NBER WORKING PAPER SERIES

CURRENT ACCOUNT SUSTAINABILITY AND RELATIVE RELIABILITY

Stephanie E. Curcuru
Charles P. Thomas
Francis E. Warnock

Working Paper 14295
http://www.nber.org/papers/w14295

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
September 2008

This paper, which is forthcoming in the NBER's International Seminar 2008, is also being released as Federal Reserve International Finance Discussion Paper 947. The authors are indebted to Jeff Frankel for suggesting the topic and to Trevor Reeve for particularly helpful discussions. We thank James Albertus for excellent research assistance and Mike Dooley, Daniel Gros, Philip Lane, Gian Maria Milesi-Ferretti, and participants at the Wisconsin Conference on Current Account Sustainability and the NBER International Seminar on Macroeconomics Conference in Slovenia for helpful comments. Warnock thanks the Darden School Foundation for generous support. The views in this paper are solely the responsibility of the authors and should not be interpreted as reflecting the views of the Federal Reserve Bank of Dallas, the Board of Governors of the Federal Reserve System, any other person associated with the Federal Reserve System, or the National Bureau of Economic Research.

NBER working papers are circulated for discussion and comment purposes. They have not been peer-reviewed or been subject to the review by the NBER Board of Directors that accompanies official NBER publications.

Current Account Sustainability and Relative Reliability
Stephanie E. Curcuru, Charles P. Thomas, and Francis E. Warnock
NBER Working Paper No. 14295
September 2008
JEL No. F3

ABSTRACT

The sustainability of the large and persistent U.S. current account deficits is one of the biggest issues currently being confronted by international macroeconomists. Some very plausible theories suggest that the substantial global imbalances can continue in a benign manner, other equally plausible theories predict a disorderly resolution, and in general it is very difficult to discern between competing theories. To inform the debates, we view competing theories through the perspective of the relative reliability of the data the theories rely on. Our analysis of the dark matter theory is cursory; from a relative reliability perspective, it fails as it is built on the assumption that an item that is largely unmeasured is the most accurate component of the entire set of international accounts. Similarly, the best data currently available suggest that U.S. returns differentials are much smaller than implied by the exorbitant privilege theory. Our analysis opens up questions about potential inconsistencies in the international accounts, which we address by providing rough estimates of various holes in the accounts.

Stephanie E. Curcuru
Board of Governors
of the Federal Reserve System
20th Street and Constitution Avenue, NW
Washington DC 20551
stephanie.e.curcuru@frb.gov

Charles P. Thomas
Board of Governors
of the Federal Reserve System
20th Street and Constitution Avenue, NW
Washington DC 20551
thomasc@frb.gov

Francis E. Warnock
Darden Business School
University of Virginia
Charlottesville, VA 22906-6550
and NBER
warnockf@darden.virginia.edu

1. Introduction

One of the biggest issues confronting international macroeconomists is whether or not the large and persistent U.S. current account deficits are sustainable.[1] There are varied views about how the current situation of global imbalances—in which the United States has a sizeable current account deficit of over five percent of GDP and, to a first approximation, the rest of the world has a sizeable current account surplus—might resolve itself. In a simplistic way these views can be divided into those who believe these imbalances will evolve in a benign manner and those who worry that their resolution will involve substantial disruptions to the global economy, disruptions that could include, among other things, a sharp decline in the dollar, a sharp increase in U.S. interest rates, and substantial negative spillovers to other economies.

The problem, from a lay person's perspective, is that it is extremely difficult to determine which of the competing views of U.S. current account sustainability are valid. From a distance, they all seem plausible. Take, for example, the "exorbitant privilege" view that the United States can earn its way to current account sustainability because U.S. claims on foreigners earn a much higher rate of return than foreign claims on the United States. Such a return differential would indeed loosen the U.S. budget constraint and make it easier to run continued large current account deficits. As theoretical work such as Cavallo and Tille (2006) shows, a positive returns differential would decrease the likelihood of a disorderly adjustment in the U.S. current account and the dollar; were the exorbitant privilege view true, the U.S. current account would be more sustainable than otherwise. Complicating matters is that while some—such as Gourinchas and Rey (2007a), Obstfeld and Rogoff (2005), Lane and Milesi-Ferretti (2005), and Meissner and Taylor (2006)—have computed a returns differential that can be described as exorbitant, others (Curcuru, Dvorak, and Warnock 2008a,b; Lane and Milesi-Ferretti 2008) provide evidence suggesting such estimates might be biased upward. Another example is the "dark matter" view of Hausmann and Sturzenegger (2007), henceforth HS. HS propose an alternative method to computing

[1] On this, see, among others, Hausmann and Sturzenegger (2007), Kitchen (2007), Pavlova and Rigobon (2008), Edwards (2005), Frankel (2006), Roubini and Setser (2004), Obstfeld and Rogoff (2007), and Meredith (2007).

net international positions and current accounts. With their method, global net asset positions are stable, suggesting that the current global imbalances are sustainable and that neither a major adjustment in the exchange value of the dollar nor a large rebalancing of the global economy is necessary. In contrast, Gros (2006) concludes that the U.S. net IIP is *more* negative than reported after examining the same data. So which is it? Is the actual U.S. net international position more stable than suggested by the published data (the HS view) or more negative (the Gros view)?

One way to discern between competing views of current account sustainability is to examine the data upon which they rely. That is, as we will show in this paper, many competing views on whether the U.S. current account deficit is sustainable or not hinge importantly on beliefs about the *relative reliability* of various components of the international accounts.[2]

Questions about the relative reliability of entries in the international accounts are not new:

> "Clearly, if our investments abroad are yielding a positive return, their capital value must be positive not negative. Is this a defect of the figures on current flows, or is it a defect of the balance-sheet figures? The only obvious reconciliation is to assign the whole of the statistical discrepancy as an unrecorded negative net investment income, but even that does not seem satisfactory…" (Milton Friedman, 1987)[3]

Over 20 years later, these issues are still open and the question of relative reliability remains a useful perspective through which to view theories on current account sustainability.

Our results can be summarized as follows. First, from a relative reliability perspective the dark matter view can be quickly dispensed with. HS suggest that the external position for all asset types should be estimated by capitalizing income at a common discount rate. They then compute the net position from these capitalized values, and form the current account as the year-to-year change in their constructed net position. This explicitly assumes that investment income, a subcomponent of the current account, is the most reliable portion of the entire set of international accounts, and that it is appropriate to construct positions in this manner. Given that approximately two-thirds of published investment income data are

[2] By international accounts we are referring to the balance of payments (BOP) and the international investment position (IIP).
[3] Personal correspondence with Charles Thomas, June 1987.

not measured, but are formed by applying estimates (of yields) to estimates (of positions), from a relative reliability perspective dark matter fails. Moreover, while we have sympathy for some parts of the hypothesis, we find the methodology of capitalizing income streams to be questionable. Even if the investment income numbers are entirely reliable, we doubt this method of constructing the current account or position is an improvement over the published estimates.

Second, the view that the United States can earn its way to current account sustainability rests on the continued existence of an exorbitant privilege, which rests in turn on a view of relative reliability in which position and flow data form a cohesive dataset. But Curcuru, Dvorak, and Warnock (henceforth CDW) (2008a) argue convincingly that, for the purpose of calculating returns, positions and flows data do not form an internally consistent dataset and show that the returns differential—the difference between the rate that the United States earns on its foreign claims and the rate it pays on its foreign liabilities—is not as sizable as previously assumed.[4]

To weigh in on this, we first form returns differentials in the most accurate way currently possible. For one asset class—direct investment (DI)—we cannot confidently form what we would consider accurate returns, so there we present a range. But with either high or low DI returns, in aggregate we produce returns differentials that are consistent with those from CDW (2008a) and much smaller than the exorbitant privilege view suggests. There is no evidence from carefully constructed returns differentials that the United States can count on earning high international returns.

The analysis of returns differentials, as in CDW (2008a) and Lane and Milesi-Ferretti (2008), opens up a puzzle. Specifically, it exposes a substantial "gap" in the international accounts that implies mismeasurements in some combination of our preferred valuation adjustments, reported balance of payments data, and reported international investment positions data. To weigh in on this, we address known weaknesses in the accounts by forming adjustments for (i) assets not currently captured in the

[4] CDW's view can be interpreted as one in which improvements to the data collection system make information on relatively recent positions (taken from the IIP) more reliable than information on past positions (also in the IIP) and that position data is generally more reliable than that on financial flows (presented in the IIP, but originating in the BOP) which are seldom revised even after errors are identified.

historical financial accounts data (residential real estate, which should be in the direct investment data, and financial derivatives, introduced only in 2006), (ii) items that have known shortcomings in the transactions data in the current and financial accounts but have no known accompanying flaws in the positions data (IPOs, asset-backed repayments, goods exports), and (iii) items that have known shortcomings in the positions data but for which the associated transactions data are thought to be sound (short positions, direct investment in intangibles). We develop reasonable plugs to these holes and construct revised estimates of the remaining unexplained difference between the cumulated current account deficit and the net IIP.

In the end, after accounting for weaknesses in the international accounts, the gap is quite small and entirely consistent with small CDW-type valuation adjustments. Moreover, our best estimate indicates that the current account deficit is somewhat smaller than has been reported (on average 0.35% of GDP per year), net financial inflows are smaller than reported (on average 0.7% of GDP per year), and the end-2007 net IIP is $500 billion more negative than reported.

In the next section we examine the dark matter hypothesis. In Section 3 we weigh in on the exorbitant privilege view, discuss the relative reliability of various items in the international accounts, and provide adjustments to plug known holes in the accounts. In Section 4 we take a step back and think more broadly about current account sustainability, discussing the implications of our results and, just as importantly, suggesting avenues that are potentially more informative. Section 5 concludes. Drier material on forming our preferred returns and the details of our adjustments to the international accounts are relegated to appendices. We provide annual data on our adjustments, as well as some underlying data, at http://www.nber.org/data-appendix/w14295.

2. Dark Matter

At least in its original incarnation, the dark matter of HS rested on a very severe notion of relative reliability. In particular, HS explicitly assume that investment income, a subcomponent of the current account, is the most reliable portion of the entire set of international accounts. Given this view of the

relative reliability of various components of the international accounts—in this case that information on investment income is more reliable than information on the IIP and the current account—a view of current account sustainability follows. If investment income is the most accurate component of the entire set of accounts, then the HS suggestion that the net IIP should be estimated by capitalizing net investment income is reasonable, and so might be estimating net financial flows as the changes in the capitalized-net-income measure of the net IIP.[5] Doing so produces global net asset positions that appear to be relatively stable, leading to the HS view that global imbalances are sustainable and that neither a major adjustment in the exchange value of the dollar nor a large rebalancing of the global economy is necessary.

Kozlow (2006) presents a cogent critique of this dark matter hypothesis.[6] Here we will raise only one point about the leg on which it stands. The notion that income streams are the most accurate aspect of the account is patently false. In gross valuation terms, more than two-thirds of the income streams—those arising from non-DI positions—are derived by taking an estimate of the position, picking a reasonable yield, and applying that yield to positions to estimate income streams. In 2007, combined gross income payments and receipts totaled a bit less than $1.5 trillion; of this more than $1 trillion was non-DI and hence was estimated by applying an estimated rate of return to estimated positions.[7] Our view is that from a relative reliability perspective this theory, which relies on largely on data constructed by applying estimates to estimates, is fairly weak.

Since HS first applied the term dark matter to international accounting, it has become associated with the difficulty in accounting for cross-border transactions in intellectual property (IP) such as patents, trademarks, and other intangibles. We have some sympathy for this view. In the U.S. National Income and Product Accounts (NIPA) all trade in IP (whether for the use of the IP or ownership rights to it) is

[5] HS actually suggest that the current account balance, not net financial flows, be measured in this way. However, estimating the current account in this way ignores the potentially large (if currently unmeasured) contribution of capital account transactions and introduces inconsistencies into the NIPA measurement of product.
[6] See also Willem Buiter's critique, "Dark Matter or Cold Fusion?" (http://www.nber.org/~wbuiter/dark.pdf).
[7] Thus, when positions data are revised when more accurate information becomes available, so too are income streams. This explains why starting in the late 1990s the United States repeatedly became a net debtor in the income balance only to have revisions to positions push it back into the black.

included in the current account under services.[8] This is true for trade between unaffiliated parties as well as trade within a DI relationship. BEA has recognized that its coverage of these transactions has been incomplete and recently revised its forms and reporting panels.[9] Although these efforts will likely increase coverage, and perhaps increase recorded services trade, they will likely do little to address the issue of how firms value the IP transferred between affiliates. One hypothesis to reconcile the high income rate of return earned on U.S. direct investment abroad and the low income rate of return earned on foreign direct investment in the United States is that U.S. firms undervalue the IP transferred to their foreign affiliates while foreign parents overvalue the IP transferred to their U.S. affiliates.

