Economic Policy Institute

Briefing Paper

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# THE RECESSION, THE DOLLAR, AND THE TRADE DEFICIT

## CURRENTTRENDSANDFUTUREPROSPECTS

By Robert A. Blecker

**Introduction**

For the last year, most monthly trade reports have brought apparently good news: falling U.S. merchandise trade deficits. Although these monthly reports are subject to wide variations, the general trend of improvement seems confirmed by the quarterly international transactions (balance of payments) data. The preliminary merchandise trade deficit for the first quarter of 1991 was $18.4 billion, down from $27.7 billion in the fourth quarter of 1990,' and the second quarter deficit is expected to be even lower.' Even if the deficit remained at $18.4 billion per quarter for the rest of 1991, we would have an annual trade deficit of $73.6 billion, the lowest since 1983.

If these reductions in the trade deficit were due to improved competitiveness of U.S. products and more rapid export growth, it would be good news indeed for the American economy. Unfortunately, this is not the case. While exports have continued to grow, their growth has actually slowed down in the early 1990s compared to the late 1980s. This is because foreign income growth has also been slower in the early 1990s compared to the late 1980s.[3] The recent improvements in the trade deficit are mainly the result of two other, less favorable factors:

- The U.S. **economic recession** has cut American incomes and thus reduced U.S. demand for imports. The data analyzed in this paper show that this was the main cause of the lower trade deficit (the smaller excess

of imports over exports). While the recession has not yet ended definitively, there are growing signs that a recovery (however modest) may be underway. Unfortunately, a recovery of the economy will inevitably bring with it a recovery of import demand and thus a rise in the trade deficit, holding all other factors constant.

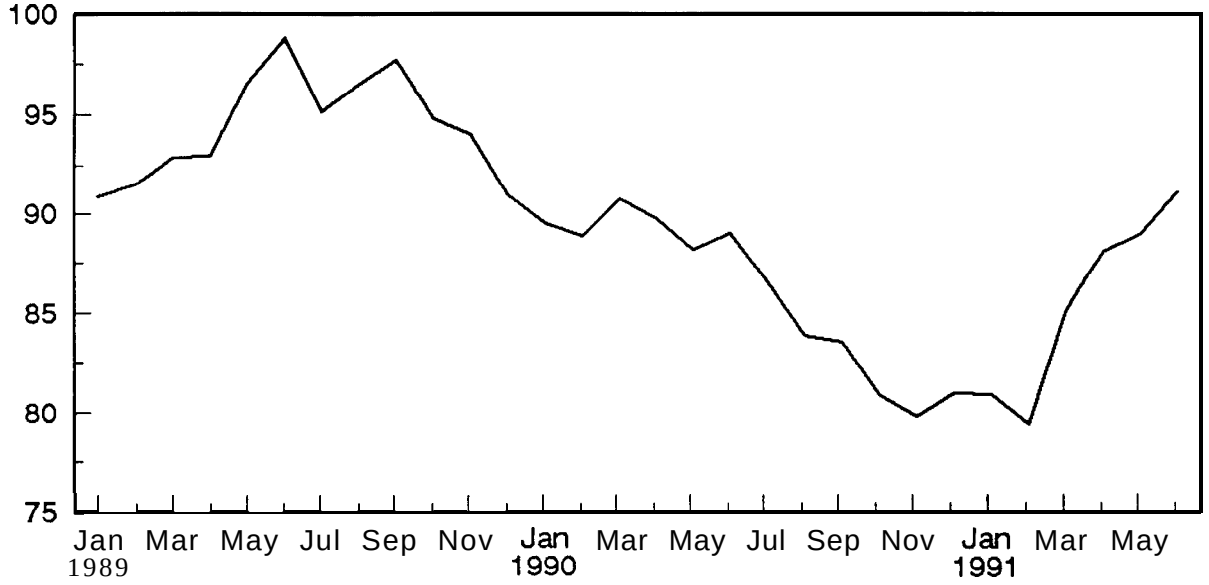
- The **fall in the value of the dollar** at the end of 1990 temporarily made US. products more competitive in price terms. As we are still trading goods based on contracts made when the dollar was low six to nine months ago, the positive effects of the low dollar are still appearing in current trade volumes. However, the dollar has already reversed its fall of last year, and by June 1991 was back to approximately its real (inflation-adjusted) value as of early 1990 (see Figure 1). Over the next two years, the higher dollar will eventually take its toll in reduced export growth and higher import growth.

Given these trends, the question is not whether the trade deficit will rise again, but exactly when and by how much. This will depend on the future trend of the dollar as well as the strength and timing of the recovery. This paper makes projections of the U.S. trade deficit for the end (fourth quarter) of 1992, based on three alternative scenarios for the dollar (with the same modest recovery assumed in all three scenarios). Assuming that the dollar remains at about its current real value (as of mid-1991),[4] the mid-range forecast, is that the trade deficit will rise to an annual rate of about $106 billion[5] by the fourth quarter of 1992, or just about the annual average for 1990. If the dollar rises further, the trade deficit could reach an annual rate of over $128 billion by the end of 1992. If the dollar falls back to about where it was in late 1990, the trade deficit could be held down to about $80 billion -- just above its current level.

