

## WILL THERE BE A DOLLAR CRISIS?

Paul Krugman

Sept. 18, 2006

The United States has a remarkably large current account deficit, both in absolute terms and as a share of GDP. At the moment the country isn't having any difficulty attracting capital inflows sufficient to finance this deficit, but many observers nonetheless find the deficit worrisome. The worriers see an ominous resemblance between the current U.S. situation and that of developing countries which also went through periods during which capital flows easily financed large current deficits, then experienced "sudden stops" in which capital inflows abruptly ceased, the currency plunged, and the economy experienced a major setback.

Yet there doesn't seem to be a clear consensus about how to think about the risks of a dollar crisis. A recent issue of *Brookings Papers on Economic Activity* (1:2005) was largely devoted to the issue, and contained excellent, stimulating discussions. Yet the papers seemed, in many ways, to be talking past each other – answering different questions, without being clear about their differences. The purpose of this paper is to sort out the major issues. The idea is to figure out where the various arguments fit, whether they really mean what their proponents claim, and – to the extent possible – how they add up given the available numbers.

Although there are some analysts arguing that the U.S. current account deficit is either sustainable or a statistical illusion – arguments discussed briefly below – for the most part the crucial debate isn't whether the dollar and the U.S. current account deficit

must eventually decline; even if the unorthodox views are given the benefit of the doubt, it's hard to argue that the current levels are indefinitely sustainable. Instead, the debate is or should be about two questions. First, will there be an *abrupt* fall in the dollar – a dollar plunge? Second, if there is a dollar plunge, will it be merely embarrassing or a source of major macroeconomic problems?

This paper doesn't offer a full model. Instead, it carries out a reduced-form analysis of the possibility of a dollar plunge, followed by a sketch rather than a model of the ways in which such a plunge might cause macroeconomic trouble. As we'll see, there are some conceptual problems in linking the question of whether the dollar will plunge to the question of what will happen if it does. But this paper tries to tell a consistent story.

The remainder of the paper is in five parts. The first part argues that investor myopia is key to the question of whether a dollar plunge is likely: it's reasonably clear that the dollar must eventually fall, but that fall only needs to happen abruptly if investors have failed to factor the long-run need for dollar decline into their portfolio decisions. The second part offers an analytical treatment of the question of investor myopia and a potential dollar plunge. The third part introduces some caveats and qualifications to that analysis. The fourth part suggests a framework for thinking about the macroeconomic effects of a dollar plunge, if that's what's going to happen. A final section suggests some conclusions and directions for research.

### *1. The case for a plunge: a Wile E. Coyote approach*

There is little doubt that the dollar must eventually fall from current levels. Trade deficits on the current scale cannot continue forever – and we’re all fond of quoting Stein’s Law: “If something cannot go on forever, it will stop.” Closing the trade deficit will require a redistribution of world spending, with a fall in U.S. spending and a rise in spending abroad. One occasionally hears assertions that this redistribution of world spending can lead to the required change in trade deficits without any need for a change in real exchange rates – a view John Williamson once felicitously described as “the doctrine of immaculate transfer.” In fact, however, a redistribution of world spending will require a fall in the relative prices of U.S.-produced goods and services, because U.S. spending falls much more heavily than the spending of other countries on those U.S.-produced goods and services. So there must, eventually, be a real depreciation of the dollar. But this depreciation could be gradual, a few percent per year or less. Why should it take the form of a discrete drop?

There has actually been surprisingly little discussion of this question, even in papers that can seem, on a casual reading, to be about the prospects for a dollar plunge. For example, the widely cited work of Obstfeld and Rogoff about dollar adjustment, continued in their 2005 Brookings paper, is often cited as reason for alarm. But their framework is designed to estimate the size of the dollar decline needed to eliminate the current account deficit; it sheds little light on whether that decline will happen quickly, as opposed to a gradual adjustment over the course of a number of years.

The closest any paper in last year’s Brookings symposium came to addressing that question directly was Edwards (2005), whose view is echoed less clearly in a number of discussions. The basic idea can be summarized as follows: there has been an upward shift

in the proportion of U.S. assets that foreign investors want to hold in their portfolios. As long as foreign investors are still in the process of moving to this new, higher share of dollars in their wealth, their actions generate a large capital flow into the United States. But the capital flows needed to *maintain* an increased dollar share in portfolios are much smaller than those required to *achieve* that share. So once the desired holdings of U.S. assets have been achieved, the argument goes, capital flows into the United States will drop off sharply, leading to an abrupt decline in both the current account deficit and in the dollar.

There are a number of questions we could raise about this story, but one that seems particularly germane is that of expectations: won't investors see this coming? If they do, the dynamics will be very different. The initial shift into dollars, and hence initial capital inflows, will be damped by expectations of future depreciation. On the other hand, capital inflows will be sustained much longer, because dollar assets will become more attractive over time as the dollar drops toward its long-run sustainable level, reducing the need for further depreciation. So the whole process will be smoothed out. In fact, that's the adjustment process described by another paper in the same conference, Blanchard, Giavazzi, and Sa (2005), which does *not* imply a dollar plunge. So to get the kind of sudden stop envisaged by Edwards and others, investors must be myopic: they must fail to understand the unsustainability of the current exchange rate.

Once we've introduced the possibility of investor myopia, however, we've also introduced the possibility that this myopia will eventually be cured by events: at some point it will become obvious to investors that the dollar must decline – and at that point it

will, suddenly. And this brings us to an approach I and others took to the question of prospects for a dollar plunge more than 20 years ago.

