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How Fixed Are Fixed Exchange Rates?: The Bretton Woods Case

by

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HOW FIXED ARE FIXED EXCHANGE RATES?

THE BRETTON WOODS CASE

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Abstract

The results in this paper suggest that a stabilized nominal exchange rate regime does not necessarily lead to stabilized real exchange rates.

I would like to thank my colleagues, especially Thomas R. Ireland, at the Department of Economics. However, any errors belong to the author.

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How Fixed Are Fixed Exchange Rates?

The Bretton Woods Case

The advantages and disadvantages of exchange rate flexibility have been quite extensively debated in the literature (Friedman, 1953). This has led to several policy initiatives which advocate targeting zones for particular currencies (Mckinnon (1986). An examination of the 1944-73 Bretton Woods Era of (adjustable) pegged exchange rates, however, suggests that targeted zones for particular currencies do not ensure stability in the international monetary system. While nominal exchange rates were stabilized, during the Bretton Woods period, real exchange rates were not only fluctuating, but they were as volatile as during the post Bretton Woods Era of a managed float.

One reason this issue has not been addressed is that existing trade-weighted exchange rate indices do not cover the Bretton Woods Era (years). The index developed here is very similar to the Federal Reserve index of the dollar which includes G-10 countries and Switzerland. The G-10 countries include Belgium, Canada, France, West Germany, Italy, Japan, the Netherlands, Sweden, the United Kingdom and the United States. The index used is

geometric, which eliminates a systematic upward bias produced by arithmetic averaging. A geometric index "averages the percentage changes in the individual exchange rates to determine the percentage change in the index," (Federal Reserve Bulletin, August 1978, p. 700).

The index used is also multilateral rather than bilateral. Multilateral exchange rate indices are better suited than bilateral indices for examining the complex effects of simultaneous interactions among similar exchange rates on trade, (Artus and Rhomberg, 1975; and Black, 1976). This study follows Black's definition of multilateral exchange rate indices as " ... a weighted average of the exchange rates of its [a country] trading partners, with all rates being measured relative to some base year, (p. 615)." Thus, each country's weights are based on that of the country's share of world trade.

Equation (1) is used to measure a geometric trade-weighted multilateral nominal exchange rate for the U.S. dollar, NER_t:

$$(1) \qquad NER_t = 100 \prod_{i=1}^{10} (R_{it})^{w_i} \qquad t=1,\ldots,T$$

where R_{it} is the exchange rate of currency i (per U.S. dollar) at time t over the exchange rate of the same currency (per U.S. dollar) at the base period.[1] The weight, w_i, is the world trade share of country i.

Taking a natural log of equation (1) gives

$$\log NER_t = \log 100 + w_1 \log R_{1t} + w_2 \log R_{2t}$$

$$+ \ldots + w_{10} \log R_{10t} \tag{2}$$

$$NER_t = \exp(\log 100) * \exp\left(\sum_{i=1}^{10} w_i \log R_{it}\right)$$

$$= 100 * \exp\left(\sum_{i=10}^{10} w_i \log R_{it}\right) \tag{3}$$

The <u>real</u> exchange rate version of the above index, RER_t, is calculated as:

$$RER_t = 100 * \exp\left(\sum_{i=1}^{10} w_i \log[R_{it}(P_{UST}/P_{it})]\right) \tag{4}$$

where P_{UST} and P_{it} represent U.S. and country i consumer price indices at time t. The real index is used to measure the international competitiveness of domestic manufacturing (Maciejewski, 1983).

Using equations (3 and 4), <u>nominal</u> and <u>real</u> effective exchange rates for the dollar are calculated for the period January 1957 to June 1986. These calculations use the period of January 1958 to December 1962 to represent an average basket of the respective weights, and January of 1960 as a base year for exchange rates.[2] These results are reported in Figures 1 and 2.

[Figures 1 and 2 approximately here]

To measure the volatility of these rates, normalized monthly percentage changes of both the nominal and real

effective exchange rates of the dollar for the periods of February 1957 to June 1968 and March 1973 to November

[Figures 3 and 4 approximately here]

1986 are calculated.[3] Figures 3 and 4 present the results. The percent changes during the 1968 - 1973 are intentionally excluded, since this was the period during which the Bretton Woods system was experiencing dramatic pressure before its ultimate collapse in 1973.