The fact that only a falling dollar can prevent the trade deficit from rising in the future is evidence that there is still a declining trend in U.S. competitiveness, in spite of the dip in the trade deficit in recent months.

**Figure 1**
**Real Value of the U.S. Dollar,**
**Monthly, January 1989 to June 1991**

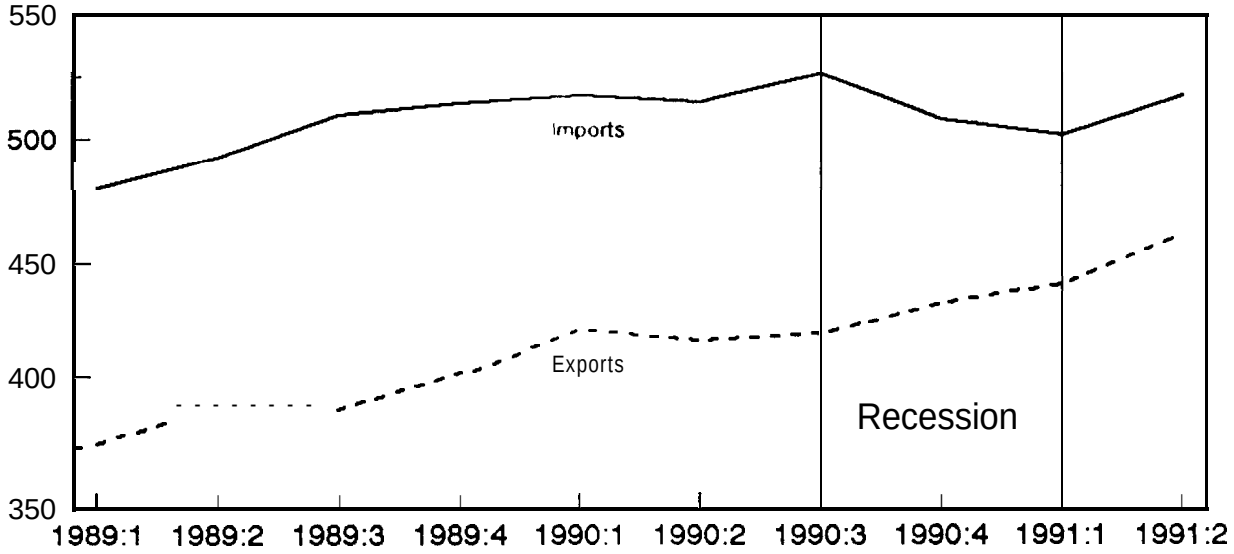
(Index, March 1973 = 100)




Source: Federal Reserve System, Board of Governors.
Note: Inflation-Adjusted using Consumer Price Indexes

**Figure 2**
**Real Merchandise Exports and Imports, Seasonally Adjusted**
**Quarterly Data at Annual Rates, 1989:1 to 1991:2**

Billions of 1982 Dollars




Source: U.S Department of Commerce, Bureau of Economic Analysis
Note: Figures for 1991:2 are author's estimates based on Census Bureau constant dollar monthly data.

## Recent Trends in U.S. Trade

Figure 2 shows the recent trends in U.S. merchandise exports and imports, measured in billions of constant (1982) dollars to approximate real trade volumes. As may be seen, there was a notable decrease in real U.S. imports in 1990:4 and 199 1: 1, after continuous increases in this variable for most of the preceding seven quarters. This decrease suggests that the U.S. recession which occurred in those two quarters is probably the main factor responsible for the recent narrowing of the U.S. trade gap. Note also that the export growth of 1990-91 is actually somewhat slower than it was in 1989, although exports appear to have picked up a bit in preliminary figures for 1991:2.[6] The fact that exports picked up a bit in the last few quarters probably results from the lagged effects of the falling dollar in 1990, while the uptick in imports in 1991:2 would appear to reflect the beginnings of a recovery from the U.S. recession.

It is important to note that the effects of changes in the value of the dollar operate on the trade balance with long and variable lags. In the first place, it takes longer for a change in the dollar to affect U.S. dollar import prices than to affect foreign currency prices of U.S. exports (see Krugman and Baldwin, 1987). Secondly, it takes time for import and export quantities to adjust to new relative prices as existing contracts (based on old exchange rates) expire and new contracts are negotiated. These lags give rise to the famous "J-curve" phenomenon, in which a depreciation of the home currency initially Worsens the trade balance (as it makes the existing quantity of imports more expensive) before eventually improving it (after the quantity of imports falls and the quantity of exports rises). In the first half of 1991, we seem to have witnessed an upside-down J-curve, as the rising dollar made imports cheaper, which initially *improved* the trade balance, before the quantity of imports was able to increase, and while the quantity of imports was further restrained by the lingering weakness of domestic demand due to the recession.

The rest of this paper will use an econometric model of U.S. trade to obtain more precise quantitative estimates of how the trade balance has been

affected by the recession, the fluctuations in the dollar, and other factors. In the next section, the model will be used to estimate how much the recession and falling dollar, along with other variables, contributed to the recent reduction in the trade deficit. In the following section, the same model will be used to obtain forecasts of the trade balance for 1992, based on reasonable assumptions about the U.S. recovery and foreign growth, depending on whether the dollar tends to rise, stay constant, or fall in the next year.

