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ABSTRACT

We show that the when one takes into account the global equilibrium ramifications of an unwinding

of the US current account deficit, currently estimated at 5.4% of GDP, the potential collapse of the

dollar becomes considerably larger--more than 50% larger--than our previous estimates (Obstfeld

and Rogoff 2000a). That global capital markets may have deepened (as emphasized by US Federal

Reserve Chairman Alan Greenspan) does not affect significantly the extent of dollar decline in the

wake of global current account adjustment. Rather, the dollar adjustment to global current account

rebalancing depends more centrally on the level of goods-market integration. Whereas the dollar's

decline may be benign as in the 1980s, we argue that the current conjuncture more closely parallels

the early 1970s, when the Bretton Woods system collapsed. Finally, we use our model to dispel some

common misconceptions about what kinds of shifts are needed to help close the US current account

imbalance. Faster growth abroad helps only if it is relatively concentrated in nontradable goods;

faster productivity growth in foreign tradable goods is more likely to exacerbate the US adjustment

problem.

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Four years ago, we published a paper (Obstfeld and Rogoff 2000a) arguing that the United States current account deficit—then running at 4.4% of GDP—was on an unsustainable trajectory over the medium term, and that its inevitable reversal would precipitate a change in the real exchange rate of 12 to 14% if the rebalancing were gradual, but with significant potential overshooting if the change were precipitous. Though the idea that global imbalances might spark a sharp decline in the dollar was greeted with considerable skepticism at the time, the view has since become quite conventional. Indeed, when Federal Reserve Chairman Alan Greenspan gave a speech in November 2003 arguing that the US current account would most likely resolve itself in quite a benign manner, his once conventional view was greeted as contrarian.[1]

In addition to updating the earlier calculations, this paper extends our previous analytical framework in some important dimensions, including taking into account general equilibrium considerations resulting from the United States' large size in the global economy. We also generalize our model to incorporate terms of trade changes (to the relative price of exports and imports), in addition to the relative price of traded and nontraded goods. These analytical changes point to a steeper dollar decline, with the general equilibrium considerations being particularly significant.

Under most reasonable scenarios, the rise in relative United States saving required to close up the current account deficit implies a negative demand shock for US-produced nontraded goods. The same forces, however, imply a positive demand shock for foreign nontraded goods, and this general equilibrium effect turns out to imply an even larger change—more than 50% larger—in the real dollar exchange rate than in our earlier partial equilibrium calculation. Overall, taking into consideration current data, as well as our improved analytical framework, we conclude that the US current account poses a larger potential decline in the dollar than we had earlier speculated. Moreover, we now believe that some of the potential rebalancing shocks are considerably more adverse than one might have imagined in 2000 (in view of the increased long-term security costs that the United States now faces as well as its open-ended government budget deficits). Thus, our overall take is

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[1] See Greenspan (2004).

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that the United States current account problem poses much more significant risks today than it did when we first raised the issue four years ago.[2]

The general equilibrium perspective of this paper also offers helpful insights into what sorts of traumas the US and foreign economies might experience, depending on the nature of the shocks that lead to global current account rebalancing. For example, a common perception is that a global rebalancing in demand risks setting off a dollar depreciation that might be catastrophic for Europe and Japan. But as the model makes clear, this is not necessarily the case. It is true that a dollar depreciation will likely shift demand towards United States exports and away from exports in the rest of the world, although this effect is mitigated to the extent there is home bias in consumers' preferences over tradables. However, ceteris paribus, global rebalancing of demand will give a large boost to foreign nontraded goods industries relative to United States nontraded goods industries, and this has to be taken into account in assessing the overall impact of the dollar depreciation. Another widespread belief in the policy literature is that a pickup in foreign productivity growth rates, relative to United States rates, should lead to a closing of global imbalances. Our analytical framework shows that would only be the case if the relative productivity jump were in nontradable goods production, rather than tradable goods production where generalized productivity gains usually first show up. Therefore, contrary to conventional wisdom, as the global recovery rebalances towards growth in Europe and Japan, the US current account deficit could actually become larger rather than smaller, at least initially.

In the first section of the paper we review some basic statistics on the size and current trajectory of the United States current account deficit, the country's net international investment position, and the dollar's real exchange rate. Compared to similar charts and tables in our 2000 paper, we find that the US current account position has worsened somewhat, whereas the trade-weighted dollar has moved very little (appreciating until February 2002, and unwinding that appreciation since). The path of US net international indebtedness has been somewhat different from that of cumulated current accounts, in part due to the rate-of-return effect highlighted by Gourinchas

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[2]For another early examination of US external deficit sustainability, see Mann (1999).

and Rey (2004): that US current account deficits historically predict high future dollar returns on US foreign assets compared to US foreign liabilities.[3] As Tille (2003, 2004) has observed, the composition of US foreign assets and liabilities—with US assets only partly linked to the dollar and liabilities almost entirely dollar-denominated—implies that a depreciation of the dollar helps strengthen the US net foreign asset position.[4] In the United States, however, the bond-market rally associated with the onset of recession in 2001 worked to increase net foreign debt, an effect that will play out in reverse if long-term dollar interest rates rise relative to foreign rates. While these considerations are important for determining the timing of the United States current account's ultimate reversal, they turn out not to be very important (as we shall see) in determining the ultimate requisite fall in the dollar whenever global current accounts finally close up. The reason is that the main impact on the dollar comes from a global rebalancing of demand, rather than any change in the transfer necessitated by interest payments on global net debt positions.

A few further points merit mention, both by way of introduction to the present analysis and clarification of our earlier paper. First, our framework should not be thought of as asking the question: "How much depreciation of the dollar is needed to rebalance the current account?" Though wildly popular, this view is misguided. In fact, most empirical and theoretical models (including ours) suggest that even very large autonomous exchange rate movements will not go far toward closing a current account gap of the magnitude presently observed in the case of the United States. The lion's share of the adjustment has to come from saving and productivity shocks that help equilibrate global net saving levels, and that imply dollar change largely as a by-product (though our model of course implies simultaneous determination of exchange rates and current accounts). In particular, although we allow the terms of international trade to respond to current account adjustment, the relative price of imports and exports is only one element underlying the

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[3]In general, the rate of return on US foreign assets has exceeded that on US foreign liabilities; see Lane and Milesi-Ferretti (2003).

[4]Lane and Milesi-Ferretti (2001) have attempted to adjust for such asset-price changes in constructing their series of countries' foreign assets and liabilities. See also Lane and Milesi-Ferretti (2004).

overall real exchange rate response, and not the dominant element from a quantitative viewpoint.

Second, it is important to note that our model assumes that labor and capital cannot move freely across sectors in the short run. To the extent factors are mobile, domestically as well as internationally, and to the extent that the closing of the current account gap plays out slowly over time (allowing factors of production more time to relocate), the real exchange rate effects of global rebalancing will be smaller than we calculate here. A related issue that we leave aside is the possibility of change in the range of goods produced and exported by the United States. Although that effect realistically is absent in the short run, over the longer run it might soften the terms of trade effects of various economic disturbances.

Third, the sanguine view that capital markets are deep and the US current account can easily close up without great pain ignores the adjustment mechanism highlighted here, which depends more on goods-market than capital-market integration. The US current account may amount to "only" 5% of *total* US production, but it is likely 20% or more of US *traded* goods production (at least according to the calibration suggested by Obstfeld and Rogoff [2000a]). Our view is consistent with the empirical findings of Edwards (2004). His survey of current account reversals in emerging markets finds an economy's level of trade to be the major factor in determining the size of the requisite exchange rate adjustment, with larger traded-goods sectors implying a smaller currency adjustment on average. Calvo, Izquierdo, and Talvi (2003), who adopt a framework nearly identical to that of Obstfeld and Rogoff (2000a), arrive at a similar conclusion. Parenthetically, we note that most studies of current account reversals (including IMF 2002) focus mainly on experiences in small open economies. But as our model shows, the fact the United States is a large economy considerably levers up the potential effects.

