Dark matter: substance or black hole?

The US foreign debt is real

Rabobank Nederland

Economic Research

Wim Boonstra

www.rabobank.com

Summary

Due to its huge deficits on the current account of the balance of payments, the US has developed into a major international debtor. Nevertheless, it still has a positive balance on its capital income account. Some economists argue, that this also means that the US must, contrary to government statistics, actually have a net international asset position. They conclude that somewhere out there, under the radar of the international financial statistics, there must be a huge amount of unregistered US assets: Dark Matter.

If these economist are right, the external position of the US would be much stronger than most analysts assume, meaning that the dollar currently is strongly undervalued.

Alas, false hopes. The adepts of the Dark Matter hypothesis are wrong. The capital income riddle can easily be solved without Dark Matter and the US is, indeed, a major international debtor.

Introduction

The US international investment position and its balance on the current account have been a subject of intense debate. Although economists have had doubts about the sustainability of the US current deficit for years, the actual size of the deficit has continued to grow and has reached unprecedented levels. Apparently, these deficits and the resulting debt position are sustainable after all. Although the dollar has suffered, especially against the euro, there has been no current account crisis in the traditional sense.

A new twist in the debate came in 2005 when economists Hausmann & Sturzenegger launched their so-called Dark Matter hypothesis, in which they doubt whether the US is a debtor at all. Based on the strong income account they come to the conclusion that the US still must have a positive net international asset position. This is a long way from the cumulative current deficits, that since 1981 amount to almost $ 6,000 billion. In this article, I will discuss their contribution and come to the conclusion that, although innovative, the house of Dark Matter is build on a weak statistical foundation.

The Dark Matter hypothesis

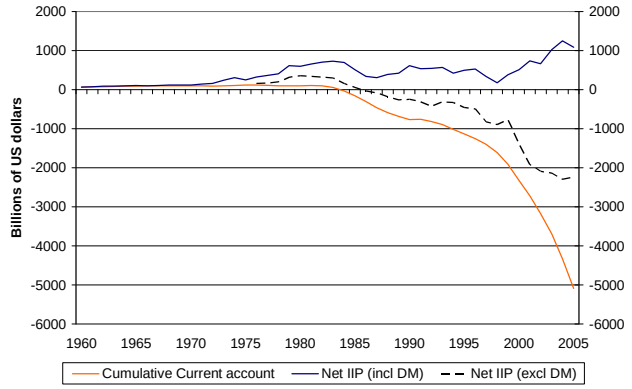
The 'dark matter' theory published by Hausmann & Sturzenegger (2005-a; 2005-b) starts with the realisation that certain balance of payments statistics can mislead analysts. These publications concern specifically the capital income account of the US balance of payments. Hausmann & Sturzenegger start with the observation that the US still has positive capital income. From this, they draw the conclusion that the US also must have a positive net international investment position.

The mathematics behind this hypothesis are relatively simple. Starting for the surplus in capital income, they recalculate the net international investment position using an assumed return. The result, referred to in this article as the Dark Matter-based international investment position (IIP), differs strongly from both the officially reported net IIP and the cumulative current deficits. From annual changes in this Dark Matter-based IIP one also can calculate a Dark Matter-based current account

Dark Matter: substance or black hole?

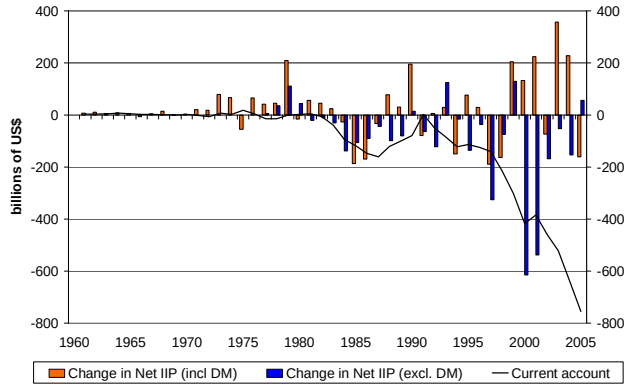
which, of course, differs strongly from the standard current account statistic.

