Perspectives on OECD Economic Integration: Implications for U.S. Current Account Adjustment

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Introduction 1

The U.S. current account deficit surged to 3.7 percent of GDP in 1999, up from an already high average of 1.7 percent of GDP during 1992-1998. Over the next two years, the deficit is projected to grow even more, reaching 4.3 percent of GDP in the current year 2000, and 4.4 percent in 2001. True, the U.S. still poses no threat to the reigning OECD (and Olympic) borrowing champion, Australia, whose current account deficit averaged over 4 percent of GDP throughout the 1980s and 1990s. Still, as a percentage of world GDP, the U. S.'s $316 billion 1999 deficit was the largest imbalance in recorded history. How long can the global economic system sustain such enormous borrowings from its largest member, and what would be the consequences, especially for exchange rates, of a sudden reversal?

This paper argues that the medium-term real exchange rate effects of a dramatic turnaround in the U.S. current account position—a turnaround we view as extremely likely within the next five to ten years, if not sooner—could be quite dramatic. Long-time participants of this conference may recall Krugman's celebrated (1985) Jackson Hole paper, in which he argued that the inevitable reversal of the massive Reagan-era U.S. current account deficit would require a sharp depreciation of the U.S. dollar. Of course, there are many differences between the situation of today and that of fifteen years ago.

During the 1980s, the U.S. government was busy running massive fiscal deficits, arguably producing a "twin" deficit in the current account. Today, the federal government is trying to decide how to allocate surpluses. During the 1980s, the U.S. was in the early years of recovery from the low growth induced by the oil shocks of the 1970s, and the Volcker-era crackdown on inflation. Today, inflation seems well under control and the economy is into its ninth year of strong growth. If one subscribes to the Lawson doctrine, current account deficits should not be a concern when growth is high and government deficits are low.

At the same time, many would argue that increasing integration of global asset and goods markets makes the financing of large current account deficits far less problematic today than it was just fifteen years ago. Therefore, current account deficits should be less of a concern, regardless of their origins. Taken to its extreme, this logic dictates that the Federal Reserve does not need to worry any more about the overall United States current account position than it does about California's deficit or surplus vis-a-vis the other forty-nine states. But is this right? Have increased global linkages transformed the current account deficit into a benign accounting relationship, rather than a meaningful policy barometer? It is certainly the case that cross-national equity holdings and direct foreign investment have expanded: The more current accounts merely represent a scorecard for payouts on international investments, then, arguably, the less we should worry about them. Perhaps less obviously, if falling transport costs and increasing homogenization of global tastes cause consumers throughout the world to choose increasingly similar bundles of goods, then the historical sensitivity of the real exchange rate to sharp changes in the current account balance may no longer be a problem.

Are we, indeed, in a brave new world, where sustained current account deficits, even by the world's largest country, no longer have significant implications? Our answer, in brief, is not yet. We argue that by a variety of concrete measures, including evidence on prices, trade, and macroeconomic data, most global markets are far less integrated than their domestic counterparts. As a consequence, the "tradable" share of U.S. GDP is effectively much smaller than commonly

imagined, so that a current account shift of 4 to 5 percent of GDP still would have a significant impact on the relative price of U.S. and foreign goods, and can have enormous nominal exchange rate effects in the short run.

Using a fairly simple but representative modern model of equilibrium exchange rates and current accounts, we calculate that the inevitable reversal of today's U.S. current account deficit can potentially have a substantial real exchange rate impact over the medium term. For example, if the U.S. current account was to move suddenly into balance—not a totally implausible scenario if, for example, U.S. share prices collapse—our baseline calculation suggests a short-run real exchange rate impact in excess of 24 percent, and possibly even over 40 percent, depending on how the Fed weighs the costs of currency depreciation against those of unemployment. If, however, a gradual return to external balance could be achieved over a period of three to five years, the required real exchange rate adjustment would only be around 12 percent. Of course, the exact magnitudes depend on many factors, and certainly on the kinds of economic shocks that ultimately set off the correction, so there is a range of uncertainty in our numbers. We argue, though, that the basic quantitative effect we analyze applies to a broad range of scenarios.

An assumption that is critical to our analysis, however, follows from our claim that international markets remain far more segmented than domestic markets. In the first part of the paper, we look at a range of concrete quantitative evidence on international market segmentation, including measures of international price deviations, as well as home bias in the demand for both equity and goods. We also revisit the famous Feldstein-Horioka puzzle, which asks why countries seem to need to rely so much on local savings to finance domestic investment. The second part of the paper argues that one can go far, surprisingly far, in explaining these various anomalies by appealing to trading frictions in international goods markets, without necessarily having to assume that international asset markets are any less efficient than domestic ones. In the third section, we use our evidence on imperfect goods market integration to parameterize a simple model of the current account's impact on the real exchange rate.

We use the model first to investigate the sustainability of the present path of the U.S. current account deficit, and then to suggest just how far the real exchange rate might have to drop when the inevitable reversal takes place. While we do not pretend that these simple note-pad calculations define the state of the art in international macroeconomics, we, nevertheless, believe they are quite suggestive of the relevant orders of magnitude.

**Some measures of just how local our global markets still are   2**

If one thinks about the steady growth of international telephone and airline traffic, the exponential expansion of foreign exchange markets, or the advent of global news networks, the world, indeed, seems a far smaller place today than it did just four decades ago.[1] So, international economists have been stunned in recent years, when study after study has shown that the degree of international economic integration, even among OECD countries, still seems to fall far short of what one observes within national boundaries. Although a detailed examination of the evidence is far beyond the scope of this paper, we will try to give the reader a flavor of this recent research, as it really forms the core justification for our later claim that the U.S. still remains a surprisingly closed economy. Our organizing principle is to pose a series of empirical "puzzles" for those who believe that international capital and goods markets are already virtually as well integrated as domestic ones.

Home bias in equity holdings   2.1

The logic of diversification would seem to strongly dictate that investors should not put all their eggs in the home basket. Indeed, to a first approximation, the simplest canonical models of international portfolio diversification would have all investors allocating their portfolios across countries roughly in proportion to their size in world markets. Thus, if the U.S. constitutes 25 percent of world GNP, then all investors everywhere should hold (roughly) 25 percent of their assets in the U.S. Correspondingly, U.S. citizens should be holding 75 percent of their assets abroad. But this is nothing like what one observes in practice. At the end of 1999, U.S. citizens held

Chart 1
Home Bias in Equity Portfolios: 1987-1996*

Percent of total portfolio
in foreign stocks

Percent of total portfolio
in foreign stocks
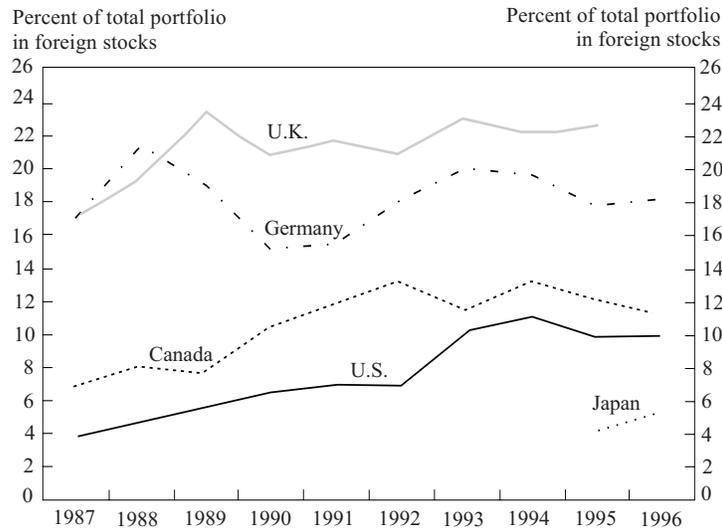
* From Tesar and Werner (1998).

only 11.7 percent of their total equity holdings in foreign stocks, up slightly from 11.3 percent in 1998.[2] True, this share represents a notable rise from ten years earlier when the share of foreign equity in U.S. equity portfolios was under 5 percent, but it is still far less than simple models of portfolio diversification would suggest. As Chart 1, taken from Tesar and Werner (1998), documents, the home bias puzzle is hardly a phenomenon special to the United States. As of end-1996, Germans held 18 percent of their equity in foreign stocks, Canadians 10 percent, Japanese 5 percent, and Britons 22 percent. Though the degree of home bias is indeed diminishing over time, as the figure documents, it remains quite large.

