Strategic Analysis

Interim Report: Notes on the U.S. Trade and Balance of Payments Deficits

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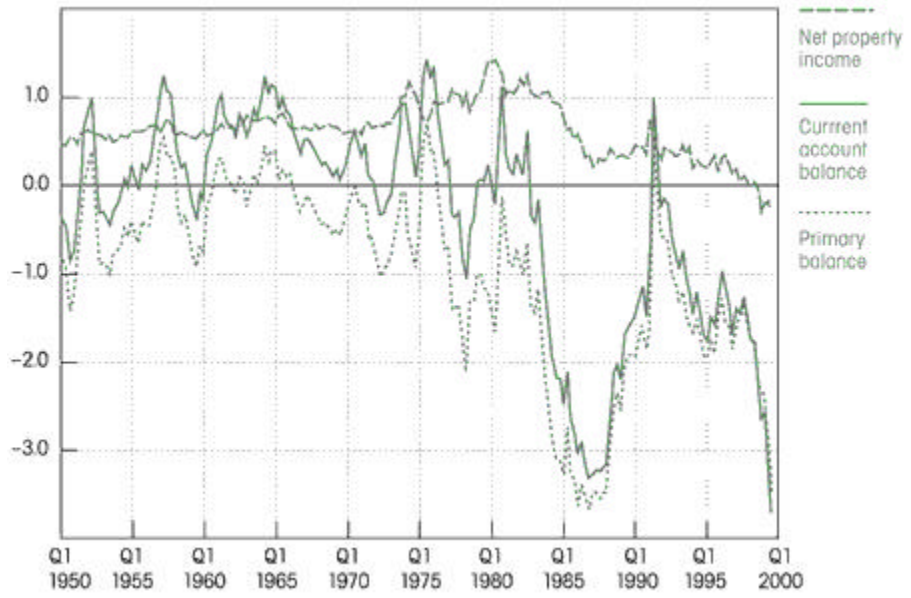
Summary

1. The United States has a balance of payments deficit worth nearly 4 percent of GDP and negative net foreign assets (or foreign debt) worth nearly 20 percent of GDP. If U.S. growth is sustained in the medium term, it is quite likely that the balance of trade in goods and services will not improve. The United States is the only major country, or country "bloc," to have a substantial trade deficit and this is proving of great advantage to the rest of the world.
2. If the balance of trade does not improve, there is a danger that over a period of time the United States will find itself in a "debt trap," with an accelerating deterioration both in its net foreign asset position and in its overall current balance of payments (as net income paid abroad starts to explode). Such a trap would call imperatively for corrective action if it is not at some stage to unravel chaotically.
3. The emergence of a debt trap is put forward as a possibility that must be taken seriously rather than as a forecast of what is most likely to happen. Policymakers are advised to ensure that adequate instruments are available should things start getting out of hand.
4. Whether the outflow of property income starts to accelerate depends critically on the rate of return earned on internationally owned assets and liabilities. The well-known condition for exploding payments on debt is that the rate of interest exceeds the growth rate. At present the United States's negative position is worth about $1,500 billion while the net foreign income outflow is only about $10 billion, so it might be supposed that there is nothing to worry about. But this is deceptive. The low rate of return overall, measured ex post, is the consequence of the extremely low return so far earned on foreign direct investments in the United States. However, the bulk of any change in the net asset position, in the future as in the past, is likely to take the form of financial investment, which has been earning a much higher rate of return and one that already slightly exceeds the growth rate. Also, the return on foreign direct investment in the United States may improve.
5. There have recently been extremely heavy direct investments by foreign firms in the United States, but a high proportion of these have been financed by exchange of shares and, to that extent, make no contribution at all to the financing of the deficit. The analysis of capital account flows and rates of return would be greatly facilitated if acquisitions financed by share exchange were identified separately in the accounts.
6. Policy responses in principle come down to:
    a. Reducing domestic demand
    b. Raising foreign demand
    c. Reducing imports and increasing exports relative to GDP, preferably by changing relative prices
7. The danger is that resort (perhaps by default) will be had to remedy (a), in other words, that chronic and growing imbalances between the United States and the rest of the world come to impart a deflationary bias to the entire system, with harmful implications for activity and unemployment. Remedy (b) reads hollow when neither appropriate institutions nor agreed upon principles exist, but should not be dismissed out of hand. As for remedy (c), currency depreciation is the classic remedy. But, in view of the way global capital markets work, depreciation has ceased to be a policy instrument in any ordinary sense, and "floating" cannot be counted on to do the trick. Policymakers should be aware of the possibility of using nonselective (nondiscriminatory) control of imports in extremis in accordance with the principles set out in Article 12 of the WTO. Such a policy is to be sharply distinguished from "protectionism" as commonly understood.

