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A Modest Proposal for International Monetary Reform¹

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An ideal system of international payments should be characterized by stability and balance: stability in exchange rates and the absence of sudden crises, and balance in the sense that individual national economies should suffer neither from the deflationary effects of chronic external deficits nor the distorting consequences of chronic external surpluses. Both requirements are essential to the efficient international movement of capital. Yet neither requirement appears to have been met by the current dollar-based reserve currency system. Recurrent crises in Asia, Latin America, and Eastern Europe, and chronic and growing US payments deficits (with their associated deflationary impact) are longstanding characteristics of the current system.

This chapter argues that the problems just described are fundamental aspects of the present system and that, without reform, they will continue to plague the global economy. However, a simple set of institutional reforms would go a long way toward alleviating these difficulties. In order to understand the need for and nature of these reforms, we begin by analyzing the dynamics of the current system using a simple global macroeconomics framework. Within this context, we examine a number of proposed explanations for current imbalances and ultimately focus on a small number of potentially responsible factors. They bear a striking similarity to those which Keynes cited in connection with the failure of the pre-Bretton Woods system. The chapter then lays out reforms designed to alleviate these problems. Finally, it ends with a broader analysis of the costs and benefits of such a reformed system.

Issues of reform of the global reserve system have achieved increasing attention, especially since the UN Commission on the Reform of the Global Monetary and Financial System, chaired by Stiglitz, suggested that this was the most important item on the longer-term agenda for ensuring a more stable global financial system. China's Central Bank governor has added his voice to those suggesting a need for a reform.⁴

We argue that a key explanation for the massive global imbalances that prevailed in the years prior to the crisis—and whose disorderly unwinding has been a

recurrent subject of concern—is the large increase in the demand for reserves, partially explained in turn by the need for self-insurance against global instability. This has been a persistent problem in recent years, but the crisis has given immediacy to the demands for reform for two reasons. First, those holding large amounts of dollars have suddenly become aware of the riskiness of their reserve holdings; the dollar has become a poor store of value, as its value has decreased and become volatile. But worse, the massive debt and massive lending by the Fed have stoked worries about the risk of a decrease in the value of the dollar as a result of inflation. Compounding the problem is that the return on Treasury bills has fallen to near-zero. Countries holding dollars in reserves are bearing risk without reward, and quite naturally, the citizens of these countries have become worried that the assets which they view as having resulted from their hard work and thrift will quickly dissipate. These concerns have been reinforced by the large losses by China's sovereign wealth funds on its investment in Blackstone. (China's premier's stern warning to the US, to maintain the value of what China has invested in the US, needs to be seen in this light.)

International dynamics within the current international monetary system

An analysis of the macrodynamics of the global economy must begin with an analysis of the macroeconomic balances within each of its constituent economies. Those balances, in turn, rest on the equality of savings and investment. Formally, in any national economy, domestic investments (I) plus the net foreign surplus (NFS), which corresponds to net overseas investment, must equal the sum of net private savings (NPS) by households and firms and net government savings (NGS), the surplus in aggregate government budgets. For ease of future reference we will designate this as

$$I + \text{NFS} \equiv \text{NPS} + \text{NGS}$$

or, in terms of external balance,

$$\text{NFS} \equiv \text{NPS} + \text{NGS} - I \tag{1}$$

This formulation presupposes nothing about whether the economies in question are fully classical, with interest rates adjusting to ensure satisfaction of equation (1) at full employment, or subject to Keynesian unemployment, with the level of output being an important equilibrating variable whose distance from full employment depends on the efficacy of monetary and fiscal policy.

The fundamental discipline imposed by any international monetary system is embodied in the fact that the sum over all countries of net foreign surplus must be zero, namely

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$$\Sigma \text{NFS}_i = \Sigma \text{NPS}_i + \Sigma \text{NGS}_i - \Sigma \text{I}_i \equiv 0 \quad (2)$$

where the summations are taken over all individual national economies.⁵ Equations (1) and (2), together with the behavioral regularities determining their individual components, govern the dynamics of the international monetary system. Equations (1) and (2) are identities and are always true. It will be useful to look at that system from the perspective of these two equations.

The twin deficits theory

The standard analysis of trade deficits is based on *the theory of the twin deficits*, which holds that when a country has a fiscal deficit it is likely to have a current account deficit as well.

In a partial equilibrium setting the relationship is clear: *ceteris paribus*, any increase in the government deficit reduces domestic national saving.⁶ In equilibrium, capital inflows have to equal the difference between domestic investment and domestic savings; but capital inflows also have to equal the difference between imports and exports. Hence, if domestic savings falls *and nothing else changes*, then capital inflows and the trade deficit *must* increase.

In terms of equation (1), the twin deficit theory assumes that I and NPS remain unchanged. Of course, in the real world, *ceteris paribus* does not hold. Some economists have argued that when fiscal deficits increase, taxpayers, realizing that there are future bills to be paid, increase their savings *in a fully offsetting way*. (This is called the Barro-Ricardo model.) If that were true, increased fiscal deficits would be accompanied by increased private savings, and national savings would be unaffected. Increases in fiscal deficits would not be accompanied by increases in trade deficits. There would be no such thing as the “twin deficits.”

This is an example of a “theory” that, although widely taught, especially in graduate schools, makes little sense and has little empirical support.⁷ Recent events in the US provide a dramatic illustration. Under President George W. Bush, fiscal deficits had risen, but household saving had actually declined (to zero, or even negative in some quarters). When one hears somebody say, “Economic theory says . . .” one must be cautious. Often such statements refer to a theory that assumes perfect markets, perfect information, and perfect risk sharing in an economy with identical individuals living infinitely long. The assumptions are suspect, at best, in the most advanced industrialized countries and certainly not true in the developing world.

The Barro-Ricardo model, though implausible, does make one important point: we are not living in a *ceteris paribus* world; there are lots of other things going on simultaneously. We have to be careful in analyzing what are endogenous and what are exogenous variables.

A (cyclical) increase in investment, for instance, may lead to an increase in GDP, a (cyclical) increase in government and private savings, and an increase in imports. Whether capital inflows decrease or increase depends on whether government and private savings increase to fully offset (or not quite offset) the increase in investment. In this case, both the government deficit and the trade deficit are endogenous variables.

Both cross sectional and time series data make clear that there is no simple relationship between fiscal and trade deficits. Figure 17.1 provides aggregate G-7 data on twin deficits (aggregate current account and government balances as a percentage of GDP). If one believed in the twin deficits argument, the data would be aligned along a 45 degree line through the origin; the two would increase in tandem. In fact, no real pattern is discernible in the data.

More interesting is the time series data, shown for each of the G-7 countries in the following figures. Again, “twin deficit theory” has an obvious prediction: an increase in the fiscal deficit should be quickly reflected in an increase in the current account deficit. We can evaluate this theory by examining time series data on the current account as a percentage of GDP (country_CA_PGDP) and the government balance as a percentage of GDP (country_GB_PGDP).

Figure 17.2 shows data for the US since 1980. What is striking is that the trade deficit has been steadily increasing *regardless* of what happened with the fiscal deficit and regardless of who was in the White House. The pattern goes back

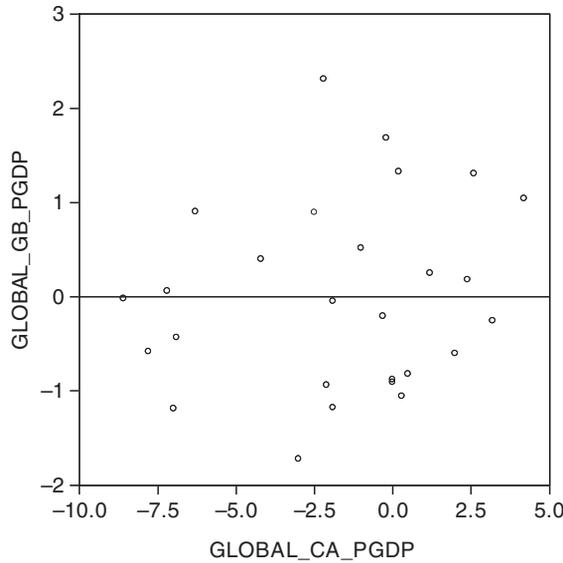


Figure 17.1 Global double deficits, 1980–2006 (% of GDP)
 Source: International Monetary Fund, World Economic and Financial Surveys Series.

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even earlier. The US government deficit rises steadily from the early 1970s to the late 1980s, begins to decline in the 1990s and moves into surplus in 1998, and finally rises sharply post-2000. In contrast, the current account deficit grows steadily throughout the period. Thus, in the 1990s the trade deficit increased, even as the fiscal deficit decreased. (The good thing about the 1990s was that it was linked to an increase in investment. In the present decade, under President Bush, money was to a large extent going into a consumption binge, with household savings approaching zero. From a balance sheet perspective it did make a big difference; borrowing to finance consumption rather than to finance an asset leaves the balance sheet obviously much worse off.)

