10

Competitiveness and the Assessment of Trade Performance

MARTIN NEIL BAILY and ROBERT Z. LAWRENCE

No one has worked more extensively on the issue of US competitiveness than C. Fred Bergsten. He has made this issue one of the central concerns of the Institute throughout its existence, and he chaired the Competitiveness Policy Council (CPC) in the early 1990s at the request of Congress. Fred has been a tireless advocate for expanded trade and for policies worldwide that liberalize trade, but his advocacy has always been tempered by a concern that not everyone benefits from trade. In part, this concern has motivated his support for adjustment assistance programs to help those that are displaced by trade. In addition, Fred has supported policies that help US workers and companies as they compete in global markets. A strong educational system, a strong science and technology community, a high level of saving and domestic investment, and a cost-effective health care system are all goals that he has endorsed.

This chapter, intended as a tribute to Fred's accomplishments in the area of competitiveness, reviews some of the thinking on competitiveness from the 1980s and 1990s, provides a new way of framing the trade com-

Martin Neil Baily has been a senior fellow at the Institute since 2001. Robert Z. Lawrence, senior fellow at the Institute since 2001, is the Albert L. Williams Professor of Trade and Investment at the John F. Kennedy School of Government at Harvard University. *Jacob Funk Kirkegaard, Katharina Plück, and Ceren Erdogan provided analysis and assistance. Michael Mussa and many other colleagues made helpful suggestions.*

petitiveness issue that allows us to benchmark America's recent performance, and sets out additional work to be done.

The Competitiveness Problem Posed by the Competitiveness Policy Council

In the 1980s the persistence of slow productivity growth combined with large trade deficits created concern about the ability of the US economy to compete. To explore the problem President Reagan appointed a Commission on Industrial Competitiveness in 1983, under the chairmanship of John Young of Hewlett-Packard, which issued its report in 1985.[1] The commission defined competitiveness as "the degree to which a nation can, under free and fair market conditions, produce goods and services that meet the test of international markets while at the same time maintaining or expanding the real incomes of its citizens" (Young 1986, 502). Its key findings were:

> 1. There is compelling evidence that this nation's ability to compete has declined over the past 20 years. We see its effects both in our domestic markets and our ability to sell overseas. 2. We must be able to compete if we are going to meet our national goals of a rising standard of living and a strong national security for our people. 3. Decision makers in both the public and private sectors must make improved competitiveness a priority on their agendas. As a nation, we can no longer afford to ignore the competitive consequences of our actions—or our inaction. (Young 1986, 502)

The commission proposed a set of goals for policy and business to improve the situation: strengthening of the US technology base, increasing the supply of capital, developing a more skilled and flexible workforce, and making trade and the international trading system a priority (Young 1986, 508). The commission report was the most visible of a large number of studies reaching similar conclusions, most notably an MIT study by Michael L. Dertouzos, Richard Lester, and Robert Solow (1987) and Michael Porter's book *The Competitive Advantage of Nations,* published in 1990.[2]

In response to these concerns, the US Congress in 1988 decided to establish and fund the Competitiveness Policy Council and C. Fred Berg-

1. See President's Commission on Industrial Competitiveness (1985). The discussion here draws on Young (1986).

2. Porter portrayed the US economy as losing its position in the world economy. He pointed out the tremendous strength the economy had after the end of World War II and then described the subsequent decline: "American firms have diminished competitive advantage in a wide range of industries. The fundamental problem is a lack of dynamism. American industry, in too many fields, has fallen behind the rate, character, and extent of improvement and innovation. The rate of upgrading has slowed down, American industry is on the defensive, preoccupied with clinging to what it has instead of advancing" (Porter 1990, 532).

sten was appointed as its chair.[3] The CPC defined competitiveness based on four criteria:

> First, US goods and services should be of comparable quality and price to those produced abroad. Second, the sale of these goods and services should generate sufficient US economic growth to increase the incomes of all Americans. Third, investment in the labor and capital necessary to produce these goods and services should be financed through national savings so that the nation does not continue to run up large amounts of debt as in the 1980s. Fourth, to remain competitive over the long run, the nation should make adequate provisions to meet all these tests on a continuing basis. (Competitiveness Policy Council 1992, 2)

The key point, both in this definition and that of the earlier Council on Competitiveness, was that US competitiveness is not an end in itself but rather is important for its impact on US living standards. International trade, for example, is valuable to the United States to the extent that it allows Americans to achieve a higher standard of living than they would if trade were restricted or eliminated. Therefore, US participation in the global economy should be on terms that enhance living standards over a sustained period of time.[4]

In a series of three reports to Congress and the president, the CPC described in detail the areas where competitiveness in the US economy was deficient and suggested a number of policies to address the problems (Competitiveness Policy Council 1992, 1993, 1994). In its second report, the CPC (1993, 1–2) identified six indicators showing poor performance: Productivity had grown by less than 1 percent a year for the previous 20 years, real average wages were lower than in 1973, the economy had experienced four years of sluggish economic growth, high school students performed far worse than their counterparts abroad, 20 percent of adults were functionally illiterate, and the United States had run up merchandise trade deficits totaling $1 trillion and these deficits were continuing to grow.

The CPC then suggested three important national economic goals to address these problems: increasing the rate of productivity growth to 2 percent a year, increasing national investment by 4 to 6 percent of GDP, and financing new investment through increased domestic saving. In its 1992 and 1994 reports, the CPC also stressed the goals of improved education and training, increased spending on R&D, and control of health care costs.

---

3. Howard Rosen was the executive director of the council. At the time there were two other such groups, the private-sector Council on Competitiveness, chaired first by John Young of Hewlett-Packard and then by George Fisher of Motorola, and the President's Council on Competitiveness, chaired by then Vice President Dan Quayle. The private-sector group, still active today under the leadership of Deborah L. Wince-Smith, launched the National Innovation Initiative in 2004.

4. The relationship between trade and living standards continues to be a matter of study at the Institute; see the study led by Gary Hufbauer (Bradford, Grieco, and Hufbauer 2005) showing that trade accounts annually for $1 trillion of value to the United States.

It is interesting that the commission's concerns were broad. Faster productivity growth, increased saving and investment in human and physical capital, and research and development are desirable because they are associated with higher incomes rather than simply because they might improve trade performance. Indeed, one problem with the term competitiveness is that it is often used in different senses. Sometimes what people mean by "American competitiveness" is "How does America compare with other countries with respect to desirable economic goals such as productivity, employment, and equality?" At other times, they mean "How well are we performing in international trade?" In this chapter we look at each of these dimensions in turn, first asking broadly about US economic performance and then focusing more narrowly on trade. In both cases, though, the central concern is higher US living standards.

Has Recent US Economic Performance Matched the Goals of the CPC?

Growth and Productivity. Since the CPC's reports in the early 1990s, overall economic growth in the US economy has improved considerably. The most dramatic improvement has come in US productivity growth (output per hour in the nonfarm business sector), which accelerated after 1995 and has averaged 2.8 percent a year through 2005, double its earlier pace.[5] Labor force growth has slowed in recent years, but the increase in productivity fueled higher GDP growth, which averaged 3.1 percent a year from 1992 through 2005, compared to a growth rate of 2.8 percent a year from 1973 to 1992. US GDP per capita also grew more solidly and faster than for other developed-economy competitors. In the 1980s, GDP per capita in France, Germany, and other European economies as well as in Japan was converging close to the US level (OECD 2005), but by 2004 these economies had slipped back to around three-quarters or less of the US level. The CPC did not mention inflation and unemployment among its major concerns, but these have been surprisingly good also, averaging 5.1 percent for unemployment and 2.6 percent for CPI inflation (2.3 percent excluding food and energy) over the years 1995 to 2005. By these important macroeconomic measures, the US economy has performed far better than anyone would have predicted in the early 1990s.

