Will a Weaker Dollar Mean a Stronger Economy?

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WILL A WEAKER DOLLAR MEAN A STRONGER ECONOMY?*

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Modern work in international economics dating at least since Joan Robinson (1947) shows that protectionist policies, including policies to devalue a currency, reduce domestic real income, despite any temporary beneficial effects on the traded goods sector of the economy. Yet in the view of many analysts, the title raises not only a serious question, but one which has a positive answer.[1/] This paper focuses on some fundamentals of economic analysis and the empirical record that have been extensively ignored in discussions of exchange rates and U.S. trade in the 1980s. It addresses both the issue of why an appreciation of the dollar was associated with the relatively strong performance of the U.S. economy in the first half of this decade, and why the subsequent depreciation could be associated with a reduction in U.S. real income growth.

A fundamental flaw in analyses of the exchange value of the dollar, U.S. trade, and domestic income or output arises from considering exchange rate movements to be exogenous in determining the effects of their movements on demand for traded goods. The principal oversight is that economic policy can influence supply conditions and thereby change domestic prices, output, and the exchange value of the currency; the exchange rate and domestic output have a positive relationship in this case, in contrast to the negative relationship emphasized in the conventional analysis.

The first section provides a perspective on why the dollar improved in the early 1980s. It is argued that tax incentives introduced in 1981 increased the real rate of return on investment, capital formation and productivity, especially in U.S. manufacturing. Incentives to reallocate international capital led to a reduction in the supply of dollars in foreign exchange markets and raised the value of the dollar. But these changes were accompanied by a rise in domestic productivity and decline in foreign productivity growth. Hence, the appreciation of the dollar was a symptom of a stronger manufacturing sector, not a prescription for a declining one.

The second section turns to the recent decline in the dollar. One interpretation of that decline is that the incentives provided in the early 1980s were reversed. For example, tax reform proposals since late 1984 envisioned a reversal of business tax incentives for investment; similarly, money stock growth accelerated sharply in 1985-86. If these factors predominately raised the supply of dollars in foreign exchange, they contributed to the decline in the value of the dollar. Of course, to the extent the dollar decline has been induced by such a policy reversal, the counterparts of reduced investment and productivity growth suggest that a weaker dollar is likely to be accompanied by a weaker, not stronger, economy.

The analysis here compares three periods when the dollar generally fell, rose and fell against foreign currencies. The periods are II/1976 to III/1980, III/1980 to I/1985 and I/1985-III/1986, respectively. Of course, developments in the latest

period were, at the end, continuing to unfold. Moreover there is little argument on the direction and influence of economic policy, even in the earlier period. Thus, a resolution of competing hypotheses on economic policy and its effects and on the sources of exchange rate changes and their consequences in the 1980s remains for the future.

I. The Changing Value of the Dollar: Supply Vs. Demand

One source of confusion in analyses of the changing value of the dollar in recent years has been a failure to distinguish supply and demand movements for the dollar in international currency markets. From 1980 to early 1985, when the dollar rose, it was widely perceived to be due to an increase in the demand for dollars fostered by improved real interest rates in the United States which, in turn, were purportedly due to higher fiscal deficits [see, e.g., Williamson (1983) and Summers (1987)]. Of course, the dollar rise and higher real interest rates preceded emerging budget deficits by over a year; when the deficit began to rise sharply, interest rates declined (and continued to move oppositely since then). There is an alternative hypothesis, however. The 1981 tax act (and earlier, anticipation of it) raised the real rate of return on capital in the U.S. leading to a reduction of U.S. investment abroad, an increase in investment in the U.S. and an increase in productivity growth on real income in the United States compared with capital formation, productivity and income abroad.

The supply of dollars declined over the period of the rising dollar. Table 1 shows the components of dollar supply in 1980, the four quarters ending in I/1985, and in the recent four quarter period ending in II/1986. From 1980 to early 1985, import growth failed to keep pace with U.S. GNP; more importantly, U.S. investment abroad plummeted sharply, reflecting improved relative incentives for investment in the United States.[2/] As a result, the supply of (and demand for) dollars in international exchange fell by about 4.5 percent of GNP or about $170 billion in the period ending early in 1985. Some analysts focus on the rise in net foreign investment which is also shown in the table; this rise is often attributed to a rise in foreign investment. As the table indicates foreign investment fell from 3.5 percent of U.S. GNP in 1980 to about 1.5 percent in the year ending in early 1985.

Since that time, imports have changed little as a share of GNP, but U.S. investment abroad (and the supply of dollars in international exchange) has risen. The last column in table 1 shows data for the four-quarter period ending in II/1976 when the dollar began falling. The decline in the dollar from 1976 to 1980 was accompanied by rising shares of imports and of U.S. investment abroad in GNP.

Domestic Production and the Exchange Rate

The conventional view of the effect of dollar appreciation can be seen in figure 1. According to this view, an exogenous rise in the value of the dollar lowers domestic

prices of imports and exports by inducing substitutions away from U.S. traded goods. As a result of lower domestic prices, domestic output of traded goods falls. Figure 1 focuses on manufacturing output; this is the domestic sector which has attracted so much attention in the 1980s. The exogenous rise in the exchange rate raises the foreign price of U.S. exports and lowers domestic prices of imports. Purchasers would tend to substitute away from U.S. manufactured product and increase demand for foreign product. The domestic price of manufactured product falls, inducing U.S. producers to produce less; U.S. consumers buy more of the product that was formerly exported, but overall domestic production falls. For imported goods the analysis is essentially the same; the rise in the value of the dollar reduces domestic prices of imported goods, raising purchases of such products and imports, but reducing domestic production.