It is clear from the data that there is no systematic relationship between the trade deficit and the fiscal deficit; in other words, there is no such thing as “twin deficits.” Actually, if one looks at the other G-7 countries, it is also apparent that there is no systematic relationship, except for in one country, Canada (see Figure 17.8).⁸

In the case of Canada there is a systematic relationship, but it is not the fiscal deficits that are giving rise to the trade deficits. Rather, if we do a Granger causality test,⁹ it appears that the fiscal deficit is endogenous and is being driven

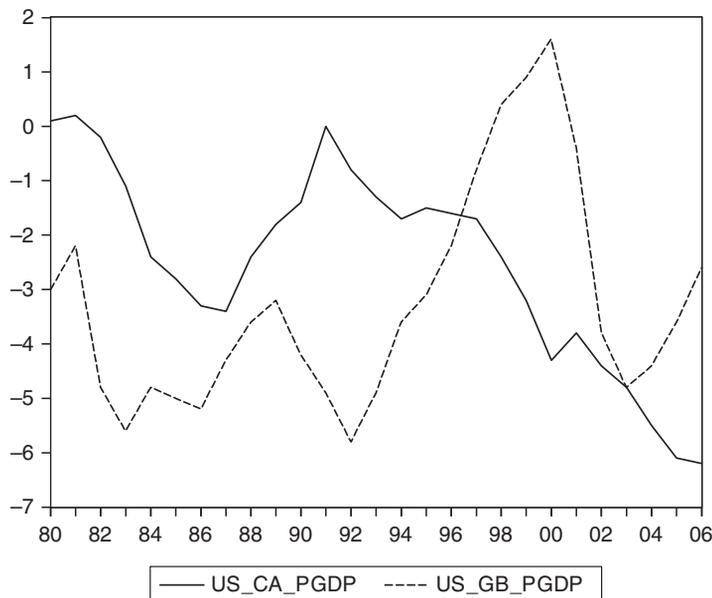


Figure 17.2 Current account and government balances: United States, 1980–2006 (% of GDP)

Source: International Monetary Fund, World Economic and Financial Series.

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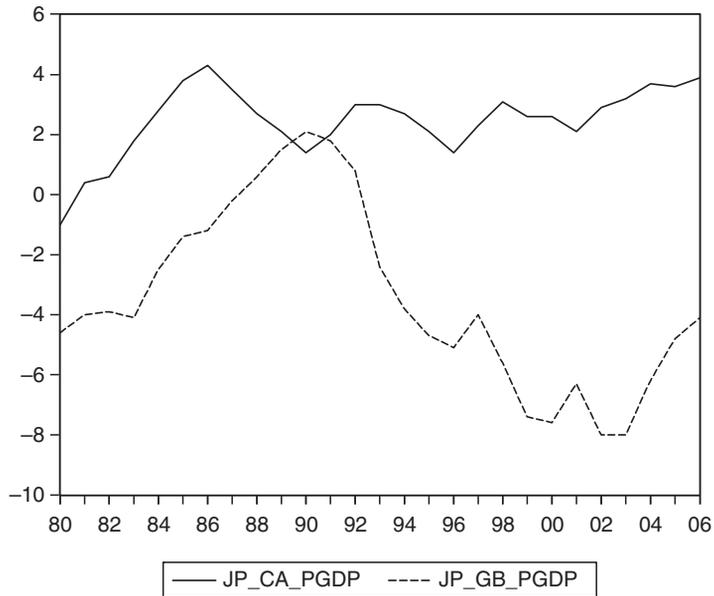


Figure 17.3 Current account and government balances: Japan, 1980–2006 (% of GDP)
 Source: International Monetary Fund, World Economic and Financial Series.

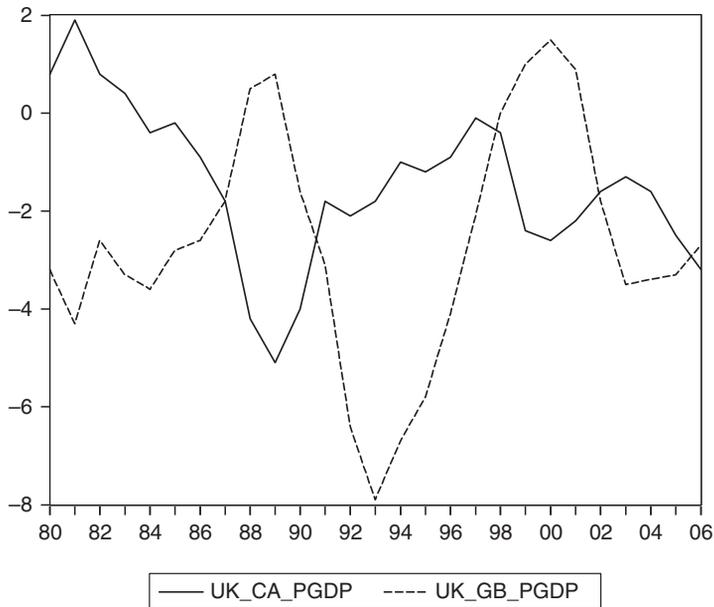


Figure 17.4 Current account and government balances: United Kingdom, 1980–2006 (% of GDP)
 Source: International Monetary Fund, World Economic and Financial Series.

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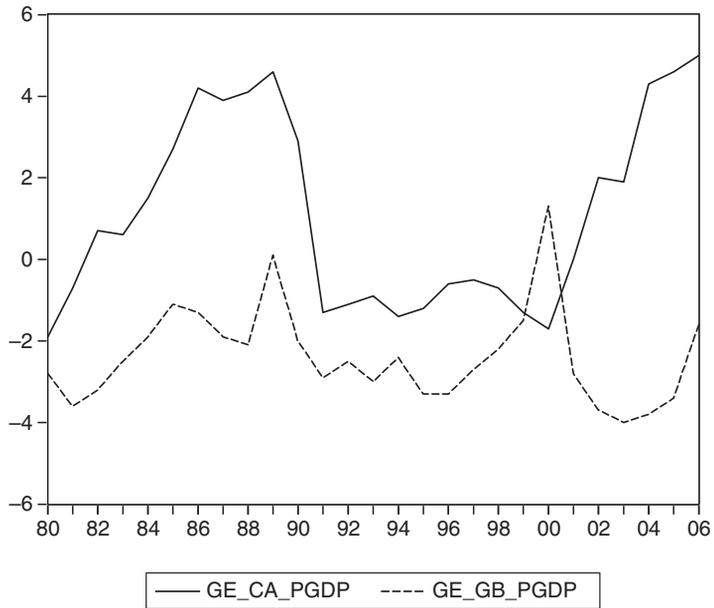


Figure 17.5 Current account and government balances: Germany,¹ 1980–2006 (% of GDP)

¹ Pre-1990 data are for West Germany; post-1990 data are for unified Germany.

Source: International Monetary Fund, World Economic and Financial Series.

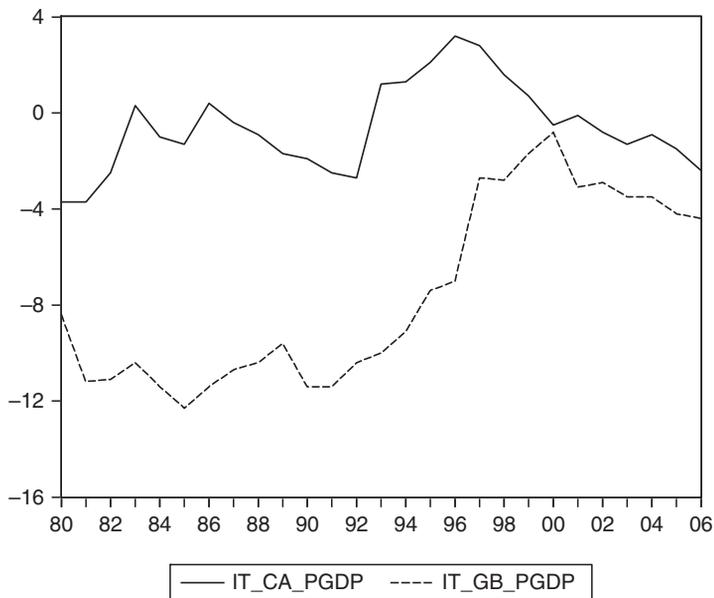


Figure 17.6 Current account and government balances: Italy, 1980–2006 (% of GDP)

Source: International Monetary Fund, World Economic and Financial Series.

