The Implications of Dark Matter for Assessing the US External Imbalance

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CID Working Paper No. 137
November 2006

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Working Papers

Center for International Development
at Harvard University

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November 2006

Abstract: This paper clarifies how dark matter changes our assessment of the US external imbalance. Dark matter assets are defined as the capitalized value of the return privilege obtained by US assets. Because this return privilege has been steady over recent decades, it is likely to persist in the future or even to increase, as it becomes leveraged by an increasingly globalized world. Once this is included in future projections of US current accounts, the US external position looks much more balanced than depicted in official statistics.

Keywords: global imbalances, United States current account deficit, valuation problems, Foreign Direct Investment (FDI)

JEL codes: F32, F34, F36, F41

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The Implications of Dark Matter for Assessing the US External Imbalance

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It is well known that the US economy has been running increasingly large current account deficits since the early 1980s. Current account deficits signal an economy that is spending beyond its means, so it comes as no surprise that the accumulation of deficits during this period, adding up to 5.27 trillion dollars between 1982 and 2005, have significantly increased US net foreign debt to more than 20% of GDP. If those trends were not in themselves cause for concern, in recent years the deficits have escalated in both nominal value and as a percentage of GDP suggesting that the process cannot continue much longer and that a large and painful reversal may be near.

In a series of articles Hausmann and Sturzenegger (2005, 2006a, 2006b) (HS hence), we have argued that this concern may be misguided. Our work starts by pointing that such large increase in debt needs to be reconciled with a rather contradictory fact: that what the US economy pays on its net foreign position seems to have been surprisingly constant in spite of the measured increase in net foreign liabilities[2]. Paraphrasing Bill Cline (2005) we asked in our work if it made sense to call a country that makes money on its net foreign position a debtor. The question we raised in these studies was whether there were hidden assets or services provided by the US economy, the size of which had increased steadily over recent decades, explaining why the net income flow had remained stable in spite of the increase in measured debt. In that work we called these assets "dark matter" and provided evidence for their existence.

In their article "Borrowing without Debt? Understanding the US International Investment Position" (this issue) Mathew Higgins, Thomas Klitgaard and Cedric Tille (HKT hence), acknowledge the existence of these intangibles, but argue that dark matter is unable to account for the difference between the stock and flow data, that the methodology for computing it is doubtful and that it has no substantive implications for the future evolution of US imbalances. Naturally, we believe these claims to be incorrect. After a year of work by us and a number of other scholars, there is growing evidence, both at the micro and macro level on the existence of significant amount of dark matter.[3] Furthermore, we believe that

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[2] In Hausmann and Sturzenegger (2006b) we show this the US is an outlier as for most other countries there is a reasonable good link between current account imbalances and changes in net investment income.

[3] In Hausmann and Sturzenegger (2006b) we provide cross country evidence on the existence of dark matter, but other authors have provided alternative empirical estimates. Meissner and Taylor (2006) present evidence at the macro-historical level. Buiter (2006) provides an estimate for liquidity dark matter. At the micro level Chari and Tesar (2006) provide evidence of dark matter associated to firm takeovers in emerging countries.

thinking in terms of dark matter radically changes the way in which we evaluate the future evolution of US and global imbalances. To discuss why we disagree with HKT is the objective of this brief reply.

What is dark matter?

Before addressing HKT's concerns let us first briefly clarify the meaning of dark matter. As mentioned above our motivating fact is that net income from foreign assets seems to be poorly accounted by the change in foreign assets obtained from accumulating the current account or from direct measures of the stock of net foreign assets that some countries estimate. Thus, we propose an alternative way of measuring the current account, one that starts by defining net foreign assets of the country (NFA) as the capitalized value of the net investment income (*NII*), discounted at a constant rate of interest (*r*):

$$NFA_t^{DM} = \frac{NII_t}{r}. \tag{1}$$

The superscript *DM* corresponds to *dark matter*, a name that is taken from a term used in physics to account for the fact that the world is more stable than you would think if it were held together only by the gravity emanating from visible matter. In the same way that physicists infer matter in the world from its gravitational pull (but not from adding up the visible matter) we infer the assets from their returns and not from adding the current account imbalances. As a result countries with net investment income larger than what is presumed on the basis of their asset base will have dark matter assets, while countries for which the net investment income is too low will have dark matter liabilities.