The alternative view is given in figure 2. Another source of a rise in the value of the dollar is a productivity improvement in U.S. production of tradeable goods (and/or a fall in productivity in foreign production of traded goods). The effect of a domestic productivity improvement is represented in figure 2 by a downward shift in domestic supply from S to S'. The world price of manufactured product falls because of the increase in world (domestic) supply. Domestic producers increase production, though not by as much as the productivity improvement would allow domestic producers to profitable expand output. Domestic purchasers substitute toward relatively cheaper traded goods.

The principal difference in figures 1 and 2 is that an exogenous increase in the exchange rate reduces domestic production of traded goods (figure 1), while such production expands when the source of the appreciation, or fall in domestic prices, is induced by domestic productivity changes (figure 2).

There is another difference in the outcomes in figures 1 and 2 that warrants some clarification. When the change in the exchange rate is exogenous, exports fall or imports rise, while in figure 2 they tend to move in the opposite direction. But the analysis in both figures ignores shifts in relative real incomes. The domestic productivity shock raises domestic income, given the same domestic resources, and this tends to raise import demand and reduce exports, given relative prices. In addition, when the shift in domestic productivity can reallocate world resources toward the domestic economy, the movement toward a larger trade deficit is reinforced by a reduction in foreign real income, further reducing domestic exports and raising domestic imports.

Some Evidence

Tatom (1986) shows the share of U.S. manufacturing product in real GNP rose sharply from 1980 to 1985, especially when cyclical movements in the relative demand for such product are taken into account (see chart 1). A comparison of domestic and foreign output, labor productivity, and unit labor cost in manufacturing for the period of the declining dollar

(1976-1980) and rising dollar (1980-1984) supported the view above and not the conventional view. Output and output-per-hour growth in U.S. manufacturing accelerated sharply in the United States and generally slowed abroad, and unit labor cost growth slowed sharply in the United States and slowed relative to foreign competitors.[3/]

This earlier paper was motivated, in part, by the relatively slow growth of U.S. manufacturing output from mid-1984 to late 1985. Subsequent GNP revisions indicate that neither real GNP growth nor manufacturing output growth slowed as much as earlier reported. For example, from III/1984 to IV/1985, earlier data indicated a 1.5 percent rate of growth of manufacturing output; revised data show a 3 percent rate. The earlier results showing that manufacturing output growth has been unusually strong since the dollar began rising in mid-1980 continue to hold in the revised data (see the Appendix for revised estimates). Until recently, the strength of U.S. manufacturing output growth is positively correlated with the exchange value of the dollar, not significantly negatively so, as the conventional view suggests. Fieleke (1985) has shown that there is no correlation between the growth of import penetration in various U.S. industries and their employment growth over the 1980-84 period. This result is consistent with the hypothesis here, and not with the conventional view based on an exogenous exchange rate.

Table 2 shows the composition of real GNP (1982 prices) in both 1980 and 1985 and illustrates the changing composition

of output towards domestic production of traded goods. The industry shares in 1980 are used to project forward the real income increase between 1980 and 1985; the difference between actual 1985 and the projected 1985 levels without compositional changes are shown in the last column. The table indicates gains in the share of real GNP originating in wholesale and retail trade and services. These gains did not come from the traded goods sector, if that term applies to manufacturing and agriculture. Manufacturing output rose $28.4 billion or 3.4 percent more than would have been the case based on its 1980 share of real GNP.[4/] Agriculture, forestry and fisheries showed a $6.5 billion or 7.6 percent compositional gain on the same basis. The largest compositional losses occurred in government and the rest of the world sector. The latter reflects a shift in domestic resources to home production relative to employment abroad in response to 1981 changes in incentives for capital formation.

According to the hypothesis above, the 1980-85 relative productivity growth in U.S. manufacturing and the compositional gains shown in table 2 arose from a reallocation of world capital. Table 1 shows that the rise in the value of the dollar was associated with a decline in U.S. investment abroad. The strength of domestic business investment in plant and equipment is shown in table 3. Table 3 shows business fixed investment and its components, equipment and structures for 1980, 1985 and the first three quarters of 1986. Real business investment as a share of real GNP surged to record

high levels in the period ending in early 1985. Since then it has fallen sharply, just as investment abroad (table 1) has accelerated.

Measures of U.S. output and inputs shed more light on productivity developments in this decade. Table 4 shows growth rates of the capital-labor ratio and output per worker in the United States for the business, manufacturing, farm, non-farm, and non-farm, non-manufacturing sectors from 1976 to 1980, an earlier period when the value of the dollar generally fell, and from 1980 to 1985, when the dollar rose, at least on an annual basis.[5/]

During the period of the rising dollar, annual productivity growth accelerated sharply in all sectors. The largest gains were in the manufacturing and farm sectors, two areas which are typically regarded to be producers of traded goods. It should be noted that during the period of the falling dollar, productivity growth was generally negative, although in the manufacturing sector the growth rate was slightly positive, and in the farm sector output grew 2.8 percent per year faster than labor employment. The unusual movements in productivity can be seen in chart 2 which shows the ratio of output per worker in the manufacturing sector to that for the economy as a whole (real GNP per civilian worker). Relative productivity growth in manufacturing flattened out from 1977 to 1981 and accelerated subsequently.

An important factor in the accelerated growth in productivity, except in the farm sector, has been an

acceleration in the growth of capital per worker.[6/] This acceleration also is indicated in table 4. During the earlier period of the falling dollar (1976-80), the stock of plant and equipment per worker was stagnant or declining in all the sectors shown except farming. Since 1980, the capital-labor ratio accelerated sharply in all sectors but farm.

Summary

The conventional analysis of U.S. economic policy and domestic and international developments in the early 1980s indicates that tax cuts (mainly for individuals) raised the budget deficit and thereby increased the real rate of interest in the United States. This, in turn, raised the demand for dollars in foreign exchange markets and hence increased the value of the dollar. Monetary policy is often added as a compounding influence to this sequence at least in those subintervals when money was viewed as "tight." The predominately adverse effects of these policies was to reduce real income especially in the traded goods sector because most of the expected crowding out occurred through a loss of international competitiveness of U.S. industry, as indicated in the rise of the value of the dollar, import volume, and a decline in the volume of exports.