Figure 1: Three measures of US net IIP



Source: BEA, Own calculations

Figure 2: Measures of the US current account



Source: BEA

Calculating Dark Matter

Dark Matter is calculated using the following formula to determine the net 'Dark Matter-based international investment position':

1) $NIIP^{DM}_t = NIC_t * (1/r_t)$

Given this definition, we can define a 'Dark Matter-based current account balance' over a year as the change of Dark Matter-based IIP during the year:

2) $CA^{DM}_t = NIIP^{DM}_t - NIIP^{DM}_{(t-1)}$

In which:

$NIIP^{DM}_t$ = Dark Matter-based net international investment position

NIC_t = Net capital income

CA^{DM}_t = Dark Matter current account balance

r = Asumed return

Figure 1 shows the change of the US net international investment position over time as measured by three definitions. The orange line is the cumulative balance of the current account since 1960, as reported by the US Bureau of Economic Analysis (BEA). It illustrates the strong deterioration of the US balance of payment and it acceleration since the mid 1990s.

The black dotted line is the officially reported net IIP of the US. As can be seen in the graph, there is quite a gap between both official measures. According to Hausmann & Sturzenegger, this can be explained by the fact that the BEA already captures part of Dark Matter, albeit without knowing this [Hausmann & Sturzenegger (2007)]. The blue line illustrates the development of the Net IIP, using the Dark matter method (using an assumed return of 5%). As one can see, the picture is completely different. Next figure pictures the US current account, again using these three methodologies. According to the alternative, Dark Matter current accound, the US, predictably, shows a healthy surplus. Global imbalances? What global imbalances? Not as far as Hausmann & Sturzenegger are concerned!

The Dark Matter concept may be useful

The contribution of Hausmann & Sturzenegger to the debate is rather innovative. Intuitively, one can agree with some of their observations. It is clear that the US dollar enjoys a special status in world financial markets. Given its roles as safe haven and vehicle currency for world trade, one can indeed make a case, as Hausmann & Sturzenegger do, that the US delivers the world with invisible services such as liquidity and insurance. A further explanation is,

in their view, that US investors generate superior returns on their investments abroad, when compared to foreign investors in the US. Moreover, the concept of valuing assets and liabilities by the cash flow they generate is not unusual in finance theory. So far so good, the concept of Dark Matter appears to make sense. The problems begin, however, once one tries to calculate its exact value, because this demands some heroic assumptions.

But there are problems with Dark Matter

The Dark Matter approach suggested by Hausmann & Sturzenegger is based on three crucial assumptions. The first is that all returns on foreign assets and liabilities are captured by the capital income account of the balance of payments. Secondly, they assume that the quality of the data booked on the capital income account is beyond questioning. The third crucial assumption is their observation that a country with a surplus on its capital income account should, by definition, have a net international asset position. If only one of these three assumptions is not fulfilled, the foundation house of Dark Matter starts to crack.

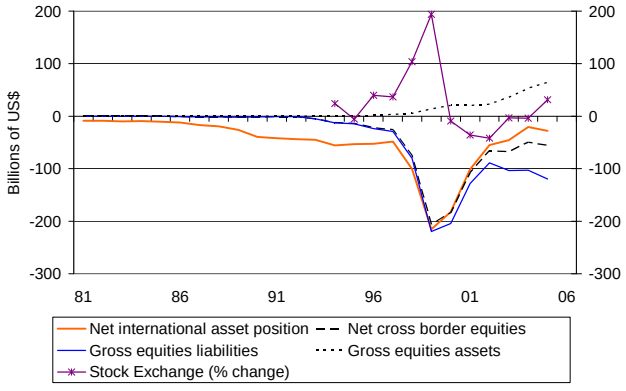
Why are the coverage and quality of the data in the capital income account so crucial for the Dark Matter hypothesis? Because they are the only statistics being used by Hausmann & Sturzenegger. From net capital income they calculate Dark Matter-based net IIP, and from the changes in this new figure they recalculate a new current account balance (without identifying which parts of the current account are not properly registered by the BEA). Every statistic might be wrong, as far a they are concerned, excluding of course the net capital income (which itself of course is part of the current account). They throw all other statistics effectively straight into the dustbin. This is not justified.