Wages. Real wage growth remained weak in the early 1990s but has done better since then, although not stunningly well. Real average hourly earnings, which had fallen pretty steadily after 1973, rose from 1994 to

5. A portion of this faster growth is attributable to changes in measurement. Based on today's measurement methodology, output per hour is estimated to have grown by 1.4 percent a year over 1973–95 rather than the rate of below 1 percent a year reported by the CPC.

2003 before dipping in 2004 and 2005 in the face of rising energy costs. Real average hourly earnings in 2005 were 8.6 percent above their 1994 trough, although still well below their peak of the early 1970s. A more comprehensive measure of payments to workers is provided by real compensation per hour in the business sector. This figure, which includes benefits and covers salaried as well as hourly wage employees, rose steadily after 1973 and quite rapidly in the late 1990s, ending in 2005 at 23 percent above its 1994 level and 44 percent above its 1973 level.[6]

The gap between average earnings of hourly employees and total compensation of all employees highlights two important issues. The first is the rapid growth of benefit costs, notably health care costs (to be discussed shortly), and the second is the sharp widening of the wage and income distribution. Hourly employees have done relatively badly compared to salaried workers. Much of the gain from economic growth has gone to the most educated, skilled, and talented individuals as well as to business profits.

An important issue for the competitiveness debate is the extent to which wage trends and the widening of the wage distribution are or are not the result of international competition.[7] Popular opinion argues that competing against workers in China who earn a few dollars a day has had a depressing effect on the wages of low-skilled workers in the United States. And there is the Stolper-Samuelson trade theory to support the view that trade could put downward pressure on these earnings. Whether this theoretical finding applies to US workers to any substantial degree is open to question, however.[8] The assumptions required for this result do not hold in practice and there are many ways in which trade with low-income countries such as China has helped moderate-income US workers. As producers, US manufacturers do not specialize in the labor-intensive activities that China specializes in, so US workers generally are not competing head-to-head with low-wage workers. And in their role as consumers US workers buy the low-cost apparel and other goods made in China.

In the US economy labor demand is determined primarily by the large sectors that are not heavily exposed to international trade with low-wage countries (e.g., services, government, construction, and food processing). And a variety of factors in the broad economy have contributed to the widening wage distribution, including changing technology (skill-biased technical change) and the immigration of low-skilled workers.

6. Data from the Bureau of Labor Statistics, reported in the *Economic Report of the President* (Council of Economic Advisers 2004, 2006).

7. For a survey of the debate, see Lawrence (1996).

8. For a skeptical study, see Lawrence and Slaughter (1993). William Cline (1997) finds that trade is only a small contributor to the widening wage distribution.

One of the issues identified by the CPC was the US education system. In one important respect the US education system has performed well: There has been a significant increase in the fraction of the college-aged population enrolled in colleges, from 21 percent in 1960 to 40 percent in 1992, according to Cline (1997). He estimates that this increase in the supply of educated workers could have been expected to reduce wage dispersion by 40 percent from 1973 to 1993, if other things had remained equal. Other things did not remain equal, however, and the demand for skilled and educated workers has risen even faster than supply, pushing up the relative wage of skilled workers. Significant improvements in the level of skill imparted in the K–12 educational system might have alleviated the widening of the earnings gap, but such improvements do not appear to have happened.

Investment and Saving. Fixed investment shows an increase in its share of GDP since 1990 in constant dollar terms. It is highly cyclical, of course, but nonresidential business fixed investment was 4.2 percentage points of GDP higher in 2000 and 2.7 percent higher in 2005 than in 1990. These figures are in real or price-adjusted terms and reflect the fivefold increase in investment in information processing equipment and software between 1990 and 2005. This increase is, in turn, driven both by higher business spending in dollar terms and by rapid declines in the quality-adjusted prices of computers and other equipment. The share of investment in GDP has risen because we are getting more bang for the buck (in current dollar terms nonresidential fixed investment was 10.7 percent of GDP in 1990 and 10.2 percent in 2005).

A goal of the commission was to increase saving as well as investment, and this has not happened. Household saving has declined to almost zero, and total private saving has also fallen, although by a smaller amount. Public saving is now negative again, after turning positive in 1999 and 2000. The gap between saving and investment is the current account deficit, which, of course, has grown and grown over the period.

Technology. There was considerable concern in the 1980s and early 1990s that the United States was losing its technological strength and would be overtaken by Europe or Japan, but that did not happen. In computers and related technologies, US companies still dominate the world, and the emerging biotechnology field is centered in the United States—no other country comes close in advanced technology. However, a greater share of high-tech production manufacturing is done overseas, so that the United States now runs a small trade deficit in high-tech products.

Health Care Costs. US health care costs have not been contained. There is an important question of who bears these costs and whether or not they are an issue for trade competitiveness. Most health care costs are paid for

either by employer health insurance premiums or by tax-financed government support for Medicare and Medicaid. However, these costs are thought to be borne primarily by workers through lower wages and higher taxes. If so, any wastefulness in health care is an issue for US living standards but not something that raises employer costs. Other countries, such as many in Europe, pay a larger portion of health care costs out of taxes, but that does not directly affect their trade competitiveness. Health care costs may impact the composition of trade. Companies with strong unions and generous health care provisions for employees and retirees are facing crippling costs. General Motors reportedly pays about $1,500 per vehicle in health care costs for its US employees and retirees. Producing cars has been cheaper in Canada than in the United States in large part because health care costs are much lower in Canada (reported to be about $400 per vehicle) under its state system.

Lessons from the Past 15 Years. The CPC in the early 1990s would surely have been surprised to learn that US GDP growth and productivity growth have turned out to be as rapid as they have and that US technological performance has been so strong. But they would have been absolutely astounded to be told that the US trade and current account deficits would continue to grow, seemingly unbounded, reaching about 7 percent of GDP by 2005. Who would have believed that the rest of the world would finance a cumulative $4.5 trillion of US current account deficits between 1990 and 2005? And there have been other surprising economic outcomes:

- It had appeared to the commission that the US trade deficit was linked to, even the result of, weak productivity growth and sluggish investment. It turned out, however, that an increase in investment and an acceleration of productivity accompanied a worsening of the trade deficit. US demand expanded even more than supply.
- The other side of the coin was that competitors such as Germany and Japan experienced weak overall economic growth, slow investment, and sluggish productivity increase even though they continued to show strong export growth. Germany ran a $200 billion trade surplus and became the world's largest exporter in 2005; also that year, its GDP growth was only 1.1 percent and has averaged less than 1 percent per year since 2000. These contrasting experiences between the United States on the one hand and Germany and Japan on the other show that trade surpluses are neither necessary nor sufficient for strong economic growth.
- It had seemed that strong investment required strong domestic saving. It turned out that a higher level of domestic investment was

achieved despite a decline in domestic saving. The United States consumed more, invested more, and borrowed to cover the gap.