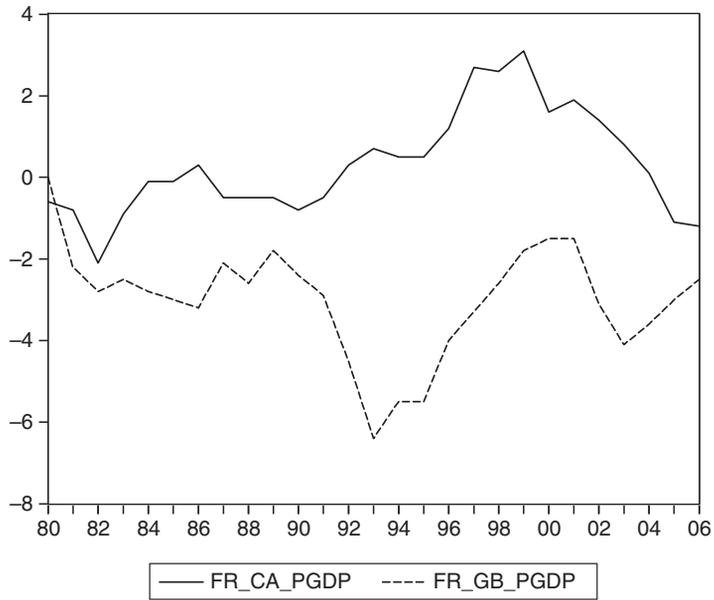


Figure 17.7 Current account and government balances: France, 1980–2006 (% of GDP)
 Source: International Monetary Fund, World Economic and Financial Series.

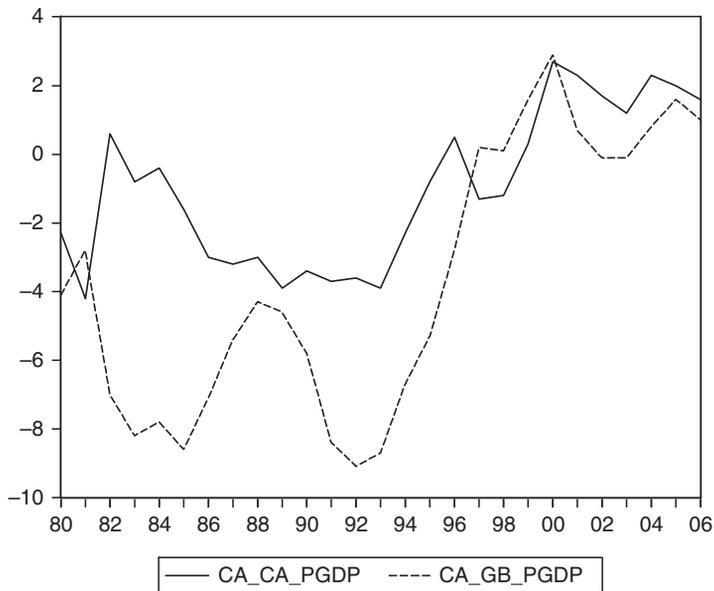


Figure 17.8 Current account and government balances: Canada, 1980–2006 (% of GDP)
 Source: International Monetary Fund, World Economic and Financial Series.

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Table 17.1 Pairwise Granger causality tests

Sample: 1960–2007

Lags: 1

Null hypothesis:	Observations	F-Statistic	Probability ¹
CA_GB_PGDP does not Granger Cause CA_CA_PGDP	26	6.54829	0.0175
CA_CA_PGDP does not Granger Cause CA_GB_PGDP		1.12550	0.2998

¹ Probability of rejecting the Null hypothesis.

by the trade deficit. It is actually easy to understand what is going on, on the basis of standard Keynesian economics.

Fiscal deficits help maintain the economy at full employment. For a country like Canada, at least in the very short run, the trade deficit (capital inflows) is exogenous. A downturn in the US economy reduces, for instance, Canada's exports to the US and increases the trade deficit. But as external circumstances affect the economy (e.g. exports decrease), the government has to respond. It typically uses fiscal policy to stimulate the economy to offset a potential threat of recession. Thus, it is the fiscal deficit that follows the trade deficit.¹⁰

While the notion that trade deficits drive fiscal deficits seems plausible for a small country like Canada, we want to examine the view that, at least in part, capital flows should be treated as exogenous for the United States and increasingly so for Europe.

The demand for reserves and trade deficits

The problem with the twin deficit theory (at least for the US) is not just that it assumes that I and NPS are exogenous but that it views the entire world from a US centric perspective. Hidden behind all the behavioral equations are relative prices (i.e., exchange rates), and these are determined by the behavior of other countries as much as by the US, including their demands for holding US dollar-denominated assets. Any theory attempting to explain the US trade deficit must be based on a global general equilibrium model. In this section, we present the simplest such model.

In our current dollar-based reserve currency world a further specialization of equation (2) is useful:

$$\Sigma \text{NFS} \equiv \text{NFS}_R + \text{NFS}_N \equiv 0$$

and thus:

$$\text{NFS}_R \equiv \text{NPS}_R + \text{NGS}_R - I_R \equiv -\text{NFS}_N = -[\text{NPS}_N + \text{NGS}_N - I_N]$$

where the subscript R denotes the reserve currency country and the subscript N , the sum of balances for the non-reserve currency countries.

The different causes put forward to account for the chronic US international deficit are readily identifiable within this context. The basic “twin deficits” view that the imbalance is driven by US government deficits and low savings rates amounts to assuming that the exogenous variables in this relationship are NPS_R (relatively small¹¹), NGS_R (large and negative) and I_R (relatively large and positive) which together determine a level of NFS_R that is large and negative (i.e. a large net foreign deficit). In turn, this deficit *drives* surpluses in the rest of the non-US world. This view is more broadly characteristic of a policy consensus which attributes international imbalances of individual countries to their management of variables on the right-hand side of equation (1). The focus is on national behavior rather than the global constraints embodied in equation (2).

While the twin deficit explanation of the trade deficit focuses on the US, and the misdeeds of the Bush Administration, others seek to shift the “blame” abroad. For instance, the US has consistently blamed China’s undervalued exchange rate. A quick look at the numbers suggests what is wrong with such a claim: the United States’ trade deficit in 2006 was more than \$850 billion, whereas China’s multilateral trade surplus was only about \$150 billion; when the US started talking about China’s trade imbalances, it was actually close to zero. China has been growing very rapidly, but even if China were to eliminate its current \$150 billion trade surplus with the US, and even if this reduction in the bilateral trade deficit were translated dollar for dollar into a reduction in the US multilateral trade deficit, the US deficit would still stand at some \$700 billion, or just under \$2 billion per day. In fact, the likely outcome of China eliminating its trade surplus would be a very small change in the US multilateral trade deficit. The United States would quite simply start buying textiles and apparel from Cambodia, Bangladesh, or some other country rather than from China.

There is a real risk that global instability might actually be increased, because while China may be willing to finance the US deficit, it is not clear whether Cambodia or Bangladesh would. It is plausible that these countries will think it better to invest their money into their own country; and if they do lend their money abroad, they are more likely to put it into euros or yen rather than just financing the US deficits by holding dollars, which are a depreciating asset. While it is true that even if China did not buy US bonds another country would, to induce those purchases may require large changes in asset prices. There is a high likelihood of what has come to be called a disorderly adjustment, and such adjustments are likely to be painful.

While attempts to *blame* China for the US capital inflow/trade deficit seem misplaced, the discussion highlights the role of the behavior of foreigners in determining the US trade deficit.

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In terms of our framework, this means that NFS_N , the net foreign surplus for non-reserve countries, is treated as the exogenous variable. It is strongly positive. The resulting net domestic savings must be deployed abroad, so that the strongly positive NSF_N drives the offsetting US position (NSF_R) to be strongly negative. The capital inflow into the United States, combined with weak aggregate demand from high imports, “forces” the government to have a large trade deficit (not unlike the earlier story for Canada.) While the United States may be larger than any other country, it is still far smaller than the rest of the world put together.

Savings glut as an explanation

This explanation for chronic US international imbalances is, at least in recent years, related to the view of a global “saving glut” (see Bernanke, 2004).¹² There are many reasons that “the rest of the world” might have an imbalance of savings and investment. From a taxonomic perspective, a high value of NFS_N , in turn, occurs because high private savings (NPS_N) and low government deficits (NGS_N) are not offset by comparably high rates of investment (I_N).

There are two complementary versions of this argument. The first is classical in spirit. At full employment, local interest rates, determined by local capital market conditions, foreign investment opportunities (ultimately in the United States) are relatively attractive. This drives down exchange rates and creates surpluses in the external current accounts to offset the desired level of external investment. These surpluses then translate into US deficits. The second explanation is Keynesian in spirit. Excess local savings relative to investment lead to local aggregate demand shortfalls. If local constraints on monetary and fiscal policy mean that they cannot compensate for this deficiency in aggregate demand, then full employment may still be pursued by manipulating exchange rates to produce offsetting current account surpluses (namely by selling local currency to drive down exchange rates). The net result is to export the excess savings (aggregate demand shortfalls) to the United States. Again US deficits are created by local current account surpluses.