Discussing the assumptions

Assumption 1: all returns on foreign assets and liabilities are captured by the capital income account of the balance of payments and, moreover, the quality of these data is beyond questioning.

Does the capital income balance really capture all relevant returns? Unfortunately, this is not the case. Basically, the balance of payments deals with flows only. For many categories of cross border assets and liabilities, however, returns also come in the shape of value changes, such as currency and capital gains (or losses). These are by definition not registered on the standard balance of payments presentation, although many statistical offices publish so-called reconciliation tables in which they quantify these value changes. In some cases, these changes can be so large that they even completely outweigh the balance on the current account. The best illustration of this mechanism is Finland, where the stock price of Nokia is by far the most important explanation of the development of the international investment position. This is illustrated by the next figure. It shows how an increase in Finnish stock prices (mostly driven by Nokia) translates into a strong deterioration of the international investment position of Finland. This is caused by the fact that foreign demand pushed up the price of Nokia shares and as a consequence the value of these foreign holdings.

Figure 3: External position Finland



Source: Bank of Finland, MSCI data via Ecowin

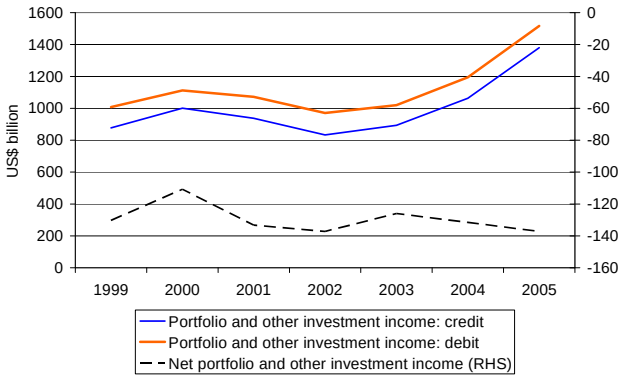
After the burst of the telecom bubble in 2000, the decline of Finnish stock prices resulted, via losses

suffered by foreign investors, in a strong improvement of the Finnish net IIP. The Finnish case is not isolated. This effect can also be identified for other countries such as the Netherlands, Switzerland, the US and Japan [Bruinshoofd & Kool (2008), Boonstra (2008)].
The conclusion is that a substantial part of the return on foreign holdings is by definition not captured in the income account of the balance of payments. Assumption nr. 1 is falsified, severely undermining the foundation of the house of Dark Matter.

Assumption 2:capital income data are superior to other balance of payments data.

In an ideal world, all interest income, dividends and profits are registered on the income balance. Even some non-flow income, such as reinvested profits and –in some countries- accrued interest on bond investment is fully captured in the capital income account of the balance of payments. But there are basically three problems here. First, an unknown amount of dividends and interest is not booked properly. The IMF reports on a global scale a structural gap between credit and debit entries of portfolio and other investment income (this is excluding direct investment income) in the range of $ 100 to $ 140 billion per year (figure 4).

