Board of Governors of the Federal Reserve System

International Finance Discussion Papers

Number 688

December 2000

THE GEOGRAPHY OF CAPITAL FLOWS: WHAT WE CAN LEARN FROM BENCHMARK SURVEYS OF FOREIGN EQUITY HOLDINGS

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Abstract: To provide insight into the accuracy of U.S. data on international equity transactions, we compare estimates of U.S. holdings of equities in over 40 countries with actual holdings given by comprehensive U.S. benchmark surveys. If the rate of return used to revalue U.S. holdings in a given country is accurate, accurate holdings estimates imply accurate transactions data. For some countries, such as Canada and much of Latin America, the holdings estimates are quite accurate. For the majority of countries, however, there is a great disparity between our estimates and actual amounts, likely because U.S. data on international equity transactions record the country of the transactor, not the country of the issuer. Our estimates are far too high for financial centers--because many U.S. transactions that go through these countries involve securities issued in other countries--and far too low in most other countries, particularly in Europe and Asia. To illustrate the potential pitfalls of using estimated country-specific holdings data, we briefly present two cases in which the use of actual data leads to different conclusions. One case examines the determinants of U.S. equity holdings across countries; the other concerns the turnover rate of foreign equity portfolios.

Keywords: portfolio flows, international investment position, net foreign assets.

* When this paper was written, the authors were, respectively, Economist and Summer Intern in the International Finance Division of the Board of Governors of the Federal Reserve System; the second author has since resumed her studies at Wartburg College and thanks the IF Division for its hospitality. The authors thank William Griever, Dale Henderson, Gary Lee, Lois Stekler, and especially Charles Thomas for helpful comments. All errors are our own. The views in this paper are solely the responsibility of the authors and should not be interpreted as reflecting the views of the Board of Governors of the Federal Reserve System or of any other person associated with the Federal Reserve System. Corresponding author: frank.warnock@frb.gov

I. Introduction

In this paper we analyze the geographic accuracy of published U.S. data on *transactions* in foreign equities by comparing estimated and actual data on U.S. *holdings* of equities in over 40 countries. If the country-level holdings estimates are accurate, it is likely that the transactions data are also accurate. On the other hand, inaccuracies in country-level holdings estimates are likely due to inaccuracies in published transactions data, provided the composition of U.S. holdings in a given country is similar to the composition of that country's market.

A quick glance at Figures 1-6 should give the reader a clear indication of the conclusions from this exercise. In each chart the square dots represent actual holdings from comprehensive benchmark surveys and the solid line represents our holdings estimates. For financial centers such as Hong Kong, U.S. holdings are vastly overestimated; hence, published data on equity flows from the U.S. to financial centers are likely too high. For continental Europe, we underestimate U.S. holdings and, hence, published flows are likely too low. And for Latin American countries such as Mexico, U.S. holdings estimates and reported flows appear to be rather accurate. In our view, the main reason for the discrepancies apparent in the figures is that published U.S. portfolio flows data, as collected by the Treasury International Capital (TIC) reporting system, are ill-suited to estimate cross-border holdings because they identify only the country that the transaction is made through, not the country in which the foreign security was issued.

We care about the geographic accuracy of portfolio flows data for a number of reasons. First, any discussion of the effects of capital flows on a bilateral exchange rate, such as recent discussions concerning the strength of the dollar against the euro, presupposes that the bilateral flows data are accurate, contrary to the evidence in Figures 1-6. Second, bilateral capital flows data are the main component of estimates of cross-border portfolio holdings, which themselves are important for a number of reasons. To estimate wealth effects of changes in stock prices on consumption spending, one first needs estimates of equity holdings in both domestic and foreign stocks. Moreover, estimates of holdings of foreign securities play a large role in determining a country's net international investment position (IIP).[1] For example, although holdings of foreign equities are just one component of one side of the net IIP, inaccurate estimates can have a large effect on the overall position: A ten percent underestimation of holdings of foreign equities at end-1999 would result in

[1] For estimates of IIPs across a wide range of countries, see Lane and Miles-Ferretti (1999).

a 20 percent, or almost $200 billion, overstatement of the U.S. position as a net debtor.[2] Finally, investment income from foreign securities holdings, which is calculated using dividends and interest rates and estimates of holdings, feeds into both the national income and balance of payments accounts. Underestimation of foreign holdings--and, thus, investment income receipts from these holdings--results in underestimation of gross national product, overestimation of the current account deficit, and underestimation of national savings. Put another way, underestimating holdings leads to overestimation of the financing required for the current account deficit and underestimation of its availability.

In the United States, as in many other countries, timely and accurate estimates of foreign portfolio holdings do not exist. Official estimates are available only annually with about a six-month lag and are subject to major revisions. Prior to the mid-1990s, no accurate estimate of holdings at any point since the Second World War existed. To form an estimate of current holdings, economists had to guess an initial level of holdings at some point in the past--or start with levels from a survey conducted in 1943--and then sum subsequent transactions data and make valuation adjustments. No one knew how accurate the holdings estimates were, nor could they determine the accuracy of either the transactions data or the valuation adjustments. That changed in 1996: The inadequacy of holdings estimates became clear with the release of results from the Treasury Department's first modern-day benchmark survey of U.S. holdings of foreign securities. Official U.S. estimates, prepared by the Bureau of Economic Analysis (BEA), badly underestimated holdings: The benchmark survey prompted BEA to increase their estimate of end-1994 holdings by some $263 billion, or over 80 percent. Private estimates were no better; for example, Bohn and Tesar (1997) were off by more than $300 billion. Still, without having a true initial value of holdings to start from, there was no way of discerning whether the underestimations were due to poor estimates of initial holdings, omissions or inaccuracies in the transactions data, or inappropriate valuation adjustments.

With the release of the second modern-day benchmark survey, conducted as of December 1997, it became apparent that the transactions data and/or the valuation adjustments were flawed. Even starting with actual March 1994 holdings, by December 1997 the BEA underestimated

[2] These calculations use the net IIP with foreign direct investment valued at current cost.

holdings of foreign equities by $200 billion, or 17%. An underestimation that large could be taken as an indication that some transactions in foreign securities were likely being missed by the TIC system.[3] We do not dispute that some transactions might circumvent the reporting system, but we focus in this paper on the geography of portfolio flows and, hence, the weighting scheme used to revalue U.S. holdings of foreign equities.

The paper proceeds as follows. In the next section, we discuss our data and methodology for forming estimates of U.S. holdings of equities in over 40 countries. We view inaccuracies in the geography of our holdings estimates, which are presented in Section III, as an indication of geographical error in the portfolio flows data. At the end of the day, however, we still do not know the true geography of portfolio flows, so we do not know the extent to which erroneous portfolio flows data might influence conclusions made by researchers. But we do have actual holdings data, and hence can show how conclusions can be affected by erroneous holdings estimates, the main component of which are published portfolio flows data. In Section IV we discuss two cases. In the first, we show that using estimated rather than actual data would lead one to erroneously conclude that trade links are statistically significant determinants of the country distribution of the U.S. foreign equity portfolio. The second example in Section IV highlights the findings of Warnock (2000), who shows that U.S. (and Canadian) investors' turnover rates on foreign equities are much smaller than previously reported. Section V concludes.