Finally, we caution the reader that while our analysis points to a large potential move in the dollar—at least 20% in our baseline long-term calculation and, if the adjustment takes place quickly so that exchange rate pass-through is incomplete, the move could top 40%—it does not necessarily follow that the adjustment will be painful. As we previously noted, the

end of the 1980s witnessed a 40% decline in the trade weighted dollar as the Reagan-era current account deficit closed up. Yet, the change was arguably relatively benign (though some would say that Japan's macroeconomic responses to the sharp appreciation of the yen helped plant the seeds of its later prolonged slump). However, it may ultimately turn out that the early-1970s dollar collapse accompanying the breakdown of the Bretton Woods system is a closer parallel. Then, as now, the United States was facing open-ended security costs, rising energy prices, twin deficits, and the need to rebalance monetary policy.[5]

1   The Trajectory of the US Current Account: Stylized Facts

Figure 1 shows the trajectory of the United States current account as a percentage of GDP since 1970. As is evident from the chart, the recent spate of large deficits exceeds even those of the Reagan era. Indeed, in recorded history, the US current account never appears to have been larger than the 5.1% experienced in 2003, much less the 5.4% projected by the IMF for 2004. Even in the late nineteenth century, when the US was still an emerging market, its deficit never exceeded 4% of GDP according to Obstfeld and Taylor (2004). Figure 2 shows the net foreign asset position of the United States, also as a percentage of GDP. The reader should recognize that this series is intended to encompass all type of assets, including stocks, bonds, bank loans, and direct foreign investment. Uncertainty about the US net foreign asset position is high, however, because it is difficult firmly to ascertain capital gains and losses on US positions abroad, not to mention

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[5]Though there is no official Bretton Woods system today, some have argued (Dooley et al., 2004a, b) that the current Asian exchange rate pegs constitute a Bretton Woods II system. Perhaps, but that analysis applies more readily to China than Japan, which accounts for a much bigger share of global current account surpluses. Even for China, current evidence suggests that more market-based interest rates and exchange rates are going to be needed to achieve stability. If, instead, the yuan's dollar exchange rate remains inflexible as China further integrates into global trade and finance, the yuan will become increasingly vulnerable to speculative attack.

foreign positions in the United States. But the latest end-2003 figure of 23% is close to the all-time high level that the United States is estimated to have reached in 1894, when assets located in the US accounted for a much smaller share of the global wealth portfolio. Figure 3, which updates a similar figure from our 2000 paper, shows the likely trajectory of the US net foreign asset position, assuming continuing external deficits of 5% of GDP and continuing 3.5% GDP growth. (We note that IMF 2004 predicts a 2005 US deficit of 5.1% of GDP.) The graph also shows various benchmarks reached by other, much smaller, countries, in many cases prior to major debt problems. We do not anticipate the United States having a Latin-style debt crisis, of course, but these benchmarks are nevertheless informative. We note that our figure does not allow for any exchange rate depreciation which—assuming foreign citizens did not receive compensation in the form of higher nominal interest payments on dollar assets—would slow down the rate of debt accumulation along the lines emphasized by Tille (2003) and by Gourinchas and Rey (2004).

Figure 4 shows the US Federal Reserve's "broad" real dollar exchange-rate index, which measures the real value of the trade weighted dollar against a comprehensive group of US trading partners. As we asserted in the introduction, the index has moved relatively little since we presented our 2000 paper. Although the nexus of current accounts and exchange rates has changed only slightly over the past four years, however, other key factors have changed dramatically.

Figure 5 highlights the dramatic changes witnessed in the fiscal positions of the major economies. The swing in the United States fiscal position has been particularly dramatic, from near balance in 2000 to a situation today where the consolidated government deficit roughly matches the size of the current account deficit. That fact is highlighted in figure 6, which breaks down the US current account deficit trajectory into the component attributable (in an accounting sense) to the excess of private investment over private saving, and the component attributable to government dissaving. One change not indicated in this diagram is the changing composition of the private net saving ratio. From the mid 1990s until the end of 1999, the US current account deficit was largely a reflection of exceptionally high levels of investment. Starting in 2000, but especially by 2001, investment collapsed.

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Private saving also collapsed, however, so there was no net improvement in the current account prior to the recent swelling of the fiscal deficit.

Finally, figure 7 illustrates another important change, the rising level of Asian central bank reserves (most of which are held in dollars). At the end of 2003, foreigners owned 37% of all US Treasuries. Netting out the Treasuries held by the US Social Security Trust administration and by the Federal Reserve System, the remaining Treasuries held privately are of roughly the same order of magnitude as foreign central bank reserves. These reserves are held mostly by Asia (though Russia, Mexico, and Brazil are also significant), and held mostly in dollars. Indeed, during late 2003 and early 2004, foreign central bank acquisition of Treasuries nearly equaled the entire US current account deficit.

We acknowledge that these data do not necessarily imply any immediate end to the sequence of high US current account deficits. It is possible that they will go on for an extended further period as the world adjusts to more globalized security markets, with foreign agents having a rising preference for holding United States assets. We do not believe, however, that this is the most likely scenario, particularly given that the composition of foreign flows into the United States remains weighted toward bonds rather than equity, and particularly now that the twin deficits problem of the 1980s has resurfaced. One likely shock that might reverse the US current account is a rise in US private saving—perhaps due to a slowdown or collapse in real estate appreciation. Another possibility is a fall in saving rates in Asia, which is particularly likely in Japan given its aging population and the lower saving rates of younger cohorts. A combination of faster traded goods productivity growth in the United States or nontraded goods productivity growth in the rest of world, and some consolidation of the US government budget deficit would all help tilt the US current account back toward balance.

In the next section of the paper, we turn to an update of our earlier model that aims to ask what a change in the US current account might do to global demand and exchange rates. We note that the model is calibrated on a version of our "six puzzles" paper (Obstfeld and Rogoff 2000b) that attempts to be consistent with observed levels of OECD capital market integration and saving-investment imbalances. Less technically oriented readers may choose

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to skip directly to section 3.

2 The Model

The model here is a two-country extension of the small-country endowment model presented in Obstfeld and Rogoff (2000a), in which one can flexibly calibrate the relative size of the two countries. We go beyond our earlier model by differentiating between home and foreign produced tradables, in addition to our earlier distinction between tradable and nontradable goods. We further extend our previous analysis by exploring more deeply the alternative shocks that might drive the ultimate closing of the US current account gap.

Otherwise, the model is similar in spirit to our earlier paper on this topic. We draw the reader's attention to two features: First, by assuming that endowments are given exogenously for the various types of outputs, we are implicitly assuming that capital and labor are not mobile between sectors in the short run. To the extent global imbalances only close slowly over long periods (admittedly not the most likely case based on experience), then factor mobility across sectors will mute any real exchange rate effects (Obstfeld and Rogoff 1996). Second, our main analysis assumes that nominal prices are completely flexible. That assumption—in contrast to our assumption on factor mobility—leads one to sharply understate the likely real exchange rate effects of a current account reversal. As we discuss later, with nominal rigidities and imperfect pass-through from exchange rates to prices, the exchange rate will need to move much *more* than in our baseline case in order to maintain employment stability.

The Home consumption index depends on Home and Foreign tradables, as well as domestic nontradables. (Think of the United States and the rest of the world as the two countries.) It is written in the nested form

$$C = \left[\gamma^{\frac{1}{\theta}} C_T^{\frac{\theta-1}{\theta}} + (1-\gamma)^{\frac{1}{\theta}} C_N^{\frac{\theta-1}{\theta}}\right]^{\frac{\theta}{\theta-1}},$$

where C_N represents nontradables consumption and C_T is an index given by

$$C_T = \left[\alpha^{\frac{1}{\eta}} C_H^{\frac{\eta-1}{\eta}} + (1-\alpha)^{\frac{1}{\eta}} C_F^{\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}}.$$

where C_H is the home consumption of Home-produced tradables., and C_F is home consumption of Foreign-produced tradables. Foreign has a parallel index, but with a weight α ($\alpha > \frac{1}{2}$) on consumption of its own export good. This assumption of "mirror symmetric" rather than identical tradables baskets generates a home consumption bias within the category of tradable goods.[6]

The values of the two parameters θ and η are critical in our analysis. Parameter θ is the (constant) elasticity of substitution between tradable and nontradable goods. Parameter η is the (constant) elasticity of substitution between domestically-produced and imported tradables. The two parameters are important because they underlie the magnitudes of price responses to quantity adjustments. Lower substitution elasticities imply that sharper price changes are needed to accommodate a given change in quantities consumed.

The Home consumer price index (CPI) corresponding to the preceding consumption index C, measured in units of Home currency, depends on the prices of tradables and nontradables. It is given by

$$P = \left[\gamma P_T^{1-\theta} + (1-\gamma) P_N^{1-\theta} \right]^{\frac{1}{1-\theta}},$$

where P_N is the Home-currency price of nontradables and P_T, the price index for tradables, depends on the local prices of Home- and Foreign-produced tradables, P_H and P_F, according to the formula

$$P_T = \left[\alpha P_H^{1-\eta} + (1-\alpha) P_F^{1-\eta} \right]^{\frac{1}{1-\eta}}.$$

In Foreign there are an isomorphic nominal CPI and index of tradables prices, but with the latter attaching the weight $\alpha > \frac{1}{2}$ to Foreign exportable goods. These exact price indexes are central in defining the real exchange rate.

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[6]Warnock (2003) also takes this approach.