Figure 4: Global (world total) income flows



Source: IMF, BoPS, Yearbook 2006

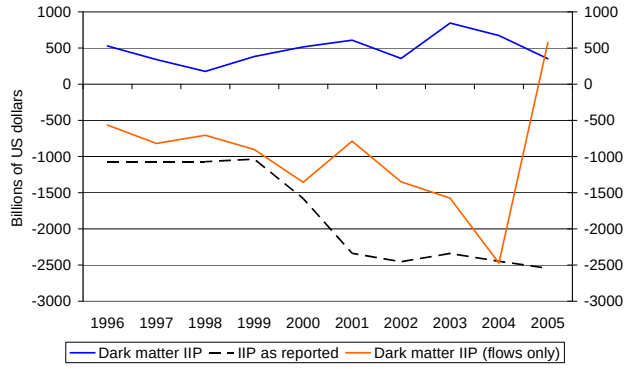
Debits structurally exceed credits. The reported gap is comparable with the global current account gap, also reported by the IMF in its International Financial Statistics. These gaps are probably just the tip of the iceberg, gross underreported flows are likely much larger. But it is clear that the income data are not free from flaws in reporting and are not superior to other Balance of Payments data.
The second problem concerns the treatment of reinvested earnings. These are booked as flows in the balance of payments statistics, although they are technically just administrative entries.[1] The problem here is that companies may have incentives to influence these 'flows' in order to minimize taxation and maximize net profits on a worldwide scale. For the US, this is a highly relevant issue, as US capital income is actually negative if one excludes this category. If one would calculate Dark Matter using actual flows of capital income, without reinvested earnings, the picture becomes totally different from the data presented by Hausmann & Sturzenegger. This is illustrated in figure 5, which clearly shows that, when based on flows only, Dark Matter-based IIP for the US has been negative for many years in a row.

In 2005, however, this situation changed dramatically. In that year, American companies were persuaded by the government in the Homeland Investment Act to repatriate reinvested profits from abroad. The reward for repatriation was a much lower corporate tax rate than usual. The massive response to this tax incentive illustrated that, under normal circumstances, American companies have reasons not to repatriate their profits broad. At the same time, profits of foreign companies in the US

[1] Reinvested earnings are booked as capital income on the income account of the balance of payments. Against this entry, they are booked as outflow on the financial account in the category direct investment abroad. The same goes basically for accrued interest, which is booked as a capital income and an outflow on the financial account in the category debt instruments.

are extremely low. Is this the true picture, or are there other factors at work?

Figure 5: US Dark Matter IIP without reinvested earnings



Source: based on IF data, BoPS yearbook, 2006

Daniel Gros (2006) asserts that because of higher US corporate tax rates in comparison to many other industrial countries, companies have incentives to keep profits in the US as low as possible. This is the third problem. It explains why the profitability of foreign companies in the US seems to be structurally and substantially lower than domestic US companies. Foreigners use their box of tricks to keep profits in the US as low as possible. For American companies abroad, on the other hand, this is a strong reason not to repatriate their foreign earnings. As long as they keep their foreign profits outside the US, they are not taxed in the US. Without this tax distortion, the 'superior returns on direct investment' disappear like snow in summer. Moreover, the US would have a negative balance on its capital income account.

In other words: without the highly uncertain category 'reinvested profits' the substance of Dark Matter turns into a Black Hole.

All in all, we can conclude based on both empirical observations and methodological considerations that there is no reason to expect that data on the capital income account are free from statistical problems. Exit assumption 2.

Assumption 3: positive net capital income implies positive net international assets.

As indicated in the discussion on assumptions 1 and 2, not all returns on foreign assets and liabilities are registered on the balance of payments. This makes an examination of assumption 3 already more or less irrelevant and thus unnecessary. However, for the sake of argument, let's assume that assumption 1 and 2 were not proven false. Would in that case assumption 3 hold?

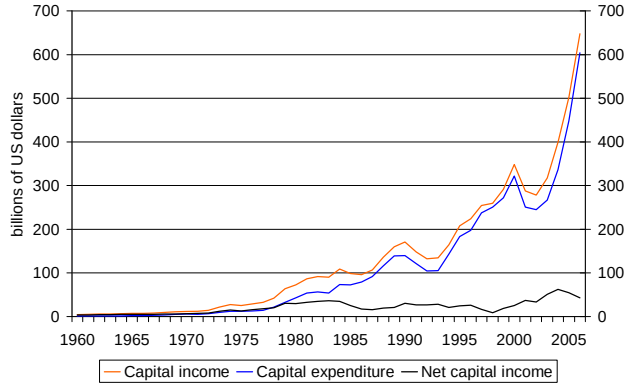
This is interesting, because it is the third assumption that deals with the starting point of the analysis by Hausmann & Sturzenegger. They begin with the observation that the US, in spite of its huge current account deficits, still has a healthy surplus on the capital income account of the balance of payments. Intuitively, especially if assumptions 1 and 2 hold, this is not logical. Countries with large foreign debts are supposed to pay interest and the larger the net liability position, the larger the net interest payments should be. For countries with positive net foreign asset positions, one would expect that they receive a positive return on their foreign assets. For many economies, including the Euro Area, this expectation appears to be met. However, this is not the case for all countries, and certainly not for the US.