Table 1
Estimated Effects of the Recession, Falling Dollar, and Other Variables on Changes in the U.S. Merchandise Trade Balance, First Quarter 1991
(in billions of dollars at a seasonally adjusted annual rate)

| Effects of: | On the U.S. Trade Balance Measured in | |
|---|---|---|
| | Current Dollars | Constant (1982) Dollars |
| U.S. Recession | 27.2 | 26.8 |
| Fall in Dollar | 20.7 | 21.6 |
| Oil Price Shock | 2.2 | 3.4 |
| Subtotal for positive effects | 50.1 | 51.8 |
| Slower Foreign Growth | -12.1 | -13.0 |
| Structural Increase in Nonoil Imports | -6.9 | -6.7 |
| Subtotal for negative effects | -19.0 | -19.7 |
| Total Predicted Effect | 31.1 | 32.1 |
| Actual Change in Trade Balance (from first quarter 1990) | 29.4 | 35.1 |

Source: Author's calculations. See text for explanation. and the Technical Appendix for more details on the model used to estimate these effects.

**Causes of the Falling Trade Deficit**

Table 1 shows estimates of how much the US. recession, the falling dollar, and other variables contributed to the changes in the U.S. trade balance over the past year.' Note that the table shows changes in the trade *balance;* an increase (decrease) in the balance is equivalent to a reduction (increase) in the deficit. The analysis focuses on the first quarter of 1991, for which more complete and reliable data are available than for the second quarter. As a benchmark, the bottom row of the table shows the actual improvement in the quarterly trade balance (measured at a seasonally adjusted annual rate) between the first quarter of 1990 and the first quarter of 1991, which was $29.4 billion in current dollars and $35.1 billion in constant 1982 dollars.'The numbers in the table show how much of this improvement can be attributed to each of the causes of changes in the trade balance.

The factors which have caused the trade balance to improve are grouped into two categories, those which have had positive effects and those which have had negative effects. The first category includes the domestic recession, the fall in the dollar, and the oil price increase of late 1990. The second group includes the slowdown in foreign growth and the deteriorating trend in U.S. competitiveness (which shows up in the model as a structural trend increase in nonoil imports). The model which is used to derive these estimates yields results (predicted effects on the trade balance) in constant 1982 dollars, which are shown in the right-hand column. These figures have been converted to current (first quarter 1991) dollars in the center column.

For the effects of the recession, I compared the baseline forecast of the model for 1991: 1 with a counterfactual forecast assuming (very conservatively) that the U.S. economy had continued to grow at a 1 percent annual rate (in real terms) in 1990:4 and 199 1: 1. Measured in current prices (for 199 1: 1), the trade deficit would have been $27.2 billion higher (at a seasonally adjusted annual rate) if the U.S. economy had continued to grow at this very modest rate instead of falling into a recession. Measured in constant prices (of 1982). the improvement attributed to the recession is $26.8 billion at a seasonally

adjusted annual rate. Thus the lower import demand (estimated separately for oil and nonoil imports) due to the recession conservatively accounts for most of the reduction in the trade deficit over the past year.

In addition, the fall in the dollar is estimated to have raised the trade balance (lowered the deficit) by about $20.7 billion in current dollars, or $21.6 billion in constant 1982 dollars, at a seasonally adjusted annual rate. These effects were estimated by separate counterfactual simulations for exports and nonoil imports. For exports, I assumed as a counterfactual that the real value of the dollar (measured by the Federal Reserve's inflation-adjusted index for ten major currencies) did not fall after its peak in the third quarter of 1989.[9] For imports, I assumed as a counterfactual that the price of imports did not rise after the second quarter of 1990.[10]

In addition, another, smaller positive effect on the 1991: 1 trade balance resulted from the lagged effects of the temporary oil price shock due to the Persian Gulf crisis in late 1990. This price shock manifested itself in a higher price for imported oil (measured by the implicit deflator for imports of petroleum and petroleum products) mainly in the fourth quarter of last year. In early 1991, the real volume of oil imports was still held down by the lagged effects of the late 1990 price shock. Comparing this effect with a counterfactual scenario in which there was no such price shock, we estimate that the reduction in oil imports in 1991: 1 due to the lagged higher price (in 1990:4) was $3.4 billion in 1982 dollars, but only $2.2 billion in current dollars (since oil import prices in the first quarter of 1991 were back down to only about 64 percent of their 1982 level).

These three positive factors together overexplain the improvement in the trade balance. They imply that the trade balance should have improved by *more* than it actually did-by $50.1 billion in current dollars or $5 1.8 billion in constant 1982 dollars. If the trade balance actually improved by only about three-fifths of these amounts, it must be because *other, negative factors offset the improvement due to the three positive factors*.

There are two main negative factors which held down the total improvement. First, as noted earlier, foreign growth actually slowed down in 1990-91, and this tended to make exports rise more slowly than they did in 1987-89 (although the effect on U.S. exports was partially offset by the falling dollar in 1990). The effect of slower foreign growth is estimated using a counterfactual which assumes that the real gross domestic product (GDP) of the non-U.S. OECD countries" (measured at constant prices and purchasing power parity exchange rates of 1985, from OECD 1991b) continued to grow in 1990 and 199 1: 1 at the same rate as it had in 1987-89. This implies a worsening in the U.S. trade balance of $12.1 billion in current dollars or $13.0 billion in constant 1982 dollars for 199 1: 1, measured at a seasonally adjusted annual rate, due to the foreign growth slowdown. Thus we cannot count on export growth to lift us out of the current recession, at least not unless foreign countries start to grow faster than they have in the past year.