Choosing to value the assets on the basis of their returns is just like valuing a company by calculating its earnings and multiplying by some price-earnings ratio, or valuing a property based on its rental value. We know from the corporate finance literature that for an individual company the earnings of any given year may give an unreliable measure of its true earning potential, but if we average over an economy and look at trends over a couple of years, this simple methodology delivers reasonable results. Of course, this opens many methodological questions but we refer the reader to Hausmann and Sturzenegger (2006a, 2006b) for further discussion.[4]

With this measure of net foreign assets, we define the current account simply as the change in the stock of net foreign assets, i.e.:

$$CA_t = NFA_t^{DM} - NFA_{t-1}^{DM} = \frac{NII_t - NII_{t-1}}{r}. \tag{2}$$

Campbell, et al (2006) provide a justification for insurance-based dark matter. Theoretical justifications for some other channels are provided in Caballero et al (2006) and in Mendoza et al (2006).

[4] This way of computing net foreign assets has been suggested by Cline (2005) and previously by Ulan and Dewald (1989). It was discussed by US government officials, but the Bureau of Economic Analysis eventually discarded it on the difficulties associated with choosing a discount rate (see Landefeld and Lawson, 1991).

We can further understand the sources of the stock of dark matter (*DM*) by noticing that:

$$DM = NFA_t^{DM} - NFA_t = \frac{NII_t}{r} - NFA_t = \frac{\tilde{r}(NFA_t + \mu_t)}{r} - NFA_t = \frac{\tilde{r}}{r}\mu_t + \frac{(\tilde{r} - r)}{r} NFA_t, \quad (3)$$

where NFA_t stands for the official measure of net foreign assets. In this expression we allow for assets to be mismeasured, with μ indicating that error in measurement. In addition we assume assets yield a rate of return $\tilde{r}$ different from the constant rate used for discounting. The two terms in the last expression of equation (3) allow visualizing that dark matter may have two origins: the capitalized return to unaccounted assets and return "privileges". These privileges may arise because assets abroad earn a higher rate of return or because liabilities at home pay a lower rate. We agree with HKT that it is irrelevant from the perspective of net income to say that the asset base is larger (say, because, assets are mismeasured) and earn a lower yield, or that they are less earning a higher return. In our original work we distinguish the two channels because the underlying economics are different and thus useful to be identified separately, but to study the relevance of dark matter we can assume μ=0, associating all the effect to the yield differentials. If so equation (3) becomes:

$$DM = \frac{(\tilde{r} - r)}{r} NFA_t \quad (4)$$

i.e. the capitalized value of the return differential relative to a given benchmark rate. Once a discount rate is chosen we can easily compute this measure for any country in the world. Figure 1 shows the stock of dark matter assets for the US when a 5% discount rate is used. It has been growing pretty steadily, accelerating towards the end of the period. On average the increase in dark matter assets has average 2.4% of GDP per year since 1982, but close to 5% of GDP in recent years.

Equation (4) states that dark matter originates in "return privileges", i.e. higher relative return for assets than liabilities. We argue that there are at least three main factors that explain a persistent return differential between assets and liabilities: a return differential for FDI investments, the sale of insurance, and the provision of liquidity services.

The first channel involves the notion that FDI investments abroad are a vehicle for the dissemination of ideas, blueprints, knowledge and that they are the vehicle for unaccounted exports of services produced by headquarters and used by affiliates around the world. FDI investors purchase assets in order to invest, but also bring with them a blueprint, a product and a business know-how that is usually poorly accounted for. Because of the difficulties in tracking the trade of these services across national borders, it is likely that numbers underestimate both the net worth of the companies or the exports of the source countries that are then used by foreign affiliates to generate income, all of which show up as a larger yield for these assets (See Higgins, Klitgaard and Tille, 2005). The second channel may arise because the underlying stability or instability of a given economy may allow some economies to sell some of this stability to the rest of world, and to do so they will charge a risk premia and earn a steady flow for these "insurance" services. The third channel is related to the provision of liquidity services, either directly through the use the domestic currency abroad, or because assets with deep markets earn a liquidity premium. In Hausmann and

Sturzenegger (2006b) we use a cross section of countries and discuss related literature providing evidence for all of these channels.

By capitalizing the income from these return differentials we are redefining the stock of assets in a way that more explicitly shows the value of this underlying capital and services, regardless of whether they are included in official statistics or not. In other words, capitalizing these steady return differentials allows including in the asset estimates the advantage or disadvantage reflected in the differences in the rates of return providing a more coherent picture of actual global imbalances. As we will show below, assimilating the return differential to an "asset" is tantamount to assuming that this differential will persist in the future. Here lays the main difference when looking at global imbalances from the perspective of dark matter.