Simple models based on mean-variance analysis invariably show large gains to diversification at the level of the individual investor; see, for example, Lewis (1999). Admittedly, most partial equilibrium studies look at nominal rather than real returns, and implicitly

assume that the marginal value of income is constant (rather than varying with the overall level of consumption in the country). It is also true that international bond holdings are somewhat more diversified than equity holdings, and one might argue that country bond portfolios share many of the same risks as country equity portfolios (e.g., exchange rate risk). Finally, "domestic" firms sometimes have extensive foreign operations. But the basic point remains. Even though popular press accounts frequently trumpet twenty-four-hour-a-day international trading and large pools of supposedly mobile international investment funds, investors appear to remain stubbornly loyal to local assets.

The Feldstein-Horioka saving-investment puzzle: It holds for middle-income countries just as strongly as for rich countries   2.2

In a world of perfectly integrated capital markets, one would expect savings to migrate to the country offering the highest rate of return. For example, the invention of air conditioning helped fuel a huge shift of investment from the American North to the American South. Barring perfect correlation of productivity shocks across countries, one would expect periodically to see similar flows between countries, resulting in massive current account deficits and surpluses.

In reality, however, current accounts are seldom very large relative to net investment or national saving, at least not over any sustained period of time. For example, even over the years 1992-1998, when U.S. current account deficits averaged 1.7 percent of GDP, they still financed less than 10 percent of U.S. investment, which averaged over 17 percent of GDP. The rest was financed out of U.S. domestic savings. Because current accounts are seldom very large relative to investment, at least not for OECD countries, one tends to find that high saving and investment rates go hand in hand. One simply does not observe the kind of massive migration of savings across countries that one seems to see, at least on occasion, within countries.

Feldstein and Horioka (1980) first documented the high correlation of national savings and investment rates in their now classic paper, which many international economists regard as posing the

Table 1
Feldstein-Horioka Regressions, 1990-1997[a]

|	No. of Obsvs.	α	β	R^2
	$$\frac{I}{Y} = \alpha + \beta \frac{NS}{Y} + \varepsilon$$			
All countries[b]	55	.13 (.02)	.49 (.07)	.46
Countries with GNP/cap > $2000	41	.07 (.02)	.70 (.09)	.62
OECD countries[c]	24	.08 (.02)	.60 (.09)	.68

[a] OLS regression. Standard errors in parenthesis.
[b] Israel and Jordan are excluded from all regressions in this table. The inclusion of both countries in the first regression decreases the estimate of β to .39. The inclusion of Israel in the second regression decreases it to .63.
[c] If one adds Korea to the OECD sample, the estimate for β rises to .76. Korea is included in the larger samples.

"mother of all puzzles." Table 1, which looks at cross-country regressions of average investment and savings rates, gives an update of the Feldstein-Horioka results, and extends them to look at a broader sample of countries. We do find that the coefficient on saving has fallen, from 0.89 in Feldstein and Horioka's 1960-1974 sample, to 0.60 for our 1990-1997 sample of OECD countries, excluding Korea. But this is not to say that the puzzle has gone away. First, even 0.60 is still quite a bit larger than one would expect in world of perfectly integrated markets. Second, if one includes Korea, the coefficient rises to 0.76.

Indeed, the popular wisdom, based on Dooley, Frankel, and Mathieson (1987) and Summers (1988), is that the Feldstein-Horioka results are sharply diluted when one adds developing countries to their original OECD sample. But while the first row in Table 1 confirms

Chart 2
Saving-Investment Puzzle: 1990-1997
OECD Countries
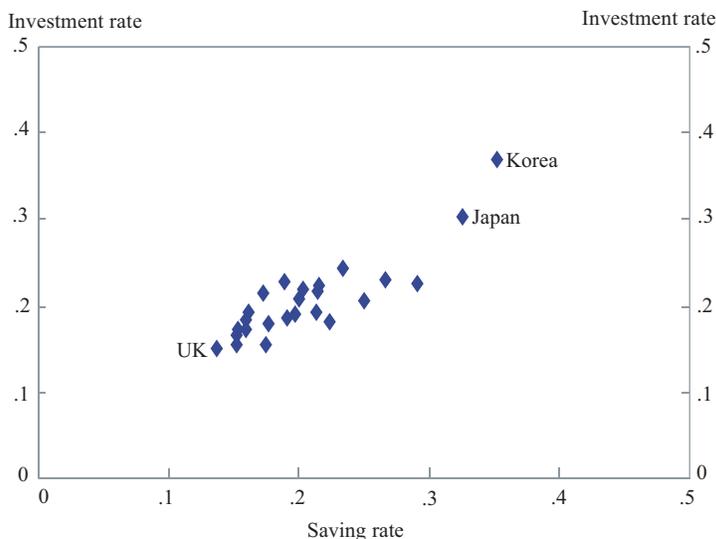
this view (the coefficient falls to 0.49 in the extended fifty-five-country sample), it is quite misleading. In fact, as Table 1 also shows, the Feldstein-Horioka paradox holds as strongly for middle income countries (>$2000 per capita) as it does for rich countries. It is really only when the poorest countries are added that the coefficient drops (and here one might also question whether this is partly an artifact of much poorer data). Chart 2 graphs saving versus investment for the OECD countries. Chart 3 gives a sample of middle income countries (those for which the necessary data are available in the IMF's IFS database). As one can see from the figures, and as the regressions in Table 1 confirm, the slope coefficients are actually quite similar for the two groups. Finally, since the folk wisdom is also that the Feldstein-Horioka coefficient can be quite sensitive to outliers, we test robustness in Table 2 by checking how the estimated F-H relationship changes when various outliers are excluded. It is notable that when Japan is excluded from our OECD sample (sans Korea),

Chart 3
Saving-Investment Puzzle: 1990-1997
Non-OECD Countries with GNP Per Capita
Greater Than $2000
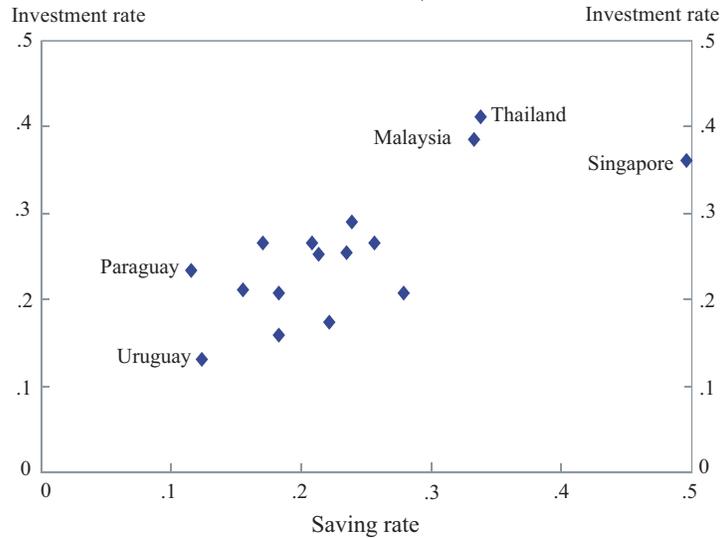
the coefficient drops from 0.60 to 0.49. On the other hand, when Singapore is dropped from the extended sample that includes middle-income countries, the coefficient rises from 0.70 to 0.82.

All in all, we may conclude that the past twenty-five years of capital-market integration have slightly tempered the Feldstein-Horioka results, but overall the paradox is still alive and well.

Home bias in trade   *2.3*

Recent research has also documented the remarkable extent of home bias in international trade patterns. Of course, one would expect that states within a country should trade more with each other than states across national boundaries. Geographical proximity, language, a common legal and regulatory system, and the like, all help to promote intranational trade relative to international trade. But

Table 2
Sensitivity to Outliers, 1990-1997[a]

$$\frac{I}{Y} = \alpha + \beta\frac{NS}{Y} + \varepsilon$$

Excluded countries	OECD countries		GNP > $2000		All countries	
	No. of Obsvs.	β	No. of Obsvs.	β	No. of Obsvs.	β
None	25	.76	41	.70	55	.49
J[b]	24	.74	40	.70	54	.49
S[c]			40	.82	54	.50
K[d]	24	.60	40	.67	54	.46
M[e]			40	.65	54	.45
T[f]			40	.64	54	.44
S, J, K, M, T	23	.49	36	.46	50	.22

[a] OLS regressions.
[b] Japan
[c] Singapore
[d] Korea
[e] Malaysia
[f] Thailand

while there is some controversy, the extent of the home bias appears to be quite a bit larger than most researchers had imagined. McCallum (1995) found that, even after controlling for factors such as distance and partner-country trading size, the typical Canadian province trades twenty times more with other Canadian provinces than with U.S. states. Although more recent results have tempered these findings—Helliwell (1998) finds a home bias factor of 12 in updated data, while Wei (1998) and Evans (2000) find biases in the range of 2.5 to 10 for a broader range of OECD countries—the evidence of home bias in trade is still quite striking.