These explanations may have some relevance for the past half decade: high oil prices have increased income in the oil exporting countries faster than they can invest the proceeds; and while governments (which, in most of the world, receive a large fraction of the increased value of oil sales) have used some of the proceeds to increase consumption, they prudently realize that these high oil prices may not last and so have wanted to save substantial fractions of the income. (Real returns in the United States may have not been as large as market participants believed; they were attracted to the US by its bubbles, and the high *apparent* returns. The fact that so much of the investment was going into housing—combined with the indicia of a bubble and widespread financial shenanigans—should, perhaps, have been a warning.)

However, while perhaps a partial explanation for the recent imbalance, both evidence and theory argue against this as an explanation for what has been going on for the past three decades. Empirically, it is difficult to believe that a global “savings glut” has been a constantly increasing fact of international economic life for the past thirty years. Yet this is what the history of the US current account deficit—i.e. almost constant growth—requires. Theoretically, it is not clear why over the long run a structural imbalance between global (non-US) savings and investment should exist and why, if it does, the gap should not be offset on a country-by-country basis by appropriate local fiscal and monetary policies. The fact that so much of the rest of the world is developing, with a capital scarcity, would suggest not a global savings glut but a global savings dearth. Over this period, the US, with the impending retirement of the baby boomers, should have been having a net savings surplus.

One thing that both explanations (twin deficits and global savings glut) have in common is that they focus primarily on the right-hand side of equation (1) on a country-by-country basis, although the global savings view does at least recognize the constraint embodied in equation (2). An alternative is to focus on the left-hand side of equation (1) and the requirement of international balance (equation (2)), looking directly at the determinants of external balances and then examining the consequences of international balance for domestic macroeconomic circumstances. This generates dynamic behavior that appears to be far more consistent with the relevant history. It also captures more effectively the full range of potential national behaviors in a world where there are policy variables that can be used to manage external balances (notably exchange rates) independently of local domestic macroeconomic goals.

A simple global general equilibrium model

A natural starting point of this alternative perspective is to examine national demands for reserves. Just as individual households and firms hold cash to offset temporary imbalances between income and expenditures, so do national governments presumably hold reserves to offset temporary imbalances between the supply of and demand for their currencies (i.e. foreign capital outflows and inflows). Like cash holdings, the demand for reserves should grow with the volume of international transactions. As international transactions volume grows over time, nations should seek to add to their currency reserve positions. If the growth in transactions is proportional, then the size of these desired additions to reserves should also grow over time. Since reserves can only be accumulated by running official balance of payment surpluses, the demand for reserve additions translates immediately into a demand for official surpluses. As the level of desired additions to reserves grows, the level of these desired official surpluses grows as well.

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Especially since the 1997 global financial crisis, foreign governments have wanted to increase their currency reserves. Reserves increased from 6–8 per cent of GDP to 30 per cent of GDP by 2004.¹³ Developing countries do not want to have to call upon the International Monetary Fund (IMF) for a bail-out, in the event of a crisis. There is a high price to accumulating reserves—the money could have been spent, say, to increase investment and hence growth—but there is an even higher price to pay if they do not have sufficient reserves and have to call upon the IMF.¹⁴ It is not just that the policies the IMF has imposed put the repayment of creditors above all else (even at the cost of countries sinking into recessions or depressions); borrowers also must worry about the loss of sovereignty entailed by IMF conditionality. Figure 17.9 shows the holdings of total reserves minus gold for both the industrialized and the emerging/developing countries. Figure 17.10 shows the evolution of the spread in reserves between the industrialized and developing countries. Figure 17.11 shows the gold holdings of the two groups. Note that the industrialized countries have been reducing their gold holdings just as the price of gold has reached record highs. Meanwhile, the emerging markets have been slowly and steadily accumulating gold.

There is another reason, not unrelated, why matters may have become “worse” in recent years. In the past, countries offset the savings represented

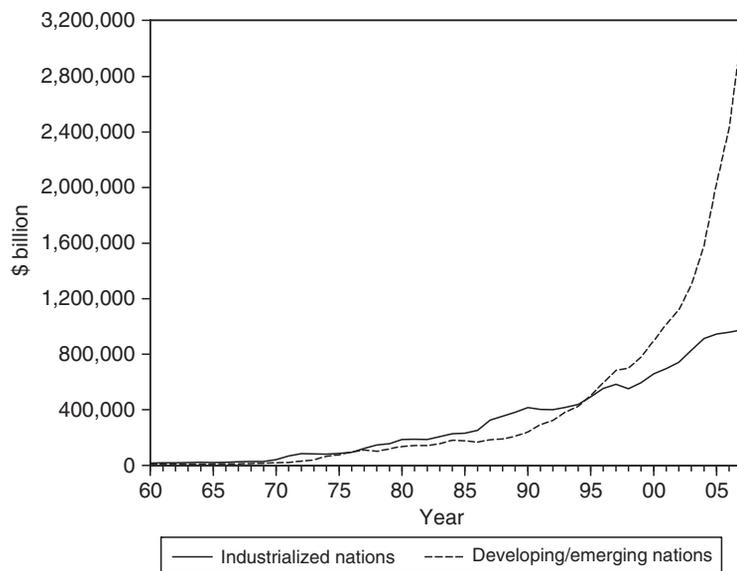


Figure 17.9 Total reserves minus gold

Source: International Monetary Fund, International Financial Statistics.

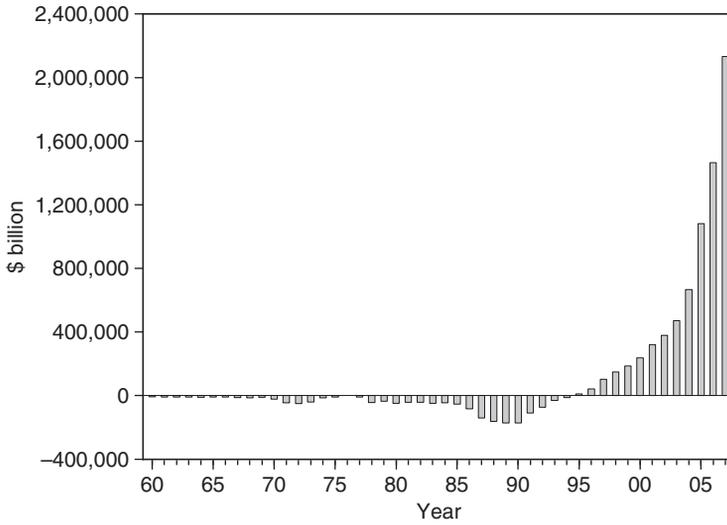


Figure 17.10 Total reserves minus gold spread

Source: International Monetary Fund, International Financial Statistics.

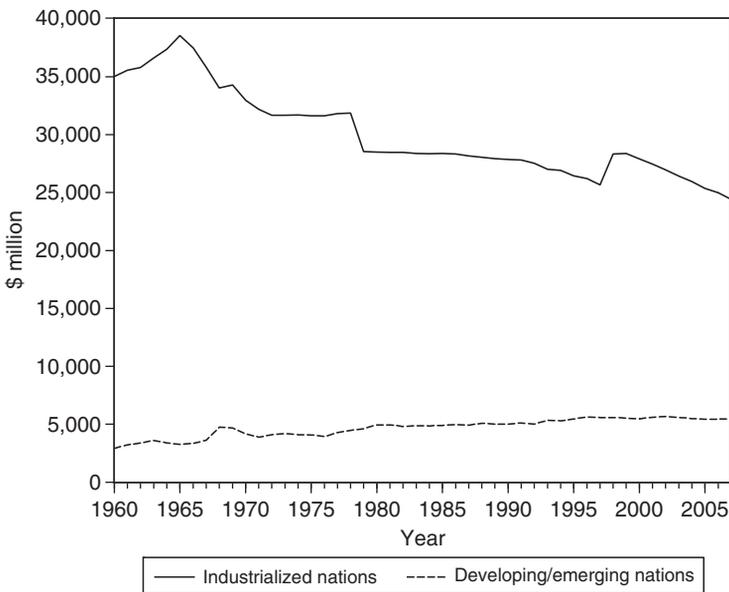


Figure 17.11 Central bank gold holdings

Source: International Monetary Fund, International Financial Statistics.

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by reserve accumulations by profligate fiscal policies and loose monetary policies; or perhaps more accurately, some developing countries offset the savings of other developing countries. But in recent years, as the religion of sound fiscal and monetary policy has been adopted, there has been nothing to offset this saving of non-reserve countries.

Of course, from the global perspective, a savings glut is nothing more than an insufficiency of aggregate demand. Unless there is an excess of investment over savings in the US, *at full employment*, to make up for the excess of savings in the rest of the world, there will be a problem of global insufficiency of demand. The money put into reserves is part of global output (= income) that is not being spent. The United States has become the *consumer of last resort*—making up for the deficiency in aggregate demand elsewhere—a problem which has become worse as other countries have learned to follow prudent monetary and fiscal policies. At the same time, as other countries strive to make sure that they do not have large trade deficits (harbinger of a crisis to come), the United States has also become the *deficit of last resort*—as identity (2) makes clear that it must.