- US dominance in technology did not translate automatically into trade surpluses. Indeed the US began to run a trade deficit even in computers and semiconductors.
- The growth rate of real wages has been slower than the growth rate of productivity for 30 years. However, faster productivity growth did translate into better average wage performance. But the distribution of wages and family incomes has widened substantially.
- In the 1980s, Europe and Japan were seen as the main competitors, while the United States was apparently mired in slow growth. Few foresaw either the strength of the US economy or the explosive growth of China and the emergence of India.
- Increased globalization and a large and rising trade deficit have not caused weak employment growth or unemployment in the United States. Except in 2001–03, private-sector employment growth has been very strong and unemployment very low. There were large job losses in US manufacturing after 2000, but overall manufacturing employment in the United States has done better since 1992 than in Germany or Japan.

In sum, in the 1980s and early 1990s a whole constellation of economic indicators suggested problems and seemed linked to overall structural weaknesses in the economy. The lessons from what happened over the next 15 years reveal that some of these problems have been solved while others remain undiminished or have worsened. Problems associated with slow productivity growth, weak investment, and technological dynamism were resolved, while weak saving, rising health care costs, increasing international indebtedness, and wage and income inequality remain. Let us turn now to consider trade performance.

Reframing the Trade Competitiveness Debate

"Competitiveness" is a highly loaded term, and many economists avoid using it because it can be so easily misunderstood. In this chapter we will focus on a particular aspect of competitiveness, namely the impact of trade on living standards. In this, we follow the Bergsten CPC and the earlier Young Commission by arguing that trade competitiveness is not sought for its own sake but rather because it allows Americans to enjoy higher living standards. While in the short term trade is a concern for issues like employment, over the long run the key metric is the implications of trade performance for living standards. In a closed economy, the only way a

country can enjoy higher living standards is to increase production of goods and services. With the opportunity to trade, however, an open economy can raise its income in excess of that associated with its domestic production by exchanging domestically produced goods for imports. Everything else being equal, living standards will be higher the better the terms of this exchange—that is, the more imports a given quantity of exports can buy. Thus the terms of trade—the ratio of export prices to import prices—is a crucial link between trade performance and living standards.

By restricting our analysis to trade performance we ignore many of the issues discussed above that are part of a broader debate. For example, US living standards are primarily determined by the productivity of the US economy. Trade enters the picture because an increase in US productivity and the corresponding supply of US goods may actually lower the terms of trade: The United States would not receive the full benefit of its productivity increase because part of the benefit would be lost to the decline in its terms of trade.

Applying this perspective leads to conclusions that sometimes support but sometimes conflict with commonly held views of what changes in the global economy help and hurt the United States. It confirms that the country benefits when it can obtain higher prices for a given quantity of exports because, for example, of an increase in foreign demand due to changes in tastes, incomes, or a reduction in foreign barriers to US exports. But this perspective also implies that the United States benefits (its terms of trade improve) when it can obtain imports at lower prices, because of either improvements in foreign productivity or increases in foreign output. Most people do not think of relatively faster growth in other countries as beneficial to US competitiveness, but if it improves US terms of trade it certainly is. Likewise, people generally do not think of an improvement in the foreign ability to sell at lower prices as something that increases US competitiveness, but from the perspective of the benefits trade brings to US living standards, it certainly does.

This perspective also suggests the need to be careful in judging trade performance by the growth in exports or their share in world markets. US firms may export more because they reduced their prices or because of a weaker dollar. While these factors could mean more sales, they would not necessarily be associated with rising living standards or higher terms of trade.

We focus here on how changes in economic conditions in the United States or in the rest of the world affect US trade and on how changes in US trade in turn affect US living standards. We measure trade performance, an important component of overall competitiveness but not the whole story.

Trade Performance When Trade Is Not Balanced. If trade were always balanced and products standardized, the terms of trade would tell us what we want to know about the implications of trade performance for

living standards.[9] In fact much of the analysis of trade in the economics literature is based on the assumption of balanced trade. In practice, of course, trade is not balanced, and the general policy discussion of trade often focuses primarily on the US trade deficit rather than on the terms of trade. This is particularly the case when, as is currently true, the United States has a very large trade deficit. For many the deficit is a problem—they consider trade deficits bad and surpluses good. In fact the trade balance itself is often taken as the right measure of trade performance and countries that run large trade surpluses are considered highly competitive. Indeed, this view is so widely accepted that a shrinking of the surplus is said to reflect a "worsening" of the trade balance.

There is a disconnect, therefore, between the economists' view of trade performance and the popular view. Consider an example of the problems this disconnect creates. Suppose there were very high relative prices for US exports but the trade balance was in deficit. Would we say the United States was highly competitive because it has high terms of trade or uncompetitive because it has a trade deficit? If we look only at the terms of trade and fail to account for the deficit, we will miss the fact that by running deficits today, the United States will have more foreign debts or fewer foreign assets in the future. But by failing to take account of the high terms of trade, when we consider only the trade deficit we miss the fact that US living standards have been raised by the access to foreign goods at low prices.

This disconnect points to the need for a coherent framework for sorting out these issues. How can we take account of trade deficits and surpluses within the terms of trade framework, and how can we use this framework to appraise US trade performance?

A Model of Trade Performance with Unbalanced Trade. To motivate our subsequent empirical analysis, we will build the simplest model we can that captures the above elements. We will draw on the pure theory of international trade to show how this can be done in a simple but rigorously devised framework. We will make assumptions that will allow us to link the trade balance, the real exchange rate, and the terms of trade in a way that we believe can offer some important insights into US international trade performance.[10]

Assume there are two countries, the United States and the rest of the world (ROW). Each is fully employed and specialized in the production of a single (composite) good. Let us denote the US good as U and the ROW good as R. The quantities of U and R are U_0 and R_0 respectively. The

9. Trade could also affect living standards by increasing variety and changing competition, but we focus here on price.

10. Early demonstrations of the determination of the terms of trade in the pure theory of trade can be found in Marshall (1930) and Meade (1952).

price of U in dollars is (P_u) and the price of R in the foreign currency (say, euros) is P_r. If E is the dollar price of foreign exchange (i.e., \$/€), then EP_r is the dollar price of R and P_u/EP_r is the US terms of trade T. In this model changes in the real exchange rate move one for one with the terms of trade—indeed, if nominal prices were fixed they would move one for one with the nominal exchange rate.

A simple two-dimensional framework can be used to illustrate the model.[11] We will chart the terms of trade P_u/EP_r on the y-axis. On the x-axis we do something unusual: Instead of just measuring the quantity of one good, we measure the ratio of the quantity of U to the quantity of R. Since both economies are fully employed, the world relative supply of the two products, U_0/R_0, is a vertical line.

