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THE STATISTICAL DISCREPANCY IN THE U.S. INTERNATIONAL TRANSACTIONS
ACCOUNTS: SOURCES AND SUGGESTED REMEDIES

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ABSTRACT

The statistical discrepancy in the U.S. international transactions accounts has tended to be both large and positive over the last decade and a half. In 1990 the statistical discrepancy rose by \$45 billion to a record \$64 billion and brought the cumulative discrepancy since 1960 to almost \$250 billion. The size and persistence of this discrepancy has called into question the accuracy of the data on the U.S. current and capital accounts.

This paper attempts to find clues to the sources of the statistical discrepancy by 1) reviewing past history, 2) examining the data sources for each major component of the U.S. international transactions accounts, and 3) using regression analysis. The paper concludes with a list of recommendations for data improvements.

While inadequacies are evident in the data for a wide variety of international transactions, both current and capital account, the search for sources of the big increase in the discrepancy between 1989 and 1990 probably can be narrowed largely to the capital account. It seems unlikely that net exports of goods, services, or investment income increased by an additional \$45 billion in 1990. On the capital account side, increases in foreign holdings of U.S. currency probably played a significant role, but the bulk of the increase in the statistical discrepancy in 1990 remains a mystery.

THE STATISTICAL DISCREPANCY IN THE U.S. INTERNATIONAL TRANSACTIONS
ACCOUNTS: SOURCES AND SUGGESTED REMEDIES

Lois Stekler¹

I. INTRODUCTION

The statistical discrepancy in the U.S. international transactions accounts has tended to be both large and positive over the last decade and a half. In 1990 the statistical discrepancy reached a record \$64 billion and the cumulative discrepancy since the beginning of 1960 summed to almost \$250 billion. The size and persistence of this discrepancy has called into question the accuracy of the data on the U.S. current and capital accounts.

In principle, the sum of all transactions in the U.S. balance of payments accounts, a double-entry bookkeeping system, should equal zero; for each transaction there should be two equal entries of opposite sign. In practice, the recorded accounts never sum exactly to zero because the data that would reflect the debit and credit counterparts of each single transaction generally are obtained from different sources. The statistical discrepancy is the net of errors and omissions in all the components of the international transactions accounts. A positive statistical discrepancy represents some combination of net unrecorded

1. The author is a staff economist in the Division of International Finance. This paper reflects the views of the author and should not be interpreted as reflecting the views of the Board of Governors of the Federal Reserve System or other members of its staff. The author would like to acknowledge many helpful conversations with staff members at BEA, Treasury, the Federal Reserve Bank of New York, and the IMF Working Party on the Measurement of International Capital Flows. The author would also like to thank Allen Frankel, Bill Helkie, Sarah Holden, Peter Hooper, Russ Krueger, Walther Lederer, Kathy Morisse, and Larry Promisel for helpful comments on an earlier draft and Vladimir Gutin for his assistance.

exports to foreigners of goods, services, and investment income and net unreported capital inflows from abroad.

There are, undoubtedly, errors and omissions in the recording of both current and capital account transactions. On the current account side, customs data on imports are generally monitored more carefully than exports. Data on services transactions, which are generally more difficult to collect than data on goods (because they cannot be monitored as they physically enter or leave the country), have been greatly improved in recent years, but further progress is needed. U.S. data on portfolio investment income are estimates based on shaky assumptions about investment positions and rates of return; comparisons of U.S. data with data reported by other countries to the Bank for International Settlements (BIS) suggest that U.S. portfolio investment income may be substantially understated. In addition, the United States has little information on the assets of new immigrants or their subsequent transfers abroad.

On the capital account side, innovation and technological change have contributed to the globalization of financial markets, multiplying both the number of participants in foreign markets and the channels through which transactions occur. These developments have made the tracking of international capital flows far more difficult, at a time when it has been very difficult to get additional resources to devote to data collection. Comparison of data from the U.S. international transactions accounts with data from other sources (Federal Reserve, BIS, and Japan) raises serious questions about the accuracy of the U.S. capital flows data.

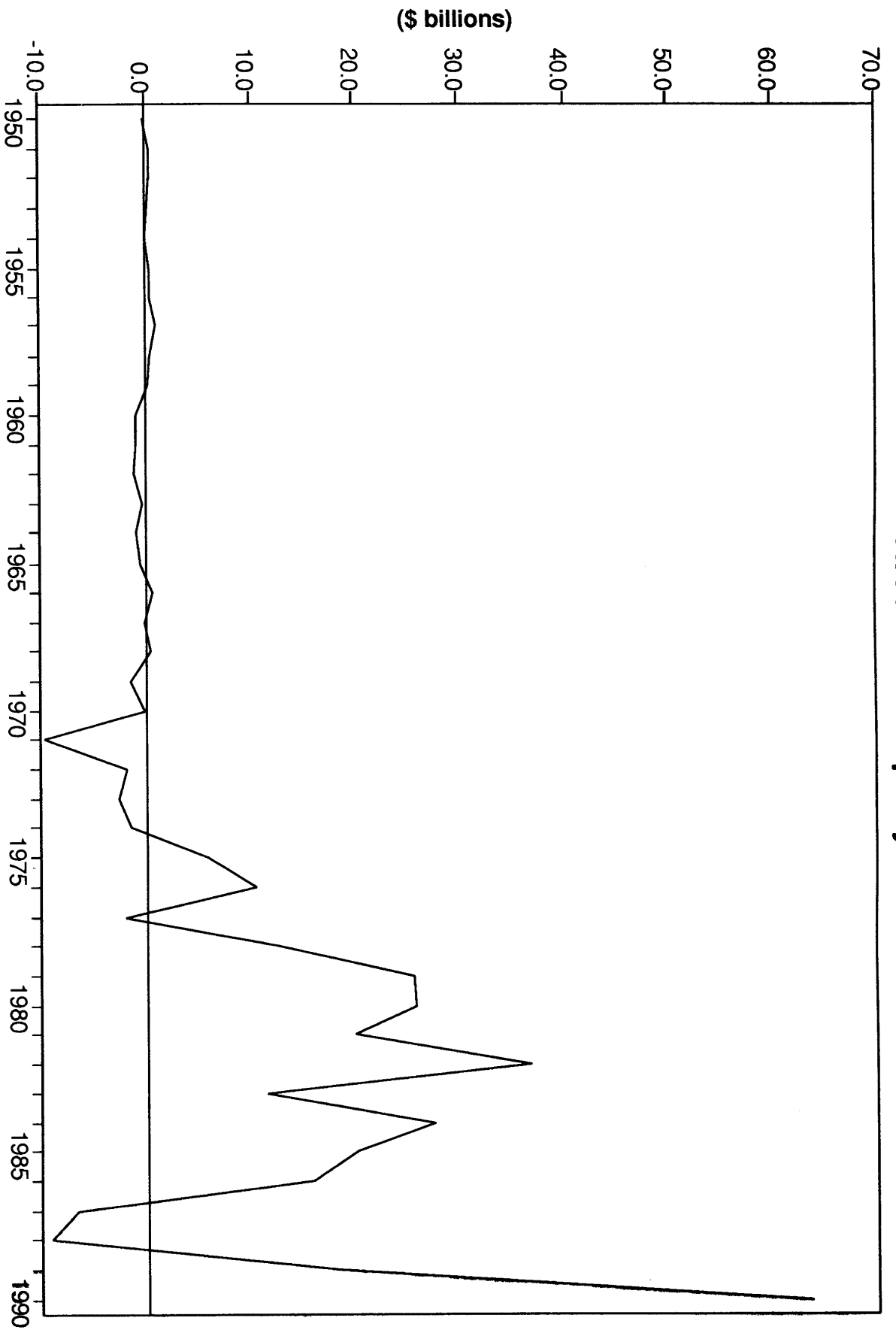
Inadequacies in the data on U.S. international transactions have produced both increased volatility in the statistical discrepancy in recent years and a tendency towards large positive values. The sources for these trends need not be the same. While timing problems and errors and omissions in the reporting of capital flows are more likely sources of the increases in short-term volatility, errors and omissions in the recording of current account transactions also have probably contributed to the upward trend in the discrepancy.

Part II of this paper reviews the past history of the statistical discrepancy for clues about its sources. Part III examines the data sources for each major component of the U.S. international accounts, points to problem areas, and suggests certain improvements. Part IV uses statistical tests to try to shed light on the sources of the statistical discrepancy and Part V summarizes the conclusions and suggestions for improving the data.

II. CLUES FROM PAST HISTORY

The growth of the statistical discrepancy in the U.S. international transactions accounts is a relatively recent development. In both the 1950's and the 1960's the statistical discrepancy was close to zero. (See chart 1.) In contrast, during the early 1970's there were substantial net unrecorded outflows or payments. Since 1974 the statistical discrepancy has tended to be both large and positive, indicating net unrecorded receipts or inflows. This increase in magnitude is not just the result of the inflation of nominal values. The ratio of the statistical discrepancy to the value of trade (the average of recorded exports and imports of goods, services, and investment

Statistical Discrepancy



income) rose from a mean absolute value of .02 in the 1950's and 1960's to .05 in the 1970's and 1980's.²

The statistical discrepancy has increased not only in size, but also in volatility. Increases in the statistical discrepancy in one quarter, tend to be followed by decreases in the next quarter.³ The average absolute size of the quarterly changes in the statistical discrepancy, scaled by the value of trade, has risen from .04 in the 1960's, to .06 in the 1970's, and .09 in the 1980's.