Recent Developments

Chart 1 shows the United States's current balance of payments (expressed as a percent of GDP) since 1950. In the early postwar years there was generally a surplus, but since 1982[1] there has been a deficit that has trended upwards, albeit with large fluctuations, reaching a postwar record of 3.6 percent of GDP in the third quarter of 1999. Net property income[2] from abroad has fallen from about 1 percent of GDP (positive) in the early 1980s to a small negative in 1999. The chart also shows the "primary" balance of payments, that is, the current balance less net property income (the difference between the other two lines on the chart).[3]

Chart 1
The U.S. Current Account and Related Series (Percentages of GDP)

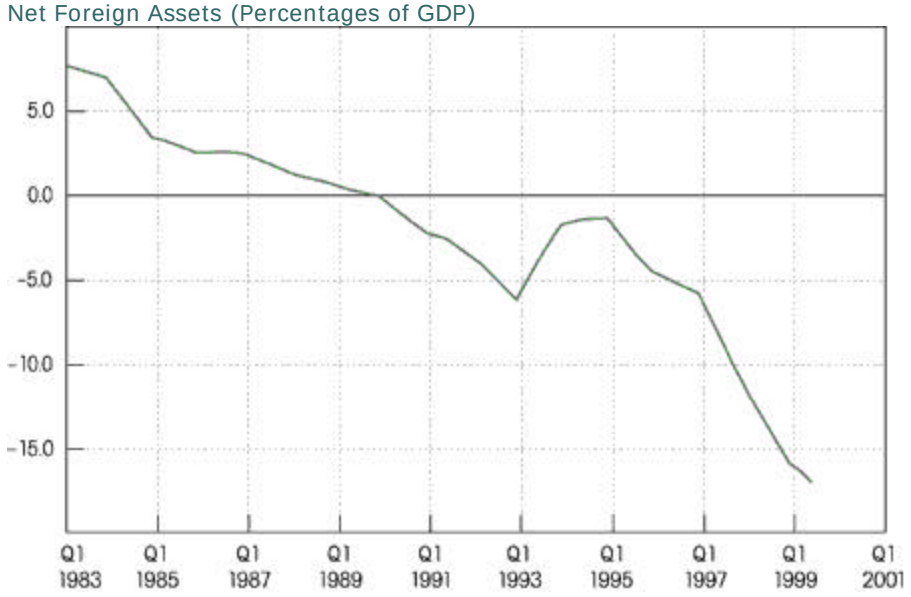


Source: Citibase

The current account deficit has generated a large and growing debt owed by the United States to foreigners, which some people prefer to call the United States's negative net asset position (NNAP). As Chart 2 shows, the NNAP reached about -17 percent of GDP in the middle of 1999. With the current account deficit running at nearly 4 percent of GDP and a further rise in stock prices, the NNAP will probably reach -20 percent of GDP by the end of this year.

The United States's economic expansion and its high and rising external deficit have been of enormous benefit to the rest of the world, large parts of which, even so, have been depressed or stagnating. The United States has for some time been the only country (or country "bloc") to have a significant trade deficit; any serious attempt to eliminate the U.S. deficit could, accordingly, have serious implications for the world economy.

