for investment positions in stocks and bonds are available, the position in stocks (bonds) is expressed as a share of the domestic stock (bond) market capitalization. For all countries except Germany, data include the investment positions of private individuals, enterprises and banks and exclude the official assets of the public sector; German figures exclude the assets of the banking sector. The figures indicate that the level of portfolio

TABLE 2. International investment positions as shares of market capitalization values (in percent).

	1970	1975	1980	1985	1990
<i>Canada</i> ^a					
Portfolio Investment	n.a.	4.0	3.6	4.5	4.2
Stocks	n.a.	7.1	6.0	6.5	6.6
Bonds	1.7	1.2	0.8	2.4	2.2
<i>Germany</i> ^b					
Portfolio investment ^d	4.9	2.4	2.7	5.8	10.2
<i>Japan</i>					
Portfolio investment	n.a.	1.3	2.0	6.9	10.7
<i>UK</i> ^c					
Portfolio investment	9.5	8.6	11.4	27.5	31.9
Stocks	n.a.	n.a.	16.9	24.8	23.5
Bonds	n.a.	n.a.	6.4	32.3	61.4
<i>US</i> ^d					
Portfolio investment	n.a.	2.3	2.2	2.2	2.7
Stocks	n.a.	1.4	1.5	2.0	3.3
Bonds	2.6	3.0	2.8	2.4	2.4

Notes: The investment position in stocks is the domestic investment position in foreign equities as a fraction of the end-of-year domestic stock market capitalization. The investment position in foreign bonds is the investment position in foreign bonds as a fraction of the end-of-year domestic bond market capitalization. Portfolio investment is the sum of investment in foreign stocks and bonds.

All data on foreign investment positions are from the individual country sources described in the Appendix. End-of-year stock and bond market capitalizations are from Morgan Stanley Capital International and Salomon Brothers, respectively.

^a Figures exclude loans and subscriptions, official international reserves, non-bank deposits, other debt and other assets.

^b Includes assets of enterprises and individuals and excludes banks and public authorities. In December 1990, enterprises and individuals accounted for 88% of total foreign direct investment and 87% of total holdings of foreign securities.

^c Overseas investment by UK residents including banks, financial institutions and other UK residents. The data appear to have been revised upwards in 1980. Values reported prior to 1980 should be interpreted with caution.

^d US private assets excluding claims on unaffiliated foreigners reported by non-banking concerns and US claims reported by US banks not included elsewhere. Portfolio investment positions are calculated at current cost.

investment in most countries has increased since the early to mid-1970s. The UK leads the sample in international portfolio diversification with foreign security holdings of 32 percent in 1990, compared with 11 percent in Japan, 10 percent in Germany. In Canada and the USA, however, portfolio investment has remained fairly constant at two to four percent. In all cases, the actual investment positions are still substantially lower than the limits implied by foreign investment restrictions affecting mainly institutional investors in these countries.⁷

Table 3 further decomposes the US investment position in foreign securities into stock and bond holdings by country. The figures in the table can be interpreted as the weights attached to foreign securities in US investors' equity and bond portfolios. Interestingly, while there has been a doubling of the investment position in foreign equities, US investment in foreign bonds has remained at a fairly constant level of 3 percent of the value of the US bond market. The vast majority of US foreign portfolio investment is allocated to Canada and Western Europe.

The 100 percent increase in equity investment might seem impressive at first glance. It should, however, be remembered that the USA's share of the equity markets in our sample has roughly halved since the mid-1970s while the USA's share of bond markets has remained nearly constant over this period. A simple illustration will put the increase in the share of US investment portfolios allocated to foreign equities into perspective. Let K^{FO} and K^{US} denote the initial equity market capitalization of the foreign and US equity markets respectively. Also, let g^{FO} and g^{US} denote the gross growth rate of the foreign and US equity markets respectively. In 1975, the US equity market capitalization as a fraction of our five country aggregate was $K^{US}/(K^{US} + K^{FO}) = 0.68$. In 1990, the share had fallen to $K^{US}g^{US}/(K^{US}g^{US} + K^{FO}g^{FO}) = 0.40$. Simple algebra shows that the implied ratio of the growth rates is $g^{FO}/g^{US} = 3.2$. The market capitalization of the foreign equity markets thus grew more than three

TABLE 3. Estimated portfolio weights on foreign security investments by US investors, 1970–1990 (in percent).

	1970 ^a	1975	1980	1985	1990
<i>A. US investment position in foreign corporate equity as a share of the US equity market capitalization</i>					
Canada	n.a.	0.87	0.95	0.69	0.83
Western Europe	n.a.	0.39	0.46	1.00	2.25
Total foreign ^b	n.a.	1.40	1.53	2.04	3.31
<i>B. US investment position in foreign bonds as a share of the US bond market capitalization^c</i>					
Canada	1.42	1.76	1.48	1.09	1.00
Western Europe	0.10	0.14	0.51	0.98	1.37
Total foreign	2.60	2.97	2.78	2.39	2.42

Source: US investment positions in stocks and bonds are from the Survey of Current Business, Department of Commerce. End-of-year stock market capitalization values are taken from Morgan Stanley Capital International and end-of-year bond market capitalization values are published by Salomon Brothers. Fourth quarter stock market capitalization values are used as the base for equity shares. Bond market capitalization values are reported on an annual basis.

^aMarket capitalization values for the USA are available for 1974:4–1991:1.

^bAccording to Department of Commerce publications, official figures for the total foreign investment position is likely to be underreported given the problems in estimating the value of US holdings of Japanese securities.

^cBond market capitalization equals the sum of the capitalized values of outstanding government, federal agency, non-agency mortgage securities, municipal and total corporate bonds.

times as fast as that of the US equity market. Let α denote the fraction of the initial US equity portfolio, P , allocated to US equities. Our reported initial foreign investment ratio for a US investor is then $P(1 - \alpha)/P\alpha = 1.40$. Without any repatriation of capital gains, this ratio would have grown to $P(1 - \alpha)g^{FO}/P\alpha g^{US} = 4.47$ by the end of the period. This means that a US investor who kept reinvesting capital gains in foreign markets would by December 1990 have tripled the share of his portfolio allocated to foreign securities. As can be seen from Table 4, the share allocated to foreign equity, 3.31, is substantially smaller, which means that part of the capital gains have been repatriated from foreign markets and reinvested in the US. Thus, even though the US foreign equity investment share has doubled, this is a smaller rate of increase than the rate implied by a buy-and-hold strategy with continual reinvestment of capital gains.