We are not going to address this issue beyond making two points: First, the current cost valuation of DI used throughout this paper excludes intangibles, including IP. Second, the fundamental issues associated with sustainability depend on the willingness of cross-border investors to continue investing and the servicing burden of the investment positions. The particular values that compilers attach to DI positions in the IIP are irrelevant. For example, foreign parents may be quite happy with the fact that their U.S. affiliates earn low (profit) rates of return so long as they pay large royalty payments back to the parent. From the standpoint of the current account (and hence financial flows), it does not matter if the debit entry is recorded as investment income payments or royalty payments.[10]

---

[8] This treatment is out of sync with the System of National Accounts, 1993, (SNA93) and causes an inconsistency in the NIPA measurement of product. Within SNA93, transactions in the ownership rights to IP are to be recorded in the capital account unless the IP is the result of research and development (R&D). Trade in the ownership rights to IP that results from R&D is to be recorded in the current account as "research and development services." However, trade in the rights to use IP are to be recorded in the current account under services as "royalties," regardless of whether R&D was an input to the IP. In the draft edition of the update to the Balance of Payments Manuel, BPM6, the term "royalties" has been replaced by "Fees for franchises and other property rights."

[9] The new form, BE-125, first collected data for 2006. Estimates based on these data will be folded into the annual revisions to the IT accounts published in June 2008.

[10] We can be more precise on this point. Consider, for example, a foreign subsidiary (the sub) that does not pay royalties to its U.S. parent and instead books a high profit and pays taxes to its host country, which, in a host country like Ireland, would be at a low rate. The U.S. parent pays no taxes until the sub repatriates the income; if the sub does pay royalties to its parent, the sub's profits are lower and the sub pays (a little) lower taxes to its host country. In that case the U.S. parent has the higher royalty income which, all else equal, flows directly into pre-tax profits; U.S. tax must now be paid on this, presumably at a higher rate than in the host country. As long as the sub has something reasonable to do with the funds abroad, then it makes sense to not pay royalties. If and when there comes a time when the parent needs the funds back home, the sub pays the parent a dividend and at that time the parent pays taxes to the U.S. government equal to the difference between what it would normally pay and what the sub has already paid to the sub's host country. Note that the accounting treatment of these earnings may, however, violate

3. Exorbitant Privilege

The exorbitant privilege view that the United States might be able to earn its way to current account sustainability also hinges on relative reliability. Proponents of this view point to the large returns differential the United States enjoys—the idea that the United States can persistently earn sizably more on its foreign portfolio than it pays foreigners on their U.S. portfolios—that has been reported in Gourinchas and Rey (2007a), Obstfeld and Rogoff (2005), Lane and Milesi-Ferretti (2005), and Meissner and Taylor (2006). Subsequent work—CDW (2008a,b) and Lane and Milesi-Ferretti (2008)—has found that early estimates of the U.S. returns differentials were biased upward.

Why is there a discrepancy between estimates of the returns differential? From a relative reliability perspective, the large U.S. returns differential and, hence, the empirical cornerstone of the exorbitant privilege view, rests on the implicit but ultimately incorrect assumption that the various components of the U.S. international accounts form a cohesive dataset (CDW 2008a). The CDW view can be interpreted as one in which information on relatively recent positions (taken from the IIP) is more reliable than information on past positions (also in the IIP) and financial flows (presented in the IIP, but originating in the BOP).

In this section we put forward what we believe to be the best quality information on returns differentials currently available. Our analysis exposes a substantial gap in the international accounts—an inconsistency between our preferred valuation adjustments, reported balance of payments data, and reported international investment positions data—that we then address. We end by summarizing the implications of our analysis for the exorbitant privilege view. Data availability limits our analysis to the period from 1990 to 2007.

IRS transfer-pricing guidelines and can result in significant tax penalties such as those recently levied on pharmaceutical companies Merck & Company and Glaxo SmithKline. See "Merck Tax Settlement Carries $2.3B Tab", WebCPA, Feb. 15, 2007, available at http://www.webcpa.com/article.cfm?articleid=23366.

3.1 Estimating Returns Differentials

Returns on international investment positions are never directly measured and thus must be inferred from other data. As shown in CDW (2008a), there are essentially three methods for estimating cross-border returns. Two methods use IIP data—one as-reported data from each year's IIP release, the other the current vintage of revised data—on flows and positions to back out implied returns. The third uses a combination of market-based returns data where possible and original IIP data where market-based data are not readily available. In this section we discuss and compare the three methods.

3.1.1 Original IIP Method

The "Original IIP" approach estimates capital gain returns for a particular asset class using:

$$r_t^O = \frac{A_t^O - A_{t-1}^O - FLOW_t^O - OA_t^O}{A_{t-1}^O + \frac{1}{2} FLOW_t^O} \qquad (1)$$

where *A*, *FLOW*, and *OA* denote positions, flows, and "other adjustments" and the O superscript denotes that all are as reported in the original year *t* IIP release.[11]

From a relative reliability perspective, the Original IIP method presumes that *originally reported* positions and flows form a cohesive dataset and that originally reported "other adjustments" are not valuation adjustments. These "other adjustments" are one item in the IIP presentation: In each annual IIP release, for both claims and liabilities positions and for each asset class, BEA provides a reconciliation between start- and end-of-the-year positions, attributing movements over the year to net flows, valuation changes due to price or exchange-rate movements, and "other adjustments." BEA defines "other adjustments" as (i) changes in coverage, (ii) capital gains and losses of direct investment affiliates, and (iii) other adjustments to the value of assets and liabilities. Large contributors to "other adjustments" are

[11] Throughout, DI is valued using the current-cost method. Alternatively, these positions could be reported based on their historical cost, or based on an estimate of the current market value. BEA shifted their emphasis to the current-cost method starting in 2006. In general, the value of DI is extremely difficult to determine because it typically involves illiquid ownership interest.

the addition of new reporters to the panels, identified reporting errors, and reclassification of assets among categories, but—except for the banking and nonbanking categories—the "other adjustments" reported in the *original* IIP releases are very minor.

Column (A) of Table 1 shows capital gains returns differentials computed using the Original IIP method. The overall differential is quite small at 0.7 percent per year for the period from 1990 to 2007. The source of this modest differential is the different compositions of U.S. assets and liabilities, first pointed out by Gourinchas and Rey (2007a); U.S. assets are weighted toward equities and DI, while U.S. liabilities are weighted toward lower yielding debt securities.

3.1.2 Revised IIP Method

The second method, the "Revised IIP" method, uses the following formula to calculate implied capital gains returns:

$$r_t^R = \frac{A_t^R - A_{t-1}^R - FLOW_t^R}{A_{t-1}^R + \frac{1}{2}FLOW_t^R} \qquad (2)$$

where the R superscript denotes that these variables are formed using the most recently revised data (that is, the current vintage of revised data).[12]

Note that an implicit assumption behind (2) is that the current vintage of revised positions and flows data form a consistent data set from which implied returns can be computed. While one would expect revisions to generally enhance the accuracy of reported data, when computing implied returns from position and flow data it is relative reliability that matters. In fact, Figure 1, reproduced from CDW (2008a), shows that over time positions data have been systematically revised upward from a U.S. perspective,[13] while flows are little revised. Large upward revisions to positions with essentially no

[12] Equations (1) and (2) differ slightly from those presented CDW (2008a) because the denominator includes a term for one-half of the year's flows, and the numerator in equation (1) also subtracts the contribution of "other adjustments." The differences in the resulting valuation adjustments are minor.

[13] This upward revision in U.S. positions is a combination of upward revisions to U.S. assets abroad and downward revisions to foreigners' positions in the United States.

corresponding revisions to flows produce—when returns are computed using (2)—large returns differentials.[14] This is evident in Column (B) of Table 1: In aggregate the Revised IIP method produces a substantial capital gains returns differential of 2.4 percent per year, owing to large differentials favoring the United States for bonds, equities, and direct investment.

3.1.3 Our Preferred Method

Our preferred method takes the following approach. For portfolio bonds and equities, as in CDW (2008a,b) we use a market-based approach that assumes that holdings data are the most accurate aspect of the international accounts and applies reasonable returns indices to the measured positions to form estimated returns. For asset classes where capital gains are minor and little additional information becomes available over time, such as the banking/nonbanking/other categories, we assume the Original IIP releases provide a reasonably accurate picture. The most difficult asset class for which to estimate returns differentials is direct investment. There is a long literature on puzzling aspects of returns on direct investment in the United States and abroad.[15] From our perspective, the difficulty in calculating accurate returns differentials for DI stems from three factors: (i) BEA only publishes revised valuation and other adjustments for aggregate claims and liabilities, without a breakdown by asset class, so there is no reported estimate of adjustments in revised data, (ii) there are no market-based indices that are appropriate, and (iii) in contrast to other asset classes, "other adjustments" in the current vintage of revised data likely contains some information on valuation adjustments. To address the first factor, we infer DI other adjustments as what remains after we subtract the "other adjustments" associated with non-DI assets from the reported aggregate. With regard to the last two factors, we calculate implied DI returns from the current vintage of data by assuming that either all revised DI "other adjustments" are indeed valuation adjustments or, alternatively, that they are associated with intangibles and should remain "other

[14] To be more precise, this statement is true only if previous-period positions are not fully revised. They are not; see CDW (2008a).

[15] There is a long-standing, positive total returns differential for direct investment, the bulk of which arises from relatively higher income yields. The capital gains differential reported in Table 1 ranges from 0.8 to 2.3 percent per year, depending on how other adjustments are treated.

adjustments". This approach means that we have a range of returns for DI, which, while not entirely satisfactory, at least accurately depicts our lack of knowledge of underlying DI returns.[16]

Complete details of the calculations behind our preferred method—from our choices of returns indices to the way we estimate DI other adjustments—are provided in Appendix A. The resulting returns are in Column (C) of Table 1. Returns differentials computed using our preferred method are quite small, with an aggregate differential of 0.9-1.1 percent per year, depending on whether DI "other adjustments" are considered valuation adjustments.

3.1.4 Comparison of the Three Methods

The aggregate differential from our preferred method is only slightly higher than that from the Original IIP method, but much smaller than the differential from revised data. The asset classes that produce the large discrepancy between our preferred returns and those from the Revised IIP method are equities and bonds. Our preferred capital gains rates on equity claims are significantly smaller than those computed by the Revised IIP method (8.2 percent vs. 13.2 percent). Also dramatic are the differences in the capital gains on bonds, with Revised IIP annual returns being 2.5 percent higher for claims and almost two percent lower for liabilities, both of which inflate the overall differential.

The main difference between the large differentials from the Revised IIP method and the smaller ones from our preferred method is that the revised method assumes all "other adjustments" are in fact valuation adjustments. From a relative reliability perspective, we find that assumption untenable, as for asset classes like bonds and equities there is little additional information on returns in the revised releases; returns are not measured in the original release, nor are they measured in subsequent ones.

3.2 The Gap in the International Accounts

From a relative reliability perspective, returns differentials from our preferred method are the most accurate. Yes, they can be improved upon in the future, in particular by forming even finer returns

[16] This treatment of DI "other adjustments" is similar to that in Lane and Milesi-Feretti (2008).

indices for cross-border portfolio bond and equity positions, but for each asset class they are based on assessments of the best available information for computing returns. That said, as can be seen in Table 2, they expose a "gap" in the international accounts that, computed over the 1990 to 2007 period, totals between $1,358 billion and $1,752 billion (depending on how revised DI "other adjustments" are treated).[17] Conceptually, this gap—which is equal to the net of "other adjustments" for claims and liabilities shown in Table 2—is the difference between the position recorded in 2007 and the position that would be estimated by adding flows and valuation adjustments to the initial (end-1989, in this exercise) position.[18] A positive gap indicates that 2007 positions are greater than implied by past flows and valuation adjustments.