What are some potential sources of home bias in trade? Two obvious candidates are tariffs and nontariff barriers. As Table 3 illustrates, tariffs among OECD countries are fairly low, though for a

Table 3
Production Weighted Average Tariff Rates

	1989	1993
U.S.	4.7	4.9
E.U.	7.3	7.7
Japan	4.0	3.5
Canada	9.2	8.9

Source: "Indicators of Tariff and Non-Tariff Trade Barriers," OECD 1996, Paris, France, Table 11, p. 40, line 9.

variety of technical reasons, average observed tariff rates can substantially understate the tariffs' economic effects. For example, trade-weighted average tariff rates understate the effects of tariffs because goods subject to prohibitive tariff rates are not shipped at all. The table below uses a preferable measure, production-weighted tariff rates, though these too have potential sources of bias.

Though it is extremely difficult to quantify the effects of nontariff barriers, academic studies indicate that these may still be quite important, perhaps as important as explicit tariffs; see, for example, Anderson and Neary (1998). (Judged by its tariff rates alone, Japan would be the least protectionist country listed in Table 3.)

There are other factors as well that may add substantially to international trade relative to domestic trade costs. Though most studies of home bias attempt to control for distance, the public goods problems inherent in designing transportation networks imply that they are likely to be better developed for domestic shipping than for international shipping. International commercial law is less crisply defined, and enforcement less clear-cut, than is the case for domestic commercial law. Other barriers to trade include the lack of a common currency. Indeed, Rose (2000) argues that trade between two countries triples (at least) when they adopt a common currency. Perhaps

an even larger effect comes from national regulation of domestic
financial markets, which still helps to keep the cost of cross-border
remittances quite high in many parts of Europe, despite the advent of
a common currency.[3] Taken individually, these obstacles to trade
may seem relatively small. But their joint effect may be very large.
As we shall discuss in Section 3, if the differential cost of trading
goods internationally rather than domestically is on the order of 25
percent, one can do a surprisingly good job explaining the various
puzzles listed here, even with relatively low elasticities of substitu-
tion between home and foreign goods.

International pricing puzzles   *2.4*

   Corresponding to the quantity evidence on the segmentation of
international goods markets, there is corresponding strong evidence
on the price side. Product prices, particularly at the consumer level,
simply do not adjust quickly to exchange rate changes. Indeed, it is
hard to find evidence of any goods other than precious metals for
which the "law of one price" holds exactly, even in relative form.

   For a long time, the conventional wisdom was that the law of one
price holds fairly well for traded goods, and that for most countries
these account for a significant share of GDP. Rampant evidence that
traded goods prices differ sharply across countries was explained by
the fact that once most goods reach the retail level, they embody a
very large nontraded component (e.g., rental space, domestic trans-
portation, labor, and the like). So, comparisons of retail prices are
highly misleading. The new conventional wisdom, based on numer-
ous international comparisons of prices (for example, Engel and
Rogers 1996; Engel 1999) is that the law of one price really does not
hold for anything, at least not at the retail consumer level. In compar-
isons across countries with highly volatile exchange rates, it is hard
to find much corresponding movement in the consumer prices of any
goods, from the supposedly most tradable to the least. The relative
home and foreign prices of goods commonly classified as tradables
move almost one for one with the exchange rate, though perhaps the
correlation is slightly less than for the relative prices of goods com-
monly classified as nontraded. Adding further to the mystery is the

apparently robust result that shocks to real exchange rates have remarkably long half-lives, ranging from three to five years. That is, if the yen appreciates today, the impact on relative U.S. and Japanese prices can be expected to take more than three years to dissipate by 50 percent. True, results based on retail prices probably exaggerate the segmentation somewhat. When one looks at the prices paid by importers, exchange rate changes have much larger effects, as Obstfeld and Rogoff (2000a) document. Still, there is a large body of evidence that manufacturing exporters can price discriminate and "price to market" internationally, and, as a result, the pass-through from exchange rates to import prices is partial and slow. For manu-factured goods, a reasonable average exchange-rate pass-through estimate would be only 50 percent after one year. Thus, price data strongly support the notion that there is considerable international segmentation of goods markets.

A unifying explanation?   3

Although the puzzles described in the last section may appear fairly disparate, Obstfeld and Rogoff (2000b) have proposed that there may be a unifying explanation. Indeed, they argue that by explicitly introducing trade costs into canonical models of interna-tional macroeconomics, one can go surprisingly far in explaining all of the major empirical puzzles in the field, most of which relate to apparent failures of international market integration. In particular, imperfections in international capital markets may strongly mirror imperfections in international goods markets. Although we do not have the space or license here to review the technical details of our analysis, we will try to briefly restate the main ideas. Whereas the thrust of our discussion may appear purely academic, it is quite cen-tral to the way in which we will later explore the relationship between current account adjustment and the exchange rate.

Trade costs and the home bias in trade   *3.1*

That trade costs can explain home bias in trade is hardly surprising, so we will not dwell on this point. We will only note that relatively small trade costs can cause extremely large biases if home and for-

eign goods are relatively close substitutes. Indeed, if one takes standard empirical estimates of the elasticity of substitution between home and foreign goods, then with trade costs as little as 10 percent, one can produce a home bias in trade of 400 to 500 percent. If trade costs are closer to 25 percent, one can produce large home biases even with relatively low elasticities of substitution.

Trade costs and home bias in equities   *3.2*

It is, perhaps, somewhat more surprising that these trade biases can translate into comparable biases in asset holdings. It turns out that the benefits of international diversification become much less once one realizes that profits cannot actually be cashed in for consumption without paying substantial trade costs.

An easy example is the case where there are two extreme distinct types of goods, zero trade cost ("traded") goods and prohibitive trade cost ("non-traded") goods. Then, with the technical proviso that utility in consumption is separable between traded and nontraded goods (a good baseline case), optimal portfolio diversification will call for all agents to hold pro rata shares in a diversified basket of traded-goods industry equities, while at the same time holding 100 percent of all domestic nontraded-goods industry equities. In this baseline case, if cement is not traded, investors will not hold overseas stock in cement companies even if stock certificates can be costlessly traded. The logic of this result (proved rigorously in Obstfeld and Rogoff 1996) is that even if cement stock can be traded, payments to foreigners can only be made in the form of traded goods. But if traded goods portfolios are already diversified, all risk-sharing opportunities have been exploited, and there is no gain to further trade in securities on nontraded-goods industries. This logic turns out to extend to the case where trade costs are positive and finite, rather than zero or prohibitive.

Trade costs and the Feldstein-Horioka puzzle   *3.3*

How can trade costs explain the Feldstein-Horioka puzzle? Again, it is easiest to see the main idea in the context of the old-fashioned

traded-nontraded goods paradigm, even if the more elaborate (and more realistic) proportional trade costs model or our earlier paper is better suited to quantification.

Suppose that a country has a flat time profile of traded and nontraded goods production (endowment), and consider varying the rate of time preference so that for high time preference rates, the country borrows, and for low time preference rates, it lends. If the home country borrows in the first period and repays in the second, its consumption of tradables will be skewed toward the first period. But this means that in the first period, the price of nontradables will be relatively high (since they will be scarce relative to tradables). For the same reason, the price of nontradables in terms of tradables will be low during the second period, when the debt is being repaid. This price tilt implies that, overall, borrowing induces expected deflation in consumer prices, driving up the real interest rate for a borrower. The reverse happens for a lender: the more a country lends, the lower the effective real rate of interest it faces. Moreover, under plausible conditions, this effect can be quite nonlinear. In the baseline trade cost model of Obstfeld and Rogoff (2000b), small levels of foreign borrowing or lending have relatively minor effects on the real interest rate, but large current deficits (surpluses) drive the real interest rate up (down) quite sharply. As a result of this incipient interest rate effect, countries will be quite reluctant to run overly large current account deficits or surpluses.