To start, we assume the law of one price for tradables. Thus $P_F = \mathcal{E}P_F^*$ and $P_H^* = P_H/\mathcal{E}$, where $\mathcal{E}$ is the Home-currency price of Foreign currency—the nominal exchange rate. (In general we will mark Foreign nominal prices with asterisks.) The terms of trade are

$$\tau = \frac{P_F}{P_H} = \frac{P_F^*}{P_H^*}$$

and the real exchange rate is

$$q = \frac{\mathcal{E}P^*}{P}.$$

Note that because of the home bias in consumption of tradables, purchasing power parity does not hold for the differing preferred baskets of tradables in each country, even if the law of one price holds for individual tradable goods. That is, $P_T \neq \mathcal{E}P_T^*$. Indeed, the ratio $\mathcal{E}P_T^*/P_T$ is given by

$$\frac{\mathcal{E}P_T^*}{P_T} = \frac{[\alpha\tau^{1-\eta} + (1-\alpha)]^{\frac{1}{1-\eta}}}{[\alpha + (1-\alpha)\tau^{1-\eta}]^{\frac{1}{1-\eta}}},$$

while the real exchange rate is

$$q = \frac{\mathcal{E}P_T^*}{P_T} \times \frac{[\gamma + (1-\gamma)(P_N^*/P_T^*)^{1-\theta}]^{\frac{1}{1-\theta}}}{[\gamma + (1-\gamma)(P_N/P_T)^{1-\theta}]^{\frac{1}{1-\theta}}}.$$

For $\alpha > \frac{1}{2}$, the measured real exchange rate depends positively on the terms of trade (that is, $dq/d\tau > 0$).

Because the assumed utility functions imply constant elasticity of demand for each of the endowment goods, we can conclude that the global market for the home produced good clears when

$$Y_H = \alpha\gamma \left(\frac{P_H}{P_T}\right)^{-\eta} \left(\frac{P_T}{P}\right)^{-\theta} C + (1-\alpha)\gamma \left(\frac{P_H/\mathcal{E}}{P_T^*}\right)^{-\eta} \left(\frac{P_T^*}{P^*}\right)^{-\theta} C^*,$$

where Y_H is home's endowment of its tradable good. There is a corresponding market-clearing condition for the foreign tradable supply, Y_F. For Home nontradables we have

$$Y_N = (1-\gamma) \left(\frac{P_N}{P}\right)^{-\theta} C,$$

and, of course, there is again a corresponding Foreign condition.

Let us abstract from the underlying determinants of domestic and foreign saving and consumption. Thus, we take as given C and C^*, along with the endowments Y_H, Y_F, Y_N, and Y_N^*. Then the preceding market-equilibrium conditions allow us to solve for relative prices. For example, we can rewrite the equilibrium condition for the home export's market as

$$Y_H = \alpha \left(\frac{P_H}{P_T}\right)^{-\eta} C_T + (1-\alpha)\left(\frac{P_H/\mathcal{E}}{P_T^*}\right)^{-\eta} C_T^*$$

implying that the price indices must be governed by

$$P_H Y_H = \alpha \left(\frac{P_H}{P_T}\right)^{1-\eta} P_T C_T + (1-\alpha)\left(\frac{P_H}{\mathcal{E} P_T^*}\right)^{1-\eta} \mathcal{E} P_T^* C_T^*. \qquad (1)$$

Residually, we can calculate Home's current account surplus CA, measured in Home currency, as

$$CA = P_H Y_H + iF - P_T C_T,$$

where F is net Home foreign assets (in Home currency units). For Foreign, the corresponding relationship is

$$\mathcal{E} CA^* = \mathcal{E} P_F^* Y_F - iF - \mathcal{E} P_T^* C_T^* = -CA.$$

As a first pass to understanding the exchange rate impact of global current account rebalancing, we begin by solving analytically for the effects of shocks that make $CA = 0$. (If there is no production effect, such shocks are best thought of as shocks to relative Home and Foreign demand. When we move later to consider supply shocks, we will allow relative outputs to move simultaneously.) Substituting for $P_T C_T$ and $\mathcal{E} P_T^* C_T^*$ in eq. (1) and its Foreign-tradable analog, one gets

$$P_H Y_H = \alpha \left(\frac{P_H}{P_T}\right)^{1-\eta} (P_H Y_H + iF - CA) + (1-\alpha)\left(\frac{P_H}{\mathcal{E} P_T^*}\right)^{1-\eta}(P_F Y_F - iF + CA),$$
$$(2)$$

$$P_F Y_F = (1-\alpha)\left(\frac{P_F}{P_T}\right)^{1-\eta}(P_H Y_H + iF - CA) + \alpha \left(\frac{P_F}{\mathcal{E} P_T^*}\right)^{1-\eta}(P_F Y_F - iF + CA),$$

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for tradables. while, for the nontradables markets, one can show that

$$P_N Y_N = \frac{1-\gamma}{\gamma} \left(\frac{P_N}{P_T}\right)^{1-\theta} P_T C_T = \frac{1-\gamma}{\gamma} \left(\frac{P_N}{P_T}\right)^{1-\theta} (P_H Y_H + iF - CA), \quad (3)$$

$$\mathcal{E} P_N^* Y_N^* = \frac{1-\gamma}{\gamma} \left(\frac{P_N^*}{P_T^*}\right)^{1-\theta} (\mathcal{E} P_F^* Y_F - iF + CA). \quad (4)$$

Of the preceding conditions, three are independent, allowing solution for the terms of trade τ, $\frac{P_N}{P_T}$, $\frac{P_N^*}{P_T^*}$, and hence the real exchange rate, q. Notice the presence of a transfer effect in the equations above. Unless $\alpha = \frac{1}{2}$, the stock of net foreign assets influences equilibrium relative prices. It will be most helpful to rewrite the equations in terms of ratios to nominal tradable GDPs ($P_H Y_H$ and $P_F Y_F$), the ratios of nontradable to tradable supplies, and the relative sizes of the two countries' tradables sectors. Let $ca = CA/(P_H Y_H)$ and $f = F/(P_H Y_H)$. Let $\sigma_T = Y_H/Y_F$, $\sigma_N = Y_N/Y_H$, and $\sigma_N^* = Y_N^*/Y_F$. Finally, let $x = P_N/P_T$ and $x^* = P_N^*/P_T^*$. Then we can write the three independent eqs. (2)-(4) as

$$1 = \alpha \frac{1}{[\alpha + (1-\alpha)\tau^{1-\eta}]} (1 + if - ca) + (1-\alpha)\frac{1}{[\alpha\tau^{1-\eta} + (1-\alpha)]} \left(\frac{\tau}{\sigma_T} - if + ca\right),$$

$$(5)$$

$$\sigma_N = \left(\frac{1-\gamma}{\gamma}\right) x^{-\theta} \left[\alpha + (1-\alpha)\tau^{1-\eta}\right]^{-\frac{1}{1-\eta}} (1 + if - ca),$$

and

$$\sigma_N^* = \left(\frac{1-\gamma}{\gamma}\right) (x^*)^{-\theta} \left[\alpha + (1-\alpha)\tau^{-(1-\eta)}\right]^{-\frac{1}{1-\eta}} \left(1 - i\frac{\sigma_T}{\tau}f + \frac{\sigma_T}{\tau}ca\right).$$

The real exchange rate q is given by

$$q = \frac{[\alpha\tau^{1-\eta} + (1-\alpha)]^{\frac{1}{1-\eta}}}{[\alpha + (1-\alpha)\tau^{1-\eta}]^{\frac{1}{1-\eta}}} \times \frac{\left[\gamma + (1-\gamma)(x^*)^{1-\theta}\right]^{\frac{1}{1-\theta}}}{[\gamma + (1-\gamma)x^{1-\theta}]^{\frac{1}{1-\theta}}}.$$

With these analytical results in hand, we now proceed to study the model's quantitative implications.

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3 The Exchange Rate Impacts of Rebalancing Global Current Accounts

One can potentially do a number of alternative experiments within the preceding framework. For example, as already discussed, just letting CA go to zero gives a pure relative demand-driven current account reduction (that is, rebalancing of current accounts because US aggregate demand falls while foreign aggregate demand rises). And, as we have also already alluded, one can simulate any accompanying effects of a relative productivity shocks by varying Home and Foreign relative output at the same time as we let the current account go to zero.

Other exercises include trying to simulate the effects of a rise in US government war expenditures. To parametrize that exercise, we need to ask how military spending is allocated between tradables. and nontradables, as well as between Home and Foreign. We are assuming that international debt is denominated in dollars, but that assumption is easily relaxed. Finally, we can vary the relative size of the US economy within the global economy.