One may observe, from Figures 3 and 4, that the nominal exchange rate is obviously more volatile during the post Bretton Woods period of the managed float. However, the normalized percentage changes of the real effective exchange rate of the dollar clearly show the frequency and depth of fluctuations that existed during the Bretton Woods system, as compared to the post-Bretton Woods period of a managed float.[4] These results suggest that a stabilized nominal exchange rate regime does not necessarily lead to stabilized real exchange rates. Thus, domestic markets were not sealed off from changes in foreign competitive pressures, even during the Bretton Woods Era, a presumably stable period of adjustable pegged exchange rates.

APPENDIX A

The purpose of this appendix is to show that the use of alternative base years confirms the results derived in section one. These new calculations are based on the respective weights derived from the period of June 1973 to June 1975. June of 1973 is also used as a base year for respective exchange rates.

Figures A-1 and A-2 describe nominal and effective exchange rate for the U.S. dollar, using equations (3) and (4). These figures describe a similar trend--the same as the one one depicted in the text--for real effective exchange rate of the dollar. This similarity, however would be more obvious by recalculating the normalized monthly percentage changes of both real and nominal effective exchange rates (Figures A-3 and A-4).

[Figures A-1, A-2, A-3, and A-4 approximately here]

APPENDIX B

R_i: The monthly U.S. dollar exchange rate of the country i's currency. Board of Governors of the Federal Reserve System.

w_i: Annual average basket of the respective trade weights as a percentage of world trade, different issues of the Direction of the Trade.

P_i: The G-10 and Switzerland monthly CPIs are from different issues of the International Financial Statistics.

FOOTNOTES

1. Federal Reserve Bulletin, August, 1978.

2. In appendix A, nominal and real effective exchange rates are recalculated by using the period of January 1973 to December 1975 as an average basket of respective trade weights. June 1973 is also used as a base year for the exchange rate. This appendix establishes that the results in section one do not depend on the choice of base period and year.

3. The normalization process is carried out by subtracting the series from its average, and dividing the results over the original series's standard deviation. This process accentuates the fluctuations of a series, adjusting for the long run effects of the growing magnitude of the original series.

4. Specifications of data are explained in appendix B.

REFERENCES

Artus, J.R. and Rhomberg, R.R., 'A Multilateral Exchange Rate Model,' International Monetary Fund Staff Papers, November 1973, 20: 591-611.

Artus, J.R. and McGuirk, A.K., 'A Revised Version of the Multilateral Exchange Rate Model,' International Monetary Fund Staff Papers, June 1981, 28: 275-309.

Batten, D.S. and Belongia, M.T., 'Do the New Exchange Rate Indexes Offer Better Answers to Old Questions?,' The Federal Reserve Bank of St. Louis Review, May 1987 69: 5-17.

Belongia, M.T., 'Estimating Exchange Rate Effects on Exports: A Cautionary Note,' The Federal Reserve Bank of St. Louis Review, January 1986, 68: 5-16.

Black, S.W., 'Multilateral and Bilateral Measures of Effective Exchange Rates in a World Model of Traded Goods,' Journal of Political Economy, June 1976, 84: 615-21.

Federal Reserve Bulletin, August 1978.

Friedman, M., 'The Case for Flexible Exchange Rates,' in Essays in Positive Economics. Chicago: University of Chicago Press, 1953, pp. 157-203.

Henneberry, D., Drabenstott, M., and Henneberry, S., 'A Weaker Dollar and U.S. Farm Exports: Coming Rebound or Empty?' Federal Reserve Bank of Kansas City Economic Review, May 1987, 22-36.

Henneberry, D., Henneberry, S., and Tweeten, L., 'An Analysis of Trade-Weighted Foreign Exchange Rate Indices with Implications for Agricultural Trade," Agribusiness, 1987, 3: 189-206.