The estimated portfolio weights on foreign security investments of Canadian investors are reported in Table 4. Canadian holdings of foreign equity have remained nearly constant at between 6 and 7 percent of the capitalized value of the Canadian stock market while bond holdings vary between 0.8 and 2.4 percent of the value of the Canadian bond market. These figures are surprisingly low given the relatively small size of the Canadian equity and bond markets and the low historical returns on Canadian equity. The vast majority of Canadian investment in foreign bonds and equity is made in the USA. Since Canada's relative share of both equity and bond markets have been shrinking over this period, the foreign investment positions would have increased much

TABLE 4. Estimated portfolio weights on foreign security investments by Canadian investors, 1970–1990 (in percent).

	1970	1975	1980	1985	1990
<i>A. Canadian investment positions in foreign corporate equity as a share of the Canadian equity market capitalization</i>					
USA	n.a.	6.15	5.14	5.53	4.69
UK	n.a.	0.20	0.07	0.20	0.70
Japan	n.a.	n.a.	n.a.	0.25	0.23
Total foreign	n.a.	7.15	5.96	6.51	6.62
<i>B. Canadian investment positions in foreign bonds as a share of the Canadian bond market capitalization^a</i>					
USA	0.74	0.35	0.33	1.81	1.34
UK	0.07	0.09	0.07	0.05	0.26
Japan	n.a.	n.a.	n.a.	0.00	0.03
Total foreign	1.57	1.18	0.76	2.44	2.22

Source: Canadian investment positions in stocks and bonds are published in Statistics Canada, *Canada's International Investment Position*. End-of-year stock market capitalization values are from Morgan Stanley Capital International and bond market capitalization values are published by Salomon Brothers. ^aThe bond market capitalization is the sum of the capitalized values of outstanding marketable government bonds, provincial and municipal bonds, corporate bonds and bonds issued by institutions (hospitals, colleges and religious institutions).

more than the rate observed based on a buy-and-hold strategy with reinvestment of capital gains.

Several issues should be kept in mind in drawing inferences from these estimates of international investment positions. First, the data are only as reliable as the government's ability to accurately incorporate the effects of changes in asset prices, exchange rates and changes in the composition of security holdings on the value of the portfolio. In USA, the last benchmark survey was conducted in the the mid-1940s. As a result, estimates of US holdings of Japanese securities are no longer published as the official figures on investment positions appear to have little correspondence with the reported transactions series. Data reported by the German, Canadian and British governments are based on more recent surveys but the data nonetheless suffer from similar problems in estimating the effects of changes in asset prices on portfolio values.⁸

A second problem relates to tracing shifts in bilateral investment positions. Governments typically collect figures on the residence of the foreign party involved in the transaction and record whether the security being traded is a 'domestic' or 'foreign' stock or bond. If, for example, a British broker sells a share of German equity to an American investor, the transaction will be recorded as a capital outflow from the UK to the USA; however, the change in each country's position of net indebtedness is not recorded.⁹ This reporting methodology also misses some of the large and growing volume of cross-exchange transactions (*i.e.* trading of securities in the investor's market or on a specialized international exchange).¹⁰

Third, it is possible that the reported value of holdings of foreign securities based on the assets side of a country's balance sheet will differ from actual investment positions due to investor responses to capital controls or taxes on investment income. All of the countries in our sample have had (or to a limited extent still maintain) capital controls and limitations on foreign exposure of large investors. To the extent that investors have been successful in finding ways of circumventing these controls by underreporting the amount of the transaction or by misrepresenting nationality, the transactions will be outside of the scope of current methods of data collection. Differences in income tax laws may also induce an investor to hold foreign securities in an account with a foreign broker or bank. In Tesar and Werner (1992), we utilize bilateral data for the USA and Canada to compare the official figures on one country's external assets with the other country's external liabilities. This comparison revealed a significant discrepancy between the two sources. For example, in 1990 the liabilities to Canadian investors reported by US sources is more than four times larger than the corresponding Canadian assets reported by Canadian sources. It may be that some Canadian investors transact in US securities in such a way as to circumvent Canadian regulations or to avoid the higher Canadian taxes on investment income.¹¹ Alternatively, US firms may be consistently overreporting their transactions in Canadian securities, although it is more difficult to rationalize this type of behavior. Ideally, we would like to cross-check reported international investment positions for all of the country pairs in our sample. Unfortunately, to our knowledge only the USA and

Canada report the bilateral international investment positions needed for cross-source verification.

II. Foregone gains from international diversification?

There is currently no model of international capital market equilibrium that is consistent with our evidence on the allocation of national portfolios across international markets. In a standard model of portfolio choice with identical investors and independently and identically distributed random returns, all investors hold the same proportion of wealth in each security and there is no trade in equilibrium. Allowing for differences in risk aversion produces trade in equilibrium, but the optimal portfolios differ only in the fractions allocated to risky versus riskless securities and there is no difference across investors in the relative allocation across risky assets (Dumas, 1989). Allowing for differences in preferences over the currency denomination of the portfolio generates some heterogeneity in asset holdings, although this typically has a bigger impact on the allocation across bond markets, where the largest source of risk is due to stochastic deviations from purchasing power parity. This risk may induce a 'home bias' toward domestic bonds, but has no effect on the portfolio allocation across equities (Solnik, 1974b).¹²

The large discrepancy between observed portfolios and the predictions of standard theoretical models makes it virtually impossible to quantify how far observed portfolios are from an 'optimal' portfolio in a meaningful way (see de Santis, 1993; Harvey, 1994). Even if one has a realistic model for investor- or country-specific portfolio choice, calculation of the expected return on a portfolio is highly sensitive to the method used to forecast moments of security returns.

Given these difficulties, we will only report some suggestive assessments of the gains from international diversification which investors forego by holding a predominance of domestic securities in their portfolios. We compare purely national portfolios to a neutral benchmark, the market-capitalization weighted 'world' market portfolio. If investors across countries are identical, and the world market portfolio consisting of these five countries is held, each investor allocates his or her portfolio according to the observed market-capitalization shares across markets. By using purely national portfolios, we do not take the limited international investment of our sample countries into account. This approximation is certainly reasonable for Canada and the USA, but for Germany, Japan, and the UK the results underestimate the degree of portfolio diversification.¹³ The purpose of this exercise is not to add to the already exhaustive literature on international diversification across equity markets; we merely wish to show in the simplest possible way that the gains from diversification for investors in our sample of countries are still available in the 1990s. We also extend the existing literature by examining a portfolio that includes bonds as well as equities.

