INFORMATION TO USERS

This material was produced from a microfilm copy of the original document. While the most advanced technological means to photograph and reproduce this document have been used, the quality is heavily dependent upon the quality of the original submitted.

The following explanation of techniques is provided to help you understand markings or patterns which may appear on this reproduction.

1. The sign or "target" for pages apparently lacking from the document photographed is "Missing Page(s)". If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting thru an image and duplicating adjacent pages to insure you complete continuity.

2. When an image on the film is obliterated with a large round black mark, it is an indication that the photographer suspected that the copy may have moved during exposure and thus cause a blurred image. You will find a good image of the page in the adjacent frame.

3. When a map, drawing or chart, etc., was part of the material being photographed the photographer followed a definite method in "sectioning" the material. It is customary to begin photoing at the upper left hand corner of a large sheet and to continue photoing from left to right in equal sections with a small overlap. If necessary, sectioning is continued again – beginning below the first row and continuing on until complete.

4. The majority of users indicate that the textual content is of greatest value, however, a somewhat higher quality reproduction could be made from "photographs" if essential to the understanding of the dissertation. Silver prints of "photographs" may be ordered at additional charge by writing the Order Department, giving the catalog number, title, author and specific pages you wish reproduced.

5. PLEASE NOTE: Some pages may have indistinct print. Filmed as received.

Xerox University Microfilms

300 North Zeeb Road
Ann Arbor, Michigan 48106

Downloaded from SHAREOK. Persistent Handle URL: https://hdl.handle.net/11244/4132

76-24,369

OZMUN, Jon Day, 1936-
AN ANALYSIS OF MANAGED FLOATING EXCHANGE RATES: THE FRENCH FRANC, 1931-1938.

The University of Oklahoma, Ph.D., 1976
Economics, general

Xerox University Microfilms, Ann Arbor, Michigan 48106

THE UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

AN ANALYSIS OF MANAGED FLOATING EXCHANGE RATES: THE FRENCH FRANC, 1931-1938

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

BY

JON DAY OZMUN

Norman, Oklahoma

1975

AN ANALYSIS OF MANAGED FLOATING EXCHANGE

RATES: THE FRENCH FRANC, 1931-1938

APPROVED BY

John S. Hodgson, Chr.

James E. Hibdon

Alexander B. Holmes

Chy Lin

[illegible]

DISSERTATION COMMITTEE

ACKNOWLEDGEMENTS

I wish to acknowledge the valuable comments and criticisms offered during the course of this study by the members of my dissertation committee, Professors John Hodgson, Lex Holmes, Jim Hibdon, Chong Liew and Marion Phillips. To John Hodgson, my disseration director, teacher and friend, I owe an immense debt which I hope to repay in part by following the examples he set as a professor and researcher in economics.

Special thanks are due to Professor Ryan Ammacher and Sue Amacher, who helped gather valuable data without which the analysis of exchange rate effects on trade in Chapter V would have been impossible.

In addition, I owe thanks to the staff at the Northern Arizona Library for their efforts in obtaining materials through inter-library loan. Also I wish to thank Dean Frank Besnette and the economics area faculty of the College of Business Administration at Northern Arizona University for the special considerations extended to me while I was writing the dissertation.

Special thanks go to those who typed the dissertation--Jo Ann Lesko and her staff in the typing pool for work on the first drafts and Jackie Priser who worked quickly and competently to complete the final draft. Of course I accept responsibility for any remaining errors.

My deepest love is extended to my family--to Tish who held things together at home (and did a fantastic job) and to Tish, Peachi and Gretchen who continued to love me.

Finally I congratulate Jon Ozmun, who won a big battle with himself.

TABLE OF CONTENTS

		Page
ACKNOWLEDGMENTS		iii
LIST OF TABLES		vi
Chapter		
I.	INTRODUCTION . . . . . Focus of the Study; Reasons for Making this Study; Outline of the Study	1
II.	THE EXCHANGE STABILIZATION FUNDS: HISTORY AND OPERATION . . . . . Exchange Stabilization Funds; The British Exchange Equalization Account; The American Stabilization Fund; The French Attempt to Deflate Prices and the Popular Front; The French Exchange Stabilization Fund; The Question of Competitive Depreciation; Summary; Appendix II - Activity of the Funds	9
III.	AN ANALYSIS OF THE FRANC-POUND EXCHANGE RATE . . . . . The Model; Development of the Structural Model; Trade Influences; Capital Flow Influences; Official Intervention Influences; The Equilibrium Condition of the Model; The Basic Model as a Linear Equation; The Lag Structure of the Model	46
IV.	EMPIRICAL RESULTS AND COMPARISONS WITH OTHER STUDIES . . . . . Data; The Dummy Variables; Empirical Results; Preliminary Conclusions; Comparison with the Results of Other Studies	68
V.	AN ANALYSIS OF THE STABILIZATION FUNDS . . . An Evaluation of Exchange Market Intervention; Time-Series of the French Export Surplus; Empirical Results; Summary	116
VI.	SUMMARY AND CONCLUSIONS	157
APPENDIX A		164
APPENDIX B		191
BIBLIOGRAPHY		200

LIST OF TABLES

Table		Page
3-1	Predicted Signs of Coefficients of Explanatory Variables	67
4-1	Initial Test of Equation 16	82
4-2	Test of Equation 16 with "High-Powered" British and French Intervention Dummy Variables	88
4-3	Test of Equation 16 with "High-Powered" Intervention Dummies and French Industrial Production	90
4-4	Initial Estimation of Equation 17	93
4-5	Estimation of Equation 17 with "High-Powered" British and French Intervention Dummy Variables	95
4-6	Estimation of Equation 17 with "High-Powered" Intervention Dummies and French Industrial Production	98
4-7	Final Test for Equation 16 with Insignificant Variables Omitted	100
4-8	Final Test for Equation 17 with Insignificant Variables Omitted	101
4-9	Summary of Results from Hodgson's Study of the Dollar-Pound Rate, 1919-1925	107
4-10	Summary of Results from Hudgin's Study of the Dollar-Pound Rate, 1931-1938	109
4-11	Summary of Thomas' Study of Six Exchange Rates Involving the U.S. Dollar, 1920-1924	112
5-1	Terms of Trade Index Numbers	124
5-2	Index Number Series, TOT (t)/TOT (t-1)	125
5-3	Analysis of Intervention Activity-BEEA	127
5-4	Analysis of Intervention Activity-FESF	128

Table		Page
5-5	Summary of Intervention Activity by BEEA and FESF (Assumption No. 1)	131
5-6	Index Number Series,TOT (t)/(Average of Past Three Months TOT)	132
5-7	Analysis of Intervention Activity-BEEA	133
5-8	Analysis of Intervention Activity-FESF	134
5-9	Summary of Intervention Activity by BEEA and FESF (Assumption No. 2)	135
5-10	Index Number Series, TOT (t)/TOT Trend	137
5-11	Analysis of Intervention Activity-BEEA	138
5-12	Analysis of Intervention Activity-FESF	139
5-13	Summary of Intervention Activity by BEEA and FESF (Assumption No. 3)	140
5-14	Final Summary of Intervention Activity by BEEA and FESF	141
5-15	Predicted Signs of Coefficients of Explanatory Variables	147
5-16	Initial Estimation of Equation 5	151
5-17	Estimation of Equation 5 with Lagged TOT . . .	152
5-18	Estimation of Equation 6 with Lagged TOT . . .	154
A-1	Franc-Pound Exchange Rate (Francs/Pound) . . .	165
A-2	Wholesale Price Index-France (1913=100)	166
A-3	Wholesale Price Index-UK (1913=100)	167
A-4	Ratio of Wholesale Price Indices (France/U.K.)	168
A-5	Index of French Employment Level (1929=1000) .	169
A-6	Index of U.K. Employment Level (1929=1000) . .	170

Table		Page
A-7	Index of Industrial Production-France (1913=100)	171
A-8	Ratio of French to U.K. Employment Level (1929=1.000)	172
A-9	Ratio of French Industrial Production to U.K. Employment Level	173
A-10	Money Supply-France (MM Francs)	174
A-11	Money Supply-U.K. (MM Pounds)	175
A-12	Ratio of French to U.K. Money Supply	176
A-13	% Interest Rate Differential (r_f-r_{uk})	177
A-14	FESF Intervention Dummy Variable-Regular	178
A-15	FESF Intervention Dummy Variable-High Powered	179
A-16	BEEA Intervention Dummy Variable-Regular	180
A-17	BEEA Intervention Dummy Variable-High Powered	181
A-18	Seasonal Dummy Variables-Spring, Summer and Fall (SSF)	182
A-19	D_1 Dummy, United States Dollar Devaluation	183
A-20	D_2 Dummy, The Paris Riots	184
A-21	D_3 Dummy, The Flights from the Franc	185
A-22	D_4 Dummy, The Deflation Policy of the Laval Administration	186
A-23	D_5 Dummy, The Election and Social Reforms of the Popular Front Government	187
A-24	D_6 Dummy, The Pause in the Social Reforms	188
A-25	D_7 Dummy, The "Panic" Regarding the French Treasury	189
A-26	D_8 Dummy, The Declaration of Rambouillet	190
B-1	French "Real" net Exports to U.K.	192

Table		Page
B-2	Terms of Trade ($P_{f/P_{uk}}$ x 1/ER)	193
B-3	U.K. Index of Level of Employment	194
B-4	French Index of Level of Employment	195
B-5	Terms of Trade-Lagged One Month	196
B-6	U.K. Index of Level of Employment-Lagged One Month	197
B-7	French Index of Level of Employment-Lagged One Month	198
B-8	Seasonal Dummy Variables (S_1 = 1st Quarter, S_2 = 2nd Quarter; S_3 = 3rd Quarter)	199

AN ANALYSIS OF MANAGED FLOATING EXCHANGE RATES: THE FRENCH FRANC, 1931-1938

CHAPTER I

INTRODUCTION

This study will analyze the fluctuations in French franc-British pound exchange rate and the development of exchange stabilization funds during the period 1931-1938. The study of franc-pound exchange fluctuations during this period allows for an examination of the determinants of exchange rate levels and changes under a system of managed or "dirty" floating exchange rates. Britain left the gold standard in September 1931 and in the period which followed until May 1938 the pound was free to float against the franc. During this period, both countries established stabilization funds for the purpose of intervening in the foreign exchange market to influence the level of the franc-pound exchange rate. The British established the Exchange Equalization Account (BEEA) in 1932 for the purpose of smoothing out unduly wide fluctuations in the pound's exchange rate, but not to resist appreciations or depreciations resulting from fundamental

economic forces. In October 1936 with the passage of the law officially devaluing (with respect to gold) the franc, the French created the Exchange Stabilization Fund (FESF). The expressed purpose of the FESF was to keep exchange fluctuations of the new national monetary unit within well defined limits.

While the franc remained tied to gold, the gold value of the pound after September 1931 was determined by the market forces of supply and demand. Thus the pound was not tied to gold and therefore the franc-pound exchange rate fluctuated according to market forces, subject to the activities of the BEEA and FESF.

Focus of the Study

Against this historical background, attention will be paid to (a) an analysis of the fluctuations in the franc-pound exchange rate from September 1931 through April 1938 including the influence on this exchange rate of fundamental economic forces and the intervention in the exchange market by the BEEA and the FESF, (b) an investigation into the question of competitive depreciation which may or may not have resulted from the activities of the two stabilization funds, and (c) a study of the effects of the franc-pound exchange rate on trade between France and the United Kingdom and arising out of the investigation of these three factors, an answer to the following questions:

1. What was the effect on the monthly average franc-pound exchange rate of the following:
   a. the magnitude of fundamental economic variables in France and the United Kingdom such as price levels, real income levels, and nominal money stocks
   b. interest rate differentials
   c. seasonal and trend effects
   d. intervention by the BEEA and FESF
   e. psychological forces arising out of non-quantifiable economic, political or social events such as the Paris riots in 1934 and the "flight from the franc" in 1935-1936.
2. Did either the BEEA or FESF act to manipulate the exchange rate to gain an advantage in international trade, i.e. do their activities support the commonly accepted notion that this was a period of competitive depreciations?
3. Does the evidence from this period suggest that the export surplus of France and the United Kingdom was significantly influenced by the franc-pound exchange rate and relative price levels in the two countries as suggested by international trade theory?

Reasons for Making this Study

On August 15, 1971, President Nixon officially broke the tie between the dollar and gold and thus destroyed the foundation for the adjustable peg international exchange rate system adopted by the member nations of the International Monetary Fund at Bretton Woods, New Hampshire, in 1944. For most of the period since, currencies have been allowed to "float" relative to each other and exchange rates have more or less been determined by market forces. There is strong evidence that some exchange rates, notably the yen-dollar, franc-dollar and mark-dollar, have been subject to manipulation by official sources. This has given rise to the description of the recent period in the foreign exchange markets as a period of "dirty" floats.

However one chooses to describe the present international exchange rate system, it is in marked contrast to the previous adjustable peg system. Accordingly, there is much discussion about the viability of a floating exchange rate system and a clamor by many for a quick return to some variant of the fixed exchange rate system. The debate over alternative exchange rate systems has a lengthy history, yet very little empirical evidence is available for those responsible for making the choice of systems.

The major purpose of this study is not to answer directly the question of which is the better exchange

rate system, freely foating, managed floating or some variation of fixed rates. Instead, this study seeks to provide a careful analysis of a period during which exchange rates floated subject to official intervention in the market. It is hoped that this study will stand with the growing body of literature which seeks to provide more than just casual evidence regarding periods when exchange rates were neither fixed nor subject to adjustable "bands." The premise of this study is that when historical experience is subjected to careful analysis, it can be a source of useful information to decision makers faced with the problem of constructing a new monetary system.

An investigation of the fluctuations in the franc-pound exchange rate during the 1930's is of major interest for the following reasons:

1. The three major currencies of the world during this period were the dollar, the franc and the pound. During much of the period, the dollar-franc rate was fixed but the dollar-pound and the franc-pound rates both floated, subject to some official management. Managed floats are a possibility and in some cases a reality in today's international monetary system, yet evidence about similar historical episodes is scarce. A study of the dollar-pound exchange rate during the 1930's has recently been made

and is referred to in a later section. On the other hand, no examination of the franc-pound rate has been undertaken and this would appear to be the more important in terms of the lessons to be learned. Since international trade had a much more pervasive influence on the French economy than the American economy during this period, exchange rate levels presumably would have had a more distinct impact on such real variables as the export surplus, employment, production and income.

2. The period under investigation is similar to today in that both episodes involve major international disruption. During the 1930's, the world was in the throes of a major economic depression, while today price inflation is present in every major non-communist industrial nation. The lessons learned from the experiences of the 1930's should be valuable today.

3. Of a more academic interest is the question regarding "competitive devaluation" or "competitive depreciation." Partly because many countries established stabilization funds during this period, and partly because there was a series of devaluations and continuing depreciations during the period, it is commonly argued that

the 1930's was nothing but a series of competitive devaluations. To my knowledge, only one other study has attempted to analyze empirically the roles of any of the stabilization funds, and no study has been made to determine the roles and effects of the BEEA and FESF on the franc-pound exchange rate. This study attempts to assess the validity of the claim regarding competitive devaluations by careful analysis of intervention by the two funds.

4. During the 1930's, French trade deteriorated and the nation remained mired in the trough of the depression long after recovery had begun in the United States and the United Kingdom. To my knowledge, no one has attempted to empirically analyze the relationship between the level of export surplus and the level of the franc-pound exchange rate together with the relative price levels in France and the United Kingdom. This study attempts to show that the exchange rate and relative prices had a significant effect on the level of the French export surplus and therefore on the level of production and employment in France.

Outline of the Study

The study will proceed as follows:

Chapter II will present a brief discussion of the events leading to the demise of the gold standard and the development and operation of the exchange stabilization funds. An analysis of the question of competitive depreciations concludes the chapter.

Chapters III and IV present an analysis of the franc-pound exchange rate from 1931 through 1938. In Chapter III, a theoretical model is developed for analyzing fluctuations in the exchange rate. Chapter IV is divided into three sections: First a discussion of the data used in the analysis is presented; a second section provides results of the estimates obtained through econometric analysis as well as comments on these results. Finally, a third section provides a comparison of the results of the present study with other studies of floating exchange rates during the 1930's and other periods.

Chapter V first considers the effect that the BEEA and FESF had on the terms of trade between France and the United Kingdom. A second section examines the relationship between the terms of trade and the export surplus of France with Britain.

Chapter VI summarizes the conclusions drawn regarding the questions raised in the study.

CHAPTER II

THE EXCHANGE STABILIZATION FUNDS: HISTORY AND OPERATION

The decade of the thirties saw profound changes in the international monetary system. As the decade began, the Western industrial world was experiencing a severe depression and the exchange rates between the major currencies were being maintained in a fixed relationship through the international gold standard.

The British pound sterling after being allowed to "float" from 1919-1925 was given a fixed value in terms of gold on May 13, 1925, with the passage of the Gold Standard Act.[1] The United States dollar had returned to the full gold standard in 1919. By the end of 1925, thirty-five currencies had been stabilized on gold or were pegged to gold standard currencies. A notable exception was the French franc. Largely because of the carry-over effects from World War I,

---

[1]Two empirical studies of this period of floating exchange rates are John S. Hodgson, "An Analysis of Floating Exchange Rates: The Dollar-Sterling Rate, 1919-1925," The Southern Economic Journal (October 1972), 249-57, and Lloyd B. Thomas, "Behavior of Flexible Exchange Rates: Additional Tests from the Post War I Episode," The Southern Economic Journal (October 1973), 167-82.

France experienced a rather severe inflation during the early 1920's. From 1922 through 1926, the franc exhibited extreme instability relative to the pound and the dollar.[2] From the end of 1926 until June 1928, the franc was stabilized de facto by official dealings of the Bank of France in the foreign exchange market. The value of the franc was fixed in terms of gold on June 25, 1928.

Before the end of the 1930's each of these currencies--the dollar, pound, and franc--had left the gold standard either temporarily or permanently and a new type of international monetary system was in operation: a system of managed floating exchange rates.

Exchange Stabilization Funds

Each country which left the gold standard and proceeded to establish an official organization for the purpose of intervening in the exchange market had a somewhat different list of reasons for so doing. In general, however, it was agreed that a continuation of the gold standard was inconsistent with viable domestic economic policies for dealing with the problems of falling incomes, production, and

---

[2]The franc depreciated suddenly from a high of 9.23 cents in April 1922 to a low of 3.49 cents on March 8, 1924. After rising to 6.71 cents in April 1925, the franc depreciated again to a low of 2.05 cents during July 1926. Raymond Poincare, a fiscal conservative, formed a cabinet on July 22, 1926, and the franc began a slow appreciation to approximately 4.0 cents by December 1926. Leland B. Yeager, International Monetary Relations (New York: Harper and Row, 1966), pp. 280-85.

employment. Adherence to the strict tenets of the international gold standard immobilized domestic monetary policy and it was felt that an expansion of the credit base was a prerequisite to ending the depression.[3] The immediate past experience with freely floating exchange rates had convinced many government leaders (and economists as well) that such a system was highly unstable and produced disruptive effects on trade and therefore on production and employment.[4] The managed exchange rate system of the thirties was thus born of apparent necessity and represented a compromise between the principle of national sovereignty over monetary policy and the principle of adaptation to the requirements of an international monetary system.

---

[3]"Devaluation was felt to be necessary, and was used, chiefly as a means to obtain freedom of national action in combating depression, in maintaining or revising aggregate demand and employment at home. No country achieved recovery without some measure of monetary expansion." Ragnar Nurske, International Currency Experience (League of Nations, 1944), p. 130.

[4]For instance see arguments by Nurske, Currency, pp. 117, 118 and 211. Such assertations regarding the innate instability of freely fluctuating exchange rates are not supported by recent empirical studies of such episodes. Broad swings in the exchange rate tend to follow rather closely broad swings in macrovariables. See for instance Hodgson, Southern Economic Journal; Thomas, Southern Economic Journal; John S. Hodgson, "An Analysis of Exchange Rate Behavior under a Managed Floating Regime," presented at the annual meetings of the Western Economics Convention, San Diego, California, June 1975; M. Hudgins and J. K. Whitaker, "The Exchange Equalization Account and Sterling: An Empirical Study of the Floating Pound of the 1930's" (unpublished manuscript, University of Virginia, 1974); and Chapter IV of this study.

Individually, the British, American, and French exchange stabilization funds sought widely different goals and their organization and operations reflected these differences. Each of these funds was a "collection of assets segregated under a central control for the purpose of intervention in the exchange market to prevent undesirable fluctuations in exchange rates."[5] A key to the differences in the funds lies in understanding how each defined "undesirable fluctuations" in exchange rates.