In addition, my research (in Blecker, 1991 and 1992) has confirmed that there is a declining tendency of U.S. competitiveness, particularly in import-competing industries. This trend shows up in the form of a structural rising trend of U.S. nonoil imports independent of the effects of U.S. income growth and relative prices of foreign and domestic goods (including exchange rate effects), and that this trend accelerated after 1985. This trend implies that the US. must either depreciate the dollar or else lower its growth rate (relative to other countries) in order to prevent rising trade deficits.

For 1985-1991, I estimate that the structural trend increase in real nonoil imports (in 1982 dollars) was about 0.8 percent per quarter, or about 3.2 percent per year. By comparing this effect with the counterfactual of no structural trend increase during the recession quarters (1990:4 and 1991: 1), I estimate that the structural trend accounts for a further worsening in the US. trade balance of $6.9 billion in current dollars, or $6.7 billion in 1982 dollars. The two negative effects together sum to $19.0 billion in current dollars or $19.7 billion in constant 1982 dollars.

Thus the total predicted effect from my model is a net improvement in the U.S. merchandise trade balance of $3 1.1 billion in current dollars, or $32.1 billion in constant 1982 dollars, figures which are close to the actual improvement in both figures over the preceding year. This confirms the view that most of the recent improvement in the trade deficit can be explained by weak domestic demand (the recession) and the temporary fall in the dollar which has already been reversed. In fact, the trade deficit would have improved even more if it had not been for the increasing weakness of foreign demand growth in the past eighteen months, as well as the continuing structural deterioration in U.S. competitiveness relative to imports. Thus the *falling trade* deficits should ***not*** be interpreted as *signalling* either revived competitiveness or *an export* boom.

## The Projections

The trade balance projections in this section are based on the same model of U.S. trade that was used for the analysis in the previous section and Table 1. To avoid any possible bias, I used independent forecasts of the U.S. economic recovery and of foreign economic growth for the next year and a half. The forecast for the U.S. recovery is taken from the July 8, 1991, Merrill Lynch Economic Forecast for real gross national product (GNP) at a seasonally adjusted annual rate (Merrill Lynch, 1991, p. 6). The forecast for foreign growth is taken from the July 199 1 issue of the *OECD* Economic Outlook (OECD, 1991a, p. 107). These two series of growth rates are shown in Table 2.

Three sets of projections are made, based on alternative assumptions about how the value of the dollar changes in the next year. In all three scenarios, the price of oil imports is assumed to remain constant at its 199 1: 1 level through the end of 1992. For exports and nonoil imports, prices are assumed to behave differently depending on whether the dollar rises to a higher level, stays at about its current level, or falls back to about where it was at the end of 1990. These are referred to as the high *dollar,* medium dollar, and low *dollar* scenarios, respectively. Since, as discussed earlier, import and

export prices do not respond symmetrically to changes in the value of the dollar, different standards were used for these two variables.

Table 2
Growth Rate Forecasts Used for U.S. Merchandise Trade Projections, 1991:2 to 1992:4

| Quarter | Growth Rate (Seasonally Adjusted Annual Rates, in Percent) | |
|---|---|---|
| | U.S. | Foreign |
| 1991:2 | -0.4 | 1.6 |
| 1991:3 | 1.5 | 2.2 |
| 1991:4 | 4.6 | 2.2 |
| 1992: 1 | 4.5 | 2.8 |
| 1992:2 | 3.1 | 2.8 |
| 1992:3 | 2.5 | 3.1 |
| 1992:4 | 2.5 | 3.1 |

Sources: The U.S. growth rate is the forecast for real GNP from Merrill Lynch (1991); the growth rate for U.S. demand in 1992:4 was assumed to be the same as for 1992:3. The foreign growth rate is the forecast for total OECD less the United States from OECD (1991a, p. 107) on a half-yearly basis.