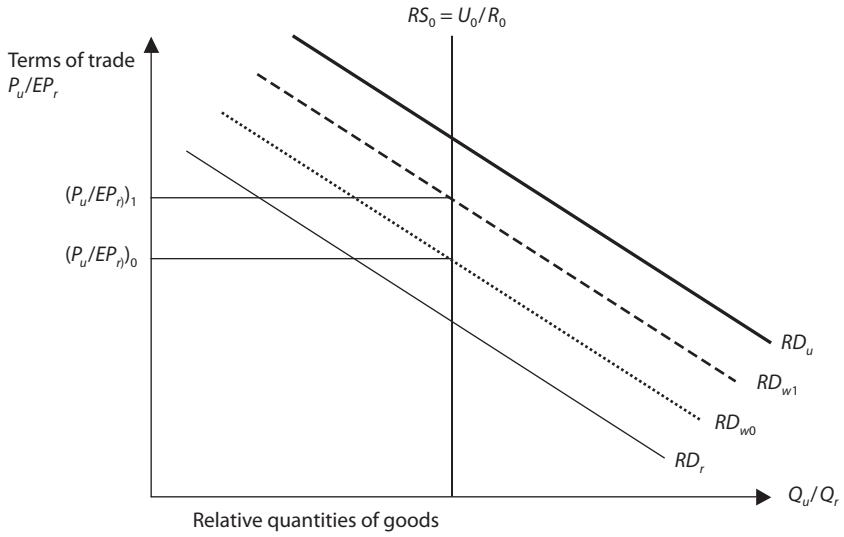
Since supplies are fixed, the terms of trade will depend on demand. To simplify, we assume that in both countries the demand curve for both products has unitary income elasticity. We can therefore draw relative demand curves for each country as downward sloping schedules that depend only on relative prices (or the terms of trade). We make an additional and crucial assumption that each country has a preference for its home good. This means that at any given world price, the relative demand for U is higher in the United States than in the rest of the world. These relationships are depicted in figure 10.1, where RD_u is the relative demand in the United States and RD_r is the relative demand for U goods in ROW. The initial world relative demand curve RD_{w0} will be a weighted average of the two curves and will lie between them. The weights reflect relative shares in spending on each product. The larger is US spending, the closer the world demand curve will be to the US relative demand curve, RD_u; the larger is ROW spending, the closer the world demand curve will be to RD_r. As the initial condition, assume there is balanced trade and an equilibrium at $(P_u/EP_r)_0$.

Transfers and a Trade Imbalance. We can now derive a relationship between trade balances and the terms of trade by thinking about the effect of transferring spending power from ROW to the United States. If ROW transfers spending power, its spending must decline relative to its income—in other words, ROW must have a trade surplus. On the other hand, if the United States now spends in excess of its income, it must have a trade deficit. So we can ask what happens to the terms of trade when the United States has a trade deficit?

We know that now more of world spending will originate in the United States. This means that the world relative demand curve will shift outward, shown in figure 10.1 as RD_{w1}, and the new equilibrium will entail a higher value for P_u/EP_r, which corresponds to an improvement in the

11. For a more complete explanation, see chapter 5 in Krugman and Obstfeld (2003).

Figure 10.1 Transfers and terms of trade

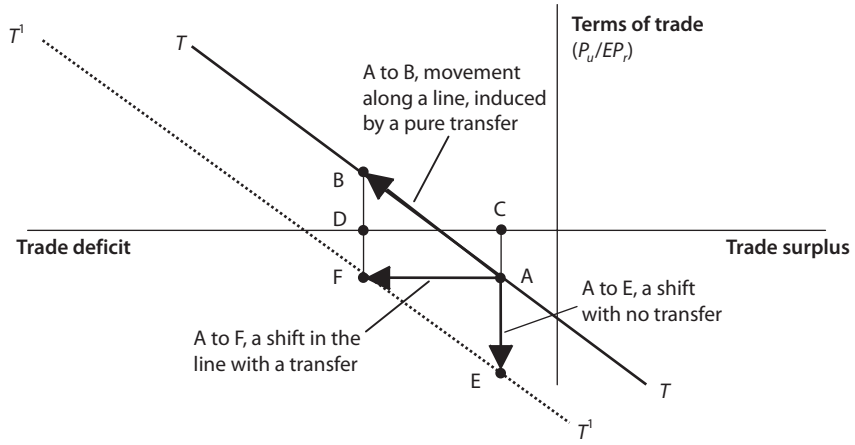


terms of trade for the United States or an appreciation in the real exchange rate to $(P_u/EP_r)_1$. We see then that a transfer to the United States induces a US trade deficit and an improvement in the terms of trade and real exchange rate appreciation. The larger the transfer from ROW, the greater the increase in the US terms of trade. Thus we can derive a schedule with a downward slope that relates the size of the US trade deficit and the US terms of trade. This is the terms-of-trade transfer (*TT*) schedule, shown in figure 10.2.

But can we be sure the *TT* schedule has a negative slope? In this model the crucial issue relates to the location of the relative demand curves. Transfers to a given country improve its terms of trade if at the margin that country has a higher marginal propensity to consume its own good than the other country's marginal propensity to consume that good. If the opposite were true in this example, then the transfer would shift world demand away from US goods and the terms of trade could actually worsen. If the countries had similar demand patterns, the terms of trade would be unaffected.[12]

12. There is a vast literature on the transfer problem as originally set forth in the famous debate between Keynes and Ohlin over the German transfer problem. A transfer could in principle move the terms of trade in either direction depending on the relative marginal propensities to consumers. The standard presumption, however, is that an inflow of capital (a transfer into a given country) will increase its terms of trade—the schedule slopes down to the right. Classic articles include Keynes (1929) and Ohlin (1929), Samuelson (1952, 1954), Johnson (1956), Jones (1970), and Bhagwati, Brecher, and Hatta (1983).

Figure 10.2 Shifts in the schedule as a measure of trade performance



Changes in Foreign Tastes or in Technology. This model can be adapted to show how other changes could affect the terms of trade. Suppose there were a shift in foreign tastes that increased preferences for the US good. In figure 10.1, such a shift is reflected in an upward (or rightward) shift in the RD_r line and a smaller upward shift in the RD_u line. In figure 10.2, the effect is an upward (or rightward) shift in the TT schedule. Suppose now the relative global supply of the foreign good were to increase, because of an increase in either foreign growth or foreign productivity. In figure 10.1, the vertical *RS* line shifts to the right and the RD_u schedule shifts to the left by less than the *RS* line (because ROW spends some of its increased income on *U*). The result is that the terms of trade at balanced trade, or at any relative trade imbalance, go up. The *TT* schedule in figure 10.2 would shift to the right in this case also. Both of these changes affect the US terms of trade positively, but of course not all such changes will have this effect. If there were a shift in tastes toward the foreign good, this would worsen the US terms of trade at any level of the trade imbalance (indeed in figure 10.2 the case we highlight is where *TT* shifts to the left to T^1T^1).

Assessing Trade Performance. On the basis of this discussion we would expect at any point in time that there would be a negatively sloped line or schedule tracking the relation between the terms of trade and the trade balance. Everything else being equal, we would expect to find stronger US terms of trade associated with a larger US trade deficit. This is the schedule *TT* we show in figure 10.2. A pure transfer to the United States would move the economy from A to B, increasing US terms of trade but also increasing the trade deficit (from C to D). On the other hand, if there were a decline in US trade performance, due for example to a decreased foreign

taste for US products, the entire schedule would move downward. With no capital transfer, this would lower the terms of trade, moving the economy to E. Alternatively, there might be a transfer that held the exchange rate constant but also increased the deficit, such as from A to F.

We propose therefore to measure trade performance (or trade competitiveness) by the position of the downward sloping *TT* schedule showing the relation between a transfer and the terms of trade. This allows us to separate the effects of a fundamental change in underlying trade performance associated with a shift of the *TT* schedule for a movement along a given *TT* schedule that is due to other forces affecting the trade balance (including changes in macroeconomic conditions in the United States and ROW).

The Trade Balance and the Terms of Trade in Practice

In this section we show that the relation between the trade balance and the US terms of trade identified in the simple model of the previous section has a counterpart in the actual data for the United States. We start by explaining how we formulate this relation and show how it has shifted over time. We then explore some of the ways in which other factors in the real economy, which were not taken into account in the simple model used above, could affect the findings. In particular, the US business cycle is seen by many as a major driver of the trade balance in the short run, whereas our model postulated a full employment framework.