The critique

HKT cast doubt on our valuation procedure using a simple argument. Accept for a moment that it makes sense to discount the investment income by, say a constant discount rate, and, specifically, by the 5% rate used in HS. If this is correct, one could apply the valuation procedure not only to the net return but also separately to the income obtained from assets and liabilities. However, when doing so with US data, they find that some assets and liabilities are undervalued relative to official numbers. They argue this indicates there is "anti dark matter" rather than "dark matter" in these assets and liabilities, and only because there is larger "anti dark matter" in liabilities is that the US appears as having dark matter assets. They claim this is evidence against the existence of dark matter in US assets.

We believe this misses the point. The underlying framework we use is simply to claim that there has to be a reason why assets deliver ex post different rate of returns (we suggested risk premia, know how and liquidity as potential conceptual explanations). We define dark matter for each asset as the capitalized value of the deviations in returns from a benchmark rate, which measures the "return" to these hidden attributes (productivity, risk or liquidity). For example, the capitalized value of the risk premia of a stock return will be its dark matter, and the liquidity discount on a financial instrument another source of dark matter.

Thus valued, assets and liabilities may contain positive or negative amounts of dark matter. Assets will contain positive dark matter if their return is larger than a benchmark interest rate. For reasonable rates there is positive dark matter in US FDI assets, but not necessarily so for other assets. Liabilities contain dark matter if their return is below the benchmark. In the case of the US this is particularly relevant for debt which pays low returns and has liquidity advantages. In fact, finding that these assets are worth less than market value is equivalent to confirming the existence of dark matter in liabilities, not the other way around.

HKT associate dark matter to know-how assets, and thus look for it only within US assets, but this misses one of the key sources of dark matter for the US, the fact that insurance and liquidity considerations allow it to pay much lower rates on its liabilities. Gourinchas and Rey (2006) find it is in debt instruments where the US commands the highest gross return differential. This turns out to be a critical source of dark matter for the US, though not unique to it, Kugler and Weder (2004, 2005) show that Switzerland benefits from similar if not larger benefits.

Of course it may be asked whether our measure provides an alternative to market values. We think they do not. But our point remains that it is useful to take into account systematic return differentials when analyzing global imbalances because it is feasible that these assets will be delivering steady return differentials in that future that will be relevant to assess vulnerabilities. By focusing on market values to assess asset positions this feature is totally missed[5].

Why does it matter?

Having clarified that finding a lower value of US liabilities does not only not pose any problem with the procedure used, but on the contrary is at the core of the argument, we tackle now the question of explaining why we believe that dark matter provides an alternative vantage point for understanding current account imbalances.

To illustrate this, let us use a simple example that roughly relates to the current US net asset position. Imagine a country with foreign assets to GDP to 100% and foreign liabilities to GDP of 125%. Just for the sake of the argument imagine assets yield a 6.25% return while liabilities pay 5% thus yielding a balanced income flow in spite of measured net foreign assets imply net liabilities of 25% of GDP.

There are two ways to interpret this result. The conventional way is to say that in this country assets yield a relatively higher rate of return that compensates for the higher liabilities. The dark matter interpretation, on the other hand, would describe this by stressing that the interest differential reflects underlying fundamentals and therefore should be interpreted as the return to an "unobservable" asset. In this example assets yield 1.25% more than liabilities, so there are implicit assets equal to 25% of GDP (1.25/.05 to stick to our 5% rate). Of course the returns or the discount factor can be changed, but the underlying story would be the same.

What is the difference between stating that the US earns a return differential on its assets and liabilities, or that it holds unmeasured assets in an amount equivalent to the capitalized value of the return differentials relative to a benchmark rate? We believe there are basically two.

The first is that by assigning asset-type characteristics to these return differentials, we are implicitly assuming that this return differential will persist going forward, i.e. the null hypothesis becomes that the underlying stock of assets and liabilities will continue to deliver such return differentials in the future. Notice that in the traditional interpretation, the null hypothesis is that this will not happen,

[5] The exact amount of dark matter is arbitrary, as it depends on the arbitrarily chosen discount rate. If the chosen rate increases we will find less dark matter in assets and more of it in liabilities. If the chosen rate decreases we will find more of it in assets and less in liabilities. The net effect, while less sensitive, will also depend on the discount rate used (as an extreme example if we choose the evidently unreasonable low rate of 0.1% as discount factor we would describe the US as having net liabilities for 7 trillion US dollars, way above its current value, resulting from an asset valuation of 585 trillion and liabilities for 592 trillion, i.e. measuring both assets and liabilities at close to 60 times their market value, though all earning the paltry 0.1% return). While describing the data this way would deliver virtually the same message, we believe choosing a reasonable rate of return, close to risk free rates, provides a more intuitive interpretation.

so that an "explanation" needs to be given every period why the assets are not inducing a commensurate net income flow.[6]

But what evidence is there that these returns are relatively stable? In the case of the US the evidence is fairly compelling. Figure 2, shows the return differentials computed for assets and liabilities from official US data. It seems that the null hypothesis that these returns will continue to deliver a return differential, at least in the case of the US, appears perfectly reasonable.

