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Persistent Dollar Swings and the US Economy

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The dollar has experienced two large sustained upward movements in the past 30 years, and both of these episodes were associated with large trade and current account deficits. Large swings in the dollar cause shifts of resources back and forth between the tradable and nontradable sectors, and these adjustments may be costly. A great deal of concern has been expressed about the impact of dollar variations on the manufacturing sector. Organizations representing both labor and management have complained that the strong dollar is hurting their constituencies and have suggested policies ranging from a new rhetoric from government officials[1] to exchange rate intervention and even capital controls.[2] In this paper I

Martin Neil Baily, senior fellow at the Institute for International Economics, was chairman of the Council of Economic Advisers of President Clinton from 1999 to 2001 and a member of President Clinton's cabinet. *The author would like to thank his colleagues at the Institute for International Economics for many helpful comments, especially C. Fred Bergsten, Robert Lawrence, Catherine Mann, Mike Mussa, Ted Truman, and John Williamson. Karen Johnson and David Wilcox of the Federal Reserve and their staffs, Joel Prakken of Macroeconomic Advisers, and David Heuther of the National Association of Manufacturers gave substantial assistance or advice; and Pavel Trcala provided excellent research assistance.*

1. See Jasinowski (2002).

2. See Palley (2002), a study for the AFL-CIO. C. Fred Bergsten of the Institute for International Economics does not represent either of these constituencies but has argued for a change in rhetoric and possibly for exchange rate intervention on the grounds that a disequilibrium exchange rate imposes costs on the economy. Bergsten and John Williamson, also of the Institute, favor the establishment of target zones for the dollar and the euro. See Bergsten (2002).

examine how the manufacturing sector has actually been affected by swings in the dollar and by other economic forces.

In addition, I look at macroeconomic effects of dollar changes. How did the macroeconomy accommodate to the dollar adjustments of the 1980s and 1990s? And what would be the macro effects for the US economy in the future if the dollar were to fall enough to reduce the current account deficit from the level of 4.2 percent of GDP reached in 2000 to about 2.5 percent?

I am not attempting to predict where the dollar will move in future years. It has fallen somewhat since its peak in the spring of 2002, but it still remains high relative to its recent historical average, and the US current account and trade deficits are very large. A substantial decline in the dollar is possible, and even likely, over the next few years. So it is worthwhile exploring the macro consequences of such a dollar decline. This would involve a readjustment of the savings-investment balance, requiring a reduction in the growth of consumption and investment, as well as an inflationary impact.

Examining the potential impact of a decline in the dollar can raise a hornet's nest of objections from economists. The dollar is not exogenous but a market-determined price, so instead of asking what would be the consequences of a lower dollar, it is more appropriate to ask what the consequences would be of some shock to the world economy that would also result in a decline in the real value of the dollar. Another area of concern for economists is that the value of any dollar index depends on a large vector of bilateral exchange rates, and the outcome of changes in the relative prices of the dollar can depend on exactly which countries adjust more and less.

Ideally one would explore exchange rate adjustments within a meaningful multicountry general equilibrium framework that allowed examination of a variety of possible shocks to the system.[3] However, there is an advantage in focusing on a US-based model to explore the consequences for the US economy. I will be using the Macroeconomic Advisers model, which has a clear track record in following the historical movements of the US economy and has shown the ability to make useful predictions of the future. Multicountry models introduce the danger that specification errors in the model of some other country will throw off the results for the United States.

In terms of the shock that causes a dollar decline, there is a case for adjusting the model equation that determines the exchange rate. This is the preferred approach of Macroeconomic Advisers and also used by the international staff at the Federal Reserve Board. The idea is to capture either shifts in expectations (the exchange rate risk premium), or the

3. See, for example, Bryant, Hooper, and Mann (1993).

impact of portfolio effects that cannot be modeled well in the econometric exchange rate equation. I discuss this point further below.

To anticipate the main findings: First, for the manufacturing sector as a whole it is hard to find signs that swings in the dollar over the period 1973-2000 have had a large negative impact. This is also true when three specific industries are considered, autos, steel, and high tech (computers and semiconductors). US manufacturing has done relatively well in the period of floating exchange rates (although the unionized part of manufacturing has done less well). Second, the past two years have been unusually difficult ones for manufacturing. The sector has been hit very hard in this recession by three blows at once. There has been a sharp fall in the domestic demand for manufactured goods; the dollar has remained strong during this downturn—actually rising throughout 2001; and there has been economic weakness in the other major world economies. Third, because of continuing capital inflows and because of the growth of services trade, the value of the dollar is likely to remain indefinitely above the level that would result in balanced trade in manufactured goods. A manufacturing trade deficit will likely be a persistent feature of the US economy. Fourth, looking forward, the US current account deficit could be reduced to around 2.5 percent of GDP by a devaluation of 20 to 25 percent. Fifth, such an adjustment, should it take place, would benefit the goods-producing and service-producing sectors of the US economy and would slow sharply the growth of net foreign indebtedness. It would, according to the simulation model, come at a rather high price in terms of much higher interest rates, a slower GDP growth, and a substantial sacrifice of consumption and investment. Sixth, the exchange rate adjustment can be made gradually or more sharply. The benefits come more quickly and the costs are higher in the latter case, and there is some overshooting of the exchange rate on the downside.

US Manufacturing During the Period of the Floating Dollar, 1973-Present

The theory of comparative advantage provides the rationale behind the drive for worldwide trade expansion. The analysis of the gains from trade is generally developed under the assumption of balanced trade, but with open capital markets and flexible exchange rates, there can be and have been very large trade deficits and surpluses for different countries. The adjustment costs imposed on the tradable goods sector of the economy by fluctuating exchange rates are not ignored in the literature, but they are not given great prominence.[4] For the United States, dollar swings,

4. The ability of the US economy to adjust to trade was explored in Lawrence (1984). The Globalization Balance Sheet project at the Institute for International Economics, led by J. David Richardson, has explored the costs of adjustment. In a paper written contemporaneously

generally seen as driven by capital flows, impose an adjustment cost on all tradable goods and services, and notably on manufacturing.

For a company exporting a commodity product (one that has very close substitutes) with a price set in terms of local currency in the export market, a rise of 30 or 40 percent in the exchange rate is large enough to eliminate all of the profit margin in many cases. Exporting can become unprofitable in the face of an elevated dollar. In the first instance, this can create large instability in profits for companies involved in exporting and a loss of foreign market share.

Companies in import-competing industries face a similar problem. A company that had thought its competitive position was very strong could find itself losing contracts to foreign producers because it cannot match the prices available in world markets.

As witness to the importance of these issues in practice, the National Association of Manufacturers collected comment letters from a variety of small manufacturers throughout the United States and sent them to Treasury Secretary Paul H. O'Neill.[5] For example, an Ohio machine tool maker wrote about the ''devastating impact'' of the undervalued euro on his company and his industry. ''Between 1990 and 1998 our exports represented an average of 25 percent of our business. In 1999 exports represented only 7 percent of our bookings and there have been NO export orders in 2000. Our employment is down 33 percent.'' An Indiana maker of veneer machinery reports, ''Foreign companies tell us they wish to buy our machinery but cannot afford it with the difference in currency value. Our foreign sales have dropped over 90 percent in the last four years.'' And there are many, many more such stories.

The pressure of the high dollar has been linked to a weakness in business profitability in recent years. Corporate profits before tax of nonfinancial corporations nearly doubled between 1992 and 1997 (current dollars) and then were fairly flat until 2000, even though the output of this sector continued to grow strongly. In 2001, profits fell 31 percent (profits as measured in the national income and product accounts).

When exporting or import-competing companies experience a drop in orders or a sharp downward price movement, they often respond by reducing employment. US labor unions see the rise in the dollar after 1995 as a central reason for the weakness in manufacturing employment over the past few years. Thomas Palley (2002), in a report for the AFL-

with this one, Robert Blecker (2002) argues that the ''overvaluation of the dollar has caused massive damage to the US manufacturing sector as a whole, and was an important contributing factor in the surge of imports that caused a crisis for the US steel industry in the late 1990s and early 2000s.''

5. Available from the National Association of Manufacturers in Washington. Excerpts presented at the hearings by the House Committee on Small Business, June 12, 2002, testimony by Tony Raimondo, Behlen Manufacturing Company.

CIO, finds that the manufacturing trade deficit in 2000 had reached over 20 percent of manufacturing value added, having grown dramatically since 1991. Figure 5.1 shows this measure of trade impact. The United States has run persistent trade deficits in manufactured goods since 1983, and those deficits have widened dramatically since 1998. Palley notes that manufacturing employment fell nearly 2 million from 1998 to March of 2002.

In this section, I examine the performance of US manufacturing during the period of the floating dollar after 1973, and especially in the past ten years. In the next section I look in more detail at three industries that have figured large in the discussion of the trade effects of the dollar: steel, autos, and high tech.

Manufacturing Employment, 1973-2000: The US and Other Advanced Economies

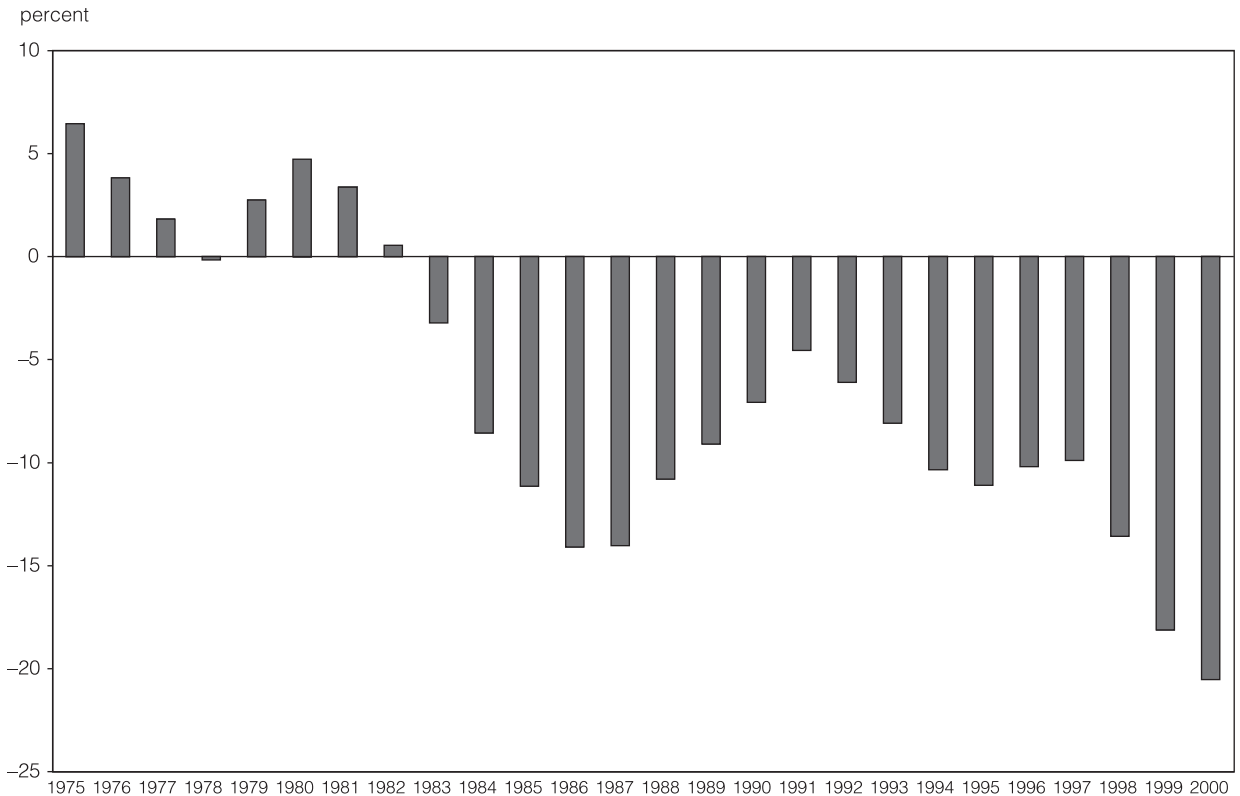
Changes in the level of employment in a given sector in a given country depend on its productivity growth and the increase or decrease in the demand for its products. Total demand for a product is the sum of domestic demand and net foreign demand. Domestic demand, typically by far the largest component, follows secular trends and is subject to short-term movements, notably cyclical changes.

Looking at the trends, an industry that experiences rapid productivity growth will generally reduce its prices over time, relative to other goods and services, and this will help bolster demand. For example, the volume of semiconductors produced in the United States has increased sharply over time as the quality-adjusted prices have fallen dramatically. Demand for an industry's products may also increase over time if people buy more of them as their income increases. And there may be factors external to an industry at work, such as the price and availability of substitute products.

For many mature or traditional manufacturing industries the secular trends are working against employment. Productivity continues to rise over time, but the combination of falling prices and rising incomes does not provide enough impetus to demand to increase employment. The classic example of this phenomenon is outside of manufacturing, namely in agriculture, where both income and price elasticities are low; here, a strong productivity performance over at least a century has reduced employment to very low levels. The service sector provides many examples of the opposite case, where low productivity growth is combined with rising employment—legal and business services, for example.

The manufacturing sector as a whole seems to be more like agriculture than services on a secular basis. Output has grown over time, but not fast enough to keep employment up, given strong productivity growth. The key reason for believing there is a secular trend weakness in manufac-

Figure 5.1 Manufacturing trade balance as a share of manufacturing value added, 1975-2000



Sources: Bureau of Economic Analysis, International Trade Administration, and author's calculations.

turing employment is that this pattern is typical of advanced economies. Figure 5.2 shows how the level of total hours worked (employment times average annual hours per employee) has changed over the period 1973-2000 for the large industrial economies. The pattern of declining employment is very marked. In fact, Canada is the only one of the large economies that has experienced employment growth since 1973. Germany and Japan are both manufacturing powerhouses in international markets and have run consistent manufacturing trade surpluses over this period. Yet both countries have experienced much sharper declines in employment than did the United States. Viewed against the example of its developed-country competitors, the US manufacturing sector performed well in terms of maintaining employment over the 27-year period after the start of floating exchange rates. There are two reasons for this. First, the level of productivity in US manufacturing was (and is) very high, so there was less restructuring to be done in the United States. Second, the United States has been successful in developing new industries where demand growth has been very rapid—instruments, computers, and semiconductors, for example.