Specifically, the gap is defined as:

$$GAP_T = NIIP_T^R - EstimatedNIIP_T \tag{3}$$

where NIIP is the net international investment position, T is the end-date (in this case, 2007), the R superscript indicates that these are the recorded values, and *EstimatedNIIP* is the NIIP estimated by adding cumulated flows and valuation adjustments to the initial NIIP, $NIIP_0$. Let CA denote the current account, FA the financial account, KA the capital account, VA valuation adjustments, and SD the statistical discrepancy. Then, expressed another way, the gap is:

$$GAP_T = NIIP_T^R - (NIIP_0^R - \sum_{t=1}^{T} FA^R + \sum_{t=1}^{T} VA^R) \tag{4}$$

or, since the financial account is equal to the negative of the sum of the current account, capital account, and statistical discrepancy:

[17] A look at cumulative "other adjustments" by asset class (equivalent to the by-asset-class "gaps" in Table 2) shows that assuming they are all valuation changes is incorrect. For example, large "other adjustments" appear in the banking and non-banking categories in part because of a reclassification of deposits at securities brokers from the non-banking to banking category, as occurred in the 2003 IIP (Abaroa 2004, p. 32); at the asset level, including all the reported "other adjustments" as capital gains is clearly incorrect. For securities positions, revisions typically come in response to securities claims and liabilities holdings surveys that are collected and released at a long lag to the initial IIP publication, and, as discussed in detail in CDW (2008a), are often the result of sizable errors in the Treasury flow data supplied to BEA which are difficult to revise.

[18] In this section, we build on the detailed analyses of the gap in CDW (2008a) and Lane and Milesi-Ferretti (2008).

$$GAP_T = NIIP_T^R - (NIIP_0^R - \sum_{t=1}^{T} CA^R - \sum_{t=1}^{T} KA^R - \sum_{t=1}^{T} SD^R + \sum_{t=1}^{T} VA^R) \quad (5)$$

Note, too, the relationship between changes in the NIIP and the financial account:[19]

$$\Delta NIIP^R = NIIP_T^R - NIIP_0^R = -\sum_{t=1}^{T} FA^R + \sum_{t=1}^{T} VA^R + \sum_{t=1}^{T} OA^R \quad (6)$$

where OA are "other adjustments" attributable to items like series breaks that create inconsistencies in the data series and the inconsistency that arises from recording DI positions at their current-cost value while DI transactions occur at market value. Note that equations (4) and (6) combined indicate that the gap is also the sum of "other adjustments":

$$\begin{aligned} GAP_T &= (NIIP_T^R - NIIP_0^R) + \sum_{t=1}^{T} FA^R - \sum_{t=1}^{T} VA^R \\ &= (-\sum_{t=1}^{T} FA^R + \sum_{t=1}^{T} VA^R + \sum_{t=1}^{T} OA^R) + \sum_{t=1}^{T} FA^R - \sum_{t=1}^{T} VA^R = \sum_{t=1}^{T} OA^R \end{aligned} \quad (7)$$

Using our preferred valuation adjustment estimates, Figure 2 provides a representation of the $1.75 trillion gap for 1989 to 2007, assuming that no "other adjustments" are valuation adjustments. The current account, capital account, statistical discrepancy and NIIP are taken from the most recently released (April 2008) BEA data. The individual components of the gap are shown in the embedded table.

3.3 The Gap from a Relative Reliability Perspective

A gap of $1.75 trillion suggests some combination of two things: our preferred valuation adjustments are incorrect or there are inaccuracies in the international accounts. While our preferred valuation adjustments are surely not perfect, we calculated them using the best quality data currently available. From a relative reliability perspective, the substantial gap—assuming that our preferred valuation adjustments are roughly accurate—suggests inconsistencies between items in the international accounts. At the asset class level, reclassifications can lead to a gap; for example, the large gap in the

[19] We assume that the financial account flows are signed according to the BOP convention, which is the opposite of how they appear in the BEA NIIP presentation and is why they have a negative sign in equations (4) and (6).

banking and non-banking data was created when deposits were reclassified between categories. But, more generally, the gap can be the result of errors in flows or problems with the initial or final position that could result from series breaks such as the reclassification of data between asset types or the introduction of new reporters or assets. To better understand the gap, we must investigate these inconsistencies by examining (and providing estimates for) potential holes in the international accounts. We divide our analysis into three categories of adjustments. Note that to conserve space we provide annual data on all of our adjustments, including some of the underlying data used to create the adjustments, at http://www.nber.org/data-appendix/w14295.

The first category of adjustments, presented in detail in Appendix B, is entire asset classes missing from both the transactions accounts and IIP, such as financial derivatives (which were introduced in 2006) and residential real estate claims and liabilities (which should be included as part of direct investment). For financial derivatives, we form estimates based on the growth rate of transactions and holdings reported to the IMF by other countries. For residential real estate, which should be part of DI, we construct estimates of foreign purchases of U.S. real estate using recent National Association of Realtors survey data and estimates of U.S. purchases of foreign real estate by following the Flick and Yun (2007) construction of estimates using State Department data. While such missing flows and assets have no impact on the visible gap (by construction, since we assume there are no "other adjustments"), their inclusion will have an impact on the statistical discrepancy and the IIP. Our analysis suggests that there are additional substantial net unrecorded inflows from these assets, and that residential real estate substantially increases the net IIP liability position.

The second category of adjustments, presented in Appendix C, is shortcomings in the transactions data in the current and financial accounts that are not accompanied by known problems with positions data. Examples of these include initial public offerings and asset-backed repayments in the financial account (both measured well in the positions data but not in the financial account) and goods exports in the current account. There is substantial evidence that financial account net outflows are undercounted; we also identify research that has identified under-reporting of net exports.

The third category of adjustments, presented in detail in Appendix D, consists of items for which there are problems with IIP positions but for which the associated transactions data are thought to be sound. Examples of these include short positions and direct investment in intangible assets such as research and development. For short positions, the U.S. surveys used to collect position data do not admit the reporting of negative positions and, as a result, both the equity and bond positions are likely overstated. To estimate the impact of the omission of short equity positions, we construct estimates of the fraction of cross-border equity claims and liabilities that have negative positions using representative short sales as a percentage of float, and the corresponding impact on net dividend income. We construct an adjustment for short positions in U.S. Treasuries based on short Treasury positions reported by U.S. broker/dealers. We find that adjusting for equity short sales makes the net IIP slightly more negative, but this is more than offset by adjustments for short bond liabilities positions (which make the IIP more positive). For DI in intangible assets, we use BEA estimates of the impact of intangibles such as research and development, which also move the net IIP into a more negative position.

Our adjustments to the international accounts are summarized in Table 3. Panel A shows our adjustments to transactions. The net effect is that our estimated adjustments to recorded net outflows into bonds, banking and nonbanking deposits, equities, and DI are only partially offset by adjustments to inflows from financial derivatives, real estate, income, and goods exports; in sum our adjustments increase cumulative net outflows by $501 billion. Panels B and C show our adjustments to claims and liabilities positions. The estimated net IIP adjustment is shown in the final column of Table 3 Panel C; our adjustments indicate that the net IIP in 2007 was $512 billion more negative than what was recorded.

After making adjustments to plug known holes in the accounts, we can reevaluate the gap. Specifically, to construct revised estimates of the gap we utilize the transactions and positions adjustments summarized in Table 3 to form revised estimates of the gap for a number of adjustment scenarios (Table 4). The original estimate of the gap totaling $1.75 trillion is shown in the first column; the subsequent columns add combinations of adjustments from Table 3. Column (A) includes all adjustments with an impact on the financial account, which average 0.7 percent of U.S. GDP per year,

and offsetting current account adjustments for goods exports, income and R&D, which combined average 0.35 percent of U.S. GDP per year. It also includes the corresponding valuation adjustment for financial derivatives and real estate implied from equation (4) under the assumption that "other adjustments" are zero, and an estimate of the change in securities valuation adjustments if the positions are adjusted for short sales. The resulting gap falls dramatically to $369 billion; it is the sum of "other adjustments" for DI and other assets, and an amount needed to reconcile the new R&D positions.

As a secondary check we verify that after the BOP adjustments the statistical discrepancy is reasonable. The year-by-year recorded statistical discrepancy is shown in Panel B, with the total shown in the final memo line of Panel A. Under Scenario (A) the cumulated discrepancy increases substantially to $533 billion, as the more than $1.0 trillion decrease in financial account transaction adjustments is only partially offset by current account adjustments. This remaining discrepancy may be the result of known issues that we are unable to estimate, such as unrecorded services and intellectual property exports.

As discussed earlier, some of the "other adjustments" in DI adjustments reflects the difference between the market value and book value of a transaction or are capital gains and losses of affiliates, but it is unclear how much should be allocated to each. The original and column (A) scenarios assume that all these "other adjustments" are attributable to differences between the market value and book value – essentially the marking down of the transaction value by the amount of intangibles and goodwill. These are legitimate "other adjustments" that remain in the gap. In all scenarios we also left the $8 billion of "other adjustments" associated with other assets and the $18 billion needed to reconcile the new R&D positions as "other adjustments", because it is unclear if these should be allocated to valuation adjustments, transactions, or positions. In column (B) we treat all DI "other adjustments" as capital gains. Moving all these "other adjustments" to capital gains almost eliminates the gap and is equivalent to increasing the returns differential on DI from 0.8 percent to 2.3 percent (as in the Revised IIP estimate from Table 1), and the aggregate returns differential from 0.9 percent to 1.1 percent, shown at the bottom of Table 1.

In column (C) we remove our estimates for financial derivatives and real estate, as these were based on relatively thin information. There is a notable increase in the discrepancy because the real estate inflows had offset a good deal of the additional securities outflows.

Figure 3 depicts Scenario (A) graphically. When compared with Figure 2, the most substantial differences are that in Figure 3 the 2007 Net IIP is more negative, and the lines associated with the cumulated financial and current accounts are less negative. There is still a gap, but it is mainly an amount associated with DI and may be a legitimate "other adjustment" to the position. There is also a noticeable increase in the statistical discrepancy. We note, however, that most of the discrepancy arises in the 1990's; the cumulated discrepancy from 2000-2007 is only $95 billion, which suggests that the missing net inflows occurred in the early part of our sample.

3.4 An Assessment of the Exorbitant Privilege

A reasonable counterargument to CDW (2008a) is that the sizeable valuation adjustments and the remaining $1.75 trillion gap shown in Figure 2 call into question the assertion that cross-border returns differentials have been overestimated in favor of the United States. What we have shown is that to get to an exorbitant privilege one would have to assume that the gap from Figure 2—the bulk of which owes to "other adjustments"—is really unmeasured capital gains. However, by recognizing that the gap more plausibly owes to inconsistencies in the international accounts and plugging some known holes in those accounts, we have shown that using the small returns differentials of CDW (2008a) produces a reasonably small end-2007 gap of $369 billion depicted in Figure 3. Thus, by harvesting some low hanging fruit in a conservative manner, we have shown that a small returns differential can be consistent with the patterns of cumulated (adjusted) current account deficits and (adjusted) IIP figures. After applying the best estimates of returns currently available and addressing known inconsistencies in the international accounts, we find no evidence supporting the exorbitant privilege view.

That said, we note, as CDW (2008a) did, that a returns differential, however small, does exist. This is in large part because of the venture capitalist nature of U.S. cross-border positions, first noted in

Gourinchas and Rey (2007a), with liabilities primarily in debt-like instruments that generate only modest capital gains and assets having a greater weight on equities. We note also that a small average returns differential does not imply that valuation adjustments are insignificant: Even small returns differentials, when applied to large gross positions, can significantly impact the evolution of the current account and net investment position. Although the net return of 0.9-1.1 percent per year is not exorbitant, it is still capable of generating valuation adjustments that account for half of the difference between the net IIP and the cumulated current account. Nonetheless, the positive differential enjoyed by the United States is neither exorbitant nor large enough to fundamentally alter the dynamics underlying sustainability analysis.[20]

4. On Current Account Sustainability

We have shown that the dark matter and exorbitant privilege theories that have been used to suggest that the U.S. current account deficits are sustainable do not hold up to scrutiny of the data they rely on. Our work also suggests that the net investment position is more negative and somewhat less stable than recorded. Does this mean the U.S. current account is not sustainable at the current level?