The alternative view taken here emphasizes economic policy changes that cut taxes (principally on income from business capital formation), increased domestic investment and the real rate of return on capital and led to a reallocation of

world capital. The improvement in business capital formation, in turn, raised domestic productivity relative to foreign competitors. As a result, the domestic output of traded goods, especially in manufacturing, rose relative to our competitors and real income grew in the United States compared to foreign countries. The relative rise in U.S. income, in turn, accounts for a rise in U.S. purchases of importable and exportable goods. The supply effects of economic policy also entailed a decline in the prices of U.S. produced goods, other things equal, while the higher cost of capital abroad tended to raise foreign prices. On this view then, the rise in the dollar reflected an improvement in U.S. competitiveness and real incomes rather than being an exogenous force reducing both. The record of improvement in U.S. relative income, unit labor cost, productivity and capital formation are consistent with this view, but is not consistent with the conventional analysis above.

II. The 1985-86 Decline in the Value of the Dollar

If tax incentives played a major role in increasing domestic investment, productivity and the value of the dollar in the first half of this decade, the reversal of these incentives would reverse effects. Since early 1985, tax reform has been expected to lengthen asset service lives for depreciation especially for structures, and to end the investment tax credit. Not surprisingly, the rise in domestic investment has come to a halt, according to table 3. The

largest reduction has been in structures investment, the area most affected by the changing service lives used for depreciation.[7/] Table 1 shows that U.S. investment abroad picked up over the same recent period. Of course, such developments are not suggestive of accelerating output, productivity or real output.

Some analysts contend that 1981 and subsequent business tax changes had little effect on the return to capital. But corporate profits after tax (corrected for capital consumption and inventory valuation adjustments) rose from $92.1 billion in 1980to $203.6 billion in 1985 or from 2.9 percent to 4.9 percent of GNP, while cyclical forces, as measured by capacity utilization rates or unemployment, would have been expected to reduce profits over this period. Most of this gain was accounted for by the tax saving associated with the rise in depreciation allowances and the reversal of inventory losses ($57.8 billion).

Whether tax reform raises or lowers expected real rates of return on investment, is even more controversial. The statutory business and personal marginal tax rates decline under tax reform, but the effective rates for capital income rise. Tax reform leaves the maximum statutory tax rate (corporate + personal) on corporate income from capital at 55.3 percent, while such taxation, when realized through capital gains taxation on retained earnings, equaled 56.8 percent before tax reform. The rise in capital income taxation arises

from substantial increases in service lives for depreciation and the ending of the investment tax credit. The dominant effect is to raise taxes and reduce investment.[8/]

A second key factor influencing whether a fall in the value of the dollar will strengthen output, employment, productivity and real income in the U.S. economy concerns monetary expansion. There was (and is) a widespread consensus that, in the late 1970s, accelerating monetary expansion depressed the dollar directly, and, by reducing real income growth, further depressed the value of the dollar. The latter effect arose from the inflationary consequences of monetary expansion on real tax burdens that depressed capital formation, productivity growth, and, therefore, output growth. Table 4 provides evidence supporting this view.

The sharp reacceleration in monetary growth since early in 1985 could, via the same channels, have contributed directly to the fall in a dollar since then. Table 5 shows growth rates of the money stock growth for 11 countries. The acceleration in U.S. money growth since the end of 1984 was exceeded only in the United Kingdom; several of the countries actually reduced money growth since 1984, including Switzerland, Sweden, the Netherlands, Italy, German central bank money, and France.[9/]

Whether the recent acceleration in money growth will result in a matching acceleration of inflation and further reduce capital formation, economic growth, the value of the dollar, and increase the trade deficit remains to be seen. The tax structure that raises real business tax burdens on capital

income when inflation accelerates has not been altered by the various tax law changes since 1980. The 1985-86 reductions in domestic investment, increases in U.S. investment abroad, and the continuing relatively large U.S. trade deficit, do not bode well for the view that a weaker dollar will lead to a stronger U.S. economy.

IV. CONCLUSION

Joan Robinson (1947) explained the effects of various policies to reallocate world demand and improve domestic employment and the trade balance by "beggar-my-neighbor" policies. She indicates that such actions, including currency depreciation, reduce the real income of a nation.

One of the fundamental lessons of the last six years has been that, in a world of significant taxation of income from capital, there is a type of "beggar-my-neighbor" gain that can be had through reductions in the taxation of income from capital. But this gain is not obtained, as in the case of the demand-side policies examined by Robinson, at the larger expense of competing nations. Instead, real consumption possibilities, world wide, are enhanced by reallocating and increasing the capital stock, through improvements in the efficiency of resource use. Tax changes that reduce investment incentives, accordingly, are likely to lower future real income.[10/]

Monetary policy actions in 1985-86 appear to have returned to a strongly expansionary stance, which, if correct,

would lead to a trade balance that initially worsens, then improves, but only by lowering domestic real income and imports. Recently enacted tax reform also could reduce the trade deficit, both in the short and the long run. If, as advertised, tax reform left future fiscal deficits unaffected, reductions in domestic investment would tend to lower net foreign investment and the trade deficit. Unfortunately, the reduction in net foreign investment would arise from increases in U.S. investment abroad relative to foreign investment in the United States.

Thus, the view taken here of both monetary and fiscal policy actions suggests an improving trade balance in the long-run, but at the expense of U.S. and world income. In the short-run, the trade-deficit-expanding effects of monetary expansion contend with the opposite effects of tax reform. Which effect dominates is important for short-term movements in the trade balance. From a longer-run view, however, an improvement in the trade balance, to the extent that it is obtained through the actions described here, would be a very mixed blessing indeed.