The second reason is that the value of the unobservable assets may be growing over time. Tracking the stock of dark matter over time is a way of estimating if this is indeed happening. Figure 1 depicted the evolution of the value of these assets for the US, in fact showing a growing stock of dark matter. This increasing stock of dark matter is probably the combination of a fairly constant yield differential, shown in Figure 2, combined with increased leverage of this differential as gross asset positions increased hand in hand with an increasingly intense process of financial globalization.

So when predicting the evolution of US current account imbalances in the future, should the analyses ignore the fact that the US will continue to master a return differential and that it may be able accumulate dark matter assets? If there is evidence over the last 25 years that it has accumulated dark matter assets at the tune of 2.4% per year (and close to 5% over the last 5 years), doesn't it make sense to extrapolate this trend forward?

Analysts can have their own view on whether the US economy will be able to continue exporting dark matter (i.e. of sustaining a return privilege on its net foreign assets). Our work provides some historical facts that may become guidance as to what to expect for the future. Short as it is, the data for the last 25 years suggests that it may make sense to assume that these increases in the stock of dark matter will persist into the future. In fact, as the world becomes increasingly globalized it is likely that some of the sources of dark matter may be bound to increase. If so, the deterioration of net income will be significantly slower than what is anticipated by official numbers.

In the end it boils down to the difference between evaluating the future prospect for a country with net foreign debt of about 25% of GDP and running a current account deficit of 6% of GDP with that of a country that has no net foreign liabilities and runs a current account of between 1 and 3.5% of GDP.[7] The difference between those two scenarios provides the scope for understanding the relevance of the dark matter approach to interpreting future US and global imbalances.

At a minimum, the dark matter hypothesis focuses the question of the US current account imbalances on the underlying motives for the return differentials. Rather than concentrating on savings behavior the analysis suggests that it is equally important to evaluate whether the US will continue to be a safe haven for investments, run a stable and attractive currency, and have the most innovative university and firms. These issues have been largely absent from the debate on US current account imbalances but our approach focuses squarely on them.

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[6] HKT spend a great deal of their paper explaining "measured" valuation effects that explain why the net foreign asset position has not deteriorated hand in hand with the current account. Notice, however, that our valuation effects are larger, even than those described by them, as in our measure net foreign assets are significantly larger than what is measured by BEA.

[7] If the US increases it's dark matter assets at 2.5% of GDP per year, running a deficit of 6% of GDP per year, entails a reduction in its net investment income of .17% of GDP per year (assuming an average payment rate of 5%), a number that seems a long stretch from being a cause for concern.