We consider investment portfolios that are hedged against currency risk. This ignores the fact that it may not always be beneficial to fully hedge such risks. We make this simplifying assumption to highlight the pure gains from

diversifying across equity and bond markets. We assume that the investor's hedging strategy is to enter into a forward contract at the beginning of each month to sell the current foreign currency value of the foreign investment position in 30 days. Note that this strategy does not fully eliminate exchange rate risk since it does not cover capital gains or losses that occur during the month. Let R_t^{FX} denote the local currency return of a foreign security index over the period t to $t + 1$, s_t denote the natural logarithm of the exchange rate expressed as US dollars per unit of foreign currency, $f_{t,t+1}$ denote the natural logarithm of the one-month forward exchange rate, and r_t^{USD} (r_t^{FX}) denote the US (foreign) short-term interest rate. From the perspective of a US investor the return on the portfolio of a foreign security investment plus a forward contract is then

$$(1) \quad R_t^{FX} + s_{t+1} - s_t + (f_{t,t+1} - s_{t+1}) - r_t^{USD} = R_t^{FX} - r_t^{FX},$$

where we have relied on covered interest rate parity, $f_{t,t+1} - s_t = r_t^{USD} - r_t^{FX}$. The hedged *ex post* excess return (the return in excess of the riskless rate of return, here taken to be the US short-term rate) on a foreign portfolio investment is thus equal to the local currency return on the security minus the local short-term interest rate. The excess return on this portfolio is independent of the currency domicile of the investor. The gross returns can be obtained by adding the local currency, short-term interest rate for each investor.

We use the unconditional hedged historical excess returns and standard deviations for the equity market indices in Canada, Germany, Japan, the UK, the USA, and the value-weighted World portfolio.¹⁴ As a proxy for long-term bond returns, we use Salomon Brothers government bond indices.¹⁵ Excess returns in US dollars are computed by subtracting the holding period returns on the US Treasury Bill that is closest to 30 days to maturity on the last trading day of each month. Treasury Bill data are drawn from the CRSP Government Bond File. Holding period returns on Treasury Bills are computed as in Fama (1984). Excess returns in foreign currencies are computed by subtracting the 30-day Eurorate for each currency as reported by the BIS. All returns are expressed as percentages and are annualized by multiplying the monthly returns by 12.

We find that Canadian and US equity markets and bond markets are highly positively correlated, 0.78 and 0.79, respectively. Canadian and US equity returns are not only highly correlated with each other but also with British stock returns (0.65 and 0.69, respectively). Based on diversification alone, one would predict that, all other things being equal, investors in the USA should prefer investing in German and Japanese equity to investing in Canadian and British equity. From Tables 3 and 4, we concluded that to the extent foreign investment occurs, US and Canadian residents invest heavily in the other's market: over 25 percent of US foreign investment is held in Canadian stocks while 71 percent of Canadian foreign equity investment is placed in the USA. Given the high correlation between the Canadian and the US stock markets, this contradicts the notion that investors primarily seek portfolio diversification by choosing foreign markets which have a low correlation with the domestic

market. Instead, it suggests that other factors such as geographic proximity, strong trade linkages or the lack of a language barrier may matter potentially even more than the diversification motive per se for international portfolio choice.

The filled squares in Figure 1 illustrate the unconditional moments for historical hedged excess equity market returns (prefix E). We see that Japan has the highest mean while Germany has the highest standard deviation. Canada has the lowest mean return but not the lowest single market standard deviation. The US equity market has the lowest standard deviation during the 1980s relative to the other four countries; only the World portfolio is marginally less risky. The value-weighted World portfolio dominates investment in the Canadian, the British and the US equity markets in that it has both a higher mean and a lower standard deviation. Returns on government bond markets (prefix B) are illustrated by filled triangles. In most countries, both the means and standard deviations of excess returns are lower for bonds than for equities. The exception is Canadian equity which has historically exhibited a lower mean and higher standard deviation than Canadian bonds. Comparing across bond returns, US bonds have the highest return of the countries in our sample. The World bond portfolio dominates the Canadian and the British bond portfolios.

Hedged unconditional moments of excess returns for purely national portfolios made up of bonds as well as equities and the corresponding world market portfolio (prefix P) are indicated with hollow squares in Figure 1. These portfolios include equity and bonds according to market-capitalization-shares in the respective markets at the end of 1990.¹⁶ Note that the Canadian portfolio is strictly dominated by the World portfolio, the US portfolio is marginally dominated, while the purely German portfolio has a lower standard deviation (about 2 percentage points) but a more than 2½ percentage points

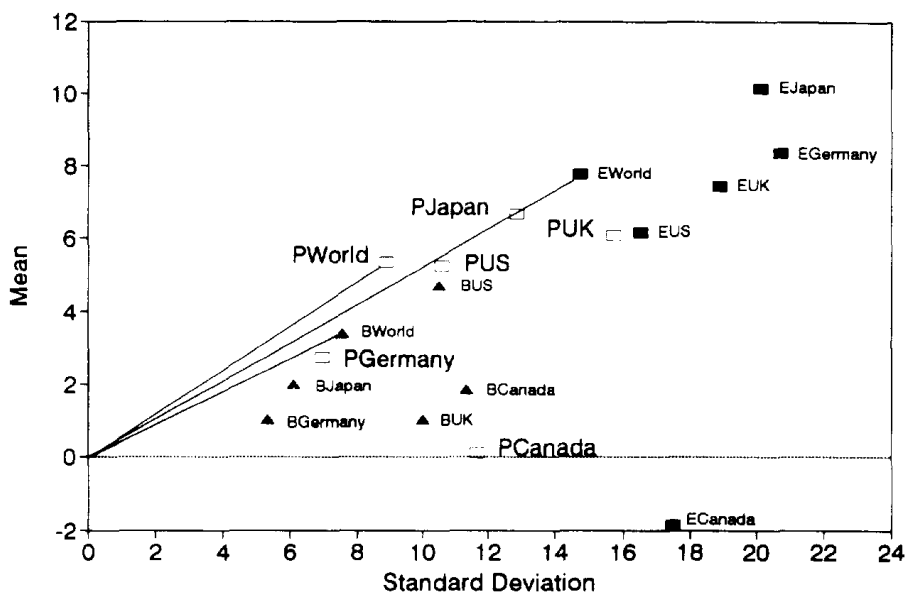


FIGURE 1. Hedged excess returns: monthly data 1980: 12–1990: 12.