The British Exchange Equalization Account

Britain left the gold standard in September 1931[6] basically because its position as a world banker was threatened by adverse events on the European continent. Before devaluation, Britain was loaning to the rest of the world on long-term, but this was not being made possible by an export surplus. In fact, the British balance of trade had been in chronic deficit since 1924.[7] The outflow of long-term capital was being financed by a compensating inflow of short-term loans from the rest of the world. This put

---

[5]Nurske, Currency, p. 143, with emphasis added.

[6]While Britain was the first of the major industrial nations to devalue its currency in terms of gold, it was not the first country to abandon the gold standard. Seven other countries preceded her: Uruguay, Argentina, and Brazil in 1929; Australia, New Zealand, and Venezuela in 1930, and Mexico in 1931. Yeager, Monetary Relations, p. 299.

[7]Milton Gilbert, Currency Depreciation (Philadelphia: University of Pennsylvania Press, 1939), Table 18, p. 44.

the British banking system (and therefore the pound) in a vulnerable position should a withdrawal of the short-term loans occur.

Two events in the summer of 1931,[8] the failure of the Danat Bank in Germany followed by the Macmillian report, stimulated the capital flight from the pound and the subsequent devaluation. The Danat Bank suffered a run on its assets following the bankruptcy of one of its customers, the largest textile firm in Germany. The bank re-opened a month later, but operated under restrictions, among which was the immobilization of funds owed by Germans to foreign banks. This effectively froze L 70 million of British short-term claims against foreigners.[9] The Committee on Finance and Industry then issued the Macmillian report which inopportunely called attention to the deficit in Britain's short-term capital account.[10] Sterling depreciated to the gold export point and gold flowed out of the United Kingdom. The pound left the gold standard on September 21, 1931, in order to protect the London money market from a continued flight of funds.

---

[8]Gilbert, Currency Depreciation, p. 296.

[9]Yeager, Monetary Relations, p. 296.

[10]Britain's short-term claims on foreigners amounted to L 153 million of which 270 million were frozen in Germany while short-term claims against Britain were in excess of L 400 million. Yeager, Monetary Relations, p. 297.

The pound was allowed to float free from any official intervention for a period of approximately seven months until on April 19, 1932, Neville Chamberlain, Chancellor of the Exchequer, established the British Exchange Equalization Account (BEEA or Account) as part of the Finance Bill.[11] The explicit purpose of the BEEA according to Chamberlain was to:

> . . . smooth out the variations in exchange caused by three sets of phenomena: (1) the seasonal fluctuations; (2) the operations of speculators, which increase those seasonal fluctuations, and other fluctuations, too; and (3) this special flight of capital from other countries for the sake of finding a safer place to stop for a time.[12]

Harris cites British officials as "having steadfastly declared that the establishment of the BEEA was to eliminate unnecessary fluctuations in sterling and not to maintain it at a level below that determined by fundamental forces."[13]

Other sources attributed a larger set of goals to the BEEA which included protection from liquidity changes

---

[11]W. A. Brown, Jr., The International Gold Standard Reinterpreted 1914-1934 (New York: NBER, 1940), II, 115.

[12]This statement attributed to Chamberlain in 1933 appears in L. M. Pumphrey, "The Exchange Equalization Account of Great Britain, 1932-1939: Exchange Operations," American Economic Review, XXXII (December 1942), 803.

[13]Seymour E. Harris, Exchange Depreciation (Cambridge: Harvard University Press, 1936), p. 402. The obvious problem for any fund with such objectives is how its managers are to distinguish between exchange rate movements caused by fundamental forces and those resulting from speculative forces.

produced by hot money flows,[14] safeguarding the British economy from the effects of imported deflation, accumulation of a large gold and foreign exchange reserve and stimulation of exports through a deliberate undervaluation of sterling.[15] It was this last possibility which generated the majority of the controversy associated with stabilization accounts and led to claims that the 1930's constituted a period of competitive exchange depreciations.[16] One can conclude from these statements that a certain amount of disagreement existed with regard to the objectives pursued by the Account.[17]

The method of operation by the BEEA is well documented

---

[14]Yeager, Monetary Relations, p. 238, and Charles P. Kindleberger, International Economics (4th ed.; Homewood, Illinois: Richard D. Irwin, 1968), p. 354.

[15]Paul Einzig, The History of Foreign Exchange, pp. 288-289.

[16]Nurske, Currency, pp. 122-33; Gilbert, Currency Depreciation, pp. 1-4, 86-88, and 156; Harris, Exchange Depreciation, chap. i.

[17]An investigation into the effects of the exchange market intervention by the BEEA (as well as the French Exchange Stabilization Fund) will be the subject of Chapter V of this study. The issue of competitive depreciation involving the BEEA and the American Stabilization Fund was the subject of an earlier study by Hudgins, who found no conclusive evidence that either the BEEA or the American Stabilization Fund engaged in competitive depreciation with regard to their intervention in the dollar-pound exchange market. M. Hudgins, "Currency Exchange Rate Fluctuations Under a System of Stabilization Funds: The Case of the Pound-Dollar Rate, 1931-1938" (unpublished Ph.D. dissertation, University of Virginia, 1973).

elsewhere[18] and therefore only a brief outline of its operation is included below. In order to maintain the exchange rate at the level desired by monetary authorities, the BEEA was requried to buy and sell foreign currencies and therefore influence supply and demand relationships in the foreign exchange markets. Effective intervention required that the BEEA have the ability to buy or sell foreign exchange and that its activity be kept secret.[19] At first the objective of the BEEA was only to resist an unwanted appreciation of the pound and its assets consisted only of British Treasury bills. In order to permit the Account to also mitigate a depreciation in the pound's value, it was allowed to keep a reserve of foreign exchange and gold (obtained by sales of sterling). The Account was thus not constrained to furnish support for the pound at any publicly announced level and could in fact act to increase or retard an appreciation or depreciation of the pound.[20]

---

[18]See for instance, Pumphrey, "Exchange Operations," pp. 804-06; Brown, Gold Standard, pp. 119-25; or Yeager, Monetary Relations, pp. 238-40. The following description draws heavily on these sources.

[19]For the most part, effective intervention did require secrecy. However, Pumphrey points out that on ". . . occasions they deliberately operated in full view of the market." Usually the BEEA was only interested in keeping secret the extent rather that the fact of intervention. At times however, the managers felt that the greatest impact could be derived if it was actively and openly dealing in the exchange and on those occasions they would place orders directly with various exchange brokers in London.

[20]This was a "freedom" which distinguished the BEEA from the French Exchange Stabilization Fund.

While the BEEA was an integral part of the Bank of England, its activites were not reported on a weekly basis as were those of other departments.[21]

In order to resist an undesired appreciation of sterling, the BEEA would buy foreign exchange with sterling obtained from the sale of Treasury bills in the market. The foreign exchange so obtained was converted to gold (to eliminate and exchange risk of holding exchange currencies) which was sold to the Bank of England. The BEEA then had its choice of increasing its balances with the Bank, or re-investing in Treasury bills. When the managers chose to buy Treasury bills (as they usually did), these were bought "through the tap" in order that the public would not deduce the extent of the BEEA's intervention in the foreign exchange market.[22] If it was desired to resist a depreciation of sterling, the process was reversed. The operation of the BEEA could thus be considered identical to the effects of a gold import carried out under gold standard conditions by private arbitrage and offset by Bank of England open market operations. By selling or buying securities (Treasury bills)

---

[21]A weekly reporting of its activities would have undermined its desire for secrecy of operation.

[22]Treasury bills bought "through the tap" were not purchased in the market, but directly from the Treasury. This increased the available funds of the Treasury and allowed them to reduce the amount of bills offered at the next tender.

whenever it bought or sold foreign exchange, the Account neutralized the expansionary or contractionary domestic monetary impact.[23]

While it was impossible to determine the magnitude of intervention by the Account in the franc-pound exchange market, reliable sources did report the Account's presence in that market. In its weekly accounts of activity in the foreign exchange markets, The Economist included reports of the intervention operations of both the BEEA and FESF.[24]

The American Stabilization Fund[25]

The United States left the gold standard in April 1933 for very different reasons than Britain had in 1931. The primary objective was to allow for an inflation of United States prices to their 1926 level. It was the general opinion that a "reflation" of prices was necessary for economic recovery and that domestic policies to accomplish

---

[23]Yeager, Monetary Relations, p. 238. The ability to neutralize the domestic monetary impact of its exchange market operations is a second feature which distinguished the BEEA from the French Exchange Stabilization Fund.

[24]These accounts are presented in summary form in the appendix following this chapter. This information was also used to construct dummy variables to analyze the effects of intervention on the franc-pound exchange rate in Chapters III and IV and to determine the effects of intervention on the terms of trade between France and Britain in Chapter V.

[25]This brief section on the departure of the United States from the gold standard and the subsequent formation of the American Stabilization Fund is presented only to provide contrast to the similar occurrences in Britain and France. No attempt is being made in this study to analyze the activity of the American Stabilization Fund.

this reflation would be more effective if the dollar were depreciated.[26] In addition, a set of secondary objectives included: (1) an increase in exports and a decrease in imports, (2) correct an adverse balance of payments situation leading to deflation of prices, (3) prepare for other expansionist policies by readjusting the balance of payments situation so that deflationary pressure may not arise.[27]

The American Stabilization Fund established on April 27, 1934 was created out of profits accruing from the devaluation of the dollar from $20.67 to $35.00 per ounce of gold on January 31, 1934. The expressed purpose of the American Fund was the stabilization of the dollar at home and abroad at $35.00 per ounce of gold. In Hudgin's empirical investigation, mentioned previously, no evidence was found that the American Stabilization Fund influenced

---

[26]On October 22, 1933 Roosevelt stated that the policy of the U.S. Government "Has been to restore commodity price levels . . . " (and to) "seek to establish and maintain a dollar which will not change its purchasing and debt paying power during the succeeding generation." " . . . our dollar is now altogether too greatly influenced by the accidents of international trade, by the internal policies of other nations, and by political disturbances in other continents. Therefore the United States must take firmly in its own hands the control of the gold value of the dollar. This is necessary in order to prevent dollar disturbances from swinging us away from our ultimate goal, namely the continued recovery of our commodity prices." J. D. Paris, Monetary Policies of the United States: 1932-1938 (New York: Columbia University, 1938), pp. 22-23.

[27]Gilbert, Currency Depreciation, p. 116.

the dollar-pound exchange rate, but instead followed its objective of keeping the dollar rigidly pegged to gold throughout the remainder of its existence.[28]

Given this brief description of the American Stabilization Fund, attention is now turned to circumstances leading to the development of the French Exchange Stabilization Fund.

The French Attempt to Deflate Prices and the Popular Front

One cannot fail to be impressed with the tragedy which befell France during the 1930's. Having stabilized the franc in 1926 and joined the gold standard currency group of nations in 1928, France experienced a substantial increase in her export surplus and a concomitant inflow of gold. The federal budget was in surplus in 1928, 1929, and early 1930 and allowed for a reduction in both taxes and the national debt.[29] It was commonly believed that the Poincare franc was the "strongest currency in the world" and further that France's apparent immunity from the depression occurring in the rest of the world was the result of the franc's strength. In addition, the prosperity of the period (1928-1930) was thought to depend largely on the maintenance of the gold standard.

---

[28]Hudgins, "Currency Exchange Rate Fluctuations," p. 220.

[29]Martin Wolfe, The French Franc Between the Wars 1919-1939 (New York: Columbia University Press, 1951), pp. 75-77.

The tenacity of the French to remain on the gold standard long after the British pound had left gold and the United States had devalued the dollar became a major reason for the failure of the French economy after worldwide recovery began in early 1933.

According to many observers, the reason for the early "immunity of the French economy from the depression and the later inability to mobilize a recovery was to be found in the Poincare franc.

> The rise in world incomes during the international boom of the twenties enabled French exporters to boost their sales to unprecedented levels. By the end of the decade, therefore, an export-led boom had taken over from the reconstruction (from World War I) and the home market in feeding the expansion. These favorable conditions were, however, to be short-lived. If the crisis struck France belatedly chiefly because of the undervaluation of the franc Poincare, when it did so, after the sterling crisis of the autumn of 1931, its effects were all the more severe. The franc became overvalued and French goods were now priced out of many markets at the very time when incomes had been cut and competition had become sharper.[30]

Whereas the franc was generally acknowledged to have been undervalued vis-a-vis sterling and the dollar in 1928, the devaluation of the pound (1931) and dollar (1933) were excessive to the extent that the franc was left overvalued.[31]

---

[30]Tom Kemp, The French Economy 1913-1939 (New York: St. Martin's Press, 1972), p. 97. See also accounts by Wolfe, French Franc, chap. iii; Gilbert, Currency Depreciation, pp. 53, 86-88; and William H. Wynne, "The French Franc, June, 1928 - February, 1937," Journal of Political Economy, XLV, (August, 1937), 484-85.

[31]Gilbert, Currency Depreciation, pp. 53, 86, 88 and Wolfe, French Franc, p. 106.

Using a purchasing power parity calculation The Economist reported that in 1935 the franc was overvalued by twenty-six per cent against the pound and thirty per cent against the dollar.[32] Adherence to the gold standard was not only a problem in itself, but also contributed to a larger problem of the French economy--falling incomes, production and employment. Recognizing that French prices were out of line with those of its trading partners, a downward adjustment was desirable. This could be accomplished through either devaluation or domestic price deflation. The French initially chose deflation.[33]

---

[32] The Economist, May 30, 1936, p. 492.

[33] "To all except the few advocates of a French devaluation, the solution to this problem was not to drive down the exchange value of the franc, but to drive down wages and prices within France to the point where French goods could compete again on international markets." Wolfe, French Franc, p. 106. Yeager comments on this policy of forced deflation: "Some economic logic can actually be claimed for Laval's program. If defending the exchange rate rules out monetary expansion to promote recovery from depression--if domestic purchasing power must not be expanded by increasing the number of francs in circulation--then the next best approach is to expand total real purchasing power by raising the purchasing power of each existing franc." Yeager, Monetary Relations, p. 315. As Yeager points out, the theoretical argument is of course acceptable. Practically, however, the task of deflating wages and prices by 30 per cent or more in an industrial country poses a monumental problem. Since prices and wages were also falling in the rest of the world, this compounded the French task.

A series of French Governments from 1933 to 1935 pursued policies aimed at deliberate deflation. The most notable of these was the government headed by Pierre Laval from June to October 1935.

Granted plenary powers by the legislature, the Laval government sought to force a deflation through "decree-laws" which included: (1) a decrease of ten per cent on wages and prices under the control of the government, (2) a ten per cent cut in governmental administrative budgets, (3) a ten per cent reduction in the interest paid on government gonds.[34] The French attempt at deflation failed to the extent that the prices of industrial materials failed to fall. This was largely the result of trade restriction policies which protected French industry from lower priced foreign commodities.[35]

---

[34]Wynne, "The French Franc," pp. 499-501.

[35]If French exports were to sell at competitive prices without a devaluation of the franc, then prices of industrial materials had to fall first. Imports came largely from dollar and sterling areas, and as their world market prices fell, French tariffs were raised and French import quotas were extended obviating a fall in the prices of imported industrial materials. Wolfe, French Franc, p. 124. This is not the only seeming contradiction of the Laval deflationary policies: "Under M. Laval, France was at one and the same time deflating and reflating. In order to defend the franc, the government cut budget expenditure; while, concurrently, it jeopardized the franc's parity by incurring heavy extra-budgetary charges for armaments and public works. And, when loans to cover these charges were not forthcoming in sufficient amount from the public, the government found it necessary to have recourse to a form of borrowing from the Bank perilously akin to overt inflation." Wynne, "The French Franc," pp. 499-501.

The Popular Front Government of Leon Blum, advocating sweeping social reforms, followed Laval into office. While in most ways, Blum was the polar opposite of Laval, he came into office reluctant to devalue, having made such a promise in his campaign. Blum hoped to remain on the gold standard and reflate the economy through a series of government programs which would increase wages and hopefully purchasing power and employment.[36]

Throughout the Blum and earlier administrations, the Bank of France had manipulated discount rates in an attempt to attract short-term capital and bolster the franc. This policy also failed as speculators began to regard increases in the discount rate as signals of impending crisis and acted to depress the franc on the exchanges.[37]

Like its predecessors, the Blum Government failed to bring French prices into line with foreign prices while remaining on the gold standard, and on September 26, 1936

---

[36]The Popular Front Program consisted of: (1) the enforcement of a system of collective bargaining, annual holidays with pay and the forty-hour (maximum) week, (2) the nationalization of industries making war material, (3) the authorization of a large program of public works, (4) the enforcement of a price control system, the reorganization of the coal industry and the creation of a national monopoly for the distribution of wheat. H. V. Hodson, Slump and Recovery 1929-1937 (London: Oxford University Press, 1938), p. 407. At a future date Blum intended to "enact a scheme of old-age pensions, further measures to deal with unemployemnt, and tax reform at the expense of inherited wealth." Yeager, Monetary Relations, p. 316.

[37]See for example accounts by Yeager, Monetary Relations, p. 317; Wynn, "The French Franc," p. 508; and Wolfe, French Franc, p. 117.

sought escape from the continuing stagnation through the devaluation of the franc. In summary, it was the failure to reduce prices through deflation and the failure of the social reforms of Leon Blum which left the French with no choice but to devalue the franc.

The French Exchange Stabilization Fund

The law officially devaluing the franc was passed on October 1, 1936. The new "elastic franc" was still defined as a gold currency, its value to be fixed at "some future date by the Council of Ministers at a figure between forty-nine and forty-three milligrams of gold . . ."[38] In addition the Devaluation Law provided for the establishment of the French Exchange Stabilization Fund (FESF or Fund) with ten billion francs (obtained by revalorizing the Bank of France's gold holdings) and charged the Fund with maintaining the exchange value of the franc inside the new legal limits.

Unlike the previous devaluations by the British and Americans, the action by the French was undertaken in a spirit of close cooperation. In fact, one of the fears of the French was that a devaluation of the franc might serve only to encourage competitive devaluations by the United

---

[38]Wolfe, French Franc, p. 146. This allowed a devaluation of between 25.2 and 34.4 per cent. When the exchange markets reopened, the franc had been devalued approximately 30 per-cent with respect to the dollar and 28 per cent with respect to sterling.

States and Britain. The fact that the Blum Government worked closely with the United States and Britain is evidenced by the simultaneous announcement of the franc's devaluation and the "Tripartite Monetary Pact" on September 26, 1936. The "Pact" originally included France, Britain and the United States as members and contained assurances that the British and the United States would not respond competitively to the devaluation of the franc. "Supplements to the original declaration provided for convertibility of the franc, pound, and dollar at fixed prices prevailing from day to day, thus creating a sort of new gold bloc on a twenty-four hour basis."[39]

The FESF was in many ways a copy of the BEEA. It operated in the foreign exchange market as a subsidiary of the central bank to oppose undesirable fluctuations in the value of the national currency. Like its British counterpart, the Fund maintained secrecy in its operations to "minimize speculative movements of short-term capital which might result from, as well as induce, fluctuations in exchange rates."[40]

A basic difference between the accounts was found in their ability to offset the impact of foreign exchange

---

[39]Yeager, Monetary Relations, p. 318. By late 1936, Belgium, Holland, and Switzerland had also joined in the agreement.

[40]Robert Solomon, "The French Exchange Stabilization," Federal Reserve Bulletin, January, 1950, p. 35.

market activities on domestic credit conditions. As explained previously, the BEEA, through the simultaneous purchase or sale of Treasury bills, could insulate the domestic money market from external influences. When the FESF acted to resist a depreciation of the franc, it sold gold abroad to acquire dollars or pounds which it then sold on the foreign exchange market (to buy francs) in France. If the Fund's gold reserves became exhausted, it was forced to buy more gold from the Bank of France.[41] The franc assets acquired by the FESF when it sold foreign exchange to the public were placed on idle deposit at the Bank of France. Thus an outflow of capital caused a transfer of reserves and notes from banks and individuals to the Fund's idle deposit account and tended to produce monetary stringency identical to that experienced under the formal gold standard.

Another major difference between the two stabilization agencies involved the nature of their intervention in the foreign exchange market. The intervention of the BEEA was always discretionary, but because of the Devaluation Law of 1936, the FESF was forced to support the franc at arbitrary

---

[41]Especially during the first ten months after the devaluation of the franc, the Fund was forced to maintain the franc through gold sales. In so doing, the FESF acted as an intermediary through which the Bank of France sold gold to support the exchange rate and in effect, France remained on the gold standard. Robert Solomon, "French Exchange Stabilization," p. 37.

levels.[42] The Fund exhausted its original gold allotment plus two subsequent borrowings from the Bank of France attempting to keep the franc within the bands set in 1936. A decree was therefore passed on June 30, 1937, which divorced the franc from gold and allowed the FESF to intervene in the exchange market on a discretionary rather than a mandatory basis.[43]

Basically, the so-called "floating franc" floated downwards. The devaluation of June 30, 1937, did not inspire confidence in the new franc and the Fund intervened not to resist a further depreciation, but only to smooth out fluctuations around a downward trend.