Hervey, J.L. and Strauss, W.A., 'The New Dollar Indexes are no Different From the Old Ones,' Federal Reserve Bank of Chicago Economic Review, July/August, 1987, 3-22.

Maciejewski, E.B., ''Real' Effective Exchange Rate Indices, A Re-Examination of the Major Conceptual and Methodological Issues,' International Monetary Fund Staff Papers, September 1983, 30: 491-541.

McKinnon, R.I., 'The Dollar Exchange Rate and International Monetary Cooperation,' in How Open is the U.S. Economy? Edited by R.W. Hafer, Lexington Books: Lexington, Mass., 1985, p. 211-31.

Ott, M., 'The Dollar's Effective Exchange Rate: Assessing the Impact of Alternative Weighting Schemes,' The Federal Bank of St. Louis Review,' February 1987, 69: 5-14.

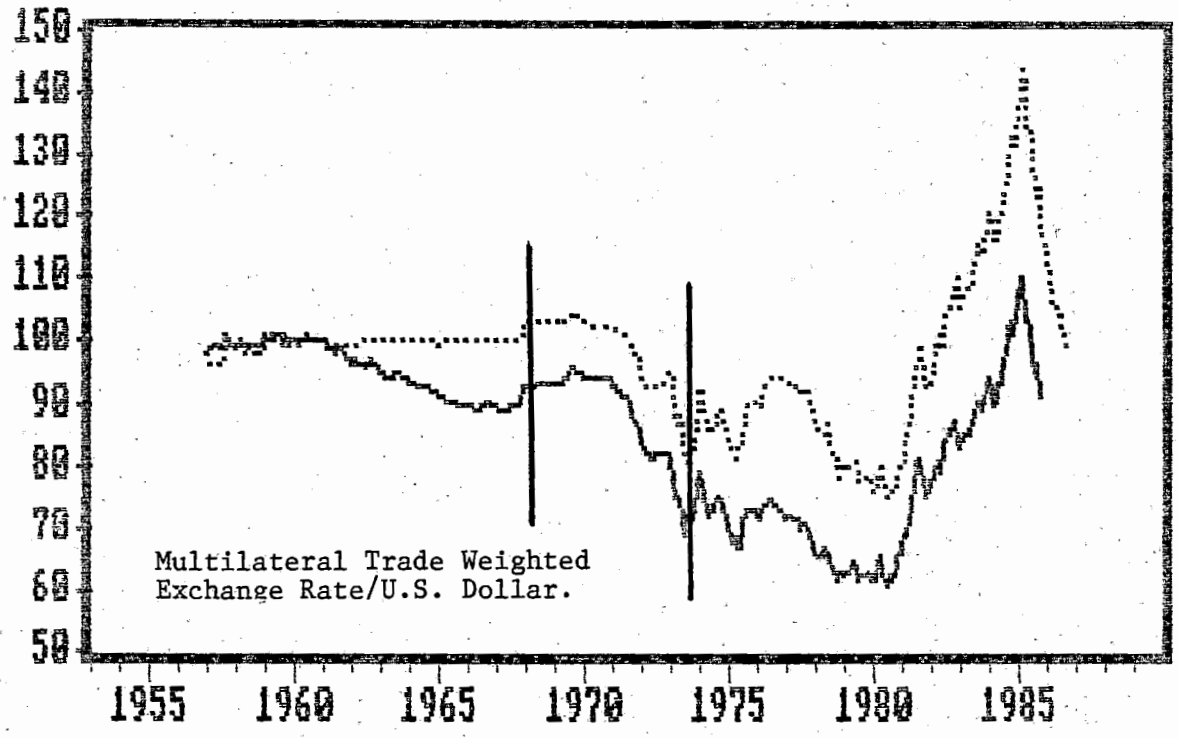


Figure 1, — Real ..... Nominal

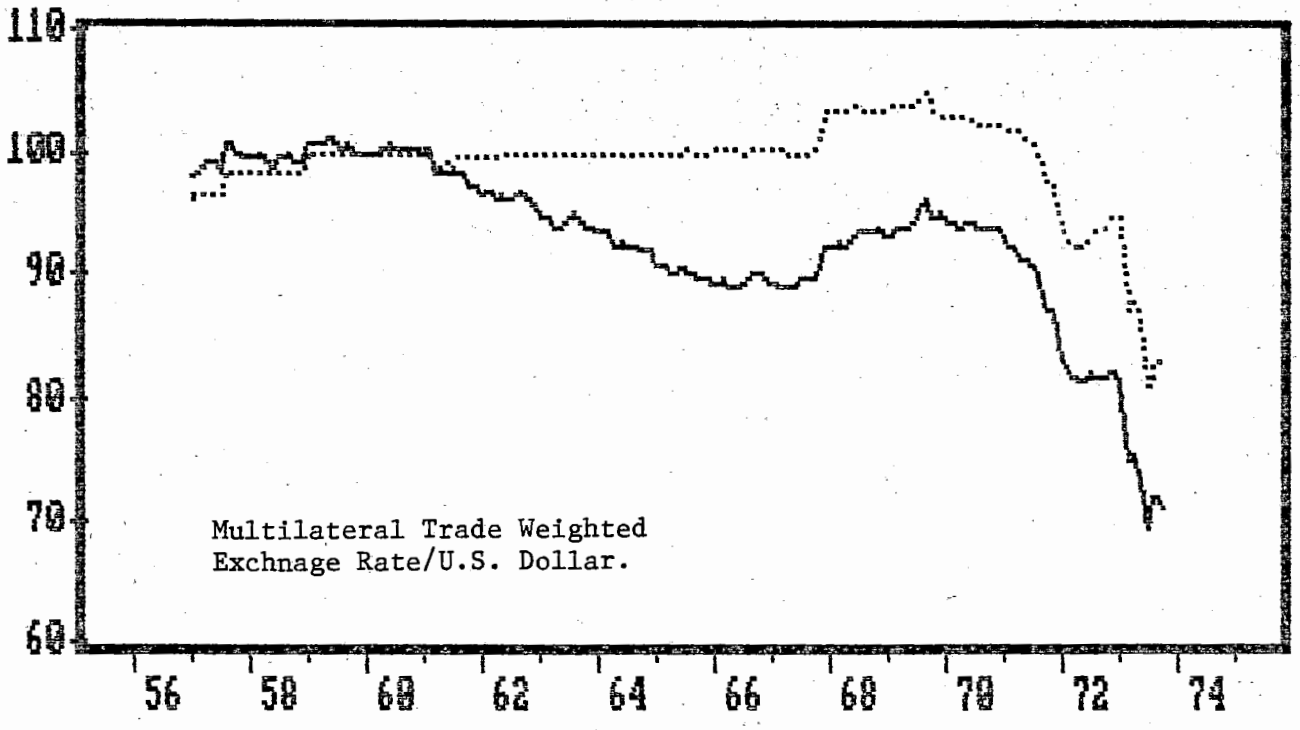


Figure 2 — Real ..... Nominal

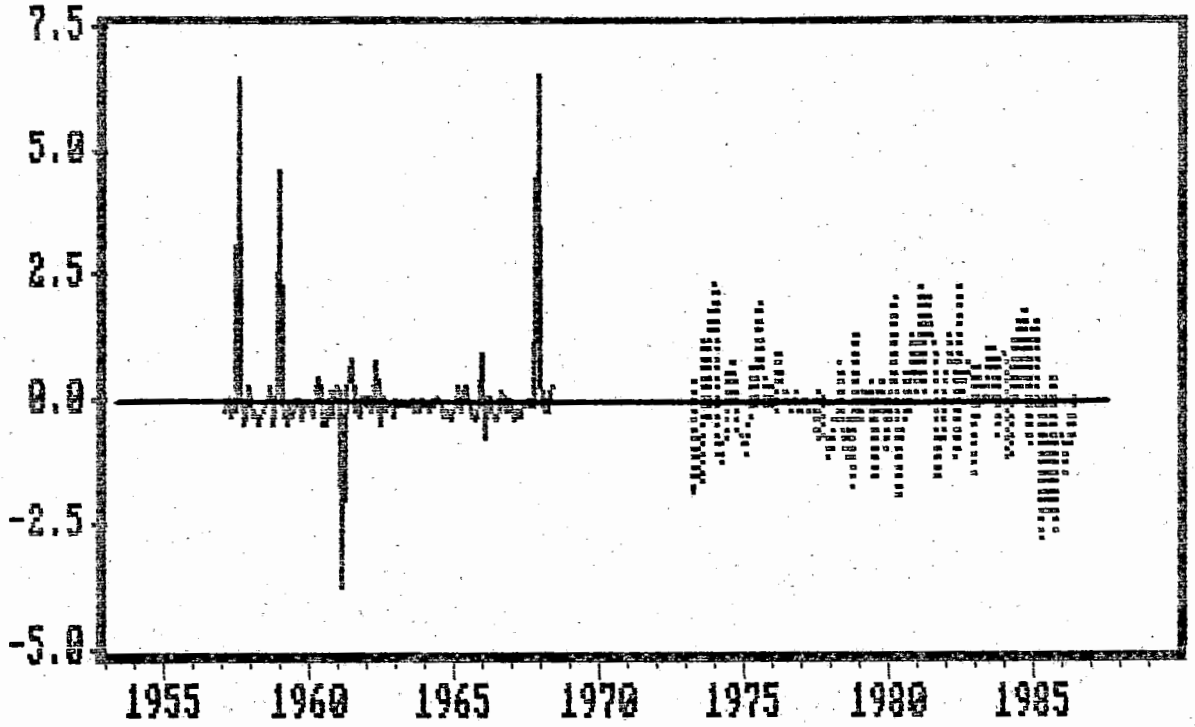


Figure 3, Nominal Effective Exchange Rate, Monthly Percentage Changes.

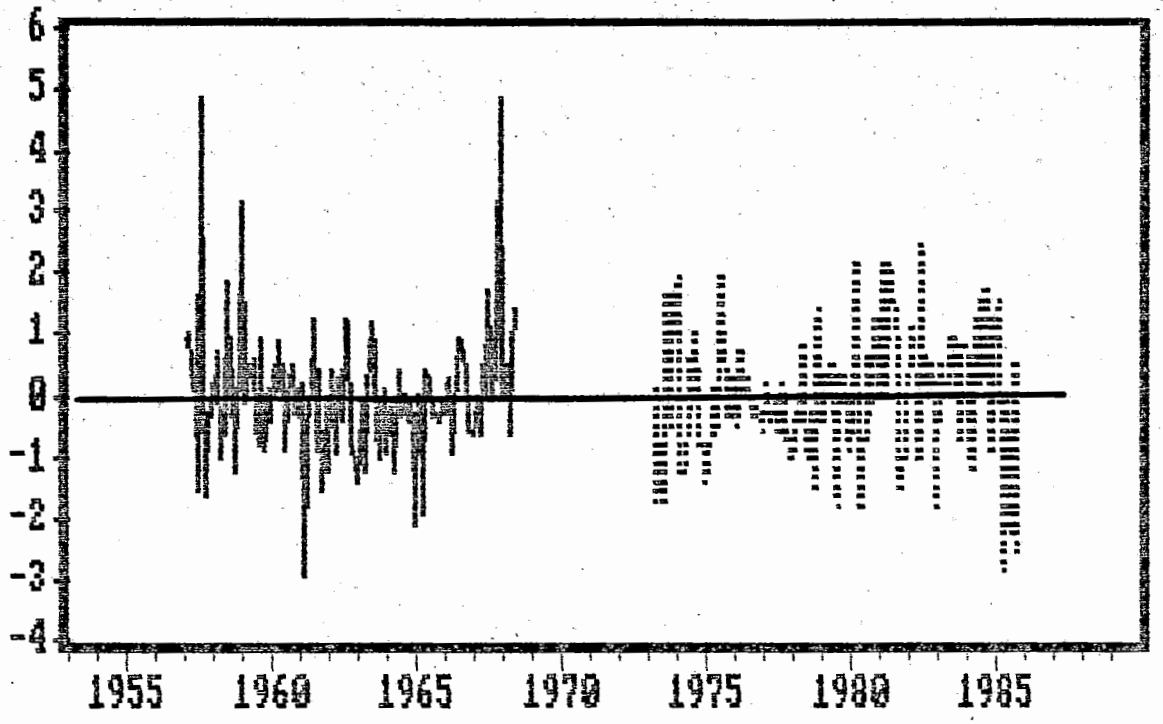


Figure 4, Real Effective Exchange Rate, Monthly Percentage Changes.