II. Methodology and Data

We start with actual U.S. holdings of equities in 44 countries as well as a handful of regions as of March 31, 1994, as given by the Treasury Department's benchmark survey. The relatively small countries that we omit amount in sum to one percent of U.S. foreign equity holdings in 1994. Monthly data on net purchases of foreign equities by U.S. residents are from the TIC reporting

[3] Lois Stekler has, in a series of papers, pointed out that the TIC system is increasingly likely to miss transactions as it becomes more common for U.S. investors to deal directly with foreign intermediaries. See, for example, Stekler (1990) and Stekler and Truman (1992).

system. Data on stocks acquired via mergers are from Securities Data Corporation (SDC). Valuation adjustments are made using MSCI dollar price indices.[4]

To estimate holdings at the end of a month, we adjust the previous month's holdings for estimated price and exchange rate changes and add the current month's net purchases and equities acquired through stock swaps. Specifically, we use the following formula to estimate U.S. holdings of country *i*'s equities at the end of period *t*:

$$A_{i,t} = A_{i,t-1} * R_{i,t}/R_{i,t-1} + NP_{i,t} + SS_{i,t} \quad (1)$$

where $A_{i,t}$ is the amount of U.S. holdings of country *i*'s equities at the end of month *t*; $NP_{i,t}$ is net U.S. purchases of country *i*'s equities during month *t*; $SS_{i,t}$ are country *i*'s equities acquired by U.S. residents through stock swaps; and $R_{i,t}$ is the country *i*'s Morgan Stanley Capital Investment (MSCI) price index at the end of month *t*. The initial values of all A_i are given by the March 1994 benchmark survey. We now briefly discuss each of these four components.

Holdings

Holdings data are from the U.S. Treasury Department's comprehensive surveys of U.S. holdings of foreign securities, conducted as of March 31, 1994 and December 31, 1997. The surveys collected detailed information at the individual security level for U.S.-held foreign equities. Collecting data at the security level enables identification of the country of the issuer. Reporting to the surveys was mandatory, with penalties for noncompliance, and the data received were subjected to extensive analysis and editing before being accepted as accurate. The reporters consisted mainly of large custodians and large institutional investors, both of which were universally included in the sample; smaller custodians and institutional investors were sampled, but 99 percent of the data was from the major reporters. Holdings of U.S. private investors were included inasmuch as they were through U.S. mutual funds or entrusted to U.S.-resident custodians for safekeeping. Further details of the

[4] The benchmark survey and TIC data are available through the TIC web site, www.treas.gov/tic/. MSCI price indexes can be found at www.mscidata.com. Stocks swaps data are available by subscription from SDC, but often also appear in the financial press.

1997 survey, including findings and methodology, are discussed in Treasury Department and Federal Reserve Board (2000).[5]

Valuation adjustments

While we believe that the main source of discrepancies between estimated and actual holdings is flaws in the geography of the capital flows data, another possible source of error is in the price indexes used to make valuation adjustments. To the extent that in a given country the portfolio of U.S. investors differs from the market portfolio--or, more specifically, differs from the composition of that country's MSCI index--our valuation adjustments will not reflect actual capital gains or losses experienced by U.S. investors. Ideally, one would use a returns index with the same composition as U.S. holdings. Not knowing the composition of U.S. residents' equities portfolio in country *i*, we assume--as every researcher before us has--that U.S. residents hold the market portfolio in that country.[6] Morgan Stanley strives to capture 60 percent of each market in their indexes, and therefore their indexes seem to be appropriate for our purposes.

Morgan Stanley reports, in general, three price indices per country: the straight dollar returns index, a net index with dividends net of estimated taxes reinvested, and a gross index with gross dividends reinvested. If dividends are always paid out and not reinvested, or reinvested in a transaction reported to the TIC system, the straight dollar returns index is appropriate. However, to the extent that dividends are automatically reinvested, as is the case with dividends reinvestment plans (DRIPs), and this reinvestment circumvents the TIC reporting system, the index with gross dividends reinvested is appropriate.

We do not know the extent to which U.S. investors utilize DRIPs, although a cursory investigation suggests their use is prevalent. The two major U.S. holders of foreign equities are mutual funds and pension funds. Mutual funds tend to automatically reinvest dividends unless

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[5] The more recent survey was part of the 1997 Coordinated Portfolio Investment Survey (IMF, 2000) in which 29 countries participated. The United States was among the few countries that used the security-by-security approach to data collection that is recognized by the IMF as providing more accurate results.

[6] It is likely that U.S. investors' foreign equity portfolios are skewed towards equities of larger firms, about which information is more readily available. See Kang and Stulz (1997) for evidence of foreign investors' holdings in Japan.

investors explicitly state another preference. The few large pension funds that we contacted indicated that they, too, automatically reinvest dividends. Our hunch, therefore, is that the majority of U.S. investors automatically reinvest dividends, suggesting that the index with gross dividends reinvested is the most appropriate one to use. However, not knowing precisely the extent to which DRIPs are used, we present results using both indexes. The reader should view the two sets of estimates as upper and lower bounds, with our "true" estimate falling somewhere in between.

A further issue with our valuation adjustment is that for a given country even if the composition of the MSCI index exactly matches the composition of U.S. holdings, with monthly transactions data we can not capture profits (or losses) made on intra-month trades. To the extent that traders are profiting on intra-month trades, we will underestimate valuation changes.

Transactions

If the price indexes used to make our valuation adjustments are reasonable, then deviations of our country-level estimates from actual holdings are due mainly to inaccuracies in the transactions data. These data, collected monthly through the TIC reporting system, measure transactions in foreign equities between U.S. and foreign residents. As noted above, a major shortcoming of the TIC system is that it records only the country of the foreign transactor, but not the country of the foreign issuer. The common assumption is that the countries of the transactor and issuer are the same, but transactions that go through financial centers such as Hong Kong and the United Kingdom often involve equities issued in other countries. For these centers, it is clearly incorrect to suppose that countries of the transactor and issuer are the same. As we will show, a system that identifies only the country of the transactor, not the country of the issuer, is inherently flawed for estimating country-level holdings. The extent of this flaw is the subject of Section III.

Stock Swaps

The TIC data on long-term securities capture market transactions between U.S. and foreign residents. However, U.S. residents also acquire stocks through merger-related stock swaps. When a foreign company acquires a U.S. firm, one form of financing the deal is an exchange of equity in which shareholders of the target (U.S.) firm are given stocks in the acquiring (foreign) firm. Such acquisitions of foreign stocks are not reported to the TIC system. Moreover, if the acquisition of

foreign stocks through swaps results in a greater than desired weighting on foreign stocks in U.S. equity portfolios, U.S. residents will subsequently sell foreign stocks to rebalance their portfolios, and such sales are reported to the TIC system. Since the TIC system does not capture the initial acquisition, but does capture subsequent sales, measures of stock swaps must be included in any analysis of capital flows or asset holdings.

The use of stock swaps to finance cross-border mergers and acquisitions is a relatively recent phenomenon that swelled in importance in 1998 and 1999, when U.S. residents acquired over $100 billion annually in foreign stocks through swaps, due largely to the megamergers of Daimler Chrysler, BP Amoco, and Airtouch Vodafone. Data from SDC indicate that prior to 1998 there was only one deal that involved a substantial exchange of stocks, the 1989 Beecham/SmithKline Beckman merger. In the period we investigate in this paper, 1994 to 1997, stock swaps were relatively small; including stock swaps increases our aggregate end-1997 holdings estimate by about $8 billion,or less than one percent.[7]

III. Results

Tables 1a and 1b, which differ only by the type of index used for estimating valuation changes, show our main results. In Table 1a, we use MSCI straight dollar price indexes, which capture changes in exchange rates and equity prices. In Table 1b, we use MSCI indexes with (gross) dividends reinvested, which have been used in, for example, Lewis (1999). A comparison of the bottom lines in the two tables shows that assuming dividends are reinvested (and that these reinvestment transactions are not captured by the TIC system) increases our aggregate estimate by $87 billion, or a little over 8 percent. The difference between the two types of returns indexes varies by country; for example, dividends pay-outs are relatively low in Asia, so estimated holdings of Asian equities do not differ greatly between Tables 1a and 1b. We do not judge which, the straight price index or the gross index with dividends reinvested, is more appropriate, but instead view our estimates in Tables 1a and 1b as lower and upper bounds. Our hunch is that DRIPs are prevalent but not captured by the TIC system; if so, the estimates in Table 1b are likely more appropriate. But, for ease of exposition, in all that follows we use our estimates using the straight price index (Table 1a).

