ECONOMIC COMMENTARY

Two Neglected Implications of Dollar Depreciation

by Gerald H. Anderson

Federal Reserve Bank of Cleveland

October 15, 1987

The foreign-exchange value of the dol-
lar has been depreciating for more than two decades. Various attempts to gauge the
effect of this depreciation have focused on
traditional issues, such as its effects on
the overall trade balance, economic
growth, import prices, inflation, and the
trade deficit. Some other important
implications, however, have been
overlooked. Because dollar depreciation
imposes changes in the prices of imports
and exports, and because it reduces
the resources the United States would
have to pay for only a smaller amount
of foreign goods, a given physical
amount of imports would increase. Only
if the prices of U.S. exports also increased
would there be greater export earnings
from a given volume of exports to help
pay the higher import bill, would some
of this higher cost be offset. There has
been practically no public discussion of
the import cost increase, nor attempts
to measure it, despite the fact that the
cost to the United States is poten-
tially large. Even research on the trade
deficit is also costly, however, in
the sense that it implies continued
growth of U.S. net indebtedness.

Gerald H. Anderson is an economic advisor at the Federal Reserve Bank of Cleveland. The author would like to thank Josiah Cheadle, Martin Soder- man, and E.J. Stevens for helpful comments. The views stated herein are those of the author and not necessarily those of the Federal Reserve Bank of Cleveland or of the Board of Governors of the Federal Reserve System.

1. For a discussion of these traditional issues, see Gerald H. Anderson, "Is Dollar Depreciation Desirable?", Economic Commentary, December 15, 1985.
2. The equation for calculating the responsive-
terms of trade to changes in exchange rates
is given in R. Robert Heller, Interna-
tional Monetary Economics, 1974, Prentice
Hall, Inc., Englewood Cliffs, NJ, page 101. Esti-
mates of supply and demand elasticities of
U.S. exports and imports are summarized in
the Handbook of International Economics,

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Economic Commentary

Impact of the Depreciation on the Trade Balance

Calculations similar to those above
indicate that the depreciation has given
industries a net gain of $33 billion,
the $18 billion gain, and the $7 billion gain
to a one-time realization of the United
States of $58 billion.9

An alternative estimation of the
costs and benefits imposed through
changes in exchange rates and import
prices, indicates a net one-time gain for the
United States of $32 billion.

Conclusions

The dollar's 37 percent depreciation
between the first quarter of 1985 and
the fourth quarter of 1986 occurred at a
time when the United States was
facing a growing trade deficit, causing a
continuing deterioration of the terms of
trade. It is not the purpose of this presenta-
tion, however, to argue that dollar
depreciation is either good or bad. Such
a judgement must be based on an eval-
uation of all of the effects of the depres-
sion, not just on the net loss that is cal-
culated here. Such an overall evaluation
remains beyond the scope of this essay.

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growth of U.S. net indebtedness.

The trend, in contrast, has received
much public attention.

Another potential implication result-
ging from dollar depreciation centers
on the foreign assets owned by U.S. citi-
zens and on the debts that Americans
owe to foreigners. Depending on the
currencies in which they are denomi-
nated, the values of these assets and
liabilities may either rise or fall, or be
increased or decreased by dollar deprecia-
tion. But again, there has been little public dis-
ussion of this effect of depreciation.

Economic Commentary

Implications of Dollar Depreciation

The amount by which dollar depreci-
ation changes the prices of U.S. imports
and exports depends on the size of the
depreciation and on the extent to which
U.S. and foreign exporters try to offset
effects. A foreign exporter, for exam-
ple, may be able to change only by dollar deprecia-
tion's effect on the
temporary purchasing power of U.S.

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culated here. Such an overall evaluation
remains beyond the scope of this essay.

Change in Terms of Trade

The terms of trade are a measure indi-
cating the amount of imports that can
be purchased with a fixed amount of
exports. As a result, the dollar price
of U.S. imports will not rise by the full
extent of the dollar's depreciation.

In this case, there is less than full
"pass-through" of the depreciation to
the import price. Because the Japanese
importer has been willing to shave his
profit margin. By the same token, U.S.
exporters, finding themselves in a more
competitive position because of the dol-
lar's depreciation, may take advantage

currency. A decrease in this ratio
would be considered a deterioration in
the terms of trade. The nation would be worse off economically after the decrease because its exports would have less buying power.

A terms-of-trade loss is not the same
as a reduction in a nation's real gross
national product (GNP). Real GNP
could remain unchanged, but a nation with
a terms-of-trade loss would still be
worse off because a given physical
quantity of its goods can now be traded
for only a smaller amount of foreign
goods. Thus, even if the nation's pro-
duction of goods and services did not
change, the resources it would have
available for consumption, investment,
and government would be smaller because its exchanges of goods with
other nations would be on less-
favorable terms.