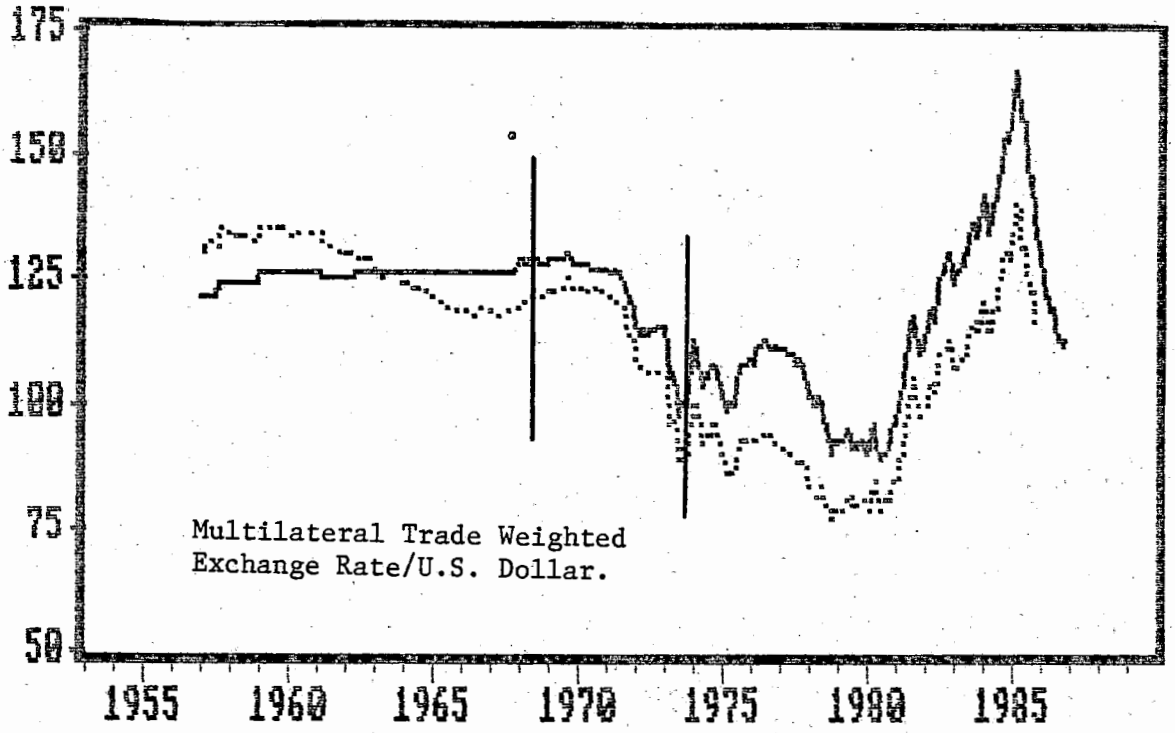
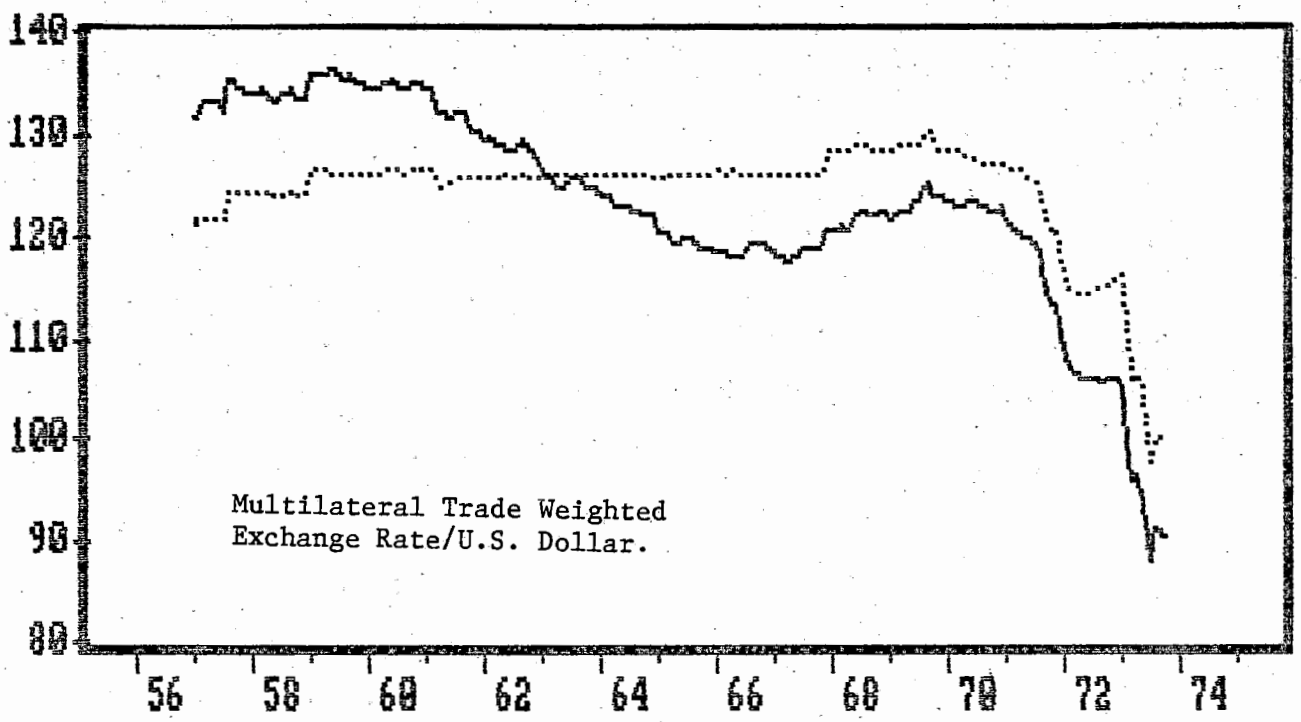