After this observation, Hausmann & Sturzenegger conclude that, given the fact that the US has positive net capital income, it therefore *must* have a positive net international asset position. This is their third and most far reaching assumption, because an unavoidable conclusion from this assumption is that all other official data on the international investment position, and those on the current account balance, must be wrong. Of course, one could have drawn the opposite conclusion: that given the huge net liability position, there must be something wrong with the data in the capital income account. Potentially both statistics are wrong. But Hausmann & Sturzenegger *de facto* throw away all official BoP- and IIP-data, except the income account.

Dark Matter: substance or black hole?

In discussing this third assumption, it is important to realise that net capital income is the balance of two huge gross flows. Figure 1 illustrates this for the US for the period 1960 – 2006.

Figure 6: Inflow and outflow of capital income, US, 1960 – 2006



Source: BEA

These huge gross flows illustrate the fact that the net IIP of a country is also the balance of much larger gross asset and liability positions. One of the most important trends in the current globalization wave is the unprecedented growth in cross border financial flows. In earlier times, financial flows reacted primarily to current account imbalances.

Since the early 1980s, however, the situation is totally different. Thanks to financial account liberalization, structural capital flows have grown and move more or less autonomously over the world, in search for yield. As far as national savings or the structural inflow of foreign capital are insufficient to accommodate the capital outflow, the difference can easily be financed on the world financial markets.
As a result of this trend, countries have built up huge gross cross border asset and liability positions (figures 7 and 8). For some smaller countries, such as The Netherlands or Switzerland and even for the UK, these gross cross border positions easily exceed 400% of GDP.

Figure 7: Gross international assets (%GDP)

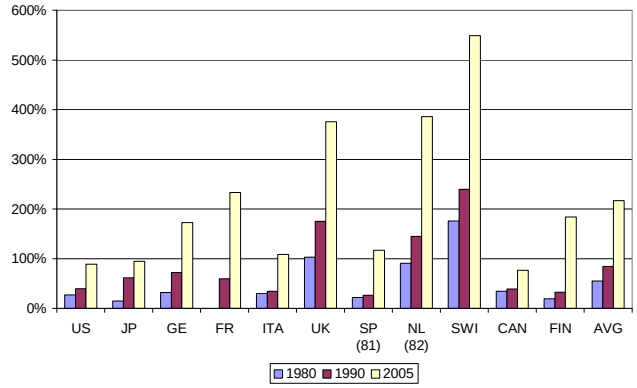
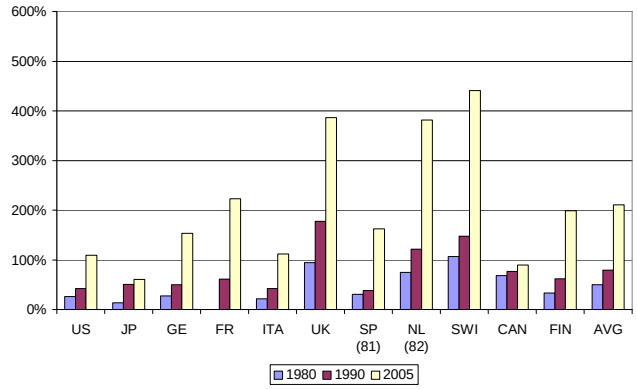


Figure 8: Gross international liabilities (%GDP)