Chart 2
Net Foreign Assets (Percentages of GDP)



Source: Survey of Current Business (SCB), Citibase, and author's projections

Things as They Appeared in 1996 and Now (Percentages of GDP)

	Current Account Balance		Net Foreign Assets ("NNAP")		Net Property Income	
	Then (1)	Now (2)	Then (3)	Now (4)	Then (5)	Now (6)
1993	1.3	-1.1	-10.0	-2.7	0.16	0.37
1994	-2.0	-1.5	-10.3	-2.5	-0.05	0.24
1995	-1.9	-1.3	-12.5	-5.7	-0.10	0.27
1996		-1.4		-7.0		0.23
1997		-1.5		-12.8		0.05
1998		-2.3		-17.5		-0.11

The above table shows the main indicators as they appear now and as they appeared three years ago.The revisions to the stock data (shown in columns 3 and 4) have been spectacular, with the NNAP for 1995 revised down by about 60 percent; but revisions to the current account have also been substantial. I note these revisions with some feeling because several years ago (Godley 1995) I wrote a paper that drew alarming conclusions from the figures in columns 1, 3, and 5, supposing them to be accurate. However, we do now seem to be faced with a situation similar to, but if anything worse than, that which I wrongly supposed we were facing three years ago. I shall continue this submission on the assumption that the new figures are correct, while keeping a very large reservation concerning their reliability in the back of my mind.

Basic Concepts

I find myself provoked by some of the submissions the Commission has received into making a few observations about elementary concepts. The current balance of payments is defined as

(A) Exports - imports + net property income from abroad = national income (GNP) - private expenditure - public expenditure

This expression can be enriched by deducting taxes (defined to include government transfers) from income and then including a new expression (the budget balance) in which taxes and transfers are added back again. So we now have

(B) Exports - imports + net property income from abroad = [national income - taxes - private expenditure] + [taxes - public expenditure]

This expression implies that a balance of payments deficit is always equal by definition to the excess of private spending over private disposable income plus any budget deficit (or less any budget surplus).

While (B) is, in itself, nothing more than an accounting identity, it provides a useful framework for making a causal analysis because so much can be organized around the concept of aggregate income. Thus, imports are related to income (as well as to the price of imported goods relative to domestically produced goods); taxes are functionally related to income; and private expenditure is functionally related to income less taxes. At the same time income itself is always equal to the total of all expenditures less imports. As soon as these relationships are articulated and exports seen as a function of world activity and relative prices, we get a sense of the main individual lines of causality as well as a sense of the complex interdependence of the system as a whole. The outcome for GDP and the primary balance of payments may be thought of as the solution to a set of simultaneous equations that have as exogenous variables world output, the government's fiscal and monetary policy, and domestic relative to foreign prices.[4] Net property income is determined by the net wealth or debt generated by the current account flows together with the rate of return this earns. The analysis presented here uses an econometric model based on these ideas that simulates past history fairly accurately.

The model outlined above suggests some of the reasons the trade deficit has been growing. The United States, with its relatively fast growth rate, has had a greater appetite for imports (given their relative price in domestic markets) than foreigners have had for U.S. exports (given their relative price in foreign markets). The readiness of foreigners to invest in U.S. assets has kept the exchange rate from falling to a level that would correct the adverse trends in trade. This model is also suggestive of remedies if they are needed. If the deficit is to be reduced without resort to protectionism, either domestic activity must be reduced or foreign activity must be raised or relative prices must be changed, by hook or by crook, in a way that causes the United States to sell a higher proportion of its output abroad or reduce its dependence on imports.

Regrettably, it is common practice to modify the identity called (B) by deducting private consumption both from disposable income and from private expenditure and also by deducting public consumption from the budget balance. This leaves a familiar expression that says

(C) Balance of payments = [private saving - private investment]+ [public saving - public investment]

There is nothing formally wrong with (C). It is an accounting identity, true by definition. But it has abolished the concept of aggregate income without which a causal analysis of the system as a whole is impossible. And because this organizing principle has been lost, the expression seems to have encouraged people to suppose, because the deficit is equal by definition to an excess of investment over saving, that it could be cured, quite simply, if the American people were to save more or invest less. But this is misleading to the point of being incorrect, if the conclusion is then drawn that a rise in saving could, by itself, cure the deficit by any means that would not also cause a first-class recession in the economy.

Balance of Payments Deficit as Net Investment

The current balance of payments, as it appears in Table 4.1 of the NIPA, is described as "net foreign investment." "Investment" in this context means nothing more than that foreigners are net lenders of the funds the United States must borrow to cover the excess of its spending over its income. It is clear from evidence presented to the Trade Commission that there exists an influential line of argument that would equate this "investment" with fixed capital formation in the United States that would not otherwise have happened. Hence, the argument continues, the deficit is benign because it leads to an enlargement of the capital stock, raises productivity, raises the U.S. growth rate, etc., etc.