In our calibration we assume that $P_H Y_H/(P_H Y_H + P_N Y_N) \approx 0.25$, so that a deficit-to-tradables ratio of $CA/P_H Y_H = -0.2$ approximates the current external deficit of the United States. We take net US foreign assets (in dollars), F, divided by the dollar value of traded goods output, $P_H Y_H$, to be -0.8, and assume a nominal interest rate of 0.05 per year. Also, under the assumption that, $Y_H/Y_F = 0.22$, the dollar value of tradables produced by the US is close to a quarter of global dollar sales of tradables. We take $\eta = 2$ or 3, $\gamma = 0.25$ and $\alpha = 0.7$ For the most part, this calibration is broadly consistent with the one that we deduced in Obstfeld and Rogoff (2000b), where we argued that realistic trade costs (here, a large share of nontraded goods in consumption) can explain the degree of international capital-market integration that we actually observe among the OECD countries. We have taken the international trade elasticity η to be quite a bit lower than the value of $\eta = 6$ assumed in Obstfeld and Rogoff (2000b), however, both because short-run trade elasticities are smaller and because estimates based on micro data are quite a bit larger than those estimated to apply to aggregated US trade flows (Gagnon 2003). Our calibration also requires an assumption

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about the elasticity of substitution in consumption between tradables. and nontradables, θ. In our 2000a paper, we argued that a unit elasticity was a reasonable base case, and that the empirical literature would support even a lower estimate. Since it will turn out that the exchange rate change is larger the smaller θ, and since we want to include a conservative benchmark, we allow for θ as large as 2, in order to see how a higher elasticity of intranational substitution (that is, between tradables and nontradables) might moderate the exchange rate effects.[7]

In table 1, we ask what happens if the US accounts for roughly a quarter of world GDP and a relative demand shock suddenly closes its current account deficit from 5% of GDP to full balance. (Suppose, for example, that an end to the housing boom in the United States reduces consumption there, while improving growth expectations lead to higher consumption levels in Europe, Japan, and China.) In our first (low-elasticity) case of $\theta = 1$, $\eta = 2$, the real exchange rate needs to move by about 34% (computed as a log difference), more than twice the effect we found in our earlier small-country model with flexible prices. (Our favored estimate, which allows for nominal rigidities and incomplete pass-through in the short run, is going to be higher still, see below.). Why is the effect so large? One part of it comes from the fact that we are now allowing for terms of trade changes, which reinforce the effects of the relative price of nontraded goods on the real exchange rate. (The shift in the locus of global demand away from the United States leads to a relative drop in demand for US traded goods because US citizens are assumed to have a relative preference for US-produced tradables. Thus the US terms of trade fall by about 7%.) Some of the difference comes from the fact that whereas the US current account was 4.4% of GDP in 2000, it is over 5% today, so closing up the gap leads to a bigger exchange rate

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[7]The only technical issue in the simulation below comes in solving eq. (5), which we write as

$$1 = \alpha \frac{1}{z}\left(1 + if - ca\right) + (1 - \alpha)\left[\frac{1 - \alpha}{\alpha(z - \alpha) + (1 - \alpha)^2}\right]\left(\frac{\tau}{\sigma_T} - if + ca\right).$$

Given τ, this is a quadratic equation in z. One can solve for z using the quadratic formula, then extract the implicit solution for a τ using $z = \left[\alpha + (1 - \alpha)\tau^{1-\eta}\right]$, then substitute the τ back into the quadratic, solve again for z, and iterate until convergence is achieved.

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movement. But a final key difference arises because we are now allowing for general equilibrium effects. In the United States, the elimination of the current account deficit implies roughly a 20% fall in the demand for traded goods in the United States (since the current account deficit is 5% of GDP, while traded goods production accounts for about 25% of GDP). Thus, the relative price of nontraded goods needs to fall by 20% when the elasticity of intranational substitution is 1. But now, we must also take into account the fact that abroad, the price of nontraded goods must *rise* in parallel to the effect in the United States. If the two regions are assumed roughly equal in size, then in our general equilibrium model, the real exchange rate change must be twice that in the partial equilibrium model. If the US were to account for only 1/4 of global traded output—so that a US current account deficit of 5% of GDP corresponded to a foreign current account surplus of 1.67% of foreign GDP—the effect would be roughly 33% larger instead of double. With higher elasticities all around, for example, as in the last row of table 1, where $\theta = 2$ and $\eta = 3$, the terms of trade fall by only 3.9% whereas real dollar depreciation is 14.7%.

We emphasize that in a quantitative decomposition of the overall real exchange rate response, substitution between US-produced and foreign traded goods is less important empirically than substitution between traded and nontraded goods. With nontraded output constituting roughly 75% of GDP, restoration of balanced trade requires a big overall shift in the consumption of nontradables relative to the consumption of both imported and exported goods. The terms of trade effect would dominate only if the elasticity of substitution between traded and nontraded goods were much higher than that between imports and exports, which does not appear to be the case empirically.

Table 2 asks what happens if the shock that closes up current accounts is associated with a large relative *rise* (20%) in US productivity in tradables This will, of course, mute the real exchange rate effect: higher production of tradables allows the US to cut its current account deficit without a correspondingly large cut in consumption. In our base case, $\theta = 1, \eta = 2$, the dollar depreciates in real terms by only 25.5% as compared with the 33.6% in table 1, but remember, this is in the face of a huge increase in traded

goods production that depresses our terms of trade by 14.6%. The effect is approximately linear, so for more realistic values of the productivity shock (e.g., $\Delta Y_H / Y_H = 0.02$), the effect would be to reduce the exchange rate movement implied by full current account adjustment by only a couple of percent, or even less. For higher elasticities, both the terms of trade decline and the real dollar depreciation are smaller.

It may seem anomalous to the reader that it takes a *rise* in relative US productivity in tradables to dampen the exchange rate effect of a reduction in the US deficit; however, this is perfectly logical. Policy analysts frequently argue that a rise in relative productivity in the rest of the world will mute the exchange-rate impact of global current account rebalancing. But this is correct only if the foreign productivity rise is concentrated in the non-tradables sector—for example, if foreign retailing productivity levels start to catch up to those of the United States, which has experienced a retailing productivity boom over the past 20 years. Indeed, according to our model, the US nontraded-goods productivity boom could help explain the widening of the US current account deficit. We will explore the issue in a follow-up paper.[8]

Table 3 allows the real dollar depreciation to reduce the real value of the US net foreign debt, in line with Tille's (2004) estimates of US foreign assets and liabilities denominated in foreign currencies. As hinted above, the effect on the extent of depreciation is not large, even when the reduction in net foreign debt is substantial. (This is only to be expected, as debt reduction cannot be significant when the exchange rate change is small.) For example, in the first row of Table 3, the net foreign debt of the US is reduced from 0.8 of tradables output to only 0.15 of nominal tradables output, yet the degree of real dollar depreciation is still 28.4% (as compared with 33.6% in table 1) and the fall in the terms of trade is 6.0% (as compared with 7.1% in table 1). For higher elasticities, the debt reduction is smaller, as is the effect on the ultimate equilibrium relative-price changes.[9]

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[8] For foreign productivity growth in tradables to promote real dollar appreciation, we would need an implausible combination of higher home consumption bias in tradables, a larger overall consumption share of tradables, and lower trade elasticities.

[9] These simulations assume that the monetary authority stabilizes the CPI, as explained below.

A final exercise, reported in table 4, assumes that the closing of the deficit is accompanied by a shift to permanently higher military and security expenditures, for example, due to an open-ended commitment of American force in Iraq. Nordhaus's (2002) estimates suggest that roughly 3% of US tradables would be required annually for this purpose. We assume that all the resources used are tradables, drawn roughly half out of US tradables and half out of foreign tradables. In the low-elasticity case, $\theta = 1$ and $\eta = 2$, both depreciation and the terms of trade decline are greater than in table 1, but not hugely so: a 36.1 versus 33.6% depreciation and a 7.3 versus 7.1% terms of trade decline. The differential effects are smaller at higher elasticities, as expected.

Some readers will be more interested in understanding what happens to the nominal exchange rate as opposed to the real exchange rate. To make this translation, we must, of course, make an assumption about monetary policy. The simplest assumption is that central banks target CPI inflation rates in which case, under flexible prices, $\Delta \log \mathcal{E} = \Delta \log q$.

All of the above assumes flexible prices and complete pass-through from exchange rates to final goods prices. While we do not explore price rigidities and imperfect pass-through explicitly in this paper, we can draw some preliminary conclusions from the results of our earlier small-country model. If pass-through from exchange rates to prices is 50% (as we assumed in our 2000 paper), the requisite change in the exchange rate will have to be roughly double the ones calculated in the tables, assuming that central banks target overall inflation and allow the exchange rate to move to maintain full employment in the nontraded goods sector. See figure 8. In fact, newer estimates suggest that for the United States, pass-through is less than 50% after one year, and 25% in the short run, (see Campa and Goldberg 2002), in which case the immediate overshooting would be twice as large. Because the pass-through following a very large exchange-rate change probably is higher, we might take 50% as a conservative estimate to use for the medium-term pass-through to import prices.

4 Parallels with the 1970s

Given our analysis, why then do some, such as Greenspan (2004), argue that a decline in the United States current account deficit is likely to be benign? Greenspan points to the fact that capital markets are becoming increasingly integrated, and cites reductions in home bias in equities, the secular waning of the Feldstein-Horioka puzzle, and other factors considered in our 2000b paper on the six major puzzles in international macroeconomics, as well as in our 2000a paper. But our calibration here is totally consistent with the current degree of integration of capital markets, and indeed is consistent with the calibration of our earlier paper. What matters for the exchange rate effect here is not the depth of international capital markets, but the costs of adjusting to lower tradables consumption in the *goods* markets. If the nontraded sector accounts for 75% of GDP, this is fully consistent with what we observe in capital markets.