At times, US government officials have been explicit about this role of the United States' "imbalances." They have argued that the rest of the world should thank the US for keeping up global demand and growth. Yet, as we comment below, there is something peculiar about a global economic order which depends on the richest country of the world consuming beyond its means in order to maintain global full employment. We can summarize these identities and behavioral relations in the following simple, global general equilibrium model:

$$NFS_R \equiv -NFS_N \quad (3a)$$

$$NFS_R \equiv NPS_R(p_R, v_R, e) + NGS_R(p_R, v_R, e) - I_R(p_R, v_R, e) \quad (3b)$$

$$NFS_N \equiv NPS_N(p_N, v_N, e) + NGS_N(p_N, v_N, e) - I_N(p_N, v_N, e) \quad (3c)$$

where p_i is a vector of policy variables in the reserve (non-reserve) countries, v_i is a vector of exogenous variables (preferences, technology, etc.), and e is the exchange rate. There are, of course, a large number of endogenous variables (prices, interest rates, etc.) within each country that we assume have been solved.¹⁵

We deconstruct government savings into the demand for reserves and the fiscal deficit (FD); the former we treat as exogenous, the latter as a function of policies (e.g. expenditure policies), the exchange rate, and exogenous variables.

$$NGS_N = NDR_N + FD(p_N, v_N, e) \quad (3d)$$

where NDR_N denotes the aggregate demand for addition to reserves.

Equations (3a–d) are identities—they are always true. In the old, fixed exchange rate system, we can think of e as exogenous and of equations (3a–d) as

determining NGS_N —the value of increases (decreases) in reserves that will, at the fixed exchange rate, ensure that equations (3a–d) hold. But in the era of flexible exchange rate that has prevailed for the past 35 years, e is endogenous, and reserves are exogenous.¹⁶ If foreigners wish to hold more reserves, then there has to be a capital outflow from the non-reserve countries, a capital inflow into the US, i.e. imports *must* exceed exports, so the exchange rate has to rise to accommodate the capital inflow.¹⁷

In this interpretation, the longstanding US trade deficit is the result of the high demand for dollars as a reserve currency. With growth of the non-reserve countries, they are holding more and more reserves. In effect, the US is exporting Treasury bills to be held in reserves—partly at the expense of automobiles. And, except when the US is experiencing an investment boom—as in the 1990s—this means that the government *must* run a fiscal deficit to keep the economy at full employment. In a sense, the US story is much like that of Canada—though the complexity of the dynamics is such that the interaction between the trade deficit and the fiscal deficit is not as apparent.

The model presented here is, of course, a gross simplification. A more complete model would have similar equations for each date, a set of state variables, and a set of dynamic equations that describe the evolution of those state variables. Yet, these dynamic equations would complicate the analysis, without affecting the basic points which we wish to make.¹⁸

We should emphasize that there are a host of policy variables that can affect the exchange rate: anything that might affect the demand or supply of a country's currency today or in the future. Hence, an increase in the fiscal deficit could increase national income, increasing imports at each exchange rate, and thereby increase the equilibrium exchange rate.¹⁹

Allegations of exchange rate manipulation seem to be about intent: presumably, the policies of the US government which have led to a low exchange rate (or have they led to a higher exchange rate than otherwise would be the case?) were undertaken for other reasons. But, of course, the same point can be made about interventions by those the US accuses of exchange rate manipulation, and there are other instruments that they could make use of which would have much the same effect. China could, for instance, allow more Chinese to invest abroad. There are good public policy reasons for doing this, but the effect would be to lower the exchange rate.

A special case

Analytically, the relationship between the demand for reserves and trade deficits can be seen most easily in the special case where there are no net private capital flows. The total NPS for any single country consists of the official surplus

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plus the private surplus. In terms of target levels, the NFS for a country will be the sum of the desired official surplus plus the desired private surplus. The desired private foreign surplus consists of the difference between desired overseas investment by private domestic agents and desired foreign private investment in the country.

As capital flows equalize returns (adjusted for risk) across national economies, private investment inflows and outflows should balance out over time. However, desired official surplus will always be positive, reflecting the continuing demand for additions to reserves as international transactions grow. Assuming for convenience that desired private capital flows across non-reserve countries are zero,²⁰ the aggregate desired level of net foreign surplus for the non-reserve countries is equal to the sum of the desired official surplus or, equivalently, to the aggregate demand for additional reserves. Symbolically,

$$\text{NFS}_N = \text{NFS}_N(\text{official}) = \text{NDR}_N$$

where NDR_N denotes the aggregate demand for addition to reserves. This figure is positive, as long as international transactions volume grows and keeps growing, since growth in transaction volume is proportional. Thus, as long as non-reserve countries attain their desired levels of reserve accumulations, the reserve money currency country (i.e. the US) will be faced with chronic growing deficits (as the United States has).²¹

The methods by which non-reserve currencies might attain these goals are fairly straight forward. Favorable tax and regulatory treatment of export industries and impediments to imports and exchange rate management are the obvious ways to do so. However, if the reserve currency country is not content to run the required deficits, then these methods might be insufficient as each non-reserve nation struggles to acquire its desired share of a supply of reserves that overall is inadequate. If all countries, including the reserve currency country, simultaneously seek to devalue their currencies, then none will succeed. The further result may, therefore, be increasing barriers to trade, which will also be mutually defeating, or worse still, competing domestic deflations, designed to reduce import demand.

An example of this kind of situation in practice is the experience of crisis and contagion in the middle and late 1990s. In the struggle to run net foreign surpluses, some countries will inevitably lose out, either because their policy options are inadequate to the task or, what amounts to almost the same thing, because they are unwilling to make the domestic economic sacrifices necessary to succeed. South Korea, Indonesia, Thailand, and Malaysia appear to have been in this situation in the early to middle 1990s. Despite various degrees of government fiscal restraint and rapid economic growth, they all experienced large deficits in the current account. (In the case of Thailand, the government tried the standard procedure of raising interest rates to dampen demand; but this simply attracted more capital, strengthening the baht and increasing the

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foreign trade deficit. Ironically, Korea's crisis happened just after it had managed to reduce its current account deficit.) Ultimately, these deficits undermined confidence in their currencies, leading to capital flight, rapidly falling exchange rates, rising foreign debt burdens (in local currency terms) and severe economic contraction. The combination of lower exchange rates and reduced economic activity (through reduced import demand) moved all these economies into net foreign surplus positions but at great economic cost. More importantly, as they moved into surplus, other countries necessarily had to move into greater deficit, since the aggregate zero constraint on Σ NFS (equation (2)) is always binding. Deficits are like hot potatoes—so long as some countries are in surpluses, the sum of the deficits of the other countries must add up to the value of their surpluses. If the US did not absorb these new surpluses they would migrate to other relatively weak economies like Russia, Mexico, and Brazil (as they did). *In the absence of sufficiently high deficits by the reserve currency country, the whole reserve currency payments system is inherently unstable with a deflationary bias.*

Reserve accumulation represents a subtraction from global purchasing power. If the United States were to fail to offset this subtraction by aggressive consumption and government deficit spending, the consequences might well be a serious prolonged global recession. Yet as the United States does this, US consumers, who are among the richest in the world, benefit at the expense of those (often much poorer) nations accumulating dollar reserves.

Thus, chronic and growing US deficits are an essential feature of the current system. This basic imbalance may be exacerbated by a number of factors. For idiosyncratic reasons, individual national economies may be committed to producing net foreign surpluses beyond their need for reserves. One example already cited is that of countries like China that turn to foreign demand as an engine of output growth since they lack sufficient monetary and fiscal controls to manage their macroeconomies locally.²²

Whatever the explanation, China has run large persistent net foreign surpluses as an adjunct to its domestic macro policy, and these must be absorbed by other nations in the global system.²³ Japan has also been in persistent surplus despite the advent of flexible exchange rates in 1971. It appears to regard itself as a resource-poor, highly vulnerable economy, the security of which depends on a powerful ability to sell its manufacturers to the world at large. The result has been a range of policies that through all domestic economic conditions has continued to produce net foreign surpluses, and again, these must be absorbed by the rest of the world. In other countries, most notably in Europe, powerfully entrenched interest groups in manufacturing (unions and management) and agriculture have been protected over many years in ways that have generated persistent net foreign surpluses. In agriculture this has been achieved by restricting import competition. In manufacturing, since domestic demand has been inadequate to support these large establishments, foreign demand

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has been an important target. To cite two examples, Germany and France (until very recently undermined by the rise in the euro) have had long-lasting foreign surpluses on current account.