Two decades ago the United States was in a position that resembled the present in some important respects. The country had a large current account deficit, although it was only half as large relative to GDP as the deficit today. Then as now some people argued that this deficit could be sustained indefinitely. Others, myself included, argued that the dollar was in for a fall (Krugman 1985.) And some argued that this fall would have dire consequences (Marris 1985.) Fortunately, although the dollar did fall, the predicted evil effects failed to materialize.

At the time I suggested an approach to thinking about the prospects for a dollar plunge that I believe is once again useful, although the modeling framework here is different. The key to this approach is arguing that the real question isn't whether the dollar must eventually depreciate. It's whether the dollar must eventually depreciate at a rate *faster than investors now expect*. That is, the only reason to predict a plunge is if we believe that today's capital flows are based on irrational expectations – that the future path of the exchange rate that investors expect is inconsistent with a feasible adjustment path for the balance of payments. If markets are failing to take the required future fall of the dollar into account, they will eventually have a “Wile E. Coyote” moment<sup>1</sup>, when they look down and realize that nothing is supporting the currency. At that point the dollar will plunge. That is, we're looking for evidence that investors aren't properly forward-looking, and that an abrupt exchange rate adjustment will occur when reality bites.

---

<sup>1</sup> For those not familiar with the classics: there were often scenes in Road Runner cartoons in which the ever-frustrated Wile E. Coyote would run off a cliff, take several steps on thin air, then look down – and only after realizing that there was nothing under him would he plunge.

Some form of Wile E. Coyote analysis is implicit in many dire warnings about a dollar plunge, such as those of Roubini and Setser (2005). The IMF's most recent *World Economic Outlook* (IMF 2006) offers, in guarded terms, what appears to be a Wile E. Coyote warning: after laying out a benign "No policies scenario" for the adjustment of external balances, it goes on to point out two problems with this scenario:

"First, foreigners are assumed to be willing to accommodate a further very substantial buildup in U.S. foreign liabilities, from currently less than 30 percent to ultimately around 85 percent of U.S. GDP. This would represent a very high level of external indebtedness, even for a large industrialized country. Second, foreigners would be willing to allocate an increasing share of their asset portfolios to U.S. assets without demanding a large risk premium, even though they may face continued foreign exchange losses ... [T]hese assumptions may not be realistic, and it is relevant to explore alternative scenarios based on more pessimistic assumptions." (p. 26.)

It is, however, useful to make the Wile E. Coyote analysis explicit: doing so both highlights the significance of key economic observations, such as the absence of clear real interest rate differentials between major economies, and helps us sort out the relevance of various seemingly related arguments, such as the alleged emergence of a "Bretton Woods II" system of exchange rates.

## 2. *Wile E. Coyote analytics*

What constitutes a feasible adjustment path for the dollar? I would argue that the key criterion for feasibility is that the dollar must fall sufficiently rapidly to avoid an unsustainable level of US external debt. I won't try to define at this point how high a level of debt is unsustainable; as we'll see, that may be the crucial question.

How should we model the relationship between the path of the exchange rate and the path of external debt? Those who have been involved with exchange rate models since the early days of floating rates have seen a sudden jump in the value of some old intellectual capital: portfolio-balance models of the exchange rate, drawing on early work by Kouri (1976) in particular, are back in fashion. As we'll now see, a "generic" portfolio balance model, which glosses over many details, lets us get quite directly at the question of whether investors are properly anticipating the necessary future fall in the dollar.

Our generic model contains only two equations. The first is the portfolio balance equation, which determines the real dollar exchange rate given U.S. net external debt – measured as a share of GDP – and expected dollar depreciation:

$$(1) \quad x = x(D, \delta)$$

where  $x$  is the real exchange rate,  $D$  is U.S. net external debt as a share of GDP and  $\delta$  is the expected rate of real dollar depreciation. (We measure  $x$  so that up is up: a rise in  $x$  is a real appreciation of the dollar.)

$D$  has a negative effect on  $x$  for at least one and possibly two reasons. First, there is the usual portfolio balance effect: a larger net external debt requires some combination of foreigners holding a larger share of U.S. assets in their portfolios and U.S. residents

holding a smaller share of foreign assets in their portfolios. Both changes in portfolio require a lower dollar, other things equal. Second, there may be concerns about U.S. ability and/or willingness to service its debts as the debt-GDP ratio grows large.

The other equation describes debt dynamics:

$$(2) \dot{D} = B(x, D, \dot{x})$$

The rate of change of the debt-GDP ratio isn't identical with the ratio of the current account deficit to GDP, because it must also take account both of changes in the denominator due to growth in GDP and of capital gains and losses. As Gourinchas and Rey (2005) show, these capital gains and losses loom large in some years. Because the United States tends to hold real assets or equities abroad, while its liabilities consist to a large extent of dollar-denominated debt, dollar depreciation tends to reduce the US net external debt position.

Here's how to interpret the effects of the three variables on the right side of (2). The effect of the real exchange rate is fairly straightforward, although it's important to understand that we're not talking about a naïve "elasticities" approach. Instead, it should be understood as a reduced form of a general equilibrium calculation: given a redistribution of spending from the United States to the rest of the world that has as its counterpart a rise in  $B$ , we ask how the real exchange rate changes as part of the adjustment. (A well-known recent example of this kind of calculation is Obstfeld and Rogoff 2005.)