[7] More than half of the swaps in our sample involved stocks in the United Kingdom and Canada.

We see in Table 1a that there are only a few countries for which holdings estimated using transactions and valuation adjustments are greater than holdings given by the December 1997 benchmark survey. For most countries estimated holdings fall short of actual holdings. We investigate the country-level estimates in this section, starting with the financial centers.

Financial Centers

Our prior going into this exercise was that because the TIC system identifies only the country of the transactor, not the country of the issuer, using TIC data to estimate U.S. holdings of stocks in financial centers would likely result in sizeable overestimations. This proves to be true for Hong Kong and the United Kingdom. As a way of describing Table 1a, we will go through the Hong Kong numbers column-by-column.

The first benchmark survey showed that U.S. residents held almost $18 billion in Hong Kong stocks in March 1994 (column 1). We applied Equation 1 to estimate holdings based on net purchases and a valuation adjustment for each month from April 1994 to December 1997; the December 1997 estimate of $103 billion is reported in column 6. The difference between the $85 billion increase in estimated holdings (column 4, which is column 6 minus column 1) and the $96 billion in reported net purchases (column 2) is the negative $11 billion in valuation adjustments (column 3).

Two useful and related comparisons can be made with the data from Table 1a. First, we can compare estimated and actual holdings as of December 1997 (columns 6 and 7), which for Hong Kong are vastly different: End-1997 holdings estimated using TIC data and MSCI returns were $103 billion, compared with only $28 billion given by the survey. Similarly, the difference in the sum of estimated transactions and valuation adjustments (column 4) and the change in holdings from the surveys (column 5) can be examined: Estimated net purchases and valuation adjustments were $85 billion, far greater than the $11 billion increase indicated by the two benchmark surveys, suggesting that we should be extremely wary of U.S. transactions data opposite Hong Kong.

Estimated end-1997 holdings of U.K. stocks based on transactions data, stock swaps, and valuation adjustments are also greater than actual holdings. Estimated holdings increased $148 billion, some $30 billion (or 25 percent) greater than the change in holdings indicated by the surveys. That our estimate overstates the change in holdings by only 25 percent for a financial center such as

the United Kingdom is somewhat surprising. Two possible reasons come to mind. One is that the transactions data are accurate and the U.K. is not a financial center for equities trading. The other, more likely, reason is that our valuation adjustments underestimate valuation changes experienced by U.S. investors. Moreover, U.K. firms appear to be generous in their dividends payments; in Table 1b with gross dividends reinvested, estimated holdings increase by almost 50 percent more than actual holdings.[8]

Figures 1 and 2 show the evolution of estimated holdings (the solid lines), as well as the actual benchmark values (the square dots), for Hong Kong and the United Kingdom. Figure 1 highlights the problem with the TIC data for Hong Kong. Even with the sharp drop in estimated holdings of Hong Kong stocks in late 1997--due to a 30 percent drop in dollar returns in October 1997 alone--using the TIC data we vastly overestimate holdings. By comparison, in Figure 2 our estimates using the TIC data seem surprisingly close to the U.K. survey number.

There are no MSCI indexes for the main financial centers in the Caribbean Basin (Bermuda, Bahamas, Netherlands Antilles, Panama, and the British West Indies), so we group them in our analysis. In Table 1a we use the MSCI World index on the assumption that these firms are more global than local to the Latin America/Caribbean region. Even with a substantial valuation adjustment, estimated holdings fell some $12 billion short of actual holdings. Using the MSCI index for the U.S.--appropriate if funds going through the Caribbean are returning to the U.S. market--would increase the valuation adjustment by another $16 billion and bring the estimate in line with actual holdings.

Overall, we overestimate holdings in the three main financial centers by $86 billion. Combined with the fact that we underestimate overall holdings, this indicates that we must underestimate holdings in other countries. As we show next, we underestimate holdings for almost every other country in our sample.

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[8] While we do not address bond flows in this paper, net U.S. purchases of U.K. bonds are likely vastly overcounted in the TIC data. The benchmark surveys indicated a $34 billion increase in U.S. holdings of U.K. bonds over the same period that the TIC system counted $46 billion in net purchases. Preliminary calculations suggest that valuation adjustments totaled $18 billion, so estimated holdings increased $64 billion, or almost double the increase in actual holdings.

Europe

Underestimations in Europe (excluding the U.K.) total $145 billion, of which $114 billion are in the largest five countries: France, Netherlands, Italy, Germany, and Switzerland.[9] As the overestimation in the U.K. was only $30 billion, it is likely that many transactions in European equities are either going through Hong Kong or being missed altogether. Figure 3 shows the evolution of estimated holdings for one representative European country, Germany; graphs for the other large European countries, not shown, are similar.[10]

Asia/Pacific

Partially offsetting the $74 billion overestimation in Hong Kong is a $42 billion underestimation in Japan. There are also underestimations in each of the emerging market Asian countries, the greatest being in Taiwan. However, as Figure 4 shows, in late 1997 estimated holdings plummeted in Indonesia--and in emerging Asia in general--due primarily to the sharp drop in equity valuations. Given the severity of the decrease in valuations that coincided with the East Asian crisis, estimated holdings were rather close to actual ones.

Western Hemisphere

For most countries in the Western Hemisphere, our holdings estimates are quite accurate. For Canada, the sum of TIC net purchases ($6.6 billion), stock swaps ($1.4 billion), and valuation adjustments ($26.1 billion) was within $3 billion of the increase in holdings given by the benchmark surveys. For most of the large Latin American countries, our estimates are also quite accurate, implying that for these countries the TIC transactions data are also relatively accurate. Estimated holdings of Mexican (Figure 5) and Argentinian stocks were each within 5 percent of actual holdings, and estimated holdings of Chilean stocks within 15 percent. However, holdings of

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[9] Comparable underestimations from Table 1b with gross dividends reinvested are $114 billion for Europe and $93 billion for the five largest European countries.

[10] Going forward, care must be taken to include stocks acquired through swaps when estimating U.S. holdings of European stocks. We do so, but as we have noted the amounts were quite small prior to 1998 and hence have little effect on our estimates. However, in 1998 and 1999 U.S. acquisitions of European stocks were dominated by swaps.

Brazilian stocks (Figure 6) are underestimated by a large amount; our estimate is some $10 billion less than the $31 billion given by the survey.

Figure 5 deserves a close look. Even with the sharp drop in estimated U.S. holdings during the Peso crisis of late 1994 and the spillover effects of the 1997 East Asian crisis, our end-1997 estimate of U.S. holdings of Mexican stocks is remarkably close to the actual amount.

IV. Implications

Our results have implications for U.S. data collection efforts and for the research community. We briefly discuss these in turn.

Implications for U.S. Data Collection

Our results have important implications for the collection of U.S. data on transactions in, and holdings of, foreign equities. As Tables 1a and 1b and Figures 1-6 show, country-level holdings estimates that are based on transactions data can be incredibly inaccurate. Over the almost four years between benchmark surveys, estimated holdings for many countries deviated greatly from actual holdings. One way to increase the accuracy and timeliness of the estimates is to increase the frequency of the benchmark surveys. Another possibility is to expand the current monthly reporting system to include information on the country of the security, not just of the transactor.

Summing our estimates produces an estimate of aggregate U.S. holdings of foreign equities as of end-1997 of $1054 billion (using straight MSCI price indexes), somewhat closer to the $1208 billion counted in the benchmark survey than was BEA's estimate of $1001 billion. Does this mean that our estimates are better? To answer this, we must first understand why our estimates differ from BEA's.