These structural surpluses exacerbate the basic imbalance at the heart of the reserve currency system. As Keynes noted, deficits are self-limiting, as non-reserve countries run out of reserves. Surplus countries as long as they neutralize the domestic inflationary pressure of surpluses can go on forever. This is especially true in a flexible exchange rate world since surplus countries can always counteract the adverse consequences of rising pressure on exchange rates by selling their own currencies, which they possess in unlimited supply.

We have already noted another source of excess global demand for surpluses is the experience of countries like Korea, Thailand, and Indonesia—and those who have learned from their experiences. Having suffered the consequences of persistent deficits, these nations are likely to embrace policies (e.g. low exchange rates) that engender persistent surplus as a precautionary matter. By doing so, they exacerbate the problem of global balance and, in particular, of US deficits.

Having looked at the equilibrium system described by equations (1) and (2) from the perspective of net foreign surplus (NFS), it is relatively straightforward to examine the domestic macroeconomic consequences of global interactions. In the reserve currency country, the result is chronic deflationary pressure which must be offset by aggressive monetary and fiscal policy, except when, by coincidence, the country otherwise would have been confronted with a period of excess demand. That was the situation confronting the US in the 1990s. Irrational exuberance, then based on the internet bubble, was so great that in spite of the trade deficit, the economy could maintain itself at full employment. (It benefited, too, from the deflation in China, combined with its stable exchange rate, which enabled the US to have low manufacturing prices even with low levels of unemployment. It was not the careful conduct of monetary policy in the US that led to the benign confluence of high growth and low inflation, but the overinvestment in competitive manufacturing in China.)

In non-reserve currency countries, sudden changes in $\{v_i, p_i\}$ —at home or abroad—can lead to sudden changes in exchange rates or reserves, with the potential of Asia-type crises.

What we have ignored, of course, is the mutual interaction of domestic and international policies. They can be summarized as follows:

1. The efficacy and stability of the present system depends on continuing and growing US foreign payment deficits.
2. These foreign payments deficits exert a powerful deflationary effect on the US domestic economy, which can only be offset by aggressive US government fiscal and monetary policy.

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3. These difficulties are exacerbated by chronic surplus countries whose behavior is difficult to control within the context of the current system.
4. These surplus countries tend to export deflationary tendencies not only to the United States but also to other industrial economies.

This list elucidates many of the shortcomings of the current dollar reserve currency system. One final shortcoming of the present system should be noted. As the US increasingly becomes the deficit country of last resort, the world becomes increasingly awash with dollars. This is an unavoidable consequence of the present system and the economic behaviors of powerful participating nations.²⁴ Nevertheless, the flood of dollars inevitably undermines confidence in the value of the dollar which, in turn, contributes to exchange rate instability and concern in national economies about the value of their increasing level of dollar holdings. The result is an increased level of concern and potential instability that it would be useful to alleviate.

Equity²⁵

While the global reserve system has contributed to weaknesses in the global economy and to its instability, it is a system that is particularly unfair to developing countries. They suffer particularly from the instability—especially given the failure of international financial markets in shifting risk to the rich. But while they pay a high cost from the failure of the system to produce stability, they also pay a high dollar cost directly in the way the system is run.

In effect, the system allows the US to have access to a ready supply of cheap credit. This has resulted in the most peculiar situation noted earlier where the world's richest country is living well beyond its means, borrowing from countries far poorer. Just as risk should move from the poor to the rich, but is not, so too capital should flow from the rich to the poor—but in fact is moving in the opposite direction.²⁶

There is essentially a net transfer from developing countries to the richest country in the world, as the poor countries make low interest loans to the United States (often reborrowing some of the money at much higher interest rates.)²⁷ Obviously, these net transfers—which exceed the value of the aid many of the poor countries receive from the US—have adverse consequences for the countries' growth.²⁸

The cost to developing countries of holding dollar reserves in recent years has been very high. China, for instance, has earned (in terms of its own currency) a return, which must be close to zero, or even negative, with the interest not compensating for the depreciation of the value of the dollar. Surely, there are investments in their own country that would yield a higher return. Developing countries maintain such large holdings in part at least because the cost of not

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having these holdings is even greater—the risk of a crisis, with the attendant possibility of the loss of national economic sovereignty.

The weakening of the dollar has had a profound effect in changing mindsets about reserves. The dollar is increasingly no longer viewed as a good store of value. It has heightened a focus on reserve management, and this in turn shifts attention towards portfolio diversification. Concern about low returns from holding Treasury bills has motivated the formation of sovereign wealth funds, which, while they might rectify the inequities associated with differential returns, have in turned heightened protectionist sentiments.

But as the example of China makes clear, there are multiple motivations for large reserve holdings. The reserve holdings may be the result of a foreign exchange rate policy, with growth benefits identified earlier. In estimating the *net* cost of reserve holdings, one has to subtract out the ancillary benefits.

A simple reform proposal

The primary goals of any international monetary reform should be to alleviate these problems by: (i) decoupling reserve accumulation from the deficit positions of any reserve currency countries; (ii) providing some means of disciplining surplus countries; and (iii) providing a more stable store of international value than the dollar or any other reserve currency. In addition, an international monetary reform should be equitable—with the benefits of any seignorage arising from reserves sharing equitably.

One way to do this would be to issue special drawing rights (SDRs) on a substantial and regular basis as a non-reserve currency source of international reserves. Current international reserves are about \$3,000 billion. Assuming the demand for reserves increases at the average rate of world trade (about 7 per cent), an annual issue of \$200 billion in SDRs would satisfy any demand for reserve accumulation without a US payments deficit. The reserves could be simply credited to the IMF accounts of current member countries in proportion to their current IMF fund positions.

Since SDRs are valued as a weighted average of all convertible currencies, their value is largely stable in the face of changing exchange rates. Thus, as SDRs become more widely available as a source of reserves, they might ultimately serve as a stable international unit of account for pricing international commodities such as oil.

Finally, SDR allocations could serve as a basis for partially offsetting the externalities generated by chronic surplus countries. SDR allocations could be taxed at a rate of 50 per cent (or some other appropriate fraction) per unit of current account surplus up to the full amount of a country's allocation. The resulting SDR taxes could then be used as a source of global financial aid to be distributed among developing countries (which might then be required to

subscribe to a set of “good government” principles—e.g. nuclear non-proliferation—to qualify for such distributions).

One could view the new reserve system as a form of cooperative mutual help. The international community would be providing entitlements to automatic “help” in times of crisis, allowing the country to spend beyond its means and beyond what international financial markets are willing to lend, as each country guarantees that the new reserve currency could be converted into their own currency.

Political economy of reform: incentive compatibility

In the limited space available here, we cannot discuss the political economy of reform. Suffice it to say that since the gains to all—including the United States—are significant (described more fully in the next section), there should be widespread support. But as an alternative, the reform could be implemented in a piecemeal manner, as a group of countries agreed to the new system, and agreed that those who join the system would gradually move toward holding only the new reserve currency and the currencies of other members of the “club,” as reserves. If enough countries joined the “club” there would be an incentive for any country that currently is a reserve currency (and believes that it gains from being a reserve currency) to join the club too.

Here is how the club might work. Every year, each of the members of the “club” would contribute a stipulated amount to the GRF (global reserve fund), and at the same time, the GRF would issue “global greenbacks” of equivalent value to the country, which they would hold in their reserves. There is no change in the net worth of any country; it has acquired an asset (a claim on others) and issued a claim on itself. Something real has happened, however: it has obtained an asset, which it can use in times of an emergency. (And at the same time, it has agreed to let others call upon its resources in times of emergency.)

Normally, of course, except for the cost of holding reserves, these exchanges of pieces of paper make no difference. Each country goes about its business in the same way as it did before. It conducts monetary and fiscal policy much as it did before. Even in times of emergency, life looks much as it did before. Consider, for instance, an attack on the currency. Before, the country would have sold dollars (buying up its own currency) to support the value of its currency. (Whether such intervention makes sense is not a question we address here.) And it can continue to do that so long as it has dollars in its reserves (or it can obtain dollars from the IMF). Now, it exchanges the global greenbacks for conventional hard currencies to support its currency.^{29,30}

Because each country is holding global greenbacks, each no longer has to hold dollars or euros as reserves, and for the global economy, this has enormous consequences, both for the (former) reserve currency countries and for global

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economic stability. The deflationary pressure noted earlier would no longer be present, because each country would no longer have to “bury in the ground” some of its purchasing power. Reserve currency countries, whose “exports” of IOUs are matched by a current account trade deficit, would no longer face the systematic deflationary bias of net imports.

For a country like the United States, which has been tempted to have large fiscal deficits because of the low cost of financing these deficits, the enhanced discipline would contribute to long-term fiscal probity. If it ran huge deficits year after year, it almost surely would face higher and higher real interest rates.