The FESF also had more trouble maintaining secrecy in its operations than did the BEEA. During the fall of 1937, the gold transactions conducted between the Fund and the Bank of France were reflected in the Bank's weekly balance sheet. Adverse movements were thus public knowledge and tended to encourage capital flight and speculation. In April 1938 a law which created the "sterling franc" also authorized the FESF to:

---

[42]Alternatively, one could say that until the decree of June 1937, the FESF attempted to resist trend while the BEEA did not.

[43]Since it was no longer attached to a specific amount of gold, the new "Bonnet franc" was also known as the "floating franc." The FESF had its powers and privileges reaffirmed, but was only committed to a "mobile defense of the franc." Wolfe, French Franc, p. 175.

> borrow francs from the Treasury (instead of selling gold to obtain francs) and also to sell gold to the Fonds de Southien des Rentes (instead of the Bank). a Government agency charged with the responsibility of supporting the prices of Government securities.[44]

Thus the exchange market activities of the FESF could no longer be inferred from gold movements between the Fund and the Bank.

The creation of the "sterling franc" is the event which marks the end of the historical period under study. The franc was pegged to the pound at a rate of about 179 francs per pound sterling on May 4, 1938, and the long depreciation of the franc was ended.

In the appendix which follows this chapter, the activity of the FESF is presented as it was documented in weekly accounts in The Economist.

The Question of Competitive Depreciation

The fact that exchange stabilization funds had the ability to influence the level of the exchange rates created suspicions that they were engaged in acts of competitive depreciation. Such accusations were most frequently made against the BEEA.

Generally, a competitive depreciation may be said to occur when country F responds to a depreciation of country

---

[44]Solomon, "French Exchange Stabilization," p. 37.

U. K.'s currency by depreciation of its own currency.[45] If such was the nature of activity by the BEEA and FESF, then one would expect that accounts of their interventions in the exchange market would show that when one was trying to depreciate the franc-pound rate, the other was attempting to appreciate the rate. An examination of the weekly accounts in The Economist shown in Appendix II does not reveal a single act which could be labeled "competitive" according to this criteria.

The weekly accounts summarized in Appendix II show that in the vast majority of the cases, the two funds did not even operate in the market at the same time. This would support a claim that the FESF and BEEA were operating with the same implicit goals in the exchange market. To add support to this claim, on the six occasions reported when both agencies were active at the same time, they always worked to the same ends.[46] On one occasion, it was reported that the BEEA operated on behalf of the Bank of France.[47]

---

[45]For instance, assume that Britain was letting the pound float and the BEEA intervened in the exchange market to influence sterling fluctuations against the French franc. If as a result, the FESF feels compelled to intervene to offset the intervention by the BEEA, then the stabilization funds of the two countries are engaging in competitive exchange intervention.

[46]See summary comments in Appendix II for the following dates: May 26, 1934; August 11, 1934; March 14, 1936; April 11, 1936; April 10, 1937 and September 18, 1937.

[47]The Economist, July 11, 1936, p. 69.

Thus rather than supporting claims that the 'thirties were a series of competitive depreciations, the evidence indicates that at least the BEEA and FESF were engaged in "cooperative exchange intervention". However, the fact that the funds were not competing with each other does not imply that the activities of one fund did not bring about undesired repercussions on the other country. Chapter V of this study presents evidence that the intervention activity was in fact disruptive to trade between France and the United Kingdom.

Chapter Summary

While both Britain and France abandoned the gold standard and established stabilization funds to facilitate managed floating exchange rates, many differences were noted surrounding these similar events:

Abandonment of the gold standard. - Britain left the gold standard to protect the London money market while France left because deflationist policies had failed to bring French prices into line with her trading partners and the social reforms of the Blum Government failed to revive the stagnating economy.

Goals of the stabilization funds. - Ostensibly, the BEEA's goal was only to smooth out undue fluctuations in the value of sterling and not to resist fundamental forces. Other possible goals of the Account were noted. Until the summer of 1937, the goal of the FESF was basically to resist trend and maintain a fixed value of the franc relative to gold.

After June 1937, the Fund operated in much the same way as the Account.

Rather than supporting the claim of competitive exchange interventions, the evidence suggests that a cooperative relationship existed between the BEEA and FESF.

In the next two chapters an anlysis of the franc-pound exchange rate between September 1931 and April 1938 will be made. As a part of this analysis, the impact of the activity of both the BEEA and FESF on the level of the franc-pound rate will be determined.

Appendix II

Summarized below is information reported by The Economist regarding the activity of the BEEA and FESF in the franc-pound exchange market. For the majority of cases, these observations were found in the "Foreign Exchanges" sub-section of the major section entitled "Money and Banking." Except where quotation marks are used, the comments below are paraphrased and condensed versions of the original text. The data given is the date of issue.

Date	Comment
7-30-32	The Bank of France sold francs for pounds to support a sagging pound.
9-17-32	The pound weakened and French authorities intervened, buying pounds to slow appreciation of the franc.
3-11-33	British Control bought francs to keep the pound from appreciating too rapidly.
5-6-33	The BEEA sold francs to drive the exchange rate from 83 3/8 to 84 3/4 (francs per pound).
6-10-33	The BEEA bought francs to help move the exchange rate from 86 1/8 to 85 5/8.
6-17-33	There was occasional intervention by the BEEA to buy pounds.
6-24-33	"The Paris rate has been inclined to weakness and at times intervention by the British Control has again been thought advisable."
7-15-33	The BEEA sold francs.
7-22-33	British Control sold francs.
7-29-33	"French francs have also continued to appreciate against sterling and frequent sales of francs have been made this week by the British Control."

Date	Comment
8-5-33	The BEEA sold francs.
9-2-33	Rumors of further inflation in the U.S. sparked a demand for francs. The BEEA let the franc-pound rate move freely.
9-9-33	The knowledge that the BEEA stood ready to sell francs proved sufficient to deter speculators. British Control is and has been inactive for several weeks now.
10-21-33	A revival of confidence in the dollar has caused a return of funds to New York from Paris via London. As a result the franc depreciated against the pound and the BEEA intervened on several occasions to buy francs.
10-28-33	Rumors are that in the absence of BEEA intervention, the Bank of France bought francs to support the rate.
11-18-33	As U.S. funds were transferred to London via Paris, the pound appreciated and the BEEA bought francs.
11-25-33	There was continuous support (buying francs) by the BEEA. Losses of gold and devisen by the Bank of France and political and budgetary difficulties in France are seen as problems.
12-2-33	The BEEA bought francs but was less active than in the previous week.
12-9-33	The franc was firmer "with practically no official intervention in London."
12-16-33	"No support of the franc by British Control has lately been necessary. . . ."
1-27-34	The BEEA is inactive, but the exchange rate is being supported by the Bank of France (buying francs) at 79 1/2.
3-10-34	The BEAA sold francs to keep the rate from moving below 79

Date	Comment
5-12-34	The BEEA intervened at 77 1/4 by selling francs. Indications are that some official support of sterling has been necessary for the last few weeks.
5-19-34	The BEEA made "small sales of francs from time to time."
5-26-34	The franc appreciated in spite of intervention by both the BEEA and the Bank of France. Chief resistance to an appreciation will come from the French since the attitude of the BEEA is not to check a genuine fall. France is concerned with any increase in the undervaluation of the pound.
6-2-34	The BEEA continued to sell francs (although not heavily) to keep the pound from depreciating as confidence in French finances increased.
6-9-34	The BEEA continued to sell francs.
6-16-34	The BEEA sold francs to support the pound.
6-30-34	The BEEA sold francs all week.
7-7-34	The BEEA sold francs and the Bank of France continues to gain gold.
7-14-34	The BEEA only intervened once this week to sell francs.
7-28-34	On two occasions this week, British Control sold francs.
8-4-34	The BEEA sold francs consistently but allowed the dollar to go and the franc depreciated against the dollar.
8-11-34	Both the BEEA and the Bank of France sold francs this week.
8-18-34	The BEEA sold francs.
8-25-34	"There has been a persistent demand for francs, and as the British Control has been less active, the spot rate has fallen to Frs. 76 1/32."

Date	Comment
9-8-34	The BEEA sold francs to stop the depreciation of the pound.
9-15-34	Sterling showed strength and allowed the BEEA to sell pounds (buy francs).
9-29-34	There were small sales of francs by the British Control.
10-13-34	Early in the week the BEEA bought francs in response to pressure from the Marseilles assassinations. Later the BEEA sold francs as sterling weakened.
11-10-34	"British Control was buying Frs. at 76 1/16."
11-24-34	The BEEA sold francs as the pound weakened.
12-8-34	As the exchange rate dipped to Frs. 75, the BEEA intervened to sell francs.
12-22-34	The BEEA "bought a few francs" as the franc weakened.
1-5-35	The BEEA sold francs as demand for francs was high due to expectations for a steady return of investment funds to France.
2-2-35	There were strong rumors that the Bank of France sold francs to steady the exchange rate.
2-16-35	The BEEA sold francs as a continual selling of British securities created a supply of pounds.
2-23-35	The BEEA sold francs occasionally.
3-9-35	British Control "sold francs on a fairly large scale."
3-16-35	"Very little intervention by the British Control was noticeable last week."
3-23-35	"The British Control is believed to have sold a few francs from time to time."
5-4-35	British Control bought francs as spot sterling was weak.

Date	Comment
5-18-35	"Once or twice the British Control intervened and bought small quantities of francs."
5-25-35	"This week the French franc has been subject to heavy and continuous pressure in an active market. The British Control bought francs fairly frequently and must have well replenished its stocks of devisen. . . . It seems that the weakness of the franc is due to a definite flight of funds from France and not to speculation.
6-1-35	The BEEA intervened heavily to buy francs. Estimates are that since the present weakness of the franc began the Account has accumulated L 40 million of gold and foreign exchange.
6-8-35	"During the week, purchases of spot francs by the British Control have been frequent, but limited in magnitude."
6-15-35	The formation of a new Government under M. Laval caused the franc to strengthen and it was rumored that the BEEA sold a few francs.
7-6-35	As speculatives forward sales of gold currencies made last April are falling due, gold currencies were being bought spot to cover. The franc strengthened and the BEEA "sold a few francs to steady the rate."
7-27-35	"Spot French francs began to weaken, but as soon as the rate touched Frs. 75 the British Control intervened (to buy francs) and held the rate."
8-3-35	Early in the week the BEEA bought francs, but later sold as the rate improved. By the week's end, there was no intervention.
8-10-35	The British Control bought francs.
8-17-35	The BEEA has been buying spot francs at 75 1/32 and using these to buy gold in Paris. But the London price of gold has fallen low enough to make it profitable to buy gold in London for resale in Paris. The gold bought by British Control probably came from London.

Date	Comment
8-31-35	British Control continued to buy francs to support the rate.
9-28-35	"The British Control intervened heavily in Paris in support of sterling at the end of last week, and it is unofficially believed in London that it sold as much as Frs. 300 million."
10-5-35	In order to indirectly support sterling against the dollar, ". . . British Control sold French francs for pounds in large quantities. . . . In effect gold is going from the British Control's holdings via Paris to New York."
10-12-35	The BEEA was selling francs at about the rate of 250 million a day as the demand for dollars persisted.
11-9-35	British Control had to buy a few francs in order to give support as the franc weakened.
11-23-35	The BEEA bought francs as the spot rate weakened and the discount on the 90 day franc rose to over 14% per year.
12-28-35	The British Control bought francs.
1-18-36	British Control supported the franc due to adverse political events in Paris.
1-25-36	With the fall of the Laval Government eminent, francs were sold heavily against sterling and BEEA bought francs heavily. Upon Laval's resignation, the francs strengthened, but later weakened and the Account again bought francs heavily.
2-8-36	The Account bought francs to slow the depreciation of the franc against the pound.
3-14-36	"Both London control and French authorities have been buying Frs. to stabilize the rate artificially at just under Frs. 75."
3-28-36	Due to renewed French borrowing, the franc weakened and was supported by the British Account at succeedingly higher franc-pound rates.

Date	Comment
4-4-36	British Control intervened heavily to support the franc. Rumors were that the American Control was offering dollars against the franc.
4-11-36	The BEEA and the Bank of France continued to support the franc.
4-18-36	Both British Control and the Bank of France continued to support the franc. Gold losses last week by the Bank were announced to be 950 million franc.
4-25-36	There was only mild support by the British Account as the franc strengthened.
5-9-36	The BEEA bought francs heavily but could not hold the franc from rising to 75 1/2.
5-16-35	There was little intervention by the BEEA to buy francs.
5-23-36	Only a small amount of francs were bought by the British Control.
5-30-36	Only a small amount of francs were bought by the BEEA.
6-6-36	The BEEA intervened intermittently to buy francs as the franc weakened and in two days (June 2 and 3) the Bank of France lost 350 million Frs. in gold.
6-13-36	The BEEA continued to support the rate by purchasing francs.
6-20-36	British Control gave heavy support (bought francs) to the exchange rate.
6-27-36	The franc strengthened as Minister of Finance, M. Vincent Auriol stated that the French Government rejected devaluation as a remedy for its problems. The Account may have sold a few francs.
7-4-36	The Account sold francs to check too rapid an appreciation as the franc strengthened. The Bank continues to gain gold.

Date	Comment
7-11-36	The BEEA sold francs in behalf of the Bank of France as the franc continued to strengthen. The Bank continues to gain gold.
8-1-36	The Account is rumored to have supported the franc (bought francs) as it weakened.
8-8-36	The BEEA bought francs intermittently.
8-15-36	"No Account intervention has been necessary."
8-22-36	After gaining gold for several weeks, the Bank of France lost gold. There was not Account support but French authorities did sell dollars to support the franc.
9-12-36	The franc weakened and required persistent support by the Account. The Account has held the franc at certain arbitrary levels for a time and "then let it go gently."
9-19-36	The Account continued to support the franc and then let it go slowly instead of trying to maintain a fixed level, giving rise to a criticism of its tactics.
9-26-36	Spot francs were bought consistently by the Account as devaluation appeared eminent. France failed to float a bond issue and ". . . no one believes that a 5 or even a 7 percent Bank rate will be the smallest use in saving the franc."
10-17-36	The French Fund has been selling francs for pounds.
10-24-36	The franc weakened and required support by the FESF which bought francs.
10-31-36	The franc continued to weaken, but there was no official support.
11-7-36	While the franc weakened, there was no spot intervention by the BEEA or FESF although the French Fund did operate in the forward market, selling francs.
11-14-36	On a rumor that the franc would be allowed to slide to the bottom limit allowed by

Date	Comment
	by the recent devaluation, the franc weakened significantly and the FESF bought francs.
11-21-36	The rate is being supported at a strict level of Frs. 105.15 by the franc purchases of the French Fund.
11-28-36	The FESF bought francs.
12-5-36	The spot franc continues to be supported by the purchases of the Fund.
12-12-36	The franc strengthened and required only mild support by the FESF.
12-19-36	Only mild support of the franc was required by the FESF.
1-2-37	The FESF is supporting the spot franc (buying francs).
1-9-37	The Fund is intervening (buying francs) in both the spot and forward markets.
1-16-37	Due to pressures resulting from an expected further devaluation, the Fund continues to buy spot francs to support the rate.
1-23-37	The Fund continues to buy francs to peg the rate at Frs. 105.15 although rumors are strong that it will depreciate to Frs. 112 (its equivalent at 43 mg. of gold--the lower statutory limit).
1-30-37	The French Bank rate was raised from 2 to 4 percent after heavy pressure on the franc earlier in the week. This did nothing to ease the selling pressure. The Fund continued to buy francs to support the rate at 105.15.
2-6-37	The Fund continues to buy francs to hold the rate around 105.15, but the peg is removed from time to time to allow M. Cariquel (in charge of FESF) to squeeze the bear speculators.
3-6-37	"Rumours of depreciation have caused heavy selling of francs . . . to the extent of requiring occasional official intervention (by the FESF)."

Date	Comment
3-13-37	The franc was unpegged and fell to 108 1/4, but soon strengthened to 106 1/2. When the rate fell below 107 1/4, the Fund bought sterling to prevent too rapid an appreciation of the franc.
3-20-37	Despite support by the Fund (buying francs) the spot rate rose to 106.65.
3-27-37	The French Fund sold francs to support the rate in response to a moderate increase in demand for francs.
4-3-37	The Fund sold francs to keep the rate at 106.32 as francs were in demand to pay the French Defense Loan. After the loan was made, the Fund bought francs as the rate rose to 106.37.
4-10-37	Both the BEEA and FESF bought francs as the franc weakened amid rumors of a depreciation to Frs. 112.
4-17-37	The French Fund let the franc depreciate from 106 3/8 to 110.
4-24-37	The Fund bought francs to drive the rate from 111 7/16 to 110 3/4, but could not maintain it at that level.
5-1-37	The franc strengthened from 111 1/2 to 110 1/4 with no evidence of intervention.
5-8-37	A London bus strike caused the franc to strengthen and there was still no evidence of intervention.
6-12-37	The Fund sold sterling (bought francs) heavily to support the exchange rate.
6-19-37	The Fund sold sterling heavily to support the franc.
6-26-37	Because of a rumor of an impending devaluation, the Fund was forced to buy francs heavily to support the rate.
7-3-37	Both the U.S. and British authorities were aiding the FESF to depreciate the franc.

Date	Comment
7-3-37	The French Fund admitted it had exhausted its gold reserves supporting the franc at 128-129.
7-10-37	The Fund bought francs to support the rate at 128 1/4. The American Control also supported the franc.
7-17-37	A moderate demand for francs is thought to have allowed the French fund to acquire gold through sales of francs.
7-24-37	After allowing the rate to rise to 133, the French Fund bought francs to bring the rate back to 130. Later in the week, the Fund set the rate free and it depreciated to 135.
7-31-37	The Fund bought francs to bring rate from 135 to 132 7/8. The Fund regards Frs. 135 as the present limit of depreciation. Experts question how long the resources of the Fund can last.
8-7-37	"The Fund continued to support (bought francs) both the spot and forward rate." The franc is also receiving support in the form of the holiday tourist traffic.
8-14-37	The franc strengthened and the Fund sold francs to acquire gold.
8-21-37	The Fund bought francs to hold the rate. The end of the tourist demand is being anticipated.
8-28-37	The FESF bought francs as an interval French Government dispute over the proposed railway reforms weakened the franc.
9-11-37	"The French Fund revealed a decision on Thursday to cease the support of the franc." The rate fell from 132.95 to 134.50.
9-18-37	Both the BEEA and FESF bought francs to support the exchange rate.
9-25-37	The French Fund spent L 5.0 million to support the rate at Frs. 145. The announcement was

Date	Comment
	made that gold from the Bank of France would not be available to support the franc; the French Fund was on its own.
10-2-37	Fund bought francs to support rate at Frs. 144.60. Paris banks have suspended all dealings in forward francs at the request of the Bank of France.
10-16-37	The franc strengthened due to the uncertainty of the New York and London stock markets. The Fund sold approximately L 25 million of francs.
10-23-37	The French Fund continued to sell francs heavily although the Fund was allowing an appreciation of the franc to take place in order to encourage capital repatriation.
10-30-37	After allowing the franc to depreciate to 149, the Fund engineered a bear squeeze which started a general recovery, allowing the Fund to sell francs heavily at the week's end.
11-13-37	Gold shipments of $10 million to France from the American Stabilization Fund gave a psychological lift to the franc. There was little intervention.
11-20-37	The French Fund actively sold francs for dollars and converted the dollars to gold.
11-27-37	"There was little sign of any official intervention."
12-4-37	The French Fund sold francs.
12-11-37	The Fund sold spot francs "spasmodically" while buying francs forward.
12-18-37	The French Fund sold foreign exchange to support the franc due to the effect on the exchange market of the poor French economic outlook.
12-25-37	The French Fund intervened both as a buyer and seller, but in the net bought francs.