lower mean return than the World portfolio. Similarly, a purely British portfolio historically earned roughly 0.73 percentage points higher mean return than the World portfolio but had roughly seven percentage points more risk. It is only the Japanese portfolio that historically earned a substantially higher mean return (1.32 percentage points) in return for the higher risk (4 percentage points). The Sharpe ratio, defined as the mean excess return over the standard deviation, is given by the slope of a ray connecting the portfolio and the origin. Since a steeper slope indicates a higher return per unit of risk, we find that in terms of return per unit of risk the World portfolio out-performs all national portfolios, followed by the Japanese and US portfolios. The German and British portfolios have similar return-risk tradeoffs, while the Canadian portfolio has a substantially lower Sharpe ratio. Finally, if we disregard the mean returns and focus solely on risk the German investment portfolio is the only one that has lower risk than the World portfolio. Interestingly, it is the British market which is the most risky securities market overall during this period, not the Japanese market.

As an alternative benchmark to the value-weighted world portfolio, we next examine the portfolio allocations implied by a simple mean-variance model again using historical moments of returns. Consider the following mean-variance objective: $\max_x [x'\mu - \frac{\lambda}{2} x'\Sigma x]$, where x denotes a vector of portfolio weights which sum to one, μ denotes the vector of expected excess returns, and Σ denotes the variance-covariance matrix of excess returns. For the purpose of realism we impose short sale constraints, and set the coefficient of relative risk aversion, λ , to 10. This mean-variance equity portfolio would include: 43.6 percent US equity; 30.3 percent Japanese; 24.4 percent German; 1.7 percent British; and 0 percent Canadian equity. If we expand the set of securities to include bonds, the portfolio would include: 13.7 percent Japanese equity; 8.5 percent German equity; 39.7 percent US bonds; 33.1 percent Japanese bonds; and 5.0 percent German bonds. No investment would take place in the rest of the available securities. While the degree of risk aversion was set somewhat arbitrarily, the results suggest that hedged mean-variance investors would diversify their portfolios substantially more than what we observe in practice. Even if we were to adjust the observed portfolio weights for the measurement problems discussed in Section I, the resulting foreign investment positions would still remain well below those implied by this simple theoretical model.

Although this is by no means conclusive evidence that the home bias documented in Section I is sub-optimal, the results indicate that there are gains to be made from international portfolio diversification in terms of pure risk reduction for all countries in our sample except Germany. Additional gains in terms of expected returns (as measured by historical means in the 1980–1990 period) from diversifying internationally are available for Canadian, German and US investors. If we consider a linear trade off between risk and return, all countries would be better off holding the world market portfolio than their own, purely national portfolios.

Our results are based on the simplifying assumption that historical returns provide the best forecast about future returns. Other methods of forecasting future returns can be employed, yielding quite different implications for the

'optimal' level of international diversification. For example, the low returns on Canadian equity during the 1980–1990 period result in a zero weighting for Canadian equity. If we were to consider some subsamples, Canadian equity outperforms other assets increasing its weight in the portfolio. The point remains, however, that it is extremely difficult to reconcile the fact that the observed portfolio allocations are *different* across countries, and that they are universally biased toward their own financial assets.

III. Portfolio reallocation: international securities transactions

It was shown in Section I that the international investment positions of investors in our five-country sample remains low. This is surprising given the extensive deregulation of international financial investment which has taken place in the past two decades coupled with the gains available from diversifying internationally. Two potential explanations for this result have emerged from the literature on international portfolio investment: (1) that taxes disfavor cross-border investments; and (2) that transactions costs are higher in trades involving foreign securities. Turning first to taxes on foreign investment, investors are typically subject to foreign withholding taxes on dividends from foreign investment. For taxable investors, the taxes paid to foreign governments can generally be credited against domestic tax liabilities through the system of foreign tax credits. The offset is not always perfect, and the credit might have to be carried forward if the domestic tax bill in a particular income-class is smaller than what was withheld abroad. Even if the offset is perfect in theory, in practice it may be costly and time-consuming to actually obtain the tax credit. However, differences in after-tax returns directly attributable to the tax liabilities of the average investor are not likely to be substantial for our sample countries. Tax-exempt investors like pension funds will suffer a reduction in the return on foreign investment compared to domestic investment due to foreign withholding taxes. At an average withholding tax rate of 15 percent and an average dividend yield of 4 percent, this corresponds to a loss in return of 60 basis points. It is hard to believe that this effect is large enough to mitigate international investment.

The second explanation is that transactions costs associated with investment in foreign securities hinders international diversification and biases portfolios toward domestic assets. It is useful to classify these potential barriers to cross-border investment into fixed and variable costs.¹⁷ Fixed barriers may take the form of language, institutional and regulatory differences and the cost of obtaining information about foreign markets. While these costs must provide some of the explanation for home bias, it seems improbable that the *cumulated* return on a well-diversified portfolio does not exceed the fixed barriers to entry in most markets. Variable cost, such as stamp taxes, commissions, and higher spreads, are difficult to quantify but may also hinder some potential international investors. If these costs are indeed substantial, we would expect to find that investors engage in a buy-and-hold strategy and we should see fewer transactions in international securities compared to domestic securities.

One way to assess the importance of variable transactions costs in impeding

international portfolio investment is to compare the turnover rate on international investments with the turnover rate on national markets. In Table 5 we contrast domestic turnover rates in equities on each national market with each country's turnover rates on foreign equity investments. We measure the volume of transactions as the sum of purchases and sales.¹⁸ The first part of the table shows the total volume of transactions for the domestic market and the market capitalization values of each of the five markets. The domestic turnover rate is defined as the ratio of transactions to the market capitalization value. The turnover rates vary across the markets from 0.61 in Canada to 1.74 in Germany, with a five-country average of 1.09.