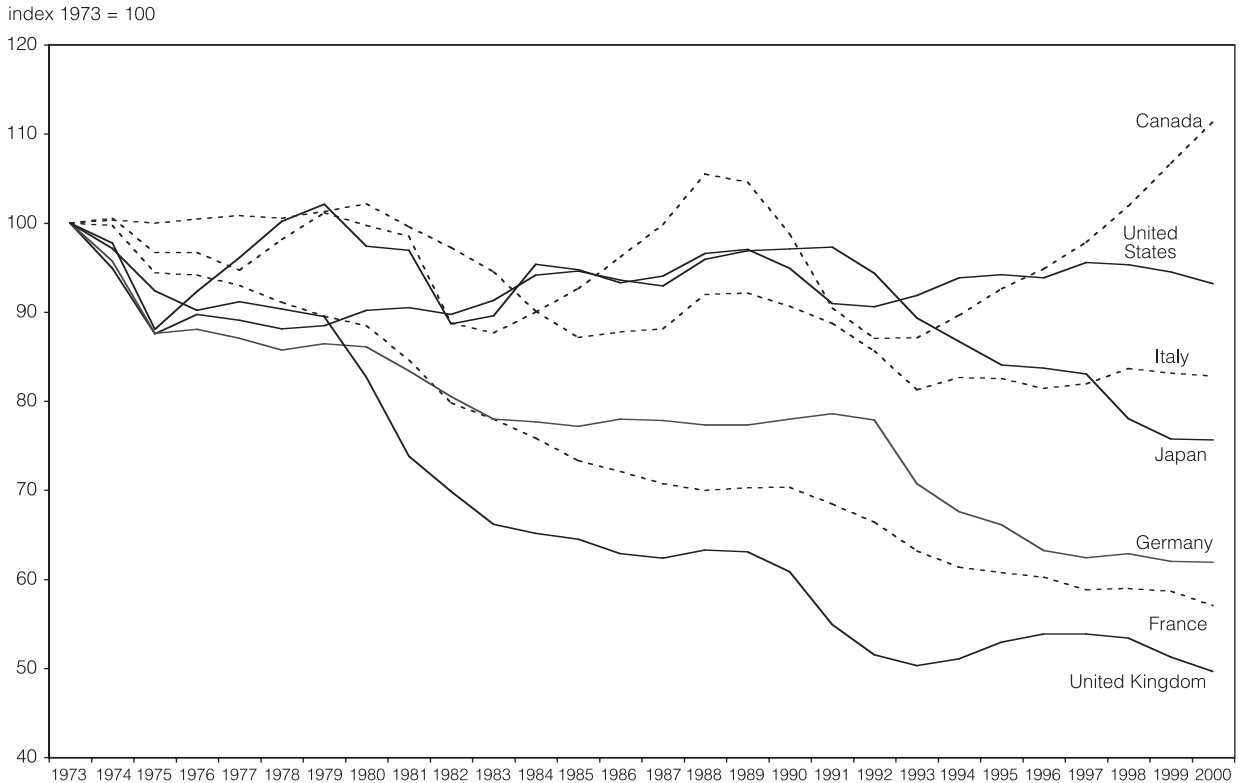
Canadian manufacturing since 1973 has actually had slower output growth than that in the US, but also far slower productivity growth, in part because of a much smaller high-tech sector. In the 1990s, Canadian manufacturing employment benefited from the weak Canadian dollar, proximity to the United States, and the robust growth of the US GDP. The North American Free Trade Agreement (NAFTA) also encouraged the expansion of trade between the two countries.

Countries that are still in the process of industrializing can be expected to show increases in manufacturing employment, just as the United States did in the first half of the 20th century. But the tendency for manufacturing employment to decline shows up rather early in the industrialization process nowadays, as technology transfer and a more favorable regulatory environment allow developing countries to move toward developed-country productivity levels in manufacturing more quickly than in service industries. Total hours worked in manufacturing have shown a declining trend in Korea since 1988 and in Taiwan since 1987.

As well as being driven by trends, the movements of employment in manufacturing in the short run are highly cyclical. Fluctuations in GDP during the business cycle are disproportionately concentrated in manufacturing, especially durable goods manufacturing. The impact of the episodes of cyclical downturn in 1974-75, 1980-82, and 1990-92 are strongly evident in the time-series pattern of employment shown in figure 5.2.

There have been two periods with a strong dollar since 1973, and there is no question that these periods put temporary downward pressure on US manufacturing employment. The high dollar during the periods 1984-86 and 1997-2000 clearly had an impact on employment, and it is evident

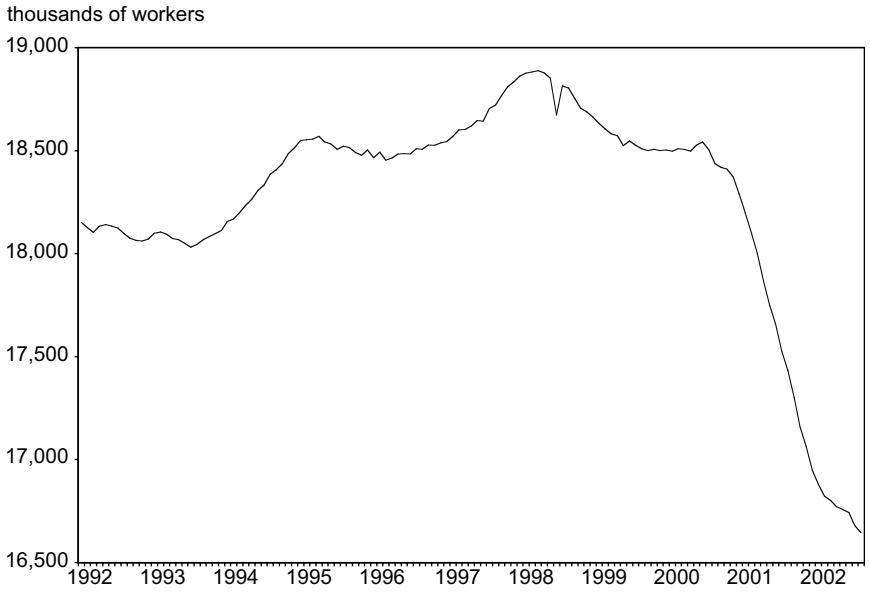
Figure 5.2 Total hours worked in manufacturing by country, 1973-2000



Note: Total hours is employment times hours worked per employee.

Source: Bureau of Labor Statistics.

Figure 5.3 US manufacturing employment in the past decade



Source: Bureau of Labor Statistics.

in figure 5.2, especially allowing for some lag between dollar movements and trade movements. It is striking, and it is not a coincidence, that during both of these strong-dollar periods, through mid-2000, the cyclical factors were working to sustain employment, and so the overall impact on employment was rather modest.

The two large upward movements of the dollar were driven by the ability of the US economy to attract large capital inflows. Relative to the rest of the world, when the US economy is growing strongly, the return on capital rises; in addition, interest rates rose with the large budget deficits of the 1980s, attracting capital from around the world. In practice, therefore, the two strong-dollar episodes since 1973 have coincided with times of strong cyclical growth in US demand, thereby minimizing the extent of adjustment or resource reallocation that has been required.

As noted above, the offsetting effect of dollar movements and cyclical movements applies only through mid-2000. I turn now to the 1990s expansion and the subsequent downturn.

Manufacturing Employment and Productivity, 1992-2002

Figure 5.3 shows seasonally adjusted monthly employment from January 1992 through September 2002, the most recently available (preliminary)

datum. Because of a recession that had started in 1990, manufacturing employment remained sluggish until mid-1993 (the ''jobless recovery''). Employment then grew by 860,000 from July 1993 to April 1998 before starting to decline gradually, with about 350,000 jobs lost through August 2000. At that point, the US economy tipped into a sharp growth recession followed by a mild overall recession, and an additional 1.86 million manufacturing jobs were lost through September 2002. The manufacturing job loss in this recession has been far more severe than in the recession of the early 1990s.

What are the forces at work over this 10-year period—and in the downturn in particular? First, the rate of productivity growth increased in the 1990s, especially after 1995. Manufacturing output per hour increased at 2.6 percent a year from 1979 to 1990, followed by a rate of 3.2 percent a year from 1990 to 1995 and 3.8 percent a year from 1995 to 2001. A higher rate of output growth would have been needed just to hold employment constant.

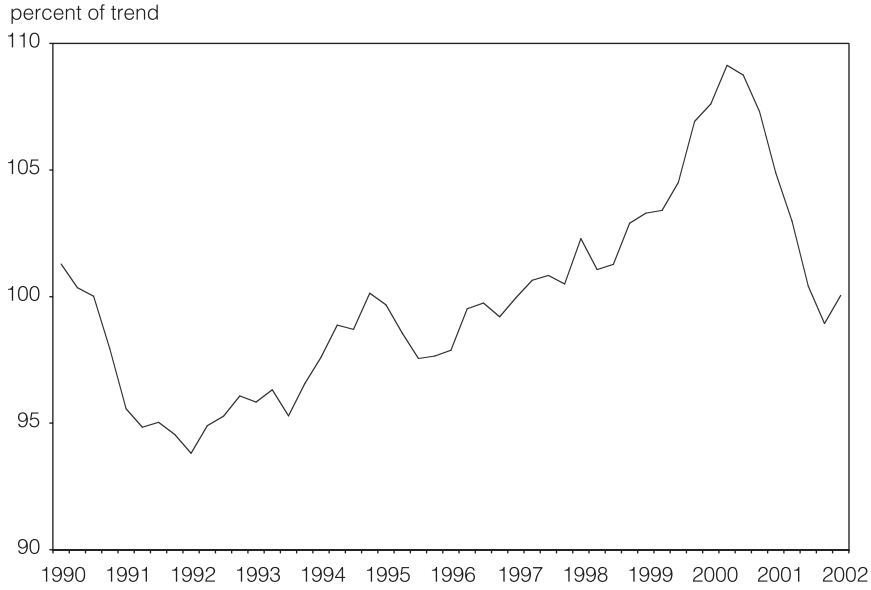
The strength of manufacturing productivity growth during the downturn and the start of the recovery is surprising. It grew by 2.6 percent a year from mid-2000 until the second quarter of 2002, despite sustained weakness in manufacturing output. After September 11, 2001, productivity was particularly striking, increasing at an annual rate of 5.9 percent over the three quarters from the fourth quarter of 2001 through the first half of 2002. Manufacturing employment continued to decline even though the sector was turning the corner in terms of output. Uncertainty about the economic outlook likely encouraged employers to make layoffs faster than in prior periods of demand weakness.

Second, during the 1990s expansion there was a shift of US investment. There was strong growth in investment in the expansion, but much of that growth was concentrated in information processing equipment and software. The information technology (IT) hardware sector has modest levels of employment, and rapid real output increases were met by extraordinary increases in productivity. The software sector is not part of manufacturing. Thus the investment boom in the 1990s, especially after 1995, was very strong in terms of increasing the real capital stock, but not in terms of the output of the traditional areas of manufactured goods. As the United States has become more of an information economy, this has changed the magnitude and mix of the demand for manufactured goods.

Third, the slowdown that started in 2000 and the recession of 2001 were concentrated in manufacturing. Even though the overall downturn (so far) has been very mild in terms of GDP, the drop in the domestic demand for goods was sharp. Figure 5.4 shows the deviation from trend of the domestic demand for goods (GDP of goods plus goods imports minus goods exports) from 1990 to the first quarter of 2002.[6] The time trend over

6. The data are in current dollars, although the corresponding real values move in very much the same pattern. GDP of goods includes the value added in manufacturing, but also

Figure 5.4 Domestic demand for goods: Deviation from trend, 1990-2002



Source: Bureau of Economic Analysis, and author's calculations.

this period has been removed. The figure shows that the downturn of 2000-02 resulted in a very sharp decline in goods demand, and the employment decline was also large. Trend-adjusted domestic demand for goods fell by 9.3 percent from the second quarter of 2000 through the fourth quarter of 2001, while manufacturing employment declined by 7.2 percent over the same period.[7] The decline in US manufacturing employment occurred in parallel with a decline in the demand for manufactured goods by US consumers and businesses.

Last but not least, the pattern of the dollar as the 1990s expansion ended was very different from the movement of the dollar as the 1980s expansion ended. The dollar started to decline in 1985 and came down quickly and substantially. As the growth of domestic demand slowed in the United States, the competitive position of US manufacturers sharply improved, helping to sustain US growth. By contrast, the dollar remained very strong even after the 1990s expansion slowed and ended, and in fact it continued

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the value added in upstream and downstream industries, notably wholesale and retail. The figure shows how much US residents were choosing to spend on goods, plus changes in inventories.

7. The employment series were not trend adjusted, but figure 5.1 showed that there was not a large trend, and certainly not a significant upward trend.

Table 5.1 The impact of trade in goods on GDP growth

Periods	Contributions to real GDP growth average of the quarterly figures (percent)		
	Goods exports	Goods imports	Net exports
1997Q1 - 2000Q2	0.54	−1.40	−0.86
2000Q3 - 2002Q2	−0.29	−0.09	−0.38
Contribution to the growth slowdown	−0.83	1.31	0.48

Source: Bureau of Economic Analysis, http://www.bea.gov, table S.2.

to rise until February 2002. Dollar movements in 2000, 2001, and early 2002 exacerbated the cyclical downturn in manufacturing.

Keep in mind, however, that even though dollar movements were hurting manufacturing, foreign trade generally acts as an automatic stabilizer for the economy, and for manufacturing specifically, and it did so in this downturn. One way to show this is to look at the contributions to real GDP growth coming from the different components of GDP, as computed by the Bureau of Economic Analysis. Table 5.1 shows how exports, imports, and net exports of goods added to or subtracted from real GDP growth over the period leading up to the growth slowdown and the period after the growth slowdown started (1997Q1 through 2000Q2 versus 2000Q3 through 2002Q2). The table shows that growth in goods exports contributed to overall GDP growth in the period before the start of the slowdown, adding 0.54 percent a year to the annual average growth rate. Goods imports, on the other hand, subtracted 1.4 percent a year from the rate during those same boom years. The net impact of goods trade was to reduce GDP growth by 0.86 percent a year—during a period when GDP growth averaged over 4 percent a year.

After the downturn started, there was a falloff in exports, and this reduced overall growth by 0.29 percent a year. The strong dollar and the weakness in the rest of the world economies adversely affected US growth. On the other hand, the turnaround in imports was even more dramatic. Imports declined, and since imports are a subtraction from GDP, this import decline reduced almost to zero the negative contribution to GDP.

The net effect of goods trade was to reduce GDP growth both before and after the middle of 2000, but the reduction in growth was far greater during the boom years (–0.86) than during the downturn (–0.38). On balance, goods trade mitigated the decline in growth by nearly half a percentage point a year (0.48). These findings reinforce the message from figure 5.4. The sharp drop in manufacturing employment that started in mid-2000 was the result of the shift in domestic demand for manufactured goods. The high dollar and the weakness of overseas economies reduced but did not entirely eliminate the role that trade in goods plays as an

automatic stabilizer to the manufacturing sector and the whole US economy.

Profits in Manufacturing

Figure 5.5a shows the real profits earned by the domestic operations of all nonfinancial US corporations from 1973 through the first quarter of 2002 (adjusted by the implicit price deflator for nonfinancial corporate output). Profits are strongly cyclical, turning down in 1974-75, in the early 1980s, and in the recent downturn. The rapid rise of profits for much of the 1990s is remarkable, a runup that reached its peak in the third quarter of 1997. After that, profits weakened until mid-2000 and then fell sharply until the third quarter of 2001. They have made a modest comeback since then and remain at a substantially higher level than in the late 1980s.[8] The fall in profits with the downturn was to be expected, but the profit weakness after 1997 is more puzzling. One possibility is that companies were overreporting profits in the bubble frenzy of the 1990s, but eventually ran out of ways to use creative accounting. Another possibility is that the strong dollar was exposing domestic operations to severe competitive pressure.

The path of profits in the 1980s suggests a more limited role for the dollar, with the cycle as the primary cause of variations. The dollar reached a peak in March 1985, while profits increased strongly from 1983 to 1985, reaching a peak in the third quarter of that year. The dollar then fell sharply, but profits weakened through early 1987.