Date	Comment
1-1-38	Due to French strikes, the franc weakened. The FESF "had to buy a fair quantity of francs" to support the exchange rate.
1-8-38	The FESF bought francs as the labor troubles continued.
1-15-38	The Fund "bought francs intermittently."
1-22-38	Upon the resignation of the Chautempo Government, the franc depreciated to 154, then strengthened and the FESF used this opportunity to replenish its gold and devisen by selling francs.
1-29-38	The FESF sold spot francs and bought forward francs.
2-5-38	The French Fund borrowed pounds in order to buy francs to support the rate.
2-19-38	The FESF is using gold obtained from the Bank of France to support both the spot and forward franc.
2-26-38	The Fund bought both spot and forward francs.
3-5-38	The FESF bought francs to support the rate.
3-12-38	"The French Exchange Fund has intervened in the market (buying francs) but with the intention of braking rather than rigidly pegging the rate."
3-19-38	The Fund bought francs to slow a depreciation.
3-26-38	There was little support by the Fund as the franc depreciated.
4-16-38	Upon Blum's resignation and M. Daladier's victory in the Chamber, the franc strengthened and the FESF sold francs to replenish its resources.
4-23-38	"As the franc continued strong, the French Control sold francs for sterling."
4-30-38	Upon rumors that M. Daladier would depreciate the franc, the rate rose to Frs. 167, and by purchasing large quantities of francs the FESF brought the rate back to 160.

CHAPTER III

AN ANALYSIS OF THE FRANC-POUND EXCHANGE RATE

Fluctuations in the franc-pound exchange rate from September 1931 through April 1938 will be empirically analyzed in this and the following chapter. The effect of both "objective" and "non-objective" events will be taken into account.[1] In this chapter the model used to conduct the analysis will be discussed. Chapter IV contains the empirical results of the investigation.

The Model

A major objective of this study is to examine those forces which are thought to determine the level of an exchange rate which is subject to some degree of official management or intervention. The implicit hypothesis being tested is that the level of the exchange rate is influenced primarily by fundamental economic forces (prices, incomes, money stocks and interest rates) but

---

[1]Price, income, money stock levels and interest rate differentials are considered "objective" events. Such non-quantifiable events as the flight of funds from France in 1935-36 and the Paris riots in 1934 are considered "non-objective" events.

is influenced on occasion by the activities of official government sources. The analysis will proceed as follows:

1. A supply-demand model for foreign exchange will be specified.
2. From this relationship a reduced form will be derived expressing the exchange rate (the dependent variable) as a linear function of its determinants (the independent variables).
3. Using ordinary least squares regression analysis the model will be estimated.

The data used in the study are monthly observations on British and French macroeconomic variables reported for the period September 1931 through April 1938.

Development of the Structural Model[2]

The effect of official (or unofficial as the case may be) intervention in an exchange market is to alter the free interaction of supply and demand in determining the rate of exchange for two currencies. In a freely floating exchange market, the interaction of supply and demand is the sole determinant of the exchange rate. In an exchange market where the rate is rigidly pegged, private supply and demand do not determine the exchange

---

[2]The author wishes to acknowledge the original development of the model used in the present chapter. See John S. Hodgson, Fluctuations of the Pound-Sterling, 1919-1925 (Unpublished Ph.D. dissertation, University of Virginia, 1971), pp. 18-20.

rate, but instead determine the quantity of currency which must be supplied or demanded by official government authorities to maintain the rigid pegged rate.

In an exchange market subject to occasional or frequent official intervention, private supply and demand at times are the sole determinants of the exchange rate and at other times force officials to intervene in order to prevent an undesired rise or fall in the exchange rate. Official intervention is therefore a response to an exchange rate determined by supply and demand, but which for some reason is undesirable. In such cases as this, a structural model for determining the level of the exchange rate should include official intervention as well as private supply and demand.

This analysis will assume a bilateral relationship with two countries, F and UK.[3] Given this relationship, domestic currency supplied by F is equivalent to a demand for the currency of UK. If the currency exchange rate is 100 units of F currency for one unit of UK currency, then an offer of 100 units of F currency is a demand for one unit of UK currency. For this reason it is possible to examine this market in terms of one currency only, in this case UK.

---

[3]The reader is invited to mentally substitute "France" for "country F" and the "United Kingdom" for "country UK" in order to reduce the level of abstraction. This seems appropriate since this is a study of the franc-pound exchange rate.

The demand for UK currency emanates from three sources: those wishing to purchase UK exports, those wishing to purchase UK financial assets and by official sources for purposes of intervention in the exchange market:

1. The demand arising from trade exports from UK to F

   Residents of F who wish to purchase goods and services from UK will demand UK currency to make these purchases. Should residents of F make payments in F currency then the exporters who receive F currency will convert this to UK currency. In either case, demand for UK exports gives rise to a demand for UK currency.

2. The demand arising from capital imports into UK

   Residents of F who wish to purchase UK assets will need UK currency to make payment. In addition UK residents who wish to repatriate assets held in F (or denominated in F currency) will demand UK currency.

3. The demand arising from intervention in the exchange market by official sources

   If F currency appreciates relative to UK currency and official sources wish to mitigate this appreciation, then officials in F would demand UK currency and/or officials in UK would demand their own currency. This additional demand

for UK currency would mitigate the appreciation of F currency relative to UK currency. Under a system of managed exchange rates, the intervention by officials is done on a discretionary rather than a mandatory basis.

The supply of UK currency also emanates from three sources, those wishing to purchase F exports, those wishing to purchase F financial assets and by official sources for purposes of intervention in the exchange market:

1. The supply arising from trade imports to UK from F

   Residents of UK who wish to purchase goods and services from F and residents of F converting the proceeds of sales of exports to F currency will supply UK currency.

2. The supply arising from capital exports from UK

   Residents of UK who wish to purchase assets in F (or denominated in F currency) and residents of F who wish to repatriate assets held in UK (or denominated in UK currency) will supply UK currency.

3. The supply arising from intervention in the exchange market by official sources

   If F currency depreciates relative to UK currency and officials in F would supply UK currency and/or officials in UK would supply their own currency. This additional supply of UK currency

would mitigate the depreciation of F currency relative to UK currency. As before, intervention by official sources is discretionary.

Trade Influences

As suggested above, the demand for UK currency is a direct function of the demand for UK goods and services by residents of F, i.e. UK exports to F.

According to theory there are several important determinants of the demand for foreign produced goods or services. Among the most important are price levels in UK and F, the income level in F, seasonal effects and changes in tastes for foreign produced goods if the period under consideration is lengthy.

If the prices of F good and services rise above the prices of UK goods and services, then to the extent that UK goods and services are considered substitutes for F goods and services, F demand for UK exports and UK currency will increase. In addition, the exchange rate itself effects the demand for UK goods and services because it has a fundamental effect on UK prices as viewed by residents of F.

If the income elasticity of demand for UK products by residents of F is positive, then a rise of F income would result in an increased demand for UK goods and

and services and therefore an increased demand for UK currency.[4]

Factors which operate with a seasonal pattern (e.g. tourism) and changes in tastes may also effect the demand for UK goods and services. Taking all of these into account, it may be written that:

$$T_{duk} = P_{uk} \cdot Q_x \quad [5]$$

$$Q_x = f\ (P_f/(ER \cdot P_{uk}),\ Y_f,\ S_x,\ Tr_x)$$

therefore

1. $$T_{duk} = P_{uk} \cdot f\ (P_f/(ER \cdot P_{uk}),\ Y_f,\ S_x,\ Tr_x)$$

where

T_{duk} = The quantity of UK currency demanded in the exchange market to purchase UK goods and services.

Q_x = An index of the physical quantity of UK goods and services demanded by F residents.

P_f = An index of the price level in F.

P_{uk} = An index of the price level in UK.

---

[4]Income changes as they are discussed here are "real" rather than "nominal." If nominal income data were available, it should be adjusted for domestic price changes, thus assuming that there is no money illusion. The real versus nominal problem is not relevant to the present study. Since income data were not available on a monthly basis, employment and production indices were used as proxies. Either of these variables can be considered as approximators of real rather than nominal income.

[5]Since both P_{uk} and Q_x are defined as indexes (of price levels and quantities demanded), the product of $P_{uk} \cdot Q_x$ is a value index of goods and services demand relative to base year prices.

ER = The exchange rate; the price of UK currency in terms of F currency.

Y_f = An index of the income level in F.

S_x = A seasonal index.

Tr_x = A trend index.

The supply of UK currency is a direct function of the demand for F goods and services by UK residents, i.e. UK imports from F. The supply of UK currency to the exchange market for trade purposes therefore depends on relative prices, the income level in UK, seasonal effects and changes in tastes; it can be summarized as follows:

$$T_{suk} = (P_f/ER)Q_m$$

$$Q_m = f\ (P_{uk}/(P_f/ER),\ Y_{uk},\ S_m,\ Tr_m)$$

therefore

$$T_{suk} = (P_f/ER) \cdot f\ (P_{uk}/(P_f/ER),\ Y_{uk},\ S_m,\ Tr_m) \quad (2.)$$

where

T_{suk} = The quantity of UK currency supplied in the exchange market to purchase F goods and services.

Q_m = An index of the physical quantity of F goods and services demanded by UK residents.

P_f = An index of the price level in F.

P_{uk} = An index of the price level in UK.

ER = The exchange rate; the price of UK currency in terms of F currency.

Y_{uk} = An index of the income level in UK.

S_m = A seasonal index.

Tr_m = A trend index.

Capital Flow Influences

Portfolio theory suggests that the demand for particular assets is a function of their expected return (including an adjustment for risk) relative to that of all possible alternative assets in the portfolio of the decision-making unit. Additionally, the level of net wealth of the decision-making unit will have a direct (scale) effect on the demand for assets.[6]

International capital flows result when assets denominated in foreign currencies are considered as possible alternatives to domestic currency assets and incentives exist which cause the foreign asset to be preferred to the domestic asset. Capital flows include short and long term components: Short-term components include portfolio and covered-interest-arbitrage adjustments and are affected by both the uncovered and covered interest differential between countries as well as scale variables representing the levels of net wealth in the two countries. Long term capital flows (direct investments) are primarily affected

---

[6]For an excellent discussion of international capital movements, see R. C. Bryant, "Empirical Research on Financial Capital Flows," in Peter B. Kenen (ed.), International Trade and Finance: Frontiers for Research (Forthcoming, Cambridge University Press).

by differences in the long-term growth of investment opportunities between countries.

The demand for UK assets by residents of F is therefore a function of the expected return of alternative assets (short and long-term) available to F residents and the level of net wealth of F residents. Since the demand for UK assets implies a demand for UK currency, any variable which causes changes in the demand for UK assets simultaneously causes a change in the demand for UK currency.

Assuming that interest rates indicate the yield on assets held for the short term and other things being equal, a rise in the UK interest rate relative to the F interest rate would induce F residents to seek higher yield in UK and transfer assets from F to UK. Residents of UK would likewise be induced to repatriate to UK assets held in F. In either case, the effect would be to increase the demand for UK currency.

If on the other hand the investor wishes to protect himself against the exchange rate risk involved in international financial transactions, then it is the covered rather than the uncovered-interest differential which must be considered as the determinant of short-term capital flows.

The above discussion implies that investors may respond to interest rate differentials in different ways,

according to whether they are "hedgers" or "non-hedgers." A hedger is defined as one who intends to repatriate funds invested in assets denominated in a foreign currency and wishes to avoid exchange risk in the process. If F funds flow to UK to seek a higher interest rate, then a transaction in the forward market (in this case a sale of UK currency) must be undertaken to avoid losses which would result from unfavorable exchange rate fluctuations. In equilibrium, there will be a forward discount (or premium) on UK currency equal to the difference in interest rates in F and UK.[7] If the forward discount (or premium) is less than the interest rate differential, then it is an "intrinsic" discount (or premium) and not simply an interest rate differential which induces transactions by hedgers, and one can argue that it is the appropriate variable for explaining covered interest-induced capital flows. In the case of non-hedgers, a rise in the UK interest rate relative to the F interest rate stimulates a demand for UK currency spot which is not offset by a forward sale of UK currency. In effect this open position defines the non-hedger as a speculator in the foreign exchange market. The non-hedger's motive may then be

---

[7]For a discussion of the theoretical foundations of this argument, see Leland B. Yeager, International Monetary Relations (New York: Harper and Row, 1966), pp. 27-30, or R. E. Caves and R. W. Jones, World Trade and Payments (Boston: Little, Brown and Company, 1973), pp. 502-6.

either the profit resulting from interest differential or from expected gain in the exchange transaction.

Long-term (direct) investments would presumably result from differences in long-term investment opportunities in UK and F. If F residents considered long-term profit opportunities in UK superior to those in F, capital would flow into UK causing a demand for UK currency. If on the other hand, residents of UK believed that long-term profit opportunities in F were superior to those in UK, then funds would flow into F, causing a supply of UK currency.

Investors arrive at a subjective evaluation of "expected return" for any asset by considering not only the nominal yield, but the risk involved in holding the particular asset. If there were expectations that the risk involved in holding assets in F would increase or that the probability of capital loss on F assets were to increase, then a movement of capital out of F and into UK would likely result. Alternatively, if there were expectations that the risk involved in holding assets in UK would decrease or that the probability of capital gain on UK assets were to increase, then a movement of capital out of F and into UK would likely result. In either case, the flow of capital might be in the same or opposite direction of the higher interest rate. Such events as domestic strikes, riots, elections, or

expectations of impending currency devaluations or armed conflict could conceivably effect investors' attitudes toward the risk associated with assets in a particular country.

Taking all of this into account, the demand for UK currency involved in capital flows is:

3. $$K_{duk} = 1/ER \cdot f\left[(r_f - r_{uk}),\ C,\ M_f,\ A,\ P\right]$$

where

K_{duk} = The demand for UK currency arising out of the demand for UK financial assets and out of the repatriation of funds to UK.

ER = The exchange rate.

$(r_f - r_{uk})$ = The differential in the interest rate between F and UK.

C = The forward discount (premium).

M_f = The nominal money stock in F.

A = The growth of long term investment opportunities in F.

F = Psychological forces which are the result of increased risk or fears of capital loss in F assets or decreased risk or expectations of capital gains in UK assets.

Similarly, a supply of UK currency arises when residents of F and UK transfer funds from UK to F. The forces described above, but working in the opposite direction will induce these transfers to take place. A rise in the interest rate in F relative to the interest rate in UK would induce a flow of funds from UK to F. A decrease in the money stock in F and/or an increase in the money

stock in UK would cause an increase in the supply of UK currency. Psychological forces which effect the degree of risk, fear of capital loss or the expectation of capital gain in F assets would influence the supply of UK currency. The supply of UK currency resulting from capital flows is therefore:

4. $$K_{suk} = f\left[(r_f - r_{uk}),\ C,\ B,\ M_{uk},\ G\right]$$

where

K_{suk} = The supply of UK currency arising out of the demand for F financial assets and out of the repatriation of funds to F.

$r_f - r_{uk}$ = The differential in the interest rate between F and UK.

C = The forward discount (premium).

B = The growth of investment opportunities in UK.

M_{uk} = The nominal money stock in UK.

G = Psychological forces which are the result of increased risk or fears of capital loss in UK assets or expectations of capital gains in F assets.

This is obviously a simple formulation considering the many complex economic forces which are thought to influence international capital flows. The foregoing gives attention to those economic forces which are well identified and accepted in the literature as important determinants of international capital flows.

Official Intervention Influences

When management of the exchange rate is considered desirable by a country, this can be accomplished by increasing the supply of or the demand for the currency and, to a greater or lesser extent, overriding the fundamental market forces described in the trade and capital flows sections above. The government must be willing and able to either buy or sell its own currency or the appropriate foreign currency. In order to carry out this activity, it is necessary for the government to have in its reserves a supply of domestic currency and foreign currency or gold. If F currency is appreciating relative to UK currency, then government of F could use domestic (F) currency to buy foreign (UK) currency to prevent or mitigate the appreciation. If the reverse were the case, a depreciation of F currency relative to UK currency could be prevented or mitigated by official sources in F selling UK currency for F currency. The government thus effects the exchange rate by operating through the law of supply and demand.

A demand for UK currency by official sources arises when UK currency depreciates relative to F currency (F currency appreciates). In such a situation F authorities would demand UK currency and UK authorities would demand their own currency if their intent were to prevent or retard the depreciation of UK currency. The demand for UK currency arising from official intervention is therefore:

5. $O_{duk} = f(I_f, I_{uk})$

where

O_{duk} = The demand for UK currency arising out of official exchange rate management activities.

I_f = The management activities of official sources in F.

I_{uk} = The management activities of official sources in UK.

Alternatively, a supply of UK currency by the government arises when UK currency appreciates relative to F currency. To prevent or retard the appreciation of UK currency, F authorities could supply UK currency and/or UK authorities could supply their own currency to the exchange market. The supply of UK currency arising from official intervention is therefore:

6. $O_{suk} = f(I_f, I_{uk})$

where

O_{suk} = The supply of UK currency arising out of official exchange rate management activities.

I_f = The management activities of official sources in F.

I_{uk} = The management activities of official sources in UK.

The Equilibrium Condition of the Model

As with other markets, equilibrium is said to exist in the exchange market when the quantity of UK currency demanded equals the quantity supplied. In terms of the preceding analysis, this is when

7. $T_{duk} + K_{duk} + O_{duk} = T_{suk} + K_{suk} + O_{suk}$.

The left side of the above equation is total demand or the sum of the individual demands arising from trade flows, capital flows and official intervention. The right side is total supply or the sum of the individual supplies arising from trade flows, capital flows, and official intervention. Equilibrium obtains when the exchange rate is at that level which equates total quantity demanded with total quantity supplied.

The Basic Model as a Linear Equation

Based on the assumption that the functions are linear, the model will take the following form in terms of specific equations:

8. $$T_{duk} = (P_{uk})\left[\alpha_0 + \alpha_1 \frac{(P_f)}{(P_{uk})(ER)} + \alpha_2(Y_f) + \alpha_3 S_x + \alpha_4 Tr_x\right]$$

9. $$T_{suk} = \frac{(P_f)}{(ER)}\left[\beta_0 + \beta_1 \frac{(P_{uk})}{(P_f)/(ER)} + \beta_2 (Y_{uk}) + \beta_3 S_m + \beta_4 Tr_x\right]$$

10. $$K_{duk} = \frac{1}{(ER)}\left[\gamma_0 + \gamma_1 (r_f - r_{uk}) + \gamma_2 (M_f) + \gamma_3 A + \gamma_4 F + \gamma_5 C\right]$$

11. $$K_{suk} = \delta_0 + \delta_1 (r_f - r_{uk}) + \delta_2 B + \delta_3 (M_{uk}) + \delta_4 G + \delta_5 C$$

12. $$O_{duk} = \eta_0 + \eta_1 I_f + \eta_2 I_{uk}$$

13. $O_{suk} = \lambda_0 + \lambda_1 I_f + \lambda_2 I_{uk}$

14. $T_{duk} + K_{duk} + O_{duk} - T_{suk} - K_{suk} - O_{suk} = 0$

In order to obtain a reduced form equation expressing the exchange rate as a function of the other variables, equations 8 through 13 were substituted into equation 14 and the resulting equation was solved for ER:

15. $$ER = \frac{\alpha_1(P_f)-(P_f)\cdot \text{ Trade Supply Function}}{\beta_1(P_{uk})-(P_{uk})\cdot \text{ Trade Demand Function}} \quad \frac{+ \text{ Capital Demand Function}}{+ \text{ Capital Supply Function} - O_{duk} + O_{suk}}$$

$$\text{Trade Supply Function} = \alpha_0 + \alpha_2 (Y_f) + \alpha_3 S_x + \alpha_4 Tr_x$$

$$\text{Trade Demand Function} = \beta_0 + \beta_2 (Y_{uk}) + \beta_3 S_m + \beta_4 Tr_m$$

$$\text{Capital Demand Function} = \gamma_0 + \gamma_1 (r_f - r_{uk}) + \gamma_2 (M_f) + \gamma_3 A + \gamma_4 F + \gamma_5 C$$

$$\text{Capital Supply Function} = \gamma_0 + \gamma_1 (r_f - r_{uk}) + \gamma_2 B + \gamma_3 (M_{uk}) + \gamma_4 F + \gamma_5 C$$

The Lag Structure of the Model

To this point, an implicit assumption has been made that changes in fundamental economic variables during a given time period will be reflected in change in the exchange rate of the same time period. An argument can

be made, however, that some impacts involve lags and still others are cumulative over several periods. The proper lag structure thus becomes an empirical question in itself. Economic theory, however, does provide some initial reference points.