In the early 1980's, it was assumed that the sudden increase in the positive discrepancy was largely accounted for by unrecorded capital flows. The wide quarterly swings in the size of the statistical discrepancy also supported that conclusion. It was recognized that errors and omissions occurred in the reporting of trade transactions, but there seemed little reason to assume that these errors would suddenly increase or that they would vary widely from quarter to quarter.

Previous periods of relatively large positive statistical discrepancies had coincided with unsettled political and economic conditions abroad. The ratio of the value of the statistical discrepancy to trade was about as high as or higher than the 1979-1980 levels (.08) in certain Depression years (1934, 1935, and 1937), the early years of World War II (1939-41), and 1948. It seemed reasonable to assume that these earlier episodes were associated with the flight of capital to a safe haven in the United States in forms that were not fully reported, either because these investors wanted to remain anonymous or because the

2. The peak values for this ratio in the postwar period were .14 in 1971, .10 in 1982, and .09 in 1990.

3. A regression between changes in the statistical discrepancy in one quarter and changes in the previous quarter (1960Q2-1990Q4) produces an R2 of .28 and a statistically significant coefficient of -.53.

BFA publishes the U.S. international transactions accounts, but relies on many other sources for the underlying data. The interested

III. REVIEW OF REPORTING SYSTEMS

were available, but problems still persist in this area. reducing the positive statistical discrepancy for years when revised data efforts to identify needed improvements. Many have been implemented, the reporting of exports and imports of services led to substantial importance of the service sector in the U.S. economy and inadequacies in investment income receipts⁴. In addition, growing recognition of the many countries were systematically underestimating their portfolio inconsistencies in global current account data strongly suggested that potential "safe havens" for capital flight. Moreover, an IMF study of variety of financial market conditions and despite the evolution of other account. The statistical discrepancy has remained positive under a the 1980s has focused attention also on components of the current The persistence of positive net statistical discrepancies during unrecorded capital inflows in 1979 and 1980. assets, were all considered potential contributing factors to the accumulation of wealth in OPEC hands and the U.S. freeze of Iranian revolution in Iran in 1978 and the second oil crisis, combined with rapid restraints had led to unrecorded capital outflows in that year. The expectations of dollar depreciation plus certain capital export large, although negative, was 1971. It seemed plausible to assume that year since World War II when the statistical discrepancy was relatively reporting system failed to catch many small investors. The only other

reader is referred to The Balance of Payments of the United States: Concepts, Data Sources, and Estimating Procedures, published by the Department of Commerce, Bureau of Economic Analysis, May 1990, for a detailed description of the accounts. This paper provides only an impressionistic survey, focusing on problem areas and particularly on capital flows and investment income, which have not been the focus of other recent studies of U.S. data adequacy.⁵ It should be noted that the statistical discrepancy is the net of all errors and omissions in the accounts; correction of some data inadequacies would add to the net statistical discrepancy rather than reduce it.

Before proceeding to discuss each of the components of the U.S. international transactions accounts, it would be useful to touch on certain general problems. One pervasive problem in the last decade has been the scarcity of resources devoted to the collection and improvement of data. Generally, staffs at Treasury, Commerce, and the Federal Reserve Bank of New York (FRBNY) are well aware of inadequacies in the international transactions data they collect or estimate, but resources have not been available to make substantial improvements.⁶ Preoccupation with reducing the Federal budget deficit and getting the government "off the backs" of the private sector has outweighed concerns about data adequacy and the potential for faulty policies based upon inadequate data. In some areas, automation has reduced the costs of data collection; data have been improved despite constant or even reduced

5. The Panel on Foreign Trade Statistics of the National Academy of Sciences expects to release its report assessing the data on trade in goods and services during 1991.

6. In some cases planning is currently underway to correct some of the inadequacies discussed in this paper and requests for additional funding are included in current budget proposals.

7. Treasury does plan to provide BEA with this information in connection with the 1989 Benchmark Survey. It is not clear to me whether the best way to obtain this information is to include questions on interest and dividends paid in the Survey itself or whether other sources could be used in combination with detailed information on holdings to provide benchmark estimates. Another open question is how the costs of obtaining this information should be allocated between Treasury and Commerce.

for balance of payments purposes (that is, when no supervisory purpose is served).

of banks that would provide information on foreign service income solely Institutions Examination Council to add questions to the reports required has not always been successful in convincing the Federal Financial Investment abroad has been conducted since World War II. Moreover, BEA provide BEA with information on income paid on foreign portfolio investment.⁷ In addition, no benchmark survey of U.S. portfolio foreign portfolio investment in the United States, Treasury did not investment income. However, as part of the 1984 benchmark survey of Treasury of holdings provide a benchmark for BEA's estimates of portfolio on portfolio capital flows; in addition, periodic benchmark surveys by the Treasury International Capital (TIC) reports are the source of data frequently differ and cooperation occasionally breaks down. For example, those who collect the data and those who use and analyze them; priorities dropped are frequently exacerbated by the split in some areas between new questions cannot be added to surveys unless other questions are The problems caused by inadequate funding and insistence that increasing internationalization of the U.S. economy.

collection have not kept pace with financial innovations and the capital flows and investment income, the resources devoted to data resources devoted to collection. However, in other areas, particularly

Access to data across agencies also has been a problem. Confidentiality requirements preclude the wide sharing of micro data, but problems frequently arise even when data are supposed to be shared. For example, it was agreed in 1983 (after a decade of negotiations between the Federal Reserve Board and the Treasury) that the Federal Reserve Board was entitled to have access to banks' TIC reports. While information is currently supplied on a special request basis, we are still working to establish on-line access for the Federal Reserve Board to the micro data (which is stored on the FRBNY's computer).⁸ Another example of problems with data access across agencies was dealt with by Congressional legislation in 1990. This legislation allows BEA access to the data provided to Census by the establishments owned by foreign direct investors in the United States. Implementation of this legislation will require both the expenditure of resources and time.

Other problems are caused by the lack of interaction between those who report the data, those who collect the data, and those who analyze them. In rapidly changing areas such as international financial markets, innovations may require frequent adaptations of reporting systems. Moreover, those who focus narrowly on data collection may not spot implausible reports without years of experience. Automated edit-checks are useful under these circumstances, but are not a complete answer to this problem.

In past decades, an Office of Federal Statistical Policy and Standards played an active role in coordinating statistical efforts across government agencies. However, in the 1980's this office atrophied

8. The last remaining hurdles are acquiring and installing certain transmitting equipment that meets government security standards and training personnel to use the necessary software.

and focused almost exclusively on reducing reporting burden for the private sector. Revival of this office, and its rededication to improving the quality of federal statistics, establishing priorities, and coordinating data collection across federal agencies would be a useful first step in improving the data on U.S. international transactions, as well as other data collection efforts.

A. Exports and Imports of Goods

Coverage by the Customs Service of imports of goods as they enter the United States is likely to be reasonably complete, except for smuggled goods, such as drug imports. Coverage of exports, however, is likely to be somewhat less adequate. Unlike imports, compliance with export filing requirements is not monitored carefully; stringent screening is limited to goods that might involve possible export license violations such as so called "high tech" shipments or armaments.

Coverage of exports at the many open border crossings between the U.S. and Canada is a particular problem. The Commerce Department (Foreign Trade Division, Bureau of the Census) corrects for this problem by substituting Canadian import data for export data collected by the United States. Although the U.S. border with Mexico is more closely monitored, underreporting of exports to Mexico may also be a problem. The Commerce Department currently is involved in a study with the Mexican government attempting to reconcile the two sets of published trade statistics. Reconciliation with Mexico is complicated by differences in the treatment of Maquiladora trade; in the U.S. data it is included in merchandise exports and imports, but in the Mexican data these transactions are treated as services (net labor value added).

Efforts to reconcile U.S. trade data with other major trading partners (to improve the basis on which to judge the reliability of U.S. statistics) is also being undertaken with the European Community and Korea, although the coverage problem is unlikely to be as large in the absence of a long land border. A study was completed in March 1991 that reconciled the U.S. and Japanese merchandise trade data for 1989; when estimated adjustments for differences in coverage and definitions were made, the difference between U.S. export and Japanese import data was only \$1.3 billion out of total U.S. exports to Japan of \$44.5 billion.

Audits of a sample of exports through four major airports in 1988 also suggested that coverage at airports of exports to countries other than Canada is substantially better than coverage of exports to Canada. It should be noted, however, that even if overall coverage of exports were fairly complete (e.g., 95 percent), the dollar value of omitted exports would still be substantial (about \$20 billion in 1990). Improvement in the coverage of exports through air, sea, or overland ports would require additional manpower and efforts devoted by the Commerce Department and the Customs Service to verify documents. In addition, it would be useful to clarify the legal authority of the Commerce Department to investigate exporters' books and to penalize them for failure to file timely or accurate declarations.

While coverage of U.S. trade in goods is probably fairly good, the accuracy of valuations is probably a more serious problem. Understandably, the Customs Service monitors declared values of dutiable imports more carefully than other imports or exports.⁹ At the same

9. For this reason free trade agreements, such as the one recently signed between the U.S. and Canada, may result in a deterioration in the trade data.