Figure 5.5b explores this idea further, dividing total profits of nonfinancial corporations into those generated by domestic manufacturing industries and nonmanufacturing industries (same deflator as above).[9] (Unfortunately, the industry profit data do not include the capital consumption adjustment (CCA). For the total nonfinancial sector this makes a big difference to profits in the second half of 2001, when economic profits (including CCA) are much stronger than reported profits because of tax law changes.)[10]

Although there is international trade in services, it is a trivial part of the total of US output of services, so figure 5.5b provides a good comparison of the tradable and nontradable sectors. In the cyclical peak 1989-90, the level of profits in manufacturing and nonmanufacturing were similar. In

8. In part this is because interest rates dropped in the 1990s and so the debt service burden on nonfinancial corporations declined.

9. Since many corporations have both manufacturing and nonmanufacturing operations, the breakdown reflects the best estimates of the Bureau of Economic Affairs staff and is not precise.

10. See *Survey of Current Business,* April 2002, 5-7.

Figure 5.5a Nonfinancial corporate profits, domestic US operations, 1987-2002

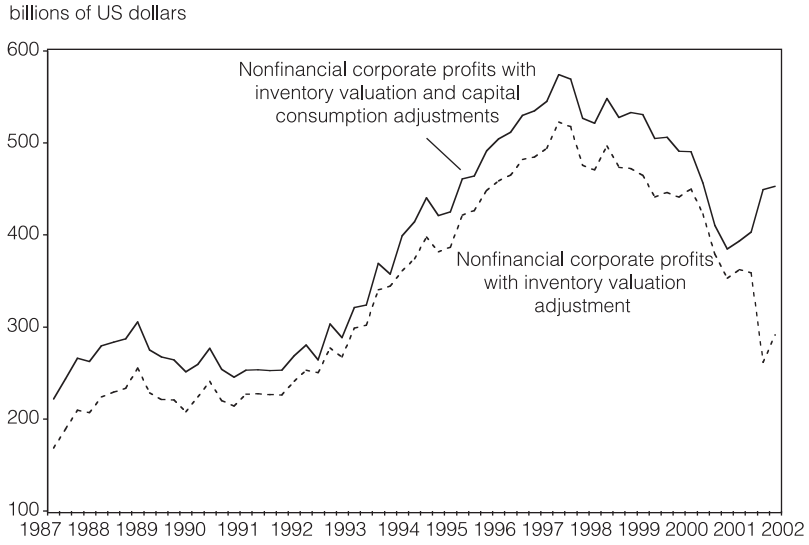
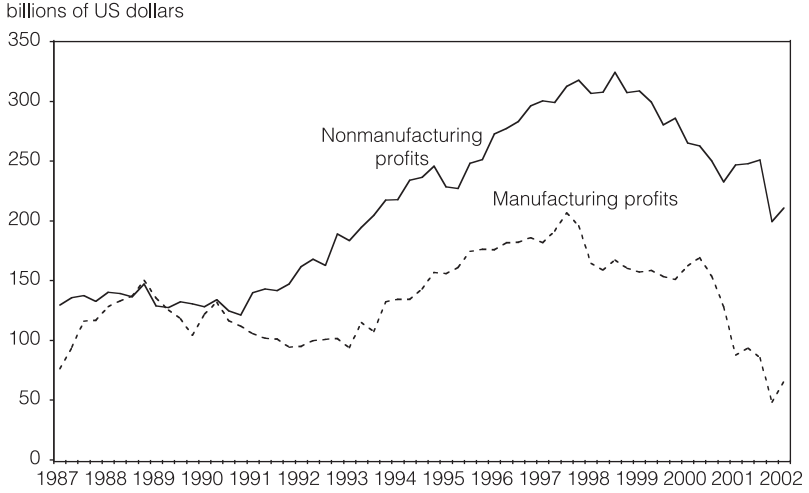


Figure 5.5b Nonfinancial nonmanufacturing and manufacturing corporate profits



Note: Corporate profits with inventory valuation adjustment. Deflated with gross product price index for nonfinancial industries.

Source: Bureau of Economic Analysis, www.bea.gov, table 6.16c.

the subsequent recession, manufacturing profits fell substantially, while nonmanufacturing profits dipped only very slightly and then started to grow strongly, reaching a peak in the third quarter of 1998. Manufacturing profits never caught up. They grew strongly through the third quarter of 1997, but reached only two-thirds of the level of nonmanufacturing profits. Manufacturing profits peaked in 1997, a year earlier than for nonmanufacturing profits, and fell sharply.

In nonmanufacturing, profits fell from their peak of $324 billion (1996 dollars) in 1998 to $248 billion in the second quarter of 2001, a 27 percent decline. In manufacturing, profits fell from $206 billion in their peak of 1997 to $93 billion in mid-2001, a much larger decline of 79 percent. Manufacturing profits were hit sooner and harder than in the nonmanufacturing sector. (Reported profits fell more after mid-2001, but the absence of CCA makes the data hard to interpret).

The fact that profits turned down in the nontradables sector a year and a half before the cyclical slowdown started (over two years before the recession started) suggests that not all of the profit weakness was the result of either the recession or the dollar. Creative accounting may have been at work, in both manufacturing and nonmanufacturing sectors.

This comparison between sectors, however, reveals that profits in manufacturing were facing stronger pressures than in the rest of the economy.[11] There was an expansion of globalization in the 1990s, which increased competitive pressure most strongly in the tradable goods sector. Manufacturers in the 1990s spoke about their lack of pricing power, presumably indicating they had had more of it in previous times, when there was less competitive pressure. Unless a US manufacturing industry has some form of strong trade protection, it faces very high competitive intensity. Any company in such an industry will face profit pressures and continually be forced to cut costs or develop new products (raise productivity) in order to be profitable. This can be hard on the producers—workers and firms—but is a benefit to consumers.

Investment in Manufacturing, the Dollar, and Capital Movements

More problematic than simply an increase in competitive pressure is the possible impact on manufacturing investment of the large, sustained swings in the dollar, which depress profits when the dollar is high even for companies that are competitive internationally in the long run. Presumably a low dollar inflates US manufacturing profits. Such currency swings, up and down, increase the risk of operating in tradable goods industries and could reduce the level of investment in those activities if the capital market is risk averse.

11. Blecker (2002) finds that manufacturing profits were strongly affected by variations in the dollar.

How would that show up? Paradoxically, if this view is correct and dollar fluctuations had increased the variability of manufacturing profits and discouraged investment in this sector, the result would be that average returns to manufacturing companies over an extended period would be higher over the long run than in nonmanufacturing. The variability of returns would have to be compensated by higher average returns. With the possible exception of some high-tech areas in the 1990s, that does not seem to be the case.

A Persistently High Dollar?

It is possible that the variations in the dollar are taking place around a mean value that results in a deficit in manufactured goods. A currency can remain above the level implied by balance in manufactured trade over an extended period if there are other sources of dollar inflows that push the dollar exchange rate up. For example, a country that suddenly discovers oil or natural gas will find its trade position and the value of its currency fundamentally altered. Instead of paying for large energy imports, the country would reduce its import bill sharply or even start to export energy. The ''Dutch disease'' is the famous example of this, when Holland discovered natural gas and started selling it in large quantities. This raised the value of the Dutch currency and caused the manufacturing sector to suffer a competitive disadvantage. The discovery of oil in the North Sea had a similar effect on UK manufacturing, visible in the very sharp declines in UK manufacturing employment over the period 1973-2000.[12] Note that a country as a whole need not be harmed by the discovery of energy and can benefit from it, but there is an adjustment in manufacturing that will result in fewer manufacturing jobs as long as the energy supply holds out.

Is there a similar problem in the United States? Not from oil or gas. After being self-sufficient in energy for over 60 years of the 20th century, the United States has become a large net importer of energy. I noted earlier that the United States had fared better than other countries in manufacturing employment since 1973, and some of this is the result of the ever-increasing need to pay for oil imports by exporting manufactured goods. This depressed the dollar relative to the counterfactual of remaining energy independent. If there is a strain of the Dutch disease in the United States, it is a different variety.

Another factor affecting the competitive position of manufacturing is that the United States has a comparative advantage in agriculture and services. The trade surpluses in these sectors generate a net inflow of

12. UK manufacturing also had low productivity and required major restructuring, especially in formerly nationalized industries.

funds that sustains the dollar. Historically, these surpluses have made a difference, but not a big difference. Going forward, if the growth of services trade continues to be rapid and the surpluses grow, this could be an important factor keeping manufacturing trade in deficit. The simulations discussed below highlight this issue.

Perhaps the biggest factor keeping the dollar persistently high is capital flows. The US has traditionally been a low-saving economy relative to other advanced countries, such as Japan and Germany. In the 1980s, national saving was pushed down because of exploding federal budget deficits. In the 1990s national saving was kept low despite a shift from federal budget deficits to surpluses, because the already low private saving rate dropped even lower. Hence one can make the following case. The United States is chronically a low-saving economy, and this means that when the business cycle is strong and domestic investment booms, foreign capital is drawn in to finance it (directly or indirectly). This raises the dollar, gives rise to periods where the dollar is higher than its long-run trend value, and hurts manufacturing profits and employment. When the dollar falls, it may reverse the short-term problem, but it does not give rise to a period of large trade surpluses.

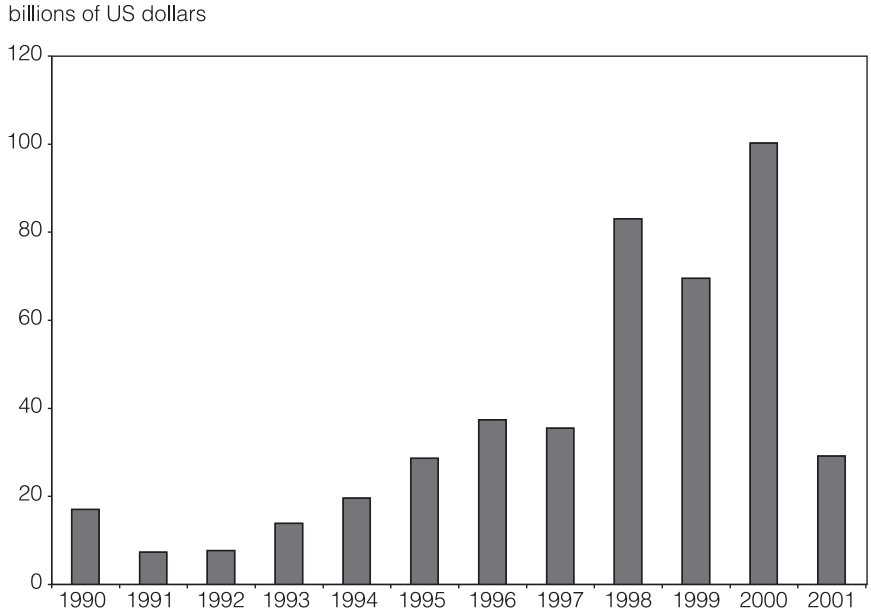
Another part of the same story is the willingness of foreign investors to buy US assets. The argument is sometimes made that ''too much'' foreign capital is flowing into the United States and distorting the dollar. To evaluate this argument, it is helpful to distinguish the types of capital inflows. An important fraction of the increased capital inflow in the 1990s was foreign direct investment (FDI).

FDI into the United States over the period 1996-2001 was $1.07 trillion, an increase of $826 billion over the period 1990-95. Both the magnitude of the FDI and its increase are important. The increase in FDI is equal to two-thirds of the increase in the current account deficit over the same period. Of course capital outflows and other inflows also increased, but FDI clearly played an important role in the increase in the net capital inflow.

An important fraction of the FDI went to US manufacturing. Figure 5.6 shows FDI into US manufacturing over the period 1990-2001. From 1996 through 2001, the period of the high or rising dollar, $356 billion of FDI went into US manufacturing. This represented one-third of all FDI into the United States. One-third is far larger than the share of manufacturing in the US economy, so foreign direct investors were favoring US manufacturing operations and supplying large amounts of capital to it. The inflow of capital did help fund investment, and hence jobs, in US manufacturing.[13]

13. Not all of the FDI was for new facilities. However, other types of capital inflow also helped manufacturing investment. Foreigners bought equities and bonds of US manufacturing companies, lowering their cost of capital.

Figure 5.6 Manufacturing foreign direct investment in the United States, 1990-2001



Note: Capital inflows without a current cost adjustment.

Source: Bureau of Economic Analysis (international accounts data).

The flow of foreign capital into US manufacturing is an important signal of the value given to the United States as a location for manufacturing activity. Foreign investors in the 1990s expected the US manufacturing sector to be profitable over the long run, even though the dollar was moving up so strongly.

Of course money is fungible. Not all of the FDI was for investment in new manufacturing facilities; some of the funds went to buy out the existing owners who then were free to do other things with the proceeds. However, whenever a foreigner purchases a US asset, this increases the supply of capital to the United States. It increases the availability of funds, which are then allocated by the market to different uses. The first-round effect of capital inflows to the United States is to increase the funds available to all industries, including manufacturing. The inflow of funds offsets the low US national saving rate. The macroeconomic simulations described in later sections provide more information on the impact of the capital inflows.

Aggregate manufacturing data have provided some insights into the impact of the dollar on manufacturing. To probe the issues further, however, it is worth looking in more detail at three specific industries that have faced particular pressures.

Box 5.1 Estimates of hysteresis in trade and wages

Hysteresis in Trade. One possible problem associated with swings in the value of the dollar is that when the dollar is high, this could cause a permanent loss of trade competitiveness for the United States. Reasons for this are that, first, US companies in export or import-competing industries may go out of business or cut back on their investments or R&D or export promotion. When the dollar comes down again, they may be unable to compete as effectively. Second, and parallel, foreign companies may use a period when the dollar is strong to expand their market shares or dealer networks in the United States. When the dollar goes down again they will use the enlarged base to continue to export strongly. These effects could create hysteresis such that net exports to the United States are larger after a period of dollar strength even if the dollar has gone back down to the level at which it started. Although this view has some surface plausibility, it is not clear a priori why ups and downs of the dollar should work asymmetrically. What does the evidence show?

Paul Krugman (1989) found empirical evidence to support the idea of trade hysteresis, but subsequent research has not generally supported this view. In particular, Robert Lawrence (1990) examined the episode of the high dollar in the 1980s and found no support for the hysteresis hypothesis. The trade equations he estimated for the period up to 1980, which did not assume the existence of any hysteresis, tracked actual trade over the 1980s very well, including the period after the dollar came back down.

The analysis is complicated because of the Houthakker-McGee effects in estimated trade equations. The pattern of US trade over time strongly suggests that if the United States grows at the same rate as the rest of the world and the dollar remains constant, then the US trade deficit will worsen. Or, alternatively, the dollar must fall over time if there is to be a constant deficit or surplus in US trade in goods and services (constant share of the economy). The causes of this remain cloudy. One reasonable possibility is that the expansion of production capacity and the spread of technology worldwide are gradually changing the terms of trade of the United States. But it has proven hard to model convincingly the forces driving this trend. The most important point is that the trend shift in the US trading position that the effect implies does not seem to be driven by swings in the dollar; indeed, the pattern predates the era of floating exchange rates. The existence of the trend means that when Lawrence rejects the hypothesis of hysteresis, this does not imply that the same value of the dollar would induce the same US trade balance in 1990 as it did in 1980 (adjusting for any GDP growth differentials over the period). It does say that the period of the strong dollar in the 1980s did not leave a permanent legacy of US trade weakness.