Part B of Table 5 reports the trading behavior of investors in each of the five countries in foreign equities. Surprisingly, despite the low share of foreign equities in the Canadian portfolio, Canadian investors' turnover rate is 7.7 in foreign equities, over ten times as large as the turnover rate in the Canadian equity market. Even if Canada's international investment position in foreign equities is tripled to take into account the possibility of under reporting, the revised turnover rate is still four times that in the domestic equity market. Similarly, US investors' turnover rate in foreign equities is more than double the domestic rate.¹⁹ The figures in the fourth column give an indication of the growing importance of cross-border transactions. By 1989, nearly a quarter of all transactions undertaken by Canadian investors, and one in ten of those undertaken by German investors, involved foreign equities.

Part C of Table 5 reports the turnover rate on *foreign* investors' holdings of *domestic* equity. It appears that in each of the countries for which data is available, foreign investors transact at a significantly higher rate than domestic investors. For example, the turnover rate on US equities held by foreign residents is 1.60, higher than the turnover rate on any of the domestic markets. Thus, the turnover rate on international equity investments is high both when compared to the turnover rate in the investor's country of origin, and when compared to the market of origination of the foreign security. Turning to the fourth column of Part C, we again see evidence of the large volume of cross-border trading. Twenty-one percent of all transactions in Canadian equity and 22 percent of transactions in British equity involve a foreign resident. Thirteen percent of all transactions on the US equity market involve a foreign resident.

Table 6 uses US data on non-resident purchases and sales of equities and bonds to estimate the turnover rates of foreign investors by country of origin. In each case, the turnover rate is measured as the ratio of purchases and sales of US securities involving non-residents to the foreigner's investment position in US securities. We find that Canadian and Japanese investors tend to transact in US equities at roughly double the turnover rate in their own equity markets, and at a rate higher than the overall turnover rate in the US equity market. Investors from Western Europe transact in US equities at a 30 percent higher rate than the overall rate in the US equity market. Separate data for German and British transactions in US securities are not available, and the aggregate for Western Europe includes countries which are likely to have low turnover rates due to exchange controls.²⁰ The foreign turnover rate in US

TABLE 5. Volume and turnover rates in international equities, 1989 (\$US billion).

<i>A. Domestic turnover rates</i>				
	Total trans. on domestic market (A)	Equity market cap. (B)	Domestic turnover (A/B)	
Canada	177.8	290.1	0.61	
Germany	628.2	361.5	1.74	
Japan	5,218.5	4,102.1	1.27	
UK	635.0	823.2	0.77	
US	3,223.9	3,027.1	1.07	
World	11,716.9 ^a	10,140.0 ^a	1.16	
<i>B. Turnover rates in foreign equity held by domestic residents</i>				
	Trans. in foreign equity (C)	Inv. pos. in for. equity (D)	Turnover rate (C/D)	Pct. foreign equity transactions in total volume (E/A) (%)
Canada	43.1	5.6	7.7	24.2
Germany	73.1	n.a.	n.a.	11.6
Japan	166.1	n.a.	n.a.	3.2
UK	n.a.	226.2	n.a.	n.a.
USA	232.8	91.7	2.5	7.2
<i>C. Turnover rates in domestic equity held by foreign residents</i>				
	For. trans. in dom. equity (E)	For. inv. pos. in dom. eq. (F)	Turnover rate (E/F)	Pct. foreign transactions in total (E/A) (%)
Canada	37.1	17.2	2.2	20.9
Germany	109.3	n.a.	n.a.	17.4
Japan	400.2	n.a.	n.a.	7.7
UK	141.3	103.1	1.37	22.3
USA	418.2	260.6	1.60	13.0

Notes:

Column A: Sum of sales and purchases in equity markets. Data from Howell and Cozzini, Figure 11, p.12.

Column B: Market capitalization values from Morgan Stanley Capital International, value at end 1989.4.

Column C: Sum of purchases and sales of foreign equity by domestic residents. Data from individual country sources.

Column E: Sum of purchases and sales of domestic equity by non-residents. Data from individual country sources.

^aData from Howell and Cozzini (1990).

TABLE 6. Foreign transactions in US stocks and bonds, 1989 (\$US billions).

	<i>US stocks</i>			<i>US bonds^b</i>		
	Gross trans. (A)	Invest. position (B)	Turnover (A/B)	Gross trans. (C)	Invest. position (D)	Turnover (C/D)
Canada	45.4	35.0	1.30	3.8	6.2	0.62
Japan	60.9	27.4	2.22	25.9	37.7	0.69
W. Europe ^a	203.3	149.7	1.36	68.2	159.2	0.43
Total foreign	416.4	260.1	1.60	119.0	228.5	0.52

Notes:

^aIn calculating gross transactions from US Treasury data, Western Europe is total Europe less Bulgaria, Czechoslovakia, the GDR, Hungary, Poland, Romania, USSR and Yugoslavia.

^bFigures exclude US Treasury securities.

Columns A and C: Total sales plus purchases of US stocks and bonds by non-US residents. Data from US Treasury Bulletin.

Columns B and D: International investment position of foreign residents in US stocks and bonds (foreign assets in the US). From US international investment position data published in the *Survey of Current Business*.

bonds (excluding Treasury securities) is considerably lower than for US equities.

Table 7 repeats the exercise on bilateral data from Canada.²¹ The results for Canada are even more striking. The turnover rates of all foreign investors in the Canadian equity market are higher than their domestic counterparts. For Japanese and British investors, the results are surprising: they sell and repurchase the value of their entire portfolio of Canadian equity five and six times per year respectively. Foreign turnover rates for Canadian bonds are on

TABLE 7. Foreign transactions in Canadian stocks and bonds, 1989 (\$Canadian billions).

	<i>Canadian stocks</i>			<i>Canadian bonds</i>		
	Gross trans. (A)	Invest. position (B)	Turnover (A/B)	Gross trans. (C)	Invest. position (D)	Turnover (C/D)
USA	30.3	17.9	1.69	56.4	45.0	1.25
UK	5.5	0.9	6.11	54.0	9.6	5.62
Japan	0.5	0.1	5.00	26.5	42.4	0.62
Total foreign	44.1	20.4	2.16	159.5	161.4	0.99

Notes:

Columns A and C: Sales plus purchases of Canadian stocks and bonds by non-Canadian residents. Data from *Security Transactions with Non-Residents*, Statistics Canada.

Columns B and D: International investment position of foreign residents in Canadian stocks and bonds (foreign assets in Canada.). From *Canada's International Investment Position*, Statistics Canada.

average lower than for equity, and only British investors are reported to be transacting extensively in Canadian bonds.