Figure A-1 ..... Real ——— Nominal



——— Real ..... Nominal

Figure A-2

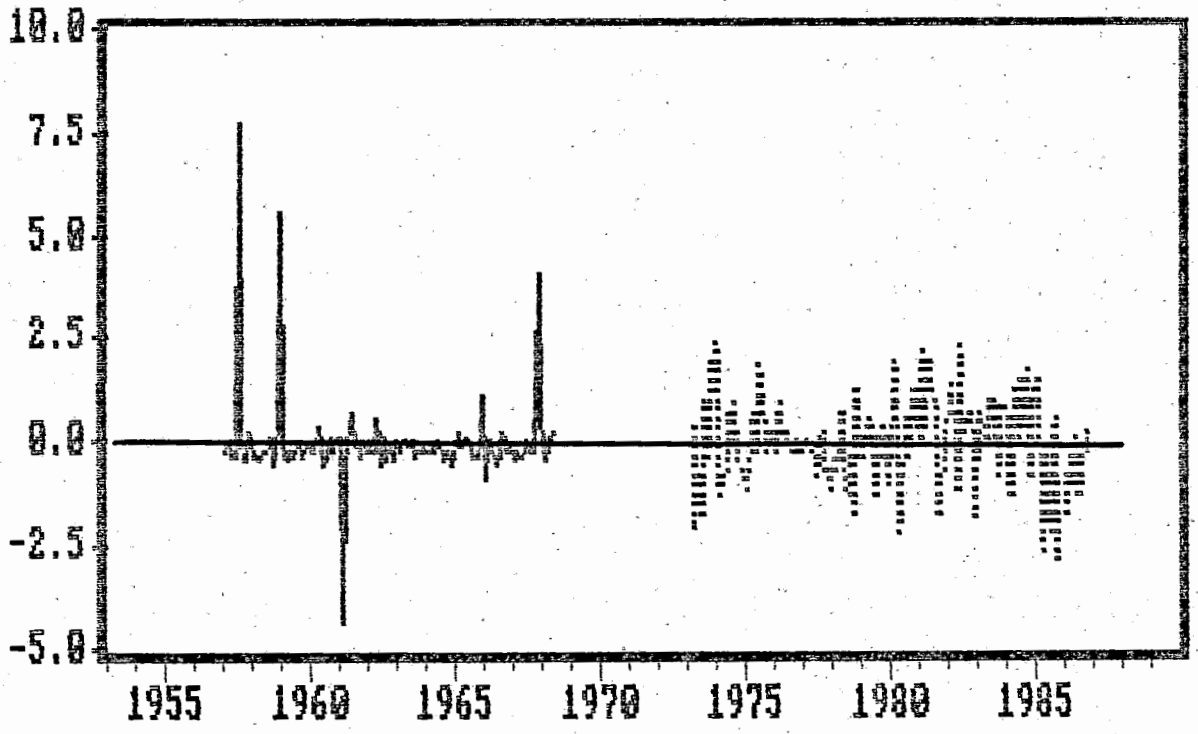


Figure A-3, Nominal Effective Exchange