One possible reason that the BEA estimate is less than our estimate is that it revalues holdings quarterly, not monthly as we have done. Suppose, for example, that U.S. investors were informed enough to be large net sellers in a market the month prior to a sharp decline in prices, and that they subsequently reestablished their positions after the price bottomed out. In this admittedly unlikely case, quarterly valuation adjustments would underestimate holdings. To judge the extent this underestimation might have occurred, in Table 2 we examine the effect of quarterly versus monthly valuation adjustments. In the aggregate, quarterly-adjusted estimated holdings were $1052

billion, only $2 billion less than monthly-adjusted holdings estimates. For every country the difference was very small. In all, the lower frequency of BEA's estimates goes only a very small way toward explaining the discrepancy. Since it is likely that the BEA uses the same price indexes for valuation adjustments, the only other reason for the discrepancy is that perhaps they use fewer countries (and, hence, more aggregation) in forming their estimates.[11]

Since the frequency of estimation makes little difference, the only other source of the discrepancy between our estimates and BEA's is the choice of a weighting scheme for valuation adjustments. For our estimates to be "better" than BEA's, our weighting scheme would have to be considered superior. But our weighting scheme is based entirely on the distribution of U.S. transactions across countries, which we have claimed throughout this paper is flawed. Since we cannot argue that our weighting scheme is superior, neither can we claim that our closer estimates are in some sense preferable.

That our aggregate results with dividends reinvested are substantially higher, totaling $1141 billion, or only 5 percent below actual holdings, deserves further attention. The extent that dividends are reinvested but not captured by the transactions data is an open question that could have important implications for estimating U.S. net foreign assets.

Implications for Research

Researchers have analyzed both estimated holdings and country-level transactions data. We examine the implications of using these data in turn.

Research on Capital Flows

Many researchers have analyzed the monthly U.S. capital flows data. For example, Chuhan, Claessens, and Mamingi (1998) examines the effects of country-specific and U.S. factors on U.S. net purchases of emerging market stocks during the initial surge of portfolio investment in these countries, 1988 to 1992; Edison and Warnock (2000) update this work through the 1990s. Taylor and Sarno (1999) use the TIC transactions data to examine the long- and short-term determinants of U.S. portfolio flows to emerging markets in a panel framework. Geert Bekaert and Campbell Harvey

[11] BEA also subtracts commissions from the TIC data, but these adjustments are far too small to explain the discrepancy between our estimates.

use the TIC data to determine structural breaks in capital flows to emerging markets; see, for example, Bekaert and Harvey (1998) and Bekaert, Harvey, and Lumsdaine (1999). Linda Tesar has used both the TIC data and estimated holdings in a number of studies, documenting among other things the high turnover rate on securities held by foreign residents; see, for example, Tesar and Werner (1995).

The TIC data likely figure prominently even in cases in which the focus is not specifically on U.S. portfolio flows. For example, Portes and Rey (1999) examine bilateral cross-border transactions for 14 countries in a panel framework and find that information flows are an important determinant of gross transactions. Since transactions through the U.S. are a substantial portion of global cross-border transactions, the TIC data are featured prominently in their data set.

The danger in using these data, our results imply, is that researchers may attribute economic causes to equity flows that are assigned to the wrong country. In the cases of Hong Kong and the United Kingdom, relating flows to other economic information may be extremely misleading. Related to the overcounting opposite these countries, flows to continental Europe are likely vastly undercounted. On the other hand, flows to emerging markets seem to be pretty well represented by the TIC data, with the notable exceptions of Brazil and Taiwan.

Given the inaccuracy of the country attributions in the TIC data, panel estimation of equity flows poses a potential problem, because the influence of erroneous county-level data may be hidden. On the other hand, when researchers estimate individual country-level regressions, it may be possible to detect the effects of the flawed geography of transactions data. For example, Brennan and Cao (1997), in explaining anomalous results in their U.K. regressions, conclude that U.S. investors have better information than U.K. residents on U.K. equities. Another interpretation is that data on U.S. transactions in U.K. securities are flawed because they include transactions involving equities issued in many countries. In the Brennan and Cao study, the anomalous results are evident only because country-level regressions are reported. In a panel framework, the effects of transactions counted opposite countries like Hong Kong or the United Kingdom are unknown; researchers should drop one or more countries to determine if the relationships change substantially.

In sum, with respect to U.S. data on equity flows, we do not view our results as suggesting that these data should not be used in research. However, since we have no true measure of transactions, we cannot know the extent to which erroneous capital flows data influence results, so

care should be taken to ensure results are not unduly influenced by data opposite financial centers in particular.

Research using Estimated Holdings

For holdings, unlike transactions, we have actual data, so we can analyze the effect of using erroneous holdings estimates. We briefly highlight two cases in which using estimated holdings substantially affects results.

As shown in Warnock (2000), the influential Tesar and Werner (1995) finding that investors turn over their foreign portfolio faster than their domestic portfolio is much less evident when actual holdings data are used. Tesar and Werner used cross-border holdings data as of end-1989, when the United States was already conducting benchmark surveys of foreign holdings of *U.S. securities*, but none of the other countries in their sample were, and no country--U.S. included--had conducted a survey of residents' holdings of *foreign securities*. Hence, the denominators in their analysis, cross-border holdings, were in all but one case official estimates based almost entirely on transactions data. Data released after the Tesar-Werner analysis show that the official estimates of holdings of foreign equities used in the study were off by a factor of two for the U.S. and by a factor of at least 10 for Canada. Table 3, which shows the original results (in Panels A and B) along with results using more up-to-date estimates (in Panel C), indicates that the finding that domestic residents turnover their foreign equity portfolios much faster than their domestic portfolios was 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 from 7.7 at least to 0.98, if not further. Of course, our point is not to fault Tesar and Werner, who used published data, or the official data compilers, but rather to highlight the fact that capital flows data are poorly suited for estimating holdings of foreign securities.

Ahearne, Griever, and Warnock (2000) find that the main determinant of the country distribution of U.S. equity holdings--after normalizing by the size of foreign markets--is the portion of the foreign market that is available on U.S. exchanges, which they interpret as evidence of the importance of information asymmetries. The first column in Table 4, which presents representative results, shows that in addition to the portion of the foreign market that is listed on U.S. exchanges, foreign ownership restrictions inhibit U.S. investment, but there is no evidence that goods trade plays

any role in the geography of U.S. holdings.[12] However, as the second column in Table 4 shows, if *estimated* rather than actual holdings were used, one would conclude that trade does indeed matter. Hence, the table shows that countries for whom the United States is an important trading partner are less underweighted in U.S. portfolios if estimated holdings are used, but not when one uses actual holdings. The reason for this discrepancy is that there is a positive relationship between trade with the United States and the degree of overestimation of holdings.

V. Conclusion

In this paper we presented estimated U.S. holdings of equities across a wide range of countries as a means to analyze the geographic accuracy of capital flows data. We found large discrepancies between our estimates and actual holdings at the country level, and argued that these discrepancies are likely due the inaccuracy of U.S. data on international equity transactions. In particular, estimated holdings in financial centers, especially Hong Kong, are vastly greater than holdings given by the U.S. comprehensive benchmark survey. Relatedly, estimated holdings fall short of actual holdings for most other countries.

We view this paper as a public service announcement. Bilateral capital flows data, readily available at a relatively high frequency, are used by many. Data users should know, however, that the geography of these data is flawed. Short of redesigning the reporting system to identify the country of the issuer instead of the country of the transactor, these flaws are likely to persist.

Cross-border holdings data might, on the other hand, become more accurate. Discussions are underway to increase the frequency of benchmark surveys, with annual surveys coordinated across many countries a real possibility.

[12] The dependent variable in Table 4 is a measure of underweighting of countries in U.S. portfolios.