As we move to empirical implementation, we make the assumption that there are composite US and foreign goods. This allows us to identify the real exchange rate with the terms of trade. The relative price of US goods and services in terms of foreign goods and services is expressed in a common currency.

The measure of the trade balance we use is the ratio of exports to imports. This is not perhaps as intuitive as the traditional measure of the trade balance, but it is very much in the same spirit and is consistent with the way economists have traditionally estimated import and export equations, as we show shortly. When the ratio of exports to imports is unity, trade is balanced. Deviations from balance show up as deviations from unity, so the ratio is an index of the trade balance.[13] The actual variable we plot is the percentage deviation of the ratio of exports to imports from trade balance. When our variable is zero, trade is balanced. When it is at,

13. One difference between our ratio trade balance and the conventional one is that the ratio improves any time exports grow faster than imports. In the dollar difference, US imports are currently so much larger than exports that the deficit can grow even if exports grow at a faster rate than imports.

say, –40 percent, then exports and imports differ by about 40 percent.[14] Appendix table 10A.1 shows the underlying data and indicates the steps leading from the dollar values of trade to the actual variable used in our relation.

The measure of the real exchange rate used is the Federal Reserve's broad real dollar index, although other exchange rate measures work pretty well also. We rebased the index to equal unity in 2000. We then use the natural log of this index as our exchange rate measure, again reflecting the trade equations, and we also multiply by 100. When the index equals zero, it is equal to its 2000 value; when it is, say, –20 percent, it is about 20 percent below its 2000 value.

We also know that there is a substantial lag in the impact of the exchange rate on trade. When the trade balance is measured in current dollars, there can actually be a worsening of the deficit for a period after a dollar decline, as the rise in the price of imports is greater than the effect of the dollar decline on real exports and imports. For our relation with real imports and exports we assume a distributed lag effect over three years. The dollar has 25 percent of its impact lagged one year, another 50 percent in the second year, and the final 25 percent in the third year.[15] Appendix table 10A.2 shows the underlying exchange rate data, again bringing out the steps along the way.

Figure 10.3 plots the resulting relationship, and it is clear that there is a powerful relation between the trade balance and the exchange rate. Other factors may indeed be at work, but it is hard to ignore this fundamental relationship. The simple model of the trade balance and the exchange rate postulated above appears to "work" in practice, showing a modest shift in the relationship after the early 1990s.

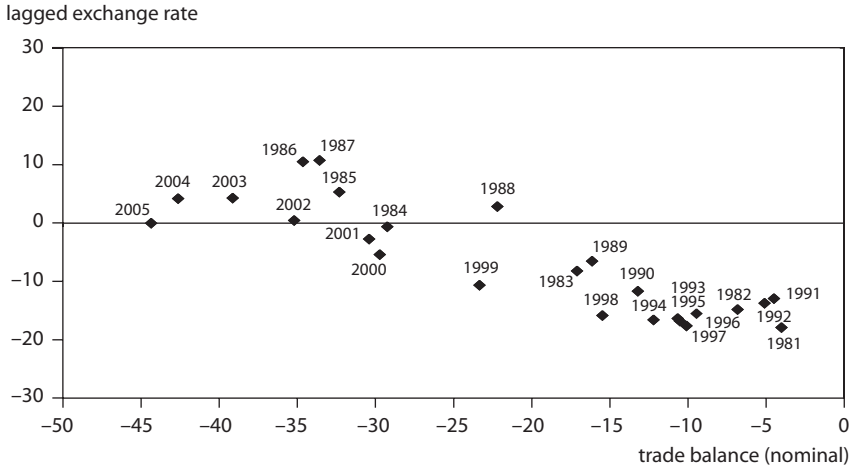
Parameters of the Estimated Relationship. We now fit a regression line to the data in figure 10.3 and find that the best fit comes from assuming a shift in the line in 1994. The regressions strongly suggest a one-time shift in the early 1990s rather than a gradual movement over the extended time period. Whether the shift took place in 1994 or a year later or earlier is not precisely estimated.

The results are illustrated in figure 10.4. It is assumed that the slope of the line remains the same in the two periods, and this assumption is supported by the data. The slope implies that a 10 percent reduction in the exchange rate will, after a lag of three years, result in a 12.5 percent reduction

14. We use the natural log of the ratio of exports to imports times 100. When this is equal to –40, it corresponds to exports being about 30 percent lower than imports or imports being about 50 percent higher than exports, averaging to about a 40 percent difference.

15. The exchange rate is calculated as a weighted geometric mean, and again the variable plotted is calculated as the natural log times 100.

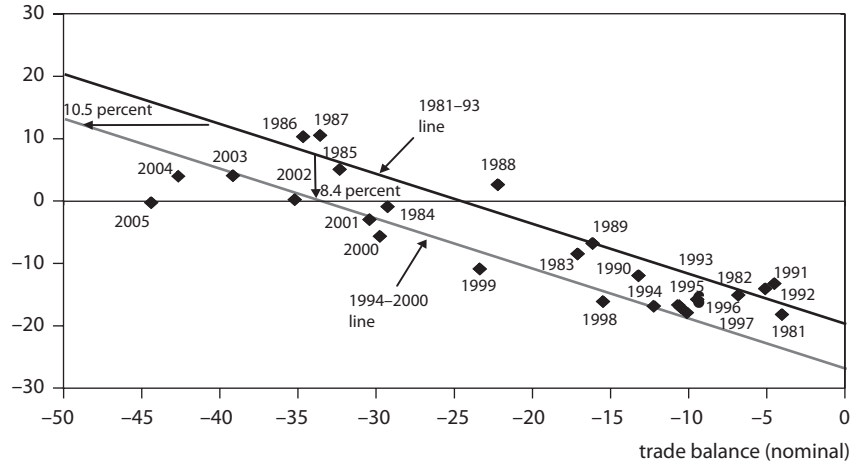
Figure 10.3 Nominal trade balance and lagged exchange rate, 1981–2005



Notes: Exchange rate is lagged one, two, and three years (weighted). Exports and imports in current dollars. Federal Reserve real broad exchange rate index. Data are from the Bureau of Economic Analysis, available at www.bea.gov.

Source: Authors' calculations.

Figure 10.4 US trade performance shifted, circa 1994



Notes: Exchange rate is lagged one, two, and three years (weighted). Exports and imports in current dollars. Federal Reserve real broad exchange rate index. Data are from the Bureau of Economic Analysis, available at www.bea.gov.

Source: Authors' calculations.

in the trade balance (the implied elasticity is 1.25). This figure is in line with mainstream estimates of the responsiveness of trade flows to exchange rate changes.[16]

We do not know what future shifts in the line may take place so we are not making predictions, but we note that the 1994–2005 line hits the vertical axis at –28 percent. Taken at face value, this says that if US and global economic conditions were to cause the dollar to settle 28 percent below its 2000 value, or 22 percent below its 2005 value, then the United States would eventually achieve trade balance.[17] This finding does not tell us, of course, what changes in global economic conditions would result in such a change in the dollar. A substantial change in the US saving-investment balance would necessarily accompany any major reduction in the trade deficit. In addition, a larger change in the exchange rate would likely be required to reach trade balance if the cost of imported oil were to remain at its current elevated level, a point further discussed below.