Hysteresis in Wages. There is a broad literature suggesting that globalization may have contributed to the widening of the wage distribution in the United States over the past 20 years.[1] There is economic theory and common sense behind the idea that as the United States increases its trade with countries with a large supply of low-skill workers, this will lower the relative wages of low-skill workers in the United States. The difficult issue is in determining how important the trade effects are. The main arguments suggesting that the effects are small are that the United States does most of its trade with Canada, Europe, and Japan, where wage levels are similar to US levels, and that the tradable goods sector in the United States is small relative to the total US labor market; to what extent can a fairly small tail

(box continues next page)

Box 5.1 *(continued)*

wag a very large dog? An alternative explanation of wage trends is that there have been shifts in the relative domestic demand for labor of different types, perhaps tied to shifts in technology. One recent study has traced a direct link not just from general trade expansion to the US wage distribution, but from dollar swings to the wage distribution. Linda Goldberg and Joseph Tracy (2002) have analyzed Current Population Survey data and concluded that when the dollar rises, this increases the gap between low-skill and high-skill workers. But when the dollar falls, the gap does not return to its former level. There is a kind of relative wage hysteresis suggested by their results.

This study is carefully done and interesting, but also puzzling to the point that the overall results are hard to accept. The impact of an increase in the dollar, in their analysis, produces a substantial increase in the wages of highly educated workers and a decline in the wages of workers with low educational levels. And this effect is true across all industries. It is not concentrated only in tradable goods industries, nor does it start in tradable goods industries and spread to the whole economy. A decrease in the dollar does not reverse these effects. I find it hard to understand a sustainable labor market equilibrium in which dollar swings over time would drive the variance of wages higher and higher. I note also that low-skill workers started to improve their wage position in the United States during the period 1995-2000, even though the dollar rose strongly.[2]

1. See, for example, Borjas, Freeman, and Katz (1997).
2. See *Council of Economic Advisers* (2001) and Juhn, Murphy, and Topel (2002).

Case Studies of Specific Manufacturing Industries

Steel

There are two very different perspectives on the US steel industry.[14] One view is that it is a viable productive industry in the process of structural change, where the main competitive threat to high-cost domestic companies does not come from abroad but from more cost-efficient producers in the United States. The second view is that the US industry faces a dire threat from unfair competition overseas. Steel plants operate with high fixed costs and low marginal costs. Foreign governments have subsidized the construction of steel capacity, resulting in global overcapacity. Foreign companies thus have an economic incentive to dump steel on the US market at prices below the unsubsidized full average cost of production. The US industry is therefore in dire need of either a lower dollar or trade protection, or both. Understanding these alternatives is essential to understanding how the dollar has affected this industry.

14. See, for example, Crandall (2001) and Economic Strategy Institute (2001).

The US steel industry emerged from World War II as the dominant industry in the world, with massive scale and productivity advantages over competitors elsewhere. Over time, the steel industries in such countries as Germany, Japan, and Korea were built or rebuilt as these economies invested heavily in developing their own steel capacity. The dominant technology for many years was the large integrated steel mill, which starts with iron ore, carries out the whole steel manufacturing process, and produces a large range of products. In the postwar period there have been technological advances in integrated steel mills, based on scale, design, and layout. The result is that newer integrated mills built around the world are more productive and have lower marginal costs than the older integrated mills in the United States. For example, the steel facilities of POSCO (Pohang Steel Company), the government-owned Korean integrated producer, are among the most productive in the world (Baily and Zitzewitz 1998). Korea imported its steel technology from best-practice equipment suppliers worldwide. Unlike industries such as autos or machine tools, basic steel technology is not very hard to transfer from developed to developing countries, since much of it is embodied in the capital goods.[15]

As economies develop economically and industrialize, the domestic demand for steel grows rapidly, which stimulates the growth of steel capacity. As economies mature, however, demand growth slows or even stops with the shift to services and to lighter products and newer materials. This pattern was intensified in Japan, which experienced strong growth in the demand for steel during its boom years in the 1980s and faced labor shortages. The industry overinvested in capacity and in automation and then found itself with severe overcapacity and an uneconomic level of capital intensity in the 1990s. Europe and other regions have also had problems with overcapacity, and the former Soviet Bloc countries had dramatic overcapacity once they transformed into market economies and cut back their defense industries.

The integrated steel producers in the United States, which had been very profitable in the 1950s, have gradually found their competitive position eroding. Their high operating costs were increased further by rapid wage increases in the 1970s (Lawrence and Lawrence 1985) and increases in the costs of retirement pension and health care costs.

An important innovation in the steel industry was developed in the United States. Minimills start with steel scrap instead of iron ore and use an electric arc furnace to melt the scrap for reuse in new steel products. They have much lower capital costs per ton of steel produced. In addition, the minimills, which started small and remained lean, have avoided the excessive bureaucracy and overstaffing that plagued the integrated pro-

15. Certain specialty steels require more sophisticated technology and high labor skills.

ducers. Nucor and other minimills have adopted practices such as cross-training workers to handle multiple tasks, limiting the number of products produced in a given mill, and using continuous improvement programs to increase productivity. In 2000, minimills were estimated to have had a 21.8 percent cost advantage over integrated mills for sheet steel products. This understates the advantage of the minimills, because integrated mills have abandoned other products where their cost disadvantage is even greater. At $376 per ton, minimill costs per ton in 2000 were close to those in Korea ($378) and Brazil ($389), despite the strong dollar of that year (World Steel Dynamics 2000).

Another sign of their strong cost position is that the minimills have expanded their capacity. An additional 9 million tons of flat-rolled mini-mill capacity came on-line in 1997-98, whereas no new integrated raw-steel capacity has been built in the United States since the 1970s. In 2001, mini-mills had 50 million tons of steel capacity in the United States, out of a total capacity of 120 million tons (Crandall 2001). Minimill production is larger than the volume of imports, which have averaged just under 30 million tons between 1994 and 2001.

Figure 5.7a illustrates the situation of the US steel industry, showing output, hours, and productivity for blast furnaces and basic steel products (SIC 331). It shows that US output has remained fairly flat over the period 1973-2000, with evidence of some cyclical losses in recessions. Productivity over the period has soared. This has been the result of increases in market share by the minimills, the closing of the least efficient integrated mills, and a push to reduce costs within both integrated and minimills as a result of the high competitive intensity in the industry. New technologies, such as computerized control of the manufacturing process, have also improved productivity. As a result employment has been weak over the whole period. Based on this figure, there is no evidence that employment in the industry was greatly affected in the mid-1980s or the late 1990s, when the dollar was strong. Hours declined slowly when the dollar was weak (1990-95) and when the dollar strengthened (1995-2000). Figure 5.7b shows employment in a broader definition of the steel industry that includes iron and steel foundries (SIC 332) and shows employment through early 2002 (the figure also shows auto employment, which I will discuss shortly). With this broader definition of the steel industry, one could argue that the dollar had some impact on employment, although it was small.

Based on import levels, it looks as if trade was actually cushioning the impact of the downturn, not worsening it. According to US Geological Survey data (iron and steel statistics, Mineral Commodity Summaries), consumption of steel in the United States was flat between 1997 and 2001. Imports fell by 36 percent over this period, including a 27 percent reduction between 2000 and 2001, when consumption fell by less than 1 percent.

Figure 5.7a Steel industry employment, output, hours, and productivity (SIC 331), 1973-99

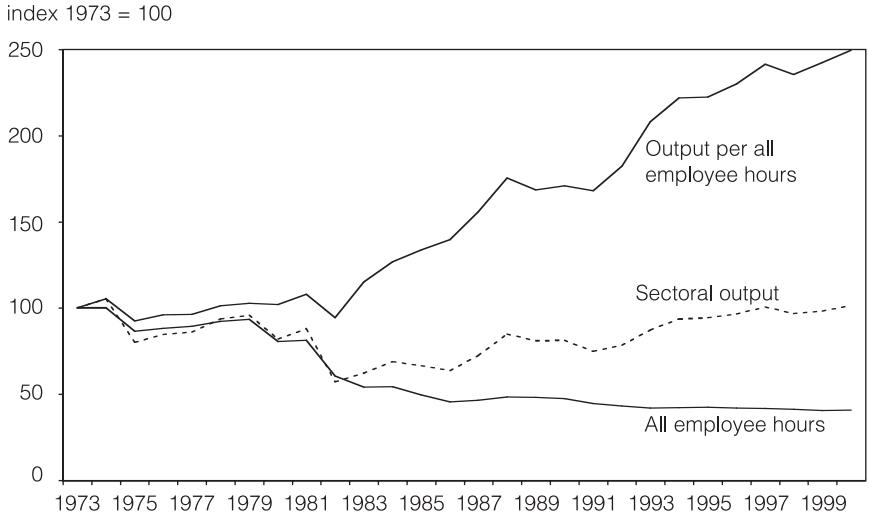
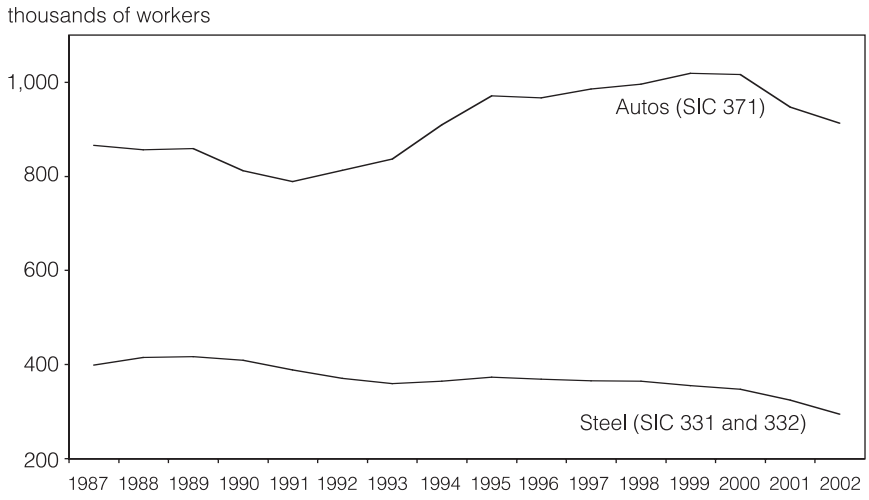


Figure 5.7b US auto and steel industry employment, 1987-2002



Source: Bureau of Labor Statistics.

In summary, there is some degree of truth to both of the perspectives of the steel industry that were presented above. Capacity decisions around the world have often not been made on the basis of rational discounted cash-flow analysis. And industries where fixed costs are high typically find it difficult to maintain a stable equilibrium in the absence of a tacit

or explicit cartel (even then, it can be difficult). Aluminum, petrochemicals, oil, and airlines come to mind. The US steel industry is vulnerable to imports of steel from countries that have overinvested and have excess capacity. It is also vulnerable to imports from countries that have very low cost structures—low wages in Russia or cheap, high-quality iron ore in Brazil, for example. At the same time, the plight of the unionized integrated steel producers does not seem to depend primarily on either imports or the strong dollar. A fall in the dollar would certainly help, but this segment of the industry is at a fundamental comparative disadvantage relative to the domestic minimills, and a reduction in the dollar will not fundamentally change that relationship. Moreover, during the recent downturn, the fall in imports has been greater than the fall in domestic production.

Autos

There are some broad similarities between the steel and auto industries in the United States. The US auto industry was also the world's best-practice industry in the 1950s and 1960s and was dominated by a few large companies. A significant innovation occurred in the production process that disrupted the domestic equilibrium, although in the auto case it originated in the Japanese industry—the Toyota production system, which emphasized incremental improvement, lean production, and new approaches to product design.

The advantages that US companies had in design and production in the 1950s led them to invest overseas. US-built automobiles were not suitable for conditions outside the United States, but US nameplates developed a strong position in overseas markets. Japanese companies had developed alliances with the Big Three automakers before World War II, but these were broken in the 1930s with friction between the two countries. After the war the Japanese companies, with some industrial policy intervention, developed their own auto industry, and by the late 1960s Japanese companies were exporting to the United States. They used the advantage of low labor costs and rapidly rising productivity, fueled by the Toyota production system. Early imports to the United States were low-quality vehicles that were much smaller than the typical US car, so the Japanese market share was small. But when oil prices rose rapidly in the 1970s and when emissions restrictions were introduced, smaller, lighter cars became much more desirable and imports surged. Chrysler moved close to bankruptcy.

Trade restrictions were imposed on Japanese companies in the form of ''voluntary'' quotas, but this simply accelerated a trend toward direct investment in the United States and Canada. A key feature of the Toyota production system is ''design for manufacturing,'' in which parts are

simplified and made easier to assemble. Productivity both in auto plants in Japan and in Japanese nameplate plants in the United States moved well above the level of the Big Three average. Also, a bonus of this effort to raise productivity was that the simpler designs were more reliable, so a quality differential opened up between the Japanese and US nameplates.

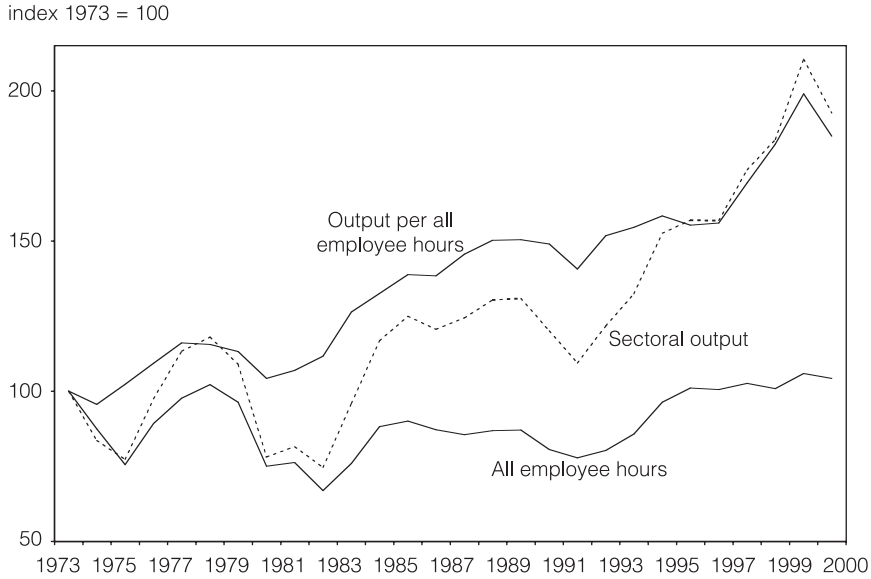
Under increasing pressure from Japanese companies as well as rising imports of luxury autos from Germany, the Big Three have moved aggressively to raise their own productivity and quality and to cut costs. Modified versions of the Toyota production system were introduced into US plants, notably with the Ford Taurus in the 1980s. Improvements in productivity within existing plants were limited because of resistance from both plant managers and production workers, so an additional two-pronged strategy has been followed. First, a number of older, less efficient plants have been closed completely. And second, the US producers have been able to move consumers into SUVs, pickups, and minivans, where profits and value added per worker are higher and the competition from the Japanese and German companies has been less strong. Although the Big Three continue to lose market share in cars and reportedly make little or no profit from their production, the market share of light trucks and minivans is now over 50 percent.