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Data Appendix:

Countries

In choosing countries, the initial criterion was that an MSCI price index, monthly TIC, and 1994 and 1997 benchmark survey data existed for each country. Since the TIC and survey data are available for a wider range of countries than are in the MSCI indexes, at times we used regional MSCI indexes to make valuation adjustments; these are noted below. We omitted many smaller countries that in sum amounted to one percent of the March 1994 U.S. portfolio of foreign equities.

MSCI Indexes

For emerging markets, we used "free" indexes where available, which exclude companies and share classes that are not available to foreign investors.

For Israel, we used the MSCI Israel price index, which includes a mixture of their domestic and non-domestic indices. Israeli law precluded any company that cross-listed on a foreign exchange from listing domestically. Although this law has recently been repealed, the indices are broken down between domestic indices, which include stocks contained in the country's domestic exchange, and non-domestic indices that only include stocks that are listed on foreign exchanges. The overall Israel index that we use is a mixture of the domestic and non-domestic indexes.

When matching data from each of the three sources could not be found, substitutions or adjustments were made, and each was case specific. We note these here.

Belgium and Luxembourg were combined in the TIC transaction data and in the 1994 survey results, but separate in the indices. In order to estimate holdings in Belgium-Luxembourg, the return ratio was weighted between the Belgium and Luxembourg price series based on a ratio of the1993 GNPs.

The Caribbean Basin includes Bermuda, Bahamas, Netherlands Antilles, Panama, and the British West Indies. These are combined in the 1994 survey, but separate under the 1997 survey. In addition, in the 1997 survey the British West Indies is divided into the British Virgin Islands, the Cayman Islands, and Turks and Caicos Islands. These all were summed in our work to obtain the 1997 survey number and net purchases. We used the MSCI World index to make valuation adjustments, which is appropriate if the majority of holdings in the Caribbean are not in domestic stocks, but rather in trusts that invest primarily in large institutions throughout the world.

African countries in this paper include Morocco, Egypt, Ghana, and Liberia. We sum their net purchases and calculate valuation adjustments using the Emerging Market Europe and Middle East price index, which appears to be the most applicable of the MSCI regional indices. Our 1994 starting value consists only of holdings of Liberian stocks, as this was the only one of the four countries listed in the1994 survey.

Other Latin America consists of Uruguay, Trinidad & Tobago, Jamaica, and Ecuador; valuation adjustments use the Latin America Free index.

The MSCI price index for Hungary starts in December 1994, so we splice it with the International Finance Corporation Global (IFCG) price index to cover April 1994 to December 1994.

The price indices for Russia and the Czech Republic start in December 1994, but there is no IFCG data for April to December 1994. Therefore, valuation adjustments are made starting January 1995. Although this is not ideal, holdings before December are not large enough to change our estimates significantly.

New Zealand and Sri Lanka are not included because monthly TIC data does not exist for these countries. New Zealand is by far the largest country we omit; in 1994, U.S. holdings of N.Z. stocks were $4.3 billion, or over half of our omitted holdings.

Stock Swaps

Stock swaps data are from SDC's subscription database and include only equity exchanges in conjunction with foreign acquisitions of non-financial U.S. firms.

Table 1a: Estimated and Actual Holdings ($ millions)

using straight dollar returns

Country	Mar-94 Actual Holdings	Changes from March 1994 to December 1997				Dec-97 Holdings		Estimation error (%)
		Estimated			Actual			
		Net Acquisitions	Valuation-adjustment	Total	(based on Surveys)	Estimated	Actual	(6-7)/7
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FINANCIAL CENTERS						**386,944**	**294,889**	
Caribbean Basin	25,200	-2,161	14,025	11,864	24,044	37,064	49,244	-25%
HongKong	17,500	95,934	-10,824	85,110	10,620	102,610	28,120	265%
United Kingdom	99,700	51,411	96,159	147,570	117,825	247,270	217,525	14%
INDUSTRIAL COUNTRIES								
Canada	39,700	7,978	26,131	34,109	31,098	73,809	70,798	4%
Europe						**356,679**	**501,275**	
Austria	1,200	320	-76	244	2,507	1,444	3,707	-61%
Belgium-Luxembourg	5,000	-3,328	2,149	-1,179	6,354	3,821	11,354	-66%
Denmark	1,800	2,093	3,095	5,188	7,117	6,988	8,917	-22%
Finland	3,000	2,152	3,868	6,020	11,785	9,020	14,785	-39%
France	25,600	13,306	13,510	26,816	59,419	52,416	85,019	-38%
Germany	25,600	3,679	18,479	22,158	39,365	47,758	64,965	-26%
Greece	500	113	333	446	1,013	946	1,513	-37%
Ireland	2,600	3,038	3,851	6,889	11,490	9,489	14,090	-33%
Italy	13,800	2,851	5,116	7,967	27,747	21,767	41,547	-48%
Netherlands	38,100	-1,092	41,347	40,255	68,884	78,355	106,984	-27%
Norway	3,900	1,360	2,678	4,038	5,593	7,938	9,493	-16%
Portugal	1,100	1,586	1,521	3,107	5,893	4,207	6,993	-40%
Spain	13,700	162	14,647	14,809	11,523	28,509	25,223	13%
Sweden	11,800	3,585	19,014	22,599	26,983	34,399	38,783	-11%
Switzerland	21,000	1,494	23,873	25,367	40,897	46,367	61,897	-25%
Turkey	600	567	2,086	2,653	5,405	3,253	6,005	-46%
Asia/Pacific						**125,885**	**177,709**	
Australia	16,900	5,375	2,197	7,572	14,220	24,472	31,120	-21%
Japan	99,400	43,640	-48,864	-5,224	37,004	94,176	136,404	-31%
Singapore	6,800	2,201	-1,764	437	3,385	7,237	10,185	-29%
EMERGING MARKETS								
Asia						**14,781**	**31,186**	
China	900	1,176	-749	427	1,356	1,327	2,256	-41%
India	1,100	1,866	-480	1,386	5,076	2,486	6,176	-60%
Indonesia	1,900	2,095	-2,745	-650	588	1,250	2,488	-50%
Korea	4,400	6,720	-8,387	-1,667	28	2,733	4,428	-38%
Malaysia	9,100	58	-5,357	-5,299	-4,387	3,801	4,713	-19%
Pakistan	200	238	-98	140	980	340	1,180	-71%
Philippines	1,900	1,271	-1,889	-618	948	1,282	2,848	-55%
Taiwan	500	156	241	397	4,439	897	4,939	-82%
Thailand	4,100	262	-3,697	-3,435	-1,942	665	2,158	-69%
Latin America						**76,554**	**88,887**	
Argentina	7,600	2,257	2,645	4,902	5,292	12,502	12,892	-3%
Brazil	8,400	6,572	6,240	12,812	22,938	21,212	31,338	-32%
Chile	2,500	1,306	116	1,422	2,055	3,922	4,555	-14%
Colombia	300	815	53	868	404	1,168	704	66%
Mexico	34,700	1,141	-1,877	-736	265	33,964	34,965	-3%
Peru	400	1,566	403	1,969	1,941	2,369	2,341	1%
Venezuela	900	263	300	563	1,075	1,463	1,975	-26%
Other Latin America	0	-32	-14	-46	117	-46	117	-139%
Other						**19,585**	**33,556**	
Czech Republic	300	135	-85	50	463	350	763	-54%
Hungary	100	360	664	1,024	3,383	1,124	3,483	-68%
Israel	2,600	2,886	961	3,847	4,436	6,447	7,036	-8%
Poland	100	448	-106	342	1,518	442	1,618	-73%
Russia	0	876	2,484	3,360	8,457	3,360	8,457	-60%
South Africa	4,400	2,291	584	2,875	5,537	7,275	9,937	-27%
African Countries	100	401	85	486	2,162	586	2,262	-74%
TOTAL	561,000	271,391	221,846			**1,054,237**	**1,198,300**	-12%