One simple piece of evidence one can look at is the relationship between the real interest rates and the current account. The theory predicts that countries with high current account deficits will have high real interest rates and countries with large surpluses will have low interest rates. Although there is more than one potential explanation of such a correlation, it is, nevertheless, interesting to ask to what extent it holds in the data. As Table 4 indicates, the correlation is actually quite strong for OECD countries.

In addition to the three aforementioned puzzles, trade costs can also explain several other well known puzzles in international economics, including the "international consumption correlations puz-

Table 4
Real Interest Rates and the Current Account, 1975-1998

	Coefficient on $\frac{CA}{GDP}$	Significance	ρ	R^2
Specification 1				
OLS	-36.9	.00	.65	.05
Country fixed effects	-46.3	.00	.65	.08
Country fixed effects, time dummies	-32.3	.00	.55	.50
Specification 2				
OLS	-17.9	.00	.58	.02
Country fixed effects	-19.4	.00	.58	.05
Country fixed effects, time dummies	-18.9	.01	.54	.32

Note: This table is taken from Obstfeld and Rogoff (2000b). The regressions use annual data. The dependent variable is the year-average annualized three-month nominal interest rate less lagged annual CPI inflation rate (specification 1) or the December interest rate less the contemporaneous inflation rate (specification 2).
Source: International Financial Statistics and the OECD. Three-month interest rates and CPI inflation rates are based on IFS and OECD data, current accounts from the OECD.

zle" (if asset markets are as integrated as they ought to be, any one country's good fortune should be reflected in every country's consumption), and the "missing trade puzzle" (one would expect that trade among nations would mirror differences in factor endowments of capital and labor to a much greater extent than it actually does).

Trade costs and the pricing puzzles   *3.4*

What about pricing puzzles? Patterns in international product prices are fundamentally more difficult to explain, and one finds it necessary to introduce more complex considerations such as domestic nominal price rigidities. It is still possible, however, to show that reasonably sized trade costs can go a long way toward resolving pricing puzzles. One feature that any realistic model must have is a dis-

tinction between the costs borne by consumers in international goods markets arbitrage and the costs borne by producers. For consumers, the costs must be quite high to make sense of the fact that domestic consumer prices move very little in response to exchange rates, even for goods that are putatively highly traded.

A framework with substantial trade costs also helps to explain what Obstfeld and Rogoff (2000b) call the "exchange-rate disconnect" puzzle—the fact that even large nominal exchange rate movements seem to feed through to the real economy only with long lags, so that in aggregate macroeconomic data, it is hard to detect any short-run impact of the exchange-rate regime except on the behavior of real exchange rates. Retail prices for even imported consumer items tend to be set in local currency terms and incorporate markups to cover the largely nontraded inputs necessary to bring the goods from the port of entry to the consumer. Even the price charged by the original exporter of the good is tailored to the domestic market and reflects exchange-rate movements partially and with long lags. Especially for larger economies such as the U.S., therefore, tight short-run connections between nominal exchange rate movements and other macro variables (other than the obvious virtually one-for-one effects on real exchange rates) become nearly impossible to detect.

Substantial market segmentation therefore implies, in particular, that even large swings in exchange rates may not set off large and immediate equilibrating movements of prices. At the same time, in analogy to Dornbusch's classic (1976) "overshooting" theory of exchange-rate volatility, the segmentation of goods markets implies that large exchange rate swings may sometimes be needed to clear asset markets in response to monetary and financial market shocks.

The need to explain the pricing puzzles as well as the earlier "quantity" puzzles inclines us to prefer our high-end estimates of the added costs to trading internationally over domestically (25 percent or above). These kind of costs seem quite consistent with recent findings in the related trade literature (e.g., Evans 2000).

Summary of puzzles and trade costs   *3.5*

We have offered a simple unifying theory of a broad range of empirical puzzles concerning international goods and asset markets, arguing that a great deal of effective segmentation in both categories of market can be driven by costs of trade in the goods markets alone. Perhaps the most surprising feature of this approach is the suggestion that asset market anomalies can be explained in terms of goods markets segmentation, rather than imperfections in asset markets themselves. (To be more precise, we do not require that international asset markets work any more or less well than domestic markets.) Of course, we do not really believe that international asset markets, even among OECD countries, function as well as those within, say, the United States (though they may function no worse or even better than those in some OECD countries with the least-developed financial systems). Nevertheless, our analysis suggests that one can go surprisingly far in explaining many apparent market imperfections in terms of one relatively simple and straightforward factor, trade costs. From a long-term policy perspective, one implication of our analysis is that as goods markets become better integrated, asset market integration will follow to a substantial extent. What of the short-term policy implications? There are many, but the one we focus on here is the potential importance of the current account for the real exchange rate.

Our previous discussion suggests that, for most OECD countries and for the United States in particular, the share of traded goods in GDP may be quite small, certainly smaller than the roughly 35 percent figure one gets by crudely taking GDP and subtracting public and private services plus construction. As a result, a current account deficit of 4 to 5 percent of total GDP may actually represent as much as 20 percent of traded goods GDP. We recognize that this simple characterization is quite loose. Over time, factors can be shifted between traded and nontraded goods production or, more generally, between low and high trade cost industries. But, since inter-industry factor adjustment itself is typically quite slow, our loose characterization is still a useful starting point.

The current account and the dollar   **4**

We are now ready to think about the implications of market segmentation for the sustainability of the U.S. current account trajectory, and the possible effects of a current account reversal on the dollar. We do take the extremely simple calculations below quite seriously, but, nonetheless, we need to begin with some disclaimers:

—Our model is very simple, and really just presents a starting point for thinking about the exchange rate effects of a current account reversal.

—In general, the current account and the exchange rate are simultaneously determined (in theory, at least—in practice, the exchange rate often seems to have a life of its own). Nonetheless, our simple calculation below is actually based only on minimal identifying restrictions, and these seem likely to be close approximations in practice. That is, one can embed our model within a broader general equilibrium setting, look at a range of alternative plausible exogenous shocks, and still arrive at the same general conclusions.

Sustainability   *4.1*

We begin by thinking about sustainability. Chart 4 graphs the U.S. current account imbalance as a percentage of GDP for the years 1970-2001. We have already noted that one must be very careful in drawing parallels between the 1983-1989 current account trajectory and the present one, though one cannot help but note that very recent deficits have surpassed the peak of the Reagan years, even as a percentage of GDP. Chart 5 graphs IMF data on the dollar's real effective exchange rate over the period 1992-1999. The dollar has appreciated in real terms by about 22 percent since 1995.

Of course, a critical issue in determining sustainability is not simply the rate of borrowing, but accumulated debt. Because accumulated debt includes capital gains and losses on existing assets, it is hard to pin down precise numbers. Chart 6 gives an estimate of the

Chart 4
U.S. Current Account: 1970-2001
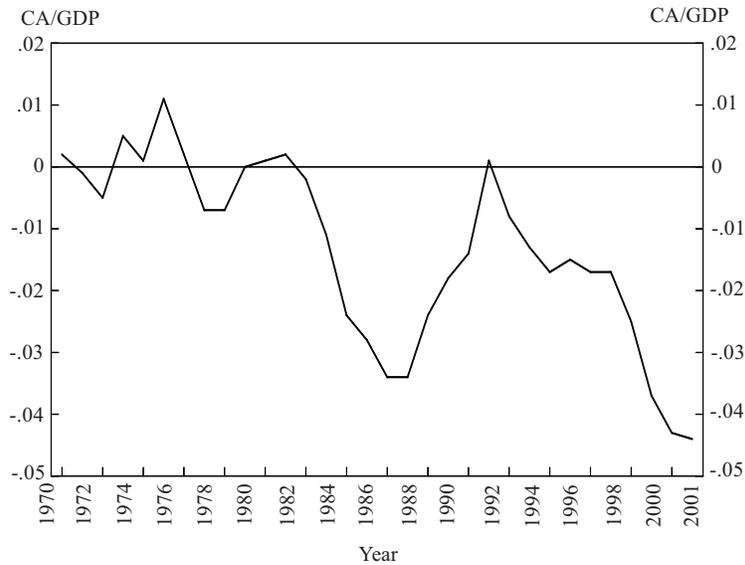
net external investment position of the United States, combining Commerce Department figures through end-1999, then adding both the projected 2000 and 2001 deficits. For end-2000, this implies a net U.S. external investment position of $1.9 trillion, or roughly 20 percent of GDP.