The Welfare Effect of the Change in Trade Performance. Our estimated relationship allows us to evaluate changes in the US terms of trade in the presence of unbalanced trade. As estimated in figure 10.4, the real dollar exchange rate consistent with any given level of the trade balance was lower in the 1994–2005 period by 8 percent, representing a decline in the US real exchange rate and a loss of welfare to the United States. With imports equal to about 15 percent of US incomes, 0.15×0.8 equals 1.2 percent of GDP.

There is an equivalent way to look at the implications of our estimated relationship. The increase of the trade deficit has been very large over the period shown here. The ratio of exports to imports moved from close to balance in 1981 and again in 1991 to a deficit of over 40 percent by 2005. About a quarter of this (10.5 percentage points) is associated with a shift in our line, that is to say a shift in the magnitude of the deficit for any given value of the exchange rate; the remaining three-quarters is the result of a movement in the exchange rate itself. Those who look at the trade deficit that has emerged in the past 15 years and say that the United States has lost its ability to compete are partly correct but mostly wrong: The bulk of the deficit is associated with a dollar value that is higher than in prior periods of balance.

16. For example, Cline (2005) suggested a responsiveness of 1.5, somewhat higher than our figure, but this was based on estimates of real export and import volumes. If we repeat our regression exercise for the ratio of constant dollar trade flows, where the elasticity estimates would be expected to be higher, we find a responsiveness of 1.4, very close indeed to Cline's value.

17. This conclusion is similar to the findings based on simulations using the Macroeconomic Advisers model reported in Baily (2003).

Exploring Robustness

The estimation of import and export equations has been a central task of trade economists over the years. Typically these equations are reduced form equations that do not look at the capital transfer side of the picture. They look at how exports and imports respond to prices or the exchange rate and they yield estimated coefficients that capture the elasticities of either exports or imports with respect to the variables in question (log-linear specifications are often used). Cline (2005) provides a clear summary of the important findings of recent estimated equations, which we represent as follows:

$$X = F(Z_1)RER^{-\alpha} \tag{1}$$

$$M = G(Z_2)RER^{\beta} \tag{2}$$

$$\text{thus } tb = h(Z) - (\alpha + \beta)RER \tag{3}$$

Equation (1) shows exports depending on a set of variables Z_1, representing cyclical and shift variables, such as the growth of productive capacity in the rest of the world. Exports then also depend on the real exchange rate, *RER,* with an elasticity of $-\alpha$. Equation (2) shows the similar relation for imports, which depend on cyclical and shift variables Z_2 and on the exchange rate, with an elasticity of β. Equation (3) takes the natural log of the ratio of exports to imports, *tb,* which then depends on the log of the ratio of F(.) to G(.), expressed as $h(Z)$. The ratio of exports to imports then depends on the exchange rate (*RER* the log of the index) with an elasticity of $-(\alpha + \beta)$. Equation (3) gives therefore a simple linear relation between the trade balance and the exchange rate. The reduced form trade equations yield the same relationship that came out of our model and that was pictured in figures 10.3 and 10.4. (In all four figures the trade balance is on the horizontal axis and the terms of trade/exchange rate on the vertical axis. The slope is the inverse of $-(\alpha + \beta)$.)

Cyclical Effects. Estimates of import and export equations typically include other variables as well as prices or the exchange rate—the Z variables in the above specification—and cyclical effects are often included. A traditional rule of thumb on such effects is that a 1 percent rise in the level of US GDP increases imports by 3 to 4 percent after a lag. A 1 percent rise in the level of foreign GDP increases US exports by about 1.5 percent. These are not large effects compared with the massive trade balance swings that have occurred since 1981.

We tried adding cyclical variables to the relation shown in figure 10.4, using US GDP relative to potential and the US unemployment rate as proxies for the US cycle. Then we used the deviation of rest of world GDP from its trend (a five-year centered moving average) and deviations of

ROW trade from its trend as proxies for the ROW cycle. These cyclical variables were not close to being statistically significant (t-values below unity) and were rather trivial in estimated impact or even with the wrong sign. Adding them made little difference to the responsiveness of trade to the exchange rate or the shift in the line in the early 1990s. As a further check, in figure 10.4 we flagged boom years and slump years as well as years with either strong or weak economic growth. We could see no systematic pattern between years with cyclical differences.

It is generally accepted that cyclical effects on US trade are present and we do not dispute that. What we do find is that over the period 1981–2005, the net results of such effects on the US trade balance (as defined here) is very small and does not alter the estimated relation between the trade balance and the exchange rate. We note that during that period US and ROW cycles often moved together, creating offsetting impacts on US trade.

Other Specifications. In addition to cyclical variables, most trade equation estimates include variables to capture structural shifts. Our approach to this question has been a simple one: We labeled each year's data in figure 10.4 and looked at how trade performance varied over the period. A specification with a single shift in the relation, taking place in the early 1990s, then fit the data very well indeed. This approach has the advantages of transparency as well as simplicity, but it does not accord with the usual econometric approaches.

We therefore applied three alternatives to the data. The first was proposed in the famous article of Houthakker and Magee (1969). An important conclusion from this work was that the increase of US exports stimulated by a 1 percent increase in the income of the rest of the world was smaller than the increase in US imports stimulated by a 1 percent increase in US income. This "Houthakker-Magee" effect implied that if US and world GDP were growing at the same rate, then the relation between the trade balance and the exchange rate would shift over time. In fact, the value of the dollar consistent with US trade balance would decline continuously over time unless US GDP growth were far slower than world growth.

Applying the Houthakker-Magee result to the trade balance in 1981–2005 did not work at all. Over this period, US and ROW growth were similar in magnitude. Given the estimated parameters from the Houthakker-Magee study, this would imply a very large shift in the trade performance line in figure 10.4—much, much larger than actually occurred. The fact that we observed a decline in trade performance over the period is consistent with the spirit of Houthakker and Magee, but the magnitude of the effect and the fact that it did not occur continuously are very different from what they found in an earlier period.

We then turned to another trade specification described by Cline (2005) as the Krugman-Gagnon specification. We constructed an adjusted trade balance to take account of global and US trend growth and the US busi-

ness cycle with the Krugman-Gagnon parameters given by Cline. This specification is symmetric, where the dollar is not forced to decline endlessly over time. It did not work well either, in terms of fitting past data or revealing the shifting relation between the exchange rate and the trade balance.

Lawrence (1990) estimated import and export equations and used a Houthakker-Magee framework that differed from the original in greatly attenuating the differences in elasticities for US and world growth. This model fit the data pretty well and is certainly a possible alternative to the one-time shift given in figure 10.4. His specification predicts that our line would move slowly down or to the left over time. The one-time shift fits the actual data better than the gradual shift, but we could not rule out the possibility that the pattern observed in this earlier work is still in effect today.

Earlier years. The real exchange rate of the dollar did not change very much from after World War II until 1971, so it is not possible to identify exchange rate effects before that year. But after 1971, the dollar moved substantially. We have added the years 1972 to 1980 to the regression analysis described earlier, looking at the entire period 1972–2005 and covering all three episodes of dollar change. With all the years included, the exchange rate continues to be a key determinant of the trade balance (t-statistic over 10), although adding the earlier years lowers the responsiveness slightly from 1.25 to 1.13.[18] The shift in the later years still occurs in 1994 and is estimated as a shift of 11.7 percentage points rather than 10.5. Overall, therefore, the results we gave earlier are not changed very much by the inclusion of the 1970s. These results may suggest that the impact of the exchange rate on trade has increased over time, perhaps because more companies are able to move their production locations to different sites around the world. More importantly, there appears to have been a dramatic shift in trade performance during the 1970s. Modeling fully what happened during this period is a topic for future research, but it appears there was an adverse shift in US trade performance in the 1970s that was 3.5 times as large as the one that occurred around 1994.