To answer this, it is useful to first step back and ask if, even putting aside measurement issues, we should expect there to be a tight or stable relationship between the current account and whatever one might mean by sustainability? In our view, the answer is "maybe, but not too tight." There are many reasons for this. Several of them stem from the fact that the current account is a System of National Accounts (SNA) concept designed to capture *transactions* in *produced* goods and services. As such, there is a step between the transactions recorded in the current account and the *transactions* recorded in the financial account. This step involves the capital account which captures, among other things, transactions in nonproduced, nonfinancial assets. As recorded in the U.S. accounts, the capital account is a minor annoyance in the identities. But in principle it captures many transfers of intellectual property, which one

[20] For more on this, see Bertaut, Kamin, and Thomas (2008).

would expect to be quite important for the United States.[21] Next there is the step between the transactions in the financial account and the changes in the IIP. This step includes the familiar valuation changes owing to price and exchange rate changes. But it also includes "other changes in the volume," which do not arise from revaluations. As recorded in the U.S. accounts, these other changes are huge and much of the work of this paper explores the extent to which they are capturing more than they should. Finally, there are many steps between the IIP and what one might consider important in the determination of future investment flows. In particular, there are wide gaps between the IIP and a country's ability to service its international obligations or the credit and price exposure of its creditors. All told, the links from the current account to the financial account to changes in the IIP to the determinants of future investment flows are tenuous enough to question whether this line of investigation will ever bear meaningful fruit.

Perhaps a more productive way to examine current account sustainability is to assume that while the United States should be able to service its international debt, the question is at what prices. A reasonable way to attack that would be not from BOP and IIP identities but from the perspective of international portfolio allocation. For example, Forbes (2008) asks a relevant question: Why do foreigners invest in the United States? Additionally, one could ask why in the United States and not elsewhere. Further work along this line will likely be fruitful.

5. Conclusion

In this paper we provided a brief summary of some of the theories of U.S. current account sustainability and viewed them through the lens of the relative reliability of various items in the international accounts. From the perspective of relative reliability, the dark matter view fails, as it rests on an assumption that income streams are the most accurate items in the entire set of international accounts. Given that the bulk of income streams are not measured but are formed by applying estimates to estimates, this assumption is false. The exorbitant privilege view also fails. In its original form it rested on

[21] The treatment of intellectual property is changing with BPM6 as now drafted with the transfer of intellectual property moving to an expanded category under services in the current account.

the assumptions that the current vintage of revised positions and flows form a consistent dataset and that all "other adjustments" are best thought of as valuation adjustments. In this paper we show that this is not true, in part by calculating "other adjustments" by asset class and filling some known holes in the international accounts. The set of accounts we produce by doing so are entirely consistent with a small cross-border returns differential, suggesting that there is no evidence that the United States can earn its way to current account sustainability.

We caution the reader on two possible interpretations of our findings. One, some may be inclined to steer clear of these data, troubled by the fact that we have identified issues with items in the international accounts. We advise against that strategy. As with any reported data series, the researcher armed with knowledge of its strengths and limitations is better suited to analyze the data. Assuming all data are pristine is not useful, nor is being paralyzed by knowledge of warts. Our view is that data should be used, but that a healthy understanding of potential limitations can help inform the researcher. Two, some will think that the CDW (2008a) finding that early computations of the returns differential were biased upward—reinforced by the additional findings presented here—calls into question recent findings on exchange rate predictability (in particular, Gourinchas and Rey 2007b) that are based on an earlier dataset. While we firmly believe that early measures of the *average* returns differentials were biased upward, in any dataset period-to-period changes in the differentials—which is what gets traction in regressions—will be driven by exchange rate changes. That is, while different datasets will produce different mean returns differentials, the correlation between any two measures of differentials should be extremely high because period-to-period changes are always driven by the same thing (exchange rate changes). As such, it is not clear a priori that different datasets of returns differentials would produce substantially different regression results on exchange rate predictability.[22]

[22] To be more precise, returns differentials from Original IIP, Revised IIP, and our preferred methods should be very highly correlated even if they have different means. We cannot say anything exact about the Gourinchas and Rey (2007a,b) dataset because, while similar in some respects to the Revised IIP approach, it is not strictly in line with any of the methods we describe as they interpolate to quarterly data and make many adjustments (all detailed in Gourinchas and Rey 2007a).

As we have noted repeatedly, in addressing some holes in the international accounts we only harvested low hanging fruit. There are, of course other aspects of the accounts that should, in the future, be addressed. We implemented an adjustment for goods exports, but the mis-measurement of trade in services is likely even greater; unfortunately, we have no information with which to adjust service trade data. The income generated by invisibles such as intellectual property is another area worthwhile of further study.

References

Abaroa, Patricia E. (2004), "The International Investment Position of the United States at Yearend 2003," *Survey of Current Business*, July 1994, 30-39.

Albertus, James, Carol C. Bertaut and Stephanie E. Curcuru (2008), "Estimating the Returns on Foreign Holdings of U.S. Securities," unpublished working paper.

Ammer, John, Sara B. Holland, David C. Smith, and Francis E. Warnock (2006), "Look At Me Now: The Role of Cross-Listings in Attracting U.S. Shareholders," NBER Working Paper 12500.

Au, Andrea A., John A. Doukas and Zhan Onayev (2007), "Daily Short Interest, Idiosyncratic Risk, and Stock Returns", unpublished working paper.

Bach, Christopher L. (1997), "U.S. International Transactions Revised Estimates for 1974–1996," *Survey of Current Business*, July 1997, 43-55.

_____ (2000), "U.S. International Transactions Revised Estimates for 1982–99," *Survey of Current Business*, July 2000, 70-77.

_____ (2002), "Annual Revision of the U.S. International Accounts, 1993–2001," *Survey of Current Business*, July 2002, 33-40.

Bertaut, Carol C., William L. Griever, and Ralph W. Tryon (2006), "Understanding U.S. Cross-Border Securities Data," *Federal Reserve Bulletin* 92, 59-75.

Bertaut, Carol C., and Ralph W. Tryon (2007), "Monthly Estimates of U.S. Cross-Border Securities Positions," FRB International Finance Discussion Paper No. 910.

Bertaut, Carol C., Steven Kamin, and Charles Thomas (2008), "How Long Can the Unsustainable U.S. Current Account Deficit Be Sustained?" unpublished paper.

Burger, John D., and Francis E. Warnock (2007), "Foreign Participation in Local-Currency Bond Markets," *Review of Financial Economics* 16: 291-304.

Burger, John D., Francis E. Warnock, and Veronica Cacdac Warnock (2008). "A Virtuous Cycle in Local Currency Bond Markets?" GEMLOC working paper.

Cavallo, Michele, and Cedric Tille (2006), "Could Capital Gains Smooth a Current Account Rebalancing?," *Federal Reserve Bank of New York Staff Reports* No. 237.

Curcuru, Stephanie E. (2007), "U.S. Cross-Border Derivatives Data: A User's Guide," *Federal Reserve Bulletin* vol. 93 (May).

Curcuru, Stephanie E., Tomas Dvorak, and Francis E. Warnock (2008a), "Cross-Border Returns Differentials," forthcoming, *The Quarterly Journal of Economics*.

Curcuru, Stephanie E., Tomas Dvorak, and Francis E. Warnock (2008b), "The Decomposition of the U.S. External Returns Differential," unpublished working paper.

Department of the Treasury, Federal Reserve Bank of New York, and Board of Governors of the Federal Reserve System (2007), *Report on U.S. Portfolio Holdings of Foreign Securities as of December 31, 2006*.

Edwards, Sebastian (2005), "Is the U.S. Current Account Deficit Sustainable? And, If Not, How Costly Is Adjustment Likely To Be?" NBER Working Paper 11541.

Endo, Tadashi and S. Ghon Ree (2006), "Margin Purchases and Short Sales in Emerging Markets: Their Rationales and Design Variables", World Bank Financial Sector Discussion Series.

Flick, Federick E. and Lawrence Yun (2007), "Americans Buying Homes Abroad: Trend Indicators and Some Initial Estimates", Available at http://www.realtor.org/Research.nsf/files/07AmericansAbroad.pdf/$FILE/07AmericansAbroad.pdf.

Forbes, Kristin J. (2008), "Why Do Foreigners Invest in the US?" NBER Working Paper 13908.

Frankel, Jeffrey (2006), "Global Imbalances and Low Interest Rates: An Equilibrium Model vs. a Disequilibrium Reality," working paper, Harvard University.

Gourinchas, Pierre-Olivier, and Helene Rey (2007a), "From World Banker to World Venture Capitalist: The U.S. External Adjustment and the Exorbitant Privilege," in R. Clarida (ed.) G7 Current Account Imbalances: Sustainability and Adjustment (Chicago, University of Chicago Press), 11-55.

_____ (2007b), "International Financial Adjustment," *Journal of Political Economy* 115, 665-703.

Gros, Daniel (2006). "Foreign Investment in the US (I): Disappearing in a Black Hole?" CEPS Working Document 242.

Hausmann, Ricardo, and Federico Sturzenegger (2007), "The Missing Dark Matter in the Wealth of Nations, and Its Implications for Global Imbalances," *Economic Policy* 22, 469-518.

International Monetary Fund (2007), *Balance of Payments Statistics Yearbook 2007*.

Kester, Anne Y. Editor, National Research Council (1992), "Behind the numbers: U.S. Trade in the World Economy" National Academy Press, Washington, D.C.

Kitchen, John (2007), "Sharecroppers or Shrewd Capitalists? Projections of the US Current Account, International Income Flows, and Net International Debt." *Review of International Economics* 15(5), 1036-61.

Kozlow, R. (2006), "Statistical Issues Related to Global Economic Imbalances: Perspectives on 'Dark Matter'". Paper for 19th Meeting of the IMF Committee on Balance of Payments Statistics.

Lamont, Owen A. and Jeremy C. Stein (2004) "Aggregate Short Interest and Market Valuations" *American Economic Review*, 94(2), 29-32.

Lane, Philip R., and Gian Maria Milesi-Ferretti (2005), "Financial Globalization and Exchange Rates," IMF Working Paper WP/ 05/3.

Lane, Philip, and Gian Maria Milesi-Ferretti (2008), "Where Did All the Borrowing Go? A Forensic Analysis of the U.S. External Position," IMF Working Paper WP/08/28.

Meredith, Guy (2007), "Debt Dynamics and Global Imbalance: Some Conventional Views Reconsidered," IMF Working Paper WP/07/4.

National Association of Realtors (2007a), "The 2007 National Association of Realtors Profile of International Home Buyers in Florida," Available at http://www.realtor.org/Research.nsf/files/2007IntlProfileFloridafinal.pdf/$FILE/ 2007IntlProfileFloridafinal.pdf

National Association of Realtors (2007b), "The 2007 National Association of Realtors Profile of International Home Buying Activity," available at http://www.realtor.org/Research.nsf/files/07IntlSurveyProflie-final-07-2707.pdf/$FILE/07IntlSurveyProflie-final-07-27-07.pdf

Obstfeld, Maurice, and Kenneth S. Rogoff (2005), "Global Current Account Imbalances and Exchange Rate Adjustments," *Brookings Papers on Economic Activity* 1, 67-123.

Obstfeld, Maurice, and Kenneth Rogoff (2007),"The Unsustainable U.S. Current Account Position Revisted," in R. Clarida (ed.) G7 Current Account Imbalances: Sustainability and Adjustment (Chicago, University of Chicago Press).

Office of National Statistics (2007), "United Kingdom Balance of Payments: The Pink Book 2007," Palgrave Macmillan, New York.

OICV-IOSCO (2003) "Report on the Transparency of Short Selling," Technical Committee of IOSCO.