9. Investors who expect dollar depreciation will, if
possible, demand higher returns on their international investments to compensate them for
expected losses from depreciation; investors who

That accrued in 1985 are considered here
to be changed only by dollar deprecia-
tion that occurred after fourth quarter
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indicate that the depreciation has given
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lion on the accruals to assets that
occurred in 1985. On accruals in 1986, the
U.S. net gain was $7 billion. Taken together, the $33 billion gain, the $18 billion gain, and the $7 billion gain add
to a one-time realization of the United
States of $58 billion.

An alternative estimation of the
costs and benefits imposed through
changes in exchange rates and import
prices, indicates a net one-time gain for the
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9. Investors who expect dollar depreciation will, if
possible, demand higher returns on their international investments to compensate them for
expected losses from depreciation; investors who

expect to gain from depreciation will
accept lower nominal returns, if necessary. Such adjustments in nominal returns will mitigate the gains
and losses and reduce the net gain to the United
States from changes in the value of U.S. interna-
tional assets and liabilities. However, most asset
holders are locked into nominal returns that they
cannot alter when depreciation occurs, so the
effect here will be partial.
of the situation to improve their profit margins by raising the dollar prices they charge. In such a case, they would also lose less than full pass-through of the depreciation to the foreign-currency prices that their customers pay for their goods.

The dollar depreciation, on which a depreciation is passed through as price changes, both in export and import markets, depends on how sensitive producers and consumers are to price changes—in other words, on the supply and demand elasticities for imports and exports. These elasticities will differ among products and will depend on conditions in the market situation, including sellers’ profit margins, the amount of idle capacity in the producers’ industries, expectations regarding the permanence of the exchange-rate change, the degree of competition in the industry, the long contracts between buyer and seller, and the strength of the buyers’ demand for the product. As a result, the dollar is usually larger in the long run than in the short run because buyers and sellers have more time to react.

An estimate of the long-run terms-of-trade effect of dollar depreciation, calculated using the method of physical amounts of exports and imports involves a simplification of the supply and demand elasticities of U.S. imports and exports, indicates that the 12.7 percent depreciation of the dollar, the U.S. terms of trade would deteriorate by 0.76 percent in the long run.7 Terms-of-trade elasticities of physical amounts of imports and exports would change only if the dollar depreciates or if the terms of trade temporarily change in the volume of imports, causing the loss to exceed that calculated in the long run. An alternative to using the long run terms-of-trade-change estimate given above is to use direct evidence on the dollar depreciation.

The dollar depreciated by a weighted average of 37 percent in 1980 and 1981, and 35 percent in 1983. While it has subsequently appreciated, the dollar depreciation in 1985 and 1986 averaged 12.7 percent, which is equivalent to a 0.76 percent deterioration in the terms of trade. If we use a lower estimate of 10.3 percent for this period, the cost of imports would be $32 billion per year. The 37 percent depreciation will eventually translate into a 28 percent worsening in the terms of trade.

Table 1. Foreign Assets in the United States and U.S. Assets Abroad* (billions of dollars, end of year)

| Year | U.S. Assets Abroad | U.S. Foreign Assets | Foreign Liabilities in the United States | Change
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1984</td>
<td>$922</td>
<td>$313</td>
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<td>$922</td>
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<td>$313</td>
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5. If the initial terms of trade = 100/100% = 1, then assuming a 10 percent depreciation, the new terms of trade would be 110/0.9 of the old terms of trade. Thus, the terms of trade depreciate by 1.097 = 0.03 or 3% of the 1.0% depreciation.

6. If the initial terms of trade = 100/100% = 1, and the new terms of trade = (100+14%/100-14%) = 110/0.86 or 1.26 or 26%.

7. The U.S. loss from a worsening of the terms of trade is distributed unevenly among U.S. residents, with the largest gains being those of foreigners because they must pay higher prices, but U.S. pro-ducers may lose because of reduced imports against their goods here or abroad gain from increased profit margins.

8. Gold has been excluded from these figures. Although gold held by the U.S. government is listed with the rest of foreign-currency assets, the gold price is based on the international monetary system. While gold still is an important claim on the U.S. government, it need not be considered a U.S. asset abroad.

Indeed, if it were to be considered as a U.S. asset abroad, it is unclear whether it should be considered a U.S. foreign-currency asset or a U.S. foreign-currency debt. The gold price has decreased, and it is unclear whether the gold price will decrease further or increase in the future. The gold price has decreased, and it is unclear whether the gold price will increase further or remain unchanged.
of the situation to improve their profit margins by raising the dollar prices they charge. In such a case, the dollar loses some of its purchasing power—less than full passage-through of the depreciation to the foreign-currency prices that foreign buyers pay for goods.