There are two possible explanations for the relatively high turnover rates in foreign equities. One explanation is that our data on cross-border transactions includes trade in derivative securities, which are not captured in our measures of domestic turnover rates. The second explanation is that cross-border investment activity is dominated by institutional investors, who presumably face lower transactions costs than the 'average' small investor and may have superior information. We have no direct evidence on the foreign transactions of institutional investors. However, in a survey of London fund managers, Davis (1991) reports that only one of the eight managers interviewed indicated that transactions costs on foreign investments was a barrier to international diversification. Davis also reports that the turnover rates on the portfolios managed by these investors was high. This accords with evidence that US institutional investors transact at a higher rate than the average US investor with turnover rates ranging from 1.1 to 1.6.²²

If we accept the premise that institutional investors from all countries tend to transact more frequently than small investors, and given that the domestic turnover rate is a weighted average of the turnover rates of institutional and small investors, at least one of two things must be true in order to explain high international turnover rates. Either (1) institutional investors transact at a higher rate on international securities than on their domestic asset holdings or (2) institutional investors are more heavily diversified internationally than small investors. With regard to the first point, we are aware of no evidence suggesting a differential between institutional investors' transaction rates on domestic and foreign assets. In a sense, a higher turnover rate on foreign assets would further deepen the home bias 'puzzle'.

To address the second point, Table 8 documents the shares of foreign assets in the portfolios of life insurance companies, pension funds and mutual funds in the five countries in our sample. In the USA and Canada, the portfolios of institutional investors mirrors the shares of foreign securities in the national portfolio at about 3–5 percent of total assets regardless of which class of institutional investor we focus on. The foreign investment positions of Canadian life insurers and pension funds fall far short of the 10 percent level statutory ceiling. Canadian institutional investors focus on foreign equity, which is not surprising given the poor historical performance of Canadian equity both relative to foreign equity and to Canadian bonds. US pension funds face no explicit investment restrictions, but are subject to the general 'prudent man' rule. US insurance companies, on the other hand, are by state law limited to holding a maximum of 3 percent of their assets overseas, of which the equity proportion cannot exceed 20 percent.²³ This probably explains the predominance of foreign bonds in the international portion of US insurance companies' portfolios. US pension funds concentrate on foreign equity investment while mutual funds have approximately a balanced allocation across equities and bonds.

Japanese pension funds and mutual funds allocate a slightly lower share of their assets to foreign securities than the average Japanese investor. Japanese

TABLE 8. International investment positions of institutional investors.

	Pct. for. assets <i>in total portfolio</i>	Pct. of int'l port. <i>in foreign bonds</i>	Pct. of int'l port. <i>in foreign equity</i>
<i>1. Life insurance companies (1988)</i>			
Canada	2.2	18	82
Germany	0.6	83	17
Japan	14.2	79	21
UK	9.5	18	82
USA	3.5	90 ^a	10 ^a
<i>2. Pension funds (1988)</i>			
Canada	5.3	7	93
Germany	0.4	93	7
Japan	7.1	50 ^a	50 ^a
UK	13.9	6	94
USA	4.0	14	86
<i>3. Mutual funds (1991)</i>			
Canada	3.0	9	91
Germany	54.4	93	7
Japan	8.2 ^b	76 ^b	24 ^b
UK	39.2	2	98
USA	4.8	40	60

Sources: E. Philip Davis, 'International Diversification of Institutional Investors,' Bank of England Discussion Papers, No. 44 (Sept. 1991). pp. 17 and 23 and Unit Trust Year Books, 1991 and 1992, and Financial Times Business Information, pp. 37 and 31, respectively.

^a Estimated.

^b (1990).

life insurance companies have more diversified investment portfolios. Although the foreign investment share has been increasing during the progressive liberalization of Japanese financial markets, it still falls short of the currently prevailing 30 percent cap on foreign investment by life insurers and pension funds. Japanese foreign securities investment is primarily in foreign bond markets.

In the UK and Germany, the portfolios of life insurance companies and pension funds are less well-diversified than the average national portfolios. In the German case, this is due to restrictions on the investments of insurance companies and pension funds which effectively imply that close to 100 percent of domestic currency liabilities be matched by domestic assets. Similarly, British life insurance companies are required to match liabilities for any one currency exceeding 5 percent of the total with at least 80 percent assets in that same currency, *i.e.* effectively 80 percent of the portfolio must be in British securities. British pension funds, on the other hand, are only bound by a trust law following the 'prudent man' concept, which has enabled them to increase their foreign investment position substantially. Interestingly, mutual funds in these two countries are more extensively diversified than the corresponding

national average. Note also that while German institutional investors focus on foreign bonds, UK institutional investors focus on equity for their international investments.

Given their small international investment positions, institutional investors in Canada, Japan and the USA would have to transact at a much higher rate in foreign markets than they do in domestic markets for their investment behavior to be the reason for the high turnover rates in foreign securities. Also, given the predominance of bonds in the foreign share of Japanese institutional portfolios, their frequency of transactions in foreign equity has to be even higher to square with what we observe. Since the foreign share of the portfolios of German institutional investors are dominated by foreign bonds, their investment behavior does not help explain the high turnover rates in foreign equities. On the other hand, British mutual funds hold a large share of their portfolios in foreign assets, and the majority of this investment is in equities. As we saw in Table 7, British investors on average also have very high turnover in both equities and bonds.

IV. Conclusions

The behavior of investors in international markets presented in this paper poses a challenge for theories of portfolio diversification. First, there is a strong bias toward domestic securities in national portfolios despite the apparent risk reduction available by diversifying internationally. These international investment positions are well below current limitations on foreign asset holdings of institutional investors. Second, observations on the portfolio choices of Canadian and US investors suggest that to the extent investors do invest in foreign securities, their investment decisions do not reflect pure diversification motives. Instead, geographic proximity seems to be an important ingredient in the international portfolio allocation decision. Third, the high transactions rate on foreign investments suggests that investors frequently adjust the composition and the size of their international portfolios, even though much of this activity has little impact on net investment positions. This observation presents a major new puzzle for the theory of international portfolio choice. It suggests that high transactions costs associated with trading foreign securities cannot be the reason for the observed reluctance of investors to diversify their portfolios internationally.

It is possible that the apparent contradiction between the data on international transactions and the low international investment positions is an indication that much of the trading reflects arbitrage activity in stocks that are cross-listed on two or more exchanges. Whether the trading activity on these types of securities is large enough to account for the high volume of cross-border flows and the high rate of transactions is an empirical question. To quantify the importance of this phenomenon, one would need data not only on the nationality of the transacting agent but also the actual (class of) security involved. To our knowledge, no such data are collected.