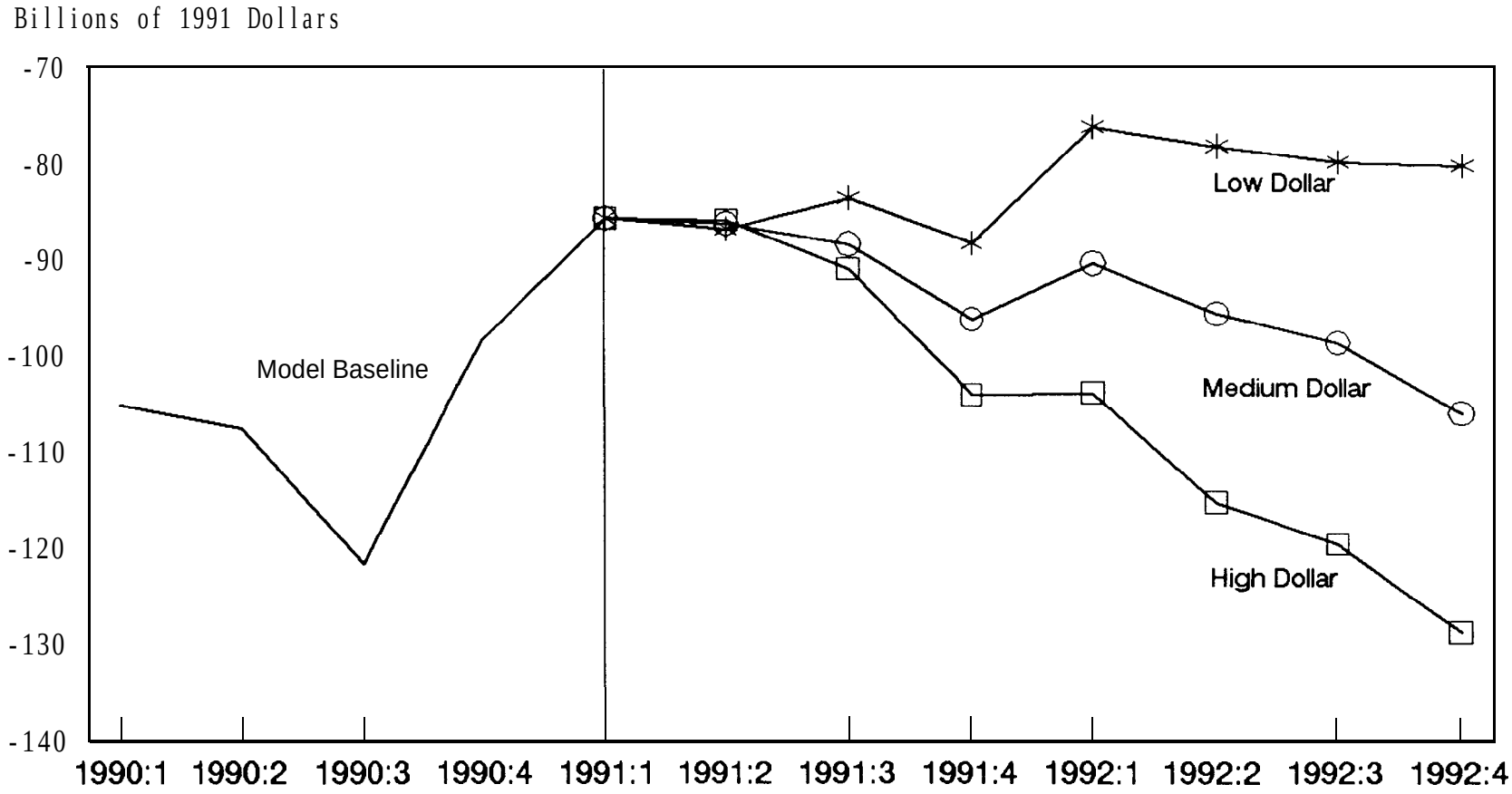
In the ***medium dollar*** scenario for imports, the relative price of U.S. nonoil imports is assumed to remain at its 1991: 1 level through the end of 1992. The 199 1: 1 level is used as a benchmark since it is close to the level in 1990: 1, before the dollar's farthest fall (see Figure 1). In the high ***dollar*** scenario, the relative price of nonoil imports is assumed to *fall* by 3.5 percent from 1991: 1 to 1992: 1 and to remain constant thereafter. This brings the relative price of imports back to the lowest level since mid- 1986. In the ***low dollar*** scenario, the relative price of nonoil imports is assumed to *rise* by 3.5 percent by 1992: 1 and then remain constant through 1992:4. This takes import prices back to where they were, relative to U.S. prices, at their most recent peak in 1988:2.

On the *export* side, the medium *dollar* scenario assumes that the relative price of U.S. exports returns to about its 1990: 1 level by 1991:3 and remains constant thereafter. This requires a 4 percent increase in the export price index from 1991:2 to 1991:3 to bring it back to its 1990:1 level. In the high dollar scenario, the relative price of exports then rises by another 10 percent from 1991:3 to 1992: 1 and remains constant thereafter.[12] The rise in the relative export price takes it back to about its recent peak level of 1988-89. In the low dollar scenario, the relative price of exports *falls* gradually by about 6 percent between 1991:2 to 1992:4, to a level just above its 1990:4 trough (which was a historical low in the post-1973 era of floating exchange rates). Although these scenarios for export prices may seem asymmetrical, they reflect past indicators of how export prices behave when the dollar is high or low.

The forecasts of the model based on these three alternative scenarios for the import and export prices are graphed in Figure 3. In the ***medium dollar*** forecast, the trade deficit rises back to an annual rate of about $106 billion (measured at the prices of 199 1: 1) by the fourth quarter of 1992—which is very close to the actual annual deficit for 1990 ($105 billion on a national income account basis, or $108 billion on an international transactions basis, at current prices). In the *high dollar* forecast, the trade deficit soars to about $128 billion by the fourth quarter of 1992, or about what it was in 1988 (measured at current prices). Finally, in the low *dollar* forecast, the trade deficit rises to only about $80 billion by the fourth quarter of 1992 (at an annual rate), from $74 billion in the first quarter of 1991, in spite of the presumed recovery of the U.S. economy.