The depreciation will, on which a depreciation is passed through as price changes, both in import and export prices, depends on how sensitive producers and consumers are to price changes—other words, on the supply and demand elasticities for imports and exports. These elasticities will differ among products and will depend on the market situation, including sellers’ profit margins, the amount of idle capacity in the market, and expectations regarding the permanence of the exchange-rate change, the degree of competition, the long-term contracts between buyer and seller, and the strength of the buyers’ demand for the product. The dollar is usually larger in the long run than in the short run because buyers and sellers have more time to respond.

An estimate of the long-run terms-of-trade effect of dollar depreciation, calculated using the balance of payments approach that combines the supply and demand elasticities of U.S. imports and exports, indicates that a 1 percent depreciation of the dollar, the U.S. terms of trade would deteriorate by 0.76 percent in the long run.7 Moreover, the volume of imports that the U.S. can purchase with the proceeds from a dollar depreciation is larger in the long run than in the short run because buyers and sellers have more time to respond.

The dollar depreciated by a weighted average of 37 percent against other major currencies during the first quarter of 1985 and the third quarter of 1987, and was continuing to depreciate through mid-1987, and was continuing to depreciate. Therefore, the revenue from a given physical quantity of goods exported after the depreciation is smaller than before the depreciation because a smaller physical quantity of imports than before the depreciation. The loss to U.S. residents equals the reduction in the dollar value of imports, or $40 billion per year.

An alternative calculation yields similar results. That approach is to examine the dollar’s terms of trade in the period immediately following the dollar’s early 1985 depreciation. Since the dollar began its depreciation in early 1985, import prices have risen much faster than export prices. Between March 1985 and September 1987, prices of imports excluding fuels, rose about 18 percent while prices of exports rose only about 3 percent. Therefore, the proceeds from exports have been by about 12.7 percent so far.

In the long run, of course, the terms of trade may worsen further or reverse some of their deterioration. If they don’t change, however, the annual cost to U.S. residents will be $29 billion (12.7% x $215 billion), or $45 billion (12.7% x $358 billion). The estimate to the United States of these annual losses can be more easily by noting that a $5 billion change in the terms of trade in terms of terms of trade might temporarily reduce the volume of imports, causing the loss to importers to be either positive or negative. An alternative to using the long run terms-of-trade-change estimate given above is to use direct evidence on the strength of the buyers’ demand for the dollar’s depreciation. In the first quarter of 1985, import prices have risen much faster than export prices, the dollar’s 37 percent depreciation in early 1985, import prices have risen much faster than export prices. Between March 1985 and September 1987, prices of imports excluding fuels, rose about 18 percent while prices of exports rose only about 3 percent. Therefore, the proceeds from exports have been by about 12.7 percent so far.

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<tr>
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Federal Reserve Bank of New York, "Changes in U.S. Foreign Assets Abroad and U.S. Assets Abroad." Recent studies of previous episodes of dollar depreciation, and thus the U.S. loss from a worsening of the terms of trade is distributed evenly among U.S. residents. This means that the physical quantity of imports earned by U.S. residents will be smaller than estimated here.5

Although the volume of imports has a long-run rising trend, the change in the terms of trade may worsen further or reverse some of their deterioration. If they don’t change, however, the annual cost to U.S. residents will be $29 billion (12.7% x $215 billion), or $45 billion (12.7% x $358 billion). The estimate to the United States of these annual losses can be more easily by noting that a $5 billion change in the terms of trade in terms of terms of trade might temporarily reduce the volume of imports, causing the loss to importers to be either positive or negative. An alternative to using the long run terms-of-trade-change estimate given above is to use direct evidence on the strength of the buyers’ demand for the dollar’s depreciation. In the first quarter of 1985, import prices have risen much faster than export prices, the dollar’s 37 percent depreciation in early 1985, import prices have risen much faster than export prices.

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6. If the initial terms of trade = 100/100 = 1, and the new terms of trade = 100/118 = 1.03478, then the depreciation is 100%/118% = 8.5714%. 7. The U.S. loss from a worsening of the terms of trade is distributed evenly among U.S. residents. This means that the physical quantity of imports earned by U.S. residents will be smaller than estimated here.5