Table 1b: Estimated and Actual Holdings ($ millions)

using returns with gross dividends reinvested

	Mar-94 Actual Holdings	Changes from March 1994 to December 1997				Dec-97 Holdings		
		Estimated			Actual			Estimation error (%)
		Net Acquisitions	Valuation-adjustment	Total	(based on Surveys)	Estimated	Actual	
Country	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FINANCIAL CENTERS						**423,459**	**294,889**	
Caribbean Basin	25,200	-2,161	16,976	14,815	24,044	40,015	49,244	-19%
HongKong	17,500	95,934	-3,630	92,304	10,620	109,804	28,120	290%
United Kingdom	99,700	51,411	122,529	173,940	117,825	273,640	217,525	26%
INDUSTRIAL COUNTRIES								
Canada	39,700	7,978	32,249	40,227	31,098	79,927	70,798	13%
Europe						**387,452**	**501,275**	
Austria	1,200	320	1	321	2,507	1,521	3,707	-59%
Belgium-Luxembourg	5,000	-3,328	3,266	-62	6,354	4,938	11,354	-57%
Denmark	1,800	2,093	3,520	5,613	7,117	7,413	8,917	-17%
Finland	3,000	2,152	4,352	6,504	11,785	9,504	14,785	-36%
France	25,600	13,306	16,838	30,144	59,419	55,744	85,019	-34%
Germany	25,600	3,679	21,470	25,149	39,365	50,749	64,965	-22%
Greece	500	113	428	541	1,013	1,041	1,513	-31%
Ireland	2,600	3,038	4,559	7,597	11,490	10,197	14,090	-28%
Italy	13,800	2,851	6,591	9,442	27,747	23,242	41,547	-44%
Netherlands	38,100	-1,092	51,237	50,145	68,884	88,245	106,984	-18%
Norway	3,900	1,360	3,197	4,557	5,593	8,457	9,493	-11%
Portugal	1,100	1,586	1,845	3,431	5,893	4,531	6,993	-35%
Spain	13,700	162	18,614	18,776	11,523	32,476	25,223	29%
Sweden	11,800	3,585	21,241	24,826	26,983	36,626	38,783	-6%
Switzerland	21,000	1,494	26,628	28,122	40,897	49,122	61,897	-21%
Turkey	600	567	2,480	3,047	5,405	3,647	6,005	-39%
Asia/Pacific+A21						**131,695**	**177,709**	
Australia	16,900	5,375	5,360	10,735	14,220	27,635	31,120	-11%
Japan	99,400	43,640	-46,472	-2,832	37,004	96,568	136,404	-29%
Singapore	6,800	2,201	-1,510	691	3,385	7,491	10,185	-26%
EMERGING MARKETS								
Asia						**15,297**	**31,186**	
China	900	1,176	-685	491	1,356	1,391	2,256	-38%
India	1,100	1,866	-399	1,467	5,076	2,567	6,176	-58%
Indonesia	1,900	2,095	-2,683	-588	588	1,312	2,488	-47%
Korea	4,400	6,720	-8,308	-1,588	28	2,812	4,428	-37%
Malaysia	9,100	58	-5,202	-5,144	-4,387	3,956	4,713	-16%
Pakistan	200	238	-79	159	980	359	1,180	-70%
Philippines	1,900	1,271	-1,860	-589	948	1,311	2,848	-54%
Taiwan	500	156	268	424	4,439	924	4,939	-81%
Thailand	4,100	262	-3,697	-3,435	-1,942	665	2,158	-69%
Latin America						**82,433**	**88,887**	
Argentina	7,600	2,257	3,913	6,170	5,292	13,770	12,892	7%
Brazil	8,400	6,572	7,948	14,520	22,938	22,920	31,338	-27%
Chile	2,500	1,306	602	1,908	2,055	4,408	4,555	-3%
Colombia	300	815	148	963	404	1,263	704	79%
Mexico	34,700	1,141	292	1,433	265	36,133	34,965	3%
Peru	400	1,566	509	2,075	1,941	2,475	2,341	6%
Venezuela	900	263	367	630	1,075	1,530	1,975	-23%
Other Latin America	0	-32	-34	-66	117	-66	117	-157%
Other						**20,706**	**33,556**	
Czech Republic	300	135	-68	67	463	367	763	-52%
Hungary	100	360	720	1,080	3,383	1,180	3,483	-66%
Israel	2,600	2,886	1,247	4,133	4,436	6,733	7,036	-4%
Poland	100	448	-94	354	1,518	454	1,618	-72%
Russia	0	876	2,545	3,421	8,457	3,421	8,457	-60%
South Africa	4,400	2,291	1,129	3,420	5,537	7,820	9,937	-21%
African Countries	100	401	230	631	2,162	731	2,262	-68%
TOTAL	561,000	271,391	308,577			**1,140,968**	**1,198,300**	-5%

Table 2: Monthly & Quarterly TIC-Adjusted Holdings ($ millions)

Country	Survey 1994	Estimated Monthly 1997	Estimated Quarterly 1997	Survey 1997	Difference (Quarterly - Monthly)	percent
African Countries	100	586	567	2,262	(19)	3%
Argentina	7,600	12,502	12,525	12,892	23	0%
Australia	16,900	24,472	24,456	31,120	(16)	0%
Austria	1,200	1,444	1,437	3,707	(7)	1%
Belgium-Luxembourg	5,000	3,821	3,849	11,354	28	1%
Brazil	8,400	21,212	21,051	31,338	(161)	1%
Canada	39,700	73,809	73,794	70,798	(15)	0%
Caribbean Basin	25,200	37,064	36,808	49,244	(256)	1%
Chile	2,500	3,922	3,898	4,555	(24)	1%
China	900	1,327	1,441	2,256	114	9%
Colombia	300	1,168	1,180	704	12	1%
Czech Republic	300	350	351	763	1	0%
Denmark	1,800	6,988	6,892	8,917	(96)	1%
Finland	3,000	9,020	8,842	14,785	(179)	2%
France	25,600	52,416	52,188	85,019	(228)	0%
Germany	25,600	47,758	47,952	64,965	194	0%
Greece	500	946	951	1,513	5	1%
Hong Kong	17,500	102,610	102,349	28,120	(261)	0%
Hungary	100	1,124	1,184	3,483	60	5%
India	1,100	2,486	2,488	6,176	2	0%
Indonesia	1,900	1,250	1,273	2,488	22	2%
Ireland	2,600	9,489	9,409	14,090	(80)	1%
Israel	2,600	6,447	6,410	7,036	(37)	1%
Italy	13,800	21,767	21,708	41,547	(59)	0%
Japan	99,400	94,176	93,838	136,404	(338)	0%
Korea	4,400	2,733	2,805	4,428	72	3%
Malaysia	9,100	3,801	3,786	4,713	(15)	0%
Mexico	34,700	33,964	33,991	34,965	27	0%
Netherlands	38,100	78,355	78,234	106,984	(121)	0%
Norway	3,900	7,938	7,912	9,493	(26)	0%
Other Latin America	3,900	(46)	(40)	117	6	12%
Pakistan	200	340	331	1,180	(9)	3%
Peru	400	2,369	2,323	2,341	(46)	2%
Philippines	1,900	1,282	1,289	2,848	8	1%
Poland	100	442	445	1,618	3	1%
Portugal	1,100	4,207	4,167	6,993	(40)	1%
Russia	-	3,360	3,201	8,457	(160)	5%
Singapore	6,800	7,237	7,279	10,185	42	1%
South Africa	4,400	7,275	7,307	9,937	32	0%
Spain	13,700	28,509	28,375	25,223	(133)	0%
Sweden	11,800	34,399	34,362	38,783	(37)	0%
Switzerland	21,000	46,367	46,368	61,897	1	0%
Taiwan	500	897	867	4,939	(30)	3%
Thailand	4,100	665	753	2,158	88	13%
Turkey	600	3,253	3,204	6,005	(49)	2%
United Kingdom	99,700	247,270	246,314	217,525	(956)	0%
Venezuela	900	1,463	1,419	1,975	(44)	3%
SUMS:	564,900	1,054,237	1,051,533	1,198,300		