Pavlova, Anna, and Roberto Rigobon (2008), "An Asset-Pricing View of External Adjustment," mimeo.

Robbins, Carol A. and Carol E. Moylan (2007) "Research and Development Satellite Account Update," *Survey of Current Business*, October 2007, 49-64.

Roubini, Nouriel, and Brad Setser (2004), "The U.S. as a Net Debtor: The Sustainability of the U.S. External Imbalances," working paper, New York University.

Taub, Leon (2008), **"**Borrowed securities: implications for measuring cross-border portfolio investment", IFC Bulletin 28.

U.S. Census Bureau (1998), "Understatement of Export Merchandise Trade Data," Available at www.census.gov/foreign-trade/aip/expunder2.html.

U.S. Census Bureau (2002), "U.S. Merchandise Trade Statistics: A Quality Profile," Available at http://www.census.gov/foreign-trade/aip/quality_profile01142003.pdf

Appendix A. Estimating Our Preferred Returns and "Other Adjustments" By Asset Class

In this appendix we detail how we form our preferred estimates of returns. To conserve space, all tables for this and the subsequent appendices, as well as some underlying data, are available at http://www.nber.org/data-appendix/w14295.

Portfolio Bond and Equity Returns

For portfolio bonds and equities, as noted in CDW (2008a,b), there are high quality security-level benchmark surveys of holdings that can inform the calculation of returns; returns must be calculated (i.e., not measured), but at least the security-level holdings data can guide those calculations. The holdings data are the estimates of monthly bilateral securities positions constructed in Bertaut and Tryon (2007). Armed with monthly bilateral positions data, we apply representative returns indices to calculate the monthly portfolio returns of U.S. investors abroad and of foreigners in the United States.

The choice of representative returns indices is crucial. To inform these choices, we rely on research that has examined the security-by-security data on U.S. cross-border bond and equity positions.

- For U.S. investors' returns on foreign equities, research on 1997 data shows that MSCI firms represent almost 80 percent of U.S. investors' foreign equity investment and that, across the Worldscope universe of 12,000 non-U.S. firms, the correlation between firm weights in U.S. portfolios and in the MSCI World (ex U.S.) index is 0.77 (Ammer et al. 2006). Accordingly, we use dollar returns on each country's MSCI equity price index to calculate the returns on U.S. investors' foreign equities positions.
- For foreigners' returns on U.S. equities, we use the MSCI U.S. index, a market-capitalization-weighted index comprised of roughly 300 large and liquid U.S. equities. Albertus, Bertaut, and Curcuru (2008) shows that the MSCI U.S. index is a good approximation of the actual U.S. equity holdings of foreign investors.

- For foreign bonds, to a large extent U.S. investors tend to hold local currency bonds in developed countries and dollar-denominated bonds in emerging markets (Burger and Warnock, 2007).[23] Thus, we use the following approach for calculating U.S. investors' foreign bond returns. For developing countries we use J.P. Morgan's EMBI+ indices (which are comprised of dollar-denominated bonds). For those developed countries in which U.S. holdings of local currency bonds are predominant, we use the MSCI bond index (which is an index of local-currency-denominated bonds). In those developed countries where U.S. holdings of dollar-denominated bonds are significant, we calculate returns as the weighted average of the MSCI bond index and MSCI Eurodollar Credit index (which is an index of dollar-denominated bonds), with the weight on the Eurodollar index being the share of dollar-denominated bonds in U.S. holdings of each country's bonds.[24,25]
- For foreign holdings of U.S. debt, we use a weighted average of Lehman Brothers U.S. Treasury, corporate and agency bond indices, with the weights being the portfolio weights in each respective bond type as given by the benchmark surveys.

To compute valuation adjustments we apply these market-based returns r_t^M to the sum of the revised position at the end of the previous period and half of the recorded transactions:

$$VA_t = r_t^M \left[A_{t-1}^R + \frac{1}{2} FLOW_t^R \right]. \qquad \text{(A1)}$$

Next, we compute the "other adjustments" as the difference between the change in the recorded position, flows, and valuation adjustments:

$$OA_t = NIIP_t^R - NIIP_{t-1}^R - FA_t^R - VA_t. \qquad \text{(A2)}$$

The resulting time series of "other adjustments" for equities and bonds is shown in Table A.1.

[23] U.S. investors have recently shifted their international bond portfolios towards local currency emerging market bonds (Burger, Warnock, and Warnock 2008), but such holdings are still miniscule.
[24] The developed countries where U.S. holdings of dollar-denominated bonds are significant include Australia, Belgium, Canada, Finland, France, Germany, Ireland, Netherlands, Sweden, and the United Kingdom.
[25] Of course, country allocations as given in the Bertaut and Tryon (2007) holdings data govern our country weighting schemes: When calculating returns on the aggregate foreign bond and foreign equities portfolios, we weight each country according to U.S. bond (or equity) holdings in that country.

Deposits, Currency, and Other Government Assets

The sizable claims reported by U.S. nonbanking concerns and U.S. banks primarily consist of interest-bearing deposits and very short-term securities, such as certificates of deposits, which are hold-to-maturity securities that do not trade in the secondary market. The return from these types of securities consists only of interest payments, which are recorded in the current account, with no valuation adjustments other than those from exchange-rate movements. The majority of these deposits, however, are dollar-denominated even though they are on deposit in foreign banks, so the impact of exchange-rate changes is minimal. Similarly, for the corresponding liabilities there are only minor exchange-rate movements because there is a small quantity of non-dollar denominated deposits held by foreigners in U.S. banks and non-banking concerns. Other U.S. government claims are fairly small, and the only valuation adjustments are those due to exchange-rate changes, primarily from holdings of foreign currencies, and changes in the value of gold. For each of these categories, our view is that the original IIP releases provide the most accurate picture of returns, so we estimate the capital gains based upon the rate of return shown in each annual IIP, equation (1). For deposits, this assumption is reasonable as long as the currency composition is largely unchanged between the initial and final data revision. For these categories the valuation adjustments are computed using:

$$VA_t = r_t^O \left[A_{t-1}^R + \frac{1}{2} FLOW_t^R \right]. \qquad \text{(A3)}$$

and "other adjustments" follow from Equation (A2).

Derivatives

Derivatives were first included in the IIP in 2006. The limited information collected on derivatives is not sufficient for BEA to break down valuation adjustments into the contributions due to price and exchange-rate changes. Only net derivatives flow data are collected, so separate estimation of returns on claims and liabilities is not possible. We assume that there are no "other adjustments" associated with derivatives and the capital gains follow directly from the revised positions and flows:

$$VA_t = NIIP_t^R - NIIP_{t-1}^R - FA_t^R. \quad \text{(A4)}$$

Direct Investment

As noted in the main text, the valuation adjustments associated with direct investment present the greatest difficulty. Our strategy to estimate DI returns is to first estimate the amount of DI "other adjustments" and then back out implied returns with and without treating "other adjustments" as returns. This task would be easier if the updated IIP for each year separated the revised series into flows, valuation, and "other adjustments." BEA does not publish this information by asset class, but it does publish it for aggregate claims and aggregate liabilities.[26] This allows us to estimate the revised "other adjustments" for direct investment by subtracting our estimate of "other adjustments" for the other asset classes from the total.

A breakdown of "other adjustments" by asset class is shown in Appendix Table A.1, with claims in Panel A and liabilities in Panel B. The last column shows an estimate of "other adjustments" for direct investment implied by subtracting "other adjustments" for the rest of the asset classes from the revised total "other adjustments" published by BEA. For DI claims the implied "other adjustments" are fairly small relative to that estimated for other assets, while for liabilities they are quite large. Using these "other adjustments" we infer the corresponding valuation adjustments for DI by rearranging equation (4).

There are three interpretations of DI "other adjustments": (1) the inconsistency that arises from recording DI positions at their current-cost value, (2) the capital gains and losses of direct investment affiliates, and (3) errors in the transactions or series breaks. Interpretation (1) is unique to DI. As noted earlier, the current-cost estimate of DI is an estimate of the value of tangible assets; the value of intangible assets is excluded. Recorded DI transactions, however, reflect the value of both tangible and intangible assets. This necessitates an "other adjustment" entry in the IIP presentation that reflects the difference between the total transaction value and the estimated value of intangible assets to account for the intangible piece. For example, in the purchase of an intangible-heavy firm such as an internet startup,

[26] http://www.bea.gov/international/xls/intinv07_t3.xls

there will be a substantial difference between the value of the firm paid by the acquirer and the current-cost value of the firm included in the IIP. This type of transaction will require a negative "other adjustment" which effectively backs out the value of intangible assets. There is evidence of this type of transaction in Panel B of Table A.1. There are sizable negative DI "other adjustments" in 1998 and 1999, reflecting foreign investment in U.S. internet firms with significant amounts of intangible assets. When these DI positions are sold there should be additional "other adjustment" entries, which may largely offset the previous ones; any remaining amount is equal to the capital gains associated with the intangible piece of the DI. Thus, much of the cumulative sum of DI "other adjustment" entries will be equal to the value of intangible assets for DI where the position is still held, plus capital gains associated with intangible assets for positions that have been sold.

Appendix B. Missing Asset Classes

In this appendix we estimate flows and positions for asset classes missing from the IIP and BOP accounts. These include financial derivatives, introduced in 2006, and residential real estate.

Financial Derivatives

The introduction of the financial derivatives asset class in the 2006 IIP provides an example of how the addition of new asset classes or reporters leads to incorrect capital gains estimates when the revised BEA data are used. Because we know their impact on the 2006 financial account and IIP we excluded them from our analysis. In BEA's revised aggregate IIP the initial 2005 derivatives claims position of $1,190 billion and liabilities position of $1,132 billion are included in "other adjustments" in that year; because there is no correction for these "other adjustments" in the revised returns estimates, using equation (1) would overstate capital gains for both claims and liabilities, and would further overstate the favorable U.S. returns differential.[27]

Estimates for net derivatives transactions will have an impact on the statistical discrepancy, and thus impact our BOP reconciliation. The BOP recorded a net financial derivatives inflow of $29 billion for 2006 and $6 billion for 2007. We construct flow estimates for earlier years based on the growth rate of transactions and holdings reported to the IMF by other countries, shown in Panel A of Appendix Table B.1.[28] Prior to 2000 we assume that transactions increased by 50 percent each year, after that at an annual rate of 30 percent. As discussed in Curcuru (2007) the sum of net transactions across all countries should equal zero, as the flows out of each country should be reported as inflows by another country. However, since some countries do not report data to the IMF the sum will likely differ from zero; while our estimated world flows are not zero (the last column of Appendix Table B.1 Panel A), they are small. We construct estimates of holdings using the same growth rates for claims and liabilities; the historical estimates are shown in Panel B of Appendix Table B.1. The inflows are modest and range from $0 to $29 billion, and the net claims position is up to $84 billion.

[27] We assume that there are no "other adjustments" associated with financial derivatives, and back out the associated entries from column (A) of Table A.1.
[28] Underlying data are from IMF (2007) and Office of National Statistics (2007).

Residential Real Estate

In principle, cross-border transactions and holdings of residential real estate should be included as part of direct investment, as is currently the case for commercial real estate. In practice, individual home-owners are not surveyed and hence these data are omitted from the recorded DI figures. To the extent that foreign activity in the U.S. residential real estate market is of the same magnitude as the level of activity of U.S. residents in the foreign real estate markets, there is no net impact on the international transactions accounts. However, recent surveys conducted by the National Association of Realtors (NAR) suggest that this may not be the case.

We construct estimates of foreign purchases of U.S. real estate using recent NAR survey data. According to NAR (2007a), a survey of members indicated that 7.3 percent of home sales in Florida in 2006 were purchased by foreign buyers. Since total existing home sales in Florida in 2006 were 395,300 units, this implies that there were about 29,000 purchases of Florida homes and condos by foreigners in 2006.[29] Assuming that foreigners purchased the same percentage of new homes adds about 6,000 additional homes, bringing the total to 35,000 Florida homes purchased by foreigners. From April 2006 to April 2007 NAR (2007b) estimates that 26 percent of international purchases were in Florida, implying there were around 135,000 total purchases of U.S. homes by foreign residents. Multiplying the total number of purchases with the median sales price U.S. homes purchased by foreigners in that period of $299,500 translates to roughly $40.4 billion in sales to foreigners in 2006.