FOOTNOTES

1/ See Berry (1986), Williamson (1983), Durell, Israilevich and Kowalewski (1986) and Meyer (1986) for examples and citations of analysts who take this view. There may, indeed, be circumstances where this question has a positive answer, but they do not encompass any policy developments changes known to the author, as of early 1985 when the dollar began its recent decline. One set of such circumstances, which is consistent with the argument below, would occur if a major foreign country, or group of countries, were to substantially reduce taxes on income from capital, other things remaining the same.

2/ See Boskin and Gale (1986) for evidence supporting this view.

3/ The view that the acceleration in income growth in the U.S. relative to our trading partners was important in the emergence of the U.S. trade deficit, at least, is supported in a recent Wharton Econometrics (WEFA) study. In their Wharton Econometrics Quarterly Model Outlook, November 1986, p. 6, they argue that from 1980 to 1985, the major factor in the decline in the ratio of real exports to real imports in the U.S. was the relative improvement in U.S. economic growth; the other factor, falling relative export prices, played a "secondary role." The trading partners included in their study are: Canada, Japan, the United Kingdom, France, West Germany, Italy, Taiwan, Singapore, Hong Kong, Mexico, and Brazil, countries which account for over 70 percent of all U.S. trade.

4/ This gain understates the gain estimated in Tatom (1986) and shown in the Appendix.

5/ The capital-labor ratio is constructed using the constant dollar (1982 prices) net stock of nonresidential private capital at the end of the previous year and employment in each sector. The former is prepared by the Bureau of Economic Analysis and the latter and the sectoral output measures used in table 4 are prepared by the Bureau of Labor Statistics.

6/ The 1974 increase in energy prices was also an important factor reducing the desired capital-labor ratio and, temporarily, investment and productivity growth. But earlier evidence, Tatom (1979b), indicates that this reduction would be similar or perhaps smaller in manufacturing because this sector is less capital intensive than the other sectors shown in table 2. Reductions in energy prices from 1981 to 1985 have partially offset 1979-81 increases that also would have adversely affected productivity and capital formation. See also Tatom (1979a) and (1981).

7/ An opposite view of the effects of tax reform on saving and investment can be found in Darman (1986). He downplays any effect on the trade balance, although he emphasizes that tax reform will raise real income.

8/ This is not to argue that such changes are undesirable from either efficiency or equity viewpoints. The latter depend on comparisons of effective marginal tax rates on corporate income compared with other income from capital and labor, respectively.

9/ See Lothian (1986) for a discussion and evidence of the effects of accelerated money growth on the real exchange value of the dollar. The impact of the 1985-86 acceleration in money supply growth on the exchange value of the dollar, however, is muted to the extent that it simply accommodates a rise in the demand for money.

10/ The tax reform discussion often focuses on the removal of subsidies to certain types of investment. The taxation of capital income was reduced in the aggregate in 1981 and thereafter compared to earlier years and this taxation has been raised by 1986 tax reform. It is not accurate, however, to refer to taxation from 1981 to 1985 as a subsidy since federal taxation of capital income remained substantial. For example, on a national income and product account basis, federal corporate income taxes equaled 30.9 percent of appropriately measured corporate income in 1985.

REFERENCES

Boskin, Michael J. and William G. Gale, "New Results on the Effects of Tax Policy on the International Location of Investment," National Bureau of Economic Research working Paper No. 1862, March 1986.

Berry, John M., "Narrower Trade Gap Will Require Cut in Spending," Washington Post, November 2, 1986.

Darman, Richard G., "Looking Inward, Looking Outward: Beyond Tax Populism," speech presented to the Japan Society's Conference on "Tax Reform in Japan and the United States: A Stimulus to New Economic Vitality?" New York City, November 7, 1986.

Durell, Amy, Philip Israilevich, and Kim J. Kowalewski, "Will The Dollar's Decline Help Ohio Manufacturers?" Federal Reserve Bank of Cleveland Economic Commentary, August 15, 1986.

Fieleke, Norman S., "The Foreign Trade Deficit and American Industry," New England Economic Review, Federal Reserve Bank of Boston, July/August 1985: 43-52.

Lothian, James R., "Real Dollar Exchange Rates Under the Bretton-Woods and Floating-Rate Regimes," Journal of International Money and Finance, December 1986, 5: 429-48.

Meyer, Stephen A. "Trade Deficits and the Dollar: A Macroeconomic Perspective," Business Review, Federal Reserve Bank of Philadelphia, September/October 1986: 15-25.

Robinson, Joan, "Beggar-My-Neighbor Remedies for Unemployment," in Essays on the Theory of Employment, 2nd Edition, (Oxford: Basil Blackwell, 1947), part III, ch. 2, reprinted in Howard S. Ellis and Lloyd Metzler, Readings in the Theory of International Trade (Philadelphia: Blakeston Co., 1949), pp. 393-407.

Summers, Lawrence H., "The Results Are In on the Deficit Experiment," Wall Street Journal, February 20, 1987.

Tatom, John A., "Domestic vs. International Explanations of Recent U.S. Manufacturing Developments," Federal Reserve Bank of St. Louis Review, April 1986, 68: 5-18.

_____, "Investment and the New Energy Regime," in Board of Governors of the Federal Reserve System, Public Policy and Capital Formation, April 1981: 221-230.

_____, "Energy Prices and Capital Formation: 1972-77," Federal Reserve Bank of St. Louis Review, May, 1979, 61: 2-11 (1979a).

_____, "The Productivity Problem," Federal Reserve Bank of St. Louis Review, September 1979, 61: 3-16 (1979b).

Wharton Econometric Forecasting Associates, Wharton Econometrics Quarterly Model Outlook, November 1986: 2.

Williamson, John, The Exchange Rate System, Washington D.C.: Institute of International Economics, September 1983.