Table 3. Turnover rates in international equities, 1989 ($US billion)

A. Domestic turnover rates (from Tesar and Werner, 1995)

	Total transactions on domestic market (A)	Equity market capitalization (B)	Domestic turnover (A/B)
Canada	177.8	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 (from Warnock, 2000)

	Transactions in foreign equity (C)	Investment positions in foreign equity (D)	Turnover rate (C/D)
Canada	43.1	44*	0.98*
US	232.8	197	1.18

* The amount should be considered a lower bound as it corresponds to Canadian holdings of *U.S. equities* as given by the 1989 benchmark survey of foreign portfolio investment in the United States (Treasury Department, 1998). Prior to 1997, Canadian position data in foreign stocks were reported at book value, not market value, and hence are not comparable with market transactions. To the extent that Canadians held foreign stocks in countries other than the United States, their foreign holdings and turnover rate in foreign equities are lower than indicated in Panel C.

Table 4. Explaining Home Bias: The Importance of Trade

	(1)	(2)
	Dependent Variable: BIAS	
	(using actual holdings)	*(using estimated holdings)*
USLISTED	-0.39*** (0.06)	-0.29*** (0.06)
RESTRICT	0.08** (0.04)	0.12*** (0.04)
TRADE	-0.08 (0.12)	-0.24** (0.12)
N	48	43
Adjusted R^2	0.53	0.50

Notes. All variables are as of end-1997. See Ahearne, Griever, and Warnock (2000) for a full description. Dependent variable, BIAS, is the deviation from the ICAPM benchmark. Constants are included but not reported. USLISTED is the share of the foreign market that is cross-listed on U.S. exchanges. RESTRICT is a measure of foreign ownership restrictions. TRADE is trade with the United States expressed as a share of the foreign country's GNP. White (1980) standard errors are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Figure 1: U.S. Holdings of Hong Kong Equities
(millions of USD)

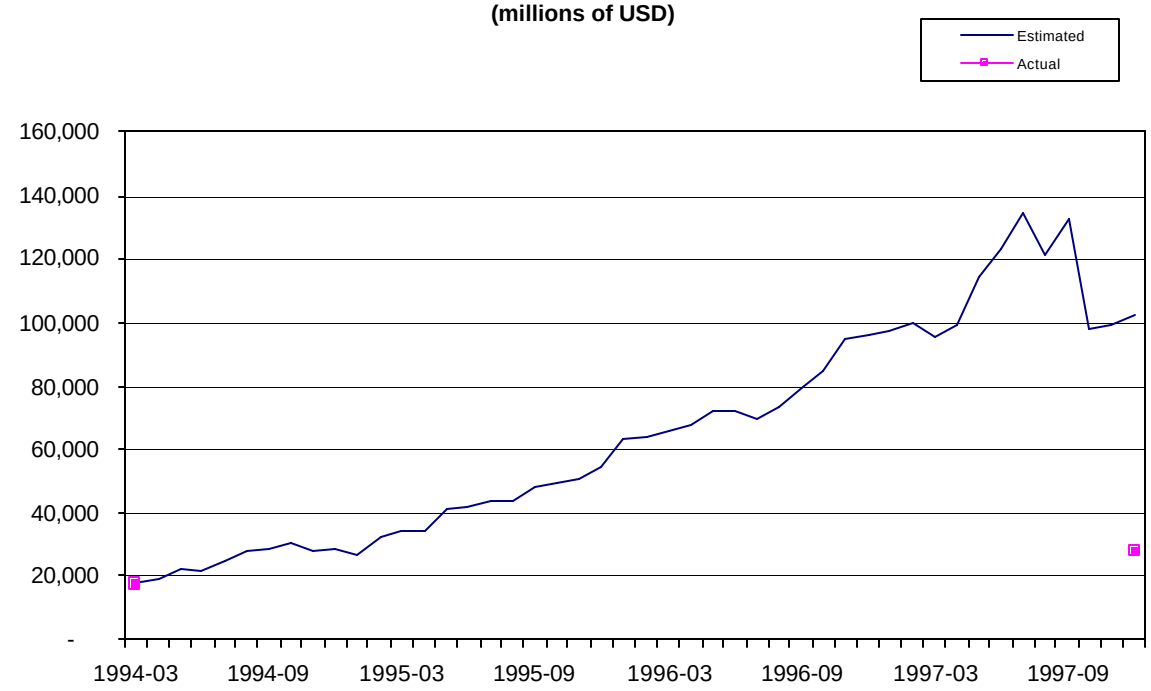

Figure 2: U.S. Holdings of U.K. Equities
(millions of USD)

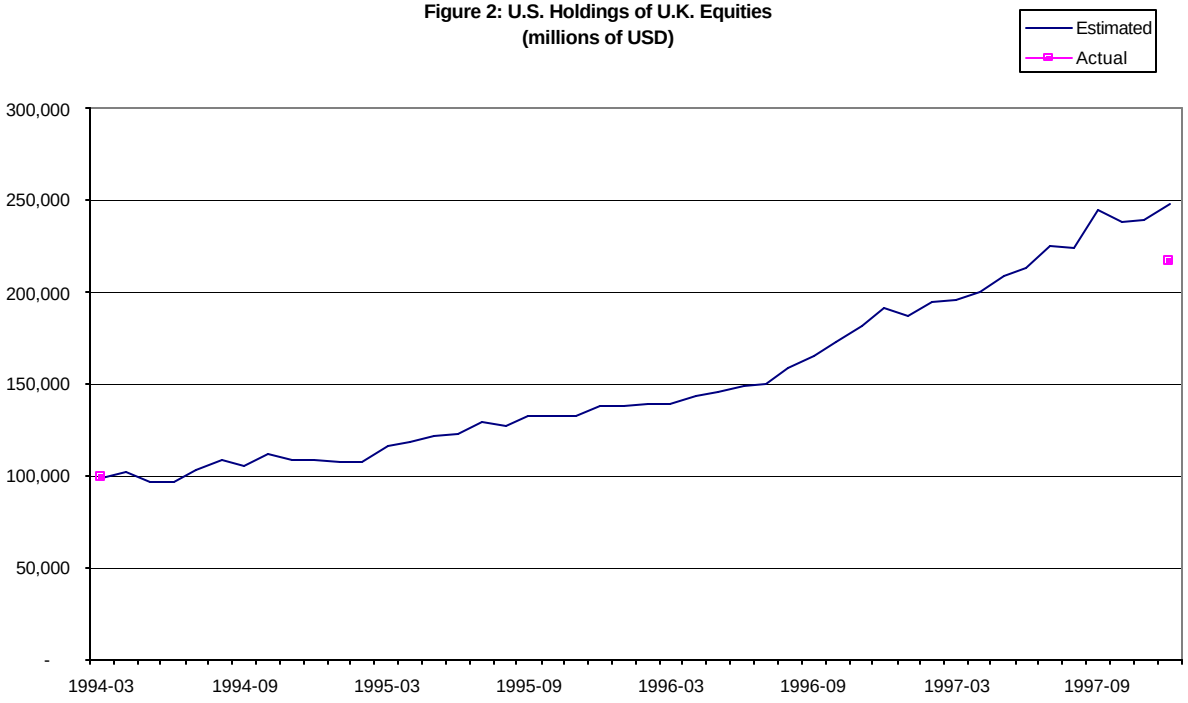

Figure 3: U.S. Holdings of German Equities
(millions of USD)