Theory suggests that prices and the exchange rate should carry the same time subscript. The relative price of UK goods as seen by residents of F depends on F and UK prices and the exchange rates; all of the same period. One can argue also that the impact of interest rate differentials on the exchange rate would be in the same period due to the high degree of capital mobility. On the other hand, changes in income, money stocks and long term investment opportunities would tend to operate with a lagged impact on the exchange rate. This follows from the prior notion that more time is required for individuals to respond to changes in their incomes, cash balances and direct investment opportunities than to price changes and interest differentials. The presence of and length of time lags is an empirical question. In order not to prejudge the issue, various lag structures were tried. A single-period lag for income and money stock was considered "best" in that it produced the lowest error-variance of all the lag structures for prices. Interest rate differentials showed that "best" results were obtained when the time subscripts were identical for the exchange

rate, prices and interest rate differentials. The basic model with appropriate time lags and the addition of a stockastic term is therefore:

$$16.\quad ER = \alpha_0 + \alpha_1 (P_f) + \alpha_2 (P_{uk}) + \alpha_3 (Y_f)_{-1} + \alpha_4 (Y_{uk})_{-1} + \alpha_5 (r_f - r_{uk}) + \alpha_6 (C) + \alpha_7 (M_f)_{-1} + \alpha_8 (M_{uk})_{-1} + \alpha_9 A_{-1} + \alpha_{10} B_{-1} + \alpha_{11} I_f + \alpha_{12} I_{uk} + \alpha_{13} S_1 + \alpha_{14} S_2 + \alpha_{15} S_3 + \alpha_{16} Tr + \alpha_{17} D_1 + \ldots + \alpha_{n+16} D_n + \mu$$

In equation 16 the S variables include the net effects of seasonal effects and the Tr variable includes trend effects. The dummy variables D_1 through D_n represent the occurrence of non-quantifiable events which are thought to have influenced the exchange rate. In the structural equations, the non-quantifiable events were represented by F and G.

The variables I_f and I_{uk} are dummies representing official intervention in the exchange market by F and UK. In the structural equations, this official demand and supply for UK currency was represented by O_{duk} and O_{suk}.

An alternative form for equation 16 which conserves degrees of freedom is:

$$17.\quad ER = \alpha_0 + \alpha_1 (P_f/P_{uk}) + \alpha_2 (Y_f/Y_{uk})_{-1} + \alpha_3 (r_f - r_{uk}) + \alpha_4 (C) + \alpha_5 (M_f/M_{uk})_{-1} + \alpha_6 (r_f - r_{uk}) + \alpha_7 (A/B)_{-1} + \alpha_8 I_f + \alpha_9 I_{uk} +$$

$$\alpha_{10}S_1 + \alpha_{11}S_2 + \alpha_{12}S_3 + \alpha_{13}Tr + \alpha_{14}D_1 + \ldots + \alpha_{n+13}D_n + \mu$$

Using implicit differentiation, the predicted signs of the coefficients in equations 16 and 17 were obtained. These results are shown in Table 3-1.

In the chapter which follows, least-squares regression techniques will be used to estimate equations 16 and 17.

TABLE 3-1

PREDICTED SIGNS OF COEFFICIENTS
OF EXPLANATORY VARIABLES

Equation 16		Equation 17	
Variable	Sign	Variable	Sign
P_f	+	P_f/P_{uk}	+
P_{uk}	-	Y_f/Y_{uk}	+
Y_f	+	(r_f-r_{uk})	-
Y_{uk}	-	M_f/M_{uk}	+
(r_f-r_{uk})	-	A/B	-
M_f	+	I_f	+
M_{uk}	-	I_{uk}	+
A	-	S_1	unknown
B	+	S_2	unknown
I_f	+	S_3	unknown
I_{uk}	+	Tr	unknown
S_1	unknown	D_1	unknown
S_2	unknown	$D_2 \ldots D_n$	+
S_3	unknown		
Tr	unknown		
D_1	unknown		
$D_2 \ldots D_n$	+		

CHAPTER IV

EMPIRICAL RESULTS AND COMPARISON WITH OTHER STUDIES

In this chapter, an empirical analysis will be made of fluctuations in the franc-pound exchange rate during the period August 1931 through April 1938. The analysis will utilize equations 16 and 17, which were developed in Chapter III. In the first section of this chapter, the data used in the study will be discussed. Following this, results obtained from the least squares regression analysis are presented. Finally, the results obtained here will be compared with those of other studies.

Data

For all variables specified in the model, monthly observations were reported or could be calculated from weekly observations. This analysis covers the period from August 1931 through April 1938 or eighty-one months. In all cases which follow, one or more variables are lagged one period; thus the number of observations in the regressions is eighty.

A monthly time series was not available for the franc-pound exchange rate. Weekly high and low rates were reported in The Economist and these were averaged to obtain a monthly rate. Table A-1, Appendix A, contains the franc-pound exchange rates used in this study.

Wholesale price indices were reported for both France and the United Kingdom in the Federal Reserve Bulletin. Retail prices were not available for the entire period for France and therefore the wholesale price indices were used. Tables A-2 and A-3 contain the French and British wholesale prices used in this study, while Table A-4 contains the same data in ratio form (P_f/P_{uk}).

No monthly series of national income levels was available for either France or the UK. Employment or production levels can be considered as reasonable proxies for income in such situations. For both countries an index of the level of employment was constructed using data found in two sources. For the period from August 1931 through March 1933 data were taken from the International Labor Review using a base year of 1924. For the remainder of the period, April 1933 through April 1938, data reported by The Statistical Yearbook of the League of Nations with a base year of 1929 were used. The former figures were adjusted to conform to the 1929 base year. For France, an index of total industrial production was reported in The Economist. Similar data for UK were

reported on a quarterly rather than a monthly basis and therefore could not be used. Tables A-5 and A-6 contain employment indices for France and UK, while Table A-7 contains an index of industrial production for France. An index of employment ratios (E_f/E_{uk}) is presented in Table A-8 and an index showing the ratio of French industrial production to employment in the UK is shown in Table A-9.

For purposes of this study, an M_1 definition of the money stock (currency in circulation plus demand deposits) was employed. The Federal Reserve Bulletin reported separate series for currency in circulation and demand deposits. These have been summed to compile Tables A-10 and A-11 which show the money supply for France and the UK respectively. Table A-12 contains an index of the ratio of the money supplies (M_f/M_{uk}).

For the period under study, only one interest rate series was readily available for France. The Federal Reserve Bulletin reported the private discount rate for French banks on a monthly basis for the entire eighty-one month period. The League of Nations in The Statistical Yearbook reported the discount rate at the Bank of France, but a large gap existed in the data during 1934. Therefore, only the private discount rate reported in the Federal Reserve Bulletin could be used in the present study. As a proxy for "the" interest rate in the United

Kingdom, the British 2½% consol rate as reported in The Statistical Yearbook was used. Table A-13 shows the monthly interest rate differential between the French private discount rate and the British 2½% consol rate ($r_f - r_{uk}$).

Regrettably, no monthly series for the forward franc could be found, and therefore it was not possible to construct a series indicating the forward discount (or premium). For this reason, the effects of covered interest arbitrage on the level of the franc-pound rate could not be tested.

The adoption of a suitable proxy for the growth of long term investment presented several problems. The best proxy would probably be the growth of real GNP or National Income, but as previously indicated, neither were reported monthly during this period. A second best alternative would be the growth of industrial production. Such a series was available for France, but not for the United Kingdom. Lacking a suitable proxy, no test was made to estimate the effect which differences in long term investment potential had on capital flows and therefore on the franc-pound exchange rate.

Because it was felt that public knowledge of their operations would impair the effectiveness of their stabilization activities, neither the French nor the British divulged quantitative information on the activities of

their exchange management agencies. Their presence in the exchange market was evident and reported in the literature.

The Economist carried weekly accounts of activity by both the BEEA and FESF and served as the source for the construction of dummy variables representing official intervention in the exchange market. Although the BEEA was also actively involved in the dollar-pound exchange market, only intervention with regard to influencing the franc-pound rate is considered here. The FESF on the other hand confined its activities to the management of the franc-pound rate. The intervention dummy variables (I_f) and (I_{uk}) were constructed in the following manner: If it was reported that the FESF bought pounds (or sold francs) during a particular month, a value of "plus one" was recorded for that month. If the FESF was reported to have sold pounds (or bought francs) a value of "minus one" was recorded. If no activity was reported for the FESF for a particular month, a value of "zero" was recorded. Using the same criteria, a dummy variable was constructed to capture the intervention activities of the BEEA. A value of "plus one" indicated the BEEA bought pounds (sold francs); a value of "minus one" indicated a sale of pounds (bought francs); no reported activity by the BEEA was indicated by a "zero." Since the activity by the BEEA and FESF were reported weekly, the possibility

existed that either of the funds might have bought during one week and sold during another week of the same month. This situation occurred during several months. The procedure used to determine the value for the dummy variable during that month was to assign a "plus one" (+1) for each week in which the funds bought pounds, assign a "minus one" (-1) for each week in which the funds sold pounds and counted the pluses and minuses algebraically to find the net effect for the month. For instance during January 1938 the FESF intervened in the market in each of the four weeks, on three occasions to sell francs (+3) and on one occasion to buy francs (-1). For the month of January 1938, the net effect of intervention by the FESF was recorded as "plus" indicating that for the month, it sold francs.

The weekly reporting of BEEA and FESF activity suggested an alternative procedure. A second set of intervention dummies was constructed by summing the "plus ones," "minus ones" and "zeros" for each week of a given month and assigning this value to the dummy for the BEEA and FESF. It was hoped that this procedure might better capture the magnitude of intervention by the exchange management agencies. Using this procedure, a value of "plus two" (+2) was assigned to the FESF dummy for January 1938 since the Fund sold francs during three weeks (+3) and bought francs during one week (-1). To distinguish

between the two sets of dummy variables generated, the former are hereafter referred to as "regular" and the latter as "high-powered" intervention dummies. Tables A-15 and A-16 show "regular" and "high-powered" dummy variables for the FESF while Tables A-17 and A-18 show the "regular" and "high-powered" dummy variables for the BEEA. The information used to construct these tables is contained in Appendix II.

A third possibility for evaluating intervention by the two stabilization funds was to assign values representing the intensity of intervention (e.g. heavy, moderate or light). However the writers in The Economist did not always mention the magnitude of intervention, and when they did, they used words which required subjective evaluation by the reader (e.g. "mild," "occasional," "sporadic," "massive," "pervasive"). Because this type of evaluation would involve too much subjective interpretation it was not included in this study.

To test for the presence of seasonal influences on the exchange rates, three-month groupings were used to construct dummy variables (S_1), (S_2) and (S_3). April, May and June comprise the spring variable (S_1); July, August and September comprise the summer variable (S_2); October, November and December comprise the fall variable (S_3). Table A-19 shows the dummy variables (S_1), (S_2) and (S_3).

The trend variable is simply a series of sequential integers (1-80).

The dummy variables D_1 . . . D_n represent events which were thought to have affected the exchange rate, but whose influence could not be quantified. Separate dummy variables were constructed for each such event as follows: If the event was reported as present during a period (month) and was thought to cause an appreciation of the pound (a rise in the franc-pound exchange rate) a value of "plus one" was assigned. Alternatively, values of "minus one" were assigned if the event was reported and thought to cause depreciation of the pound (a fall in the franc-pound exchange rate). The event not being reported as present resulted in an assignment of "zero" for that period. The sources used for the reporting of the events were Wolfe, Wynne, and Dulles and were substantiated by The Economist.[1]

In the following section, several non-quantifiable events which were thought to have caused movements in the exchange rate are discussed. These events, in most cases, were thought to have resulted in changes in attitudes

---

[1]Wolfe, The French Franc between the Wars, 1919-1939; Wynne, "The French Franc"; and Dulles, "The French Franc in 1935," The Harvard Business Review, pp. 146-60. Events cited in these sources were checked against the weekly reports in The Economist. Dummy variables were constructed when there was agreement among all of the sources.

toward risk and/or expectations regarding capital gains (or losses).

The Dummy Variables

In April 1933 the United States left the gold standard and the dollar depreciated relative to all gold standard currencies and the pound. For a period of thirteen months, the dollar "floated" in the foreign markets finally being repegged to gold in April 1934.[2] This is the first major event of the period which could have affected the franc-pound exchange rate, but which could not be quantified. With each of the three major exchange rates "floating," opportunities for currency arbitrage were increased. Thus movements in either the dollar-franc rates or the dollar-pound rate could generate discrepancies in the cross rates and therefore profit opportunities. To the extent that three currency arbitrage occurred, it would have affected the franc-pound rate. Dummy variable D_1 represents the effects of the U.S. decision to let the dollar float.[3]

The riots which occurred in Paris during February 1934 were a second set of events thought to have affected the exchange rate. Their alleged effect was to produce

---

[2]For an in-depth account of the events surrounding the U.S. dollar devaluation, see J. D. Paris, Monetary Policies of the United States 1932-1938, chap. ii.

[3]Table A-20, Appendix A, shows the values assigned to this dummy.

a general uneasiness about the relative safety of French investments and a flow of funds out of France, thus depreciating the franc. During one week in February 1934 the Bank of France's gold reserves dropped by 2 billion francs and for the months of February and March, reserves fell by 8-9 billion francs.[4] The effect of the "riots" is represented by dummy variable D_2.[5]

Dummy variable D_3 represents the impact of the devaluation of the belga by the Belgian government in late March 1935 and events following the devaluation. This is the third major event of the period thought to have affected the franc-pound rate. The devaluation was considered by many as a precursor of a devaluation of the French franc. In four days, the Bank of France lost more than 1.5 billion francs in gold reserves.[6] Following the devaluation of the belga, a flight of capital from France occurred. First in April 1935 and later in November of the same year, speculation arose that the franc would soon go the way of the pound, the dollar and the belga--that devaluation would soon occur. The high probability attached to the severance of the tie between the franc and gold resulted in outflows of capital from France. Added to this was

---

[4]Martin Wolfe, The French Franc between the Wars, 1919-1939, p. 129.

[5]See Table A-21, Appendix A.

[6]Wolfe, French Franc, p. 114; Wynne, "French Franc," p. 508.

the activity of speculators betting on the imminent devaluation of the franc.[7] These "flights" from the franc were thought to depreciate the franc relative to the pound and are represented by dummy variable D_3.[8]

A fourth event of the period occurred in 1935 after the election of a new French government. In April 1935 Pierre Laval was brought into power and he immediately sought to produce a country wide deflation of wages and prices. Reasoning that deflation was preferable to devaluation as a cure for the economic problems of France, the new administration issued 539 "decree-laws" designed to force down wages and prices.[9] This policy allegedly produced an appreciation of the franc relative to the pound by generating expectations of more favorable terms of trade for France. Dummy variable D_4 represents the effects of the Laval "deflation" policy.[10]

A fifth event of the period which is represented by dummy variable D_5 was the election of the Popular Front party headed by Leon Blum.[11] Upon taking office

---

[7]Wynne, "French Franc," pp. 502-8; Dulles, "French Franc," pp. 158-60.

[8]See Table A-22, Appendix A.

[9]Wolfe, French Franc, pp. 114-5; Wynne, "French Franc," pp. 504-5.

[10]See Table A-23, Appendix A.

[11]See Table A-24, Appendix A.

in June 1936 Blum and the Popular Front advocated liberal economic reforms such as paid holidays, public works programs and support prices for wheat and other grains.[12] The implementation of such measures was alleged to have a depressing effect on confidence in the Paris money market and resulted in a depreciation of the franc relative to the pound.

A sixth major event was the "pause" in social and economic reforms announced by the Socialist party on February 14, 1937.[13] This was a move intended to prevent a continued depreciation of the franc and its alleged effects were to cause a fall in the franc-pound rate. Dummy variable D_6 represents the effects of the "pause."[14]

In June 1937 a seventh major event occurred and is represented by dummy variable D_7.[15] The effects of the "pause" announcement of the Blum administration in February 1937 mitigated speculative attacks on the franc until a "panic" situation occurred in June.[16] This speculative attack in the exchange rate of the franc supposedly resulted from the dangerous position of the French Treasury.

---

[12]Wolfe, French Franc, pp. 139-49.

[13]Wolfe, French Franc, pp. 152-4.

[14]See Table A-25, Appendix A.

[15]See Table A-26, Appendix A.

[16]Wolfe, French Franc, p. 156.

The alleged effect of the "panic" was a depreciation of the franc and a rise in the franc-pound exchange rate.

An eighth and final event of the period was an announcement made by the French Council of Ministers in October 1937. With the seasonal decline in the tourist industry, the exchange position of the franc was extremely critical and an emergency meeting of the Council was called at the President's summer home in Rambouillet.[17] The "Declaration of Rambouillet" was issued--a statement that France would deal firmly and quickly with its economic and financial problems without recourse to any type of exchange control. This announcement had the alleged effect of strengthening the Paris money market and causing a fall in the franc-pound exchange rate. Dummy variable D_8 represents the effects of the "Declaration of Rambouillet."[18]

Empirical Results

In this section, the relationship between the franc-pound exchange rate and the variables discussed in the past section will be analyzed. Equations 16 and 17 which were developed in a previous section will be estimated using least-squares regression techniques. These equations will serve as the basis for extending the analysis through

---

[17]Wolfe, French Franc, pp. 178-9.

[18]See Table A-27, Appendix A.

modification or deletion of independent variables. The results for equation 16 are shown in Table 4-1.

Of the twenty-two explanatory variables contained in equation 16, nine were significant at the 0.05 level. Of these nine, the following carried the expected sign--the French and British price levels, the proxy for French national income and dummy variables representing French exchange intervention (I_f), "flights" from the franc (D_3) and the "pause" in French social reforms (D_6). Of the quantifiable economic fundamentals, the proxy for British national income, the French and British money stocks and the interest rate differential were not significant. The British employment index carried the correct sign but was not significant.

Trend (Tr) was significant and carried a positive sign. This indicates that those forces (e.g. tastes) affected by time were working to cause the franc to depreciate relative to the pound. None of the seasonal dummy variables were significant. The dummy variables representing the deflationary policies of Permier Laval (D_4) and the election of the Popular Front government (D_5) were highly significant but carried signs opposite to those expected.

According to the results, the deflationary policies caused a rise in the franc-pound rate. This can perhaps be explained by the effects the policies had on capital

TABLE 4-1

INITIAL TEST OF EQUATION 16

Variable	Regression Coefficient	Standard Deviation	t-Score
Franc-Pound rate	-	-	-
Constant	33.31538	-	-
Price Index-France	0.31984	0.02276	14.24
Price Index-UK	-1.40901	0.38953	3.62
Employment Index-France (Lagged 1-Period)	0.12213	0.03343	3.65
Employment Index-UK (Lagged 1-Period)	-0.07479	0.04699	1.59
M_s-France (Lagged 1-Period)	0.0002	0.00021	0.07
M_s-UK (Lagged 1-Period)	-0.00688	0.01176	0.58
R_f-R_{uk}	0.81003	0.73637	1.10
BEEA (I_{uk})	-0.13034	0.84851	0.15
FESF (I_f)	3.82470	1.57693	2.43
Trend (Tr)	0.72861	0.16868	4.32
Spring (S_1)	1.60024	1.55915	1.03
Summer (S_2)	0.05530	1.82510	0.01
Fall (S_3)	-1.47074	1.64537	0.89
US Devaluation (D_1)	-1.82416	1.65408	1.10
Riots (D_2)	-5.77841	3.08693	1.87
Flights (D_3)	3.20657	1.47551	2.17
Deflation (D_4)	-6.65400	2.72519	2.44

TABLE 4-1 - Continued

Variable	Regression Coefficient	Standard Deviation	t-Score
Election (D_5)	-8.54236	3.00859	2.84
Pause (D_6)	9.06934	3.43028	2.64
Panic (D_7)	0.3373	3.6776	0.09
Declaration (D_8)	1.52280	4.40891	0.34

R^2 = 0.98 R^2 ADJ. = 0.97 N = 80

Durbin-Watson Ratio = 1.46

flows and price levels. The deflationary policies worked to produce lower relative prices and thus strengthened the franc. To a great extent, however, this would be reflected in the French price level variable. On the other hand deflationary policies were not generally accepted as an optimal solution to French industrial recovery. For this reason, deflation may have resulted in an outflow of capital from France.[19] The outflow of capital would weaken the franc and would not be reflected in another variable in the equation. On this basis, the expected sign for the "deflation" dummy variable would be negative and be supported by the study.

The argument that the election of the Popular Front government (and its subsequent social reform policies) had a depreciating effect on the franc was that Popular Front programs caused a deterioration of the confidence in the French government by increasing the deficit position of the government's budget. This could have precipitated an outflow of capital and/or a speculative attack on the franc. On the other hand, there was in fact a strong

---

[19]At least two reasons can be offered for the pessimism which accompanied the deflation policies. First, it was not apparent to many businessmen and economists that falling prices and wages was the correct solution. Many favored devaluation and policies to stimulate rising prices and wages. Second, many doubted that the magnitude of deflation necessary to avoid devaluation was possible even if they agreed with the policy theoretically.