Cost and benefits of a revised system

Such a system appears likely to benefit all participants in the global financial system. Superficially, the greatest “loser” would be the United States, which would at least partially forego its monopoly on issuing paper claims for real goods and services. However, the UK enjoyed such a partial monopoly prior to Bretton Woods, and Keynes rightly recognized that it represented a very mixed blessing. The benefits of seignorage were perhaps more than offset by the adverse consequences of chronic net foreign deficits through their deflationary effect on the domestic UK macroeconomy. The United States has avoided many of these effects by running large, persistent government deficits to sustain full employment, but that policy too has potential adverse consequences. Keynes’ immediate solution for the UK’s situation was to offload the dubious benefits of reserve currency status on the United States. However, he ultimately envisioned a system similar to that outlined above (including discipline imposed on chronic surplus countries).

The euro community, to the extent that it too envisaged becoming a reserve currency, might also be said to suffer. However, its recently ambiguous experience with the rise of the euro appears to have qualified its enthusiasm for the chronic deficit position associated with reserve currency status.

Foreign central banks concerned with the stability of the value of their dollar holdings would benefit in three ways. First, the creation of SDR reserves would provide an alternative store of value, which would at a minimum diversify their reserve holdings. At best SDRs would provide a far more stable store of value than any individual currency. Second, the issue of SDRs would reduce the demand for dollar reserves and reduce the US current account deficit. This would reduce the continuing downward pressure on the value of dollar holdings (although there might be a significant interim adjustment in the value of the dollar). Third, an external source of liquidity should alleviate some of the pressure of competition to acquire reserves, which should help stabilize international payment and exchange rate dynamics.

With the annual issuance of these new reserves, the adverse consequences of the fact that the sum of deficits equals the sum of surpluses would be broken: any country could run a deficit equal to its receipts of new reserves without worrying about a crisis.³¹ The “hot potato” problem would be reduced, if not fully solved.³²

The fact that each country receives an annual emission of global greenbacks means that it can import more than it exports without facing an imminent crisis. So long as imports do not exceed exports by more than the emissions, its reserves are actually increasing, and so there would be little anxiety of a crisis occurring.³³ Because of the fact that under this system the cost of holding reserves appears lower,³⁴ reserves may be higher (especially for developing countries), so that even when imports exceed exports by more than the value of the emissions, crises may be less frequent.

The greater financial stability of developing countries would enhance their ability to issue debt in their own currency—thereby reducing at least exchange rate risks (one of the major sources of problems in developing countries).

All economies, not just the United States, should benefit from the reduction in the deflationary bias of the current system.³⁵ And clearly the way the deflationary bias is addressed is far more equitable than under the current system.

Finally, having a significant source of automatic purchasing power transferable to well-functioning developing economies would support economic development far more effectively than the current patchwork of national and multinational aid programs.

The evolving reserve system

The essential requirement of a reserve currency is that it be a good store of value. This is why inflation has always been viewed so negatively by central bankers. But the credibility of a currency as a reserve currency depends also on exchange rates. For foreign holders of dollars, a weakening of the exchange rate is as bad as an increase in inflation. This is, in a sense, even true for domestic wealth holders; because of opportunity costs, even citizens of a country with a stable exchange rate may want to diversify out of holding assets denominated in that country’s currency if there is high instability.

For most of the last part of the twentieth century, US dollars have been used as the world’s *de facto* reserve currency. But the current system is under threat from negative dynamics: confidence in the dollar erodes, causing people to move out of the currency, and as they do so, the currency is further weakened. While the huge fiscal and trade deficits of the Bush Administration have contributed to this weakening, the problem for the US dollar is partly inherent; the Bush Administration simply accelerated what would have eventually happened in any case. The reserve currency country naturally becomes increasingly indebted, because the ease of selling debt entices over-borrowing. Others want to

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hold Treasury bills; it is tempting to respond to the demand with an increase in supply. But eventually, debt levels get so high that credibility starts to be questioned.

This may well be happening today. Certainly there has been a major shift in thinking among central banks. Over the years, they have gone from thinking that a currency needs gold as backing to thinking that sterling is required to back their currency, to thinking that dollars should back their currency. But now, they realize what matters is wealth. They no longer rely solely on the dollar for their reserves, as they have realized that the dollar is not a good store of value, and are beginning to manage their reserves as a more diversified portfolio, which is sensitive to risk and return. With multiple hard currencies to choose from, central banks may find it prudent to hold reserves in multiple currencies—or even in other assets. And as the US dollar appears more risky, they will naturally continue to shift out of dollars—a process which is already well under way.³⁶

But this shift out of the dollar reserve system is not necessarily a smooth one. Now, investors have to think not only about how other investors are thinking, but also about how central banks are changing their perceptions of risk and reserve policy.³⁷

A multiple reserve currency system?

Having a two-reserve currency system is *not* a solution. Some in Europe had hoped that the euro would take on this role as a reserve currency. This has happened, at least to some extent, but it has not been good for Europe or the world.

As the euro becomes a reserve currency, Europe too then faces a deflationary bias. Given its institutional structure, a central bank focusing exclusively on inflation and a growth and stability pact restricting the use of expansionary fiscal policy, there are doubts about whether Europe is able to respond effectively to the consequences of having a reserve currency. If it does not, Europe, and the world, may face strong contractionary pressures.

Moreover, just as the bimetallic system was viewed as more unstable than the gold standard, a multiple reserve currency system may be more unstable—with rapid shifts from one reserve currency to another with changing perceptions.

Europe—and the world—should hope that it does not get its wish, to become a global reserve currency; but rather, that the world move to a new global reserve system, along the lines we have proposed.

Concluding remarks

It should be clear that the current global reserve system is not working well, that it is contributing to the current high level of exchange rate volatility, and that

this volatility has adverse effects on the global economic system. It is essential for the functioning of the global economic system that the global financial system functions well. The global financial system and the global reserve system are changing rapidly, but one should question whether they are changing in ways which will enhance global economic stability.

Certainly events of the last decades give us reason to pause and reflect on the weaknesses of the existing financial system. We have witnessed repeated crises and high levels of global financial instability—in spite of the fact that we have (supposedly) increased our understanding of how financial markets work, created new financial instruments to manage risk, and strengthened markets from an institutional perspective to help them perform better. The developing countries in particular have experienced enormous instability, which has come at great cost to the people in those regions. Some of that instability is a result of instabilities in the global financial system and of the failure of markets to effectively shift risk to the developed countries, which could, on a relative basis, bear it better.

There has been a great debate about allocating blame—the relative role of structural versus macroeconomic factors. Here, we have highlighted one aspect of the global economic system, which we believe has received too little attention—the global reserve system. We have suggested a simple reform to the global reserve system, which holds out the promises of greater stability, higher output, and enhanced equity. It is, in some ways, an old idea—but perhaps an idea whose time has finally come.

Notes

1. An earlier version of this chapter was presented as a keynote address to the International Economic Association in Istanbul, Turkey, June 25–29, 2008. The authors are indebted to the Ford, Macarthur, and Hewlett Foundations for financial support. The authors are grateful to Giselle Guzmán for research assistance. All equations have been estimated and graphs generated with Eviews by Quantitative Micro Software, LLC.
2. Columbia University.
3. Columbia University, Co-President of the Initiative for Policy Dialogue and Visiting Professor at University of Manchester.
4. See the Commission of Experts of the President of the UN General Assembly on Reforms of the International Monetary and Financial System website for more information <<http://www.un.org/ga/president/63/commission/background.shtml>>.
5. The term “net savings” is used to note that some individuals may be dissaving, some individuals may save part of the year and dissave other parts of the year, and still others may be savings. What matters for the national income accounts is the net savings of the private sector. Conceptually, we should have a parallel analysis for the public sector, in which case investment would include both private and public investment. Later, however, we interpret the model using standard data, in which there is no distinction between government consumption and investment. The fiscal

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deficit is the difference between government expenditures (whether investment or not) and government revenue.