The bottom line is that, unless the dollar suddenly reverses its current rising course and *falls* again, virtually *all* the gains in the trade deficit of the *last half* **year** will be wiped out by the end of next year as the US. economy recovers from the recession. The need for the dollar to fall further in order to prevent rapidly growing trade deficits is symptomatic of the underlying structural deterioration of U.S. competitiveness which is documented in two

# Figure 3
# Projected US. Merchandise Trade Balances, Quarterly, 1990-92




Source: Author's calculations.

Notes: Measured at price levels of first quarter 1991.

forthcoming studies by this author (Blecker, 1991 and 1992). Of course, a more robust domestic recovery or a more serious foreign growth slowdown would make the US. trade deficit grow wider, for any given value of the dollar, while a slower domestic recovery or more robust foreign growth would make the trade deficit narrow further.

**Conclusions**

The analysis and forecasts in this report show that there has been no *permanent improvement* in the U.S. trade position, only a temporary *reduction* in the trade deficit due to the combination of a recession in the domestic economy and a temporary fall in the dollar's value. There is no support for the hope that an export-led boom will pull us rapidly out of our recession, at least not if current trends in foreign growth and exchange rates hold up. Nor is there support for the view that recent declines in the trade deficit are harbingers of permanent improvement in the US. trade position. On the contrary, the handwriting is already on the wall forewarning rising trade deficits later this year or next year at the latest.

The policy implications of this analysis would seem to be three:

- We cannot afford to be indifferent about the rising value of the dollar. While one would not want to see the dollar collapse, under present circumstances the *dollar* needs *to fall* again in order to prevent rising trade deficits, and this in turn requires a low interest rate policy by the Fed as well as coordination of monetary policies with other nations (especially Germany and Japan). *The degree to* which *the dollar must fall can be* mitigated, *however, by progress in the following two areas.*
- We cannot afford to be indifferent about the slowdown in *foreign economic* growth. Europe and Japan should be encouraged to return to the rapid growth they achieved in the late 1980s, while developing countries with trade surpluses (including both East Asian NICs and Latin American debtors) need to revive their domestic economies. Global

efforts to hold down interest rates and to replace speculative booms (and busts) with productive investments need to be encouraged.

- Finally, we cannot continue to neglect the competitiveness of American domestic industry. While US. exports have done relatively well in the last five years, U.S. import-competing sectors continue to be suffer structural decline. Appropriate trade and industrial policies, consistent with needed restructuring and upgrading of the country's industrial base, would seem to be in order.[13]

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## Endnotes

1. These data are from the US. Department of Commerce, Bureau of Economic Analysis (BEA), International Transactions Accounts, as published in Economic Indicators (U.S. Congress, June 1991).

2. Second quarter 1991 international transactions data are scheduled for release by the Commerce Department, Bureau of Economic Analysis (BEA), on August 27, 1991. Monthly trade figures from the Census Bureau for April-June, 1991, as well as advance quarterly data in the BEA's national income and product accounts, indicate that the trade deficit will fall further in the second quarter.

3. Quarterly U.S. merchandise exports in constant 1982 dollars (on a national income account basis) grew at a seasonally adjusted average annual rate of 17 percent from 1987 to 1989, but only at an 8 percent rate from 1990 through the second quarter of 1991. According to the data and projections in the July 199 1 ***Economic*** Outlook of the Organisation for Economic Co-operation and Development (OECD, 1991a, p. 107), the growth of non-US. OECD countries declined to seasonally adjusted annual rates of 2.1 percent in the second half of 1990 and 1.6 percent in the first half of 1991, after averaging about 4 percent from 1988 through the first half of 1990.

4. More technically, the forecasts are based on assumptions about the relative prices of imports and exports, which in turn depend on the value of the dollar as well as other factors (domestic and foreign inflation).

5. Trade projections for the fourth quarter of 1992 are expressed in terms of the price level of the first quarter of 199 1 unless otherwise specified.

6. Data for 1991:2 were estimated by the author based on seasonally adjusted monthly trade data in constant 1987 dollars from the Census Bureau. The percentage increases in exports and imports in these data from the January-March period to the April-June period were applied to the final 1991: 1 figures in constant 1982 dollars from the BEA's national income and product accounts.

7. The estimated effects shown in Table 1 are based on simulations of a model of U.S. import and export trade which is presented in the Technical Appendix. The model includes separate equations for merchandise exports, nonpetroleum merchandise imports, and petroleum imports.

8. The constant 1982 dollar trade data for this modeling exercise are taken from the BEA's national income and product accounts.

9. In the export equation in the model, this real exchange rate index is adjusted by the ratio of the implicit deflator for merchandise exports to the consumer price index (the Fed's measure of inflation) in order to better approximate the price of U.S. exports in foreign markets.

10. See the Technical Appendix for how the price of imports (relative to domestic goods) was measured. Note that the import price trough lags behind the dollar's 1989 peak by three quarters, while the export price peak coincides with the dollar's peak; this different timing of the peaks and troughs of export and import prices, respectively, conforms to the difference in their responses to changes in the value of the dollar discussed earlier.

11. The OECD (defined in note 3, above) consists of all the industrialized nations of western Europe plus Japan, Australia, New Zealand, Canada, the U.S., and Turkey.

**12.** The wider variation assumed in the relative price of exports compared with nonoil imports is consistent with the past behavior of these two variables in response to fluctuations in the value of the dollar.