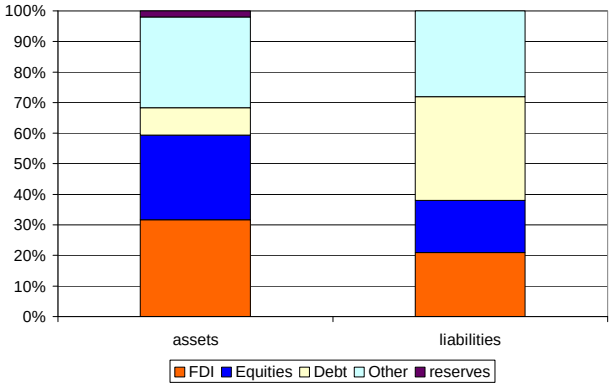


Source figures 7 and 8: IMF, IFS

These figures illustrate, that although the US is still one of the most closed economies in the industrialized world, international assets are around 90% of GDP, while gross international liabilities are some 110% of GDP. In other words: US foreign liabilities exceed foreign assets by circa 22%.
If one wants to draw conclusions on the relation between the international investment position and the capital income account, the composition of gross assets and liabilities becomes important. Should they differ, the yield per investment category becomes relevant. In the case of the US, there is a marked difference in composition of gross assets and gross liabilities.
In spite of the fact that the BEA reports for the US a huge net liability position, the country still has a positive balance in 'high yield/high risk' categories (direct investment and portfolio equities). In the 'low

yield/low risk categories (debt instruments and other investment – the latter category mostly consisting of interbank positions and trade credit), the US has a large and rapidly growing net debt position.

Figure 8: The composition of US international assets and liabilities



Source: IMF, IFS

Given the relatively small difference between the gross size of assets and liabilities (the earlier mentioned 22%), a slightly higher return on assets than liabilities is sufficient to create a positive income flow. Given a hypothetical average yield on gross liabilities of 5%, an average return of 6.5% on gross assets would already lead (under the assumption that all capital income is properly booked on the balance of payments) to a healthy surplus on the capital income account, despite the net debt position.

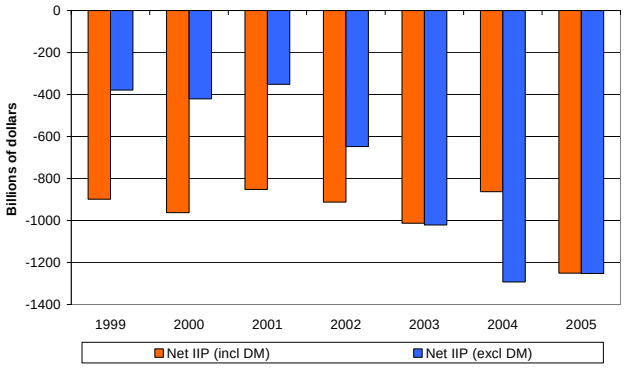
From the above, it appears that is perfectly possible for a country with a relatively small net debt position to generate a positive income flow on its capital income account. The US is such a country, with a net debt position that, although huge in dollar terms, is still relatively small compared to its gross assets and liabilities. Therefore, assumption number three is also refuted.

Intermezzo:

The seigniorage argument: dollar vs. euro

One of the explanations for the occurrence of Dark Matter is that the US earns seigniorage on the creation of dollars. Given the position of the dollar in the world's monetary system, this sounds logical. However, the dollars' position is gradually deteriorating, now that is increasingly challenged by the Euro [ECB (2007), Becker (2007), Middeldorp (2007)]. Although the Euro has a long way to go before it fully qualifies as a potential successor to the dollar, it is already gradually growing in its role as world currency. Like the dollar, the Euro is seen as a safe haven, and its share in international trade is increasing. Therefore, one would expect to find at least some Dark Matter for the Euro Area as well. Unfortunately, the capital income account of the Euro Area is in the red, which corresponds with its net negative IIP. Figure 9 illustrates the Net IIP for the EMU, both the official registration and the Dark Matter-based measure. No positive Dark Matter to be found for Europe. To the contrary, for most years the Dark Matter-based measure is deeper in the red than the officially reported one.

Figure 9: Two measures of Euro Area IIP



Source: based on IMF, BoPS, Yearbook 2006

One might conclude from these figures that the official role for the Euro is more limited than many people think. On the other hand, one can also

conclude that the European balance of payments registration is better than that of the US.