Table 1
The Share of International Transactions in U.S. Economic Activity (GNP)

Four quarters ending:	II/1986	I/1985	IV/1980	II/1976
Imports	11.3%	10.9%	11.5%	8.8%
U.S. Investment Abroad	1.7%	0.1%	4.0%	2.7%
Total	13.0%	11.0%	15.5%	11.5%
Net Foreign Investment in the U.S	2.8%.	1.4%	-0.5%	-0.9%
Foreign Investment in the U.S.	4.5%	1.5%	3.5%	1.8%

Source: National Income and Product Accounts Data, U.S. Bureau of Economic Analysis

Table 2
Changes in Real GNP(1982 Prices) by Sector: 1980 to 1985

Sector	1980	% of Total	1985 Actual	1985 with 1980 Composition	Composition Gain
Agriculture, Forestry and Fisheries	$ 76.2 billion	2.4%	$ 92.2 billion	$ 85.7 billion	$ 6.5 billion
Mining	135.6	4.3	130.6	152.5	-21.9
Construction	161.6	5.1	163.0	181.8	-18.8
Manufacturing	665.4	21.8	776.9	748.5	28.4
Transportation and Public Utilities	293.4	9.2	323.3	330.0	-6.7
Trade	500.4	15.7	604.3	569.2	35.1
Finance, Insurance and Real Estate	464.3	14.6	523.9	522.3	1.6
Services	442.6	13.9	538.5	497.9	40.6
Government and Government Enterprises	382.7	12.0	399.4	430.5	-31.1
Rest of World	55.7	1.7	37.0	62.6	-25.6
Statistical Discrepancy and Residual	9.4	0.3	3.9	10.6	-6.7
GNP	3,187.2	100.0	3,585.2	3,585.2	0.0

Source: U.S. Bureau of Economic Analysis.

Table 3
Business Fixed Investment as a Share of GNP*

Nominal Data	1980	1985	1986**
Business Fixed Investment	11.8% (11.6)	11.5 (11.6)	11.0% (10.9)
-Structures	4.2% (4.1)	3.9% (3.8)	3.5% (3.3)
-Equipment	7.6% (7.5)	7.6% (7.8)	7.5% (7.6)
Gross Domestic Fixed Investment	16.3% (16.2)	16.3% (16.5)	16.1% (16.1)
Real Data (1982 prices)			
Business Fixed Investment	11.9% (11.7)	12.9% (13.2)	12.5% (12.4)
-Structures	4.3% (4.3)	4.2% (4.20)	3.7% (3.5)
-Equipment	7.6% (7.5)	8.6% (9.0)	8.7% (8.9)
Gross Domestic Fixed Investment	16.2% (16.2)	17.8% (18.2)	17.7% (17.7)

*Final quarter for each period in parentheses
**Average for 1st 3 quarters of 1986

Source: U.S. Bureau of Economic Analysis.

Table 4
Growth Rates of the Capital-Labor Ratio and Productivity

Capital-Labor Ratio:

	Business Sector	Manufacturing	Non-Manufacturing	Farm	Non-Farm Non-Manufacturing
1980-85	1.0%	2.8%	0.5%	0.1%	0.6%
1976-80	-0.0	1.6	-0.5	5.2	-0.8
Difference	1.0	1.2	1.0	-5.1	1.4

Output Per Worker

1980-85	1.2%	4.2%	0.3%	7.4%	0.0%
1976-80	-0.3	0.9	-0.7	2.8	-0.9
Difference	1.5	3.3	1.0	4.6	0.9

Source: U.S. Bureau of Economic Analysis and U.S. Bureau of Labor Statistics.

Table 5
Money Stock Growth Rates In Selected Countries

	IV/84-II/86[1/]	III/81-IV/84
U.S.	12.0	8.0
U.K.	19.0[1/]	12.4
Canada	4.1	3.8
Belgium	6.7[1/]	4.2
France	7.6	9.9
Germany(M1)	7.7	5.9
(Central Bank Money)	5.3	5.6
Italy	11.6[1/]	13.5
Japan	5.6	4.2
Netherlands	6.8[2/]	7.5
Sweden(M3)	3.5	8.3
Switzerland	1.7	4.7