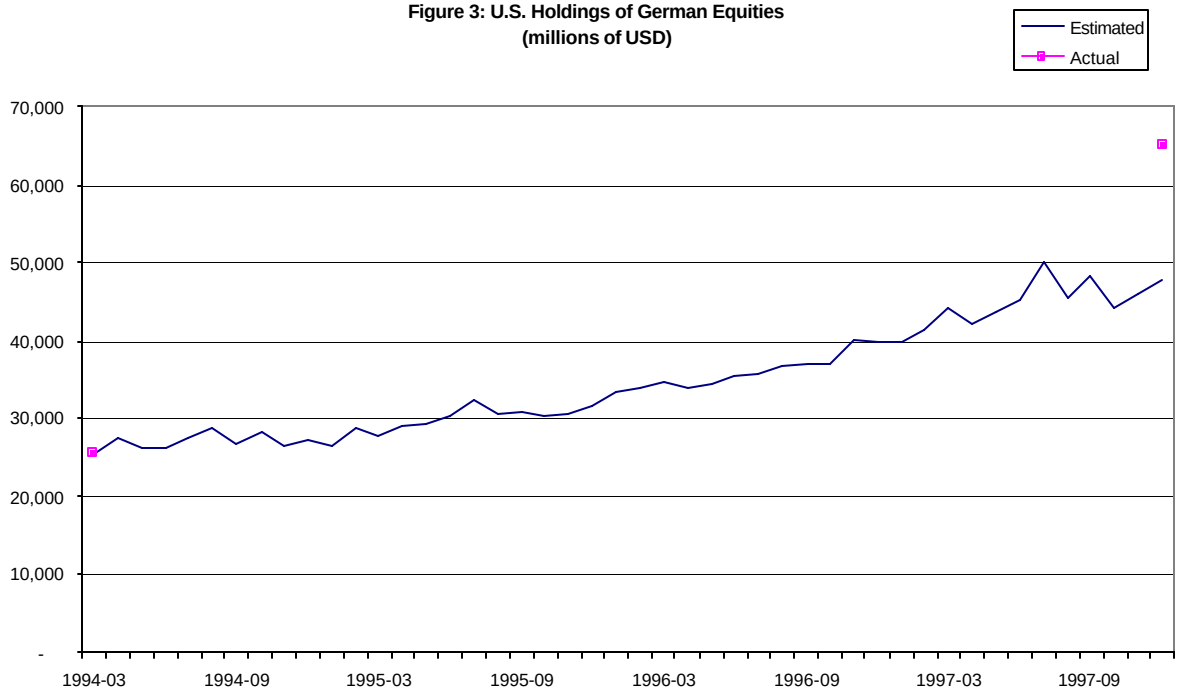

Figure 4: U.S. Holdings of Indonesian Equities
(millions of USD)

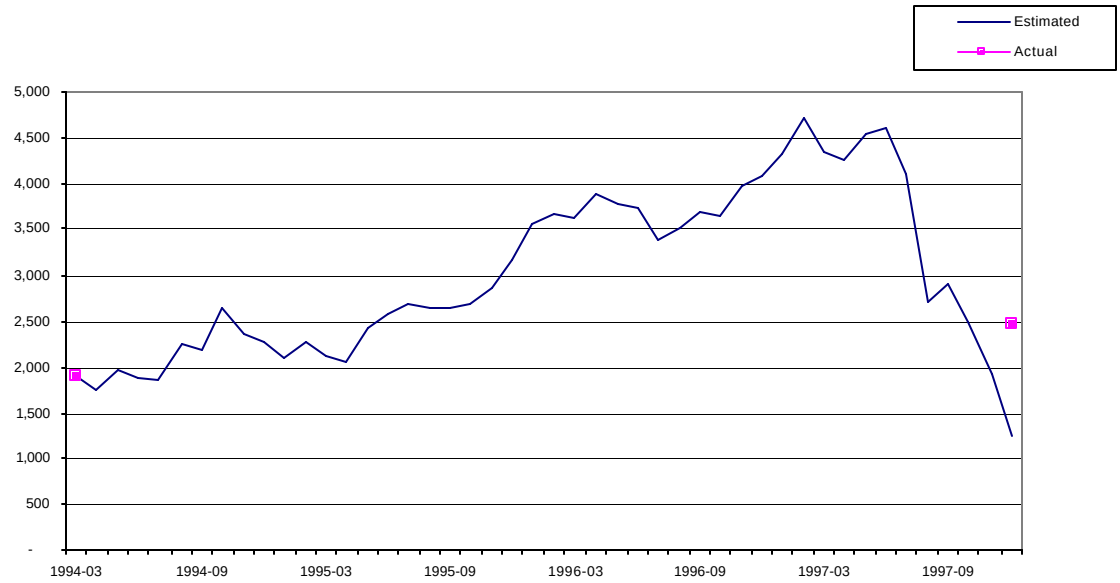

Figure 5: U.S. Holdings of Mexican Equities
(millions of USD)

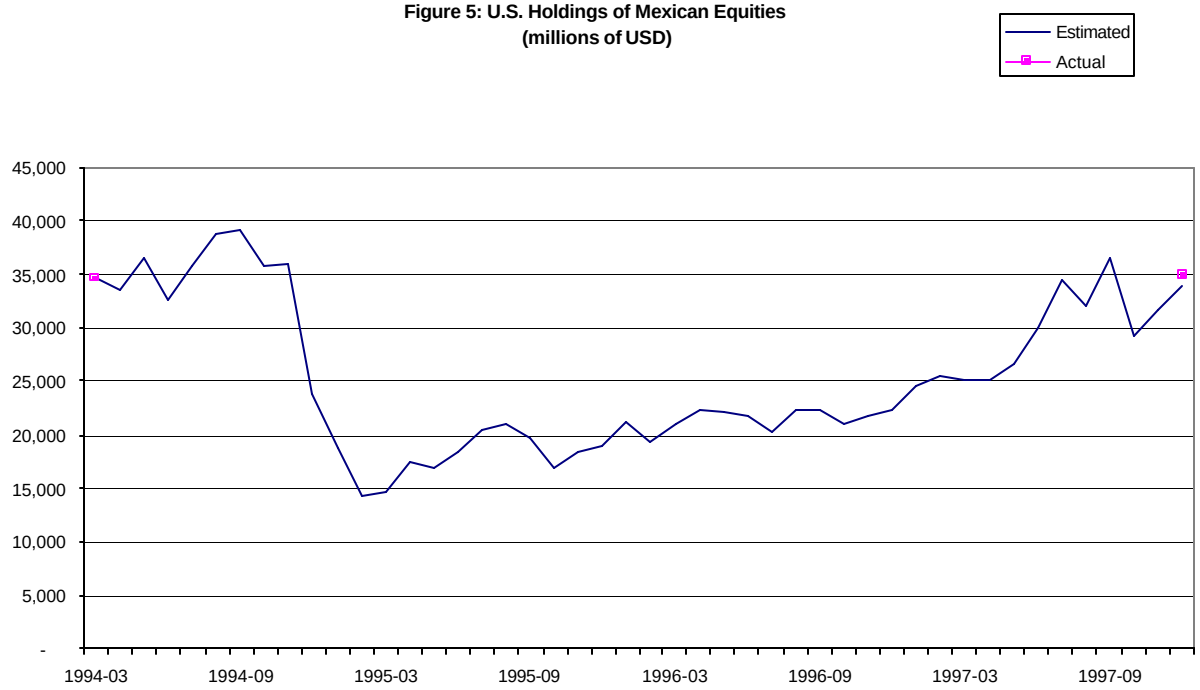

Figure 6: U.S. Holdings of Brazilian Equities
(millions of USD)