Rate, Monthly Percentage Changes.

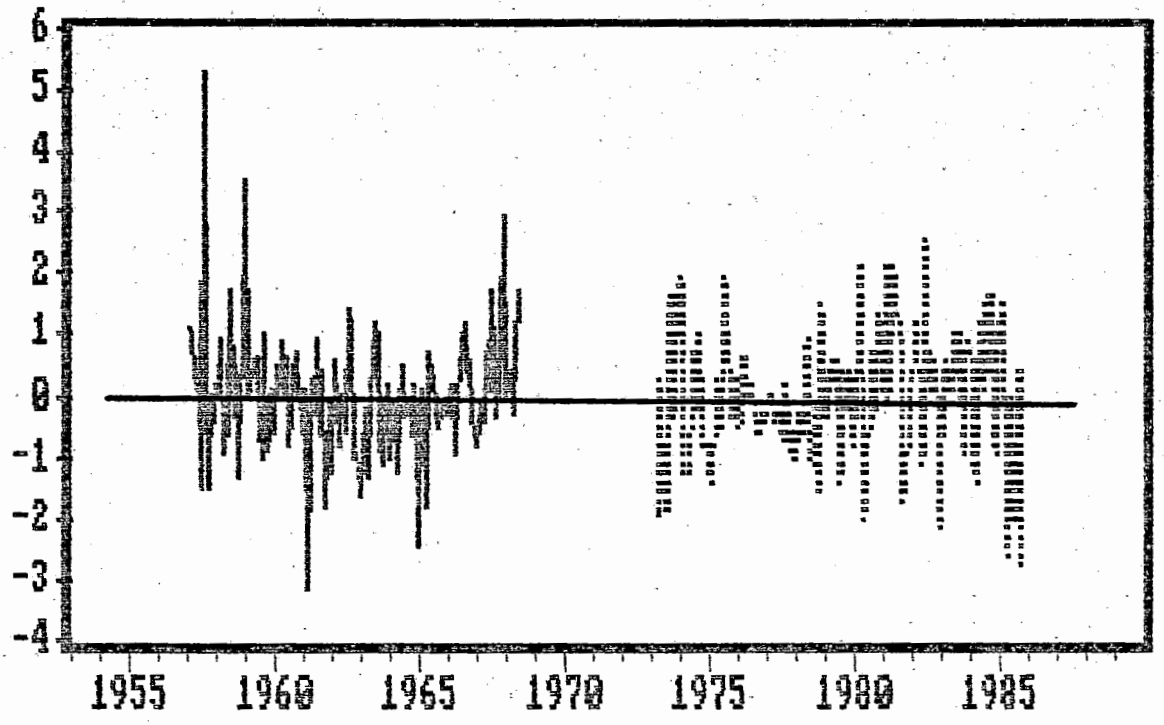


Figure A-4, Real Effective Exchange Rate, Monthly Percentage Changes.