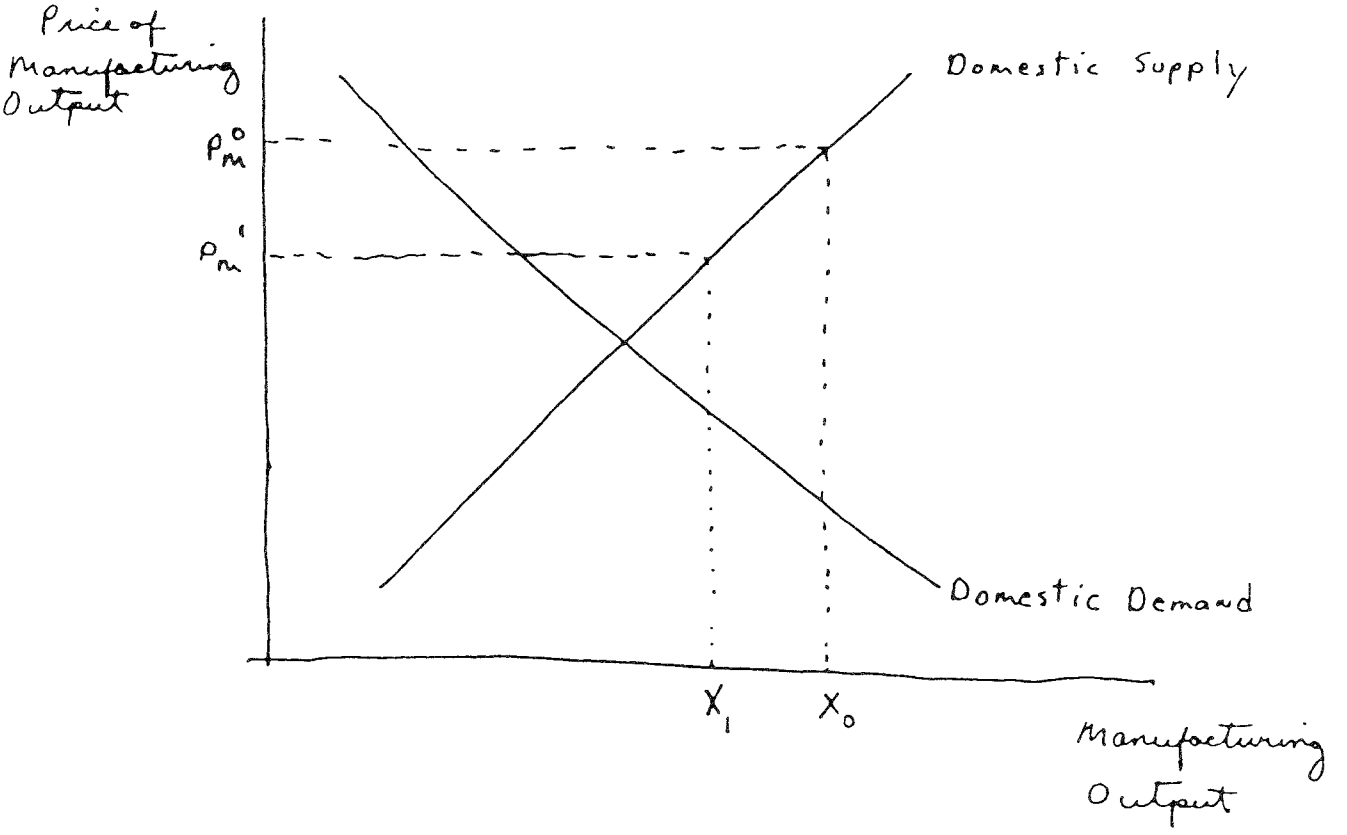
[1/] Period ends in I/1986

[2/] Period ends in IV/1985

Source: International Economic Conditions, Federal Reserve Bank of St. Louis.

Figure 1

An Exogenous Rise in The Dollar Reduces Output



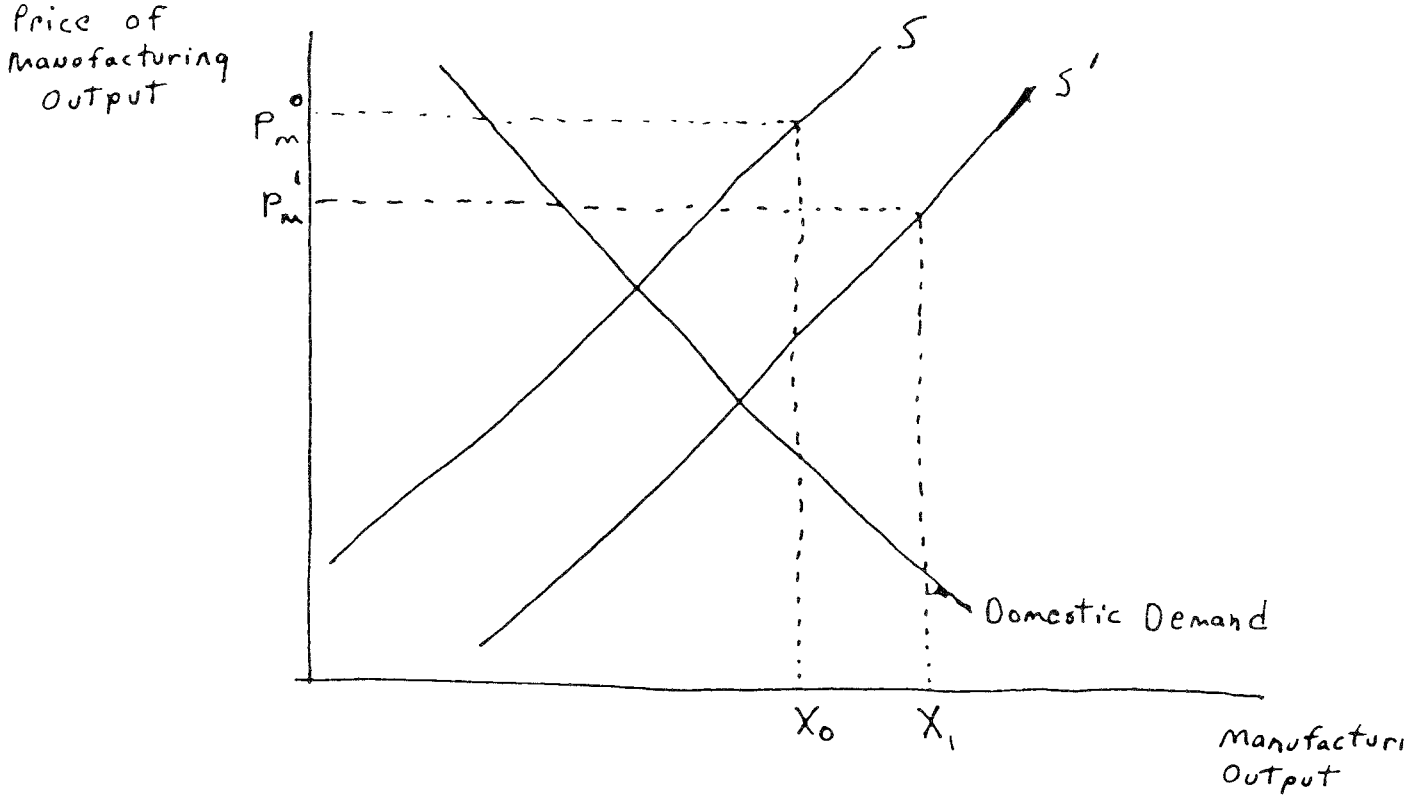
$P_m^0 = P_0^*/E_0$; P_0^* = foreign currency price