Conclusion. The US economy suffered a loss of trade performance after the 1990s, defined as a decline in the value of the dollar consistent with any given trade balance. We turn now to consider what may have caused this shift.

18. As there appears to be some cyclical movement of the trade balance in the 1970s, variables were included to capture the US cycle (the adult male unemployment rate) and the global cycle (the deviation of ROW GDP from a centered five-year moving average). Neither variable turns out to be significant.

Impact of Oil and Exports on Worsened Trade Performance

Note that the point for 2005 in figure 10.4 is well below the regression line. The trade deficit was worse than would have been predicted from the pattern of the post-1994 period. And based on current estimates of trade for this year, the 2006 value will be well below the regression line also. A very important reason for this is what has happened to the price of oil. The price index for imported petroleum products is set to 100 in 2000. It fell to 83 in 2001, helping the US trade position, and then rose to 185 in 2005. In addition, US demand for oil has risen over time, while domestic production has stagnated, so the quantity of oil imports has risen over time. The increased US dependence on imported oil and the rise in the world price of oil have worsened US trade performance over the past few years. If the price of oil stays as high as it is now, a larger decline in the value of the dollar will likely be necessary to bring about trade balance.[19]

How much difference has oil made? If the price of imported and exported oil had remained constant at 2000 levels, the trade balance in 2005 would have been –38.6 percent rather than the actual value shown in figure 10.4 of 43.8 percent.[20] This means that with constant oil prices the 2005 point in figure 10.4 would have been much closer to the line. In addition, apart from oil, the US trade balance (defined as the ratio of exports to imports) had started to improve in 2005. The decline in the value of the dollar since 2002 has begun to turn around the trade balance, a pattern that is masked by the rising cost of oil.

Despite its importance at times, however, oil is not the explanation for the shift in trade performance that occurred around 1994. To most people, the reason for the worsening of trade performance is obvious: The conventional wisdom is that the US has been flooded by imports, especially from China. As China and other Asian economies have developed, they have been importing advanced technology as multinationals have moved their operations and their jobs to Asia. We now seem to be buying everything overseas instead of making it here at home.

19. A full analysis of the consequences of a higher oil price on the sustainable exchange rate of the dollar is beyond the scope of this discussion. A higher price of oil in the long run increases the resources available to oil-exporting countries. They may save the funds or spend them; they may hold dollar assets or assets in other currencies; they may have a preference for US goods and services or of those of other countries.

20. The BEA reports total imports and nonoil imports but does not do the same for exports, except in the detailed commodity breakdown. Exports are very much smaller than imports but are not trivial. In making the above calculation we took account of the effect of price changes on both imports and exports.

As a diagnosis of the shift in US trade performance, the conventional wisdom is false. After controlling for changes in the price of oil, US imports grew more slowly from 1994 to 2005 than they did from 1984 to 1994. This is particularly the case after 2000, when US nominal imports grew more slowly than US nominal GDP (holding oil prices constant). The US was actually lowering its import intensity.[21]

Rather than imports, the reason for the deterioration in trade performance comes from weakness on the export side. Again controlling for oil prices, US exports grew at over 9 percent a year prior to 1994 and only 5.4 percent a year after that. The weakness of US exports was something we identified in an earlier paper (Baily and Lawrence 2004),[22] where we used an accounting decomposition to explore the reasons behind it. We were able to rule out a couple of possibilities. We found that the decline in US exports was not because of overall weakness in global trade but rather because of a decline in the share of US exports in total trade. Also, the US export weakness was not related either to the particular countries that the United States exports to or to the particular products exported. That left either the impact of the dollar (a prime suspect) or some other loss of competitiveness (also at work). We have updated that analysis, with very similar results. If US exports had kept their share of world trade from 2000 to 2004, exports would have increased 39 percent rather than the actual increase of 4.5 percent. Pinning down the reasons for weak US export growth is a priority for future research.

Conclusions and Directions for New Research

C. Fred Bergsten has highlighted the importance of competitiveness in his own work and that of the Institute, and the issue is increasingly in the minds of Americans today. Some of the competitiveness problems identified by Bergsten in the early 1990s have turned around, most notably sluggish productivity growth that persisted from 1973 through 1995. Since then, there has been much more rapid growth, at a level well above that of most other advanced economies. Other problems, however, have not improved or have worsened, in particular the low US national saving rate and the linked problem of the trade deficit.

With respect to the causes of the trade deficit, the message of this chapter is basically an optimistic one. Most of the increased deficit is because

21. It would be better to compare import growth to the growth of gross domestic purchases (the demand from US purchasers). As this measure grew faster than GDP, the above conclusion holds even more strongly.

22. See also Goldman Sachs (2006).

the value of the dollar is much higher than it was in 1981. US residents have chosen to borrow or to sell assets to foreign residents, who in turn have been willing to lend or to buy US assets on very favorable terms for the United States. The trade deficit has then effected this capital transfer. The normal case when such a transfer takes place is an increase in the terms of trade (the real exchange rate) of the country that is the recipient of the capital inflow. And this has been the case for the United States.

As well as the exchange rate effect, there is evidence of a decline in the terms of trade consistent with any given level of the trade balance—a loss of trade performance—and we explore some of the reasons this may have taken place. Oil is important and we look at the export side, exploring the reasons for weak exports since 2000. The United States has been losing its share of world markets. This is not because the US exports the wrong products or sells to the wrong countries. That leaves the continuing effect of the high dollar and a generally weakened ability of US producers to sell in world markets at a given exchange rate. Our analysis suggests it is more the former than the latter, but if the dollar keeps falling as it has recently, we will get a new test of the relative importance of these factors.

While any loss of trade performance is troubling, our analysis indicates that the impact of the change over the past 25 years has not been very large, accounting for 1.2 percent of GDP. We follow Bergsten's lead in identifying the changes in living standards as the key issue in evaluating competitiveness and apply this to the concept of trade performance. In addition, we find that the loss of trade performance since 1981 was small relative to the adjustment of the 1970s. At one time, the United States could have an exchange rate that made travel to Europe or Japan very cheap while still running trade surpluses. Those days are gone.

A host of topics could be addressed in further research. First, additional work could be done to expand our trade framework to different countries. Second, the reasons for the loss of trade performance need to be explored more fully. Third, can the distribution of the benefits be made more equitably? We believe that globalization and the expansion of trade and foreign investment have been a major source of productivity gains to the US economy, derived both from improved allocation of resources and from the competitive pressure that provides incentives for innovation and productivity increase. At the same time, workers at or below the median wage have not done well over the past 25 years. Most of the benefits of growth have gone to the top half or even the top 1 percent of the income distribution. Globalization certainly gets more of the blame for this than it deserves. But if political support for globalization is to be maintained, more of the benefits must be shared with more of the people. C. Fred Bergsten pointed out in the early 1990s that real average hourly earnings were lower then than in 1973. The same is still true today.

References

Bhagwati, Jagdish N., Richard A. Brecher, and Tatsuo Hatta. 1983. The Generalized Theory of Transfers and Welfare: Bilateral Transfers in a Multilateral World. *American Economic Review* 73, no. 4: 606–18.

Baily, Martin Neil. 2003. Persistent Dollar Swings and the US Economy. In *Dollar Overvaluation and the World Economy,* ed. C. Fred Bergsten and John Williamson. Washington: Institute for International Economics.