An additional problem in the trade data is that BEA must rely on the Defense Department for the reporting of military equipment shipped directly from military bases, sold from stockpiles abroad, or purchased for use abroad.¹⁰ The process of accumulating the relevant data from the far reaches of the Defense Department and transmitting them to BEA does not always run smoothly, and may, on occasion, contribute to timing problems and swings in the statistical discrepancy. However, under most circumstances, military exports are not large enough to account for major swings in the statistical discrepancy. (It is conceivable that problems in the reporting of military exports or imports associated with the Persian Gulf crisis were not negligible.)

the trade data.

A by-product of these IRS efforts may be improvement in the accuracy of multinational corporations to reduce their U.S. income tax liabilities. Powers of the IRS to deal with the use of transfer pricing by understating the value of exports. Congress has recently expanded the lower tax jurisdictions abroad by overstating the value of imports and may use transfer prices to shift profits and hence tax liabilities to account for a significant percentage of both U.S. exports and imports, with capital controls. In addition, multinational companies, which exports or imports in order to disguise capital exports from countries to the U.S. or other governments, traders may misrepresent the value of to misrepresent values. Besides efforts to minimize customs duties paid time, the presence of trade barriers may give traders a strong incentive

The net effect of inadequacies in the trade data on the statistical discrepancy is not clear. Omitted drug imports may very well be on about the same scale as omitted or understated exports. As for contributing to wide swings in the statistical discrepancy, it seems unlikely that errors and omissions in the reporting of trade in goods would vary sharply from period to period.

B. Exports and Imports of Services

Over the last decade, the Office of the U.S. Trade Representative has lobbied hard and effectively for improved data on international trade in services for use in the current GATT negotiations. BEA has responded by adding estimates for a long list of services to the accounts (many based on new surveys), improving estimates for services already included in the accounts, and providing separate estimates for certain services that previously had been aggregated with other items in the accounts.¹¹ Table 1, reproduced from Ascher and Whichard¹², provides an overview of these improvements. The net impact of the introduction of these improvements was to increase recorded net exports of services and to reduce the positive statistical discrepancy in the U.S. international transactions accounts by about \$10 billion per year in 1987 and 1988.

Much has been accomplished, but certain problems remain. Responses to the survey of travelers' expenditures are very low and estimates of receipts and payments are probably subject to a substantial

11. See Anthony J. DiLullo and Obie Whichard, "U.S. International Sales and Purchases of Services", Survey of Current Business, Volume 70 number 9 (September 1990). pp. 37-72.

12. Bernard Ascher and Obie Whichard, "Developing a Data System for International Sales of Services: Progress, Problems, and Prospects", in P. Hooper and J. Richardson (eds.) International Economic Transactions: Issues in Measurement and Empirical Research. Chicago, Chicago University Press, forthcoming.

Table 1.--U.S. Cross-Border Transactions in Services, 1979 and 1988

		1979		1988	
		U.S. sales	U.S. purchases	U.S. sales	U.S. purchases
(Millions of dollars)					
Total					
With affiliated foreigners /1/.....					
With foreign parents					
Royalties and license fees					
Other services					
With foreign affiliates					
Royalties and license fees					
Other services					
With unaffiliated foreigners					
Other services					
Royalties and license fees					
Travel					
Passenger fares					
Other transportation					
Freight					
Port services					
Other					
Education					
Financial services					
Insurance					
Primary insurance, net					
Reinsurance, net					
Telecommunications					
Business, professional, and technical services					
Accounting, auditing, and bookkeeping					
Advertising and data processing					
Computer and data processing					
Data base and other information services					
Engineering, architectural, construction, and mining, net					
Installation, maintenance and repair of equipment					
Legal services					
Management, consulting, and public relations					
Medical services					
Research and development, commercial testing, and laboratory services					
Other					
Film rentals					

Source: U.S. Department of Commerce, Bureau of Economic Analysis

1. Data on trade in services with affiliated foreigners were collected in 1979, but receipts and payments were netted for each type of direct investment (U.S. abroad and foreign in the United States), so that the two-way flow of trade could not be discerned. Because the net figures are shown in the U.S. balance of payments accounts, the sales and purchases figures shown here exceed exports and imports as recorded in those accounts.

margin of error. Estimates of financial services provided to foreigners such as swaps and foreign exchange transactions are incomplete. The survey of business, professional, and technical services probably is more adequate on the export side than the import side; providers of these services to foreigners are more likely to be easily identified than purchasers from foreigners. Although recent improvements in the data on services have reduced net omitted receipts, it is not clear that further improvements would necessarily operate in the same direction. Moreover, continued efforts are required to keep up with a rapidly changing world.

C. Unilateral Transfers

Unilateral transfers include a wide range of both government and private transfers. Among the more problematic items are estimates of immigrants' transfers. The United States receives large numbers of immigrants each year; not all are penniless, but no estimate of their wealth is included in the accounts. This omission contributes to a positive statistical discrepancy in the accounts to the extent that reported holdings of foreign residents decline and those of U.S. residents increase as a result of immigration.¹³ Lack of information on immigrants' assets abroad would also lead to a continuing underestimation of U.S. investment income. On the other hand, immigrants frequently make remittances to relatives left behind; coverage of these remittances is incomplete, and does not include any currency sent.¹⁴ It is not clear

13. BEA has occasionally made adjustments to unilateral transfers of this sort. For example, an adjustment of about \$1 billion was made when John Paul Getty died, because, although he was a U.K. resident, his estate was a U.S. resident.

14. Evidence gathered in connection with the recent amnesty granted to illegal immigrants indicates that the total of these remittances sent abroad has been substantially understated.

whether the net of the errors and omissions in unilateral transfers generally would be positive or negative.

D. Direct Investment Capital Flows and Income

Direct investment capital inflows and outflows as well as the income earned on these investments are collected by BIA through an extensive series of legally required reports. Coverage is thought to be reasonably complete. BIA devotes substantial resources to monitoring publicly available information for the names of new reporters.

Undoubtedly some U.S. companies making direct investments abroad are missed, as are some foreign investments in the United States. This is more likely in the case of small investments or private transactions. (SEC regulations require registration of the purchase of 5 percent or more of the equity of publicly traded U.S. companies.) In addition, lags may occur before data from new reporters are available, resulting in substantial revisions.

Real estate is a likely problem area because small investments are common. Moreover, most foreign investments in U.S. real estate fall between the cracks of various reporting requirements: no direct investment reports are required on residential real estate for personal use or real estate investment through limited partnerships (since direct investment is defined as control of 10 percent of the voting equity in a company or the equivalent interest in an unincorporated enterprise). In theory, the Treasury International Capital (TIC) S-reports currently include data on limited partnerships; in practice, only participations traded on exchanges are reported (aggregated with other purchases or

sales of stocks).¹⁵ Perhaps some thought should be given to changing the way data are collected on the international transactions that are associated with limited partnerships or with various forms of cooperation such as research partnerships, technology sharing, or contractual production.

Direct investment reports for balance of payments purposes include information on income (dividends, interest, and reinvested earnings) and capital flows (changes in equity capital, intercompany debt, and reinvested earnings). Since these data are required by firms for a variety of purposes, accurate reporting should be routine. BEA does monitor the data carefully, but is necessarily dependent on reporters to devote sufficient resources to ensure accuracy; BEA does not conduct audits of firms' books. Late reports are an increasing problem. In addition, foreign investors in the United States are sometimes unfamiliar with reporting requirements and recently acquired firms, heavily debt-burdened and stripped of "fat", may not devote sufficient resources to ensure accurate reporting.

In addition, it is uncertain whether wholly-owned U.S. affiliates of foreigners report as instructed using U.S. generally accepted accounting practices rather than U.S. tax accounting or foreign accounting practices. Differences between economic and tax depreciation charges could have substantial impacts on reported income and reinvested earnings. Since reinvested earnings are included in capital flows as well, the net impact on the statistical discrepancy of the use of these

15. Clarification of the TIC-S reporting instructions in July 1990 may help some, but since many real estate partnerships are formed without the participation of current S-form reporters, coverage is likely to continue to be inadequate.

differing accounting standards may be negligible. However, accounting

practices may play an important role in explaining the very low rates of return reported by foreign direct investors in the United States.

Another factor may be the use of transfer pricing by both U.S. and

foreign multinational companies to shift taxable income to lower tax

jurisdictions abroad. However, this use of transfer pricing would have

no net impact on the statistical discrepancy if the data included in the

trade and services accounts also were misstated by the same amounts.¹⁶

BFA should place high priority on investigating why the rates of return

on foreign direct investment in the United States appear so low.¹⁷

There are potential timing problems in the reporting of direct

investment transactions that could contribute to swings in the

statistical discrepancy. Firms are allowed to report on the basis of

their fiscal years. For example, if the firm's fiscal year ends on

December 15, data included in Q4 would run from Sept. 15 to December 15.

The fact that the data do not exactly cover the quarter in which they are

included could contribute to swings in the discrepancy assuming that the

timing of the reporting of the corresponding entry in the double entry

system is accurate. This discrepancy could be noticeable in the case of

16. For example, if a Japanese auto manufacturer overcharged its U.S.

wholesale trade affiliate for imported cars, then direct investment

income payments would be understated, but the value of imports probably

would be overstated. The IRS collected substantial back taxes from

Toyota and Nissan, based on the fact that they used a substantially

higher price for imported cars in calculating U.S. affiliate profits than

they declared for customs purposes. The IRS subsequently ruled that, for

goods subject to customs duties, firms must use the same value to

calculate profits as they declare for customs purposes.
17. Outsiders, barred from access to the individual company reports, cannot address questions such as whether reported rates of return rise as investments mature. The answer to this question is crucial in assessing the likely future servicing burden resulting from the recent large inflow of direct investment.

large acquisitions or sharp shifts in financing patterns. However, it would be an unreasonable imposition of burden on firms to insist that they keep a separate set of books on a calendar year basis for their reports to BEA.