Figure 5.7b shows the overall employment picture in this industry (SIC 371), showing continued employment growth through the 1990s despite the rise of the dollar after 1995. Figure 5.8 summarizes the movements of output, hours, and productivity over the longer period since 1973. The figures include US employment and production of both Big Three and foreign nameplates as well as parts suppliers. Although clearly sensitive to the business cycle, US auto industry output rose strongly in the 1980s and 1990s, roughly doubling from 1983 to 1999. Employment over the longer period did not do so well. It increased in the 1990s, but by 2000 was only just back to its 1973 level, and it has fallen since 2000. Productivity increases were strong and accelerated after 1995. They have had the effect of cutting employment for a given level of output, although of course they have also kept prices down and increased the industry's international competitiveness, both of which have encouraged output growth.

The high value of the dollar in the 1990s did not create the long-term dynamics that have driven this industry, but it did exacerbate the pressures on the domestic industry. Specifically, net imports of motor vehicles and parts into the United States rose from $56.9 billion in 1995 to $110.6 billion in 2000. Most of those net imports came from Canada, Japan, Mexico, Germany, and Korea, whose currencies were weak against the dollar after 1995.

The situation of the Big Three unionized auto producers is better than that of the integrated steel producers. They are more profitable, they have substantially improved their performance, and they retain considerable

Figure 5.8 Motor vehicle industry employment, hours, output, and productivity (SIC 371), 1973-2000



Source: Bureau of Labor Statistics.

assets, such as customer brand loyalty and skills in financing. But the challenges facing these companies are substantial. According to Harbour and Associates (2002), in 2001 Toyota, Honda, and Nissan earned an average $1,377 in profit per vehicle. In contrast, Chrysler lost $1,679 per vehicle, Ford lost $1,913, and GM made a profit of only $337.[16] In such a highly competitive market, the pressure on the Big Three to raise productivity further will remain very intense, and the potential for large output increases is limited. It will be hard to avoid further declines in employment for this segment.

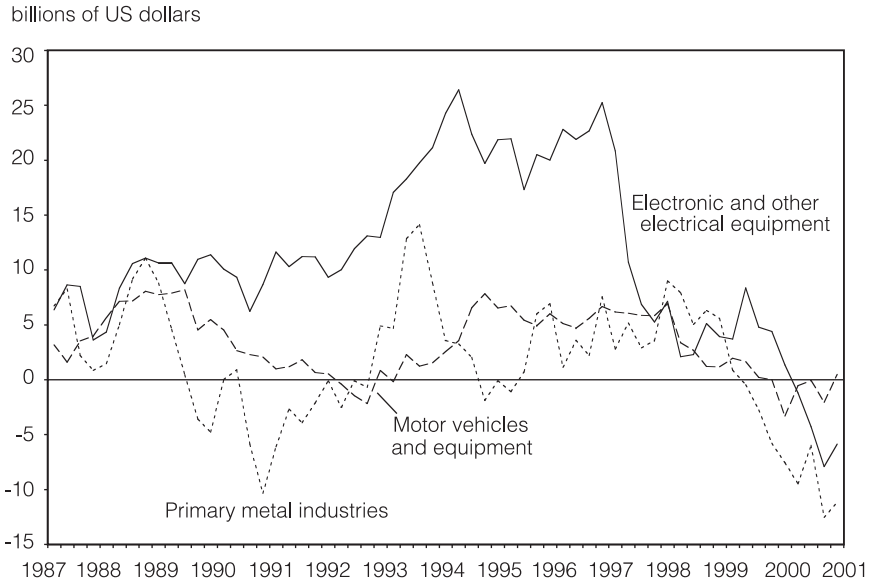
Decisions on where to locate new plants by the foreign nameplates are based on political as well as economic factors. But at current exchange rates, production is cheaper in Canada and Mexico than in the United States. Unless there is some exchange rate adjustment, net US imports of autos and parts from within the NAFTA region will keep rising.

Profitability and Legacy Labor Costs in the Steel and Auto Industries

Figure 5.9 shows real profits in three domestic industries, motor vehicles and parts, primary metals, and electronics and electrical equipment. The

16. As reported by Jeremy Grant, ''Detroit Fights Back,'' *Financial Times,* August 6, 2002. Data are from *The Harbour Report 2002.*

Figure 5.9 Corporate profits in selected manufacturing industries, 1987-2001



Note: Corporate profits with inventory valuation adjustment. Deflated with gross product price index for nonfinancial industries.

Source: Bureau of Economic Analysis.

last of these I will discuss shortly. The primary metals sector includes nonferrous metals, but it gives a sense of how the steel industry has fared in profits.

Neither the auto industry nor the primary metals industry has been a huge moneymaker over the period 1987-2001 (the same problems in the profits data described above affect the profits for 2001). Profitability has been cyclical and was hit hard by the combination of a weak economy and a strong dollar, with the weakness showing up before 2000.

The integrated steel mills and the Big Three automakers face a similar problem that is adversely affecting their profits. They reached agreements with their workers many years ago to provide retirement benefits into the future that they thought would be manageable but that have turned out to be extremely costly as the industries have faced full global competition. As the base of employed unionized workers has fallen, the cost of servicing the retired workforce has risen as a proportion of total labor costs. The proportion of the auto industry that is unionized (motor vehicles and motor vehicle equipment) has fallen from 59 percent in 1983 to 48 percent in 1990 and 37 percent in 2001. For the steel industry (blast furnaces, steelworks, rolling and finishing mills, and iron and steel found-

ries) the percentages are 60 percent in 1983, 49 percent in 1990, and 40 percent in 2001.[17] The high legacy labor costs are a major problem for these industries.

The Information Technology Sector

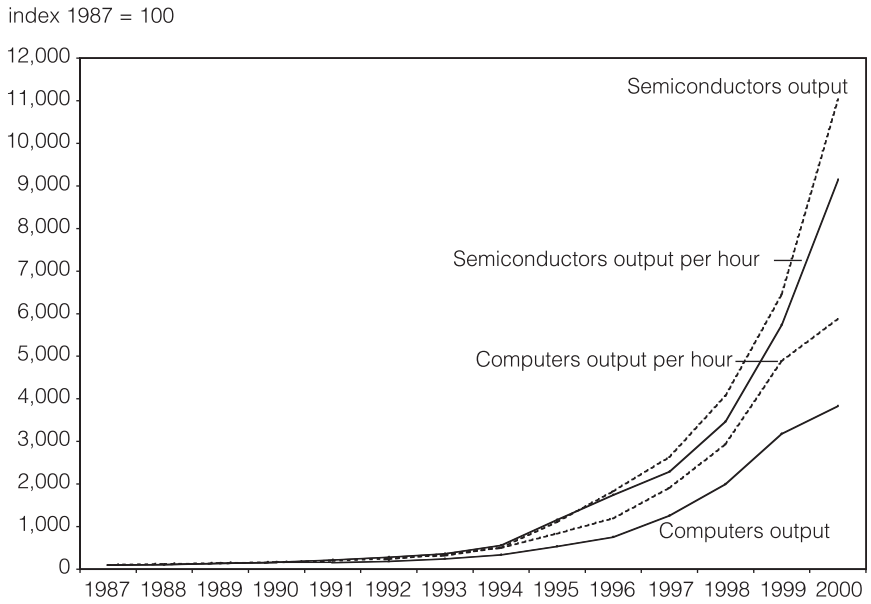
US-based companies largely developed the information technology sector and make up most of the leading companies in the industry today. This industry is still in a phase of rapid innovation, and the structure of the US market system has proven to be a major advantage in this phase—through the venture capital industry, mobile workers, the educational institutions, and the culture of Silicon Valley. In addition, first-mover advantages have proven decisive in some sectors of the industry and, to an extent, in the success of Silicon Valley itself, which has attracted people and ideas from all over the world. Historically, the Department of Defense provided financial support for R&D and purchase the resulting products, which helped some of the first movers get started.

The success of US companies in this sector has not meant, however, that the production of IT hardware, and its associated employment, has been concentrated in the United States. The industry has become global, with components manufactured around the world where costs are lowest. Much of the production is carried out in Asia, for two reasons. First, the labor-intensive parts of the value chain have located in low-wage countries. Second, industrial policy in several countries favored the development of a high-tech sector so that loans were provided to build semiconductor fabrication plants and other capital-intensive facilities. In the 1980s, there was substantial concern in the United States that industrial policy in Asia would damage the high-tech sector in the United States (Tyson 1992).

Industrial policies in the IT sector in Asia have a mixed record, however. Japan used market access as a lever to encourage IBM to share technology in the computer mainframe industry, and using this, it developed a strong industry of its own. However, the mainframe industry went into sharp decline, and the Japanese computer companies were left behind by the PC revolution. Korea used loans from government-owned or -influenced banks to fund the development of its semiconductor industry, and Korea remains a major producer of memory chips today. However, its industry has been slow to move up the technology ladder and has a relatively low-productivity, low-profit industry compared to the US semiconductor sector (Baily and Zitzewitz 1998). Semiconductor companies in Korea suffered financial problems in the late 1990s. Andrew Grove (1999) argues that getting out of the memory chip business was a vital step in Intel's success as it developed its microprocessors and other higher-value chips.

17. The data are compiled by Barry Hirsch and David Macpherson; see http://www.unionstats.com.

Figure 5.10 Semiconductors and computers output and output per hour, 1987-2000



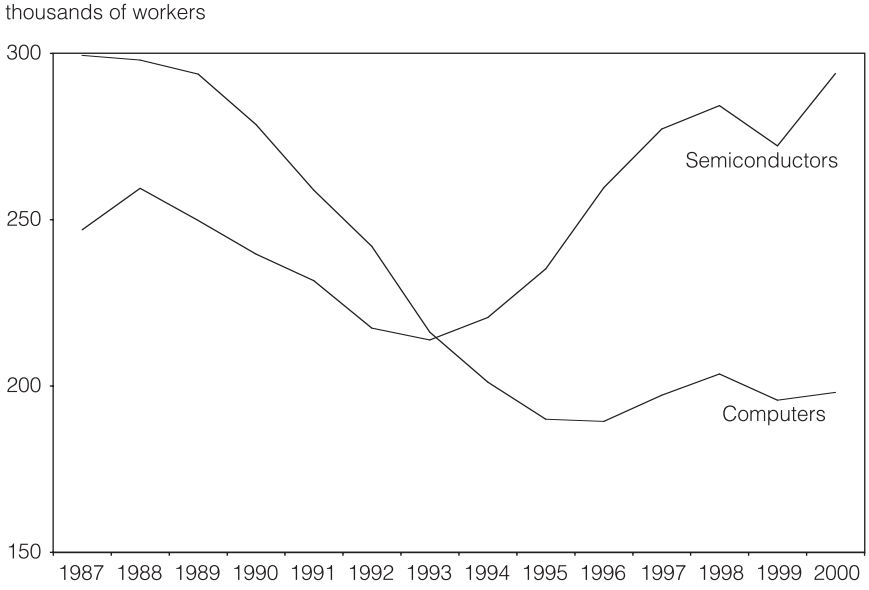
Source: Bureau of Labor Statistics.

Productivity, as measured by the Bureau of Labor Statistics, increased at phenomenal rates in both the semiconductor and computer industries in the United States—22.8 percent a year in semiconductors and 26.7 percent in computers in the 1987-2000 period (figure 5.10).[18] These rates of growth meant that employment in the computer sector fell substantially over this period and grew only modestly in semiconductors (figure 5.11). In neither industry is there any sign that the rising dollar during the 1995-2000 period was the major determinant of employment performance. The big decline in computer employment occurred before 1995 as the industry completed the transformation to PCs. Semiconductor employment rose strongly after 1993.

The profit figures shown earlier in figure 5.9 (which are profits on US-based assets), on the other hand, are consistent with a view that the industry may have been affected by the rising dollar. Profits soared with the strong economic growth and the weak dollar of the early 1990s before flattening out and then dropping sharply in the late 1990s, even as eco-

18. The computer makers did improve their manufacturing capabilities substantially, but much of the productivity growth in this industry should be attributed to the component makers. Figures on output per hour are from the Bureau of Labor Statistics Web site.

Figure 5.11 Employment in computers and semiconductors, 1987-2000



Note: Computers SIC 3571 (electronic computers). Semiconductors SIC 3674 (semiconductors and related devices).

Source: Bureau of Labor Statistics.

nomic growth continued. The bust in the tech sector then greatly exacerbated this decline.

Although the domestic profits in this industry may have been lowered by the high dollar, the industry's dynamics suggest that other factors were probably much more important. The pace of innovation, the ability of innovators to expropriate returns from their innovations, and the volatile pattern of demand for the industry's products are the factors that industry observers stress.

Lessons from the Experience of US Manufacturing

The value of the dollar certainly affects manufacturing employment, so that, other things being equal, manufacturing employment would have been higher with a lower value of the dollar. The partial effect of a lower dollar would have helped preserve employment in that sector. It is a mistake, however, to attribute cyclical effects and secular trends to the dollar. And the review of aggregate and industry data above suggests

that these trends are much more important over the long run. Key conclusions are as follows:

- The past two years represent a unique period for manufacturing. Even though the recession has been relatively mild in the economy as a whole, the decline in domestic demand for manufactured goods has been severe. The dollar continued to rise until February 2002 and has fallen only modestly since then. The economies of the rest of the world remain weak. The combination of domestic weakness in goods demand, a high dollar, and foreign demand weakness have resulted in a severe manufacturing downturn.
- Between 1973 and 2000, US manufacturing employment did relatively well during the period of dollar flexibility. Employment fell only slightly, whereas almost all advanced economies have faced much greater declines. Even middle-income countries such as Korea and Taiwan have experienced falling employment in manufacturing. There appears to be a clear trend decline in manufacturing employment among all advanced countries (except Canada), because productivity growth exceeds demand and output growth in this sector. This is the case whether countries run trade surpluses or deficits.
- The 1990s expansion, despite its overall strength, was not very favorable to manufacturing employment. Productivity growth accelerated, and the investment boom was concentrated in IT, where manufacturing employment is small.
- Foreign trade generally serves as an automatic stabilizer, in the sense that imports weaken more than exports in a recession. This was true in the 2000-02 downturn also, but the persistence of the high dollar into the downturn greatly reduced this effect. In contrast, the dollar declined after 1985, well before the cyclical peak. (Note that these comments ignore the impact of the dollar on inflation.)
- Neither the case studies nor the data from aggregate manufacturing provide strong evidence that the two episodes of a very strong dollar in the mid-1980s and late 1990s have resulted in large structural adjustment costs so far. With the exception of 2000-02, the dollar has been strong when the economy has been strong, cyclically, with offsetting impacts on manufacturing employment.
- The structural adjustments taking place in the steel and auto industries are strongly associated with increased domestic competition from nonunion companies. The structural changes taking place within the US industry are as important as or more important than foreign competition to the overall adjustment problems facing these industries.
- With the rise in the dollar there was a large increase in auto imports from Canada and Mexico. In the absence of any exchange rate adjust-

ment among the NAFTA countries, the economic incentives favor increasing the share of North American production outside the United States.

- There is a tendency for the dollar to remain persistently above the level that would be consistent with balance of trade in manufactured goods. In part this is because of a US comparative advantage in agriculture and services. In addition, it is because the United States is a low-saving economy and because opportunities for investment in the rest of the world seem limited, so capital flows to the United States. There are offsetting advantages to the United States because of its access to foreign capital, but there is a case for increased national saving in the United States.