The effect of  $D$  on its own rate of change works through two channels. On one side, higher net debt reduces net investment income. On the other side, the debt-GDP ratio tends to fall, other things equal, due to GDP growth, and the size of this effect depends on the initial ratio. Which effect predominates depends on whether the marginal rate of return on foreign debt is greater or less than the rate of GDP growth. At the moment, with the U.S. external deficit mainly financed by sales of bonds whose real interest rate seems to be less than the rate of potential growth, the numbers seem to suggest that an increase in debt *reduces* the rate of debt accumulation, a disturbing conclusion. Perhaps this condition will be reversed when foreign investors begin to earn a higher rate of return on their US assets. In any case, as we'll see, in the reduced-form approach of this paper we don't need to take a position on the sign of  $R-g$ .

Finally, the effect of the real exchange rate on the rate of debt accumulation reflects valuation effects. The United States has very little external debt denominated in foreign currency; its liabilities, consisting overwhelmingly of dollar bonds, foreign-owned stocks, and direct foreign investment, can to a first approximation be considered a claim denominated in terms of U.S. goods and services. On the other hand, the bulk of U.S. external assets consist of foreign stocks and direct investment, both of which can to a first approximation be considered claims denominated in terms of foreign goods and services. So a real depreciation of the dollar raises the value, in terms of US GDP, of U.S. external assets without increasing the value of U.S. external liabilities. As a result, dollar depreciation reduces net external debt.

Figure 1 illustrates the familiar dynamics associated with this model. The line  $DD$  shows the relationship between  $D$  and  $x$  that would apply if  $\delta=0$ , that is, if investors did

not expect any future real depreciation of the dollar. The line BB shows the locus of point at which the debt-GDP ratio is stationary, given zero change in the real exchange rate. BB is drawn as downward-sloping, which corresponds to a marginal rate of return greater than the growth rate. If  $R < g$ , BB is upward-sloping, but the qualitative behavior is unchanged. With rational expectations, the economy will follow the saddle path SS. (Ignore points 1 and 2 for now.) Notice what happens if investors are forward-looking: when  $D$  is below its long-run equilibrium level, the value of the dollar is held down by expectations of future decline, but as  $D$  rises, the decline in the dollar is cushioned by rising demand as expected depreciation falls off. That is, forward-looking behavior by investors works against the possibility of a dollar plunge.

But are investors, in fact, forward-looking? Does the current situation look as if investors are fully taking into account the prospects for future dollar decline? Or does staving off an unsustainable accumulation of debt require a rate of dollar decline that will come as a surprise to investors, setting off a dollar plunge?

One way to approach these issues is to note that if we linearize the model, it implies that both the real exchange rate and the adjusted current account will converge exponentially to their long-run levels:

$$(4) \ln x = \ln \bar{x} + (\ln x_0 - \ln \bar{x})e^{-\kappa t}$$

$$(5) \dot{D} = \dot{D}_0 e^{-\kappa t}$$

where  $\bar{x}$  is the long-run equilibrium value of the real exchange rate, and  $\kappa$  is the rate of convergence. Equation (5) also implies that the long run debt to GDP ratio will be

$$(6) \bar{D} = D_0 + \frac{\dot{D}_0}{\kappa}$$

What (6) tells us is that the eventual debt accumulation depends on the rate of convergence,  $\kappa$ . If we believe that there are limits to how high the debt-GDP ratio can realistically go, that sets a lower bound on the rate of convergence. But from (4), the higher the rate of convergence, the faster the rate of real dollar decline. So we can now rephrase our question: if we assume that the economy converges on long-run equilibrium sufficiently rapidly to lead to a feasible level of debt, is the implied rate of dollar decline consistent with what we know about investor behavior?

To answer this question, we need to put in some specific numbers. US net external debt at the end of 2005, with direct investment assessed at market value, was 20 percent of GDP in the fourth quarter of 2005, so we can set the initial value of the debt-GDP ratio,  $D_0$ , at approximately 0.20.

The initial value of  $\dot{D}$  may seem straightforward, but it's actually a bit tricky. As I've already pointed out, it isn't simply the ratio of the current account to GDP, currently approximately .7 percent of GDP. Instead, we need to make two adjustments.

First, we need to take account of the erosion of the debt-GDP ratio due to the growth of GDP. Let's assume real growth at 3 percent, and an inflation rate of 2.5 percent, giving us 5.5 percent nominal growth. With net external debt of 20 percent of GDP, this subtracts 1.1 percentage points of GDP off the current account deficit.

Second, we need to take account of valuation effects. Since we are measuring  $D$  as a share of U.S. GDP, we are in effect using U.S.-produced goods and services as a

numeraire. To a reasonable approximation, we can assume away valuation effects in terms of this numeraire on US external liabilities. However, a substantial part of US external assets, consisting both of private holdings of securities and of foreign direct investment, can to a good approximation be considered denominated in foreign goods and services. Then we have

$$A = A^* / x$$

where  $A^*$  is the value of these external US assets in terms of foreign goods and services; when the real exchange rate changes, we have

$$\Delta A = -A \frac{\Delta x}{x}$$

This tells us that the initial value of  $\dot{D}$  depends on the value of selected US assets abroad and on the rate of real depreciation along the assumed equilibrium path. US holdings of foreign securities at the end of 2005, plus foreign direct investment at market value, were equal to 59.7 percent of fourth-quarter 2005 GDP – call it 60 percent. With foreign-goods-denominated assets equal to 60 percent of GDP, real depreciation of 4 percent per year will cause valuation effects that subtract 2.4 percentage points from the adjusted current account. If real depreciation is only 2 percent per year, valuation effects will subtract off only 1.2 percentage points, and so on.