To construct historical estimates of foreign purchases of U.S. real estate, we assume that the foreign purchases have remained a constant 2.34 percent (= $40.4 / $1,730.6 billion) of total sales of U.S. real estate; the resulting estimated U.S. real estate liabilities inflows is shown in Appendix Table B.2. This might be a somewhat conservative assumption as NAR (2007b) suggested that 2006 activity by foreign investors was relatively weak as compared to earlier years.

To construct holdings estimates, we started by looking at net inflows into other private financial liabilities in 2006 as a function of 2005 holdings. Total flows in 2006 ranged from a slight outflow from

[29] Real estate transactions and price data are available at http://www.realtor.org/.

U.S. Treasuries in 2005 to a 20 percent inflow into corporate and agency bonds. As a compromise we assume that the 2006 flows constituted a 5 percent increase in stock over the 2005 levels to construct an estimate of the 2005 stock. We constructed the remainder of the liabilities stock series using the transactions estimates and price appreciation reported by NAR, also shown in Appendix Table B.2.

We face similar issues in trying to construct historical real estate transactions and holdings estimates on the claims side. While there are no available official figures for the number of homes or vacation properties Americans have purchased in foreign countries, Flick and Yun (2007) construct an estimate using State Department data. Based upon the number of U.S. residents living abroad in 1999, and a rate of homeownership equivalent to that observed in the United States (40%), they estimate that in 1999 U.S. residents owned 500-600 thousand residential real estate properties located in other countries. Unfortunately, the State Department has not updated this information because of security concerns. Using the same mean price of U.S. homes in that year ($171K), this equates to $94 billion in foreign residential real estate holdings by U.S. residents. From this 1999 holdings estimate we assume that it changed at the same rate as total residential liabilities holdings. We then inferred transactions by assuming foreign holdings appreciated at the same rate as U.S. holdings.

Based on the Appendix Table B.2 estimates, there have been more foreign purchases of U.S. real estate than U.S. purchases of foreign real estate. When compared to other asset classes, however, net transactions and gross holdings are modest. In 2007 we estimate a $25 billion net inflow, shown in Panel A of Table 3, and a sizable net liabilities position of $565 billion (from Panels B and C).

Appendix C. Problems with Current and Financial Account Transactions

In this appendix we estimate problems with the recorded transactions in the current and financial accounts. These include issues with goods exports, intangibles, foreign equity and bond claims and liabilities, and deposit claims and liabilities.

Goods Exports

The data on merchandise trade is often considered one of the most reliable pieces of the international transactions accounts. The data are compiled from official import and export documents prepared by firms for the U.S. Customs Service, which are then classified and recorded by the U.S. Bureau of the Census. These data list goods by value, commodity, country of origin or destination, dutiable status, tariff rate (import), quantity, shipping weight, location of exit or entry, and method of transportation.

But the import data is likely of much higher quality than the export data. Because import documents are the basis upon which tariffs are collected, they are scrutinized much more closely and there is a larger share of manpower dedicated to their verification. This is in stark contrast to exports, which have much fewer resources dedicated to enforcement efforts, have higher reporting thresholds, and about which much less detail is recorded. There are several reasons why there might be a downward bias in the export figures. For instance, exporting firms have incentives to understate sales to reduce their taxable income and to pay lower import duties to importing countries. Also, the commercial carriers that consolidate freight for shipment file the paperwork for the exporters. In order to obtain the lowest freight for exporters, they often report the whole batch of goods that may have varying rates as if it consists of goods at the lowest rate.

Several studies have quantified the magnitude of under-reporting of U.S. exports. For example, a detailed comparison with Canada import data showed $16 billion in unrecorded U.S. exports to Canada in 1989, approximately 20 percent of all U.S. exports to Canada. This problem is not limited to cross-border trade with Canada. An analysis in Kester (1992) found that for the period 1980-1989 a bilateral comparison of U.S. export and foreign import data suggested an undercount of about 7 percent per year of

U.S. exports to Japan, Germany, and the United Kingdom. Further reconciliation studies with Japan, Korea, Australia, and the European community, summarized in U.S. Bureau of the Census (1998, 2002), found that while automated systems introduced to collect export data had improved data quality, the combined effect of proven non-reporting, underestimation of low value trade, and unresolved discrepancies ranged from 3-7 percent of reported U.S. export value. Reconciliations with Mexico estimated the discrepancy between 1991-1994 was between 8 to 12 percent per year, and for 1995-1997 15 to 19 percent per year. The introduction of a new electronic reporting system in 2000 is thought to have reduced these discrepancies significantly, but as yet Census has not published updated analyses. Despite these findings, there is so much variability in underreporting that no effort is made by Census or BEA to adjust the values of goods exports.

Because exports are recorded as an inflow in the balance of payments, the under-reporting of exports results in an under-reporting of current account inflows - a necessary counterpart to our under-reporting of outflows in the financial account. In Appendix Table C.1 we estimate the potential impact on the current account for an understatement of 9.1 percent to Mexico of and 5.1 percent for U.S. exports to other countries, excluding Canada. Starting in 2000 we cut the adjustment in half (e.g., 4.6% for Mexico and 2.6% for other countries) to reflect improvements in the collection system. These estimates result in understatement of inflows on the order of 4-6 percent of all exports.

Intangibles

Cross-border trade in intangibles creates difficult issues for both accounting methodology and data collection. With respect to methodology, the difficulties arise because the System of National Accounts (or in the United States case the NIPA) needs to distinguish between those nonfinancial assets that are created by the production process and those that arise by other means. A good example of a nonproduced, nonfinancial asset is broadcast spectrum rights. The electromagnetic spectrum is not the result of any productive activity; nonetheless, the rights to use it have value. When such assets are sold abroad, the transaction must be excluded from the current account. Otherwise, the GDP accounting identity (GDP=C+I+G+X-M) would not hold, with the disposition of product (right hand side) exceeding

what the economy produced (left hand side). However it is not sufficient to simply exclude the transaction from the current account because the sale to a foreigner gives rise to a financial flow. To deal with this, and a few other issues such as debt forgiveness, the capital account (KA) was introduced and added to the balance of payments identity (0=CA+KA+FA).

With respect to data collection, it is particularly hard to measure trade in intangibles, especially when the trade is between affiliated parties and the intangible represents intellectual property (IP) that may have only firm-specific value. As noted earlier in the discussion of dark matter, BEA has been making efforts to improve its data collection in this area, but the most recent changes to the collection system are not yet incorporated into the published IT accounts.

We do not make any attempt to estimate how much trade in intangibles is missing from the accounts. We simply note that it could be one source of the statistical discrepancy we are left with and a possible explanation for some of the 'other adjustments' found for DI.

U.S. Net Purchases of Foreign Equities and Bonds

As discussed in substantial detail in CDW (2008a), over our sample period there have been many significant revisions to U.S. holdings of foreign equity and bonds that have implications for our understanding of transactions in these assets. The first major revision occurred after the incorporation of the first security-level measurement of U.S. holdings of foreign securities abroad (from the Treasury Department's 1994 benchmark survey), which resulted in large upward revisions to holdings of around 90 percent per year from 1990 to 1995. Prior to the 1994 benchmark survey the last claims survey was done in 1946, and positions were not measured but were estimated from capital flows data and approximations of capital gains - a method highly prone to error since there was no sense of the magnitude of initial holdings. The enormous revisions that were prompted by the benchmark survey were described by BEA in Bach (1997, p. 47) as follows:

> "The differences between the two estimates can be attributed both to incomplete coverage of these transactions in the Treasury source data upon which BEA's position estimates are based and to inexact valuation of price and exchange rate adjustments applied to BEA's estimated positions. *However, it is not possible to determine the amount of underestimation attributable to each part of the estimation process*." (emphasis added)

Because of the inability to definitively attribute the newly discovered claims to flows or valuation adjustments, BEA made *no* revisions to flows (the "transactions in the Treasury source data")—financial flows are completely absent from Table 2 in Bach (1997), which shows all revisions for the balance of payments and international investment positions—and put the difference between estimated and measured positions in the residual "other adjustments" category. The same was the case in response to the 1997 benchmark, at which time BEA stated:

> "When BEA adjusted its international investment positions estimates last year using preliminary benchmark results, it attributed all of the discrepancy to valuation changes and none to the less than complete coverage of transactions…BEA is now changing that practice and attributing a large part of the discrepancy to transactions."[30]

As transactions adjustments attributed to the 1997 benchmark survey are absent from Table 2 in Bach (2000), it is clear that the practice of adjusting transactions was implemented at a future date.

There were also significant revisions to U.S. holdings of foreign securities that dated back to 1998 after the 2001 and 2003 Treasury surveys, but these revisions were accompanied by modest revisions to transactions estimates. As reported in Bertaut et. al. (2006), an in-depth investigation revealed under-reporting of U.S. investors' purchases of newly issued foreign securities. While this reporting problem was resolved starting in 2004, BEA made only modest revisions to the recorded transactions because there were only modest revisions to underlying TIC data.

The final notable revision to U.S. holdings of foreign securities occurred in response to the 2005 Treasury survey, which resulted in a revision to U.S. equity claims totaling $231 billion. This was recorded in the 2005 position with no identified revisions to historical transactions.

Because the transactions were never adjusted for 1990-1997 even though they were suspected to be erroneous, and there were only modest transactions adjustments to the data from 1998-2003, we attribute much of the estimated "other adjustments" in equity and bond claims shown in Appendix Table A.1 to missing transactions. The other transactions associated with bonds are included in Table 3 Panel A.

[30] Bach (2000, p. 71-72).

We defer our final estimates of how much of these "other adjustments" for equity should be attributed to unrecorded transactions until we also include the impact of omitting short positions, discussed below.

U.S. Equity and Bond Liabilities to Foreign Investors

The tendency not to fully revise corresponding flows when revisions to positions are made also holds for U.S. liabilities. Regarding U.S. liabilities, Bach (2002, p. 37) writes:

> "In past benchmark years, BEA has assigned nearly all of the differences between the two estimates of the positions to either the price change or the 'change in statistical coverage' components of the investment position accounts, leaving data on financial flows as reported by the transactions reporting system little changed"

In contrast to U.S. claims, the revisions to liabilities positions were relatively small and, for some asset categories such as bonds, negative. Downward revisions in liabilities positions without a corresponding downward revision in flows imply low capital gains. According to Bach (2002, p. 38-39), BEA had tended to overestimate U.S. liabilities because the transaction reporting system underestimates redemptions and paydowns of principle on mortgage-backed securities. These redemptions should be recorded as outflows but are not recorded by the existing transactions reporting system because they do not involve the typical data reporters (brokers and dealers). As the above quote indicates, as a matter of practice BEA tended to revise positions but not flows, implying low or negative capital gains on U.S. liabilities.

As with claims, there were no adjustments to transactions in response to changes in recorded holdings for the early years of our sample period. In 1998 there were significant downward revisions to U.S. non-treasury liabilities for the years 1990-1996, in response to the 1994 survey. The position adjustments were as high as $42 billion in 1996 with no corresponding revisions to transactions. In 2002 BEA made some revisions to transactions in debt liabilities in response to the problems with redemptions and paydowns identified in the 2000 survey. However, these revisions only went back to 1995; transactions for that year were adjusted downward by $27 billion, and there were no revisions to transactions in earlier years. So as with claims, we assume that much of the "other adjustments" for securities liabilities are unrecorded transactions. The other transactions associated with bonds are

included in Table 3, but we defer our final estimates of how much to include for equity until Appendix D, where we include the impact of omitting short positions.

Banking and Nonbanking Assets

There is little ambiguity surrounding the calculation of valuation adjustments for this category, as they consist of interest-bearing deposits and short-term securities held-to-maturity, with only slight valuation effects due to exchange rate changes. On the banking side, the data are collected by monthly reports of outstanding balances – transactions are estimated as the change in the positions. Deposits reported by nonbanking concerns are mainly implied from bilateral and BIS data. The source of the "other adjustments" in these data are series breaks as new reporters are added to the panel. Revisions for both claims and liabilities go in the same direction – cumulative "other adjustments" for claims is $338 billion and for liabilities is $189 billion, so on net this category contributes a relatively modest $150 billion to the gap. We attribute all the "other adjustments" in these categories to missing transactions, shown in Table 3 Panel A.