This argument was made clearly, explicitly (and influentially) by Herbert Stein in an article published in *The Wall Street Journal* on May 16, 1989 ("Don't Worry about the Trade Deficit"). According to Stein, if foreigners had not been buying government bonds, U.S. residents would have had to buy them instead, so that there would have been correspondingly fewer funds available for domestic investment.

It is certainly true that if there were no deficit, total domestic expenditure would have to be lower absolutely, by the amount of the deficit, than it actually now is; some items of domestic expenditure would have had to be replaced by net exports. But there is no reason to suppose that any of this reduction in domestic expenditure--let alone the whole of it--would take the form of fixed investment. Aggregate demand could be the same in each case, so the general incentive to invest need not be lower. At the same time, in order to generate a switch of demand in favor of net exports, the exchange rate and interest rates would probably both have had to be lower than they have actually been--but these are both factors that would have tended to *increase* investment.

In the "alternative" position in which there is no deficit (which is to be compared with the present, actual situation), it has to be the case, by the balance of payments identity (B), that the financial surplus of the private and public sectors combined would be higher (by the full amount of the deficit) than at present. There would therefore be additional financial funds available from domestic sources (including the government) on exactly the scale needed to replace funds from foreign investors; foreign funds would no longer be forthcoming, but they would also no longer be needed.

Herbert Stein makes no mention of the fact that, since U.S. domestic expenditure has for years exceeded GNP by large and growing amounts, the United States has become "the world's largest debtor." Yet it is the cost of servicing this debt that is now the main cause for concern.

Some Substantial Issues

Prospects for the Trade Deficit

To bring some focus to the discussion, I first derive a "base case" projection of the primary deficit that is consistent with the projections published by the Congressional Budget Office and the "consensus" forecasts of developments in the rest of the world.[5] The base case projects an average GDP growth rate of 2.5 percent over the next five years following a 3.75 percent expansion this year. The average annual growth in the rest of the world is projected to rise from the depressed 2 percent rate seen in the last couple of years to 4 percent a year (using IMF definitions).

A moderate fall in the dollar is assumed to provide some uplift to competitiveness even given the consensus expectation that American inflation modestly exceeds the average of its trading partners. Inflation adjusted, the real value of the dollar is assumed to fall cumulatively by 4.5 percent over the next five years.

The price of oil is projected to be close to $20 per barrel, which is well below today's spot price. Other commodity prices are assumed to stay roughly constant in nominal terms.

A key implication of all these assumptions is that there will soon be a sharp revival in U.S. export volume growth. Hit by competitiveness losses and the depressive effects of the collapse in Asian and other emerging economies, American export volumes rose a meager 2.2 percent in 1998 and might grow by 3.5 to 4 percent this year. This performance is transformed in the projection, which envisages a rapid acceleration, pushing annual growth to above 7 percent after the turn of the decade.

But even this sharp revival will not, on the face of it, prevent some further worsening of the trade deficit. Several considerations act to offset the export volume uplift.

1. It is well attested from many studies that the United States has a relatively high propensity to import, implying a tendency for imports to grow in volume more quickly than exports even when American GDP growth only matches that in the rest of the world.
2. In recent years, commodity price weakness has improved the United States's terms of trade--and, to that extent, flattered trade performance. Prospectively, commodity price stabilization and higher oil prices will have the opposite effect.
3. The large excess of imports over exports is itself a source of trade drag. Even if exports and imports grew at the same rate, the absolute trade gap would get larger. In this base case, this effect widens the primary deficit by 0.5 percent of GDP.

Taken together, these projections imply that the primary deficit will rise slightly from 3.6 percent of GDP in the middle of 1999 to about 4 percent in 2004. After 2004 the primary deficit is arbitrarily assumed to remain constant.

Prospects for Debt and Property Income

Whether and for how long a primary deficit can be tolerated depends critically on the rate of interest that has to be paid on the debt (NNAP) the deficit generates. There exist theorems,[6] well known to students of debt processes, that precisely describe the dynamics of debt accumulation. One of the most important of these states that if the real rate of interest exceeds the economy's growth rate, an indebted country with a primary deficit, however small, will find its debt-to-GDP ratio growing forever--a process that obviously could not in reality go on for very long and that would, by the laws of logic rather than economics, imperatively require correction before things got out of hand. The theorem implies that if the interest rate exceeds the growth rate, an indebted country must achieve a surplus in its primary balance if the debt is not to explode.