Finally, how much must the real dollar fall in the long run? In principle, this depends on the steady-state level of external debt relative to GDP, and thus needs to be simultaneously determined along with the adjustment path. For the purposes of this paper, however, it seems possible to take a shortcut, by assuming that the required depreciation needs to be just sufficient to bring the U.S. balance of payments on goods and services to zero. As long as the long-run rate of return on net U.S. liabilities is greater

than the growth rate – which isn't true in current data, but will probably be true in the long run – this is a lower bound on the real depreciation necessary.

But how large a depreciation would be needed to bring U.S. trade in goods and services into balance? A simple model assumes that the United States and the rest of the world each produce a single composite good, that preferences are Cobb-Douglas, and that the current situation can be viewed as one in which the rest of the world is making a transfer to the United States equal to the US goods and services deficit. If we assume that the rest of the world has a combined GDP equal to three times US GDP, and calibrate the model to US data from the second quarter of 2006, we find that eliminating the transfer would lead to a 42.6 percent rise in the relative price of rest-of-world products, or a 35 percent logarithmic real depreciation of the dollar. This is close to the estimate of required dollar depreciation by Obstfeld and Rogoff. Both estimates of required depreciation are considerably less than those indicated by fitted trade equations, which suggest that the dollar might have to fall by as much as 20 percent to reduce the external deficit by 1 percent of GDP. For current purposes I'll assume that

$$\ln x_o - \ln \bar{x} = 0.35$$

that is, that the dollar must eventually experience a logarithmic 35% real depreciation; it's unlikely that this is a serious overestimate, and quite possible that it's a serious underestimate.

An aside: as Obstfeld and Rogoff and others have pointed out, a realistic model of future trade adjustment should, at minimum, portray a three-cornered world, since the

counterpart of the US external deficit lies in Asia, with Europe roughly balanced. The details of any attempt to model this three-cornered adjustment depends on what we assume about the European balance of payments: would a reduction in the U.S. deficit come partly via a European move toward deficit, or entirely via a counterpart adjustment in Asia? What is clear is that Asian currencies can be expected to appreciate more than average, and the euro less.

We can now look at the implications of different hypothetical rates of convergence for debt accumulation and rates of real depreciation. Let's be clear: these are not intended as predictions, they are thought experiments. As a result, the assumed rates of convergence here should not be compared with empirical estimates of convergence following exchange rate shocks.

Instead, what we're doing here is a feasibility test: we're trying to determine whether there is any rate of convergence consistent both with market expectations and with plausible end levels of  $D$ . Table 1 shows the results of such a calculation. We consider two hypothetical values for  $\kappa$ . A low value, .05, implies an initial rate of depreciation of 1.75 percent per year - .05 times the logarithmic long-run depreciation of 35 percent. After taking account of the growth and valuation adjustments, this implies an initial value for  $\dot{D}$  of .049, and an eventual net debt-GDP ratio of 118 percent. As Eichengreen (2006) has pointed out, debt level that high would imply foreign ownership of at least a third of the US capital stock, and more if the US continues to have substantial gross assets abroad. A higher value, .10, implies an initial 3.5 percent real rate of depreciation, an initial value for  $\dot{D}$  of .038, and an eventual debt-GDP ratio of only 58 percent – still

high by historical standards for a large, relatively closed economy, but perhaps plausible given financial globalization.

This exercise suggests that a plausible path for long-run adjustment requires real depreciation at more than 2 percent per year, and possibly as much as 4 percent. This needn't be implausible, if investors were being compensated with higher real returns on dollar investments. But they aren't.

As Table 2 shows, long-term nominal interest rates in the United States are higher than in the euro area, and much higher than in Japan. However, these differentials are partly offset by differences in expected rates of inflation. With well-known caveats (markets for inflation-indexed bonds are relatively thin), we can use the break-even inflation rate on inflation-indexed bonds (BEIR) as an estimate of expected inflation. As of August 2006 the long-term BEIR in the United States was approximately 2.6 percent per year; that in the euro zone was approximately 2.2 percent; that in Japan only 0.8 percent. Thus real interest rate differentials between the United States and other major currency areas are modest – approximately 0.6 percent versus the euro, and 1.2 percent versus the yen.

Nonetheless, private investors are not only holding substantial quantities of U.S. debt, they are continuing to purchase that debt at a substantial rate. (Setser (2006) argues that a substantial part of apparent private purchases of US debt are actually central bank purchases routed through intermediaries, but even he acknowledges substantial private buying.)

Because we're assuming that bonds in different currencies are imperfect substitutes, expected real returns don't have to be equalized – or to put it differently, the real interest differential is not necessarily an implicit forecast of changes in the real exchange rate. If,

however, a realistic path for the exchange rate involves dollar depreciation at 2-4%, this implies large gaps in real rates of return. In fact, investors in Japan and the euro zone are buying U.S. bonds that offer a low or even negative real rate of return in terms of their own consumption baskets. Do they know this?

It seems plausible to argue that they don't: that markets are not taking the prospective long-run decline of the dollar into account. The anecdotal evidence suggests that investors are purchasing U.S. debt not merely for the purpose of diversification, but because they perceive the expected yield on dollar-denominated debt as higher than that on euro- or yen-denominated debt. Thus in the Nov. 21, 2005 issue of *Business Week* an article on the rising dollar declared, "Behind the dollar's allure: Investors love the higher inflation-adjusted yields on U.S. securities. 'Real' rates on 10-year government bonds are around 2% in the U.S., vs. 1.5% in Europe and 1% in Japan." Notice that the *Business Week* quotation describes the higher real rate on dollar bonds as a reason for the dollar's "allure." That suggests that investors' decisions are based on the expectation that the real exchange rate will remain essentially unchanged over time.