E_0 = value of the $ in foreign currency

$P_m' = P_0^*/E_1$, where $E_1 > E_0$

Figure 2

An Increase in Domestic Productivity Raises The Value of The Dollar



$$P_m^1 = P_0^*/E_1 \qquad E_1 > E_0$$

$$P_m^0 = P_0^*/E_0$$

CHART 1

U.S. MANUFACTURING OUTPUT AS A PERCENT OF REAL GNP

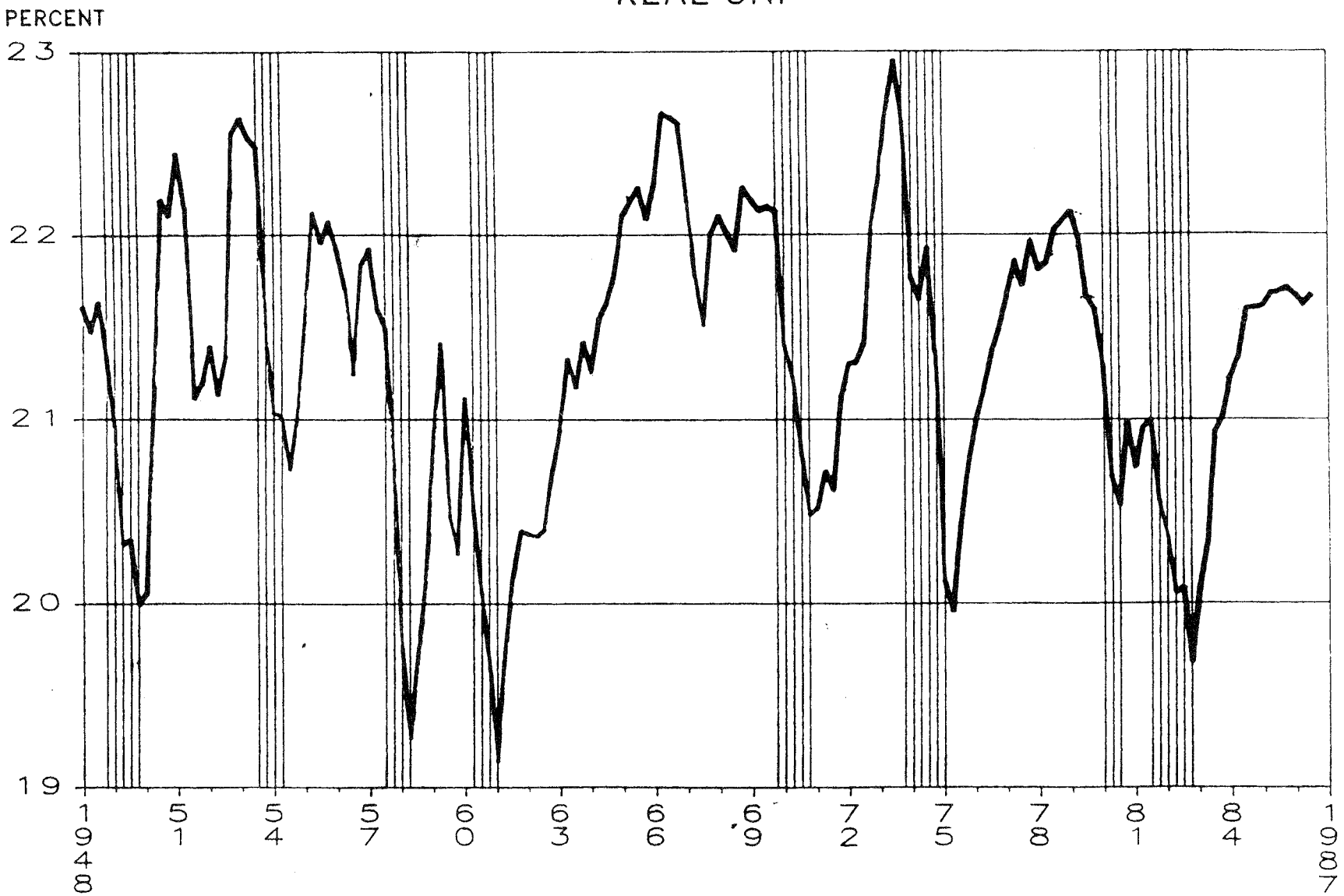
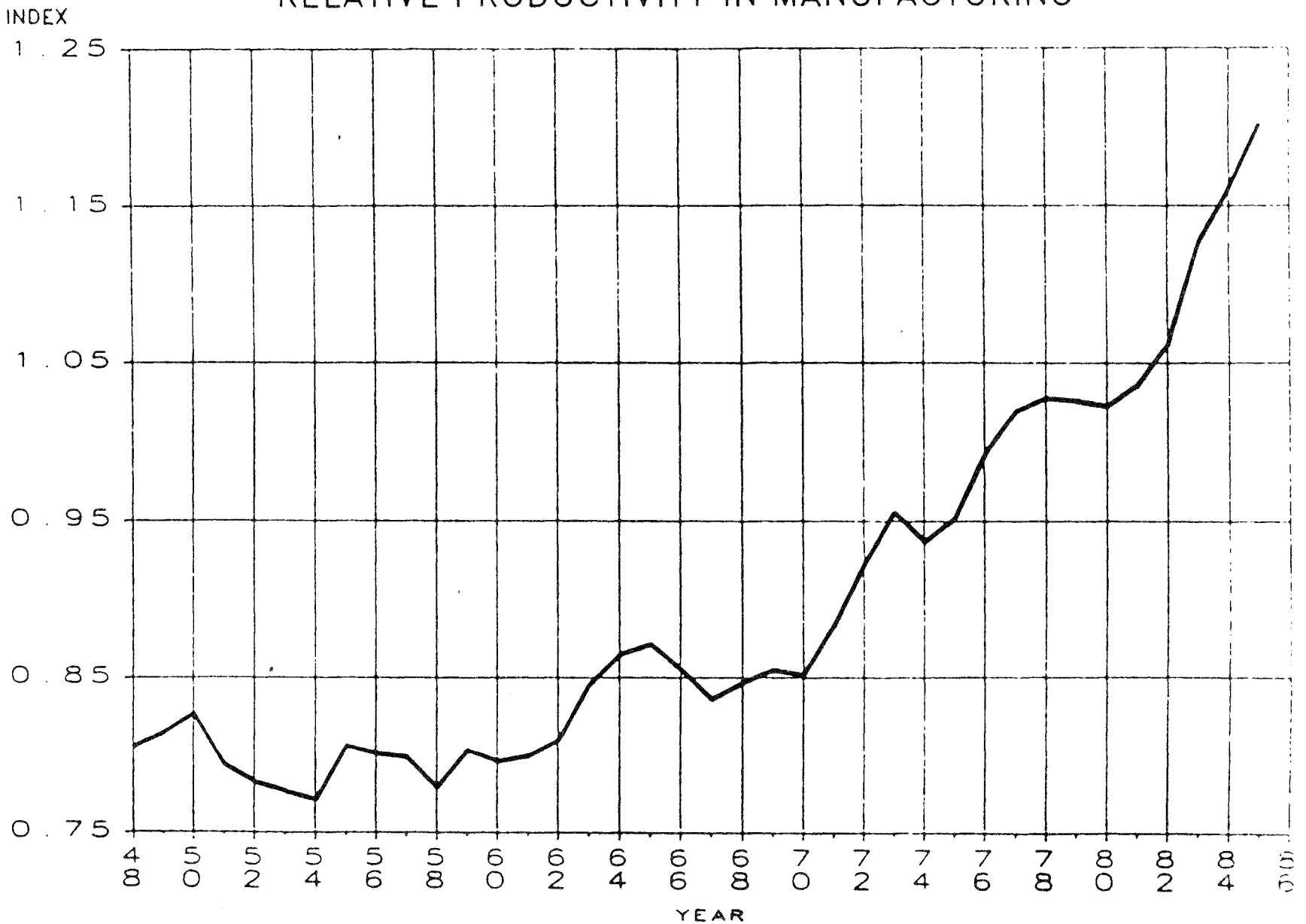