The real question is not whether there needs to be a big exchange rate adjustment when the US current account closes up. For most plausible shocks leading to global rebalancing, this is a given. The real question is how drastic the economy-wide effects are likely to be. This is an open question. We agree with Greenspan's (2004) argument that some markets are becoming more flexible, and that this should allow the world economy to absorb the blow better than it might have otherwise. But whereas US markets may have achieved an impressive degree of flexibility, Europe (and to a lesser extent Japan) certainly has not. The rest of the world is not going to have an easy time adjusting to a massive dollar depreciation. It is also the case that world derivatives markets have exponentially expanded in comparison with even ten years ago. With little reliable data on counterparty risk, there has to be concern that a massive dollar movement could lead to significant financial problems that are going to be difficult to foresee before they unfold (e.g., along the lines of the collapse of Long Term Capital Management in 1998).

Of course, the optimists can point to the dollar's relatively benign fall in the late 1980s (though arguably it was a critical trigger in the events leading up to Japan's collapse in the 1990s). But perhaps the greatest concern is

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that today's environment has more parallels to the dollar collapse of the 1970s than to the 1980s. We intend to address this analogy in future research. For now, however, we note some broad similarities. During the years 1971-72 (in the run-up to the November 1972 election), the United States ran large budget deficits, had soft monetary policy, and faced open-ended security costs. Back then it was Vietnam; today it is Iraq and homeland security, the combined costs of which could easily match the cumulative 12% of GNP that the Vietnam War cost or the 15% of GNP that financed the Korean War (see Nordhaus 2002). There were twin deficits (albeit smaller in the 1970s than they are today), and energy prices were a major factor (although the 1974 oil price hike was much greater, when measured in real terms, than anything seen yet in 2004.) The year 1973 saw a breakdown of the Bretton Woods fixed exchange rate system (mainly involving European countries), but today there is a quasi-fixed exchange rate system with Asia.

Broadly speaking, one has to be concerned that if the United States current account closes up under a backdrop more like the 1970s than the 1980s, the outcome may be much more severe than it seemed to be during the 1980s dollar descent.

5   Conclusions

In the paper, we have generalized our discussion in Obstfeld and Rogoff (2000a) to take account of general equilibrium effects and terms of trade changes. We find that looking at the rebalancing of the United States current account in a global model, rather than a partial equilibrium model as in our earlier analysis, points to a much larger requisite change in the long-run real dollar exchange rate than we had previously estimated. Although a number of factors may mitigate (a higher elasticity of substitution between tradables and nontradables than in our baseline, and a greater degree of factor mobility across sectors), it still seems quite conservative to suppose that the trade weighted dollar needs to depreciate at least another 20% as the current account rebalances, with a large potential overshoot in the event of a rapid reversal causing the trade-weighted dollar to fall by 40% or more.

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Although the terms of trade play a quantitatively significant role, and also have consequences for aggregate national welfare and income distribution, the magnitude of their impact on the real exchange rate is dominated by the relative-price change we emphasized in our 2000a paper, that between traded goods in general and nontraded goods. In this paper, however, the real exchange rate calculations fully incorporate the effects of the parallel relative price changes in foreign countries. The dominant role of the relative nontraded-goods price is linked to the very large production shares of nontradables in modern industrial economies.

Our discussion has not touched explicitly on issues of capital-market integration, and instead has focused on the relative price movements needed to preserve goods-market equilibrium in the face of a current-account adjustment. The extent of capital-market integration would enter the market primarily through the rate of interest that the US must pay foreigners on its external obligations. Even if the US can greatly expand its foreign debts without triggering a sharp rise in its cost of foreign finance, our analysis implies that when US current account adjustment comes, the exchange rate effects may be massive. Unless gross debts rise further or the US external borrowing rate rises sharply, however, the reduction in the current account itself will still be the dominant factor altering international relative prices.

Of course, as we noted above, it is difficult to say with certainty when the US current account adjustment will commence or whether it will be gradual or abrupt. With lower integration in the world capital markets, abrupt current account adjustment, sooner rather than later, is more likely. If greater financial integration allows bigger and more protracted US deficits, however, the ultimate relative price adjustments will have to be more extreme. In other words, further deepening of global capital markets may postpone the day of reckoning. But as long as nontraded goods account for the lion's share of US output, a sharp contraction in net imports—a significant closing of the US current account—will lead to a large exchange rate adjustment under most plausible scenarios. That adjustment will be sharper the longer is the initial rope that global capital markets offer to the United States.

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Table 1: Effect of Return to *CA* Balance, Outputs Constant

Value of θ	Value of η	Fall in Terms of Trade	Real Currency Depreciation
$\theta = 1$	$\eta = 2$	7.1 percent	33.6 percent
$\theta = 1$	$\eta = 3$	3.9 percent	25.4 percent
$\theta = 2$	$\eta = 2$	7.1 percent	19.8 percent
$\theta = 2$	$\eta = 3$	3.9 percent	14.7 percent

Table 2: Effect of Return to *CA* Balance, 20 Percent Rise in Home Tradables Output

| Value of θ	Value of η	Fall in Terms of Trade	Real Currency Depreciation
$\theta = 1$	$\eta = 2$	14.6 percent	25.5 percent
$\theta = 1$	$\eta = 3$	8.7 percent	15.2 percent
$\theta = 2$	$\eta = 2$	14.6 percent	16.7 percent
$\theta = 2$	$\eta = 3$	8.7 percent	9.8 percent

Table 3: Effect of Return to *CA* Balance, Allowing Exchange Rate to Revalue *NFA*

Value of θ	Value of η	Fall in Terms of Trade	Real Currency Depreciation
$\theta = 1$	$\eta = 2$	6.0 percent	28.4 percent
$\theta = 1$	$\eta = 3$	3.4 percent	22.1 percent
$\theta = 2$	$\eta = 2$	6.4 percent	18.0 percent
$\theta = 2$	$\eta = 3$	3.6 percent	13.6 percent

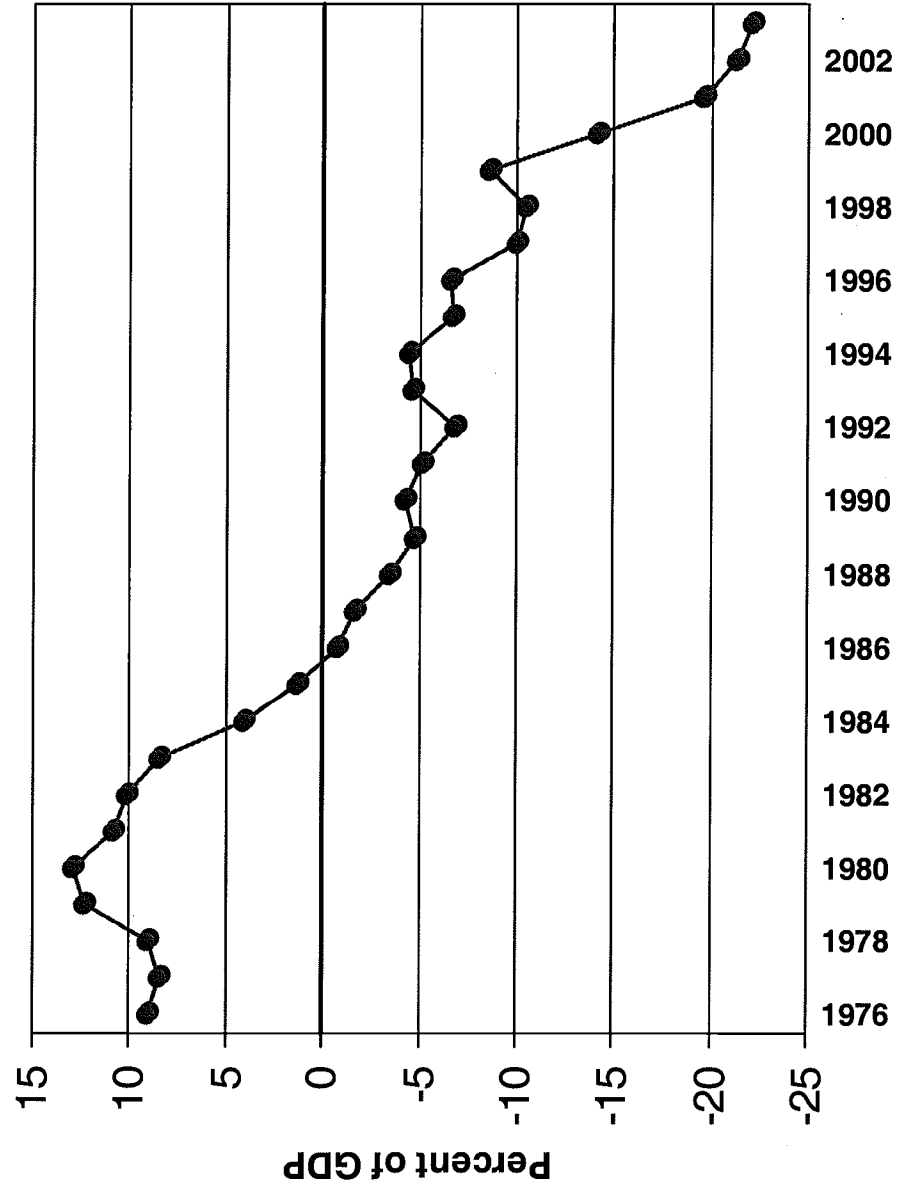**Table 4: Effect of Return to *CA* Balance, with Permanent Rise in Military Spending**