Another potential problem in the direct investment accounts that could contribute to the statistical discrepancy is caused by the fact that accounts receivable and payable between affiliates and parents may be denominated in foreign currency as well as dollars. Changes in their dollar value, which are used to estimate capital flows, could reflect exchange rate changes as well. If these accounts are largely dollar denominated or if payables and receivables in each foreign currency largely balance, then only small errors would be introduced by assuming that changes in the dollar value reflect capital flows. However, no information on currency denomination is currently collected; an occasional question, perhaps added to the periodic benchmark surveys, would be useful in determining whether the practice of denominating accounts receivable or payable in foreign currencies is widespread.

E. Currency

BEA does not include estimates of increases in foreign holdings of U.S. currency in the U.S. international transactions accounts. Conceptually, they belong in the accounts; foreign assets in the United States include non-interest bearing obligations of the U.S. government (currency) as well as interest bearing obligations such as Treasury securities. Estimates of U.S. currency in the hands of foreigners are necessarily imprecise. Piecing together information from surveys of households' currency holdings, assumptions about businesses' holdings, IRS estimates of the volume of illegal domestic transactions, and

estimates of currency lost or destroyed suggests that between one and two-thirds of the U.S. currency outstanding may be in the hands of

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foreigners--between \$85 and \$170 billion. Information from a variety of sources indicates that increases in foreign holdings of U.S. currency were particularly large in 1990, perhaps more than \$15 billion.

These totals on foreign holdings of U.S. currency are significant relative to the size of the cumulative statistical

discrepancy in the U.S. international transactions account over the past 30 years (about \$250 billion). However, the reader should bear in mind that the statistical discrepancy is the net of much larger positive and negative errors and omissions. In a system of double entry bookkeeping, a transaction will not add to the net statistical discrepancy if both

sides of the transaction are omitted.

Many transactions that result in increased foreign holdings of U.S. currency are probably omitted on both sides. Significant amounts of U.S. currency probably end up in foreign hands as a result of the drug trade. In this case the net statistical discrepancy is not directly affected, since both the imports of drugs and the payments to foreign producers for them go unreported. That is, both the current account deficit and the net inflow of capital (increased foreign holdings of U.S. currency) are understated by equal amounts. However, if the cash

payments for drugs are laundered abroad, and flow back into the United States legally through the banks, the accounts would show an increase in U.S. bank liabilities to foreigners (a recorded inflow), without a

18. More recent estimates, based on the assumption that differences in currency velocity between the New York Federal Reserve District and the rest of the country are explained by foreign demand, suggest that foreigners hold about half of the U.S. currency outstanding.

corresponding entry of the opposite sign (an unrecorded outflow). To the extent that currency payments abroad flow back into U.S. banks, the net impact of the drug trade on the statistical discrepancy would be negative.

In addition to cash payments to cover drug imports, U.S. currency ends up in foreign hands through a variety of channels. Banks (including the Federal Reserve Bank of New York) both make outgoing shipments and receive incoming shipments. U.S. tourists spend currency abroad and foreign tourists bring cash to the United States with them. U.S. residents send cash to relatives abroad and migrant workers take cash home with them.

Only limited data are available on these currency shipments. Persons taking more than \$10,000 in currency into or out of the United States are generally required to file a Currency and Monetary Instruments Report with Customs (CMIR). However, Customs' emphasis is on finding evidence of illegal transactions, not collecting accurate aggregate data. There are certain exemptions from the reporting requirement (which Treasury currently is considering eliminating), and compliance and enforcement are spotty, particularly on the outflow side.

Efforts should be made to close these gaps in the Treasury CMIR reports and the data should be incorporated in the international transactions accounts. Alternatively, a regular survey of banks involved in incoming and outgoing shipments could be initiated. Admittedly, the accounts would still lack data on illegal shipments of currency, currency inflows and outflows associated with most tourists, and currency mailed by U.S. residents to relatives abroad. One would guess that the currency outflows through these other channels are likely to exceed the currency

19. The Federal Reserve Banks actually collect the data as agents for the Treasury. The costs to the Federal Reserve Banks of collecting the TIC data are covered by their own budgets.

In recent decades, innovation, technical change, deregulation of financial markets, and elimination of capital controls have all contributed to the increasing internationalization of financial markets. New channels for capital flows have developed, involving new instruments and new participants; information from a limited number of large financial intermediaries and corporations no longer covers the bulk of international capital flows. To collect adequate data on these flows requires periodic efforts to rethink the whole capital flows data collection system. The current system has become a patchwork, increasingly inadequate to the task of providing meaningful information, particularly on non-traditional transactions.

The Treasury International Capital (TIC) reports are the source for data on portfolio capital flows. These include a wide variety of transactions such as the purchase and sale of long-term securities, short-term negotiable instruments, bank deposits, loans, inter-bank transactions, trade credits, etc. Despite advances in automation, the resources available to monitor these portfolio capital flows at the Treasury and the Federal Reserve Banks (particularly New York) have not been adequate to maintain the overall quality of the data in the face of rapidly changing financial market conditions.¹⁹

F. Portfolio capital flows

inflows; use of the Treasury net shipments data (or a system of bank reports) is likely to produce underestimates of the increase in U.S. currency held abroad, unless it is supplemented by estimates of net currency outflows through other channels.

In addition to a systematic review of the entire data collection system, it would also probably be useful to change the instructions to reporters on identification of foreigners. Currently, foreign residents are identified by their address; however, some foreigners may arrange to get their mail through a U.S. affiliate or relative or use a U.S. agent. More accurate data would probably be obtained if reporters were instructed to use their customers' tax identification information (which financial institutions are legally required to collect) instead.²⁰

1) Bank claims and liabilities

The data provided by banks on their own claims and liabilities vis-a-vis foreigners are generally assumed to be fairly accurate. The data are reported to regional Federal Reserve Banks and aggregated by the Federal Reserve Bank of New York, as agents for the Treasury. Given Federal Reserve powers over the banks, they tend to be cooperative, but errors do occur: respondents enter data in the wrong columns or on the wrong lines, they report in dollars rather than thousands of dollars, or bugs appear when changes are made to reporters' automated systems or when their new employees are inadequately trained.

As a user of these data, I have uncovered numerous errors in the process of investigating large changes that would not be expected on the basis of known financial market developments. Undoubtedly, many less glaring errors go undetected. The FRBNY always questions reporters about

20. Use of W-8 tax filings to identify foreigners would need to be supplemented by instructions to classify certain tax exempt foreigners (e.g., IBRD, official monetary authorities, etc.) correctly. Treasury, in conducting the 1984 Benchmark Survey of Foreign Portfolio Investment in the United States compiled the necessary list. One drawback of using the W-8 rather than address as the criterion for identifying foreigners is that certain U.S. citizens resident abroad may still be subject to U.S. taxes, and therefore would be incorrectly identified as U.S. residents.

changes larger than certain tolerance limits; however, the banks'

personnel tend to provide assurances that the reports are accurate

without much investigation unless they are confronted with

inconsistencies between their TIC and other Federal Reserve reports.

Some use is currently made by the FRBNY of edit-checks against data

reported on other reports. However, greater use could be made of

computer checks for consistency across reports.²¹ Efforts to eliminate

all duplication of information on reports should be tempered by the

recognition that these overlaps frequently provide the only means for

uncovering errors.²²

Information available from the Federal Reserve Report of Certain

Eurocurrency Transactions (FR 2950 and 2951, not used in the U.S.

international transactions accounts) indicates very large daily

volatility in banks' claims and liabilities vis-a-vis their own foreign

offices, particularly between the last day of certain months and the

first day of the next month. Swings of \$10-\$20 billion are not unusual.

One contributing factor (but apparently not the only factor) has been

window dressing by Japanese-based banks at certain reporting dates

(particularly end-March and September). No information is available on

the other side of these transactions, but if they do not show up in the

accounts in the same quarter, they could contribute to significant swings

21. Admittedly, there are frequently differences in definition which make

precise comparisons impossible. However, judgments often can be made

that a reported change is inconsistent with other information about

changes in the bank's balance sheet or the balance sheets of its foreign

branches. When inconsistencies are as big as \$10 billion, it is usually

clear that one report or the other is wrong.
22. There is no reason to assume that banks are any less accurate as

reporters than other institutions. However, because the Federal Reserve

has alternative sources of information on banks, their errors are more

likely to be uncovered.

in the statistical discrepancy.²³ Similarly, timing discrepancies between crediting and debiting of accounts in other transactions could also contribute to the swings in the statistical discrepancy.

Another potential problem is that capital flows for banks are calculated from changes in asset positions, but other factors can also produce changes in asset positions. Write-offs of loans are not systematically reported and may produce apparent capital flows where none actually occurred. First differencing of positions may also be inaccurate for foreign-currency denominated claims and liabilities; changes in the dollar value of these claims and liabilities would be the result of exchange rate changes as well as capital flows. However, if currency positions are about matched for each currency, the net error introduced may be small. There is no information collected on the composition of foreign currency claims and liabilities; these claims and liabilities were each about \$60 billion in March 1990, up from only about \$10 billion as recently as 1984.