Absent a believable model of international portfolio choice, we cannot accurately assess the optimality of observed investment portfolios. We can,

however, use other features of our data to shed light on what guides international portfolio investment. Revisions of conditional moments of returns, as well as changes in state variables, are likely to cause investors to reallocate their portfolios. To the extent that investors across countries reallocate portfolios differently, it may be possible to identify country and investor-specific factors affecting portfolio choices from data on international financial transactions. In future work, we will use such data to explore several alternative explanations for observed international investment behavior. The data suggest that there must be some source of country-specific shocks to income which can be partially diversified by holding claims to domestic securities. These shocks to domestic income must be large enough and occur with sufficient frequency to induce investors to adjust their portfolios often and by large amounts. Two possibilities are fluctuations in labor's share of income over the business cycle and government policies which redistribute income in response to cyclical fluctuations.

Finally, 'home bias' in international data may be a reflection of more basic investment behavior. That is, the observed lack of international diversification may have less to do with 'international' investment choices but simply reflect the tendency of individuals to hold ill-diversified portfolios, even within a given national market. The explanation for why people tend to invest 'locally' will likely require a richer model incorporating informational and institutional constraints.

Data Appendix

United States of America

1. International investment position

Annual figures on the international investment position of the USA are published in the June issues of the *Survey of Current Business*, Department of Commerce. Aggregate foreign direct and portfolio investment positions cited in this paper are based on the current-cost method of asset valuation. A complete description of the different methodologies of estimating international investment positions is provided in Landefeld and Lawson, 'Valuation of the U.S. Net International Investment Position', *Survey of Current Business*, May 1991.

Regional decompositions are available, beginning in 1976, of US portfolio investments in foreign stocks and bonds and of foreign holdings of US stocks and bonds. Figures are calculated at current cost. The regional breakdown covers Western Europe, Canada, Japan, Latin America, Other Countries and International Organizations. US assets abroad (US holdings of foreign securities) exclude official reserve assets, US government assets and the international investment positions of banks and non-banks. Foreign assets in the US (foreign holdings of US securities) exclude foreign official assets, holding of US Treasury securities and US liabilities reported by US banks and non-banks. We are grateful to Harlen King at the Department of Commerce for sending us the most recent estimates.

2. Securities transactions with non-residents

Quarterly figures on US international transactions are reported in the *Quarterly Bulletin* of the US Treasury. The *Bulletin* reports gross flows (*i.e.* sales and purchases of US and foreign securities with foreign residents). These data are collected by the Dept. of Treasury in accordance with the guidelines for International Capital Form S. All banks, brokers, dealers, and individuals must report any transaction of long-term securities with a foreign resident to the Dept. of the Treasury. Sales of ADRs are included in the figures. Securities are classified according to the residency of the issuer. For example, a bond issued by an offshore subsidiary of a US firm is considered a foreign security. Individuals involved in a transaction are classified according to their country of residence. For example, the sale of a US corporate bond to a UK brokerage appears as an outflow of capital from the UK even if the ultimate holder of the bond is a German resident.

3. Treatment of commissions and fees

The guidelines for Form S indicate that the figure reported for transactions 'should equal the cost of purchases plus commissions, etc. or the proceeds of sales less commissions, taxes, etc. as of the payment data or settlement.'

Canada

1. International investment position

Data on Canada's international investment position (1926–1990) are published by Statistics Canada in *Canada's International Investment Position, Selected Years*. Canada's asset position (holdings of foreign assets) are decomposed into direct investment, stocks, bonds, other debt, loans and subscriptions, official reserves, non-bank deposits, other assets and allowances. Liabilities include direct investment, stock, bonds, other debt, Canadian banks' net foreign currency liability position, money market securities and other liabilities. Regional decomposition is available for the USA the UK, other EEC, Japan, other OECD and all other countries. We are grateful to Tiff Macklem at the Bank of Canada for his help in obtaining the data.

2. Securities transactions with non-residents

Monthly data on international security transactions are published by Statistics Canada in *Security Transactions with Non-residents*. Sales and purchases of Canadian bonds and stock are available by area. Data are also decomposed by type of bond issue. Net transactions with non-residents in foreign bonds and stocks are reported by area.

Japan

1. International investment position

Annual data (1976–1989) on the external asset and liability position of Japan are reported in the Bank of Japan *Balance of Payments Monthly*. Data for the

private and government sectors are decomposed into direct investment, trade credits, loans, securities and other. We use the figures in the category 'securities' as a measure of the stock value of portfolio investment. Note that these figures include the asset positions of Japanese banks. Regional decomposition of Japan's international investment position is unavailable.

2. Securities transactions with non-residents

A. Annual data on the changes in asset and liability positions of Japanese securities investments (1970–1990) are published in the *Balance of Payments Monthly* of the Bank of Japan. 'Long-term securities' include corporate equities, bonds, debentures and flotation of external bonds. Data are available for a large number of countries including the USA, the UK, Canada, France, Italy and Germany. Note that the data are not decomposed into private vs. official flows and banking figures are not separated out. All data are reported in \$U.S. million.

B. The Tokyo Stock Exchange Fact Book publishes monthly data on foreign sales and purchases of Japanese stocks, bonds, repos and conversion to stocks and Japanese investment in foreign stocks and bonds. The original source of this data is the Ministry of Finance. Monthly data are available from 1981:1–1990:12.

Disaggregation of these flows by country is available annually from 1976–1990. It is unclear whether these data include foreign direct investment.

Germany

1. International investment position

Stock statistics on Germany's external asset and liability positions are reported bi-annually (1970–1990) in the *Statistical Supplement to the Monthly Report of the Deutsche Bundesbank*, Table 13 'Assets and Liabilities of the Federal Republic of Germany vis-à-vis Non-Residents.' Long-term investment of enterprises and individuals (excluding banks and public authorities) are broken down into loans, securities investment, direct investment and other capital shares. The data are adjusted for changes in asset valuation. We are grateful to Hartmut Draeger at the New York Representative Office of the Deutsche Bundesbank for providing us with data previously unavailable in the USA.