"Keynesian" flavor to the Popular Front programs. Measures which reduced unemployment and increased consumer's income served business and industry as well as the labor force. Higher wages could result in higher profits.[20] To the extent that the experiments of the Popular Front government were viewed in this latter perspective, their effect would have resulted in an appreciation of the franc. In the light of the results of this study, the effects of the election were to increase the confidence in the franc and bring about downward pressure on the franc-pound rate.

The fact that neither individual money stock variable was significant (both did carry the correct sign) indicates that the cash balance effect was not acting to influence the exchange rate. This was perhaps the most surprising result obtained in experiments with equation 16. A partial explanation results from examining the relationship between the money stock and price levels. The crude quantity theory of money suggests that the level of the money stock determines the level of prices. Not unexpectedly, the two variables were highly correlated.[21] To some extent then, the effect of the money stock on the

---

[20]Wolfe, French Franc, pp. 138-40.

[21]The partial correlation coefficient for the French price index and lagged money stock was 0.571 and for the UK price index and lagged money stock was 0.868.

exchange rate may have been absorbed by the price level variable.[22]

The interest rate differential was not significant nor did it carry the expected sign. Due to the manner in which the Bank of France manipulated discount rates during this period, these results are not surprising. The discount rate was normally raised in response to depreciations of the franc and was therefore viewed by speculators as a signal that the franc was in trouble. At such times, an interest rate differential favoring an inflow of capital may have had little effect on the actual direction of capital flows.

While the coefficient of multiple correlation is quite high for equation 16 ($R^2 = 0.98$), the somewhat low value of the Durbin-Watson ratio (1.46) indicates that the residuals are positively correlated. This suggests that one or more explanatory variables may have been omitted. This may well be the case since the effects

---

[22]In a separate experiment, the French and British price level variables were omitted from equation 16. In this formulation, both money stock variables were significant and carried the correct sign. This suggests that money stock changes were affecting the exchange rate through changes in the price level. The results were:

Variable	Regression Coefficient	t-Score
M_S-UK (Lagged 1-Period)	-0.05121	2.17
M_S-F (Lagged 1-Period)	0.00222	6.36

of "third country events" on the franc-pound exchange rate have been ignored.

Table 4-2 shows the results obtained for equation 16 when the "high-powered" intervention dummy variables were substituted for the "regular" intervention dummy variables. The major effect of this substitution is the increase in the t-score of the variable representing French exchange intervention. In addition, both R^2 and the Durbin-Watson ratio were slightly improved over the results obtained using "regular" intervention. These improvements are encouraging since they were obtained by using techniques which attempted to better "quantify" the information that was available.

A second experiment was made utilizing equation 16. As the proxy for French national income, an index of French industrial production was substituted for the index of French employment. The results of this experiment, shown in Table 4-3, were somewhat mixed. While there was an improvement in the Durbin-Watson ratio, R^2 showed a decrease. Of more importance, the index of industrial production did not appear as a significant variable at the 0.05 level as indicated by its t-score of 1.46. The t-score of dummy variable D_3 (flights from the franc) was lowered and the variable was no longer significant. Otherwise, the substitution produced only minor changes in the t-scores of significant variables. On the basis

TABLE 4-2

TEST OF EQUATION 16 WITH "HIGH-POWERED"
BRITISH AND FRENCH INTERVENTION
DUMMY VARIABLES

Variable	Regression Coefficient	Standard Deviation	t-Score
Franc-Pound Rate	-	-	-
Constant	17.38861	-	-
Price Index-France	0.31351	0.02174	14.42
Price Index-UK	-1.42360	0.37631	3.78
Employment Index-France (Lagged 1-Period)	0.12163	0.03258	3.73
Employment Index-UK (Lagged 1-Period)	-0.06303	0.04574	1.38
M_s-France (Lagged 1-Period)	0.00005	0.00020	0.25
M_s-UK (Lagged 1-Period)	-0.00308	0.01166	0.26
R_f-R_{uk}	0.21139	0.73653	0.29
"High-Powered" BEEA (I_{uk})	-0.33683	0.38498	0.87
"High-Powered" FESF (I_f)	2.09037	0.65831	3.18
Trend (Tr)	0.70973	0.16667	4.26
Spring (S_1)	1.43070	1.47845	0.97
Summer (S_2)	-0.54927	1.74710	0.31
Fall (S_3)	-2.07821	1.58482	1.31
US Devaluation (D_1)	-1.96129	1.58325	1.24
Riots (D_2)	-5.45757	2.96677	1.84
Flights (D_3)	3.10348	1.42921	2.17

TABLE 4-2 - Continued

Variable	Regression Coefficient	Standard Deviation	t-Score
Deflation (D_4)	-6.49348	2.66750	2.43
Election (D_5)	-9.32071	2.91610	3.20
Pause (D_6)	9.75935	3.34010	2.92
Panic (D_7)	0.92490	3.55089	0.26
Declaration (D_8)	1.33719	3.85177	0.35

R^2 = 0.98 R^2 ADJ. = 0.97 N = 80

Durbin-Watson Ratio = 1.48

TABLE 4-3

TEST OF EQUATION 16 WITH "HIGH-POWERED" INTERVENTION DUMMIES AND FRENCH INDUSTRIAL PRODUCTION

Variable	Regression Coefficient	Standard Deviation	t-Score
Franc-Pound Rate	-	-	-
Constant	84.86383	-	-
Price Index-France	0.33514	0.02290	14.63
Price Index-UK	-1.28145	0.41547	3.08
Industrial Production Index-France (Lagged 1-Period)	0.17351	0.11843	1.46
Employment Index-UK (Lagged 1-Period)	-0.05752	0.05062	1.14
M_s-France (Lagged 1-Period)	0.00007	0.00023	0.32
M_s-UK (Lagged 1-Period)	-0.00557	0.01300	0.43
R_f-R_{uk}	0.49684	0.81152	0.61
"High-Powered" BEEA (I_{uk})	-0.20736	0.42063	0.49
"High-Powered" FESF (I_f)	2.34318	0.72290	3.24
Trend (Tr)	0.51559	0.18104	2.85
Spring (S_1)	1.79076	1.61317	1.11
Summer (S_2)	2.30164	1.75003	1.32
Fall (S_3)	0.97589	1.49165	0.65
US Devaluation (D_1)	-2.18096	2.00336	1.09
Riots (D_2)	-5.92746	3.29611	1.80
Flights (D_3)	2.63112	1.55569	1.69

TABLE 4-3 - Continued

Variable	Regression Coefficient	Standard Deviation	t-Score
Deflation (D_4)	-7.84871	2.89587	2.71
Election (D_5)	-9.98209	3.18228	3.14
Pause (D_6)	11.87817	3.58759	3.31
Panic (D_7)	1.32032	4.17575	0.32
Declaration (D_8)	3.13601	4.17612	0.75

R^2 = 0.98 R^2 ADJ. = 0.97 N = 80

Durbin-Watson Ratio = 1.51

of these results the index of French employment seemed the better proxy for French national income.

The results for the initial estimation of equation 17 (fundamental variables in ratio form) are shown in Table 4-4. Although these results are in general agreement with those of Table 4-1, some important differences were derived: While the R^2 for equation 17 was slightly lower, the Durbin-Watson ratio was improved. Also, in equation 16 neither individual money stock variable was significant, but in ratio form (M_f/M_{uk}) the variable was significant and carried the correct sign. This supports the contention that the cash balance effect was working to influence the exchange rate.

In ratio form, price and employment indices were highly significant and carried the correct sign, but the interest rate differential remained insignificant.

As in the previous estimation, the t-score for the dummy variable D_3 was decreased and the variable could no longer be considered significant at the 0.05 level. In all other cases, dummy variables which were significant in equation 16 remained significant and carried the same sign in the initial estimation of equation 17.

Table 4-5 shows the results obtained utilizing equation 17 and substituting the "high-powered" intervention dummy variable for the "regular" intervention dummy variable. The Durbin-Watson ratio decreased somewhat but

TABLE 4-4

INITIAL ESTIMATION OF EQUATION 17

Variable	Regression Coefficient	Standard Deviation	t-Score
Franc-Pound Rate	-	-	-
Constant	-226.48991	-	-
Price Index Ratio (F/UK)	28.31288	1.59433	17.76
Employment Index Ratio (F/UK) (Lagged 1-Period)	136.67170	28.16417	4.85
M_s Ratio (F/UK) (Lagged 1-Period)	0.31446	0.14503	2.17
R_f-R_{uk}	0.44443	0.73461	0.60
BEEA (I_{uk})	-0.23986	0.84221	0.28
FESF (I_f)	4.16757	1.51790	2.75
Trend (Tr)	1.07624	0.14911	7.22
Spring (S_1)	1.53105	1.34245	1.14
Summer (S_2)	0.26217	1.59766	0.16
Fall (S_3)	-1.56280	1.46553	1.07
US Devaluation (D_1)	-0.96842	1.49913	0.65
Riots (D_2)	-4.29338	2.89167	1.48
Flights (D_3)	2.62697	1.43235	1.83
Deflation (D_4)	-6.70170	2.69850	2.48
Election (D_5)	-9.79297	2.64049	3.71
Pause (D_6)	8.70640	2.28965	3.80

TABLE 4-4 - Continued

Variable	Regression Coefficient	Standard Deviation	t-Score
Panic D_7)	3.11643	2.54994	1.22
Declaration (D_8)	-0.35752	3.93020	0.09

R^2 = 0.98 R^2 ADJ. = 0.97 N = 80

Durbin-Watson Ratio = 1.57

TABLE 4-5

ESTIMATION OF EQUATION 17 WITH "HIGH-POWERED" BRITISH AND FRENCH INTERVENTION DUMMY VARIABLES

Variable	Regression Coefficient	Standard Deviation	t-Score
Franc-Pound Rate	-	-	-
Constant	-218.18414	-	-
Price Index Ratio (F/UK)	28.26570	1.55221	18.21
Employment Index Ratio (F/UK) (Lagged 1-Period)	131.51384	27.38286	4.80
M_s Ratio (F/UK) (Lagged 1-Period)	0.27569	0.14205	1.94
R_f-R_{uk}	-0.08660	0.73562	0.12
"High-Powered" BEEA (I_{uk})	-0.27645	0.38354	0.72
"High-Powered" FESF (I_f)	2.17672	0.63370	3.43
Trend (Tr)	1.06506	0.14512	7.34
Spring (S_1)	1.29646	1.28109	1.01
Summer (S_2)	-0.36062	1.53946	0.23
Fall (S_3)	-2.07356	1.40168	1.48
US Devaluation (D_1)	-0.89481	1.44160	0.62
Riots (D_2)	-4.42014	2.78965	1.58
Flights (D_3)	2.65033	1.38880	1.91
Deflation (D_4)	-6.85432	2.64373	2.59
Election (D_5)	-10.02837	2.56303	3.92
Pause (D_6)	9.42656	2.25271	4.18

TABLE 4-5 - Continued

Variable	Regression Coefficient	Standard Deviation	t-Score
Panic (D_7)	3.53632	2.46676	1.43
Declaration (D_8)	-0.84296	3.42755	0.24

R^2 = 0.98 R^2 ADJ. = 0.97 N = 80

Durbin-Watson Ratio = 1.49

there was an improvement in R^2 and in most t-scores for significant variables. The major improvements in t-scores were noted in the French intervention and pause dummy variables. In addition, the "flights" dummy variable was marginally significant. Generally, the results of this experiment with equation 17 were consistent with previous results.

In a second experiment with equation 17, the index of French industrial production was substituted for the index of French employment. The results are shown in Table 4-6. There was a slight decrease in both R^2 and the Durbin-Watson ratio. The ratio of French to British employment was highly significant in both of the previous experiments with equation 17; substitution of the index of industrial production resulted in a large decrease in the t-score but the variable did remain significant. While there was a change in all t-scores, there were no new significant variables as a result of this substitution.

In general, this confirms the results obtained in Table 4-3 and indicates that the level of employment is the preferred proxy for French national income.

A final experiment with both equations 16 and 17 involved omission of all variables which had not been significant in any of the previous experiments. The results are shown in Table 4-7 and Table 4-8. As expected, this experiment resulted in decreased R^2 and Durbin-Watson

TABLE 4-6

ESTIMATION OF EQUATION 17 WITH "HIGH-POWERED" INTERVENTION DUMMIES AND FRENCH INDUSTRIAL PRODUCTION

Variable	Regression Coefficient	Standard Deviation	t-Score
Franc-Pound Rate	-	-	-
Constant	-122.66199	-	-
Price Index Ratio (F/UK)	31.92117	1.45088	22.00
Industrial Production-France/Employment Index-UK (Lagged 1-Period)	229.16214	108.40967	2.11
M_s Ratio (F/UK) (Lagged 1-Period)	0.22025	0.16440	1.34
R_f-R_{uk}	0.22447	0.83529	0.27
"High-Powered" BEEA (I_{uk})	-0.23153	0.43589	0.53
"High-Powered" FESF (I_f)	2.60300	0.72596	3.59
Trend (Tr)	0.62897	0.11418	5.51
Spring (S_1)	0.99626	1.45028	0.69
Summer (S_2)	1.89229	1.72765	1.10
Fall (S_3)	0.41921	1.47438	0.28
US Devaluation (D_1)	-1.93198	1.85637	1.04
Riots (D_2)	-5.87878	3.19399	1.84
Flights (D_3)	2.51822	1.57361	1.60
Deflation (D_4)	-8.45856	2.96776	2.85
Election (D_5)	-12.43674	2.86881	4.34

TABLE 4-6 - Continued

Variable	Regression Coefficient	Standard Deviation	t-Score
Pause (D_6)	11.64150	2.60136	4.48
Panic (D_7)	3.80183	2.81940	1.35
Declaration (D_8)	1.62521	3.91668	0.41

R^2 = 0.98 R^2 ADJ. = 0.97 N = 80

Durbin-Watson Ratio = 1.41

TABLE 4-7

FINAL TEST FOR EQUATION 16 WITH INSIGNIFICANT VARIABLES OMITTED

Variable	Regression Coefficient	Standard Deviation	t-Score
Franc-Pound Rate	-	-	-
Constant	18.89914	-	-
Price Index-France	0.32792	0.01233	26.60
Price Index-UK	-1.62916	0.21676	7.52
Employment Index-France (Lagged 1-Period)	0.07223	0.02554	2.83
"High-Powered" FESF (I_f)	1.58871	0.44968	3.53
Trend (Tr)	0.47983	0.07336	6.54
Flights (D_3)	3.50658	1.38208	2.54
Deflation (D_4)	-7.57697	2.39877	3.16
Election (D_5)	-8.80780	2.14754	4.10
Pause (D_6)	8.05846	2.37313	3.40

R^2 = 0.98 R^2 ADJ. = 0.97 N = 80

Durbin-Watson Ratio = 1.12

TABLE 4-8

FINAL TEST FOR EQUATION 17 WITH INSIGNIFICANT VARIABLES OMITTED

Variable	Regression Coefficient	Standard Deviation	t-Score
Franc-Pound Rate	-	-	-
Constant	-209.10361	-	-
Price Index Ratio (F/UK)	28.84951	1.27370	22.65
Employment Index Ratio (F/UK) (Lagged 1-Period)	112.28154	25.05593	4.48
M_s Ratio (F/UK) (Lagged 1-Period)	0.34553	0.13196	2.62
"High-Powered" FESF (I_f)	1.70627	0.45341	3.76
Trend (Tr)	1.03093	0.13505	7.63
Flights (D_3)	2.68465	1.39541	1.92
Deflation (D_4)	-7.70574	2.39283	3.22
Election (D_5)	-8.73739	2.24571	3.89
Pause (D_6)	8.84309	2.07656	4.26

$R^2 = 0.98$ R^2 ADJ. = 0.97 N = 80

Durbin-Watson Ratio = 1.10

ratios. For equation 16, the t-scores for each variable included showed improvement with the exception of the index of French employment which declined, yet remained significant. The results were much the same for equation 17. All t-scores improved except the ratio of French to British employment which decreased, but remained significant.

In other experiments, whose results are not shown, interest-rate differentials, lagged one-period were introduced into equations 16 and 17. A slight improvement in the t-score of the interest rate variable resulted, but for the equation, R^2 and the Durbin-Watson ratio decreased. In addition, this lagged structure resulted in a general decrease in all t-scores and several variables became insignificant. While these experiments did not totally resolve the issue of the "best" lag structure for interest rates, based on better overall results, the unlagged form had greater appeal in the present study.

Preliminary Conclusions

Based on the foregoing analysis, the following preliminary conclusions are drawn:

During the period under study, the franc-pound exchange rate was strongly influenced by "fundamentals"--relative price levels, relative income levels and relative money stocks. The significance of these variables supports

expectations based on economic theory. The very strong influence which relative price levels had on the exchange rate supports the notion that price incentives generate trade flows which produce countervailing exchange rate movements. The performance of the proxy variable for income levels suggests that the income elasticity of demand for foreign goods and services is both significant and positive. In ratio form, the money stock variable was significant indicating that the cash balance effect did influence the exchange rate. For reasons mentioned previously, interest-rate differentials were not expected to be significant and this was verified by the study.

While the influence of macrovariables was quite strong, the franc-pound exchange rate was not immune to forces emanating from the major social and political events of the day. Eight events were included in the analysis and of these, three were consistently significant: the Laval "deflation" policies, the "election" of the Popular Front party and the "pause" in the French Social reform movement. A fourth event, the "flights" from the franc was also found on several occasions to have significantly influenced the exchange rate. By creating the psychological atmosphere, these events appear to have caused inflows and flights of capital and/or stabilizing and destabilizing speculation.

> In general, the high degree of variability in the dollar price of sterling during the early 1920's appears to have reflected rather faithfully a high degree of variability in the "fundamentals."[27]

The study by Hudgins parallels closely in time the present study. His focus was on fluctuations in the dollar-pound rate from September 1931 through December 1938. While utilizing an analytical model similar to Hodgson's, Hudgins included as independent variables the exchange intervention activities of the U.S. and British governments. A summary of these results is shown in Table 4-10.[28]

Hudgins found both price ratios and employment ratios significant with the expected sign. While both money stock variables were significant, they carried signs opposite to those predicted by theory. Hudgins argued that this was the result of "inversed causality"--"that the exchange rate was affecting variables (money stocks) through speculative activity rather than vice versa, as suggested by theory."[29] In concluding that "inversed causality" was at work, Hudgins stated:

---

[27]Hudgins, "Fluctuations," p. 256.

[28]Table 4-10 has been constructed from Hudgins, Table 4-4, p. 99. Only variables which had t-scores greater than 2.0 have been included.

[29]Hudgins, "Fluctuations," p. 117.

Seasonal variation did not emerge as an influence on the franc-pound rate. The trend variable was significant in every experiment. This suggests several possibilities: First, an explanatory variable may have been omitted; second, taste patterns may have changed over the eight-year period; third, the increasing probability of war with Germany may have caused a slow deterioration in confidence regarding the continental European economies; fourth, the reluctance of France to leave the gold standard coupled with the inability of the French government to deal with the depression may have caused a secularly decreasing confidence in the franc which was not picked up by other variables; fifth, trend may have taken influence from variables with which it was correlated.

The intervention of the French Exchange Stabilization Fund did have a significant effect on the exchange rate. To some extent then the French were successful in overriding the influences of fundamental and psychological forces affecting the exchange rate. While it cannot be denied that the FESF influenced the exchange rate, it is certainly not clear that their intervention was always in the best interests of the French economy. A more complete analysis of the effects of French and British intervention will follow in Chapter V.

Comparison with the Results of Other Studies

In this section, the results obtained in the present study will be compared with those of similar studies by others.[23]

Hodgson analyzed fluctuations in the dollar-pound exchange rate from March 1919 to April 1925. The relationship between the dollar and pound during this period was similar to that of the franc and pound during the period of the present study: the dollar was pegged to gold, while the pound was not and the result was a "floating" exchange rate between the two currencies. In his study, Hodgson developed the fundamental model for analysis which was later used (with modifications) by Thomas, Hudgins and this writer.

Hodgson tested the influence of "fundamental" determinants (price levels, real income levels, interest rate differentials, money stock magnitudes and seasonal effects) and nonfundamental events (political disruptions and random economic disturbances) on the level of the exchange rate.

---

[23]Reference is made to:
John S. Hodgson, "An Analysis of Floating-Exchange Rates: The Dollar-Sterling Rate, 1919-1925."
Maxwell Hudgins, "Currency Exchange Rate Fluctuations under a System of Stabilization Funds: The Case of the Pound-Dollar Rate--1931-1938" (unpublished Ph.D. dissertation, University of Virginia, 1973).
Lloyd B. Thomas, "Behavior of Flexible Exchange Rates: Additional Tests from the Post-World War I Episode."