2) Securities purchases and sales

Purchases and sales of foreign securities (stocks and bonds or notes with maturities longer than one year) by U.S. residents are reported by securities dealers in the United States. Communications advances in recent years have made it more likely that ordinary U.S. residents (not only tax evaders or criminals) may conduct securities transactions with intermediaries outside the United States (e.g., the London office of Merrill Lynch), undermining the coverage of the reports. The problem of incomplete coverage may also be aggravated by recent SEC

23. This problem is compounded by the fact that, while banks are required to report their books as of the last business day of the year, there is some latitude for other reporting dates in the TIC reports.

rulings facilitating secondary trading by institutions in unregistered bonds.

The extent of the coverage problem is uncertain. The last Treasury benchmark survey of U.S. portfolio investment abroad was conducted during World War II. Until recently, Treasury was reluctant to undertake a new benchmark survey because of cost considerations; it was argued that a comprehensive outward benchmark would require a survey of far more respondents than the inward benchmarks, and reasonably complete coverage would be far more difficult to achieve. However, the Treasury is currently actively considering undertaking such a benchmark survey. Data from a survey covering only major corporations, institutional investors, and financial institutions, although incomplete, would vastly improve on currently available information. For example, BFA has stopped publishing data on U.S. holdings of Japanese stocks because, using current estimating methods, these would now be negative.

Purchases and sales of U.S. securities by foreigners are also reported by securities dealers in the United States. Four categories are reported: U.S. Treasury bonds and notes, bonds of U.S. government corporations and federally sponsored agencies, corporate and other bonds, and stocks. The reports of securities dealers are supplemented by reports from corporations that sell bonds directly to foreigners (e.g., Eurobonds). Coverage of such bonds is likely to be incomplete in the case of private placements by firms that are not regular reporters. Much attention has been devoted in the financial press to the apparent discrepancies between U.S. and Japanese data on Japanese purchases of U.S. Treasury securities. In fact, these data are not directly comparable because the Japanese data include all purchases of

U.S. Treasuries worldwide while the U.S. data include only securities sold directly from the United States to Japan. The development of active markets for U.S. Treasury securities in London and the Far East have made such bilateral data comparisons impossible; the U.S. reporting system cannot identify the ultimate purchaser of a U.S. Treasury security in the London market. However, the cumulative total of Treasury securities sold to all foreigners according to the U.S. data appears too low to be consistent with the Japanese estimates of their holdings. This issue may be settled by the results of the Treasury benchmark survey of foreign portfolio investment in the United States in 1989 that is currently underway.

As a result of the growth of markets abroad where U.S. securities are actively traded, the vast geographic detail collected on the TIC-S form is of limited use, for it yields no insight into the ultimate purchaser of U.S. debt instruments. Eurobonds account for most U.S. corporate bonds sold to foreigners; they are generally distributed through underwriters in London and are therefore reported as sales to the United Kingdom. U.S. Treasury securities are also actively traded in London. The geographic detail on U.S. purchases and sales of foreign securities is of limited use as well. All foreign securities are aggregated so it is impossible to distinguish the U.S. sale of a Canadian bond to a Japanese resident from the sale of a Japanese bond to a Japanese resident. The problem with equities is currently less acute, but likely to become serious as well, as the listing of equities on foreign exchanges becomes more common.

The vast geographic detail is of limited use in facilitating bilateral comparisons of data as well. For example, the Japanese report

all U.S. Treasury securities as purchases from the United States, even if the transaction is booked by a financial intermediary in London.²⁴ The

United Kingdom does not collect data on foreign transactions in foreign securities in London. IMF guidelines suggest classifying securities purchases on the basis of the residence of the debtor. This approach is appropriate in the sense that there is far more interest in the size of Japanese purchases of U.S. securities than there is in the question of where transactions are booked. The United States could change the TIC-S reporting instructions for U.S. purchases of foreign securities;

reporters could indicate the nationality of the debtor, rather than the location of the buyer or seller. However, for U.S. securities, reporters in the United States have no way of knowing the identity of the ultimate purchaser; there is no way the TIC-S form reporters could provide

information comparable to the data collected by foreign countries. One alternative would be to collect no geographic detail on foreign purchases of U.S. securities, and to use data provided by other countries to assess who is buying U.S. securities (assuming all major countries would be willing to follow the IMF guidelines and adopt comparable definitions). Another alternative would be to change the IMF guidelines and have

securities transactions reported on the basis of the nationality of the

transactor, permitting bilateral comparisons at the aggregate level.²⁵

24. The Japanese reporting of transactions in U.S. corporate securities is mixed; transactions may be reported according to the nationality of the debtor, the location of the market where the security is listed, or the location of the purchaser or seller.

25. For example, the U.S. data on U.S. purchases or sales of all bonds from Japanese residents could be compared with the Japanese data on sales or purchases of all bonds from Japanese to U.S. residents. However, no precise comparison could be made for U.S. or Japanese bonds disaggregated because the foreign bond category in each countries' data would include bonds issued by residents of third countries.

Periodic benchmark surveys of holdings would be necessary to provide information on the basis of the nationality of the debtor.

3) Options, warrants, and futures

Derivative instruments such as options, warrants, and futures are currently only partially covered in the U.S. international transactions accounts. Some data on these transactions are available; however, thorny theoretical and practical problems make it difficult to separate capital flows from service or investment income and capital gains in connection with many of these transactions.

In theory, warrants and options are included in the TIC-S reports when the underlying security is a stock or long-term bond. Data on purchases and sales of these instruments are aggregated with purchases and sales of U.S. or foreign bonds; since they are not available separately, judgments about the adequacy of coverage are impossible. All other options or warrants are omitted. In addition, BEA estimates the margin accounts and profits and losses on futures trading, based on information on foreign transactions on U.S. futures exchanges, and includes these estimates in liabilities to unaffiliated foreigners (TIC-C). U.S. residents' participation in foreign futures transactions are omitted entirely. Cooperative efforts with various regulatory agencies such as the CFTC and SEC might lead to data improvements in this area.

4) Limited Partnerships

Only those investments in limited partnerships that are listed on exchanges are covered; they are aggregated with foreign purchases of U.S. stocks in the TIC-S reports. The IRS is currently automating responses on tax returns, and as a by-product they soon will be able to produce a list of limited partnerships in which foreigners have some

26. A survey of 8000 firms was conducted, yielding few additional TIC-C form reporters.

The number of potential C-form reporters is large, and reaching all those with reportable claims or liabilities vis-a-vis foreigners is a constant problem. The last systematic canvas of potential reporters was conducted in 1978.²⁶ Since that time, foreign direct investment in the United States has mushroomed. Affiliates of foreign companies probably are more likely than U.S.-owned companies to have financial and

also, failure to report) in newspapers and trade journals might be considered would be useful. Advertising reporting requirements (and penalties for particularly the corporate sector, on the need for accurate statistics accuracy of their reports. Continued efforts to educate the public, and to be less cooperative (and sometimes hostile) when questioned about the subject to the regulatory authority of the Federal Reserve and they tend the weakest link in the TIC system. In general, TIC-C reporters are not claims and liabilities vis-a-vis foreigners. These reports are probably The TIC-C reports include a variety of financial and commercial 5) Nonbank claims on and liabilities to unaffiliated foreigners

should be studied.

collecting data on foreign participation in U.S. limited partnerships (although not when they occurred). Alternatives to the current method of extent of the omission of foreign investments in limited partnerships When the IRS automation effort is complete, the Treasury will know the payments accounts because it was in the form of limited partnerships. investment in U.S. real estate has been omitted from the balance of stake. As discussed earlier, it is suspected that much foreign

commercial ties with unaffiliated foreigners. They are also more likely to be unfamiliar with U.S. reporting requirements. Rather than conduct another general canvas, it might be more cost-effective to focus on these affiliates; Treasury could check its list of C-form reporters against a list of U.S. affiliates of foreign companies provided by BEA and canvas those who are not current reporters.²⁷

In some sense, the C reports are a residual report, catching transactions that are not reported by someone else. They exclude direct investment transactions, securities, and custody items reported by banks, brokers, and dealers. There is frequently room for confusion about reporting responsibilities. One serious problem, the reporting of loans to U.S. residents booked at banks outside the United States, was resolved (at least partially) by the introduction of the BL3 report in mid-1986. Banks in the United States, with any knowledge of loans to U.S. residents booked at their offshore offices, are required to report these loans as custody liabilities or file a BL3 form notifying the borrower (with a copy to FRBNY) of their responsibility to report the loan on the C-form. Banks have uniformly chosen the first alternative. As a result of this clarification of reporting responsibility, custody liabilities reported by banks increased by \$18 billion, while financial liabilities reported on the C form remained virtually unchanged.

However, comparisons of the data reported on custody liabilities and data reported to the BIS suggest that reporting of bank loans from

27. If focusing only on U.S. affiliates of foreign companies was viewed as discriminatory, U.S. companies with foreign affiliates might also be canvassed.

28. Differences in definitions preclude precise comparisons and definitive conclusions. In particular, the BIS data on claims frequently include holdings of securities and negotiable instruments such as commercial paper and bankers acceptances. It is not clear whether these differences in definition fully account for the data differences. 29. The Federal Reserve gets monthly reports from the foreign offices of U.S.-based banks on their assets and liabilities, including claims on U.S. residents (FR 2502). A Federal Reserve survey (1983) of foreign-based banks' transactions with U.S. residents booked outside the United States met with considerable resistance. 30. The TIC definitions also apparently depart from common usage in certain cases. For example, reporters are instructed not to classify overnight bank deposits as deposits; they are considered bank borrowings rather than deposits.