Even if nominal U.S. GDP growth of 5 percent could be sustained indefinitely, an ongoing 4.4 percent of GDP current account deficit would imply a sharply rising foreign debt-GDP ratio into the foreseeable future. Only after several decades would the debt-GDP ratio settle down in the neighborhood of 90 percent (see the Appendix). Of course, if ability to pay was the only criterion for sustainability, it's hard to see why this would be a great problem, even as the 90 percent mark was finally approached. For example, even if the world real interest rate was to exceed the U.S. real growth rate by 5 percent throughout the 22nd century (the U.S. can't own every century!), the

Chart 5
Effective Dollar Exchange Rate

Exchange rate   Exchange rate

Source: World Economic Outlook, IMF, May 2000.

U.S. would only have to pay over about 4.5 percent of its output annually to keep its debt-GDP ratio constant (again, see the Appendix).

Why then, should the U.S. current account deficit concern us at all? For one thing, even if today's 20 percent debt-output ratio still seems very manageable, it is extremely high by historical standards. At the end of the 19th century, when the U.S. was an emerging economic giant, its debt-GDP ratio never exceeded 26 percent (a high-water mark reached in 1894).[4] If today's trends continue, that figure will very soon be surpassed. One only has to recall that prior to the Latin American debt crisis in 1980, Argentina's net foreign debt stood at 22 percent, Brazil's at 19 percent, and Mexico's at 30 percent, to see that the U.S. external debt-GDP ratio has already reached a high level.[5] True, as Chart 7 shows, the U.S. will have to climb the

Chart 6
U.S. Net External Investment Position
(Percent of GDP)

Percent of GDP   Percent of GDP

Year
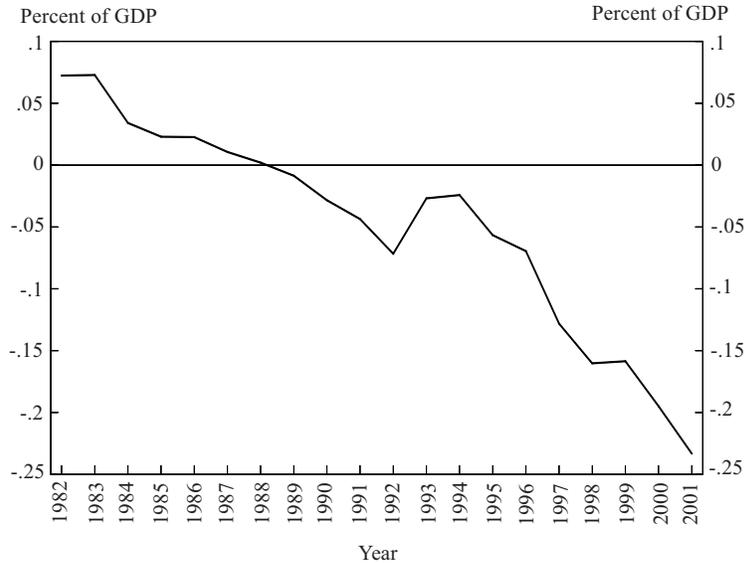
Source: "The International Investment Position of the United States," *Survey of Current Business*,
July 2000 and authors' calculations for 2000, 2001.

debt ladder for a decade more to achieve the 40 to 50 percent peak
levels reached by many OECD countries during the 1990s (including
Canada, Finland, and Sweden), not to mention levels in excess of 60
percent for Australia and 75 percent for Ireland.[6] But the preceding
OECD debtors are small countries. It is a very different matter for the
world's largest economy—one that is relatively closed to boot—to
run up foreign debts of comparable proportions. At the very least,
home bias in asset holdings suggests that the rest of the world's will-
ingness to absorb liabilities issued by the U.S. is not unlimited. If, as
our earlier discussion suggests, the effectively traded share of U.S.
output is small (say 25 percent), then a U.S. foreign debt of 20 per-
cent of GDP would, moreover, constitute 80 percent of U.S. "trad-
able" GDP.

Chart 7
Up the Debt Ladder?
Projected U.S. net foreign debt*

Net foreign debt
(ratio to GDP)

Net foreign debt
(ratio to GDP)

Hypothetical
U.S. debt trajectory

Ireland 1983

Australia 1996

Finland 1994

Sweden 1994
Canada 1993
Norway 1977

Mexico 1980
U.S. 1894
Argentina 1980
Brazil 1980
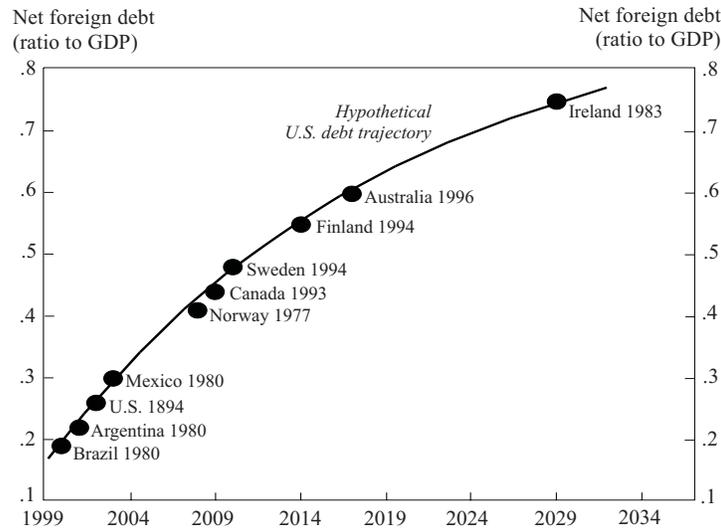
* Projection assumes U.S. current account remains at -4.4 percent of GDP and nominal GDP growth
  remains at 5 percent indefinitely.

Real-world limitations on a country's ability to borrow from the
rest of the world depend, in practice, on complex political economy
considerations, and not just ability to pay. It thus seems unlikely that
the U.S. can get anywhere near the top of the debt ladder in Chart 7
without breaking it.

A detailed discussion would take us far away from our focus here
(see Obstfeld and Rogoff 1996, chapter 6), but suffice it to say that
many factors may lead to a reversal of current trends, if not neces-
sarily an outright liquidity crisis. The most obvious "shock" would
be a sudden decline in the U.S. growth rate relative to the rest of the
world, perhaps also leading to investment collapse. Such a shock
might both cause foreigners to reduce the flow of savings into the
United States and, at the same time, induce a greater flow of U.S. sav-
ings abroad—both factors would tend to reduce the U.S. current

account deficit. An alternative scenario would be a stock market collapse (for reasons other than a decline in expected growth), due possibly to a reversal of the steady trend toward a declining share for labor in national income—or due to a sharp rise in inflation and interest rates.

In sum, the present U.S. current account trajectory and net debt position are high by any standards, and unprecedented for the world's largest economy. Whereas there are no pressing solvency considerations leading us to believe a current account reversal is necessary any time soon, it would be imprudent not to think through the consequences of a movement of the current account into balance or even surplus.[7]

Current account adjustment and the equilibrium exchange rate   4.2

We next illustrate the possible effect of a sudden reversal in the U.S. current account surplus on the dollar's real exchange rate, under the assumption that monetary policy both at home and abroad places a substantial weight on price stability. We must again stress the caveat that the exchange rate and the current account are jointly determined. Indeed, we will ignore the feedback from the exchange rate to the current account entirely. This feedback, of course, was a central theme of Krugman (1985), who calculated that a large depreciation of the dollar would be needed to reverse the current account deficit. The same channel may also be important today, but, as we have discussed, many other factors could precipitate a current account reversal.[8] In any event, our intent here is to illustrate quantitatively what we believe to be a very important, but different, feedback channel, that from the current account to the exchange rate.

Our question is the following: Suppose the U.S. current account was to suddenly reverse and go from its present position into long-term balance. What would be the likely effect on the real exchange rate, both in the short run and in the long run? Our scenario may seem drastic, but it is less radical than one in which the U.S. actually is forced to start repaying its debt, as happened to a number of highly indebted middle-income countries during the LDC debt crisis of the 1980s and again after the Asian crisis of the late 1990s.