6. There are other partial equilibrium stories that one can tell. We discuss one in the next section. Another, discussed in Ocampo et al. (2009), focuses on movements in private and public sector deficits.
7. Empirical research rejects Ricardian equivalence in its pure form, although some studies have found Ricardian effects in saving behavior. For a technical review of the literature, see Briotti (2005).
8. Note that in Figure 17.5, the pre-1990 figures are for West Germany while the post figures are for unified Germany.
9. A variable X is said to Granger cause another variable Y if lagged values of X provide statistically significant information about future values of Y .
10. In the case of the other countries, even though there is no strong relationship, we can still ask the (obviously weak) direction of causation. In the case of the US and all other countries, except Italy, we cannot reject the hypothesis that the trade deficit is causing the fiscal deficit. See Appendix 17.1.
11. NPS includes corporate as well as household savings. While household savings was zero, corporate savings was moderate—though far less than aggregate investment. (Investment includes housing.)
12. A savings glut reflects a gap between savings and investment—which can arise either because of high savings or low investment. The current problem seems generated more by the latter—what Ocampo has called investment anemia.
13. International Monetary Fund, International Financial Statistics; Rodrik (forthcoming).
14. In fact, the price paid for accumulating reserves may be less than seems apparent. The accumulation of reserves helps depress exchange rates, which increases exports and growth. See Greenwald and Stiglitz (2006).
15. Behavior may depend in important ways on other important variables, most notably on expectations of changes in the exchange rate.
16. In fact, some countries may determine their exchange rate accumulations to target an exchange rate, even under a flexible exchange rate system.
17. It is natural to use this general equilibrium approach to ask: what accounts for the deteriorating value of the dollar? It appears that to accommodate the *same* trade deficit, the dollar has to be weaker; this suggests a weakening of the demand for US exports *at a given exchange rate*. Since inflation in the US and most of its competitors has been relatively low and differences in inflation rates small, while US growth has been slower than that of the global economy, this suggests a shift downward for the demand for US exports. As we argue below, we can expect a reduced demand for dollars as a reserve currency, and this would suggest a further deterioration of the exchange rate.
18. As an example of the complexity introduced by dynamics, consider the impact of lowering interest rates in the US (the reserve country). This increases income (in the standard Keynesian model, if the economy is not at full employment); and while income in the non-reserve country also increases, it increases by less. For the US trade deficit to remain at the same level (to fulfill foreign demand for reserves) requires a fall in the exchange rate. There is an intertemporal arbitrage equation—the difference in reserve and non-reserve interest rates must be equal to the expected rate of appreciation. But to determine the latter, we have to

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specify expectations about the values of all the relevant variables in future periods.

19. A dynamic model would emphasize another effect: the increased deficit may lead to lower confidence in the country's currency. The expectation of inflation may lead to a decrease in demand for the currency (at the current exchange rate), thereby leading to a lower exchange rate.
20. This is a much weaker assumption than assuming approximate long-term balance in national private capital accounts. It effectively requires only that the US not be the target of global foreign investment over the long term. Moreover, allowing for net private capital flows would complicate the analysis without altering its basic implications. See endnote 14.
21. These results highlight the role that the simplification that net private flows are zero plays in the analysis. A country could increase its reserves by borrowing abroad, with the immediate implication that the change in the demand for foreign reserves results in no change in the value of NFS_N . If the borrowing is done by the government, the transaction is a wash, and any appearance of an increase in reserves is simply an accounting deception. Presumably, private flows are determined by values of relevant variables (incomes, exchange rates, expectations of these variables, etc.) but *not* by government demand for reserves. It is possible that changes in government demands for reserves induce changes in these variables in ways which affect net private flows that partially offset the official flows, thus mitigating to some extent the magnitude of the effects to which this paper calls attention. In recent years, some have argued that developing countries should have reserve policies which make reserves endogenous: as short-term private sector flows increase, then government reserves should increase in tandem. It is clear that while a few low income countries follow this policy, most of the increase in reserves in recent years is related to an increase in the demand for reserves (e.g. by the East Asian countries), and that the increase in the demand for reserves has (in total) not been fully offset by an increase in private flows. Some of the reserves may be viewed as "borrowed," but not all. Of course, even when reserves are borrowed, there are important implications for the stability of the system (the nature of the obligations mean that though the net flows may be zero, what is going on is not a wash.)
22. An alternative interpretation is that by distorting their economy towards exports and manufacturing, they increase their capacity to "learn," to absorb technology from more advanced industrial countries. While these benefits first touch the export sectors, they quickly diffuse throughout the economy. Elsewhere, we have referred to this as the "infant economy" argument for protection, and we have argued that maintaining an "undervalued" exchange rate may be an efficient way of implementing such policies. See Greenwald and Stiglitz (2006).
23. The data may, however, exaggerate the magnitude of these surpluses because of over-invoicing of exports and under-invoicing of imports.
24. See also Triffin (1960).
25. Concerns about the equity (as well as instability) of the global reserve system have, of course, been raised by many from the developing world. See, for instance, Ocampo (2007) and the references cited there. See also Stiglitz (2006) and the references cited there.

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26. Some have argued that being a reserve currency facilitates its ability to borrow in its own currency and to have more independence in the conduct of macro policy. While it is true that the fact that the United States borrows in its own currency allows it more freedom of action, many non-reserve currencies have long borrowed in their own currencies.
27. In a sense, the inequities are even more transparent in the case of "borrowed reserves" noted earlier—for instance, in poor countries that have to increase their reserves to offset increases in short-term private liabilities.
28. The inequities are increased further by the way that the international financial system has been run, with pro-cyclical monetary and fiscal policies being forced on developing countries (e.g. by IMF/World Bank conditionality), while the developed countries pursue counter-cyclical monetary and fiscal policies. This increases the riskiness of the periphery relative to the center, reinforces the pro-cyclical patterns of private capital flows that simultaneously are used to justify the differential treatment and exacerbate fluctuations in developing countries, and increase interest rate differentials. See, for example, Soros (2009).
29. There is an important detail: the exchange rate between global greenbacks and various currencies. In a world of fixed exchange rates (the kind of world for which the SDR proposal was first devised) this would not, of course, be a problem; in a world of variable exchange rates, matters are more problematic. So long as global greenbacks are held only by central banks, there is no real problem of speculation, so that the "official" exchange rate could differ from market exchange rates. One could use current market rates; alternatively, the official exchange rate, for instance, could be set as the average of the exchange rates over the preceding three years. In such a case, to avoid central banks taking advantage of discrepancies between current market rates and the official exchange rate, restrictions could be imposed on conversions (for instance, such conversions could only occur in the event of a crisis, defined by a major change in the country's exchange rate, output, or unemployment rate).
30. We envision global greenbacks only being held by central banks, but a more ambitious version of this proposal would allow global greenbacks to be held by individuals, in which case there would be a market price for global greenbacks, and the government could simply treat the global greenbacks as any other "hard" currency.
31. Of course, the sum of deficits would still have to equal the sum of surpluses: this is an identity.
32. Clearly, our proposal does not solve all of the problems leading to global instability of the financial system. We have already called attention to the important asymmetries in policy responses (pro-cyclical in developing countries, counter-cyclical in developed countries). Countries with fully open capital accounts will still be afflicted with pro-cyclical private capital flows. Our proposal would reduce (though not necessarily eliminate) the necessity of developing countries creating offsetting reserves, with the associated costs already noted. One could go further, as Ocampo (2007) and Ocampo et al. (2009) have done, in developing counter-cyclical allocations of global greenbacks.
33. Crises can also be precipitated by short-term dollar denominated liabilities exceeding reserves (see Furman and Stiglitz, 1998, and the references cited there); but again,

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because countries are likely to hold more reserves, it is less likely that this too will occur.

34. In some sense, there is still an opportunity cost: if there were no restriction of the kind set forth in the previous footnote, then the country could have converted the global greenbacks into dollars and used the dollars to purchase productive assets.
35. By the same token, the annual issuance of SDRs would not be inflationary—it would just undo the existing deflationary bias of the current system.
36. To the extent that motivation of holding reserves was to keep the exchange rate with the dollar low, countries may have limited scope for reallocating portfolios. They have to keep in dollar-denominated assets. Even as they began to shift out of dollars, the emphasis on portfolio management to which we drew attention earlier has led them to move out of Treasury bills into other dollar-denominated assets. This, in turn, has raised other concerns, most forcefully in the context of the debate over sovereign wealth funds.
37. Changes in central bank holdings, or market perceptions of central bank holdings, may contribute to instability; but in fact, central bankers are likely to be less volatile in their behavior than private market participants.

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A Modest Proposal

Appendix 17.1 Relationships between current account balances and government balances

	Observations	F-Statistic	Probability ¹
FR_GB_PGDP does not Granger Cause FR_CA_PGDP	26	0.97237	0.3343
FR_CA_PGDP does not Granger Cause FR_GB_PGDP		0.80137	0.3800
GE_GB_PGDP does not Granger Cause GE_CA_PGDP	26	0.39029	0.5383
GE_CA_PGDP does not Granger Cause GE_GB_PGDP		0.69059	0.4145
IT_GB_PGDP does not Granger Cause IT_CA_PGDP	26	1.57813	0.2216
IT_CA_PGDP does not Granger Cause IT_GB_PGDP		12.7867	0.0016
JP_GB_PGDP does not Granger Cause JP_CA_PGDP	26	0.47538	0.4974
JP_CA_PGDP does not Granger Cause JP_GB_PGDP		0.02899	0.8663
UK_GB_PGDP does not Granger Cause UK_CA_PGDP	26	1.42696	0.2444
UK_CA_PGDP does not Granger Cause UK_GB_PGDP		2.12446	0.1585
US_GB_PGDP does not Granger Cause US_CA_PGDP	26	0.01131	0.9162
US_CA_PGDP does not Granger Cause US_GB_PGDP		0.16075	0.6922

¹ Probability of rejecting the Null hypothesis.