U.S. short-term negotiable instruments such as commercial paper, certificates of deposit (CDs), and bankers acceptances (BAs) purchased by foreigners are frequently held in custody by U.S. financial institutions and are reported (aggregated together on the BL2) as custody

6) Short-term negotiable instruments

avoid double-counting. alternative data sources would require changes in the TIC instructions to suggest that the TIC data are seriously understated. 30 Again, the use of reports; comparison of TIC totals with BIS and Federal Reserve data could be substituted for the amounts currently included in the TIC. Similarly, reports from banks abroad of U.S. residents' deposits counting.

require changes in the TIC reporting instructions to prevent double-counting. system for obtaining data on bank loans to U.S. residents would also from banking offices located outside the United States for the current residents from offices outside the United States. 29 Substitution of data possibility of obtaining data from foreign banks on their lending to U.S.

should be explored with the BIS and other central banks is the abroad to U.S. residents may still be incomplete. 28 One solution that

liabilities.³¹ Separate information is also provided on CDs held in custody. In addition, U.S. firms that issue commercial paper or short term instruments (with maturities of 1 year or less) directly in the Euromarkets are supposed to report these as financial liabilities to foreigners on the TIC-C forms.

Since 1978, when the TIC system was last redesigned, the U.S. commercial paper market has grown to about six times its earlier size; borrowers have found it advantageous at times to issue their own short-term negotiable instruments rather than turn to the banks for funds. It would be useful to have more information on the participation of foreigners in the U.S. commercial paper market. At minimum, these short-term negotiable instruments should be covered in the Treasury's periodic benchmark surveys of foreign portfolio investment in the United States.

U.S. holdings of foreign commercial paper, CDs, or BAs are also frequently held in custody by financial institutions and reported as custody claims (TIC-BQ1). Instruments not held in custody are supposed to be reported directly as financial claims on the TIC-C reports. Coverage is clearly inadequate. For example, at the end of June 1990, \$27.5 billion in foreign negotiable instruments were reported as held in custody for U.S. residents by TIC-B form reporters. Another \$17.5 billion in financial claims on foreigners was included in the TIC-C reports, summing to \$45 billion. However, the FRBNY survey of commercial paper outstanding in the United States indicates that foreigners had \$65 billion in commercial paper alone outstanding in the United States at the

31. Some of the CDs included in these reports have maturities of longer than 1 year.

end of June 1990.³² In addition, U.S. residents have substantial

holdings of foreign CDs. Bank of England data indicate that banks in the United Kingdom hold about \$22 billion in CDs in custody for U.S.

nonbanks, and another \$21 billion is held in custody for U.S. banks. It appears that the TIC data grossly understate U.S. residents' holdings of foreign negotiable instruments. Any Treasury benchmark survey of U.S.

portfolio investment abroad should include commercial paper and other short term instruments. In addition, substitution of FRBNY data on foreign issues of commercial paper in the United States (along with

changes in the TIC instructions to exclude commercial paper from the BC and C reports) should be considered.³³

G. Portfolio Investment Income

U.S. interest receipts and payments are largely estimated rather than reported. Apart from government interest receipts and payments of interest to official monetary authorities on Treasury securities held at the Federal Reserve Bank of New York, portfolio investment receipts and payments are estimated by BEA principally on the basis of data on holdings and assumed rates of return.

The estimates on U.S. portfolio investment income are suspect for several reasons. The IMF, after attempts to reconcile current

account data for all nations, has identified portfolio investment income as one of the most serious problem areas. Reported portfolio investment

32. It is conceivable that foreigners do purchase some of the commercial paper issued by foreigners in the United States, but it seems unlikely that their purchases are on this scale. It is also conceivable that some reporters are incorrectly classifying as foreign the issues by the U.S. affiliates of foreigners.

33. This alternative assumes that foreigners are not large takers of commercial paper issued in the United States by foreign residents and that U.S. holdings of Euro-CP are not significant.

income payments world-wide far exceed reported portfolio investment income receipts. Moreover, the U.S. estimates of portfolio investment income receipts and payments are based on shaky data on holdings. In addition, there are problems in estimating certain returns.

The accuracy of the data on holdings depends on the TIC data discussed above. As noted earlier, there are serious problems with the data on U.S. residents' holdings of bank deposits abroad. Comparison with Federal Reserve, BIS, and IMF data suggest that they may be underestimated by more than \$100 billion, leading to a substantial underestimation of interest income.³⁴ Holdings of foreign commercial paper also appear to be substantially underestimated. On the other hand, BIS data suggest that U.S. borrowing from banks outside the United States may also be understated, resulting in underestimation of interest payments to foreigners. In addition, the statistical discrepancy in the U.S. international transactions accounts has cumulated to about \$250 billion in recent decades; if a substantial fraction of these errors and omissions were unrecorded capital inflows, then payments of investment income to foreigners would be underestimated.³⁵

Another source of errors in BEA's estimates of portfolio investment income is assumed returns. BEA is aware of inadequacies in this area and is actively exploring possible improvements. Because of resource shortages, BEA's assumptions about appropriate rates of return are sometimes out of date. For example, no interest is assumed paid or earned on foreign currency deposits because, many years ago, these were

34. However, acceptance of these higher estimates for U.S. assets would imply that there were omitted capital outflows in earlier years.

35. There would be no payments to foreigners on holdings of currency or residential real estate for personal use, however.

largely compensating balances. However, by the end of 1989, banks' foreign currency liabilities amounted to \$68 billion: it seems unlikely that compensating balances have grown to this size.

BEA's methodology for estimating receipts of income on equities is also inadequate. The method assumes that income this period is the same as last period plus dividends on additions to holdings; a stock acquired in 1960 is assumed to earn the same dividend today as it did 30 years ago. On the payments side, BEA revised its estimating methodology as of June 1990 and revised data back to 1984. The new method uses estimates of foreign holdings of U.S. equities combined with information on Standard and Poor's composite yield on 500 stocks. The estimates of foreign holdings of U.S. equities are based upon the periodic Treasury benchmark surveys of foreign portfolio investment in the United States, combined with subsequent reports of net purchases (TIC-S) and estimates of changes in stock prices. BEA plans an analogous change in its method for estimating dividend receipts, using information on average dividend yields on major foreign stock markets. However, estimates of U.S. holdings of foreign stocks are subject to a very wide margin of error since the last Treasury benchmark survey of U.S. portfolio investment overseas was conducted during World War II.

BEA's methodology for estimating interest earnings on long-term bonds is analogous to the method used for stock dividends. Even if it could be assumed that interest rates on outstanding bonds do not change, some guess must be made about the maturities of bonds purchased and the vintage of bonds sold or retired. However, rates cannot be assumed constant for floating rate notes or in the case of interest rate or currency swaps with foreigners. In recent years, the estimation of the

appropriate interest rate has been complicated by the expansion of foreign currency bond markets, the use of interest rate and currency swaps, and the issuance of zero coupons, bonds with warrants attached, and other innovative instruments. The TIC data does not disaggregate these instruments. In this environment, periodic benchmark surveys of U.S. portfolio investment abroad and foreign portfolio investment in the United States are crucial; without periodic benchmarks to check against, any estimating methodology could, over time, produce large errors. In addition, information is needed on currency and interest rate swaps.

Finally, more needs to be done to automate BEA's estimating procedures. PC spreadsheets are used, but much data is entered by hand, rather than transferred directly from BEA's mainframe TIC data base.

IV. STATISTICAL EVIDENCE

The review of the data sources and recent history in the preceding sections suggest that problems exist in the reporting of both current and capital account data. This section turns to statistical techniques, particularly regressions, to try to explore the importance of various factors in explaining the statistical discrepancy in the accounts. An obvious approach would be to regress the statistical discrepancy against various current and capital account components of the U.S. international transactions accounts (or the underlying variables that might explain movements in these components) and attempt to compare their contributions to explaining movements in the statistical discrepancy. Unfortunately, the insights that can be obtained from such regressions are limited.

A. Limitations

Lack of correlation between the statistical discrepancy and a particular component of the balance of payments accounts does not prove that there are no substantial errors and omissions in reporting or estimation of that component. The correlation would be high only if a stable fraction of the balance of payments component was unreported or misestimated.

Moreover, since the U.S. international transactions accounts are

a double entry system which, by definition, must sum to zero, the change in the statistical discrepancy that would result from a change in any component of the accounts, holding other components constant, must necessarily equal -1 times the change. To illustrate, the sum of the recorded current account (CA^r) and errors and omissions in the current account data (CA^e) plus the recorded net capital inflows (K^r) and errors and omissions in the capital flows data (K^e) must equal zero.

$$0 = CA^r + CA^e + K^r + K^e$$

Rearranging terms, the statistical discrepancy is equal to the sum of the current and capital account times -1.

$$SD = CA^e + K^e = -CA^r - K^r$$

Holding net capital flows constant, any change in the current account must be matched exactly by a change in the opposite direction in the statistical discrepancy.

The results of a simple regression between the statistical

discrepancy and any single component of the international transactions accounts will vary depending on what other changes occurred in the

accounts over the period studied. The estimated coefficient will reflect the net impact of errors and omissions in the studied component and

errors and omissions in the balancing components. The estimated coefficient could easily be insignificant, despite systematic errors and omissions in the reporting of the component studied, because there were also systematic errors and omissions opposite in sign in the reporting of the balancing changes in the accounts. Alternatively, the estimated coefficient could be significant even if there were no systematic errors and omissions in a particular component studied if there were systematic errors and omissions in the balancing component.³⁶ In addition, since the composition of these balancing changes may vary depending on the cause of the initial change, the estimated coefficients are likely to be unstable, and very sensitive to the addition or subtraction of observations.