A simple model   *4.3*

It is helpful to set out a modest analytical framework for our calculations, but readers who are not interested in the details can skip to Figure 1, which summarizes our reasoning. The model we use is a simple one in which consumers get utility from both a traded and a nontraded good according to the standard constant elasticity of substitution function

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

with price elasticity θ, and where C_T denotes consumption of traded goods and C_N denotes consumption of nontraded goods.[9] When $\theta = 1$, this function simplifies to the logarithmic form

$$\gamma \log C_T + \left(1-\gamma\right) \log C_N .$$

As a first pass, we will assume perfectly flexible domestic prices and wages. That assumption makes this initial calculation most applicable over a medium-term horizon of perhaps two to four years. Later we will consider the effects in the short run of sticky money prices and wages.

We assume that domestic production of both the traded and the nontraded goods is exogenous at Y_T and Y_N. (This assumption is inessential, provided we assume that the shares of the two types of goods in GDP remain relatively constant over the policy horizon.) Nontraded goods consumption, therefore, is confined to $C_N = Y_N$. Traded goods consumption may deviate from production due to net imports or exports.[10] Assuming flexible relative prices (as we shall for now), it is easy to show that the relative price of nontradables in terms of tradables, denoted by p, is given by

$$p = \left(\frac{1-\gamma}{\gamma}\right)^{1/\theta} \left(\frac{C_T}{Y_N}\right)^{1/\theta} .$$

Finally, the exact consumer price index, in terms of the tradable good, is

$$P = \left[\gamma + (1-\gamma) p^{1-\theta} \right]^{\frac{1}{1-\theta}}.$$

What, then, is the effect of a current account reversal on the real and nominal exchange rates? We essentially need to know only two numbers. The first is the elasticity of substitution, θ. The second is the effect of a current account reversal on C_T/Y_N.

Let us take up the second number first. If Y denotes GDP measured in tradable goods, D the U.S. net external debt measured in tradables, and i the nominal rate of return (in dollar terms) that the U.S. must pay to foreigners, we may write the current account ratio as

$$\frac{CA}{Y} = \frac{Y_T - iD - C_T}{Y}.$$

We will use 25 percent as our estimate of Y_T/Y, which (as we have noted) is below the estimate one gets by considering services and imputed rents on structures to be the nontraded component of GDP, but seems quite conservative given the plethora of evidence discussed in Section 2 on the international segmentation of goods markets. For iD/Y we will take an estimate of 1.2 percent. That number corresponds to a 6 percent nominal interest rate on a 20 percent of GDP net debt.

As for the elasticity of substitution θ between traded and nontraded goods (the first of the two numbers we need for our calculation), there is limited empirical evidence. Ostry and Reinhart (1992) find an elasticity averaging roughly 1 for developing countries, but differing across regions. Most estimates for industrialized countries, however, are lower and generally below 1.[11] As we shall see, the lower the elasticity, the bigger the exchange rate movement in our core calculation. Here, we will conservatively assume an elasticity of 1 in the short to medium run; the elasticity is likely to be higher in the long run, perhaps as high as 4.

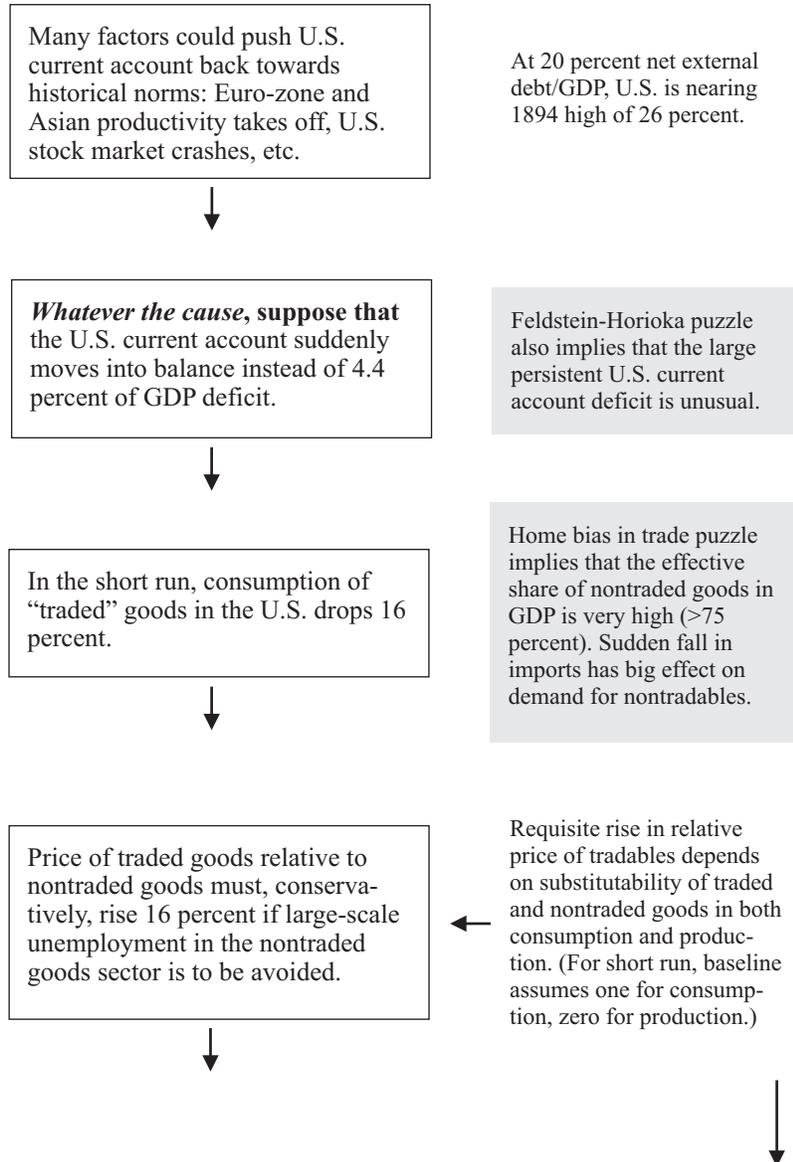*A baseline medium-term estimate*   *4.4*

Given, these assumptions, the real exchange rate effects of a return to current account balance are easily found, as we illustrate in Figure 1. We begin by supposing that an exogenous shock (e.g., a euro zone take-off or a U.S. stock market crash) returns the current account to balance from its current level of a 4.4 percent of GDP deficit.

The concomitant drop in net imports of tradables would imply an approximate 16 percent drop in traded goods consumption (calculated as a log difference).[12] How much would this affect prices? We begin by thinking about the case where prices are fully flexible (a useful benchmark if the current account drop occurs gradually). In the log consumer preference case—where the elasticity of substitution θ between tradables and nontradables is 1—the relative price of nontradable goods would also have to fall by 16 percent. (Otherwise, there would be an excess supply of nontradables and therefore pressure on employment in the nontraded goods sector.)

Given a 16 percent rise in the relative price of tradables, the effect on the nominal exchange rate itself would depend on monetary policy. In Figure 1, we suppose the Federal Reserve attempts to stabilize the CPI. Since (by assumption), 75 percent of output is nontraded and 25 percent is traded, CPI stabilization would imply a 12 percent rise in traded goods prices and a 4 percent fall in nontraded goods prices (remember, we are assuming completely flexible prices here). Then, a CPI weighted average of the two goods' (log) prices would remain constant. Since the price of traded goods is set in world markets, a 12 percent rise in their domestic nominal price would require a 12 percent depreciation of the nominal dollar exchange rate.

Note that even under flexible prices, one would get a much larger change in the exchange rate if the elasticity of substitution between traded and nontraded goods was lower. If, in line with some of the estimates cited above, θ was 0.5 instead of 1, the exchange rate depreciation would double in size to 24 percent. This calculation does not, of course, take into account very short-run price rigidities (as we shall do in a moment), so it should be thought of as a

Figure 1
Anatomy of a Crash Landing for the Dollar

Many factors could push U.S. current account back towards historical norms: Euro-zone and Asian productivity takes off, U.S. stock market crashes, etc.

At 20 percent net external debt/GDP, U.S. is nearing 1894 high of 26 percent.

↓

***Whatever the cause*, suppose that** the U.S. current account suddenly moves into balance instead of 4.4 percent of GDP deficit.

Feldstein-Horioka puzzle also implies that the large persistent U.S. current account deficit is unusual.

↓

In the short run, consumption of "traded" goods in the U.S. drops 16 percent.

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

↓

Price of traded goods relative to nontraded goods must, conservatively, rise 16 percent if large-scale unemployment in the nontraded goods sector is to be avoided.