The fact that escalating debt must eventually be corrected can be proved by *reductio ad absurdum;* for instance, the foreign debt could not be allowed to grow to the point at which the entire GDP is preempted by the need to make interest payments abroad, thereby reducing the GNP to zero. Escalating growth in the NNAP would simply have to be checked at some stage, the only questions being how and when. It is not valid to

assume that deficits are painlessly self- correcting if only because instances abound of emergent debt traps in other countries (e.g., Denmark, Australia, Ireland), which inexorably led to painful periods of retrenchment following which the primary balance was moved into surplus. The United States is fortunate in that, unlike other debtor countries, its debts are denominated in dollars and this means that devaluation does not involve a capital loss. But neither this advantage nor the enormously preponderant wealth and power of the United States, exempts the country from the laws of compound interest.

Although the NNAP in 1999 had grown to around $1,500 billion, the net outflow of property income has recently been running at only $10 billion per annum. If the United States could continue to borrow on any scale whatever and for any length of time without, in effect, paying interest at all, there would be little to worry about.

The main reason why the net outflow of property income has been so small is that the rate of return on foreign direct investment in the United States has been very much lower than the return on U.S. direct investment abroad. The stocks of inward and outward investment (measured in dollars and at market prices) are now about equal to one another, yet the inflow of direct investment income is about $60 billion larger than the outflow.

Chart 3 shows the gross flows of income from direct investment into and out of the country, expressed as a proportion of each capital stock (measured at market prices). It is noteworthy that in 1991 foreign direct investors in the United States, taken together as a group, actually made a loss. Neither of the two attempts to explain this phenomenon of which I know [Laster and McCauley (1994) and Grubert (1997)] are very conclusive. Laster and McCauley reached the tentative conclusion (to some extent confirmed by Grubert) that foreigners earned low returns because they were newcomers and that they would probably do better as they learned American ways. But while there has been some improvement, certainly compared with 1991, this explanation is wearing thin after six more years of relatively poor profit performance.

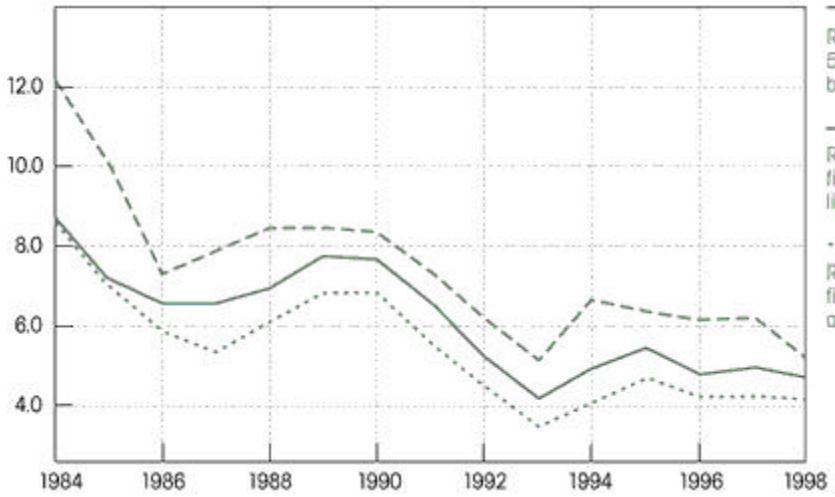
Chart 3
Rates of Return on Direct Investment, Measured *Ex Post*

Source: SCB July 1999 and author's arithmetic

However, the United States cannot rely on foreigners making poor investments in the United States to finance the current account deficit to more than a very limited extent. Apart from the fact that foreign direct investments may perform better in the future, the greater part of the funds needed to finance the deficit will have to come from financial investment, where the rates of return are much higher than those earned, so far, by foreign direct investors. It is true that during the last twelve months there has been a surge in foreign direct investment. But this surge provided very little finance for the current account deficit because it was largely financed by exchange of shares. Further discussion of this important point has been banished to the appendix.