Baily, Martin Neil, and Robert Z. Lawrence. 2004. *What Happened to the Great US Job Machine? The Role of Trade and Electronic Offshoring.* Brookings Papers on Economic Activity 2. Washington: Brookings Institution.

Bradford, Scott C., Paul L. E. Grieco, and Gary Clyde Hufbauer. 2005. The Payoff to America from Global Integration. In *The United States and the World Economy*, C. Fred Bergsten and the Institute for International Economics. Washington: Institute for International Economics.

Cline, William R. 1997. *Trade and Income Distribution.* Washington: Institute for International Economics.

Cline, William R. 2005. *The United States as a Debtor Nation.* Washington: Institute for International Economics.

Competitiveness Policy Council. 1992. *Building A Competitive America.* First Annual Report to the President and Congress (March 1). Washington.

Competitiveness Policy Council. 1993. *A Competitiveness Strategy for America*. Second Annual Report to the President and Congress (March). Washington.

Competitiveness Policy Council. 1994. *Promoting Long-Term Prosperity.* Third Annual Report to the President and Congress (May). Washington.

Council of Economic Advisers. 2004. *Economic Report of the President.* Washington: US Government Printing Office.

Council of Economic Advisers. 2006. *Economic Report of the President.* Washington: US Government Printing Office.

Dertouzos, Michael L., Richard Lester, and Robert M. Solow. 1987. *Made in America: Regaining the Productive Edge.* Cambridge, MA: MIT Press.

Goldman Sachs, US Economic Research Group. 2006. The Case of the Missing Exports. *US Economics Analyst* 06/08 (February 24).

Houthakker, H. S., and Stephen Magee. 1969. Income and Price Elasticities in World Trade. *Review of Economics and Statistics* 51: 111–25.

Johnson, Harry G. 1956. The Transfer Problem and Exchange Stability. *Journal of Political Economy* 64, no. 3: 212–25.

Jones, Ronald. 1970. The Transfer Problem Revisited. *Economica* 184 (May): 178–84.

Keynes, John M. 1929. The German Transfer Problem. *Economic Journal* 39: 1–7.

Krugman, Paul. 1990. *The Age of Diminished Expectations.* Briefing Book. Washington: Washington Post Company.

Krugman, Paul R., and Maurice Obstfeld. 2003. *International Economics: Theory and Policy.* Boston: Addison-Wesley.

Lawrence, Robert Z. 1984. *Can America Compete?* Washington: Brookings Institution.

Lawrence, Robert Z. 1990. *US Current Account Adjustment: An Appraisal.* Brookings Papers on Economic Activity. Washington: Brookings Institution.

Lawrence, Robert Z. 1996. *Single World, Divided Nations?* Washington: Brookings Institution.

Lawrence, Robert Z., and Matthew Slaughter. 1993. *Trade and US Wages in the 1980s: Giant Sucking Sound or Small Hiccup?* Brookings Papers on Economic Activity: Microeconomics. Washington: Brookings Institution.

Marshall, Alfred. 1930. *Pure Theory (Foreign Trade—Domestic Values)*. London: London School of Economics and Political Science.

Meade, James Edward. 1952. *A Geometry of International Trade.* London: George Allen and Unwin.

Ohlin, Bertil. 1929. The Reparation Problem: A Discussion. *Economic Journal* 39, no. 154: 172–82.
Organization for Economic Cooperation and Development. 2005. *Compendium of Productivity Indicators*. Paris: Organization for Economic Cooperation and Development.
Porter, Michael E. 1990. *The Competitive Advantage of Nations.* New York: The Free Press.
President's Commission on Industrial Competitiveness. 1985. *Global Competition: The New Reality.* Washington: US Government Printing Office.
Samuelson, Paul A. 1952. The Transfer Problem and Transport Costs. *Economic Journal* 62, no. 246: 278–304.
Samuelson, Paul A. 1954. The Transfer Problem and Transport Costs, II: Analysis of Effects of Trade Impediments. *Economic Journal* 64, no. 254: 264–89.
Young, John A. 1986. Global Competition—The New Reality: Results of the President's Commission on Industrial Competitiveness. In *The Positive Sum Strategy,* ed. Ralph Landau and Nathan Rosenberg. Washington: National Academy Press.

Appendix 10A

Table 10A.1 US trade data, 1981–2005 (in billions of current dollars)

Year	Exports (1)	Imports (2)	Balance (3)	Ratio of exports to imports (4)	Trade balance in figures 10.3 and 10.4[a] (5)
1981	305.23	317.76	–12.53	0.95	–4
1982	283.21	303.19	–19.98	0.92	–7
1983	276.99	328.64	–51.65	0.82	–17
1984	302.38	405.11	–102.73	0.73	–29
1985	302.02	417.23	–115.21	0.70	–32
1986	320.54	453.27	–132.73	0.69	–35
1987	363.91	509.10	–145.19	0.70	–34
1988	444.10	554.49	–110.39	0.79	–22
1989	503.35	591.50	–88.15	0.84	–16
1990	552.36	630.35	–77.99	0.87	–13
1991	596.83	624.31	–27.47	0.95	–5
1992	635.31	668.56	–33.24	0.94	–5
1993	655.84	720.86	–65.03	0.90	–9
1994	720.89	814.49	–93.60	0.88	–12
1995	812.22	903.58	–91.37	0.89	–11
1996	868.56	964.81	–96.24	0.89	–11
1997	955.34	1,056.90	–101.57	0.90	–10
1998	955.94	1,115.88	–159.94	0.85	–15
1999	991.24	1,251.75	–260.51	0.79	–23
2000	1,096.28	1,475.75	–379.48	0.74	–30
2001	1,032.82	1,399.85	–367.04	0.74	–30
2002	1,005.92	1,430.33	–424.41	0.70	–35
2003	1,045.65	1,546.50	–500.85	0.67	–39
2004	1,173.75	1,797.75	–624.00	0.65	–43
2005	1,301.18	2,027.68	–726.50	0.64	–44

a. Natural log of column 4 times 100.

Source: Bureau of Economic Analysis, International Transactions Accounts and National Income and Product Accounts.

Table 10A.2 Dollar exchange rate data, 1978–2005

Year	Federal Reserve real broad dollar (1)	Lagged Fed index[a] (2)	Exchange rate in figures 10.3 and 10.4[b] (3)
1978	0.82		
1979	0.84		
1980	0.85		
1981	0.92	0.84	–18
1982	1.01	0.86	–15
1983	1.05	0.92	–8
1984	1.12	0.99	–1
1985	1.16	1.06	5
1986	1.02	1.11	11
1987	0.93	1.11	11
1988	0.87	1.03	3
1989	0.89	0.94	–7
1990	0.87	0.89	–12
1991	0.86	0.88	–13
1992	0.84	0.87	–14
1993	0.85	0.86	–15
1994	0.85	0.85	–17
1995	0.83	0.85	–16
1996	0.85	0.85	–17
1997	0.89	0.84	–18
1998	0.97	0.85	–16
1999	0.96	0.90	–11
2000	1.00	0.95	–5
2001	1.06	0.97	–3
2002	1.06	1.01	0
2003	1.00	1.04	4
2004	0.95	1.04	4
2005	0.94	1.00	0

a. 25 percent lagged one year, 50 percent lagged two years, and 25 percent lagged three years. Weighted geometric mean.
b. Natural log of column 2 times 100.

Source: Federal Reserve Board.