Macroeconomic Adjustment: The Experience of the 1980s and 1990s

In this section I turn to the adjustment processes at the macro level. The best place to start is with the simple identity implied by the National Income and Product Accounts (NIPA). The definition of GDP when subject to a little manipulation implies as an identity that national saving minus investment equals net exports:

Net private saving + budget balance − (gross investment − depreciation) = net exports

Net national saving is the sum of net private saving and the government budget balance (positive for a surplus or negative for a deficit). Investment includes equipment, structures, residential housing, and inventory change. The depreciation of physical capital is a large, hard-to-measure item in the United States, accounting for about 12 percent of GDP in the 1990s.

Figure 5.12 shows each of the five elements in this identity expressed as a percentage of GDP over the period 1959-2001. These are calculated from nominal dollar values, since the nominal shares reflect the choices made in each year about how to allocate total GDP produced in that year.[19]

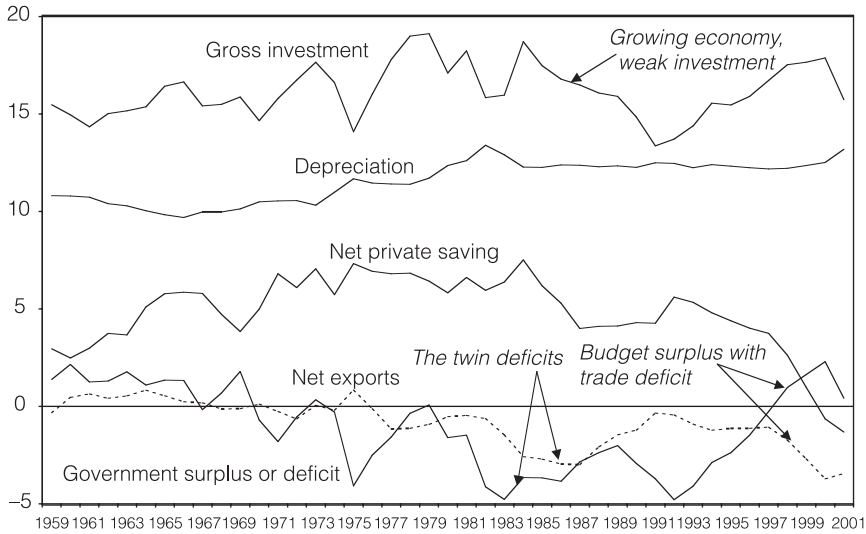
The top line of the figure shows that investment is strongly cyclical but has no particular trend over the period. It moved to a slightly higher level after the 1960s and has fluctuated since then, mostly but not entirely with the cycle.

One important period is from 1984 to 1989. The US economy went into deep recession in 1982 and then recovered strongly. Investment grew rapidly through 1984, but then started to decline as a share of GDP.

19. The chain-weighted real values do not add up and are intended to assess growth rates. The real shares of different expenditure categories in real GDP become very distorted for years not close to the base year.

Figure 5.12 Elements of the national accounts identity

percent GDP (current dollars)



Sources: Bureau of Economic Analysis, National Income and Product Accounts Tables, and author's calculations.

Given that solid economic growth continued for several years, investment spending was surprisingly weak in the second half of the 1980s.

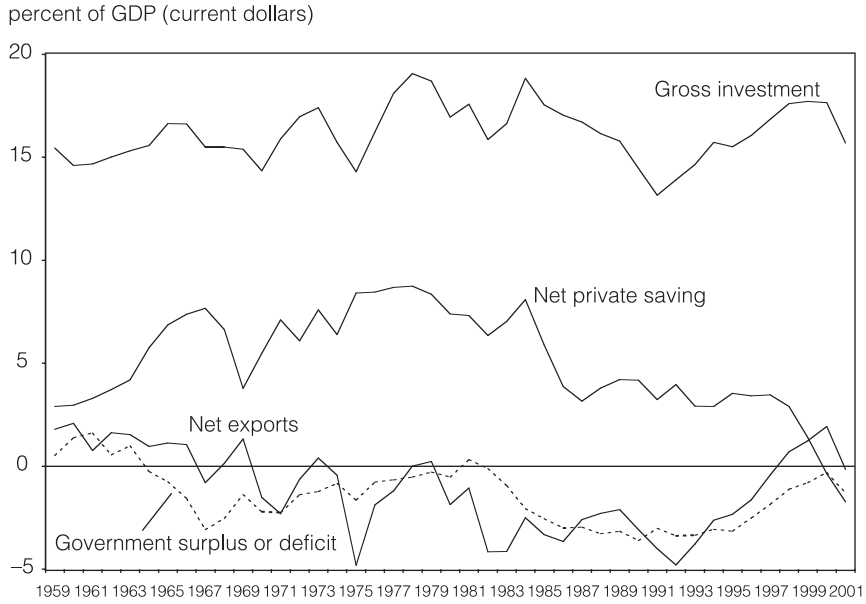
The investment boom of the 1990s is evident in the figure. Over this period information technology equipment became increasingly important, and this equipment has rapidly declining prices, so the rise in investment share was accompanied by an even faster rise in real investment.

Depreciation, which is hard to measure anyway, is fortunately not much of a story. It moved up after the 1960s, offsetting the upward shift in gross investment, but has been a very stable share of GDP since then. In painting the broad-brush picture, we can take depreciation as a constant.

Much of the action in figure 5.12 comes from the last three lines: net saving,[20] the budget balance, and net exports. All three series are cyclical, particularly the latter two. Unemployment was high in 1975-76, 1982-83, and 1992-93, and during these times the budget moved strongly toward

20. Net saving is calculated as a residual. It is GDP minus depreciation, minus consumption, minus taxes, plus transfers. This differs from reported saving numbers because of the discrepancy between the income and product sides of the NIPA. The above identity does not hold for gross domestic income. The trends of net private saving shown here are very similar to the reported saving rate, but because of the growth in the statistical discrepancy, saving in figure 5.12 falls further in the last couple of years.

Figure 5.13 Cyclically adjusted elements of the national accounts identity, 1959-2001



Source: Bureau of Economic Analysis, and author's calculations.

deficit and net exports moved strongly toward surplus.[21] Cyclical movements create a negative correlation between these series.

The unemployment rate was used to construct cyclically adjusted values for the shares of gross investment, net saving, the budget balance, and net exports,[22] and the adjusted values are shown in figure 5.13. In this chart, a positive association between budget and trade deficits emerges. The combined federal, state, and local budgets went into a trend of worsening deficits in the 1970s and into even larger structural deficits in the 1980s. Net exports moved into a parallel pattern of deficits over this period, which economists referred to as the ''twin deficits.''[23]

The argument about the twin deficits is now the stuff of textbooks, but to summarize briefly, the idea was that the rising budget deficits sharply reduced government saving (increased government dissaving). Since

21. The NBER-dated cycle peaks and troughs give the economy's turning points. The budget deficit and net exports respond more to the gap between actual and potential GDP, which is reflected in unemployment rates. Unemployment movements lag significantly behind peaks and troughs.

22. Current, leading, and lagged values of the unemployment rate were used.

23. See Mann (1999) for a discussion of the twin deficits of the 1980s and why they became uncoupled.

there was no offsetting rise in private saving, in fact private saving as a share of GDP started to fall after the mid-1980s; this meant that the impact of the budget deficits was largely pushed onto the trade account, resulting in a large trade deficit. In essence, an inflow of foreign capital was used, directly or indirectly, to finance the large government deficits.

The mechanism bringing about this relation was that real interest rates rose, pulled in capital, pushed up the dollar, and caused a trade deficit. The combination of a very expansionary fiscal policy and a restrained monetary policy changed the equilibrium in the capital market. The government was supplying large amounts of bonds, and to absorb these bonds, interest rates had to rise. The availability of high real interest rates in the United States attracted foreign capital, which made up the gap between domestic saving and domestic investment. But the effect of the capital inflow was a soaring dollar—it rose from an index value of 88 in June 1980 to a peak of 127 in March 1985, an increase of 37 percent.[24] The strong dollar, in turn, restrained exports and encouraged imports, and the trade deficit emerged, with net exports hitting –3 percent of GDP in 1987.

The twin deficits story was actually more complex than this. First, the rise in real interest rates also cut into investment, some parts of which are interest sensitive. As noted above, investment was fairly weak in the late 1980s, given a strongly growing economy. The deficit did crowd out domestic investment to an extent. Second, there are lags in the adjustment of trade flows to the exchange rate. The trade deficit continued to worsen until 1987, two years after the fall in the dollar started—a familiar J-curve effect that occurs because export growth is slow to increase and imports are more expensive in dollar terms as the dollar falls. This means that capital inflows were actually increasing in 1986 and 1987 with a falling dollar. The dollar had to fall enough that it was then expected to appreciate again, so foreigners were willing to buy larger and larger amounts of US assets.

Official reserve holdings of the dollar increased during that period, as foreign governments feared an even faster dollar decline than actually took place. Official foreign holdings of US assets rose by $120.8 billion in 1986-88, representing 28 percent of the US current account deficits in those years. Foreign governments were funding a significant proportion of the US current account and budget deficits.

The dollar index fell to 98.5 in March 1987, down 26 percent from its March 1985 peak. With modest ups and downs, the dollar continued to drift lower after that, into the 1990s, reaching a low of 84.2 in July 1995,

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24. The broad price-adjusted exchange rate index from the Federal Reserve. Conventional percentage changes, based on changes in an index divided by the initial values, can be misleading. The figures used here are the change in the index divided by the average of the initial and final values. The change in the log of the exchange rate is also 37 percent.

41 percent below its 1985 peak. The yen in particular was very high, averaging 84.5 yen to the dollar in the second quarter of 1995, despite a very weak Japanese economy.

The dollar then started to rise again, reaching an index value of 113.1 in February 2002, 29 percent above its low in 1995. The upward swing in the dollar, therefore, was not as great as had occurred in the 1980s.

Simulating the Counterfactual of No Dollar Increase

What would have happened if the dollar had not gone through the down and up cycle that it experienced in the 1990s? To give an answer to that question I report the results of a macroeconometric model run in which the dollar is held constant at its 1997 level. The model used is from Macroeconomic Advisers (MA), but this run was not carried out by them.[25] This simulation, unlike those reported below, simply fixes the value of the dollar and does not specify the shocks that would have had to occur for this to take place. The results should be viewed with appropriate caution, but they provide a starting point to look at the impact of the dollar swing of the 1990s. The model run incorporates a Fed reaction function, which targets consumer price index (CPI) inflation and real GDP growth.

Table 5.2 shows a summary of the effects. The figures for real GDP growth indicate that the swing in the dollar actually had a stabilizing effect. The boom in 1998-99 would have been even stronger without the dollar's rise, and the downturn in 2000-01 would have been sharper. The rise in the dollar reduced US growth at a time when it was running much faster than potential growth. Over the six-year period as a whole, real GDP growth is actually slightly slower overall with a constant dollar. The reason for this pattern is shown in the net export figures. The rapid expansion of the trade deficit in the 1990s curtailed the boom that was overheating the economy. Consumption and gross investment would have been markedly lower with a constant dollar, as imports would have been much less and exports more. The model does not track manufacturing output, but it is clear that in this simulation, manufacturing output would have been stronger through 1999 without the dollar increase, as goods imports would have been lower and exports higher. The United States would have run up a much smaller level of net foreign indebtedness. Consumption and investment would have been lower throughout the period because of the higher cost of imported goods and services. Another

25. The numbers were generously provided by David Heuther of the National Association of Manufacturers. I am grateful for his assistance. The results presented here do not necessarily reflect the views of the NAM.

Table 5.2 Simulating the effect of a constant dollar in the 1990s

	1996	1997	1998	1999	2000	2001
Real GDP (percent change)						
History	4.1	4.3	4.8	4.4	2.8	0.5
Constant dollar	4.1	4.3	5.1	4.7	2.4	−0.5
Consumption (percent change)						
History	3.1	4.1	5.0	5.2	4.2	3.1
Constant dollar	3.1	3.9	4.2	4.6	3.3	2.0
Gross investment (percent change)						
History	11.4	12.1	12.1	7.0	3.1	−14.8
Constant dollar	11.4	12.0	11.2	5.7	1.0	−19.2
Net exports (billions of 1996 dollars)						
History	−89.0	−113.3	−221.1	−316.9	−399.1	−408.7
Constant dollar	−89.0	−108.1	−145.8	−134.5	−134.8	−90.0
GDP price index (percent change)						
History	1.9	1.8	1.1	1.6	2.3	2.0
Constant dollar	1.9	2.0	1.8	1.8	2.7	2.5
CPI (percent change)						
History	3.2	1.9	1.5	2.6	3.4	1.9
Constant dollar	3.2	2.2	3.1	3.2	4.3	3.0

Source: See text on page 116.

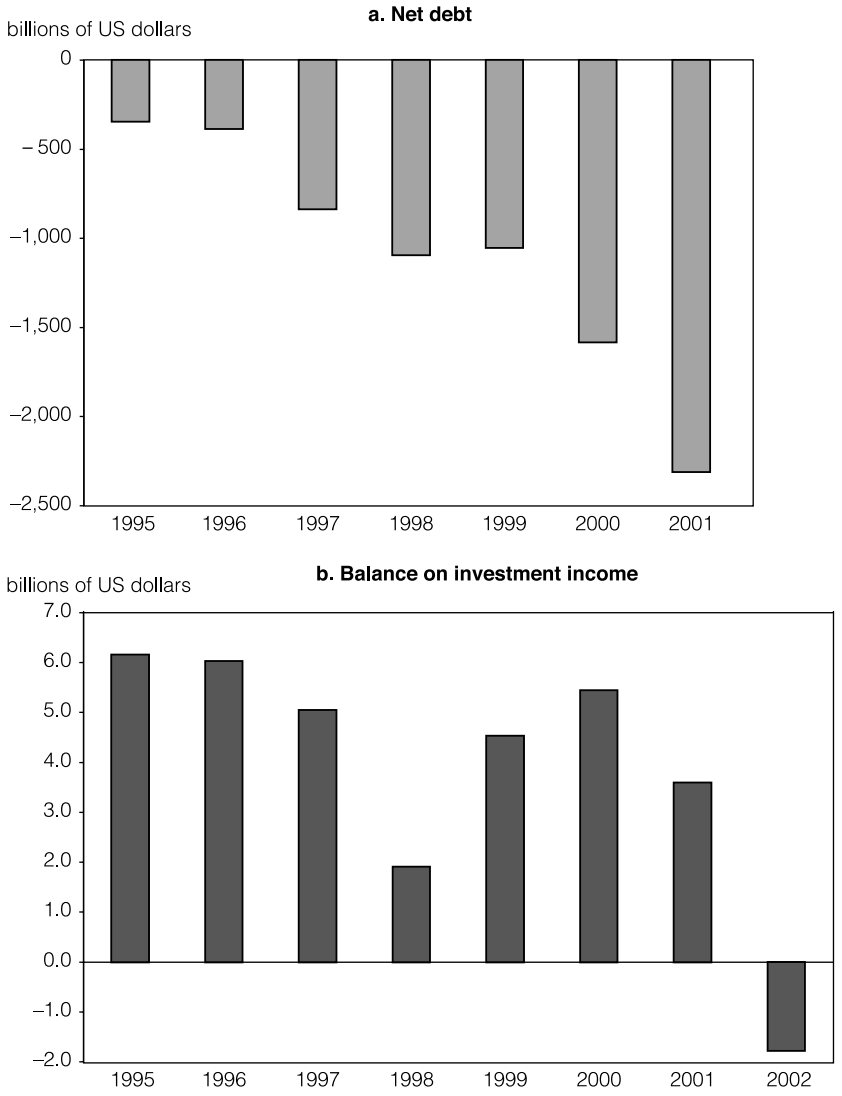
substantial cost of the constant dollar is that inflation would have been higher. The rate of change of the GDP price index in the constant dollar simulation exceeds the actual historical rate of increase quite substantially. For the CPI, which includes the prices of imported goods, the impact would have been even greater—CPI inflation would have been twice as high in 1998. Of course the Federal Reserve could have acted to offset the higher inflation (more so than is built into the model's reaction function), but that would have come at the expense of employment and GDP growth. If the Fed had fully offset the higher inflation, it is not clear that manufacturing employment would have been higher in the 1990s.