Goodbye to 'Dark Matter'?

All three assumptions underlying the Dark Matter hypothesis have been refuted. Therefore, it is clear that the house of Dark Matter is based on a very weak statistical foundation. The capital income balance has statistical holes. Moreover, a major part of the return on cross border assets and liabilities is by definition not captured in the balance of payments. Therefore, the problem of Dark Matter is that it is a purely theoretical construct that cannot be calculated with any acceptable reliability.

This is not to say, however, that the concept as developed by Hausmann & Sturzenegger is completely useless. In their articles, they correctly point at the fact that the US cumulative current account tells a different story than the statistics of the international investment position. Even without Dark Matter, there is quite a large gap between the US net IIP and the cumulative deficits (figure 5).

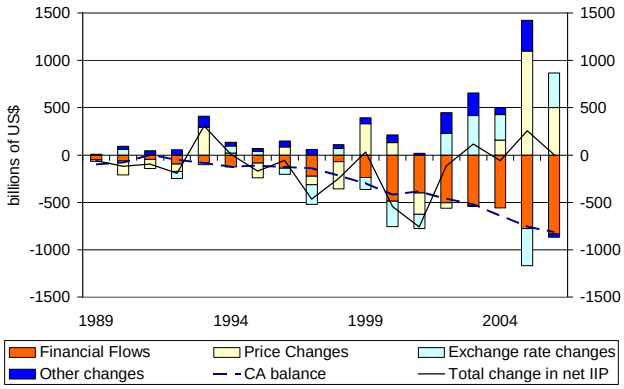
Of course one can turn the argument around, as Hausmann & Sturzenegger appear to do, and argue that the definition of a country with a positive assets position is defined by a positive balance on its capital income account. Indeed, in finance literature it is fully accepted to define the value of an asset by its expected future cash flow. But in this case, even if all capital income would be perfectly booked on the income account, the risk characteristics of assets and liabilities differ so strongly, that one should be careful by using this approach. Moreover, it requires that the capital income account fully registers all returns on foreign assets and liabilities. Hausmann & Sturzenegger (2007) admit that this is a crucial assumption for their theory, but don't elaborate to long on this issue. Had they done so, they would have found that their theory is built on a poor foundation.

If no Dark Matter, what can explain the gap?

The remaining question, of course, is that if there is no Dark Matter, what can explain the gap between the US current account balances and the changes in its international investment position as reported by the BEA?

The answer to this riddle has already been given in the discussion of assumptions 1 and 2 above. It can be entirely explained by the huge changes in values of foreign assets and liabilities that are not captured by Balance of Payments statistics.

Figure 10: Reconciliation of BoP flows with Changes in net IIP



Note: Differences between net financial flows and the current account balance originate from errors & omissions and changes in reserves.
Source: BEA

Moreover, the BEA publishes a reconciliation table from 1989 onwards, in which the differences between the current account balance and the changes in the net IIP are explained. Figure 10 shows that the gap can be closed by a combination of currency effects, price changes (mostly on securities) and other effects (including changes in value of FDI). These effects, in their turn, can be explained by composition effects (resulting from differences in composition of external assets and liabilities) performance effects (performance difference within categories, for example when domestic stocks differ from foreign stocks in their

performance, as in the Finnish example) and currency effects.
Many of the explanations by Hausmann & Sturzenegger, such as the US selling the world liquidity and insurance, will ultimately show themselves in the composition of US assets and liabilities. The fact that the US still has a net asset position in FDI and portfolio equities and a huge net liability position in low return/low risk categories clearly illustrates this.
The US seigniorage income on the creation of international dollars can therefore be calculated by the yield differential between assets and liabilities. There is thus no need to throw almost all international statistics overboard in order to incorporate the effect of seignorage. The fact remains that the US is a huge net debtor, the US dollar is not heavily undervalued and there is no Dark Matter available to save the day.

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Wim Boonstra
Chief Economist
Rabobank Nederland

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