Chart 4 shows inward and outward flows of property income other than those associated with direct investment as a percent of the financial asset and liability stocks that generated them. Notwithstanding that these "interest rates" are the messy outcome of dividing very diverse aggregates into one another, they have exhibited a considerable degree of coherence, moving roughly in step with one another and with, say, the rate on 5-year U.S. Treasury bonds. It is not surprising that "interest rates" on internationally held financial assets should be lower than the yield on bonds, if only because very roughly a quarter ($1 trillion to $1.5 trillion) of all financial assets held by foreign investors take the form of equities, which carry a very low running yield.

Chart 4
Various Rates of Interest



Source: SCB July 1999, Citibase, and author's arithmetic

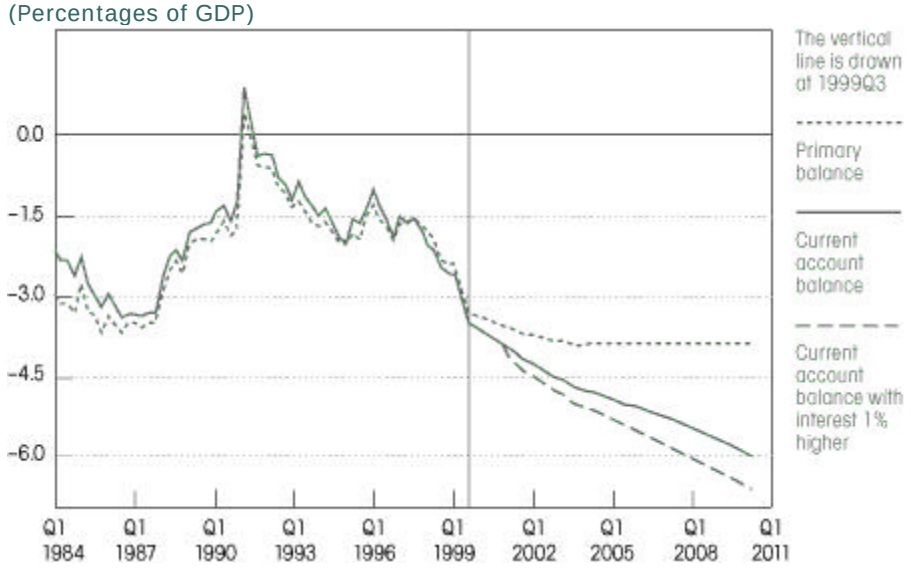
It is perfectly proper to measure the income derived from equities by their running yield, since this harmonizes with other NIPA conventions; besides, while any capital gain earned by foreigners adds to the United States's NNAP, it does not have to be financed as regular income flows have to be financed. There exists, however, an obvious danger that large-scale net sales of equities by foreigners might at some stage occur, and these would have to be financed by sales of bonds or other instruments bearing high rates of interest, which would substantially change the net property income flow for the worse. Even as things stand, the average real rate of "interest" on all financial liabilities (including equities) has been slightly above the normal growth of output and, with rising interest rates within 1999, may have come to exceed it more decisively by the end of the year.

In the base case simulation presented below, it has been assumed that the bulk of the funds that will be needed to finance the growing current account deficit will in the future come from sale of securities with an average rate of interest equal to 4.5 percent--very slightly above the rate that actually obtained in 1998.

Synthesis

Chart 5 puts together the assumptions and conditional predictions discussed in the preceding sections. The striking feature of the chart is that, while the primary balance does not deteriorate very much from now on, the net outflow of property income (measured by the gap between the primary and the current account balance) takes up the running, making the current account deficit as a whole continue to increase almost as fast in the future as during the last five years. After ten years the current account deficit is about 6 percent of GDP, nearly double its present level, while the NNAP (see Chart 6) continues to rise rapidly, reaching 50 to 60 percent of GDP in ten years' time. Chart 5 also shows a projection of the current balance of payments on the assumption that the average rates of interest on financial assets and liabilities are both 1 percent higher than in the base case. As is to be expected, the deficit rises faster and the increase in the net outflow of property income shows clear signs of acceleration.