If markets aren't taking future dollar decline into account, the world economy isn't on the rational-expectations saddle path. In terms of Figure 1, the world economy is at a position like point 1, on the curve that corresponds to zero expected real depreciation, rather than on the saddle path.

And now we can see what a Wile E. Coyote moment would look like: after a period of real dollar decline, or some kind of economic or political shock, investors would take a closer look at the prospects for dollar-denominated assets – and the world economy would jump from DD to the saddle path SS, from a point such as 1 to a point such as 2.

(Notice that the jump is to the southwest, not the south; this reflects the valuation effects of a dollar depreciation, which will reduce net external debt.)

On the face of it, then, there is a pretty good though not ironclad case for believing that markets are failing to take account of the needed future real depreciation of the dollar; that at some point investors will realize that they are being insufficiently rewarded for holding dollar-denominated assets; and that the dollar will drop steeply as a result. But the intensive discussion of the U.S. current account deficit over the past few years has turned up several influential arguments often interpreted as implying that the current value of the dollar is more sustainable than I have suggested.

### *3. Novel arguments regarding capital flows and the dollar*

Any sustained deviation of an economic variable from historical norms raises the question of whether we are seeing a temporary aberration – perhaps a bubble – or a structural change. At least four influential arguments suggest structural reasons why the U.S. current account deficit and hence the dollar may be more sustainable than previous experience would seem to indicate. On the other hand, there's one important argument, which has received surprisingly little attention, suggesting that the dollar is even less sustainable than the previous analysis indicated. Let's look at these arguments in turn.

*Global savings glut.*

In a widely quoted speech, Ben Bernanke (2005) argued that there is a global excess of savings over investment outside the United States, in effect attributing the U.S. current account deficit to high savings abroad rather than low savings at home. Follow-up analyses have tried to assess world savings and investment rates: are savings really exceptionally high, or is investment demand unusually depressed? Either way, a savings glut could explain why the United States is running such a large current account deficit, and could provide support for the view that a large deficit for an extended period makes sense in economic terms.

But even if there is a global savings glut, the net indebtedness of the United States as a percentage of GDP must eventually stabilize, which means that the dollar must eventually fall in real terms. If investors take this into account, a capital inflow produced by a global savings glut should have the same signature as a capital inflow produced by a U.S. savings shortfall: a real interest differential between the United States and other countries. That is, the sign that the United States offers higher investment opportunities than other economies ought to be high U.S. investment relative to savings *in spite of* a real interest differential that compensates investors for necessary eventual U.S. real depreciation.

So Bernanke's hypothesis does not, at least in any obvious way, offer comfort against concerns about a dollar crisis. There may well be a global savings glut, and that glut may explain why real interest rates are low everywhere. But real rates are nearly as low in the United States, with its huge current account deficit, as in surplus economies. This suggests that markets aren't taking into account the long-run need for dollar decline, which implies that at some point the dollar will plunge.

### *Return differentials*

In recent years economists, starting with Gourinchas and Rey (2005), have drawn attention to an important point, which we've already mentioned, about the U.S. position as a debtor nation: U.S. investors abroad earn substantially higher rates of return than those earned by foreign investors in the United States. This explains why the U.S. balance on investment income is still slightly positive, even though the U.S. net international investment position is strongly negative.

The explanation of this gap lies largely in the low rates of return foreign investors earn on direct investment in the United States. These low returns seem odd; they may reflect either an initial period of "breaking in" to the US market, or they may be a statistical illusion created by tax shifting. If either of these explanations is correct, the US current account deficit may, in a fundamental sense, understate the accumulation of future debts. But suppose that for some reason the return differential is permanent, that it reflects some form of what Gourinchas and Rey call "exorbitant privilege," using DeGaulle's term for the alleged ability of the U.S. to force the world to accept dollars and low-return dollar-denominated securities because of the dollar's key currency status.

Exorbitant privilege is already reflected, in two ways, in the calculations reported in part 2 of this paper. First, the yield differential, coupled with low real interest rates everywhere, leads to a low, perhaps negative value of  $R-g$ . This low value means that the impact of debt buildup on the adjusted current account is basically negligible, a point that does undermine more apocalyptic views of the consequences of today's deficits.

The second effect of exorbitant privilege is its effect on the initial value of  $\dot{D}$ , the rate at which the debt/GDP ratio is changing. Even though the United States is a net debtor, its balance on investment income is still approximately zero, and it's probably significantly positive if you adjust for inflation. So the rate of debt accumulation is actually lower than the deficit on goods and services.

Does exorbitant privilege have any further impacts on prospects for a dollar plunge beyond those already taken account of in these calculations? We'll get to that later.

### *Bretton Woods II*

In a now famous phrase, Dooley and Garber (2003) declared that the international monetary system has entered "Bretton Woods II", a new era in which major central banks, mainly in Asia, can be counted on to buy dollars in order to maintain more or less fixed exchange rates. A lot of the debate over the Dooley-Garber work has focused on their analysis of central bank motives and their implications: can we really count on the Reserve Bank of China, in particular, to seek ever-larger dollar hoards over the long term? But before we get to that, let's ask what it takes before reserve holdings can matter in the first place.

The answer, of course, is that assets denominated in different currencies must be significantly imperfect substitutes. China is engaged in very large-scale sterilized intervention that supports the dollar; sterilized intervention only affects exchange rates to the extent that bonds in different currencies are imperfect substitutes. Imperfect substitution means both that Chinese reserve acquisition can have an impact on the value

of the dollar, and that interest rate differentials cannot be interpreted as implicit forecasts of future exchange rates. So the data in Table 2 could, in principle, be consistent with the view that everyone expects the dollar to decline by 2 or 3 percent per year in real terms. And Dooley and Garber in effect argue that capital is still flowing in the United States, in spite of the low rate of return, because central banks believe that they need dollar assets to provide liquidity, act as escrow for direct investment, and so on.