B. Regression results

Given these problems, it is not surprising that regressions between the statistical discrepancy and various components of the U.S. international transactions accounts yield little insight into the sources of the statistical discrepancy. The R^2 s generally are very low and the size and sign of the coefficients vary depending on whether the sample ends in 1989Q4 or 1990Q4 and whether the data are first differenced or used in level form.

However, several other explanatory variables do shed some light on probable sources of the statistical discrepancy in the U.S. international transactions accounts. These variables include 1) variables that are frequently used to explain international capital

36. For example, there appears to be a systematic negative relationship between official capital inflows and the statistical discrepancy; the most likely explanation is that part of the decrease in private assets in the United States that occurs when official holders buy dollar assets net is unrecorded.

statistical discrepancy would be related to measures of capital flight. In unrecorded capital inflows into the United States, the U.S. If capital flight from financially troubled LDC debtors resulted

2) A measure of capital flight from LDCs

attractiveness of dollar-denominated assets and unrecorded flows. that there is not a simple relationship between the relative contribute substantially to the statistical discrepancy, they do suggest results do not rule out the possibility that unrecorded capital flows either coefficient significantly different from zero. While these much of the variation in the statistical discrepancy (equation 1), nor is correctly expected). As shown in table 2, these variables do not explain changes (where it is assumed that actual exchange rate changes were average foreign long-term interest rates and expected exchange rate variables might include the differential between U.S. and weighted might also explain movements in the statistical discrepancy. Such flows, variables that are theoretically relevant in explaining such flows If the statistical discrepancy were largely unrecorded capital

1. Variables that explain international capital flows

results are reported because they are suggestive. reflect the net of errors and omissions in all these accounts), the balanced by changes elsewhere and the statistical discrepancy will change in one of the U.S. international transactions accounts must be immune to the limitations discussed above (any variable that causes a explaining U.S. merchandise trade. While these regressions are not changes in the statistical discrepancy, and 6) errors in a model U.S. currency outstanding, 4) the level of interest rates, 5) lagged flows, 2) a measure of capital flight from LDC debtors, 3) changes in

Table 2
Regression Results ^{1/}

1. Dependent variable: Level of the statistical discrepancy			
Sample period: 1972Q1-1990Q4			
<u>Explanatory variables</u>	<u>Coefficient</u>	<u>T. stat.</u>	<u>R²</u>
Constant	4.0	4.18	.03
U.S.-foreign interest rate differential ^{2/}	.47	.72	
Exchange rate changes ^{3/}	.41	1.70	
2. Dependent variable: Level of the statistical discrepancy			
Sample period: 1974-1989 (annual data)			
<u>Explanatory variable</u>	<u>Coefficient</u>	<u>T. stat.</u>	<u>R²</u>
Constant	4.7	1.06	.29
Capital flight ^{4/}	.96	2.65	
3. Dependent variable: Level of the statistical discrepancy			
Sample period: 1970Q1-1990Q4			
<u>Explanatory variable</u>	<u>Coefficient</u>	<u>T. stat.</u>	<u>R²</u>
Constant	-1.2	.83	.15
Change in U.S. currency outstanding ^{5/}	1.86	3.89	
4. Dependent variable: Level of the statistical discrepancy			
Sample period: 1970Q1-1990Q4			
<u>Explanatory variable</u>	<u>Coefficient</u>	<u>T. stat.</u>	<u>R²</u>
Constant	-2.1	-.79	.04
U.S. Treasury bill rate ^{6/}	.73	2.18	
5. Dependent variable: Change in the statistical discrepancy			
Sample period: 1970Q3-1990Q4			
<u>Explanatory variable</u>	<u>Coefficient</u>	<u>T. stat.</u>	<u>R²</u>
Constant	.2	.32	.36
Lagged change in the statistical discrepancy	-.38	-3.65	
RHO	-.38	-3.62	
6. Dependent variable: Level of the statistical discrepancy			
Sample period: 1973Q1-1988Q4			
<u>Explanatory variable</u>	<u>Coefficient</u>	<u>T. stat.</u>	<u>R²</u>
Constant	3.1	3.43	-.01
Trade model residual	-.27	-.56	

-
- ^{1/} Data are in billions of dollars. The quarterly data on the statistical discrepancy exclude the seasonal adjustment discrepancy. All regressions were OLS except equation 5, where adjustment for serial correlation was necessary.
- ^{2/} Interest rate on 10 year U.S. treasury bonds minus the trade weighted average of rates on 10 year government bonds for the G-10 countries.
- ^{3/} Percent change in the Federal Reserve trade weighted index of the value of the dollar against G-10 currencies $((I_t - I_{t-1})/I_{t-1}) \times 100$.
- ^{4/} Capital flight from 10 Latin American countries and the Philippines. Equal to the gross external debt plus the inflow of net foreign direct investment minus the current account deficit, minus the change in external assets of the central banks and the commercial banks.
- ^{5/} Source: Flow of Funds accounts.
- ^{6/} U.S. Treasury bill rate - 3 month, secondary market.

37. The line between portfolio diversification and capital flight is hazy at best. The above measure is, admittedly, far too inclusive.

BFA omits increases in foreign holdings of U.S. currency from the international accounts. Omission of transactions that result in

3) Currency

are omitted. accounts; however, this relationship is not significant if data for 1990 the statistical discrepancy in the U.S. international transactions relationship between the average rate of inflation in Latin America and substitution of U.S. currency for local currency. There is a significant crucial, but rather accelerating inflation, which leads to the discrepancy skyrocketed. Perhaps it is not "capital flight" that is indications are that "capital flight" declined while the statistical data on "capital flight" in 1990 is not available, preliminary ended up in unrecorded U.S. capital inflows. Moreover, although complete about 95 cents of every dollar of "capital flight" from these countries accounts. However, the coefficient seems implausibly high, implying that and the statistical discrepancy in the U.S. international transactions significant relationship between "capital flight" from these countries rather than quarterly. There does appear to be a statistically comparable to those in the other regressions because the data are annual central bank and the commercial banks.³⁷ The R^2 in this equation is not the current account deficit minus the change in external assets of the of these countries plus the inflow of net foreign direct investment minus "Capital flight" is crudely measured as equal to the gross external debt one measure of capital flight from Latin America and the Philippines. The next regression (equation 2) relates the statistical discrepancy to

increased foreign holdings of U.S. currency would contribute to the net statistical discrepancy if the other side of the transaction were recorded in the accounts. For example, net shipments of currency abroad by banks would contribute to a positive discrepancy because the currency shipments are omitted from the accounts, but the payments for the currency would be recorded. Transactions that are omitted on both sides would not contribute to the net discrepancy (e.g., cash payments for drug imports).

A sharp increase in net currency shipments abroad by banks appears to explain part of the very large statistical discrepancy in 1990.³⁸ Economic disruption in Eastern Europe, the Soviet Union, Latin America (particularly run-away inflation in Argentina), and the crisis in the Persian Gulf all probably contributed to foreign demand for U.S. currency. However, since the total increase in U.S. currency outstanding (excluding bank vault cash) in 1990 was only about \$22 billion, factors other than increased foreign holdings of U.S. currency must also have played a significant role in explaining the growth of the statistical discrepancy to \$64 billion.

Comprehensive historical data on currency shipments abroad by banks are, unfortunately, unavailable. It is therefore not possible to assess directly the contribution of such currency shipments to the statistical discrepancy over a longer period of time. An indirect approach, using data on total U.S. currency outstanding, was tried instead.

³⁸. This information is based on informal discussions between FRBNY and certain banks.

39. When data for 1990 are excluded the fit is not as good, but the coefficient is 1.5 and still statistically significant. If the regressions are run using first-differenced data, the currency coefficient is even larger and also significant. Using non-seasonally adjusted data for currency outstanding reduces the size of the coefficient below 1 and also reduces the R². If it is assumed that the seasonal pattern in currency reflects fluctuations in U.S. demand, then the seasonally adjusted data are the appropriate data to use.

statistical discrepancy and the level of U.S. interest rates (equation

There does appear to be a significant relationship between the

the amounts involved would tend to increase as interest rates rose.

international accounts because U.S. assets abroad were underestimated,

income. If interest income were being underestimated in the U.S.

suggested that many countries underestimate their portfolio investment

The IMF study of the global current account discrepancy

4. Interest rate level

contributed to the statistical discrepancy.³⁹

currency outstanding have coincided with other factors that might have

implausibly high (greater than one) suggesting that movements in U.S.

changes in U.S. currency outstanding. However, the coefficient seems

to be a significant relationship between the statistical discrepancy and

statistical discrepancy? As indicated by equation 3, there does appear

changes in currency outstanding correlated with the level of the

proxy for increases in foreign demand for U.S. currency. Second, are

particular. The statistical discrepancy does not appear to be a good

models explaining the demand for currency in general and \$100 bills in

correlation between the statistical discrepancy and the residuals from

U.S. currency help explain demand? There appears to be no significant

does adding the statistical discrepancy to a model explaining demand for

This question can be approached from two perspectives: first,

4). These regressions results appear to support the contention that BEA is underestimating portfolio investment income.⁴⁰

5) Lagged changes in the statistical discrepancy

The statistical discrepancy is highly volatile from quarter to quarter. As indicated by equation 5, changes in the statistical discrepancy in one direction tend to be followed by changes in the opposite direction in the next quarter. Timing problems (i.e., the recording of one side of a transaction in one quarter and the other side in the next quarter) probably contributed to this result.