Using an equation similar to equation 16 of this study, Hodgson obtained the results shown in Table 4-9.[24] As in the present study, Hodgson found "fundamentals," especially price levels to be highly significant in explaining the level of the exchange rate. In tests of nonfundamentals, two were significant ("restrictions") and "flight") and eleven others were not. The dummy variables representing "restrictions" and "flight" were intended to capture the effects of British restrictions on capital exports and certain specified imports and the flight from the pound in response to fears that the British government would abandon internal deflation policies.[25] Hodgson found interest rate differentials significant with the correct sign, but omitted real income proxies from his final form.[26] Hodgson concluded:

---

[24]Table 4-9 has been constructed without modification of results from Hodgson, Table II, p. 252. T-scores were calculated using data contained in Table II and added to Table 4-9.

[25]Hodgson, "Exchange Rates," p. 245 Fn.

[26]Hodgson found the U.S. real-income variable insignificant at the 0.05 level and although the British real-income variable was significant, it carried the wrong sign. Hodgson reasoned that this was not implausible given rising incomes of Britain's Commonwealth trading partners and a low supply elasticity of British exports with a high supply elasticity of British imports. Thus there was a rising demand for exports not associated with U.S. incomes which caused the pound to appreciate while British incomes were rising. Hodgson, "Exchange Rates," p. 253.

TABLE 4-9

SUMMARY OF RESULTS FROM HODGSON'S STUDY
OF THE DOLLAR-POUND RATE, 1919-1925

Variable	Regression Coefficient	Expected Sign	t-Score
Dollar-Pound Rate	-	-	-
Constant	292.221	-	6.99
Price Index-US	1.292	+	8.28
Price Index-UK	-1.158	-	12.19
R_{us}-R_{uk} (Lagged 1-Period)	3.271	+	2.29
M_s-US (Lagged 1-Period)	2.406	+	3.12
M_s-UK (Lagged 1-Period)	-53.706	-	2.18
S_1 (Spring)	-7.013	Unknown	2.35
S_2 (Summer)	-7.777	Unknown	2.41
S_3 (Fall)	-4.965	Unknown	1.61
D_1 (Restrictions)	19.222	+	2.37
D_s (Flight)	16.724	+	3.56

R^2 = 0.900 R^2 Adj. = 0.884 N = 72

Durbin-Watson Ratio = 1.63

TABLE 4-10

SUMMARY OF RESULTS FROM HUDGIN'S STUDY
OF THE DOLLAR-POUND RATE, 1931-1938

Variable	Regression Coefficient	Expected Sign	t-Score
Dollar-Pound Rate			
Constant	8.38219		12.081
Price Index Ratio (UK/US) (Lagged 1-Period)	-2.04661	-	3.862
Employment Index Ratio (UK/US) (Lagged 1-Period)			
M_s-UK (Lagged 1-Period)	0.00134	-	2.860
M_s-US (Lagged 1-Period)	-0.00005	+	2.593
BEEA (I_{uk})	0.10596	+	3.550
US on Gold Standard	-0.740061	-	6.596

R^2 = 0.92024 R^2 Adj. = 0.90870 N = 88

Durbin-Watson Ratio = 0.7229

> It is not the exchange rate itself that is causing the change in the money supply variables, but speculators' expectations as to the exchange rate. In fact, a change in the money supply is in a sense acting as a proxy for the behavior of speculators.[30]

In other experiments not shown here, Hudgins found that when the interest rate differential was significant, it carried the wrong sign. Hudgins explained this as another case of "inversed causality"--"A change in the exchange rate brought about by speculators' expectations affected the money supply which in turn affected the interest rate."[31]

Whereas Hodgson tested for trend influences and found them insignificant, Hudgins ignored trend as an influence. This could partially account for the low Durbin-Watson ratios of Hudgins' study.[32]

In testing for the influence of official intervention by the British and American agencies, Hudgins found the British Account was affecting the pound-dollar exchange rate while the American Fund was not. This raised the question of whether or not the activities of the British Account constituted acts of "competitive depreciation."

---

[30]Hudgins, "Fluctuations," p. 116.

[31]Hudgins, "Fluctuations," pp. 117-18.

[32]Experiments in the present study omitting the trend dummy variable in equations 16 and 17 produced greatly reduced Durbin-Watson ratios with small decreases in R^2.

With further analysis, Hudgins concluded this was not the case.[33]

Of the "nonfundamental" events included in his analysis, only the effect of the U.S. being on the gold standard from August 1931 until April 1933 was significant in influencing the dollar-pound rate.

The conclusions reached by Hudgins would be in general agreement with those of Hodgson--that the variability in the exchange rate appeared to be primarily the result of variability in the "fundamentals."

Thomas studied the exchange rate behavior of several pairs of currencies between 1920 and 1924. He was primarily interested in determining the influence of fundamentals on the exchange rate and included only prices, incomes and interest rates in his original estimating equation. Thomas' results are summarized in Table 4-11.

Thomas found that relative prices were always significant and carried the correct sign. The interest rate variable always carried the correct sign and in five of six instances was statistically significant. The income variable had the correct sign in five of six instances and was significant in three instances. In the light of the low Durbin-Watson ratios (suggesting the omission of other explanatory variables), Thomas

---

[33]Hudgins, "Fluctuations," Chapter V.

TABLE 4-11

SUMMARY OF THOMAS' STUDY OF SIX EXCHANGE RATES INVOLVING THE U.S. DOLLAR, 1920-1924

Exchange	P_r (-)	i_r (+)	Y_r (-)	R^2	D.W.
U.S.-Canada	-34.43 (-6.67)	35.88 (5.95)	10.92 (3.05)	0.755	0.501
U.S.-England	-1.913 (-14.00)	0.271 (1.42)	-0.032 (-2.96)	0.887	0.705
U.S.-France	-2.294 (-13.07)	8.012 (5.28)	-0.701 (-0.72)	0.834	0.909
U.S.-Netherlands	-10.55 (-4.58)	4.332 (2.43)	-5.784 (-1.68)	0.780	0.358
U.S.-Spain	-6.240 (-4.84)	3.765 (2.80)	-0.966 (-1.17)	0.635	0.263
U.S.-Sweden	-6.502 (-15.38)	2.313 (2.91)	-0.334 (-3.36)	0.894	0.673

NOTES: 1. $P_r = \frac{P_{us}}{P_{other}}$; $i_r = \frac{i_{us}}{i_{other}}$; $Y_r = \frac{Y_{us}}{Y_{other}}$

2. Signs in brackets to the right of ratios are those theoretically expected.

3. Figures in parentheses below coefficients are t-statistics.

added trend and seasonal dummy variables to his model. This modification produced an improvement in the Durbin-Watson ratio (i.e. reduced serial correlation of residuals) and a general improvement in the statistical significance of the fundamental economic factors.[34]

Thomas thus tested indirectly for the influence of speculative activities on the exchange rate and concluded that because of low Durbin-Watson statistics the standard errors of the parameter estimates were biased and that

> . . . support for the hypothesis that fundamental influences were the dominating factors impinging upon the exchanges is not as firm as would be the case if autocorrelation in the residuals was insignificant. On balance, however, the results seem sufficiently consistent and persuasive to raise serious question concerning the validity of the hypothesis that speculation was the predominant influence upon the exchanges. In those equations in which autocorrelation is not highly severe (D.W. 1.1) the degree of statistical association between the exchange rate and the fundamental factors is extremely strong.[35]

The results of the present study are consistent with these earlier studies and serve to increase the strength of the argument that when currencies are not subject to

---

[34]For the six exchange rates under study, the Durbin-Watson ratios after adding trend and seasonal dummy variables to the basic model were:

Exchange Rate	R^2	Durbin-Watson Ratio
U.S.-Canada	0.924	1.269
U.S.-England	0.925	1.021
U.S.-France	0.877	1.261
U.S.-Netherlands	0.888	0.962
U.S.-Spain	0.859	1.142
U.S.-Sweden	0.900	0.672

[35]Thomas, "Exchange Rates," p. 174.

rigid pegging either to gold pars or governmental imposed parities, the degree of statistical association between the exchange rate and economic fundamentals, especially relative prices, is very strong.

A major difference in the present and earlier studies arises when account is taken of the effects of nonfundamental events. Both Hodgson and Hudgins found that these "nonfundamentals" had minimal effect on the exchange rate during their period of study. In the present analysis, nonfundamental events were found to influence the franc-pound exchange rate on several occasions. This indicates that while the franc-pound rate was primarily influenced by fundamentals, it had a greater "underlying instability" than did the dollar-pound rate.

A preliminary conclusion based on the present study is that floating currency exchange rates will be predominately influenced by economic fundamentals but they will be susceptible to the effects of nonfundamental events. The greater the "underlying instability" of the economy, the greater will be the influence of these nonfundamental events. Since the dollar-pound rate proved to be more immune to such events than did the franc-pound rate, it seems plausible to look for an explanation in differences between France and the United States during this period.

Since it is not the intention of this study to exhaustively compare the American and French economies during

the 1930's, the above argument can perhaps be made clear by quickly comparing the countries with regard to their general economic strength, political stability and exposure to war threats. In each instance one would be led to conclude that the "underlying instability" was much greater in France. The relative degree to which floating exchange rates follow economic fundamentals appears to depend on how immune the currencies are to nonfundamental events, that is, the degree of underlying instability of the countries.

On this basis then, floating exchange rates would be most appropriate (based on the criteria that they should reflect changes in economic fundamentals) between countries which exhibit stable political, military, social and economic environments.

Since intervention activity by official sources had a statistically significant influence on the franc-pound rate, the effect of their activity on the terms of trade, trade and employment patterns between the two countries will be studied in the following chapter.

CHAPTER V

AN ANALYSIS OF THE STABILIZATION FUNDS

In Chapter II, the development and purposes of the BEEA and FESF were presented. It was shown that the attention of both intervention agencies was directed totally to the exchange rate apparently without regard to other possible effects of their activities. In the case of the BEEA, the stated intent was to smooth out wide fluctuations in the exchange rate, but not to oppose movements resulting from changes in fundamental economic variables while the FESF operated to maintain the exchange rate within "bands."

The results of the empirical investigation presented in Chapter IV indicated that the accounts, notably the FESF, did affect the month-to-month level of the exchange rate. Since the BEEA did not influence the rate, it could be concluded that it operated according to stated objectives.

By focusing their total attention on the exchange rate, both intervention agencies ignored the movement in a variable closely related to the exchange rate--the

terms of trade. The thesis of the present chapter is that the BEEA and FESF on many occasions acted in a manner that produced "destabilizing" movements in the terms of trade. Assuming that a country's imports and exports are influenced by the terms of trade and further that domestic employment levels are influenced by the export surplus, then a relationship between exchange rate intervention and employment levels can be postulated. It is the purpose of this chapter to investigate the relationship (if any) which existed between exchange rate intervention by the BEEA and FESF and the export surplus of the U.K. and France.

The usual justification made for fixed or stabilized exchange rates is that they reduce the amount of uncertainty facing traders and thus stimulate trade. It is further argued that adjustment costs are reduced under a system of fixed rates.[1]

Judgment as to the desirability of an economic activity should be based on a sterner test however, cost-benefit analysis. It is contended in this study that the activity of the BEEA and FESF was undertaken without

---

[1]Exchange rate changes effectively change the price of every good and service in the two countries. It can be argued that exchange rate induced changes in relative prices can have dysfunctional effects on domestic employment and investment as large or frequent shifts in demand occur.

regard to effects on variables other than the level of the exchange rate.

Considering only the benefits derived from the reduction of uncertainty facing traders and the reduction in adjustment costs, intervention might be justified. The failure to recognize the effects of exchange intervention on the terms of trade ignores some significant costs of that activity. By taking account of intervention activity on not only the exchange rate, but on the terms of trade, the export surplus and domestic employment, manipulation of the exchange rate may be cast in a different light.

The investigation will proceed as follows: First, the effect of exchange rate intervention on the terms of trade between the U.K. and France will be analyzed. Following this, an empirical study will be made to determine the influence of the terms of trade on the export surplus of France (import surplus of the U.K.) Based on these results conclusions will be drawn regarding the efficacy of exchange rate intervention.

As used in this chapter, terms of trade (TOT) is defined:

1. $$TOT = \frac{P_f}{P_{uk}} \quad \frac{1}{ER}$$ [2]

---

[2]The reader will recognize this as a form of the net barter terms of trade. In the strict sense, the prices of imported and exported goods and services should be used. Since no series of import and export prices

where:

P_f = An index of the prices of French goods and services.

P_{uk} = An index of the prices of UK goods and services.

ER = The exchange rate expressed in francs per pound.

The TOT may change from month to month for the following reasons:

1. Relative prices change and this change is not fully compensated by an induced change in the exchange rate.[3]
2. Relative prices remain stable while the exchange rate changes.

---

is available for either France or Britain, general wholesale price levels were substituted as proxies. The net barter terms of trade is defined as index of export prices divided by an index of import prices with both expressed in the same currency units. In this case, the price of French imports was converted from pounds to francs by multiplying by the exchange rate. For a complete discussion of the net barter terms of trade (as well as other terms of trade concepts), see Clement, Pfister and Rothwell, Theoretical Issues in International Economics (Boston: Houghton-Mifflin Co., 1967), Chapter 3.

[3]According to theory, a change in relative prices would cause changes in the supply and demand for foreign exchange and therefore in the exchange rate. For example, if French prices increase while U.K. prices remain stable, to the degree that goods in the two countries were substitutable, consumers would buy larger quantities of U.K. goods and smaller quantities of French goods. In the exchange market this would result in an increase in the demand for pounds and a decrease in the supply of pounds. The franc would depreciate relative to the pound and the exchange rate increase, offsetting to some extent the difference in relative prices and reducing the demand for U.K. goods.

Looking at the effects of exchange market intervention on the TOT, intervention can be categorized as either "stabilizing" or "destabilizing" according to the following definitions:

Stabilizing Intervention: If in a given period, the activity of either fund was such that the TOT of the period was closer to the "normal" level than would have been the case had the fund not intervened, then the intervention had a stabilizing effect on trade.

Destabilizing Intervention: If in a given period, the activity of either fund was such that the TOT for that period deviated further from the "normal" level than would have been the case had the fund not intervened, then the intervention had a destabilizing effect on trade. Destabilizing intervention could take either of two forms, "predatory" or "masochistic." "Predatory" destabilizing intervention would result when intervention by either country caused a movement in the TOT away from the "normal" level in favor of the country which intervened. "Masochistic" destabilizing intervention would result when the intervening country caused a movement in the TOT away from the "normal" level but disfavoring the intervening country.[4]

---

[4]The use of the words "predatory" and "masochistic" requires clarification. In this study it is the effect of a change in the terms of trade on employment and income

These definitions raise the question: "What is the 'normal' level of the TOT?" Since this "normal" level is the basis for evaluating the effects of exchange rate intervention, the definition chosen will have a large impact on the conclusions drawn. Three possible definitions are suggested and discussed below:

Assumption 1: The "normal" level of the TOT is that which prevailed in the immediate past period. This implies that traders adjust quickly to changes in the TOT and therefore consider the most recent conditions to be the "normal" conditions. If the TOT of the period under consideration is different from that of the immediate past period, traders would quickly respond to these changed conditions. The appeal of such a definition of "normal" level is diminished by problems in testing its validity. For any given period the data available for trade flows between countries is an estimate of the money value of goods and services which actually moved across national boundaries during the period. Goods and services which move from one country to another during a given period are likely the result of orders placed during that period

---

which is being considered. If activity by the FESF results in a situation whereby British goods and services become less expensive to the French consumer, then it can be argued that they (French consumers) are better off as a result. The effects of this intervention on the French export surplus (decreases) and French employment (decreases) cause the label "masochistic" exchange market intervention to be applied to such activity.

and past periods as well. Especially in the case of manufactured goods, one could expect that such goods which are measured in a given period were the result of purchases made as a result of conditions which existed in past periods. Thus a lag structure can be safely assumed to exist between incentives to engage in trade and measurement of trade flows resulting from the incentives.

Assumption 2: The "normal" level of the TOT is a weighted average of past periods' TOT. This implies that trade flows adjust more slowly to changes in the TOT and is more consistent with the reality that measured trade flows in any period are the result of conditions prevailing in that period as well as immediate past periods. The major appeal of this definition then is that it is more consistent with the reported data on trade flows.

Assumption 3: The "normal" level of the TOT is determined by the long run trend in the TOT.[5] The basic appeal of such a definition of "normal" is that it recognizes that deviations away from a long run trend are the result

---

[5]The linear time trend for the TOT was generated by assuming that the observed TOT for any period (t) was a function of time. Using ordinary least squares regression, the following regression equation was obtained:

$$TOT\ (t) = 0.05913 - 0.00018\ (t)$$
$$(0.00002)$$

$R^2 = 0.55233$ D.W. = 0.35

of either artificially imposed restrictions (e.g. exchange rate interventions, price controls, tariffs, quotas, or embargos) or insufficient time for a complete response to market signals. On the negative side, the assumption of a linear trend in the "normal" TOT implies that such variables as tastes, productivity and technology are changing at a uniform rate, and this is truly an heroic assumption.

In the following section, the intervention activity of the BEEA and the FESF is analyzed using each of the above three assumptions regarding the "normal" level. Intervening activity will be categorized as either "stabilizing" or "destabilizing." When intervention is deemed to be destabilizing, it will be further classified as either "predatory" or "masochistic."

An Evaluation of Exchange Market Intervention

For the period of the study, the actual TOT have been calculated for each month according to equation 1. These results are shown in Table 5-1 in index number form using October 1931 as the base period.

Table 5-2 compares the TOT for period (t) with the TOT for period (t-1). This index number series is generated utilizing Assumption 1 (the "normal" level of the TOT is the level which prevailed in the immediate past period). The index numbers represent ratios and may be interpreted as follows: If the ratio is greater than

TABLE 5-1

TOT INDEX NUMBERS
(October 1931 = 1.00)

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		1.07	1.07	1.06	1.01	0.99	0.95	0.75
Feb		1.10	1.05	1.09	1.00	1.03	0.93	0.74
Mar		1.05	1.02	1.10	1.08	1.04	0.92	0.73
Apr		1.02	1.02	1.07	0.99	1.02	0.89	0.74
May		1.06	1.02	1.08	1.00	1.03	0.85	
Jun		1.05	1.04	1.07	0.95	1.02	0.86	
Jul		1.09	1.03	1.07	0.93	1.04	0.77	
Aug		1.06	1.03	1.04	0.95	1.06	0.78	
Sep		1.03	1.06	1.05	0.93	1.09	0.78	
Oct	1.00	1.06	1.07	1.04	0.96	0.87	0.73	
Nov	1.01	1.11	1.07	1.02	0.97	0.91	0.74	
Dec	1.10	1.10	1.05	0.99	0.99	0.93	0.76	

TABLE 5-2

INDEX NUMBER SERIES
TOT (t)/TOT (t-1)

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		0.97	0.97	1.01	1.02	1.00	1.02	0.99
Feb		1.03	0.98	1.03	0.99	1.04	0.98	0.99
Mar		0.95	0.97	1.01	1.08	1.01	0.99	0.99
Apr		0.97	1.00	0.97	0.92	0.98	0.97	1.01
May		1.04	1.00	1.01	1.01	1.01	0.96	
Jun		0.99	1.02	0.99	0.95	0.99	1.01	
Jul		1.04	0.99	1.00	0.98	1.02	0.90	
Aug		0.97	1.00	0.97	1.02	1.02	1.01	
Sep		0.97	1.03	1.01	0.97	1.03	1.00	
Oct		1.03	1.01	0.99	1.03	0.80	0.94	
Nov	1.01	1.05	1.00	0.98	1.01	1.04	1.01	
Dec	1.09	0.99	0.98	0.97	1.02	1.02	1.03	

1.0, then the present period TOT is larger than the immediate past period TOT. An increase in the value of the TOT in period (t) relative to period (t-1) would create price incentives for increased French imports from the U.K. and decreased French exports to the U.K. When the ratio is less than 1.0, the opposite situation occurs and incentives are created favoring decreased French imports and increased French exports. When the ratio is 1.0, there is no change in price incentives resulting from the TOT.

Of primary interest is the effect which exchange market intervention had on the TOT and therefore presumably on French exports and imports. Table 5-3 and Table 5-4 show the effects of intervention on the TOT by the BEEA and FESF respectively.