Appendix D. Issues with Recorded Positions

There are two assets for which there are known problems with recorded positions, for which transactions are thought to be correctly recorded. The first is the recording of equities that have been sold "short"; that is, borrowed from one party and then sold to another. The other is the omission of positions in intangible DI investments such as research and development.

Negative Positions Arising from Short Sales

As is the case in most countries, the reporting of portfolio investment positions is based on data provided by custodians. The U.S. surveys used to collect position data do not admit the reporting of negative positions, which is not currently an international reporting standard but will likely become one in the future (Taub 2008). This omission leads to the overstatement of both claims and liabilities. For example, if a foreign resident sells a U.S. security short to a U.S. resident, the transactions accounts will correctly capture the decrease in liabilities to foreigners, but the negative position of the foreigner will not show up in the holdings survey. The result is that the total liabilities position is the sum of positive holdings only, not short positions. A similar problem is realized on the U.S. claims side. Both result in the overstatement of positions relative to the transactions and would lead to positive "other adjustments."

To estimate the impact of the omission of equity short sales, we construct estimates of the fraction of cross-border equity claims and liabilities that have negative positions using representative short sales as a percentage of float. Because U.S. restrictions on short sales are stringent compared to those in other developed nations, U.S. short positions are relatively small. Lamont and Stein (2004) estimate that short sales as a percentage of float for the NASDAQ ranged between 2 percent and 4 percent of total market capitalization over the period 1995-2002, while estimates of short-selling on the New York Stock Exchange are even lower at 1.5 percent in 2003 (OICV-IOSCO 2003). However, since foreign investors tend to hold large-cap equities these ratios are likely biased downward because for some equities there is no short-selling at all. Therefore we computed average short sales as a percentage of float for the equities in the S&P 500 as that is more likely representative of the average short-selling in the equities owned by foreign investors. For the end of 2006 the average for the equities in the S&P 500 was

just over 3 percent. As total U.S. equity liabilities in 2006 were $2,791 billion, the estimated overstatement is $84 billion, included in Table 3 Panel C, and we assume the same share through history.

On the equity claims side, the largest share of U.S. residents' holdings is in U.K. equity, with large holdings also in Japan, Canada, France, Switzerland, and Germany. In most emerging market countries, market development lags developed economies and short sales of securities are generally prohibited or the required infrastructure for borrowing securities does not exist. Table 7 in Endo and Ree (2006) provides a list of countries that allow short-selling and in which short-sales are practiced. For these countries, we take U.S. holdings of those countries' equities from Table 18 in Dept. of Treasury et al. (2007) for all of the U.S. holdings surveys; the combination is shown in Appendix Table D.1.

An estimate for short interest on FTSE 350 equities trading on the London Stock Exchange constructed by Au et. al. (2007) ranged between 2.5 percent in 2003 to 4 percent in 2006, and it is thought to be higher in other markets (Endo and Ree (2006)). We assume that U.S. holdings of equities in the U.K. are overstated by 4 percent and holdings overstated by 5 percent in other countries that allow short-selling; the resulting position adjustment is shown in the final line of Appendix Table D.1.

We use these position adjustments to construct short-adjusted equity returns. Adjusting the time series of equity liabilities positions downward by 3 percent each year and computing the revised capital gains returns results in a decrease in the returns from 11 percent over our sample period (Table 1) to 10.8 percent, in the correct direction but still higher than our market-based estimate of 10.1 percent. This moves the total "other adjustments" implied for equity liabilities to $181 billion, a narrowing of $36 billion. With the short adjustment, revised U.S. claims returns fall from an average of 13 percent over our sample period (Table 1) to 12.2 percent, still much greater than the market-based estimate of 7.7 percent. This narrows the total implied "other adjustments" for equity claims by $76 billion to $596 billion. We include the net impact of these adjusted "other adjustments" in Table 3 Panel A, and the revised position estimates are shown in Panels B and C.

Estimating short bond positions is more difficult because we have not been able to identify any studies that estimate the size of this market. It is likely that some classes of investors do not take short

positions, while others have large short positions. For example, a large fraction of debt liabilities are U.S. Treasuries held by foreign officials as part of foreign-exchange reserves; it is unlikely that these investors have large offsetting short positions. In contrast, the balance sheets of several large U.S. broker/dealers list short U.S. Treasury and agency bond positions as large as their long positions.[31] One way to construct an estimate that deals with this heterogeneity is to assume that a subset of foreign investors behave like U.S. broker/dealers, and assume that they have short positions equal in size to their reported holdings. One candidate is investors from the Caribbean financial centers because most of these are hedge funds. The share of bond liabilities vis-à-vis Caribbean financial centers ranges from 3 percent of total debt liabilities in 2007 to 4.1 percent in 2004. This is close to the 3 percent we used as an estimate of the fraction of short positions in equity liabilities, so for consistency we decided to also use 3 percent for debt liabilities. The resulting estimate of the overstatement due to omitted short positions ranges between $17 and $185 billion. Since the same broker/dealer balance sheet data indicates that corporate debt trading liabilities are relatively small, we made no adjustment for short positions in corporate bonds.[32]

These adjustments to positions have corresponding adjustments to current account income receipts and payments. For equity we use the dividend yields on claims and receipts from CDW, and for Treasuries we use the yield on a 2-year constant maturity Treasury.[33] The impact on income receipts and payments is reported in Appendix Table D.2. The net impact, included in the income column in Panel A of Table 3, is cumulative $41 billion increase in receipts.

Direct Investment Intangibles

BEA follows the standards published in the International Monetary Fund's *Balance of Payments Manual* in compiling the BOP and IIP. According to these standards financial flows and positions are based on market prices, when observable. The market prices of intangible assets are rarely observable,

[31] For example, the November 2007 consolidated balance sheet of Goldman Sachs lists U.S. Government and agency trading assets totaling $36.9 billion and liabilities totaling $34.5 billion; the values reported by Lehman are assets of $40.8 billion and liabilities of $71.8 billion.
[32] For Goldman Sachs in November 2007 corporate debt trading assets totaled $15.7 billion and liabilities totaled $3.5 billion; the values reported by Lehman are assets of $54.1 billion and liabilities of $6.8 billion.
[33] From the Federal Reserve H.15 "Selected Interest Rates" release available at http://www.federalreserve.gov/releases/h15/data.htm.

and as such BEA revalues book values to current-period prices using two indicator series: equity indexes and the replacement value of tangible assets. Recognizing the importance of measuring the impact of intangible assets such as research and development (R&D) and other intellectual capital, BEA publishes a satellite account that estimates the effects of R&D spending as investment rather than an expense. We assume that financial account transactions in intangibles are correctly recorded, but include a current account adjustment for BEA estimates of the change in investment income. Our estimates are shown in Table 3. For 1995-2004 we take the estimates shown in Robbins and Moylan (2007) Table G and base our estimated adjustments to the positions for earlier and later years in the sample period based on the growth rates, and for the current account impact we hold constant. The effects on these accounts are minor. The largest current account impact is a decrease of $8 billion in 1998; the largest net IIP impact is a decrease of $29 billion in 2003.

Table 1: Estimating Capital Gains Rates

Estimates are for 1990-2007. Details of how these estimates were constructed are given in the text. Our preferred measure (in column C) utilizes market-based returns for portfolio equity and debt, a range of inferred returns for DI based on whether DI other adjustments are treated as capital gains or not, and original IIP returns for banking, nonbanking, and other assets. Other assets includes U.S. official reserve and other U.S. Government assets, U.S. Government liabilities associated with military sales contracts and other transactions arranged with or through foreign official agencies, and foreign holdings of U.S. currency. DI positions are valued using the current-cost method. Financial derivatives are not included.

		Original IIP (A)	Revised IIP (B)	Preferred (C)
Equity	Claims	8.6%	13.2%	8.2%
	Liabilities	9.5%	10.9%	9.7%
Bonds	Claims	0.7%	4.5%	2.0%
	Liabilities	0.7%	-1.3%	0.6%
DI	Claims	0.7%	0.3%	0.3-1.3%
	Liabilities	0.4%	-2.0%	-2.0-0.5%
Banking and Non-Banking	Claims	0.1%	0.0%	0.1%
	Liabilities	0.1%	0.5%	0.1%
Banking	Claims	0.1%	4.5%	0.1%
	Liabilities	0.0%	-0.8%	0.0%
Nonbanking	Claims	0.1%	-5.6%	0.1%
	Liabilities	0.3%	-4.1%	0.3%
Other Assets	Claims	2.8%	2.7%	2.8%
	Liabilities	0.0%	0.1%	0.0%
Aggregate	Claims	2.2%	3.3%	2.3-2.5%
	Liabilities	1.5%	0.9%	1.1-1.6%
	Difference	**0.7%**	**2.4%**	**0.9-1.1%**

Table 2: A First Pass at Reconciling Positions, Flows and Valuation Adjustments

Flows and positions are from the current vintage of revised BEA data. Valuation adjustments are computed using our preferred rates of return as discussed in the text. DI and, hence, Total are presented both with and without DI "other adjustments" counted as valuation adjustments. Other assets includes U.S. official reserve and other U.S. Government assets, U.S. Government liabilities associated with military sales contracts and other transactions arranged with or through foreign official agencies, and foreign holdings of U.S. currency. DI positions are valued using the current-cost method. Financial derivatives are not included. The gap is positive if recorded 2007 positions are larger than flows and our preferred valuation adjustments would suggest.

US $ Billions		1989 Recorded Position (A)	Flows (B)	Valuation Adjustments (C)	2007 Recorded Position (D)	Gap (D-A-B-C)
Equity	Claims	197	1,481	2,786	5,171	707
	Liabilities	276	1,175	1,323	3,108	352
Bonds	Claims	117	983	124	1,478	255
	Liabilities	663	6,314	81	6,667	-391
DI w/o OA	Claims	553	2,483	569	3,333	-273
	Liabilities	468	2,282	340	2,423	-667
DI w/ OA	Claims	553	2,483	297	3,333	0
	Liabilities	468	2,282	-327	2,423	0
Banking and Nonbanking	Claims	948	3,428	75	5,002	550
	Liabilities	841	4,243	59	5,387	244
Banking	Claims	714	2,382	47	3,826	684
	Liabilities	674	2,783	25	4,428	946
Nonbanking	Claims	234	1,047	29	1,176	-133
	Liabilities	167	1,460	34	960	-702
Other Assets	Claims	255	-14	132	372	-2
	Liabilities	63	228	0	296	6
Derivatives	Claims	0	-36	62	84	58
Total w/o DI OA	Claims	2,071	8,325	3,748	15,439	1,296
	Liabilities	2,311	14,223	1,804	17,881	-457
	Difference	-240	-5,899	1,944	-2,442	**1,752**
Total w/ DI OA	Claims	2,071	8,325	3,475	15,439	1,568
	Liabilities	2,311	14,223	1,137	17,881	210
	Difference	-240	-5,899	2,338	-2,442	**1,358**

Table 3: Consolidated Adjustments

The adjustments are described in detail in Appendices B, C, and D. Data underlying the adjustments are presented in http://www.nber.org/data-appendix/w14295, which contains various supplementary tables.