← Requisite rise in relative price of tradables depends on substitutability of traded and nontraded goods in both consumption and production. (For short run, baseline assumes one for consumption, zero for production.)

↓   ↓

Figure 1 - continued
Anatomy of a Crash Landing for the Dollar

If all goods prices are flexible, dollar must depreciate by 12 percent to maintain overall CPI price stability and full employment in nontradables. Traded goods (1/4 GNP) prices up 12 percent, nontraded down 4 percent.

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 percent in short term. To get the necessary adjustment in internal U.S. prices for traded goods relative to non-traded goods, again to maintain full employment in nontraded sector, exchange rate must depreciate 24 percent.

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

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

BUT
Dollar prices of U.S.-produced goods typically move very little in the short run. If all adjustment falls on import prices, exchange rate may need to fall as much as 45 per-cent to **maintain full employment**.

The Fed faces a trade-off. It must allow a large dollar depreciation to maintain de-mand for nontraded goods, but this is likely to stoke in-flationary pressures.

medium-term, one- to two-year scenario. Over the longer run, elasticities of substitution are likely to be higher than $\theta = 1$. With $\theta = 4$, for example, the price effects are quartered. Over the very long run, factor mobility across sectors would tend to mitigate the price effects even further, perhaps eliminating them entirely.

Aside from our conservative choice of 1 as the elasticity of substitution in the medium run, our calculations are perhaps conservative in another dimension. In particular, the level of market segmentation suggested by the broad range of empirical puzzles in Section 2, could be construed to imply that considerably less than 25 percent of GDP is tradable, at least in the short run. If, for example, we take Y_T/Y to be 15 percent instead of 25 percent, even the log (unitary elasticity) case would yield a much larger exchange rate depreciation, of around 20 percent.

Perils of a hard landing   *4.5*

We now turn to the next-to-last box in Figure 1. Until now, we have assumed that nominal exchange rate movements are reflected one-for-one in the prices of tradable goods, and that full employment is continuously maintained. These assumptions might be plausible if the current account's adjustment to balance is gradual and largely anticipated. The picture would look quite different, however, if the U.S. experiences a sudden reversal.

We have already observed that exporters to the U.S. price to market, passing through only about half of any exchange rate change to importers in the short run of a year. Taking this factor into consideration, the Fed would have to be willing to allow a 24 percent rather than a 12 percent depreciation of the dollar, in order to maintain both the CPI and the level of employment in the nontraded sector.

Indeed, the situation could be much worse if the current account drops too precipitously into balance. This takes us to the last box in Figure 1. As we have discussed, the prices of most U.S.-produced goods, even tradables, tend to be extremely sticky in the very short run. Assuming that imports account for roughly half of all tradables

consumed, then a much larger dollar depreciation, perhaps on the order even of 40 to 50 percent, would be needed to prevent unemployment in the nontradables sector. Admittedly to assess rigorously this final magnification effect, from 24 percent to, say, 45 percent, requires a more detailed model than the one we have presented here. Also, the Fed might view so extreme a depreciation as endangering price stability as well as financial stability, and choose to allow only a smaller depreciation. This response, however, would keep the relative price of nontradables too high, and there would be downward pressure on employment in the nontradables sectors. Thus, a rapid reversal in the current account would force the Fed to face a painful trade-off between higher unemployment and greater dollar depreciation.

If our calculations sound wild-eyed, the reader should note that a dollar depreciation on the order of 45 percent is pretty much the short-run number one gets from old-fashioned large-scale black-box macro models. Those models tend to predict that a 1 percent of GDP U.S. current-account change is associated with roughly a 10 percent real exchange rate change. Our model, however, suggests a much smaller medium-term depreciation than some of these models, and this is precisely why, in the next section, we are able to conclude that a gradual decline in the deficit will be accompanied by a much smaller decline in the dollar.

The costs of delay   *4.6*

The sudden reversal scenario is very similar to what we have observed in the many developing countries that have been forced to engineer rapid eliminations of current account deficits. But as the reader can see, the big effects come from the sudden elimination of the deficit, not primarily from the size of the debt.

Consider the extent to which delay in external adjustment exacerbates the short and medium-term real exchange rate correction ultimately required by a sudden return to a zero current account. A simple calculation shows that adding another 5 percent to the external debt-GDP ratio does not greatly exacerbate the costs of a reversal, though it may increase the likelihood. For example, if the U.S.

current account deficit continues at the rate of 4.4 percent of GDP per year, at a world real interest rate of 4 percent, then the U.S. external debt burden will grow by less than 0.2 percent of GDP per year. The move to current account balance, at that point, would involve only a slightly greater depreciation than the one calculated above, at the outside 1 percent greater.[13]

What one can see from this calculation is that the real danger is the shock of a sudden reversal in a world of sticky prices, rather than the question of whether the debt-GNP ratio peaks at 20 percent or 25 percent.

Does the source of the shock matter?   *4.7*

Since, obviously, the paths of the current account and the exchange rate are simultaneously determined, shouldn't their correlation depend heavily on the source of the exogenous shock that drives the current account into balance? In fact, because the ratio of nontradable output to GDP tends not to move sharply, we believe that the channel we have identified will express itself across a variety of scenarios once one embeds it in a more fully specified general equilibrium model.

A rise in productivity in Europe, a speculative crash of the U.S. equity market, and a rise in U.S. national savings are all factors that could induce the kind of exchange rate movement we are talking about here. Of course, this does not mean that the source of the shock is not critically important for other variables such as output, employment, and so on. But the exchange rate channel we emphasize is remarkably robust to this consideration.

Does the composition of the U.S. capital account
surplus matter?   *4.8*

During the year 2000, investment flows from Europe financed a considerable portion of the U.S. current account deficit (see Mathieson, Schinasi, et al. 2000). Won't the effects of a fall in the U.S. current account depend critically on how foreign investment in U.S. assets is distributed across equity, bonds, and direct foreign investment?

Again, the answer is obviously yes and, in general, the welfare effects of, say, a plunge in U.S. productivity, can be quite sensitive to how much of the risk is borne by foreigners. Again, however, our exchange rate calculation is relatively robust to this consideration. The exchange rate channel we identify results from a substitution effect: If the country cannot run a trade balance deficit, it will consume fewer foreign goods, and the price of domestically-produced goods must fall.

The exchange rate drop need not be precipitated by a late 1990s Asia-style liquidity crisis due, say, to a mismatch of borrowing and lending maturities. Sharp current account changes can result from nonfinancial factors such as a sharp reduction in U.S. investment; it is naive to think that if only financial crises could be averted, sharp shifts in the real economic activity would never happen.

How much would a sharp fall in the exchange rate hurt?   *4.9*

We have been cautious not to claim that a sharp drop in the exchange rate, even if it were to occur, would necessarily produce large real effects on the real economy. During the mid-1980s, the trade- weighted dollar fell, by some measures, almost 50 percent, but the U.S. has hardly suffered in the aftermath. So, it is possible that even a sharp exchange rate drop would prove relatively benign. Still, asset price movements of this magnitude obviously pose risks, risks that often become apparent only after the fact. Financial intermediation today is much more highly developed than was the case even fifteen years ago, and one cannot simply presume that a sharp dollar movement would again be painless. Indeed, the risks seem substantial.

Conclusion   5

We have argued that because international markets remain segmented, a sudden adjustment of the U.S. current account could involve a very large depreciation of the dollar, a result of the concomitant sharp downward shift in the demand for nontradables. This could happen even though, in any reasonable reckoning of long-term

national solvency, the United States can easily—indeed, almost effortlessly—afford to service its current net foreign debt. Such rapid depreciations have wreaked havoc in developing countries, and while the U.S. economy is certainly more resilient, our calculations suggest that the risk of such a steep and rapid depreciation is real.

The required exchange rate depreciation would be much more modest if the U.S. current account deficit was to fall gradually back into balance over an extended period, even though the peak debt-GDP ratio might be higher. Of course, if nothing at all happens and U.S. private saving remains at its current low level, the U.S. economy might eventually face the worst of both worlds—a big external debt and a heightened chance that foreign investors panic and force a sudden end to U.S. foreign borrowing. It may well be five years or more before that danger materializes, but it is certainly not too early to begin thinking both about the consequences and the risks under alternative policy scenarios.