On balance, therefore, the simulation results are pretty much what one would have expected. US consumers benefited over the period from the high dollar, and so did the level of investment. A large current account deficit means that we were consuming and investing more than we were producing. Given the Fed reaction function built into the model, the boom and bust cycle is greater with a constant dollar. The constant dollar would have meant less pressure on import-competing industries and a stronger export performance.

Paying for the ''Excesses'' of the 1980s and 1990s

With the exception of manufacturing, the constant-dollar simulation run suggests some advantages from the large current account deficits of the

Figure 5.14 Net US indebtedness and balance on income



Source: Bureau of Economic Analysis.

1980s and 1990s. But this can give a misleading picture, because the increased debt burden that is a legacy of this period may weigh down American living standards in the future. Simulations to follow will add more to this story, but it is worth noting here that the burden so far of the debt that was accumulated in the 1990s has been surprisingly small.

Figure 5.14a shows the increase of net indebtedness over the period 1995-2001. After being a net foreign creditor until 1988, the United States

has shifted to being a very large net debtor. This has changed the United States from being a net recipient of foreign income to being a net payer of income. In 1983, net foreign income payments to the United States peaked at $36.4 billion, or about 1 percent of GDP. As figure 5.14b shows, this net inflow had fallen by the mid-1990s and had turned negative by the first quarter of 2002. The most remarkable aspect of the data, however, is that the net income flow remained positive for so long. Moreover, the net outflow in 2002 so far is tiny. In 2001, for example, the United States was a net debtor of around $2.3 trillion, and yet the net income flow was positive and over $3 billion. The United States clearly earns much higher returns on its assets overseas than the returns earned by foreigners on assets held in the United States.

These data indicate that foreign borrowing has been a cost. Going from a net inflow of 1 percent of GDP to zero or a net outflow represents a burden to the United States. Clearly, however, the burden is amazingly small; the net cost of borrowing has been tiny. A recent Bureau of Economic Analysis study of FDI in the United States (*Survey of Current Business,* 2002) suggests one reason for this. The rates of return earned by foreign companies investing in the United States tend to rise over time. Much of the foreign investment in the United States has been made recently, and the owners have faced start-up costs and adjustment costs to operating in the United States. For a given size of the net indebtedness, it seems likely that the net outflow of income from the United States will rise in the years to come.

As Robert Lawrence pointed out to me, however, since much of the investment in the United States has been in acquisitions or portfolio investments, it is less clear that the rate of return will rise. It may be that the reason for the low levels of returns is that foreign investors have made bad investments, purchasing their share of overvalued companies or overvalued equities. Buying NASDAQ or S&P stocks looked like a great investment to a lot of people, but the returns for those who bought in the late 1990s have been very poor or negative. It is tempting for Americans to gloat a little over selling the Brooklyn Bridge to gullible world investors, but the level of returns that foreigners have earned in the past will affect their willingness to continue lending in the future. That influences the assumptions examined in the simulations described in the following section.

Reducing the Current Account Deficit in the Future

I turn now to the question of how the US economy would adjust to a lower current account deficit in the future. The approach once again is to use simulations from a macroeconometric model, again from MA, and

this time the simulations were carried out by Joel Prakken and Macroeconomic Advisers (MA).[26] These are ''authorized'' runs, although none should be seen as predictions by MA—or by me for that matter; they are ''what-if'' simulations. The first run, or ''baseline,'' simply lets the MA model run without any added factors or adjustments. The second run, ''gradual dollar decline,'' adjusts the equation of the model that determines the exchange rate. That equation is based on rate-of-return differentials but includes a term allowing for the propensity of foreigners to hold US assets.[27] Since in the 1980s the dollar declined rather rapidly once it started down, the third simulation looks at a ''fast dollar decline.'' The fourth simulation, ''faster growth in the rest of the world,'' looks at the effect of a five-year growth spurt in the rest of the world. Growth is about 1 percent a year higher for five years—a new economy boost of the type experienced by the United States in the period 1995-2000. In all of the runs there is an assumed Fed reaction function, which targets inflation and unemployment. The unemployment rate in all of the runs remains very close to the nonaccelerating inflation rate of unemployment (NAIRU), which is just over 5 percent.

Table 5.3 presents the results of these simulations. I have given only a fraction of the full set of results, but because the table still contains a lot of numbers, I will focus on a few high points. First, in the baseline run, the dollar actually rises slightly over the next few years before declining by a modest amount. Without any constraints on US borrowing overseas, the model indicates that the US economy will keep running large current account deficits and corresponding large capital inflows. The rate of growth of real GDP is just over 3 percent a year, close to the potential growth rate in the model. Consumption growth, at below 3 percent a year, is slower than GDP in the baseline, as the private saving rate is assumed to recover. So even with continued large current account deficits, consumption in the baseline simulation grows much more slowly than the 4 percent rate achieved in the period 1995-2000. Investment grows more rapidly than GDP, although again more slowly than the real investment boom of the 1990s. The rapid rate of decline of IT capital goods prices helps sustain strong investment.

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26. I am grateful to Joel Prakken for his assistance not only in running the model but also in helping figure out the most interesting runs, the best assumptions to make, and the inferences to be drawn from the results.

27. In econometric equations it is very hard or impossible to find statistically significant portfolio effects on the dollar. But reason suggests they are there. As foreigners build up larger and larger shares of US assets in their portfolios, they will demand higher returns in order to induce a given capital inflow to the United States. The adjustment of the exchange rate equation can be seen as a way of introducing this portfolio effect. In the Fed's macro model, the impacts of different exchange rates are examined by adjusting the assumed risk premium in the exchange rate equation. This is very similar in practice to what is done here in the MA model.

Table 5.3 The impact on the United States of a gradual dollar decline or faster growth abroad

	Levels					Growth rates		
	2001	2002	2007	2012	2017	2002-07	2002-12	2002-17
FRB broad foreign exchange rate (index 2001 = 100)								
Baseline	100	100.9	102.8	100.2	96.6			
Gradual dollar decline	100	100.6	90.9	85.8	82.8			
Fast dollar decline	100	99.4	85.8	79.2	79.7			
Faster growth in rest of world	100	100.9	99.5	105.3	100.6			
Real GDP (billions of chained 1996 dollars)								
Baseline	9,215	9,424	11,094	12,978	14,906	3.32	3.25	3.10
Gradual dollar decline	9,215	9,425	11,031	12,771	14,447	3.20	3.08	2.89
Fast dollar decline	9,215	9,426	10,964	12,535	14,051	3.07	2.89	2.70
Faster growth in rest of world	9,215	9,424	11,049	12,849	14,823	3.23	3.15	3.07
Consumption (billions of 1996 dollars)								
Baseline	6,377	6,577	7,586	8,791	9,859	2.90	2.94	2.74
Gradual dollar decline	6,377	6,576	7,435	8,396	9,304	2.48	2.47	2.34
Fast dollar decline	6,377	6,576	7,185	8,144	9,049	1.79	2.16	2.15
Faster growth in rest of world	6,377	6,577	7,473	8,711	9,862	2.59	2.85	2.74
Investment (billions of 1996 dollars)								
Baseline	1,575	1,572	2,123	2,696	3,394	6.19	5.54	5.26
Gradual dollar decline	1,575	1,572	1,983	2,411	2,880	4.75	4.37	4.12
Fast dollar decline	1,575	1,573	1,885	2,196	2,564	3.68	3.40	3.31
Faster growth in rest of world	1,575	1,572	2,034	2,621	3,312	5.28	5.24	5.09

(table continues next page)

Table 5.3 The impact on the United States of a gradual dollar decline or faster growth abroad *(continued)*

	Levels					Growth rates		
	2001	2002	2007	2012	2017	2002-07	2002-12	2002-17
Government (billions of 1996 dollars)								
Baseline	1,640	1,710	1,862	2,013	2,152	1.71	1.65	1.54
Gradual dollar decline	1,640	1,710	1,862	2,016	2,157	1.72	1.66	1.56
Fast dollar decline	1,640	1,710	1,863	2,019	2,161	1.73	1.68	1.57
Faster growth in rest of world	1,640	1,710	1,862	2,014	2,152	1.72	1.65	1.55
Net exports (billions of 1996 dollars)								
Baseline	−416	−486	−486	−467	−290			
Gradual dollar decline	−416	−485	−245	20	282			
Fast dollar decline	−416	−483	18	199	365			
Faster growth in rest of world	−416	−486	−315	−454	−319			
Goods exports (billions of 1996 dollars)								
Baseline	785	763	1,069	1,421	1,845	6.98	6.41	6.06
Gradual dollar decline	785	764	1,096	1,452	1,829	7.50	6.64	6.00
Fast dollar decline	785	764	1,107	1,432	1,744	7.70	6.48	5.65
Faster growth in rest of world	785	763	1,105	1,428	1,858	7.67	6.46	6.11
Goods imports (billions of 1996 dollars)								
Baseline	1,271	1,320	1,722	2,178	2,621	5.46	5.14	4.68
Gradual dollar decline	1,271	1,319	1,529	1,765	2,054	2.99	2.95	2.99
Fast dollar decline	1,271	1,318	1,314	1,573	1,855	−0.06	1.78	2.31
Faster growth in rest of world	1,271	1,320	1,631	2,209	2,695	4.32	5.29	4.87
Services exports (billions of 1996 dollars)								
Baseline	292	297	421	573	762	7.23	6.79	6.47
Gradual dollar decline	292	297	423	575	752	7.33	6.83	6.38
Fast dollar decline	292	297	427	571	725	7.50	6.73	6.12
Faster growth in rest of world	292	297	457	620	815	8.97	7.62	6.95

Services imports (billions of 1996 dollars)								
Baseline	222	226	261	298	310	2.88	2.80	2.12
Gradual dollar decline	222	226	239	251	265	1.13	1.05	1.07
Fast dollar decline	222	226	205	237	262	−1.95	0.47	1.00
Faster growth in rest of world	222	226	252	309	332	2.14	3.18	2.59
Current account balance (billions of US dollars)								
Baseline	−393	−498	−643	−845	−935	5.27	5.43	4.29
Gradual dollar decline	−393	−498	−548	−558	−550	1.92	1.14	0.66
Fast dollar decline	−393	−501	−345	−433	−484	−7.19	−1.45	−0.23
Faster growth in rest of world	−393	−498	−522	−749	−885	0.98	4.17	3.91
Current account balance as percent of GDP								
Baseline	−3.9	−4.8	−4.8	−5.0	−4.3			
Gradual dollar decline	−3.9	−4.8	−4.1	−3.3	−2.5			
Fast dollar decline	−3.9	−4.8	−2.6	−2.5	−2.2			
Faster growth in rest of world	−3.9	−4.8	−3.9	−4.4	−4.2			
US indebtedness to rest of world (billions of US dollars)								
Baseline	−2,266	−2,665	−5,475	−9,210	−13,648	15.49	13.20	11.50
Gradual dollar decline	−2,266	−2,665	−5,430	−8,234	−10,997	15.30	11.94	9.91
Fast dollar decline	−2,266	−2,666	−4,813	−6,934	−9,078	12.55	10.03	8.51
Faster growth in rest of world	−2,266	−2,665	−5,238	−8,307	−12,499	14.47	12.04	10.85
US indebtedness to rest of world as percent of GDP								
Baseline	−22.5	−25.6	−41.1	−54.2	−63.4			
Gradual dollar decline	−22.5	−25.6	−40.6	−48.2	−50.9			
Fast dollar decline	−22.5	−25.6	−35.6	−40.2	−41.9			
Faster growth in rest of world	−22.5	−25.6	−39.3	−49.3	−58.7			

(table continues next page)

Table 5.3 The impact on the United States of a gradual dollar decline or faster growth abroad *(continued)*

	Levels					Growth rates		
	2001	2002	2007	2012	2017	2002-07	2002-12	2002-17
GDP price index								
Baseline	109.4	110.6	120.2	131.1	144.4	1.68	1.71	1.79
Gradual dollar decline	109.4	110.6	121.1	133.8	149.4	1.83	1.92	2.02
Fast dollar decline	109.4	110.6	123.2	137.6	154.3	2.17	2.21	2.24
Faster growth in rest of world	109.4	110.6	120.6	131.2	143.7	1.74	1.72	1.76
Consumer price index								
Baseline	177.1	179.8	201.5	227.1	262.0	2.30	2.36	2.54
Gradual dollar decline	177.1	179.9	205.4	237.1	278.7	2.69	2.80	2.96
Fast dollar decline	177.1	180.0	212.5	248.3	293.0	3.38	3.27	3.30
Faster growth in rest of world	177.1	179.8	202.9	226.9	259.6	2.45	2.35	2.48
Foreign real GDP index								
Baseline	116.6	119.0	142.2	167.2	194.5	3.62	3.46	3.33
Gradual dollar decline	116.6	119.0	140.9	163.4	188.2	3.44	3.22	3.10
Fast dollar decline	116.6	119.0	137.8	161.1	183.6	2.97	3.08	2.93
Faster growth in rest of world	116.6	119.0	147.6	175.3	203.1	4.40	3.95	3.63

Foreign consumer price index								
Baseline	202.4	206.4	234.6	263.6	302.5	2.59	2.48	2.58
Gradual dollar decline	202.4	206.4	235.7	269.4	313.8	2.69	2.70	2.83
Fast dollar decline	202.4	206.4	240.3	277.0	324.5	3.09	2.99	3.06
Faster growth in rest of world	202.4	206.4	235.2	264.3	301.2	2.65	2.50	2.55
Federal funds rate (percent)								
Baseline	3.89	1.74	4.50	5.57	6.32	20.88	12.30	8.97
Gradual dollar decline	3.89	1.75	5.99	7.99	10.05	27.96	16.43	12.38
Fast dollar decline	3.89	1.77	7.34	11.21	13.14	32.97	20.31	14.32
Faster growth in rest of world	3.89	1.74	5.68	5.99	7.24	26.62	13.13	9.95
10-year Treasury note yield (percent)								
Baseline	5.02	4.71	5.95	6.90	7.72	4.78	3.89	3.34
Gradual dollar decline	5.02	4.71	6.89	8.84	10.88	7.90	6.50	5.74
Fast dollar decline	5.02	4.72	8.56	11.05	13.63	12.65	8.88	7.33
Faster growth in rest of world	5.02	4.71	6.82	7.35	8.39	7.67	4.54	3.92
Foreign bond yield (percent)								
Baseline	4.09	4.21	6.43	7.42	8.78	8.86	5.84	5.03
Gradual dollar decline	4.09	4.21	6.79	8.76	11.10	10.05	7.62	6.68
Fast dollar decline	4.09	4.21	8.10	10.29	13.34	14.02	9.36	8.00
Faster growth in rest of world	4.09	4.21	7.55	7.08	9.20	12.40	5.34	5.36

Source: See text on pages 119-20.