Value of θ	Value of η	Fall in Terms of Trade	Real Currency Depreciation
$\theta = 1$	$\eta = 2$	7.3 percent	36.1 percent
$\theta = 1$	$\eta = 3$	3.9 percent	27.8 percent
$\theta = 2$	$\eta = 2$	7.3 percent	21.2 percent
$\theta = 2$	$\eta = 3$	3.9 percent	16.0 percent

Fig. 1: U.S Current Account: 1970-2005
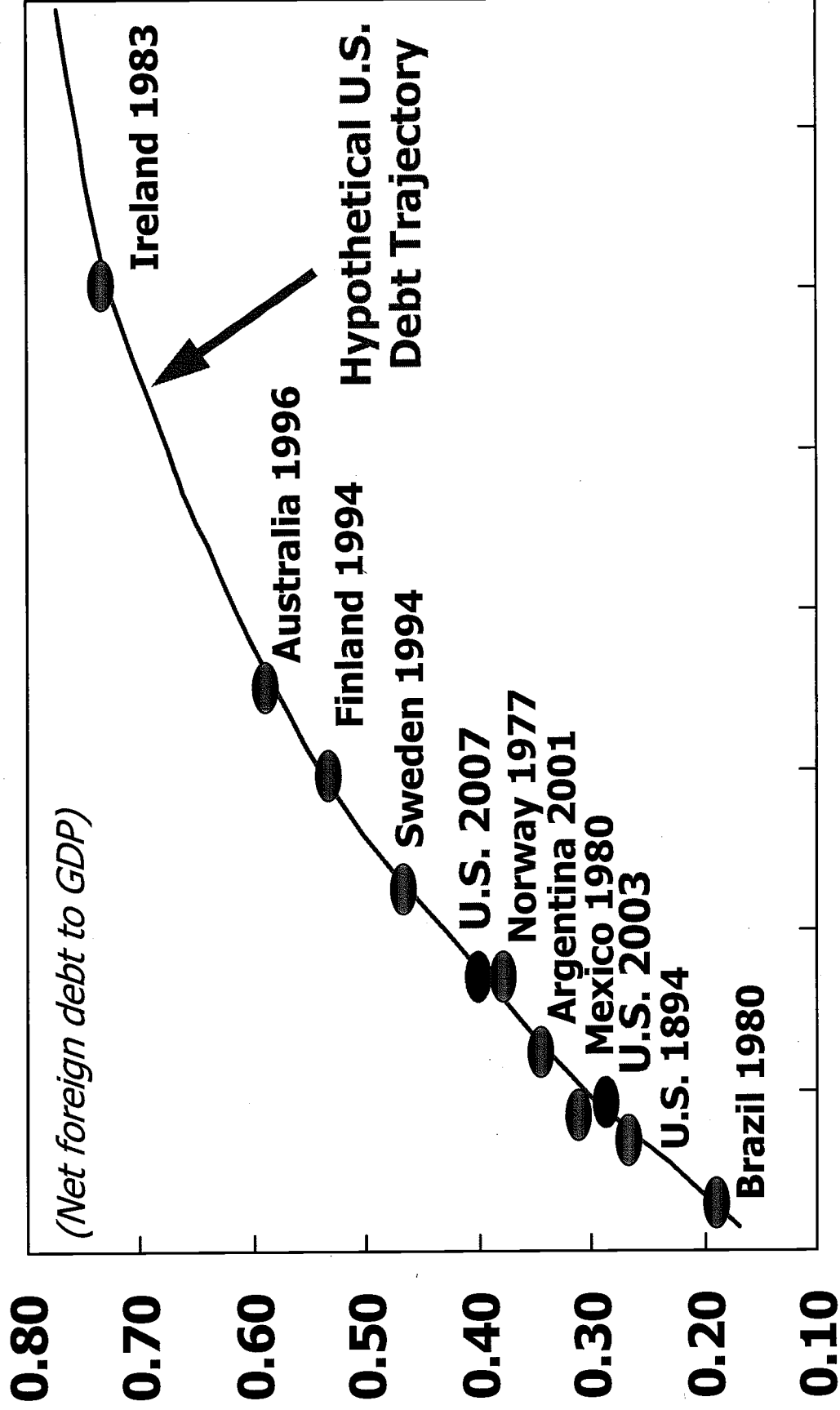
*Projected
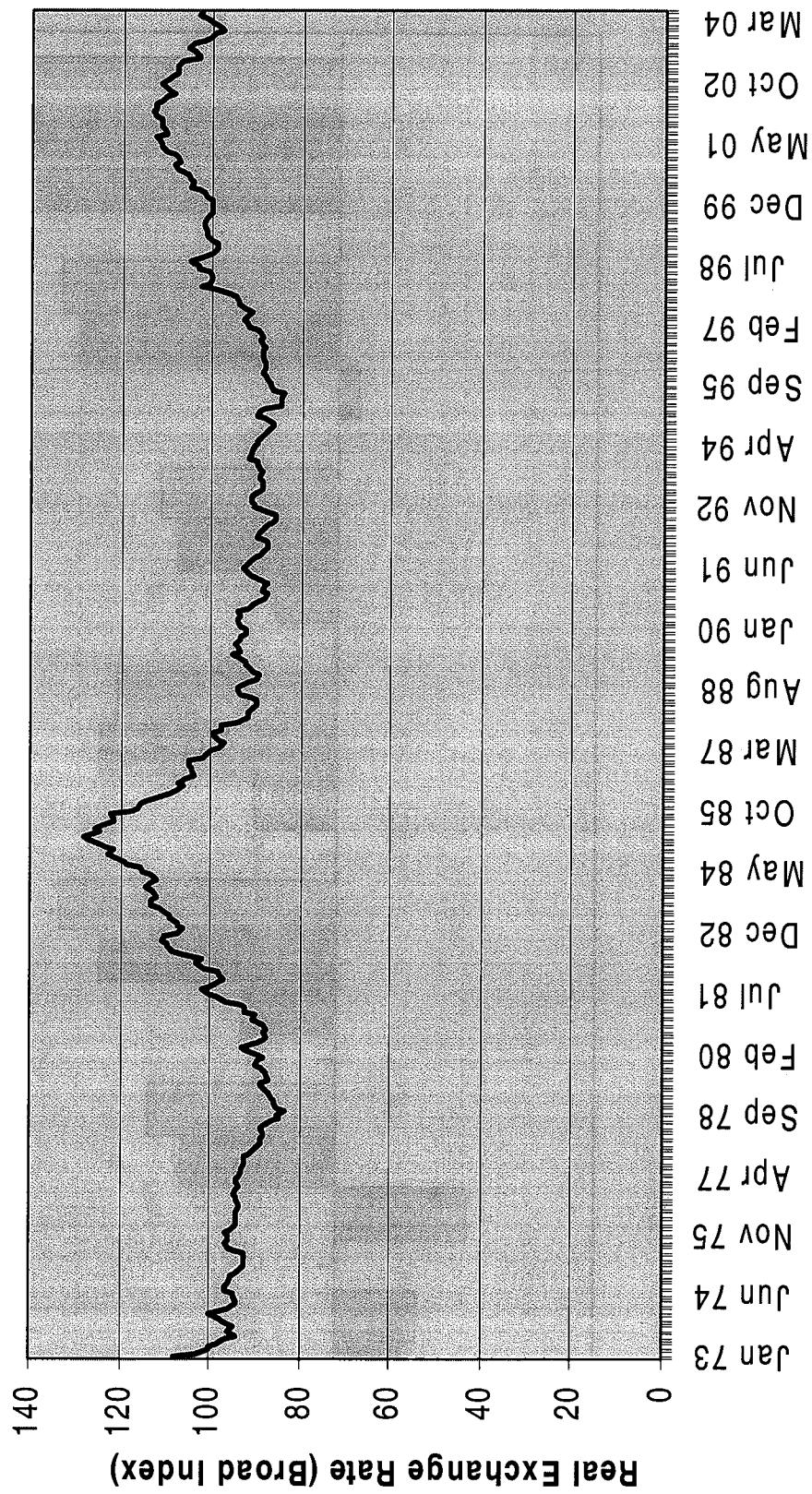
1
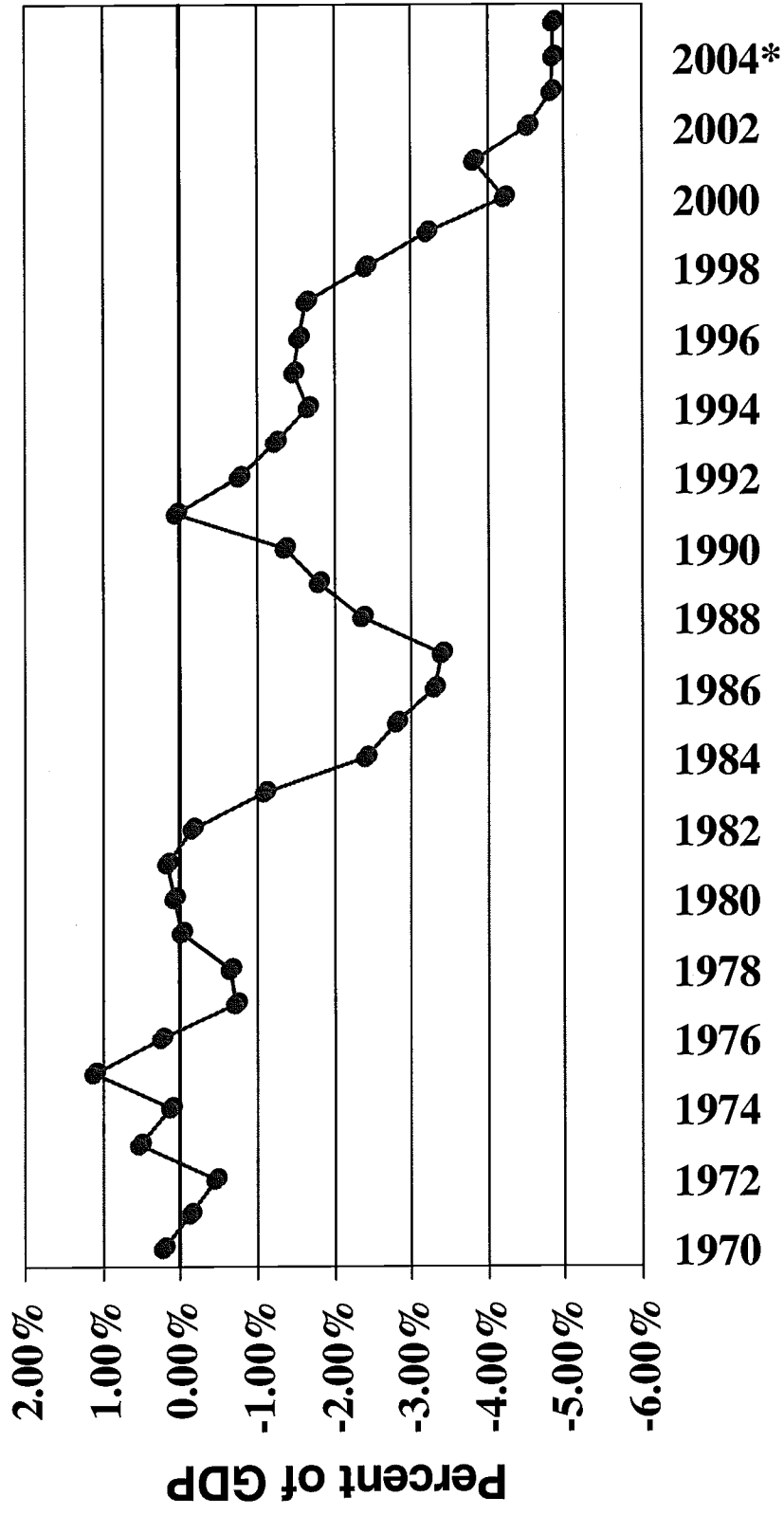
Fig 2: U.S Net International Investment Position: 1976-2003