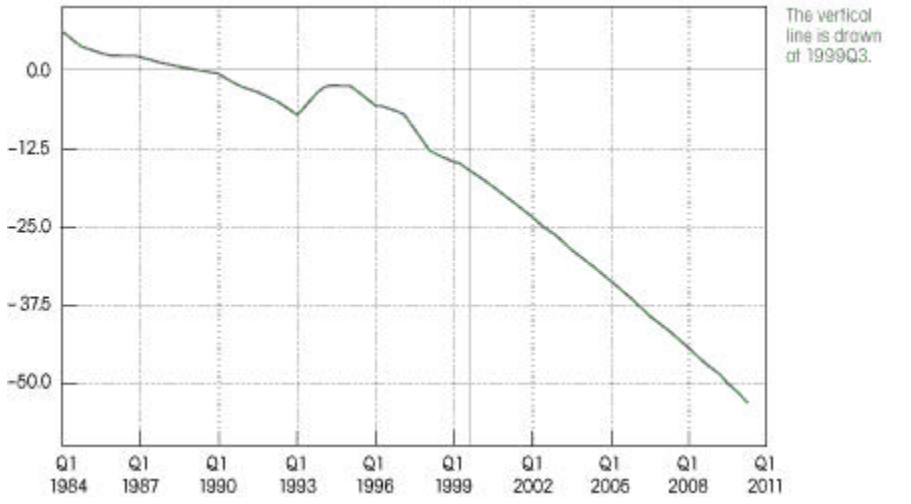
Chart 5
The Current Account and Primary Balances: Actual and Projected
(Percentages of GDP)



Source: SCB, Citibase, and author's projections

Charts 5 and 6 describe situations that, for a number of reasons, could not really happen or be allowed to happen. The interest cost (around 2 percent of GDP) would not be extremely large even after ten years. But the United States would by then have to be generating foreign capital inflows every year worth 6 percent of GDP and high and rising interest rates would probably be needed to bring this about, thus making the outflows of property income even larger than those in the projections. Next, recalling the identity (B), it would be necessary for the government to run a high and rising deficit as a counterpart of the external deficit, for it seems inconceivable that the private sector deficit, which is already at a record level, could rise further by enough to match the whole of the external deficit. But above all, it would have become clear at some point during the first decade of the new millennium that the United States was indeed in a debt trap that would be calling absolutely for countervailing measures, if it had not already caused a disorderly collapse in the dollar with inflationary and other implications that cannot clearly be foreseen.

Chart 6
Net Foreign Assets: Actual and Projected (Percentages of GDP)



Source: SCB, Citibase, and author's projections

Policy Considerations (Provisional)

The projections I have presented in this paper do not have the status of forecasts. I particularly emphasize this because it happens to be my opinion that the United States will undergo a period of recession or severe stagnation in the first decade of the new millennium, in which case the balance of payments deficit will greatly improve and any plans to improve it could be shelved. My aim, having made a fairly careful analysis of the recent past, is simply to display what seems reasonably likely to happen if world output recovers but otherwise past trends, policies, and relationships continue for a few more years. To inform policy, it is not necessary to establish that this particular projection is extremely likely to come to pass, only that it must seriously be reckoned to be in the cards. The potential usefulness of the exercise is to warn policymakers of grave dangers that may exist and to help them think out what policy instruments are, or should be made, available to deal with worst cases, should they

arise.

Yet it is somewhat awkward to discuss policy responses to the hypothetical situations that have been outlined in this paper at a time when the whole concept of active macroeconomic policy has gone out of fashion. Active fiscal policy seems for the time being to have been ruled out of court and there is a widespread belief that "market forces," working both nationally and globally, can and must be counted on to correct any imbalances that turn up. Macroeconomic policy seems nowadays to mean nothing more than the small changes the Fed and other central banks make in response to expectations about inflation.

My diffidence is increased by the fact that there is no compelling cause for immediate concern. Even ignoring that the problem may be at least temporarily eased if the United States enters a period of stagnation or recession, it could well be, as my simulations indicate, quite a long time before the alarm bells ring in earnest.

Nothing can alter the fact that an emergent foreign debt trap could at some stage place the U.S. authorities under the obligation to bring about a substantial improvement in the primary balance. By the standard theorem of debt dynamics, to stabilize the debt-to-GDP ratio, the primary balance would have to move into surplus on whatever scale is needed to pay for the property income outflow.

As indicated in the section on basic concepts, the range of possible policy responses comes, in principle, down to three categories: policies to reduce domestic output, policies to raise foreign demand, and policies to change relative prices so that a higher proportion of output is exported or a lower proportion imported.