In the baseline run, foreign GDP is expected to grow as fast as or a little faster than US GDP, unlike in the 1990s boom. This reduction in the growth differential, together with the modest decline of the dollar in the second half of the period, allows the deficit in net exports to decline over time, absolutely and as a share of GDP. The current account deficit continues to grow in dollar terms and stays fairly flat as a share of nominal GDP. The rise in US net indebtedness increases the net outflow of factor payments and keeps the current account deficit high.

In the gradual dollar decline scenario, the dollar index is 12.3 percent below the baseline in 2007 and 15.4 percent lower in 2017. In this simulation, real net exports turn positive by 2012. The current account remains negative, however, but is reduced absolutely and as a percentage of GDP, compared to the baseline. By 2012, the current account deficit is only two-thirds of the baseline, and it is down to 59 percent by 2017. The big driver of the reduction in real net exports from the lower dollar is the reduction of real imports. By 2017, real net imports, with a lower dollar, are about $570 billion lower than in the baseline, a reduction of 24 percent.

An interesting feature of the gradual dollar decline simulation is that even though real net exports become strongly positive and goods imports are curtailed, there remains a deficit in real goods exports, equal to $225 billion or 1.6 percent of real GDP. Part of this is oil imports, but a substantial fraction would represent a continued real deficit in manufactured goods. Earlier I mentioned that the competitiveness problems faced by segments of the steel and auto industries were not just vis-à-vis the rest of the world but also in relation to other domestic segments of their own industry. Somewhat parallel at the aggregate level is the fact that US service industries have become more competitive in foreign trade than US manufacturing industries. The volume of trade in services has been increasing strongly over time, and the United States has maintained a surplus in services trade despite the strong dollar ($70 billion in 2001 in 1996 dollars). In this simulation run, a substantial surplus in services trade develops ($490 billion in 2017, equal to 3.4 percent of real GDP).[28]

There is a substantial penalty to growth, consumption, and investment from the lower dollar. Real GDP grows more slowly than in the baseline model by 0.2 percent a year over the 15 years, resulting in a level of GDP that is down by $460 billion or 3.1 percent of GDP compared to the baseline after 15 years. Since the Fed reaction function keeps unemployment close to the NAIRU in both simulations, this loss of GDP is on the supply side, with lower investment and a smaller capital stock in the dollar decline simulation. Inflation is higher also, running 0.2 percent a year higher for the GDP deflator and 0.4 percent a year for the CPI (which is affected directly by higher import prices).

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28. Catherine Mann (2002) has stressed the importance of the growing trade in services and the potential for growth in services trade if other countries open their markets.

Consumption and investment take bigger hits than GDP, since they must adjust to the reduction of net exports. Consumption is down $555 billion or 5.8 percent after 15 years, growing more slowly by 0.4 percent a year. Investment is down 16.4 percent after 15 years, and the investment growth rate is reduced by 1.1 percent a year over the whole period. Interest rates are substantially higher with a lower dollar, 2.2 percentage points on the Federal Funds rate and 2.3 points on the 10-year Treasury. The higher interest rates offset the stimulus of lower net exports and serve to crowd out investment and durable goods consumption.

One surprising result is that foreign GDP is lower and foreign interest rates are higher with a lower dollar. If the flow of saving to the United States is being reduced, then in principle there should be more funds available overseas, creating the potential for higher growth. The reason for the effect is that the rest of the world is assumed to be unable to absorb the additional saving effectively—they have been relying on the United States as the main driver of demand growth for the whole world.

One of the main payoffs to the lower dollar simulation is that the net indebtedness of the United States is down $2.65 trillion in 2017, a 21.5 percent decrease compared to the baseline.

This simulation run tracks the impact over time of a reduction in the propensity of foreign residents to demand dollar assets. It ''predicts'' a gradual decline in the dollar as a result. In practice, at least based on the mid-1980s (and to a degree the early 1970s), when the dollar starts to decline, it falls rapidly. There may be a speculative component to dollar swings that is not easy to capture econometrically. When the dollar starts to fall, it could set up reinforcing movements out of dollar-denominated assets that result in a rather sharp dollar decline. The fast dollar decline simulation traces out the impact of a quicker adjustment. Since much of the impact on the economy in this fast decline occurs over the six years 2002 to 2007, table 5.4 is added to show the year-by-year effects.

In this simulation the dollar has fallen nearly 20 percent by 2004, and by 2006 total net exports in the NIPA tables has turned positive, although net exports of goods remain negative. The current account deficit remains negative also, at 2.4 percent of GDP. So if we were to see a rapid decline of the dollar by 20 percent, the model simulation predicts that this would reduce the US current account deficit below 2.5 percent of GDP by 2006.

The consequences for the rest of the economy are fairly tough. Real GDP in 2007 is down 1.2 percent compared to the baseline; real consumption is down over 5 percent; and investment is down nearly 12 percent. To induce this readjustment, interest rates are much higher, with the Federal Funds rate and the 10-year yield both exceeding 10 percent. Given the interest rate environment of recent years, a switch like that would be very disruptive. The housing market would look a lot different than it does today.

Table 5.4 The impact on the United States of a fast dollar decline

	2002	2003	2004	2005	2006	2007
FRB broad foreign exchange rate (index 2001 = 100)	99.4	88.3	79.7	76.6	82.1	85.8
Real GDP (billions of chained 1996 dollars)	9,426	9,714	10,023	10,377	10,664	10,964
Consumption (billions of 1996 dollars)	6,576	6,714	6,770	6,847	6,976	7,185
Investment (billions of 1996 dollars)	1,573	1,648	1,671	1,714	1,757	1,885
Government (billions of 1996 dollars)	1,710	1,749	1,782	1,811	1,838	1,863
Net exports (billions of 1996 dollars)	−483	−440	−231	−21	68	18
Goods exports (billions of 1996 dollars)	764	826	924	1,015	1,071	1,107
Goods imports (billions of 1996 dollars)	1,318	1,360	1,289	1,213	1,210	1,314
Services exports (billions of 1996 dollars)	297	317	343	373	400	427
Services imports (billions of 1996 dollars)	226	223	211	198	195	205
Current account balance (billions of dollars)	−501	−557	−490	−380	−307	−345
Current account balance as percent of GDP	−4.8	−5.1	−4.2	−3.1	−2.4	−2.6
US indebtedness to rest of world (billions of dollars)	−2,666	−3,170	−3,708	−4,153	−4,504	−4,813
US indebtedness to rest of world as percent of GDP	−25.6	−28.9	−32.0	−33.8	−34.9	−35.6
GDP price index	110.6	112.7	115.6	118.4	120.9	123.2
Consumer price index	180.0	186.1	194.0	201.6	207.7	212.5
Foreign real GDP index	119.0	122.9	126.4	129.7	133.2	137.8
Foreign consumer price index	206.4	212.0	218.2	225.3	232.8	240.3
Federal funds rate (percent)	1.77	3.98	6.49	8.07	7.73	7.34
10-year Treasury note yield (percent)	4.72	5.41	6.59	7.66	8.48	8.56
Foreign bond yield (percent)	4.21	4.51	5.19	5.88	6.98	8.10

Source: See text on page 127.

Financial institutions would have to make a large adjustment, and household portfolios would be greatly affected.

Inflation is higher with the fast drop in the dollar, with the rate of increase in the GDP price index being half a percentage point higher through 2012 and CPI inflation taking a big hit over the next five years, running a full percentage point higher from 2002 to 2007.

The simulation also suggests that the rest of the world would not do well with this scenario either. Foreign GDP is lower and foreign interest rates higher, and other countries fail to adapt effectively to the loss of demand generated in the United States.

The simulation of faster growth in the rest of the world shows most of its impact in the early years of the simulation—during the time the assumed ''new economy'' period is occurring. The net exports deficit is sharply lower in 2007, while real GDP consumption and investment are less affected than in the lower dollar case. As long as it lasts, faster growth overseas is an easier way for the United States to lower its trade deficit than a lower dollar. By the end of the simulation run, however, there is only a modest change in the US outcome relative to the baseline case. In fact, the net export deficit is little changed from the baseline, as goods imports increase strongly in the latter years of the simulation.

Lessons from the Simulation Results and Questions Raised

If the dollar does come down substantially, over a few years or over the next 15 years, the simulations reported here suggest that the results could be fairly costly for the United States. For one thing, the very favorable inflation-unemployment trade-off that the US economy enjoyed in the 1990s would change. In addition, the growth of real consumption and investment would be noticeably lower. Manufacturing is likely to do relatively well, although if the Fed were to fight inflation more aggressively than assumed here, then overall demand weakness might limit the benefits to this cyclically sensitive sector. The simulation results are sobering and reveal important implications of a potential dollar adjustment.

The simulation model uses assumptions that are entirely reasonable, but there are alternative possibilities that can be considered. The reason GDP growth is lower in the simulations is that investment is lower, and this feeds into a standard neoclassical production framework. Productivity growth is reduced. My own work on productivity makes me cautious in assessing the impact of slower or faster investment on productivity. The increase in productivity growth after 1995 may have been largely the result of an increased pace of business innovation, rather than just greater use of IT. As long as the pace of innovation continues, this can sustain strong productivity growth.

Another aspect of the simulation results that can be questioned is the extent of inflation pass-through. There is currently a view in Washington that the impact of currency depreciation on inflation is lower than it used to be. Depreciations do not trigger increases in inflation the way they used to.[29] The evidence for this comes partly from inflation equations estimated from a range of countries.

Robert Gordon (1998), on the other hand, has argued that variations in the dollar have had an important impact on recent US inflation experience. He finds that much of the favorable inflation experience of the 1990s was the result of the strong dollar. A dollar decline, should it occur, would run that process in reverse and provide a serious inflation shock. Gordon suggests that ''a 10 percent decline in the nominal effective exchange rate of the dollar would imply a 6-7 percent increase in import prices and 0.6-0.7 percent extra overall inflation, spread out over more than a single year'' (personal communication, August 5, 2002).

The MA model is not directly comparable to Gordon's analysis, since it takes a variety of feedback effects into account and uses a Fed reaction function, but overall it is closer to the Gordon view than the ''Washington'' view. The simulation results may be a bit pessimistic in terms of the adverse inflation impact of a dollar decline.

The model's findings about the relative performance of manufacturing and services in international trade are intriguing and make sense, given the strong relative productivity level of US service industries. But predicting trends in this area is tricky. Some business consulting groups predict explosive growth in offshore outsourcing of service activities from the United States to low-wage countries, notably India, where the English-speaking population is large and wages are low, and China, in which large numbers of people are learning English. Moreover, not all offshore outsourcing of services requires knowledge of English.[30] It is uncertain how US net trade in services will play out over time.

The final and most important question raised by the simulations is whether some of the very tough macroeconomic implications, such as the very high interest rates, would actually come about. In particular, are the results from the simulations consistent with actual past experience? The dollar came down rapidly and by a large amount in the 1980s, and the effects did not seem so bad. In the mid-1980s, Stephen Marris (1985) warned of a ''hard landing'' from a sharp decline in the dollar. He correctly predicted that the dollar would fall and fall hard. He incorrectly predicted that the consequences for the US economy would be severe.

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29. This is based on work at the IMF and the Federal Reserve Board in Washington. See, for example, Gagnon and Ihrig (2002).

30. This is based on discussions at McKinsey & Company, although specific predictions of the growth of offshore services were made by other groups.

The first point, by way of reconciliation between the simulations and past history, is that when the dollar fell after 1985, there was still a lot of cyclical slack in the economy. The unemployment rate in 1985 was 7.2 percent, compared to 5.6 percent in September 2002. After the dollar decline in the 1980s, there was still plenty of room for growth faster than the rate of growth of potential GDP. Second, the cohesion of the Organization of Petroleum Exporting Countries collapsed and oil prices fell very sharply in January 1986. This kept inflation low for a while. Third, the adjustment to the dollar decline of the mid-1980s was actually painful. GDP growth slowed and so did productivity growth. Inflation increased in the late 1980s and the economy ended up in a recession in 1990 (which started before the rise in oil prices, according to the NBER). The consequences for the economy of the fall in the dollar in the 1980s were not nearly as bad as Marris feared, but they were negative.

Policy Implications

As a market-oriented economist, I start with the presumption that free trade and free movements of capital will improve overall world economic efficiency. Production is allocated to the lowest-cost producers and capital seeks the highest rate of return. Empirical studies have supported the connection from trade to growth.[31] The empirical case for the benefits of free capital movements is less clear, however, and observation also suggests that asset prices, including the dollar, are subject to persistent swings that are hard or impossible to relate to the underlying economic fundamentals. They seem driven in part by volatile expectations, including speculative bubbles.

Asset price fluctuations can be costly. Investors lose their pensions in a stock market collapse, homeowners find they have lost the equity in their homes, and, in the case of the exchange rate, workers and companies find themselves out of a job or out of business, not as a result of the fundamental forces of comparative advantage, but because of exchange rate swings lasting several years at a time. Ideally, it would be better if exchange rates did not overshoot their long-run trend values.

The discussion in this paper points to some of the costs of dollar swings, in terms of adjustment costs in manufacturing and also because of macroeconomic adjustment. The costs revealed in this paper do not seem high enough to justify policies that could inflict significant distortions on the economy, however. In manufacturing, some of the adjustment difficulties faced by workers and firms in the sector will not go away even with a stable dollar. And in the case of the macroeconomy, there are benefits when the dollar rises and penalties when it falls, so the net costs over

31. See, for example, Frankel and Romer (1999).

time may not be large. One of the biggest problems caused by exchange rate swings is not addressed here directly but is relevant to the analysis of manufacturing. Episodes of a very high dollar undermine support for globalization and open trade. This has been particularly the case in the past two years, as recession has combined with a high dollar. It is one thing to tell workers and companies that the fundamental forces of technology have left them uncompetitive. It is another to tell them that they have been caught by the excess volatility of the exchange rate.[32]

The existence of a market ''failure'' and the adverse consequences that follow do not mean that there is a policy that can solve the problem. At this point I leave it to others to debate the pros and cons of an active exchange rate policy. I myself come out rather skeptical that such a policy can be effective, or will be beneficial if it is effective. As Alan Greenspan has noted in the context of stock market bubbles, asset price swings are hard to identify ex ante and hard to do anything about.

Two policy measures that I believe would be helpful and would ameliorate the impact of dollar swings are as follows. First, a policy of running government budget surpluses on average over the business cycle is called for. The existence of social security, together with a lack of foresight among many families, means that there is undersaving in the United States. A policy of positive government saving would partially offset this problem and would result in a smaller capital inflow to the United States and a smaller current account deficit on average.

Second, the costs of labor market adjustment could be reduced; one way to do this is to offer wage insurance to workers who are laid off as a result of trade. This idea, which was developed in 1986 (Litan and Lawrence 1986), was revived, and some new cost estimates were prepared, in recent work by Lori Kletzer and Robert Litan (2001). The proposal is feasible and not very costly, and it has won support in Washington. Wage insurance can be enacted in a way that does not undermine work incentives—indeed, it may enhance them. Ideally, adjustment assistance should be provided more broadly than simply to those affected by trade. As Davis, Haltiwanger, and Schuh (1996) point out, job loss on a large scale is the norm in manufacturing, in good times and bad. Facilitating adjustment and relocation are potentially of broader value, but wage insurance for trade adjustment is a good place to start.

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32. See the discussion by I. M. Destler in this volume.

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