But if central bank intervention was really supporting the dollar in spite of a fairly high rate of expected real depreciation, one would expect to see private capital outflows at least partly offsetting official capital inflows. That is official inflows should not merely be financing the current deficit, they should be overfinancing it (as they do, in reverse, for China's current account surplus.)

In fact, however, official data seem to indicate that while central bank reserve accumulation plays a substantial role in financing the U.S. current account deficit, private bond purchases also play a large role. Even estimates like those of Setser, which suggest that true official inflows to the United States are larger than reported, show significant private inflow, not the outflow we would expect if official inflows were maintaining the dollar's value in spite of realistic private expectations about the dollar's future evolution. As a result, Bretton Woods II seems a doubtful way to resolve the puzzling fact that investors seem to regard a modest real return differential, well short of reasonable estimates of the rate at which the dollar must fall, as sufficient to attract private funds into the United States.

*Dark matter*

In an analysis that made a substantial media splash, Hausmann and Sturzenegger (2005) argued that the positive US balance on investment income, despite a large net debtor position, reflects measurement error. In particular, they argue that U.S. assets overseas are drastically understated by official statistics, probably because U.S.-based multinationals are exporting hidden assets, such as reputation and marketing expertise. They argued that this “dark matter” not only implies that the U.S. isn’t a net debtor, but that the true current account balance is much less in deficit than the measured number.

There have been many discussions of this claim. Let me summarize what I believe to be the two key points.

First, the puzzle of the investment income balance seems to reflect low returns on foreign investment in the United States rather than high returns abroad. As Brad Setser puts it (using bad physics but good economics), to explain the numbers using the Hausmann-Sturzenegger approach we need “dark antimatter,” not dark matter; rather than having US firms export good reputations to overseas markets, we need foreign firms bringing bad reputations to US markets, which doesn’t seem to make sense.

Second, the *level* of dark matter, if it exists, isn’t very important to sustainability calculations. What we need to refute the argument made in section 2 of this paper is a rapid increase in dark matter and/or dark antimatter, so as to reduce the value of the adjusted current account deficit. And that’s a much harder case to make.

*Secular dollar decline*

One last point actually strengthens the case for a dollar plunge: the argument that any long-term dollar decline must chase a moving target.

Figure 2 shows the U.S. real effective exchange rate and the deficit on goods and services as a percentage of GDP since 1975. The data strongly confirm the impact of the real exchange rate on the trade balance, especially during the dollar cycle of the 1980s, while indicating a significant lag in that relationship, which as we'll see may play an important role in the adjustment to a dollar plunge. But they also suggest a significant secular downward trend in the real dollar: over time, the real dollar associated with any given level of trade deficit seems to have declined.

Old hands often refer to such secular trends with the term “Houthakker-Magee,” after the early work showing large differences in the income elasticities of demand for U.S. exports and imports. At a deeper structural level, the secular decline in the dollar may reflect technological catch-up by emerging economies; the data hint at an accelerated trend as China's exports have soared. Whatever the source, a downward trend in the equilibrium real exchange rate reinforces the case that markets are not properly taking future declines in the dollar into account.

#### *4. Macroeconomics of a plunge*

Suppose that there is a dollar plunge. What will this do to spending, income, and output?

There is broad consensus about what a fall in capital inflows would mean in the medium run. The dollar would depreciate in real terms, leading to a rise in net exports. At

the same time, domestic demand would be compressed, possibly via a rise in interest rates. Overall aggregate demand should be roughly unchanged, with higher net exports and reduced domestic spending canceling each other out.

The question is whether the transition to this new equilibrium would be smooth or rocky – whether it will involve a recession or at least a slowdown along the way. Mainly this comes down to the question of whether the squeeze on domestic demand will get ahead of the rise in net exports. Let me deal briefly with two possible reasons for a temporary slump in aggregate demand, before turning to what I believe is the central issue for the United States.

In many sudden stop crises in the developing world, balance sheet effects of depreciation seem to have played a crucial role. Indonesia 1997 and Argentina 2002 are the classic examples. In each case external debts were denominated in foreign currency, so that when the domestic currency fell the net worth of many economic agents was compressed, in a sort of open-economy version of Fisherian debt deflation. Advanced countries are less susceptible to this effect because they tend to be able to borrow in their own currency. The United States, of course, is especially secure. In fact, the nature of its international investment position means that depreciation tends to reduce net indebtedness and raise net worth.

The United States is less secure against a surge in consumer prices as a result of a sharp dollar decline, although even there pricing to market by foreign firms may limit the effect. If the Federal Reserve feels that it must respond to an increase in headline inflation by raising short-term interest rates – perhaps because it believes that wages and other factor costs are indexed, at least implicitly, to inflation – this could indirectly be

contractionary. The Fed's recent response to a spike in energy prices suggests that there may be something to this. But it's not the main channel most of those fearing a dollar plunge have in mind.

The main concern, instead, is that the compression of domestic demand caused by a reduced foreign willingness to buy dollar assets will happen quickly, while the increase in net exports will happen slowly. But this can seem a bit puzzling. If we expect net exports to rise in the future, that's the equivalent of saying that foreign savings available to finance domestic investment will dry up at some future date. But what's the channel through which the expectation of a future fall in savings reduces demand today?