2. Securities transactions with non-residents.

German data on securities transactions with non-residents are taken from the *Statistical Supplements to the Monthly Reports of the Deutsche Bundesbank*, Table 5e (Wertpapieranlagen (ohne Direktinvestitionen) nach Landergruppen und Landern). Quarterly data on the portfolio investment by foreign residents in Germany and German residents' portfolio investments abroad are available beginning in 1968.1 for a broad set of countries including the USA, the UK, Japan, Canada and other European countries. Decomposition into purchases and sales of stocks and bonds is available from 1986.1

United Kingdom

1. International investment position

Annual estimates of the international investment position of the UK are reported in Section 8 'Levels of Identified UK External Assets and Liabilities' of *The Pink Book: United Kingdom Balance of Payments*. Estimates of direct investment positions are based on the Census of Overseas Assets and the Overseas Transactions Inquiry conducted by the Central Statistical Office. Direct investment figures are reported as book values. Figures used in this paper include financial institutions other than banks, industrial and commercial companies and public corporations.

Portfolio investment figures are based on surveys conducted by the Bank of England and the Central Statistical Office. Data are adjusted for changes in the market values of security holdings. Figures for overseas investment by UK residents used in this paper include holdings of bonds, preference shares, debentures (bondholdings) and ordinary shares of financial institutions other than banks, and 'other' UK residents. Foreign investment in the UK cover total investment in securities issued by UK companies.

Decomposition of these data by country is not available.

2. Securities transactions with non-residents

Decomposition of transactions data is identical to that described for international investment position data. Only net transactions data (purchases less sales) are available.

Notes

1. From 'Reconciling National and International Concerns in the Regulation of Global Capital Markets' given at the London School of Economics in November 1991.
2. The investment behavior of a set of developing countries is studied in Tesar and Werner (1995).
3. The fraction of the world equity market is based on the world market capitalization reported by Morgan Stanley Capital International which includes Canada, Europe, South Africa, the USA, New Zealand, Australia, Japan, Hong Kong, Singapore and several emerging stock markets. The global bond market capitalization is taken from Salomon Brothers *International Bond Market Analysis* and covers the 15 major bond markets including the USA, Europe, Canada and Japan.
4. Japan's share of the world equity market has declined since the end of our sample period. The Japanese market capitalization value is also likely to be overstated due to the substantial investment in corporate securities by Japanese firms, resulting in a double counting of domestic firm value. For further discussion see McDonald (1989), and French and Poterba (1991b). Similar problems are prevalent in Germany (see Harvey 1991).
5. The bond data used to estimate these shares include publicly and privately issued securities. We exclude bonds issued on Eurobond markets and domestic currency bonds issued directly in foreign markets as these are generally treated as 'foreign' securities in balance of payments accounts.
6. In the USA, any transaction with a non-US resident in long-term securities should be reported to the Federal Reserve system. The data cover the transactions of institutional investors (managers of mutual funds, pension funds and life insurance companies),

financial intermediaries as well as individual investors. Details about the data used in this study are provided in the Appendix.

7. See Davis (1991) and Section III of this paper for a discussion of regulations on the international investments of institutional investors.
8. French and Poterba (1991a) start with the benchmark positions reported by the US Department of Commerce and use the reported transactions data and their own estimates of changes in asset values to update investment positions. Interestingly, their estimates of domestic weights (94 percent for the USA, 98 percent for Japan and 82 percent for the UK) are slightly higher than the shares implied by the national data sources.
9. Stekler and Truman (1992) provide a thorough discussion of the shortcomings of data on US international financial transactions and current efforts to improve the quality of the data.
10. Our data do reflect the initial listing of foreign securities on domestic exchanges and the sale of American Depository Receipts. However, after the initial listing of these securities, only those exchanges involving a foreign resident are reflected in the data.
11. Prior to 1992, Canadian pension funds and life insurers were restricted to international investment positions of 10 percent of the total value of their assets. This limit was raised to 16 percent in 1992, 18 percent in 1993 and 20 percent in 1994. Investment positions in excess of the statutory ceiling incur a tax of one percent. Although our 1990 estimates of Canadian foreign investment positions are below the statutory limit, it may be that in the face of uncertainty in exchange rates and asset prices, investors chose a foreign investment position below 10 percent to avoid inadvertently exceeding the limit.
12. This point is illustrated in Engel (1994).
13. In Tesar and Werner (1992) we undertake a similar exercise using observed national portfolios, and estimate bilateral investment positions when they are not directly available from our data sources. The results are virtually identical to those reported here using portfolios in which investors hold only domestic securities.
14. The FT-Actuaries indices^{TM/SM} are jointly compiled by The Financial Times Limited, Goldman, Sachs, & Co., and County NatWest Securities in conjunction with the Institute of Actuaries and the Faculty of Actuaries. The indices are available for 24 countries and 12 regions. Each index is representative of the market structure (industry, firm size, etc.) covered and captures approximately 75 percent of the market capitalization. The index numbers used in this study are total returns, including dividends. The authors thank Ms. Barbara Mueller at Goldman, Sachs & Co. for providing the data.
15. Salomon Brothers government bond indices are available for 6 individual countries and two aggregate portfolios; the non-US dollar world portfolio, and a world portfolio. The remaining maturities of the bonds included in the indices are a least 5 years and the average duration is typically between four and seven years. Government securities excluded from these bond indices include variable bonds, savings bonds, and private placements.
16. The shares in equity and bonds were: Canada 0.47, 0.53; Germany 0.23, 0.77; Japan 0.58, 0.42; UK 0.79, 0.21; US 0.36, 0.64; and the World 0.45, 0.55.
17. We are grateful to a referee for clarifying this point.
18. In a sense, this measure of trading activity double-counts some transactions; once as a sale to a foreign resident and again as a purchase. However, we are primarily interested in the comparison of turnover rates in domestic and foreign investments.
19. Note again that these turnover rates cannot be explained by the increase in foreign investment positions over time; if anything these international turnover rates may reflect the repatriation of foreign capital gains into domestic securities.
20. Examples include Ireland, Italy, Norway, Spain and Sweden.
21. Our Canadian data sources unfortunately do not report transactions with German residents.
22. Nussbaum and Dobrzynski (1987), report annual turnover rates of US institutionally managed portfolios (defined as the *average* of purchases and sales over assets) of 60 to 65 percent. Similarly, Jones, Lehn, and Mulherin (1991) show that US stocks which in

1988 had high institutional ownership tended to have high turnover rates (81.1%) compared to those that had low institutional ownership (54.9%).

23. In New York State, the limit is 6 percent.

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