8. Gold has been excluded from these figures. Although gold held by the U.S. government is less than 1 percent of the nation’s international assets, gold is a significant component of the nation’s international assets now. Gold is not an easy commodity to sell in a hurry, so the U.S. government holds it in the event of a financial crisis. Indeed, if it were to be considered as a U.S. asset abroad, it is unclear whether it should be considered a U.S. asset abroad because the U.S. government is not able to borrow money from the international monetary system. If gold were to be considered an asset, it would be considered a U.S. asset because the U.S. government holds it in the event of a financial crisis. Indeed, if it were to be considered as a U.S. asset abroad, it is unclear whether it should be considered a U.S. asset abroad because the U.S. government is not able to borrow money from the international monetary system.
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$572 billion to $441 billion ($572 billion + 1.296), a reduction of $131 billion. This is a loss for the United States. Third, U.S. residents also hold $313 billion equivalent of assets abroad denominated in foreign currencies. If foreign currency prices of U.S. imports fall by 20 percent of the dollar’s depreciation, as discussed above, those import prices would fall by 7.4 percent. That price decline boosts the real value of those assets from $313 billion to $315 billion divided by (1 - 0.074), an increase of $55 billion. This is a gain for the United States. In total, we can estimate that the dollar’s 37 percent devaluation has decreased the real value of U.S. international assets and liabilities. There are gains and losses, and reductions and losses and the net gain to the United States is $33 billion.

The calculations above are based on the effect of dollar depreciation since first quarter 1985 on asset positions at the end of 1984. The fourth step in the estimate takes account of the fact that there have been large additions to U.S. assets abroad and foreign assets in the United States since the end of 1984 that represent additional potential claims on U.S. and foreign goods (see table 1). The gains and losses on these additional assets here and abroad, caused by dollar depreciation, must be calculated separately to consider only the portion of the depreciation that occurred after the assets were accrued. The values of the assets here and abroad that accrued in 1985 are considered here to be changed only by dollar depreciation that occurred after fourth quarter 1985, and assets here and abroad that accrued in 1986 are considered here to be affected only by dollar depreciation that occurred after third quarter 1986.

Calculations similar to those above indicate that the depreciation has given the United States a net gain of $18 billion on the accruals to assets that occurred in 1985. On accruals in 1986, the U.S. net gain was $7 billion. Take together, the $33 billion gain, the $18 billion gain, and the $7 billion gain added to the total one-time gain for the United States of $58 billion.

An alternative assumption of the changed potential claims on U.S. and foreign assets, made using actual changes in export and import prices, indicates a net one-time gain for the United States of $32 billion.

Conclusions

The dollar’s 37 percent depreciation between the first quarter of 1985 and the third quarter of 1986 worse its terms of trade, causing a continuing annual real loss to the nation estimated to be between $24 billion and $100 billion. This annual loss will grow as the volume of trade grows.

The annual loss will be partially offset by the one-time gain from the dollar depreciation’s effect on the potential purchasing power of U.S. international assets and liabilities, which we have estimated to be between $32 billion and $56 billion. Comparing the midpoint of the range of annual real losses estimates, $62 billion, to the midpoint of the one-time gain estimates of about $45 billion, we can see that the one-time gain will offset by the annual losses in less than a year, after which the losses will continue to accrue, year after year.

Although a reduction in the terms of trade is costly, that cost may be unavoidable if the United States is to reduce its trade deficit. A reduction of the trade deficit is generally considered desirable because it will reduce the need for the United States to import capital and thus lead to reduced international indebtedness, and also because reduction of the trade deficit is generally believed to stimulate domestic production and employment.

Of course, faster growth of the economies of our major trading partners would tend to reduce the U.S. trade deficit without a worsening of the terms of trade. However, foreign governments may be reluctant to stimulate their economies if they expect such action to be inflationary, and in any event, faster foreign growth is unlikely to fully eliminate the trade deficit.

Slower growth of the U.S. economy also would tend to reduce the U.S. trade deficit, but that is, of course, an undesirable method of improving the trade balance.

The foreign-exchange value of the dollar has been depreciating for more than two years, and it is widely expected that the dollar will be further depreciated or decreased by dollar depreciation. But again, there has been little public discussion of this effect of depreciation.

This Economic Commentary discusses the costs and benefits of dollar depreciation imposes through changes in the prices of imports and exports and the costs and benefits imposed through changes in the potential purchasing power of U.S. international assets and liabilities.

Because of inadequacies in the data and uncertainty about which are the best concepts of the gains and losses, a range of estimates is presented. Despite their lack of precision, the estimates nevertheless indicate the signs and general magnitudes of these gains and losses, and help round out public discussion of the costs and benefits of dollar depreciation.

It is not the purpose of this presentation, however, to argue that dollar depreciation is either good or bad. Such a judgement must be based on an evaluation of all of the effects of depreciation, not just on the net loss that is calculated here. Such an overall evaluation is beyond the scope of this essay.

Change in Terms of Trade

The terms of trade is a measure indicating the amount of imports that can be purchased with a unit of exports. Its calculation result-ing from dollar depreciation centers on the foreign assets owned by U.S. citizens and the debts that Americans owe to foreigners. Depending on the currencies in which they are denom-inated, the values of these assets and liabilities will either rise or not change or decreased by dollar depreciation. But again, there has been little public dis-cussion of this effect of depreciation.