Discussions such as DeLong (2005) emphasize the effect of future savings on long-term interest rates. I find it clearer, however, and perhaps more accurate, to focus on Tobin's  $q$ : the price of capital in place relative to replacement cost.

Consider the following stripped-down representation of the savings-investment balance:

$$(7) S(q) - I(q) = B(x)$$

I include an effect of  $q$  on saving because of wealth effects. In fact, in the United States today surely the most important component of  $q$  is housing. Rising house prices have led both to high residential investment spending and, via refinancing, high consumption and low spending. Equation (7) defines an upward-sloping locus, as shown by GG in Figure 3.

Meanwhile, investors are comparing returns at home and abroad. Let's write the arbitrage equation as follows:

$$(8) \frac{n}{q} = r^* + \rho$$

where  $n$  is the rental per unit of capital and  $r^*$  is the rate of return on foreign bonds . Here,  $\rho$  is a catch-all term that includes risk premia and expectations both about future exchange rates and future values of  $q$ . The case for a dollar plunge can be represented in this framework as a claim that  $\rho$  is low right now compared with its medium run value, and can be expected to jump. This would have the effect of moving the economy along the curve GG from a point like 1 to a point like 2, causing a real depreciation together with a fall in  $q$ .

Why might we argue that  $\rho$  is low and must rise? First, as argued above, we can argue that investors have unrealistic expectations about future exchange rates, because they have failed to take proper account of the prospective decline in the real value of the dollar. Second, we can argue that investors have unrealistic expectations about future values of  $q$ . In practice, this amounts to saying that there is a bubble in housing prices, which in real terms are vastly above historical experience. This doesn't prove the existence of a housing bubble, a question that is much debated, but it explains why those so inclined may see high housing prices as a very big issue – quite possibly bigger than the current account deficit.

The possible excesses in housing are the reason it may be a mistake to focus on long-term interest rates in analyzing the possible effects of a dollar plunge. Suppose that we

have double bubble trouble, and the crisis takes the form of a more or less simultaneous downward revision of expectations about the future value of the dollar and expectations about the future price of houses. In that case, long-term interest rates could move either way.

Now, finally, we can ask whether the medium-term adjustment shown in Figure 3 would involve a recession or at least a slowdown in the short run. The answer depends on the relative speed of adjustment to changes in  $x$  and in  $q$ . To put it crudely, if the contractionary effect of a burst housing bubble arrives more quickly than the expansionary effect of a dollar depreciation, a dollar plunge will be associated with an overall slump.

In fact, at the time of writing a serious slump seems to be developing in the U.S. housing market, while the dollar remains in the same range as recent experience. If this really represents the bursting of the housing bubble, issues of dollar sustainability cannot play the leading role in driving an economic slowdown. However, a dollar plunge, by heading off what might otherwise be a substantial fall in long-term interest rates, may extend and deepen the housing-induced slump.

A weaker dollar would eventually be expansionary through its effect on net exports. But standard estimates indicate a lag of more than two years before depreciation has its full effect on trade flows. Moreover, the size of the trade deficit is unprecedented; this suggests that a major increase in net exports may take longer than usual, because resources need to be shifted on a large scale back into tradable sectors.

Can the Fed offset the contractionary effects of a dollar plunge-cum housing slump by cutting interest rates? There are two possible limitations to the Fed's ability to act. One is

that the Fed, concerned about inflation, might be reluctant to cut rates in the face of a plunging dollar. The second is the zero bound on the Fed funds rate. Bear in mind that the principal channel through which Fed policy affects domestic demand is via housing. If a burst housing bubble is part of the economic problem, the Fed's leverage over the economy will be greatly reduced, and even a zero Fed funds rate might have only modest stimulative effect. So there's a plausible, but far from conclusive, case that the initial impact of a dollar plunge will be contractionary, and that the Fed will find itself unable to offset this contraction.

Are we missing something here? Quite possibly. The history of crisis modeling in international macroeconomics reveals that each successive wave of crises exposes possibilities for crisis that were overlooked in earlier analysis. There may be risks of a hard landing – perhaps in the form of financial disruption – that are overlooked by our models. On the other hand, there are cautionary tales on the other side: currency plunges, from the dollar in 1985 to Brazil's *real* in 1999, that were widely expected to bring recession in their wake but didn't.

## 5. *Summary and conclusions*

Concerns about a dollar crisis can be divided into two questions: Will there be a plunge in the dollar? Will this plunge have nasty macroeconomic consequences?

The answer to the first question depends on whether there is investor myopia, a failure to take into account the requirement that the dollar eventually fall enough to stabilize U.S. external debt at a feasible level. Although it's always dangerous to second-

guess markets, the data do seem to suggest such myopia: it's hard to reconcile the willingness of investors to hold dollar assets with a very small premium in real interest rates with the apparent necessity for fairly rapid dollar decline to contain growing foreign debt. The various rationales and rationalizations for the U.S. current account deficit that have been advanced in recent years don't seem to help us avoid the conclusion that investors aren't taking the need for future dollar decline into account.

So it seems likely that there will be a Wile E. Coyote moment when investors realize that the dollar's value doesn't make sense, and that value plunges.

The case for believing that a dollar plunge will do great harm is much less secure. In the medium run, the economy can trade off lower domestic demand, mainly the result of a fall in real housing prices, for higher net exports, the result of dollar depreciation. Any economic contraction in the short run will be the result of differences in adjustment speeds, with the fall in domestic demand outpacing the rise in net exports.

The United States in 2006 isn't Argentina in 2001: although there is a very good case that the dollar will decline sharply, nothing in the data points to an Argentine-style economic implosion when that happens. Still, this probably won't be fun.