13. For further analysis of these issues see Blecker (1992).

## Technical Appendix

This Appendix summarizes the econometric model used both for analyzing the causes of the improved U.S. trade deficit in early 1991 and for projecting the future trends in the trade deficit up to the end of 1992. The model consists of three equations, one for nonpetroleum merchandise imports, one for petroleum imports, and one for all merchandise exports. Earlier versions of the model for nonpetroleum imports and for nonagricultural exports only were developed by the author in Blecker (1991, 1992). However, the precise estimates used here were all newly prepared for this paper.

### Nonoil Merchandise Imports

U.S. demand for imports of goods other than oil is assumed to depend on two main factors: the relative price of imports compared with competing domestic goods, and the total level of domestic expenditures in the U.S. economy (i.e., total spending on both domestic and foreign goods and services). In addition, there is a statistically significant upward time trend in U.S. nonoil import demand which accelerated after the dollar peaked in early 1985. The upward time trend reflects a secular deterioration in the competitiveness of U.S. industries relative to foreign producers, while the acceleration in this trend reflects the persistent effects of the dollar overvaluation of the early 1980s (what economists have come to call "hysteresis").

The nonoil import equation was estimated using quarterly data over the period 1977: 1 to 1991: 1. The sample period starts in 1977: 1 for consistency with the export equation, which is described below. The volume of nonoil imports is measured by the national income account series for nonpetroleum merchandise imports in billions of constant 1982 dollars, from the Commerce Department, Bureau of Economic Analysis (BEA). The price of nonoil imports is measured by the fixed weight price index for nonpetroleum merchandise imports, which is preferred to the implicit deflator due to problems in the measurement of computer prices which cause a more severe downward bias in the deflator than in the fixed weight index. Essentially, the implicit deflator gives an increasing weight to computer imports which have fallen rapidly in price since 1982, while the fixed weight index gives them a constant weight. For the

domestic price of nonoil import-competing goods I use the Bureau of Labor Statistics (BLS) producer price index (PPI) for nonfuel industrial commodities.

Domestic expenditures are measured by the national income account series for gross domestic purchases in billions of constant 1982 dollars. This is the sum of real consumption expenditures, gross domestic investment, and government purchases. All the variables are measured in natural logarithms ("logs") so that the estimated coefficients can be interpreted as price and income elasticities. The equation for nonoil imports, estimated by ordinary least squares (OLS) is:

$$\begin{aligned}(1)\quad \text{Nonoil Imports} = {} & -5.60 \underset{(-2.71)}{} - \underset{(-6.25)}{1.23}\ (\text{Import Price/Domestic Price}) \\ & + \underset{(12.26)}{2.05}\ \text{Domestic Expenditures} + \underset{(3.34)}{0.003}\ \text{Time} \\ & - \underset{(-3.41)}{0.23}\ \text{Dummy} + \underset{(2.53)}{0.005}\ (\text{Dummy*Time})\end{aligned}$$

$$R^2 = .997, \quad \text{Durbin-Watson} = 1.983,$$

where the dummy variable equals 1 in 1985:2 to 199 1: 1 and 0 otherwise, all variables except the dummy and time are measured in natural logs, and the numbers in parentheses are t-statistics. Note that the Durbin-Watson statistic which is close to 2.0 indicates that there is no serial correlation of the residuals, and the $R^2$ close to 1.0 indicates an excellent statistical fit. Also. note that the price elasticity of -1.23 is the sum of the coefficients on the current relative price and eight lagged values of the relative price: the t-statistic for this coefficient is for the null hypothesis that this sum equals 0. All variables in the model are statistically significant at the 5 percent level or better. The quarterly time trend of 0 003 represents an annual rate of 1.2 percent for the trend increase in nonoil imports before 19852. The coefficient of 0.005 on the interactive term (dummy times time, or slope dummy for time) represents the increase in this quarterly rate *after* 1985:2. Thus the total trend rate of increase is a quarterly 0.008 for 1985:2 to 1991:1, or an annual rate of 3.2 percent.

Experiments showed that when this equation was estimated over the period 1977: 1 to 1990:3 only, it forecast very well out-of-sample for the recession quarters 1990:4 and 1991: 1— exactly when the trade deficit fell the most. However, all the estimated effects of the variables that caused changes in the trade deficit in Table 1 were based on in-sample counterfactual forecasts using (1).

Oil Imports

Oil imports are harder to predict given their tremendous volatility in response to changing world market conditions, including expectations about future political events and price trends. Nevertheless, it was possible to develop an equation for oil import demand which fits the data reasonably well. Oil imports are measured by the national income account series for imports of petroleum and petroleum products in billions of constant 1982 dollars. The price of oil imports is measured by the implicit price deflator for imports of petroleum and petroleum products. Experiments showed that the equation fit the data better when this price measure was used alone, not relative to any domestic price index or deflator (e.g., the overall GNP deflator). The only other variable in the oil import equation is domestic expenditures, measured the same as in the nonoil import equation (see above).