Fig. 3: Up the Debt Ladder?
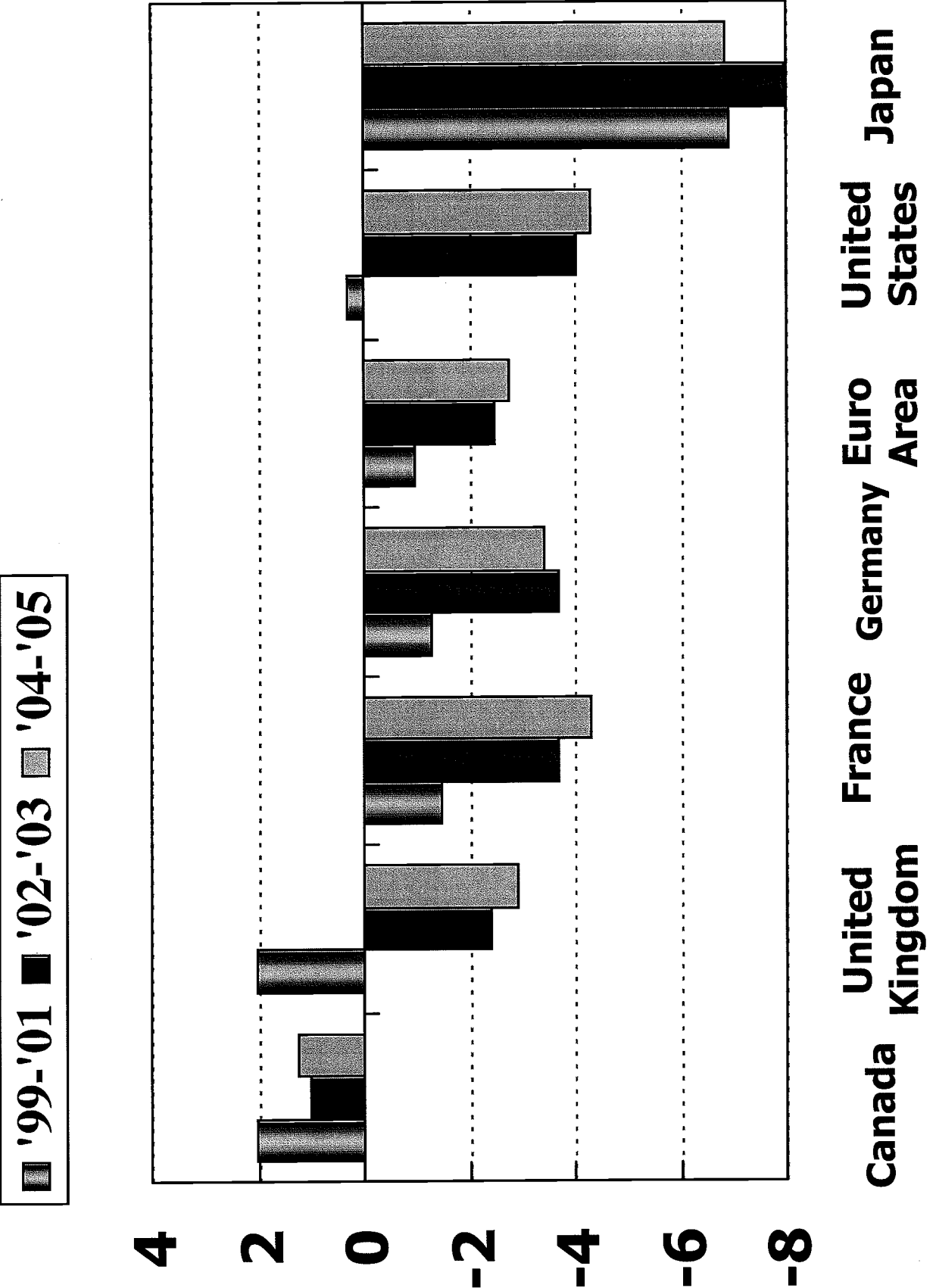
Projected U.S. Net Foreign Debt

(Net foreign debt to GDP)

Ireland 1983

Hypothetical U.S.
Debt Trajectory

Australia 1996

Finland 1994

Sweden 1994

U.S. 2007

Norway 1977

Argentina 2001

Mexico 1980

U.S. 2003

U.S. 1894

Brazil 1980

0.80 0.70 0.60 0.50 0.40 0.30 0.20 0.10

1999 2004 2009 2014 2019 2024 2029 2034

3

U.S. Dollar Real Exchange Rate: 1973-2004
(Broad Index, Mar 73 = 100)