## REFERENCES

B. Bernanke (2005), "The global savings glut and the U.S. current account deficit"

O. Blanchard, F. Giavazzi, and F. Sa (2005), "International investors, the U.S. current account, and the dollar," *BPEA 1:2005*

J. B. DeLong (2005), "Divergent views on the coming dollar crisis," *The Economists' Voice*, 2:2005

M. Dooley, D. Folkerts-Landau, and P. Garber (2003), "An essay on the revived Bretton Woods system," NBER Working Paper #9971.

S. Edwards (2005), "Is the U.S. current account deficit sustainable? If not, how costly is adjustment likely to be?," *BPEA 1: 2005*

B. Eichengreen (2006), "Global imbalances: The new economy, the dark matter, the savvy investor, and the standard analysis," forthcoming, *Journal of Policy Analysis*

P. Gourinchas and H. Rey (2005), "U.S. external adjustment: the exorbitant privilege," mimeo, Princeton.

R. Hausmann and F. Sturzenegger (2005), "Dark matter makes the U.S. deficit disappear," *Financial Times*, December 8, 2005.

P. Kouri (1976), "The exchange rate and the balance of payments in the short run and in the long run: A monetary approach," *Scandinavian Journal of Economics*, 78: 280-304.

P. Krugman (1985), "Is the strong dollar sustainable?", in Federal Reserve Bank of Kansas City, Proceedings.

S. Marris (1985), "Deficits and the Dollar: The World Economy at Risk," Washington: Institute for International Economics.

M. Obstfeld and K. Rogoff (2005), "Global current account imbalances and exchange rate adjustments," *BPEA 1:2005*.

N. Roubini and B. Setser (2005), "Will the Bretton Woods 2 regime unravel soon? The risk of a hard landing in 2005-2006," draft, NYU.

B. Setser (2006), "So, just who is financing the U.S. deficit?", *RGE Monitor*, Sept.13, 2006.

Table 1: Implications of different rates of convergence

$\kappa$	Initial value of $\dot{D}$	Long-run value of $D$	Initial rate of real depreciation
.05	.049	1.18	.0175
.10	.038	0.58	.035

Table 2: Interest rates and inflation, April 2006

	Long-term interest rate, August 2006	Break-even inflation rate on index bonds, August 2006
United States	4.87	2.6
Euro zone	3.97	2.2
Japan	1.82	0.8

Source: ECB *Monthly Bulletin*, Sept. 2006; IMF *Global Financial Stability Report*, Sept. 2006

Figure 1

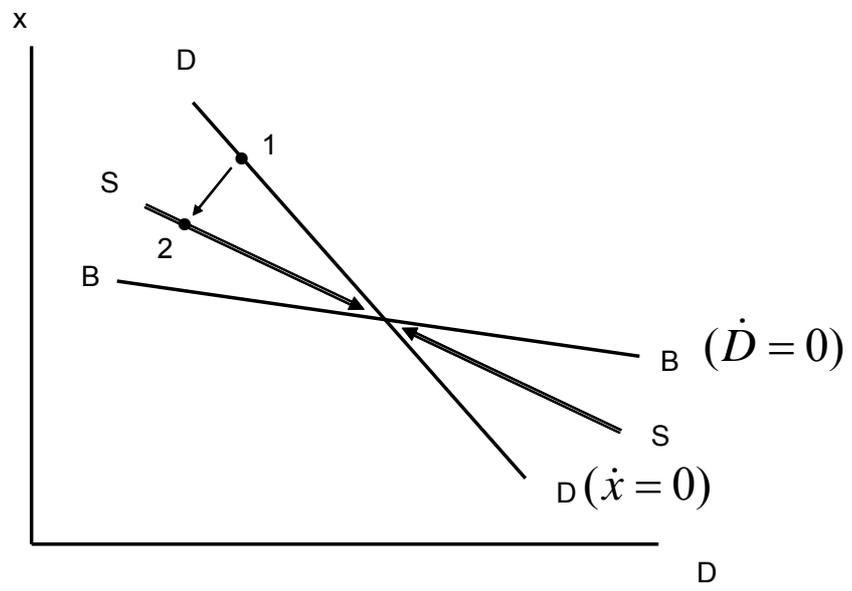
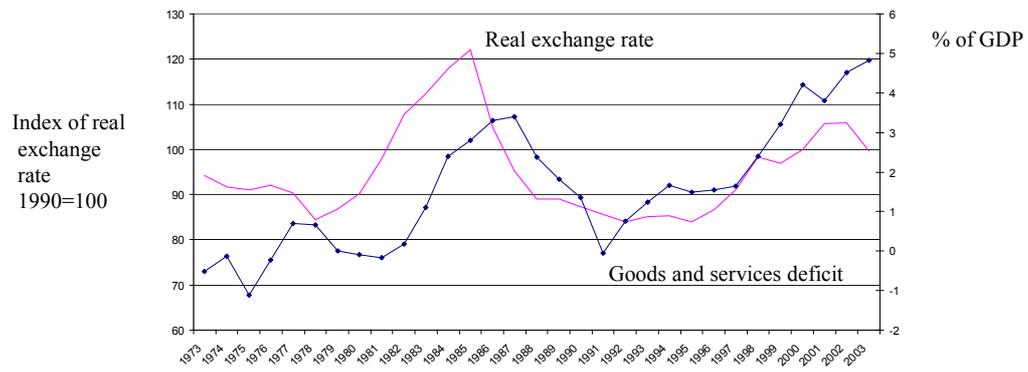


Figure 2



Source: OECD Economic Outlook database

Figure 3