For example, it is clear that the U.S. current account deficit might be far larger today were it not for the fact that the consolidated government budget of the United States is in substantial surplus (after all, the current account surplus is simply the difference between national saving and investment). If the United States were to undertake a large tax cut, the current account deficit could easily widen to even more precarious levels.[14]

Appendix
Current Account Dynamics and the
Inflation-Adjusted Current Account

This appendix contains a brief summary of some facts used in the text regarding both current account dynamics and the distinction between real and inflation-adjusted current accounts.

Let B denote the U.S. stock of net foreign assets measured in dollars and Y U.S. GDP measured in dollars. In the text we used Y to denote GDP measured in traded goods, but for convenience we now switch to a conventional notation, according to which $Y = Py$, where P is the dollar price level in the U.S. and y is real GDP. We will also use the notations $b = B/Y$, for the stock of net foreign assets as a ratio of GDP, and $\pi = \dot{P} / P$, for the inflation rate, where a "dot" over a variable signifies that variable's rate of change (derivative with respect to time). We let $g = \dot{y} / y$ denote the growth rate of real GDP, so that $\dot{Y} / Y = g + \pi$. Letting CA now denote the (nominal) current account surplus measured in dollars, we have

$$CA = \dot{B}.$$

With the preceding notation, we can understand the dynamics underlying Chart 7. Since

$$\dot{b} = \frac{\dot{B}}{Y} - \left(\frac{\dot{Y}}{Y} \right) b = \frac{CA}{Y} - (g + \pi) b,$$

we see that for constant levels of CA/Y and $g + \pi$, the steady-state ratio of net foreign assets to GDP (the level at which $\dot{b} = 0$) is given by

$$\bar{b} = \frac{CA / Y}{g + \pi}.$$

Thus, if $CA/Y = -0.044$ and $g + \pi = 0.05$ in perpetuity (as in the text), we would have $\bar{b} = -0.88$; or an 88 percent steady-state ratio of net foreign debt to GDP.[15]

Observe that if $b = B/Y$ is constant, then $\dot{B} = (g + \pi)B$, so the change in the *real* net external asset stock, *B/P,* is

$$\frac{\mathrm{d}(B/P)}{\mathrm{d}t} = \frac{\dot{B}}{P} - \pi\frac{B}{P} = g\frac{B}{P}.$$

Let A denote nominal U.S. "absorption" (defined as the sum of private and public consumption and investment). Then because of the identity

$$\dot{B} = Y + iB - A,$$

we see that if $r = i - \pi$ is the real interest rate,

$$\frac{\mathrm{d}(B/P)}{\mathrm{d}t} = y + r\frac{B}{P} - \frac{A}{P} = g\frac{B}{P}$$

assuming a constant level of b. Let a denote absorption as a share of GDP, $a = A/Y$. Then in the steady state where $b = B/Y$ is constant, the steady-state share of absorption in GDP is

$$\bar{a} = 1 + (r - g)\bar{b}.$$

If, for example, investment and government consumption are unaffected by a steady-state net foreign debt, private consumption (as a share of GDP) would have to be lower by r - g times the debt (likewise expressed as a share of GDP).

   In our analysis in Section 4, we suppose that CA goes to zero. A caveat is that setting $CA = 0$, which brings the *nominal* current account into balance, implies (with positive inflation and a net foreign debt) an *inflation-adjusted* current account surplus (Freedman 1979). Recall the first equality in equation (1), which holds even when B/Y is not held constant. If the nominal current account satisfies $CA = \dot{B} = 0$, then the rate of change of the economy's *real* net foreign asset position equals

$$\frac{\mathrm{d}(B/P)}{\mathrm{d}t} = -\pi\frac{B}{P},$$

which is positive when there is a net foreign debt ($B < 0$). Thus, the economy is amortizing its foreign debt in real terms (running an inflation-adjusted surplus) when $\pi > 0$. In order that the inflation-adjusted current account be zero—so that real net foreign claims are constant—the nominal current account CA should be in deficit at the level $CA = \pi B < 0$. This nominal deficit corresponds to a level of absorption of tradable goods of $Y_T + r(B/P_T)$, rather than the lower level $Y_T + i(B/P_T)$ considered in Section 4, and, thus, to a slightly smaller compression of demand for tradables than is posited in the text. (The difference, expressed as a percent of GDP, is $\pi B/Y$. At an annual inflation rate of 2 percent and a foreign debt-GDP ratio of 0.2, that difference amounts to 0.4 percent of GDP.)

Endnotes

[1] Greenspan (1989) has emphasized that modern knowledge-intensive products are fundamentally less costly to transport internationally, leading to greater market integration. But as we shall see, there are many other costs of trade and they seem to be very significant in practice.

[2] For end 1999, foreigners held $1,445 billion out of the total U.S. equity market of $16,794 billion, whereas U.S. residents held $2,026 billion in foreign stocks. See Commerce Department, *Survey of Current Business* (July 2000), and the International Federation of Stock Exchanges.

[3] We regard the issue of whether high charges on cross-border remittances constitute a trade or financial-market imperfection as somewhat irrelevant. Our point is that trading frictions may be the common cause of segmentation in both goods and capital markets.

[4] See O'Rourke and Williamson (1999), p. 210.

[5] See Bulow and Rogoff (1990) and O'Rourke and Williamson (1999). Remember, the figures for Argentina, Mexico, and Brazil are net, not gross, borrowings.

[6] See Lane and Milesi-Ferretti (1999). (For the sake of readability, Chart 7 omits several highly indebted OECD countries. The peak debt-GDP ratio of New Zealand, for example, exceeds that of Australia.)

[7] Mann (1999) concludes that the U.S. current account is sustainable over a two- to three-year period, but not indefinitely.

[8] Indeed, although the dollar did decline after 1985, the current account remained in sharp deficit through most of the 1980s and, after a brief flirtation with balance, the deficits soon resumed in the early 1990s.

[9] See Obstfeld and Rogoff (1996, chapter 4). In fact, we now prefer a model in which all goods are potentially tradable but subject to trade costs as in Obstfeld and Rogoff (2000b). Ultimately, such a model is preferable because it is easier to get concrete data on trade costs and on international elasticities of substitution than it is to fill in the essentially unobservable parameters of the traded-nontraded goods model. However, we adopt the conventional approach here since the other formulation is somewhat more complicated and less familiar.

[10] In the very long run, factors are mobile across sectors, and the relative price of traded and nontraded goods should depend solely on differences in productivity in the two sectors. In the short run, however, there are likely to be large adjustment costs. If international capital was fully mobile, supply could adjust even if factors were not mobile domestically. But, as the Feldstein-Horioka paradox illustrates, we should not expect to see large international capital movements to offset imbalances in sectoral supply.

Notice that investment might utilize nontraded goods as an input. In that case, we would think of θ as reflecting, in part, the elasticity of substitution between tradables and nontradables in investment.

[11] For example, Mendoza's (1991) point estimate of the elasticity of substitution between traded and nontraded goods is 0.74, while Stockman and Tesar's (1995) is 0.44. Lane and Milesi-Ferretti (2000) suggest elasticities as low as 0.5. This is the *average* estimate over their country sample. They find that for large and more closed economies (such as the U.S.), the elasticity is even lower.

[12] The precise figure is almost 17 percent. However, we round down to 16 percent so as to work with simple numbers, a reasonable approximation given the uncertainty inherent in our parameter estimates. In addition, one might question our assumption that *CA* (the nominal current account), rather than the inflation-adjusted current account, goes to zero; see the Appendix. If the inflation-adjusted current account goes to zero and inflation is running at 2 percent per year, then the drop in traded goods consumption is only about 15 percent. The 16 percent figure used in the text seems a reasonable middle ground given these two possible assumptions on the size of the current account adjustment.

[13] Observe, however, that there would have been a steady depreciation of the dollar over the intervening five years, since to maintain a constant current account deficit with a growing foreign debt, consumption of tradables must decline steadily. The cumulative five-year depreciation would be moderate, however.

[14] Our analysis certainly should not be construed as suggesting that trade restrictions are a good means of closing current account imbalances. Indeed, measures that exacerbate market segmentation would imply an even great sensitivity of the exchange rate to the current account. Furthermore, because the current account equals national saving less domestic investment, import restrictions could succeed in substantially reducing the external deficit only by raising national saving—a development that seems unlikely—or, more plausibly but undesirably, by sharply compressing investment.

[15] In this Appendix, we work in continuous time for simplicity, whereas the calculations in the text are based on a discrete-time model. In the example underlying Chart 7, the steady-state debt-GDP ratio is 92.4 percent.

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