Of these alternatives, the easiest, technically, to operate is the first. Faced with an intractable external crisis, the easiest and (probably) most common response is to deflate demand, using some combination of fiscal and monetary policy. But this is a solution to be deplored. It would allow the United States's external imbalance to impart a disinflationary bias to world, as well as to U.S., production and trade.

"Policies to raise foreign demand" sounds distinctly hollow at a time when any form of demand management or policy intervention of any kind seems to be ruled out in the public discussion and when appropriate international arrangements do not exist. Yet if the argument of this paper has any merit, there must be a danger, at the very least, that endemic trade and payments imbalances come to impart a severe deflationary bias to the whole system of world production and trade. If the means are obscure, the ends at least are clear--to achieve high levels of growth in output and employment in the United States and in the world at large.

So far as improving matters by changing relative prices goes, currency depreciation is the classic remedy. But in today's world of completely unrestricted capital flows, depreciation is not in any simple sense a policy instrument any more and it cannot be counted on to do the trick automatically or in any orderly way.

Policymakers should not forget that under Article 12 the WTO sponsors the use of nondiscriminatory import controls if there is a conflict between the objectives of full employment and balance of payments equilibrium. Article 12 insists that the methods used to control imports should be nondiscriminatory with regard both to the countries and to the products affected and is therefore to be sharply distinguished from "protectionism," which I understand to mean the use of selective controls to protect individually suffering enterprises. The provisions of Article 12 after revision as part of the Uruguay Round in 1994 expressed a preference for "price based" measures such as "import surcharges, import deposit requirements or other equivalent trade measures with an impact on the price of imported goods."

Notwithstanding the deplorable advertisement, and the awful danger that the principle of nondiscrimination might be breached by powerful special interests, nondiscriminatory control of imports must stand as a realistic policy in extremis. The great advantage of import controls, as Keynes once said, is that they do stop imports from coming into the country.

Appendix: Direct Investment Financed by Exchange of Shares

A new measurement problem has arisen. During the last twelve months there have been some extremely large takeovers of U.S. firms by foreign firms, which count as "foreign direct investment," but which were financed entirely (or nearly entirely) by exchange of shares. When this happens, the direct investment in question makes no contribution to the financing of the balance of payments deficit, precisely because no money changes hands. Corresponding to the positive figure for direct investment, there has to be an offsetting entry in the line describing transactions in securities. Ownership of the firms in question has indeed, in these cases, passed from U.S. to foreign hands with the result that the holders of shares in what had been a U.S. firm now find themselves holding shares in a foreign firm. But in the statistics, a transaction in equities is considered to have taken place although not a cent has changed hands. So the jump in direct investment by foreigners has generated an equivalent but spurious reduction in net inward financial investment. In my projections I have assumed that inward financial investment continues to be the main means by which the current account deficit is financed, with all the implications that this has for debt service. It would be extremely helpful if the statistical tables were to include a memorandum item describing that proportion of direct investment that is financed by shares--which also describes a fictitious "purchase" of foreign securities by U.S. residents.

On December 10, 1999, Wynne Godley presented these findings to the Trade Deficit Review Commission, a bipartisan congressional panel charged with studying ways to narrow the U.S. trade deficit.

Notes

1. Ignoring the "Gulf War" blip in 1991.
2. These figures now contain a small amount of employment income, but "property income" remains a convenient term of art.
3. The primary balance may alternatively be defined as the balance of trade in goods and services (which makes up the bulk of it) plus net personal, government, and busi- ness transfers.
4. This paragraph obviously draws on the work that James Meade did fifty years ago.
5. The projections described below are all based on simple econometric models of the U.S. and world economies, briefly described in the appendix to Godley (1999).

6. For instance, using discrete time, the growth in the debt-to-GDP ratio is given by the formula $\Delta dt/qt = - pbt/qt + [rt - gt] \cdot dt\text{-}1/qt\text{-}1$ where Δ is a first difference operator, *d* is foreign debt, *q* is GDP, *pb* is the primary balance, *r* is the real rate of interest on foreign debt, and *g* is the growth rate. The formula may be simply rearranged to yield the pri-mary surplus necessary to stabilize the debt-to-GDP ratio.

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