Panel A: Net Transactions Adjustments

	Fin. Derivs.	Real Estate	Goods Exports	Bonds	Banking and Nonbank	Equity	Income	R&D	Total
1990	0	6	23	-12	4	-23	2	-4	-5
1991	0	6	25	-34	3	-42	1	-4	-45
1992	0	7	26	-32	-4	-7	1	-4	-13
1993	0	8	27	-48	-40	-56	1	-4	-113
1994	0	8	30	-4	-30	-1	1	-4	1
1995	1	8	34	-63	3	-43	2	-4	-63
1996	1	10	36	0	-16	-52	2	-4	-22
1997	2	11	40	-87	25	-66	2	-4	-77
1998	2	13	40	-68	17	-16	2	-8	-18
1999	3	14	40	17	-10	-33	2	-6	28
2000	5	15	29	-82	-28	33	3	-5	-30
2001	8	16	27	-18	24	-1	3	-5	54
2002	10	19	26	-191	-17	64	1	-3	-91
2003	13	22	27	-118	-125	60	1	-4	-124
2004	17	27	30	-35	-2	48	2	1	88
2005	22	31	33	-141	-255	-139	4	1	-443
2006	0	29	39	35	119	-43	6	1	186
2007	0	25	44	71	26	15	5	1	187
Total	85	276	575	-812	-306	-302	41	-59	-501

Table 3 (continued)

Panel B: Claims Holdings Adjustments

	Financial Derivs.	Real Estate	Short Securities	R&D	Total
1989	3	32	-8	48	75
1990	5	35	-8	50	82
1991	7	41	-12	53	89
1992	11	44	-13	57	98
1993	16	48	-23	60	101
1994	24	53	-27	64	115
1995	37	58	-28	67	134
1996	55	64	-35	72	156
1997	82	73	-50	75	180
1998	123	82	-61	80	224
1999	185	94	-68	87	298
2000	278	104	-61	92	413
2001	417	117	-63	98	568
2002	542	136	-54	103	727
2003	704	155	-82	112	890
2004	915	182	-99	125	1,124
2005	1,190	212	-129	139	1,411
2006		225	-166	154	213
2007		233	-217	171	187

Panel C: Liabilities Holdings Adjustments

	Financial Derivs.	Real Estate	Short Securities	R&D	Total	**Net (Claims - Liabilities)**
1989	3	111	-25	37	126	**-51**
1990	5	120	-25	41	141	**-59**
1991	7	139	-28	45	162	**-73**
1992	10	151	-31	50	180	**-82**
1993	15	165	-35	55	200	**-99**
1994	23	182	-38	60	228	**-114**
1995	35	197	-50	66	249	**-115**
1996	52	220	-61	73	283	**-127**
1997	78	248	-77	79	328	**-148**
1998	117	281	-90	92	399	**-175**
1999	176	322	-102	103	499	**-201**
2000	264	357	-111	116	626	**-213**
2001	396	399	-117	125	804	**-235**
2002	515	464	-121	132	990	**-263**
2003	670	532	-149	141	1,194	**-304**
2004	871	624	-174	149	1,469	**-345**
2005	1,132	724	-198	159	1,817	**-406**
2006		769	-243	169	695	**-482**
2007		798	-278	180	699	**-512**

Table 4: Alternative Estimates of the Gap

This table shows the original estimate of the gap based on the revised BEA data and three alternative scenarios. Scenario (A) adds to our original estimate of the gap all adjustments from Table 3 that impact the financial and current accounts except for DI "other adjustments", which we leave in the gap. Scenario (B) is the same as (A) except it treats all DI "other adjustments" as valuation adjustments. Scenario (C) is the same as (B) except it omits adjustments to derivatives and real estate.

Panel A

			Adjustment Scenario		
		Original	(A)	(B)	(C)
1.	1989 NIIP	-240	-291	-291	-213
	Financial Derivatives		0	0	
	Real Estate		-78	-78	
	Short Sales Adj.		17	17	17
	R&D Adj.		10	10	10
2.	Σ Financial Account	5,899	4,840	4,840	4,479
	Financial Derivatives		85	85	
	Real Estate		276	276	
	Equity Adj.		-302	-302	-302
	Bonds Adj.		-812	-812	-812
	Banking and Nonbanking Adj.		-306	-306	-306
3.	Σ Valuation and Other Adjs.	1,944	1,809	2,203	2,270
	Financial Derivatives		143	143	
	Real Estate		-210	-210	
	Short Sales		-68	-68	-68
	DI "Other Adjustments"			394	394
4.	2007 NIIP	-2,442	-2,954	-2,954	-2,389
	Real Estate		-565	-565	
	Equity Short Sales Adj.		61	61	61
	R&D Adj.		-8	-8	-8
5.	GAP (4+2-3-1)	1,752	369	-26	32
	Memo: Cumulated CA	*-5,888*	*-5,331*	*-5,331*	*-5,331*
	Memo: Cumulated SD	*32*	*533*	*533*	*895*

Panel B: Time Series of the Statistical Discrepancy

		Adjustment Scenario		
	Recorded	(A)	(B)	(C)
1990	27	33	33	39
1991	-42	3	3	9
1992	-43	-30	-30	-23
1993	7	120	120	128
1994	-1	-2	-2	7
1995	32	94	94	104
1996	-9	13	13	24
1997	-77	0	0	12
1998	149	167	167	182
1999	68	40	40	58
2000	-59	-29	-29	-9
2001	-14	-68	-68	-44
2002	-38	53	53	82
2003	-6	118	118	153
2004	95	7	7	51
2005	32	476	476	529
2006	-47	-233	-233	-204
2007	-41	-228	-228	-203
Total	32	533	533	895

Figure 1. Revisions to Net Positions and Net Financial Flows

This figure, from CDW (2008a), depicts the net international investment position (solid lines), calculated as U.S. positions abroad less foreigners' positions in the United States, and net financial outflows (dashed lines), calculated as U.S. flows abroad less foreign flows into the United States. For both, thin lines denote the current vintage of revised data and thick lines denote the originally released data. All data are in billions of U.S. dollars.

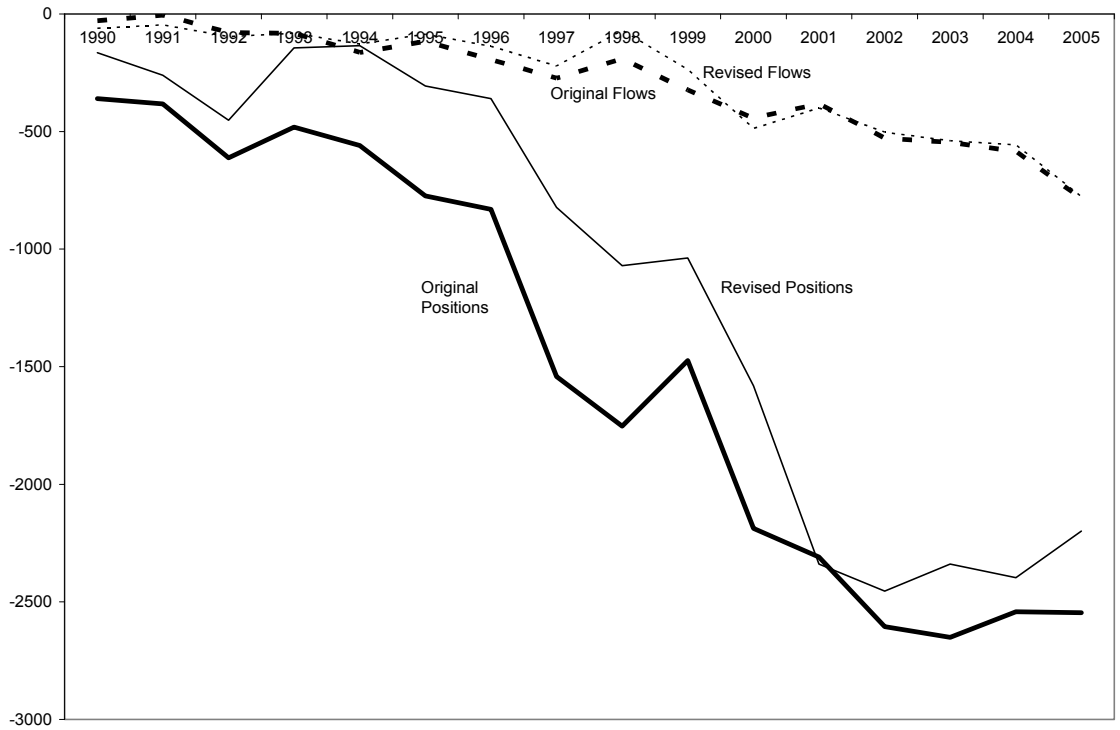

Figure 2: The Net IIP, Cumulated Current Account and Valuation Adjustments: Current Vintage
The figure uses our preferred rates of return and the current vintage of international accounts data. NIIP=U.S. net international investment position, CA=current account, FA=financial account, KA=capital account, VA=valuation adjustments, and SD=statistical discrepancy.

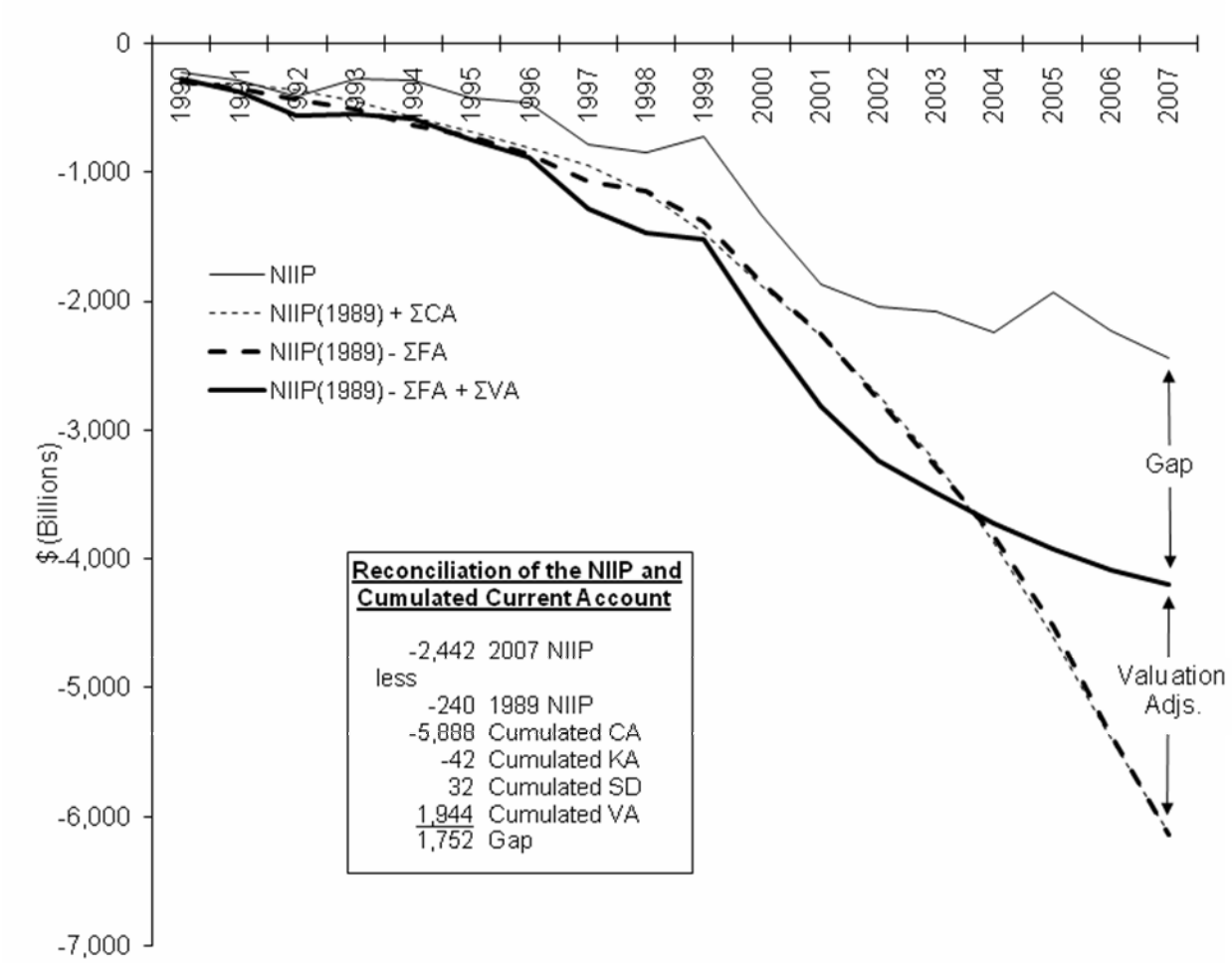

Figure 3: The Net IIP, Cumulated Current Account and Valuation Adjustments: Adjusted Data
The figure uses our preferred rates of return and our adjusted international accounts data. NIIP= U.S. net international investment position, CA=current account, FA=financial account, KA=capital account, VA=valuation adjustments, and SD=statistical discrepancy.