CHART 2

RELATIVE PRODUCTIVITY IN MANUFACTURING



APPENDIX

This appendix presents revised estimates of the cyclical demand relationship estimated in Tatom (1986) and used to test whether exchange rate changes depress domestic manufacturing output. In the equations below, XM is manufacturing output (1982 prices), X_t is real GNP in period t and TWEX is the Federal Reserve trade-weighted exchange rate for the dollar.

Revised Manufacturing Output Equation (Including TWEX)

III/1947-III/1980:

$$400\,\Delta\ln XM = \underset{(-5.44)}{-4.016} + \underset{(13.46)}{1.750}\,(400\,\Delta\ln X_t) + \underset{(3.74)}{0.487}\,(400\,\Delta\ln X_{t-1}) + \underset{(1.71)}{0.146}\,\Delta\ln TWEX_{t-3}$$

$\bar{R}^2 = 0.66$ S.E. = 6.36 D.W. = 1.93

III/1947-I/1986:

$$400\,\Delta\ln XM = \underset{(-5.78)}{-3.800} + \underset{(14.35)}{1.707}\,(400\,\Delta\ln X_t) + \underset{(4.05)}{0.484}\,(400\,\Delta\ln X_{t-1}) + \underset{(1.69)}{0.094}\,\Delta\ln TWEX_{t-3}$$

$\bar{R}^2 = 0.66$ S.E. = 6.15 D.W. = 2.01

Revised Manufacturing Output Equation (Without TWEX)

III/1947-III/1980:

$$400\,\Delta\ln XM = \underset{(-5.56)}{-4.122} + \underset{(13.37)}{1.750}\,(400\,\Delta\ln X_t) + \underset{(3.64)}{0.477}\,(400\,\Delta\ln X_{t-1})$$

$\bar{R}^2 = 0.66$ S.E. = 6.41 D.W. = 1.94

III/1947-I/1986:

$$400\,\Delta\ln XM = \underset{(-5.58)}{-3.660} + \underset{(14.23)}{1.703}\,(400\,\Delta\ln X_t) + \underset{(3.86)}{0.461}\,(400\,\Delta\ln X_{t-1})$$

$\bar{R}^2 = 0.66$ S.E. = 6.18 D.W. = 1.98

Simulation from III/47-III/80 Equation (Without TWEX)

	Actual	Predicted	Error
IV/1980	13.57	4.83	8.74
I/1981	3.12	11.70	-8.58
II	2.66	-2.81	5.46
III	2.60	-1.67	4.27
IV	-14.17	-13.12	-1.05
I/1982	-9.86	-17.46	7.60
II	-4.83	-4.93	0.11
III	-2.66	-9.16	6.51
IV	-7.40	-4.59	-2.81
I/1983	11.54	2.19	9.35
II	13.71	13.09	0.61
III	17.47	10.38	7.09
IV	8.67	10.99	-2.33
I/1984	13.35	15.60	-2.26
II	6.90	8.90	-2.01
III	7.17	2.28	4.89
IV	1.56	-0.43	1.98
I/1985	3.17	1.85	1.32
II	3.64	1.36	2.27
III	4.22	4.05	0.17
IV	2.38	1.39	0.99
I/1986	2.97	3.38	-0.41
II	-0.40	-1.31	0.91
III	3.30	1.10	2.20
Means	3.45	1.57	1.88
RMSE			4.76