Chart: U.S. Dollar Real Exchange Rate (Broad Index), showing Real Exchange Rate (Broad Index) on the vertical axis (0 to 140) and dates from Jan 73 to Mar 04 on the horizontal axis.
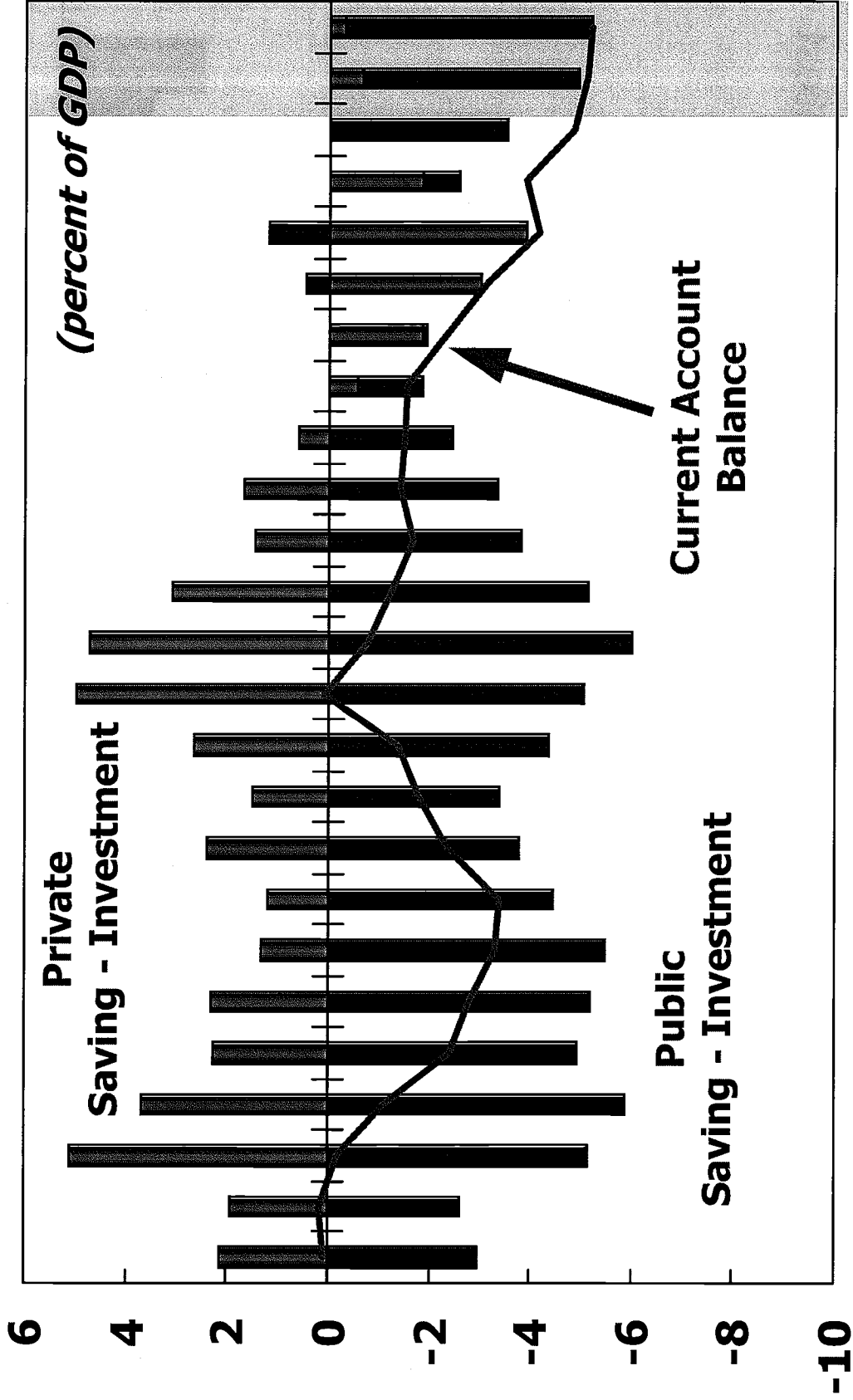
4

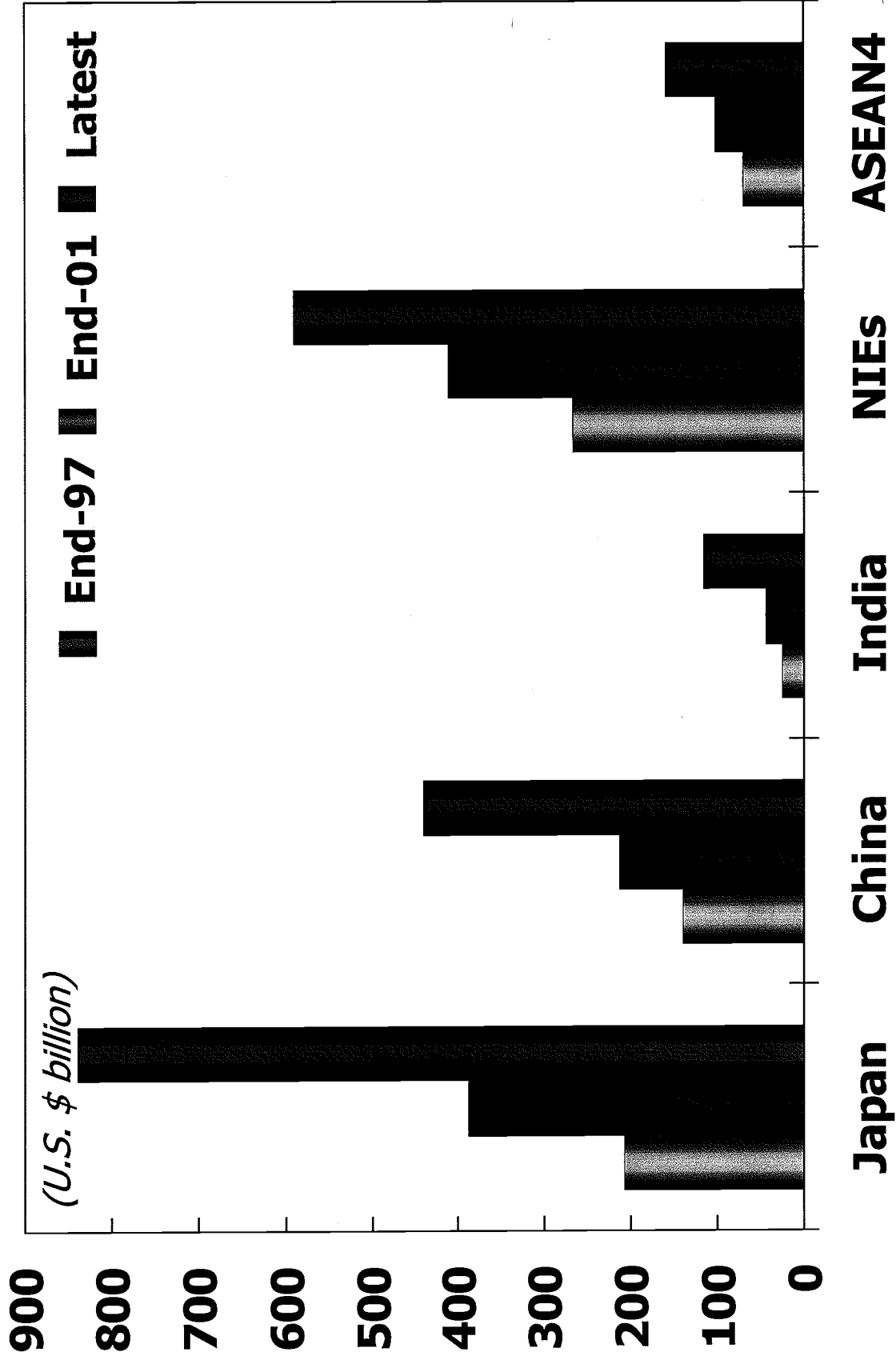Fig. 5: Fiscal Balances in Major Economies (% GDP)

U.S. Current Account Balance and Saving-Investment

(percent of GDP)

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Fig 7: Foreign Exchange Reserves

Figure 8: <u>Anatomy of a Crash Landing for the Dollar Revisited</u>

Many factors could push US current account back towards historical norms: Euro-zone and Asian nontraded productivity takes off, US housing market crashes, private saving continues to decline in Japan

At 23% net external debt/GDP, US is nearing 1894 high of 26%.

↓

<u>Whatever the cause, suppose that</u> the US current account suddenly moves into balance from the current 5.4% of GDP deficit.

Feldstein-Horioka puzzle implies that the large persistent US current account deficit is unusual.

↓

In the short run, "traded" goods consumption in the US drops sharply. Foreigners must raise their traded goods consumption 1/3 as much.

Home bias in trade puzzle implies that the effective share of nontraded goods in GDP is very high (>75%). Sudden fall in imports has a strong effect on the demand for nontraded goods.

↓

Price of traded goods relative to nontraded goods in US must, conservatively, rise in proportion if large-scale unemployment in the nontraded goods sector is to be avoided. Reverse effect abroad, but about 1/3 as big.

← Requisite rise in relative price of tradables depends on substitution elasticities of traded and nontraded goods in consumption and production. (For short run, baseline assumes 1 for consumption, 0 for production.)

↓

If all goods prices are flexible,
dollar must depreciate to maintain
overall CPI price stability and full
employment in nontradables. Traded
goods prices rise, nontraded goods
prices fall.

Assuming Fed allows ←
whatever exchange rate
adjustment is necessary
to maintain full
employment and price
stability.

↓

BUT
Exchange rate "pass-through" to
import prices is at most 50% in short
term. To get the necessary
adjustment in internal US prices for
traded goods relative to nontraded
goods, again to maintain full
employment in nontraded sector,
exchange rate must depreciate twice
as much.

Purchasing power parity
puzzle: Pass-through of
exchange rates to import
prices is very slow,
perhaps 50% after one
year at the importer
level, less than 10% at
the consumer level.

Again assuming the
←*Fed is willing to*
tolerate any exchange
rate movement to
maintain price stability.