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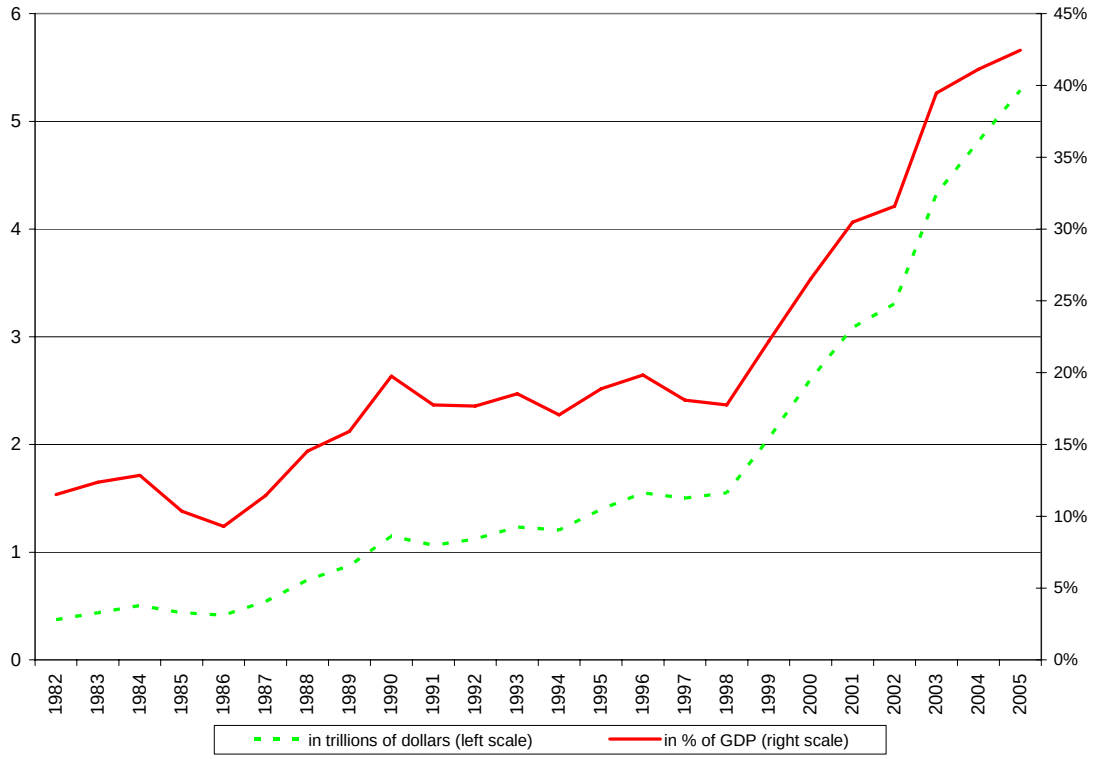
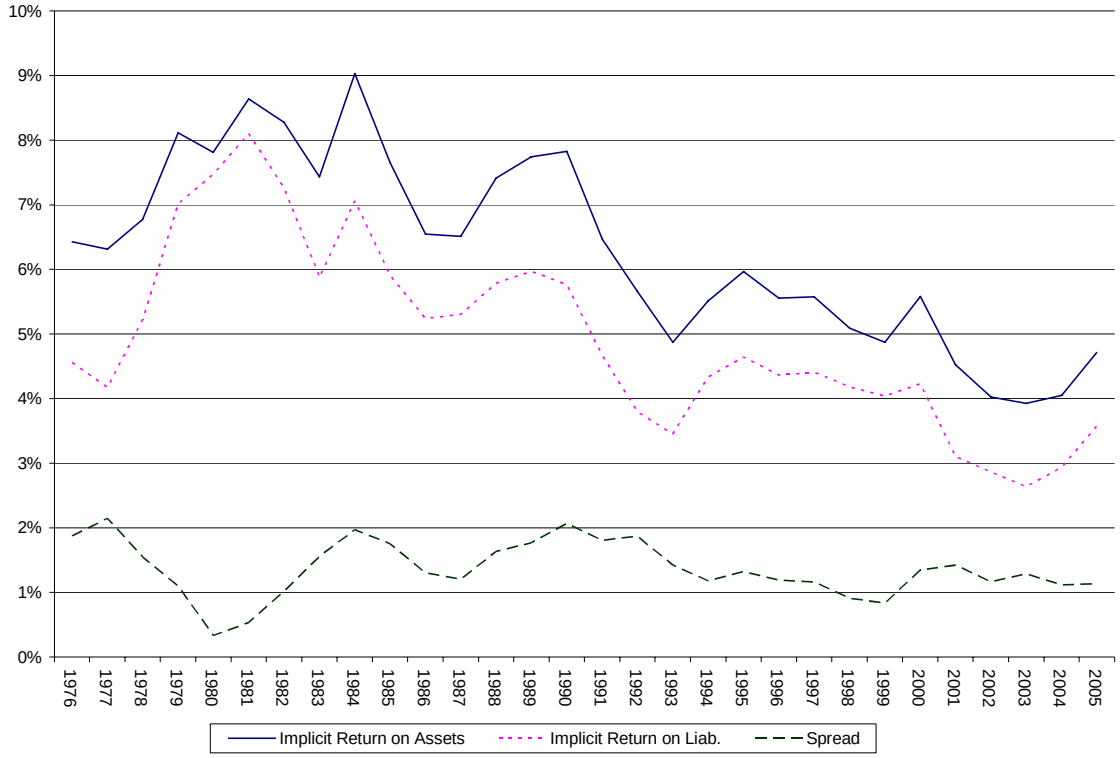
Figure 1. US stock of dark matter
(in trillions of US dollars, and in % of GDP)



Source: BEA

Figure 2. The US interest spread 1976-2005



Source: BEA