6) Residuals in a trade model

If there were substantial quarterly swings in the errors and omissions in trade transactions, there would be no reason to assume that such swings would be mirrored in trade model estimates, and the model residuals would reflect these swings. As indicated by equation 6, there does not appear to be any correlation between the residuals of the model used by the U.S. International Transactions Section of the Federal Reserve Board to project the partial trade balance and the statistical discrepancy in the U.S. international transactions accounts.⁴¹ These results suggest that the wide quarterly swings observed in the

40. The estimated coefficient implies that if U.S. short term interest rates were 100 basis point higher for a year, the statistical discrepancy would be about \$3 billion higher for the year. Another inference that can be drawn from these results is that BEA is underestimating U.S. net interest bearing assets abroad by about \$300 billion and if interest rates averaged about 7 percent for the year, the contribution of underestimated interest receipts to the statistical discrepancy would be about \$20 billion. Given the standard error of the coefficient, these estimates are undoubtedly subject to a very large margin of error, but they do suggest the importance of improving the estimates of U.S. portfolio assets abroad and the income earned on these assets.

41. The model residual equals the model estimate minus the recorded partial trade balance (the value of nonagricultural exports minus nonoil imports).

42. The possibility remains that timing problems in the recording of payment for these goods or the extension of commercial credit contribute to the statistical discrepancy. In fact, the model maintained by the FRB staff predicted a significantly larger trade deficit than was realized in 1990.

43. trade balance was any larger than the recorded data indicate. estimated models do not suggest that the expected improvement in the projections of improvement in the merchandise trade balance based on suddenly jumped in 1990 when the statistical discrepancy skyrocketed; Nor is there any reason to assume that omitted net exports of goods the merchandise trade account on the statistical discrepancy is unclear. has increased. The net effect of these and other errors and omissions in problem, but it has probably grown in absolute size over time as trade monitored than imports; underestimation of net exports is not a new undoubtedly substantial. On the other hand, exports are less carefully a negative contribution to the statistical discrepancy and are, On the current account side, imports of illegal substances make

larger than the net statistical discrepancy. also likely that gross errors and omissions in the accounts are much errors and omissions in both the current and capital accounts. It is it seems likely that the high statistical discrepancy is the result of U.S. international transactions accounts and various statistical tests, years. Based on a review of inadequacies in the data sources for the transactions accounts has been very large and highly volatile in recent The statistical discrepancy in the U.S. international

V. CONCLUSIONS

42. omissions in the reporting of imports or exports of goods. statistical discrepancy are probably not the result of errors and

Trade in services is much more difficult to monitor than trade in goods, which can be observed as goods enter or leave the United States. BEA has made substantial advances in improving its estimates of U.S. receipts and payments for services in the past decade, but holes remain. It is not clear, however, whether improving these data would add more to receipts or to payments.

In contrast, both alternative data sources on U.S. assets abroad and the statistical tests of the relationship between the statistical discrepancy and U.S. interest rate levels suggest that net portfolio investment income is substantially understated in the U.S. international transactions accounts. However, because the level of U.S. interest rates did not rise sharply in 1990 on average, omitted portfolio investment income could not have been an important contributing factor to the rise in the statistical discrepancy between 1989 and 1990.⁴⁴

The sources of the big increase in the statistical discrepancy in 1990 should be sought in the capital flows data, and perhaps in unilateral transfers. One obvious source of the discrepancy is the omission of estimates of increases in foreign holdings of U.S. currency. In 1990, as in other periods of economic and political turmoil abroad, foreigners turned to U.S. currency for transactions and as a store of wealth. Inflation in Argentina, economic disintegration in the Soviet Union and parts of Eastern Europe, and the crisis in the Persian Gulf all contributed to the demand for dollars. However, given the total increase in U.S. currency outstanding in 1990, increases in foreign demand for

44. Interest rates in some foreign countries did rise, but since only a small part of U.S. claims on foreigners is denominated in foreign currencies, only a small impact on omitted interest receipts would be expected.

U.S. currency probably could explain, at most, \$15 to \$20 billion of the statistical discrepancy; other factors must have been significant as well.

Economic and political turmoil abroad is probably also

associated with the flight of capital in other forms to safe haven in the United States. It is not clear why capital flight would necessarily take forms that would escape the reporting system for U.S. capital flows, but historically that appears to have been the case. Perhaps significant

amounts tend to be invested in real estate, an area that is inadequately covered in the capital flow reports. Alternatively, significant

investments may be made through relatives or friends who are U.S.

residents, and therefore missed by the reporting system. While the measure of "capital flight" from Latin America and the Philippines

presented earlier probably will not show an increase in 1990, flows spurred by the Persian Gulf Crisis, unrest in Eastern Europe, or

uncertainty about the future of Hong Kong may have increased. Flight of wealthy persons as well as their capital may also have occurred;

immigration of wealthy individuals to the United States would contribute to the statistical discrepancy because it is likely to be associated with a reduction in recorded liabilities to foreign residents and an increase in claims of U.S. residents on foreigners while the balancing inflow on unilateral transfers is unrecorded. It would be very difficult to give a quantitative assessment of the importance of capital flight in explaining the U.S. statistical discrepancy in 1990.

Another factor that may have played a role in the sharp rise in

the statistical discrepancy in 1990 might have been the failure of U.S.

nonbank affiliates of foreign direct investors to file TIC-C reports

indicating their liabilities to unaffiliated foreigners. These reports are probably the weakest link in the TIC reports system; the number of reporters is small and the attention devoted by companies to the accuracy of these reports is minimal. Capital inflows from foreign direct investors to their U.S. affiliates dropped from \$71 billion in 1989 to \$37 billion in 1990; however information available on acquisitions of U.S. companies by foreigners does not indicate a precipitous decline, raising the question of how these takeovers were financed.⁴⁵ While many acquisitions were funded by borrowing by affiliates in the United States, borrowing from financial institutions outside the United States also may have played a role. Much of such borrowing is, in principle, reportable on the TIC-C forms, but if omitted would contribute to the statistical discrepancy.⁴⁶ Given the widening spread between prime and libor at the end of 1990, increased borrowing in the Eurodollar market would not be surprising.

The wide swings in the statistical discrepancy from quarter to quarter seem more likely to be the result of errors and omissions in the recording of capital flows as well. Timing problems in the recording of direct investment flows or the counterpart to highly volatile bank flows probably contributed to these swings.

A. Recommendations

1. Renewed and sustained commitment to improving the data on U.S. international transactions is needed. In many cases, this would involve increasing the budgets of the agencies responsible for data

45. Starting with data for 1991, BEA's annual survey of U.S. business enterprises acquired or established by foreign direct investors (BE-13) will provide more information on sources of funding.

46. If the U.S. office of a bank played some role in the loan, the reporting responsibility would rest with the bank and not the borrower.

collection so they can fill gaps in current data, identify missing reporters, improve estimating methods, and devote more adequate resources to data verification. (The Boskin committee report has resulted in some progress in this direction, at least for BEA.) In addition, the revival of the Office of Federal Statistical Policy and Standards, and its rededication to improving the quality of federal statistics, establishing priorities, and coordinating data collection across federal agencies would help significantly.

2. A basic review of the data collection system for portfolio capital flows is needed, drawing on the views of academics and financial market participants as well as government data collectors and analysts. We need to reconsider what kinds of data are necessary for balance of payments purposes and policy analysis and to assess how such data could best be collected given evolving financial markets.

3. In particular, inadequate reporting of the transactions of U.S. nonbanks with unaffiliated foreigners (TIC-C reports) requires a serious effort to improve compliance with the reporting requirement and/or efforts to substitute alternative data sources (e.g., Federal Reserve or BIS data) for some information currently reported on these forms.

4. The Treasury should undertake a benchmark survey of U.S. portfolio investment abroad. In addition to providing information on holdings, the inward and outward benchmark surveys should be designed to provide a benchmark for BEA's estimates of portfolio investment income. Moreover, the benchmark surveys should include information on shorter term instruments, such as commercial paper, that are aggregated with other items in the TIC reports.

5. Obvious gaps in the international accounts should be closed. Estimates of increases in foreign holdings of U.S. currency should be included, based on improved Treasury CMIR data and/or a survey of banks involved in incoming and outgoing currency shipments. Problems in the coverage of real estate transactions should be tackled.

6. Efforts by Commerce and Customs to improve the merchandise trade data should continue. Periodic sample audits of shipments through specific ports are useful to identify problem areas, as are efforts to reconcile trade data with other countries.

7. Miscellaneous recommendations to BEA would include a) improving the method used to estimate dividend and interest income on holdings of securities, b) estimating interest receipts and payments on foreign-currency denominated bank deposits, and c) periodically collecting information on the currency composition of accounts receivable and payable between direct investment affiliates and their parents.

8. Miscellaneous recommendations to Treasury would include a) instructing TIC reporters to use tax identification information rather than address to identify foreigners, b) collecting information periodically on the currency composition of banks' foreign currency denominated claims and liabilities, c) improve reporting of banks' write-offs of loans, and d) disaggregate reporting of foreign investments in limited partnerships from purchases of equities and study alternative ways of collecting data on limited partnerships.

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