Oil imports depend on oil import prices in a complex fashion. Long lags of oil import prices affect oil imports under long-term contracts, while more recent prices affect oil purchased on the spot market. Generally, higher oil prices depress oil import demand, but fear of further increases in oil prices can sometimes stimulate panic buying or hoarding. To capture these complex elements, I used a specification with the current and one-quarter lagged prices plus the average oil price for the preceding 7 quarters and another average oil prices for the two years (8 quarters) before that. Thus oil price trends of up to four years are allowed to influence current oil imports. The resulting equation, estimated by OLS over the sample period 1977: 1 to 199 1: 1, with all variables measured in natural logs, is:

(2) Oil Imports = 4.19 - 0.07 Current Price - 0.10 Lagged Price
(3.76) (-0.87) (-1.02)

- 0.27 Average Price Lagged 2 to 8 Quarters
(-3.40)

- 0.22 Average Price Lagged 9 to 16 Quarters
(-3.80)

+ 0.36 Domestic Expenditures
(2.55)

$R^2$ = .881, Durbin-Watson = 1.931.

Again, the Durbin-Watson statistic is close to 2.0 and indicates the absence of serially correlated residuals, although the $R^2$ indicates that only 88 percent of the

variance in this highly volatile series could be explained by the included variables. Note that the current and (one-quarter) lagged price are not significant at the 5 percent level, but do have the right (negative) sign. These prices were included since experiments showed that they helped the predictive powers of the equation, especially in out-of-sample forecasts (done for 1990:4 and 199 1: 1 with the model estimated over 1977:1 to 1990:3).

Merchandise Exports

Merchandise exports depend on the relative prices of U.S. exports and foreign goods plus the incomes of foreign countries which buy U.S. products. Since it is harder to construct precise measures of these variables for the entire rest of the world (and economists do not all agree on what are the "right" measures, even in principle), the exact specification used was determined by considerations of data availability and tests of what measures would lead to the best fits of the model.

Merchandise exports in billions of constant 1982 dollars were taken from the BEA's national income and product accounts. It was decided to include agricultural as well as nonagricultural exports (even though the latter are often treated separately) as the model fit reasonably well for all merchandise exports, and little predictive power was to be gained by separating them.

The nominal dollar price of U.S. exports was measured by the implicit deflator for merchandise exports from the national income accounts. The nominal dollar price was then converted to foreign prices using the Federal Reserve's index of the real value of the dollar, which is a trade-weighted average of the dollar's exchange rate with 10 major currencies adjusted by consumer price indexes (U.S. and foreign). Since this is a real index, the U.S. export price (implicit deflator) was first divided by the U.S. consumer price index (to get a real price of exports) before being multiplied by the real dollar index. The result is an index of U.S. export prices relative to foreign consumer prices. While it would be preferable to have a measure of U.S. export prices relative to foreign prices of tradeable goods (e.g., a wholesale or producer price index), such a measure was not readily available on a quarterly basis, and in any case the model fits reasonably well with foreign consumer prices.

Foreign incomes were measured by the Organisation for Economic Co-operation and Development (OECD) series for total non-U.S. real gross domestic product (GDP),

calculated at constant 1985 prices and 1985 purchasing power exchange rates, from OECD (199 lb). The fact that this series starts in 1977: 1 determined the beginning of the sample period for estimating all three equations on a consistent basis. The OECD includes mainly other industrialized countries, along with Turkey. Since reliable quarterly data for most developing countries are not available, industrial country income (excluding the U.S.) is a widely used proxy for quarterly foreign income. In any case, the industrialized countries generate roughly 60 percent of world income, and their growth is highly correlated with developing country growth. GDP is used instead of foreign expenditures mainly for convenience, but there is little difference between these two series when all foreign countries (even just the industrialized nations) are aggregated together.

Since tests reported in Blecker (1992 and 199 1) show that there is no statistically reliable evidence of a time trend in U.S. exports, no such time trend was included here. The equation for merchandise exports, estimated by the Cochran-Orcutt AR1 procedure over 1977: 1 to 1991: 1, with all variables measured in logs, is:

(3) Exports = -2.07 - 0.73 (Export_ Price/Foreign Price)
(-1.17) (-8.26)

+ 1.26 Foreign GDP, Rho = 0.74
(7.52) (7.33)

$R^2$ = .993, Durbin-Watson = *1.709.*

As in the nonoil import equation, the coefficient on the relative price term is the sum for lags 0 to 8, and the t-statistic is computed for this sum. Note that the model fits well ($R^2$ is over 99 percent), although the Durbin-Watson statistic is a bit low even with the AR1 correction (indicating perhaps that there is more than first-order serial correlation in the residuals).

## Analytical Methods

The estimated effects of the variables in Table 1 on the U.S. trade balance were calculated by comparing the fitted values of these equations for 1991: 1 (the model baseline) with various in-sample counterfactual "forecasts." For example, the no recession counterfactual was conducted by assuming that domestic expenditures grew at a 1 percent annual rate in 1990:4 and 199 1: 1 in equations (1) and (2), for nonoil

and oil imports respectively. The assumptions for the other counterfactual forecasts are described in the text and will not be repeated here.

The projections shown in Figure 3 for 1991:2 to 1992:4 were done by forecasting out-of-sample. The growth rates shown in Table 2 were used to project U.S. domestic expenditures and foreign GDP, while the relative price terms were assumed to change as described in the text for the three scenarios (low, medium, and high dollar). Since the forecasts were for real imports and exports in constant 1982 dollars, the forecast values were multiplied by the implicit deflators (for nonpetroleum imports, petroleum imports, and merchandise exports separately) for 199 1: **1** to convert them to current prices.

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