For example, in July 1932, the French intervened in the exchange market, buying pounds to mitigate a fall in the franc-pound rate.[6] A priori then it can be concluded that the franc-pound rate would have been lower and the TOT for that period higher in the absence of intervention. Thus the intervention activity of the French in July 1932 was stabilizing in that it prevented a movement further away from the "normal" level (according to Assumption 1 of the TOT. Table 5-4 shows that intervention by the French in July 1932 was stabilizing (abbreviated "S" in the table).

---

[6]The Economist, July 30, 1932, p. 211.

TABLE 5-3

ANALYSIS OF INTERVENTION ACTIVITY - BEEA

	1931	1932	1933	1934	1935	1936	1937	1938
Jan			S		DP	S		
Feb					S	S		
Mar			S	DP	DP	S		
Apr						DM	DM	
May			S	DP	S	S		
Jun			DP	S	DM	DM		
Jul				S		DP	S	
Aug				S	S	S		
Sep				DP	S	S	S	
Oct				DM	DP			
Nov					S			
Dec					S			

TABLE 5-4

ANALYSIS OF INTERVENTION ACTIVITY - FESF

	1931	1932	1933	1934	1935	1936	1937	1938
Jan				DM			S	DP
Feb					S			DP
Mar						S		DP
Apr						D	DP	
May				DM		S		
Jun							S	
Jul		S				DM	D	
Aug							S	
Sep		DP					S	
Oct							S	
Nov						S	DM	
Dec						S	DM	

The next period in which intervention occurred was September 1932. Again it was the French buying pounds to mitigate a fall in the franc-pound rate.[7] The TOT for this period was 3% below the "normal" level (see Table 5-2). The activity of the French caused the franc-pound rate to be higher and TOT lower than would have been the case in the absence of intervention. Thus the intervention activity by the French in September 1932 was destabilizing in that it caused a movement away from the "normal" level of the TOT.

Since the intervention by the French also produced a trade situation which was more favorable to themselves (French commodities became cheaper to the British), Table 5-4 indicates that it was destabilizing and predatory (abbreviated "DP").

An example of intervention which was destabilizing and masochistic occurred in October 1934. Table 5-2 shows that the TOT for this period was below the "normal" level. The British intervened in the exchange market, selling francs to mitigate a fall in the franc-pound rate.[8] The effect of their activity was to cause the exchange rate to be higher and the TOT lower than would have been the case in the absence of intervention. This

---

[7]The Economist, September 17, 1932, p. 993.

[8]The Economist, October 13, 1934, p. 685.

constituted an act of destabilizing intervention because the activity of the British caused the TOT to move away from the "normal" level.

Since TOT below the "normal" level favors French trade rather than British trade (French commodities become cheaper to the British), the intervention by the British was also masochistic. For October 1934, Table 5-4 shows that British intervention was destabilizing and masochistic (abbreviated "DM").

Table 5-5 presents a month-by-month summary evaluation of intervention by the BEEA and FESF based on Assumption 1 and the previously defined criteria ("stabilizing," "destabilizing," "predatory" and "masochistic").

Using the same methodology, intervention activity was analyzed under the two alternative assumptions regarding the definition of the "normal" level of the TOT.

Tables 5-6, 5-7, 5-8 and 5-9 were constructed based on Assumption 2 (the "normal" level was an average of the three previous months' TOT). Thus Table 5-6 is an index number series comparing the TOT for period (t) with the arithmetic average of the TOT for the periods (t-1), (t-2) and (t-3). Table 5-7 and Table 5-8 show the effects of BEEA and FESF intervention respectively and were constructed using the same criteria as that used in constructing Tables 5-3 and 5-4. A month-by-month

TABLE 5-5

SUMMARY OF INTERVENTION ACTIVITY BY BEEA AND FESF (ASSUMPTION NO. 1)

	Number of Interventions*	Number of Stabilizing Interventions	Number of Destabilizing Interventions	Destabilizing Predatory Interventions	Destabilizing Masochistic Interventions
BEEA	33	20	13	8	5
FESF	23	11	12	7	5
TOTAL	56	31	25	15	10

*Number of interventions equals the number of different months during which the agency intervened in the exchange market between August 1931 and April 1938 (a period of 81 months)

TABLE 5-6

INDEX NUMBER SERIES
TOT (t)/(AVERAGE OF PAST 3-MONTHS TOT)

	1931	1932	1933	1934	1935	1936	1937	1938
Jan			0.98	0.99	1.00	1.02	1.05	1.01
Feb			0.96	1.03	0.99	1.04	1.00	0.99
Mar			0.95	1.03	1.08	1.04	0.99	0.98
Apr			0.97	0.99	0.97	1.00	0.96	0.99
May			0.99	0.99	0.97	1.00	0.94	
Jun			1.02	0.99	0.93	0.99	0.97	
Jul		1.04	1.00	1.00	0.95	1.02	0.89	
Aug		0.99	1.00	0.97	0.99	1.03	0.94	
Sep		0.97	1.03	0.99	0.99	1.04	0.97	
Oct		1.00	1.03	0.98	1.02	0.82	0.94	
Nov		1.05	1.02	0.97	1.03	0.90	0.97	
Dec		1.03	0.99	0.96	1.04	0.98	1.01	

TABLE 5-7

ANALYSIS OF INTERVENTION ACTIVITY - BEEA

	1931	1932	1933	1934	1935	1936	1937	1938
Jan			S		S	S		
Feb					S	S		
Mar			S	DP	DP	S		
Apr						S	DM	
May			DM	S	DM	S		
Jun			DP	S	DM	S		
Jul				S		DM	S	
Aug				S	S	S		
Sep				S	S	S	DM	
Oct				DM	DP			
Nov					S			
Dec					S			

TABLE 5-8

ANALYSIS OF INTERVENTION ACTIVITY - FESF

	1931	1932	1933	1934	1935	1936	1937	1938
Jan				S			S	S
Feb					S			S
Mar						S		DC
Apr						S	DC	
May				S		S		
Jun							DC	
Jul		S				DC	DC	
Aug							DC	
Sep		DC					DC	
Oct							S	
Nov						DC	S	
Dec						DC	S	

TABLE 5-9

SUMMARY OF INTERVENTION ACTIVITY BY BEEA AND FESF (ASSUMPTION NO. 2)

	Number of Interventions*	Number of Stabilizing Interventions	Number of Destabilizing Interventions	Destabilizing Predatory Interventions	Destabilizing Masochistic Interventions
BEEA	33	22	11	4	7
FESF	23	13	10	10	0
TOTAL	56	35	21	14	7

*Number of interventions equals the number of different months during which the agency intervened in the exchange market between August 1931 and April 1938 (a period of 81 months).

summary evaluation of intervention based on Assumption 2 is presented in Table 5-9.

Finally, using Assumption 3 (the "normal" level is determined by a linear time trend), Tables 5-10, 5-11, 5-12 and 5-13 were constructed. Table 5-10 compares the TOT for period (t) with the linear trend line for TOT. BEEA and FESF intervention are shown and evaluated in Tables 5-11, 5-12 and 5-13.

A summary of the results obtained using the three different assumptions regarding the "normal" level of the TOT is shown in Table 5-14. These summary results were derived from Tables 5-5, 5-9 and 5-13.

The interesting feature demonstrated in Table 5-14 is the similarity in the results obtained using the three different assumptions regarding the "normal" level of the TOT. Looking only at intervention as stabilizing or destabilizing and ignoring for the moment whether destabilizing intervention was predatory or masochistic, the choice of definition for the "normal" level had little effect on the evaluation of BEEA intervention. BEEA intervention was analyzed as stabilizing 61-67% of the time and destabilizing 33-39% of the time depending on the reference criteria (Table 5-14, columns 1 and 2).

The FESF activity on the other hand shows a somewhat higher percentage of destabilizing interventions and a higher degree of variability. Intervention by the French

TABLE 5-10

INDEX NUMBER SERIES
TOT (t)/TOT Trend

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		0.97	1.00	1.03	1.03	1.06	1.05	0.88
Feb		1.00	0.99	1.07	1.02	1.10	1.04	0.87
Mar		0.95	0.97	1.09	1.10	1.11	1.03	0.86
Apr		0.93	0.96	1.06	1.02	1.10	1.00	0.87
May		0.97	0.97	1.07	1.03	1.11	0.96	
Jun		0.97	0.99	1.06	0.99	1.10	0.98	
Jul		1.00	0.99	1.07	0.97	1.14	0.88	
Aug		0.98	0.99	1.04	0.99	1.16	0.89	
Sep		0.96	1.02	1.06	0.98	1.18	0.90	
Oct	0.90	0.99	1.04	1.05	1.00	0.96	0.84	
Nov	0.91	1.04	1.04	1.03	1.03	1.00	0.85	
Dec	0.99	1.03	1.03	1.01	1.04	1.03	0.88	

TABLE 5-11

ANALYSIS OF INTERVENTION ACTIVITY - BEEA

	1931	1932	1933	1934	1935	1936	1937	1938
Jan			S		DP	S		
Feb					DP	S		
Mar			S	DP	DP	S		
Apr						S	S	
May			DM	DP	S	S		
Jun			S	DP	S	S		
Jul				DP		DM	S	
Aug				DP	S	S		
Sep				DP	S	S	DM	
Oct				S	S			
Nov					S			
Dec					S			

TABLE 5-12

ANALYSIS OF INTERVENTION ACTIVITY - FESF

	1931	1932	1933	1934	1935	1936	1937	1938
Jan				DM			S	DP
Feb					DM			DP
Mar						S		DP
Apr						S	S	
May				DM		S		
Jun							DP	
Jul		S				DP	DP	
Aug							DP	
Sep		DP					DP	
Oct							S	
Nov						S	S	
Dec						S	S	

TABLE 5-13

SUMMARY OF INTERVENTION ACTIVITY BY BEEA AND FESF (ASSUMPTION NO. 3)

	Number of Interventions*	Number of Stabilizing Interventions	Number of Destabilizing Interventions	Destabilizing Predatory Interventions	Destabilizing Masochistic Interventions
BEEA	33	21	12	9	3
FESF	23	11	12	9	3
TOTAL	56	33	24	18	6

*Number of interventions equals the number of different months during which the agency intervened in the exchange market between August 1931 and April 1938 (a period of 81 months).

TABLE 5-14

FINAL SUMMARY OF INTERVENTION ACTIVITY BY BEEA AND FESF

Definition of "Normal" Level of TOT	BEEA Intervention				FESF Intervention			
	(1) % Stabilizing	(2) % Destabilizing	(3) % Destabilizing Predatory	(4) % Destabilizing Masochistic	(5) % Stabilizing	(6) % Destabilizing	(7) % Destabilizing Predatory	(8) % Destabilizing Masochistic
Assumption 1	61	39	24	15	48	52	30	22
Assumption 2	67	33	12	21	57	43	43	0
Assumption 3	64	36	27	9	48	52	39	13

agency was analyzed as stabilizing 48-57% of the time and destabilizing 43-52% of the time depending again on the reference criteria (Table 5-14, columns 5 and 6).

Considering the breakdown of destabilizing interventions into the categories "predatory" and "masochistic," Table 5-14 shows that the BEEA intervention when destabilizing was predatory 12-37% of the time and masochistic 9-21% of the time while FESF's intervention showed even greater variability, being predatory 30-43% of the time and masochistic 0-22% of the time.

Interpreting these findings in the broadest sense, it can be concluded that intervention tended to be destabilizing approximately one-third of the time when undertaken by the French. Further, when intervention was destabilizing, it was usually predatory in nature. Only in the case of the BEEA using Assumption 2 was a larger proportion of intervention considered masochistic as opposed to predatory.

In the light of the foregoing analysis, the alleged benefits of stabilized exchange rates must be discounted somewhat. If official intervention to smooth the exchange rate produces as a concomitant effect destabilization in the TOT leading to changes in a nation's export surplus and employment levels, then the desirability of such intervention should perhaps be re-examined.

It remains to be shown, however, that the level of the TOT had a significant influence on trade between the U.K. and France. The argument therefore must shift from the realm of a priori to that of a posteriori. In the following section, then, the relationship between the TOT and the export surplus of France will be examined.

Time-Series Estimation of the French Export Surplus

In this section, the influence of the TOT on the French export surplus with the U.K. will be examined. The foundation of the statistical research which follows is a hypothesized behavioral relationship between the level of imports and exports of goods and services and several explanatory variables.[9] Whereas in Chapters III and IV the relationship between the demand and supply of foreign exchange and various explanatory variables was examined, the focus now turns to the demand for foreign goods and services by the French and British. In particular, it is trade between France and the U.K. which is of interest, since it is being hypothesized that exchanged market intervention influenced the level of the TOT and therefore trade flows between the two countries.

---

[9]The analysis in this section draws liberally on the work of Leamer and Stearn, Quantitative International Economics, Chapter 2.

Analytical Framework

The theory of demand suggests that the quantity demanded of good x is a function of its price, the price of other goods, consumers' incomes, tastes, expectations and seasonal influences as well as other less important variables. In terms of the demand by UK residents for the goods and services of F (i.e. F. exports to the UK):

$$2. \qquad X_f = f\ \left(\frac{P_f}{ER},\ P_{uk},\ Y_{uk},\ Tr_x,\ S_x\right)$$

where

X_f = The quantity of F goods and services demanded by residents of UK.

P_f = The F currency price of goods and services exported from F.

ER = The exchange rate; the price of UK currency in terms of F currency.

Y_{uk} = An index of the income level in UK.

Tr_x = A trend index.

S_x = A seasonal index.

Residents of F can also be assumed to have a demand for foreign goods and services. Their demand for the goods and services of UK (i.e. F imports from UK) can be expressed:

$$3. \qquad M_f = f\ (P_{uk} \cdot ER,\ P_f,\ Y_f,\ Tr_m,\ S_m)$$

where

M_f = The quantity of UK goods and services demanded by residents of F.

P_{uk} = The UK price of goods and services exported from UK.

ER = The exchange rate; the price of UK currency in terms of F currency.

Y_f = An index of the income level in F.

Tr_m = A trend index.

S_m = A seasonal index.

According to the theory of income and employment determination which has evolved from the ideas of Keynes, expenditures for foreign trade constitute a part of a country's aggregate demand and thus affect income, output and therefore employment according to the relationship between exports and imports. Theory thus suggests that the export surplus (exports minus imports) will have a direct effect on domestic employment. An excess of exports over imports indicates that foreign spending for domestic goods exceeds domestic spending for foreign goods. A positive export surplus (exports exceed imports) thus stimulates domestic employment at the expense of foreign employment.

For the purpose of this study, the relationship between the TOT and the French export surplus with UK is desired. The export surplus can be derived by combining equations 2 and 3 above:

4. $$(X - M)_f = f\ (P_f, P_{uk} \cdot ER, Y_{uk}, Y_f, Tr, S)$$

where

Tr = A trend index.

S = A seasonal index.

All other variables are as previously defined.

Assuming that the relationship in euqation 4 is linear, the model will take the following form:

5. $$(X - M)_f = \beta_0 + \beta_1 \frac{P_f}{P_{uk} \cdot ER} + \beta_2 Y_{uk} + \beta_3 Y_f + \beta_4 Tr + \beta_5 S_1 + \beta_6 S_2 + \beta_7 S_3 + \mu$$

where

$\frac{P_f}{P_{uk} \cdot ER}$ = The net barter terms of trade (TOT) between F and UK.

S_1, S_2, S_3 = Seasonal dummy variables representing spring, summer and fall respectively.

An alternative form of equation 5 which conserves one degree of freedom is:

6. $$(X - M)_f = \beta_0 + \beta_1 \frac{P_f}{P_{uk} \cdot ER} + \beta_2 \frac{Y_f}{Y_{uk}} + \beta_3 Tr + \beta_4 S_2 + \beta_5 S_3 + \beta_6 S_3 + \mu$$

where

$\frac{Y_f}{Y_{uk}}$ = A ratio of the indices of income levels in F and UK.

All other variables are as previously defined.

Using implicit differentiation, the predictions of the signs of the coefficients in equations 5 and 6 were determined. The results are shown in Table 5-15.

TABLE 5-15

PREDICTED SIGNS OF COEFFICIENTS OF EXPLANATORY VARIABLES

Equation 5		Equation 6	
Variable	Sign	Variable	Sign
TOT	-	TOT	-
Y_f (Lagged)	-	Y_f/Y_{uk} (Lagged)	-
Y_{uk} (Lagged)	+	Trend	Unknown
Trend	Unknown	S_1 (Spring)	Unknown
S_1 (Spring)	Unknown	S_2 (Summer)	Unknown
S_2 (Summer)	Unknown	S_3 (Fall)	Unknown
S_3 (Fall)	Unknown		

Data on trade between France and the U.K. were not reported on a monthly basis during the period 1931-1938. Total French and British exports and imports were available in a monthly time series reported in the Trade Supplement of The Economist. Since these data were aggregated to include not just trade between France and the U.K., but trade with all of the trading partners of both countries, it was determined that such data would be inadequate for the purposes of this study. A time series for French-U.K. trade on a quarterly basis was reported by the British House of Commons.[10] Beginning with the 4th quarter of 1931 and ending with the 2nd quarter of 1938, twenty-seven observations on trade between France and the U.K. were collected.

The reported data for U.K. exports to and imports from France are in value terms (pounds). Leamer and Stearn suggest that quantity of imports (or exports) is the appropriate dependent variable.[11] To generate a time series of real net exports, the difference between U.K. imports from and exports to France were divided by the U.K. wholesale price index for the corresponding

---

[10]Great Britain, House of Commons Papers, Trade and Navigation (United Kingdom), Vol. 52 (XVII-XXVI), 1931-1938.

[11]Leamer and Stearn, Economics, p. 8.

period.[12] The real net exports data are included in Table B-1, Appendix B.

Quarterly data for the franc-pound exchange rate, and French and British price and income levels were generated by averaging the appropriate months from the available monthly time series for these variables. Since a lag structure between measured trade flows and explanatory variables appeared appropriate, two different sets of time series data were constructed for the TOT and income variables. First, the quarterly series were calculated with no lag structure assumed. Tables B-2, B-3 and B-4 in Appendix B show quarterly averages for TOT, U.K. and French income levels respectively. Second, a one-month lag was assumed to exist between net exports (as measured) and TOT and income levels. Tables B-5, B-6 and B-7 in Appendix B show quarterly averages lagged one-month for TOT, U.K. and French income levels respectively.

The seasonal dummy variables, S_1, S_2 and S_3 correspond to the first, second and third quarters of the year and are shown in Table B-8. The trend variable is simply a series of sequential integers, 1-27.

---

[12]The value of imports and exports was expressed in pounds, making it appropriate to deflate by the U.K. price index.

Empirical Results

Using ordinary least squares regression techniques, equations 5 and 6 were estimated. The results for the initial estimation of equation 5 are shown in Table 5-16.

Of the seven explanatory variables included in equation 5 only one, the dummy variable S_1 (representing the second quarter of the year April-June), was significant. The TOT, French employment and British employment variables all carried the correct sign but were not significant.

As mentioned previously, trade data which was available was in measured exports and imports. Because of the probable lag between the incentives leading to the purchase of a foreign good and the measurement of the transfer of good, some lag structure would be expected to exist between the TOT and incomes (incentives) and trade flows (measured responses).

Assuming that some lagged relationship was more appropriate, a second estimation of equation 5 was made. The results obtained from lagging the TOT and income variables one-month are shown in Tables 5-17.

The one-month lagged relationship produced a significant improvement in the results: All t-scores were improved, as was the R^2 and Durbin-Watson ratio. Of the seven variables only the seasonal variables S_1 and S_3 remained insignificant. The TOT, French income and British income variables carried the correct signs and were significant

TABLE 5-16

INITIAL ESTIMATION OF EQUATION 5

Variable	Regression Coefficient	Standard Deviation	t-Score
Export Surplus-France			
Constant	-125.70598	197.805	0.63
TOT	-231.37748	1036.18705	0.22
Employment Index-France (Lagged 1-Period)	-0.07075	0.19555	0.36
Employment Index-UK (Lagged 1-Period)	0.24670	0.17639	1.40
Trend	-2.25585	2.33233	0.97
S_1 (Spring)	-7.71771	7.62000	1.01
S_2 (Summer)	-17.04687	6.95905	2.45
S_3 (Fall)	-10.65334	7.28083	1.46

$R^2 = 0.34$ R^2 ADJ. = 0.29 N = 27

Durbin-Watson Ratio = 1.03

TABLE 5-17

ESTIMATION OF EQUATION 5 WITH LAGGED TOT

Variable	Regression Coefficient	Standard Deviation	t-Score
Export Surplus-France			
Constant	143.26585	180.30200	0.79
TOT (Lagged 1-Period)	-0.21196	0.08897	2.38
Employment Index-France (Lagged 1-Period)	-0.33990	0.17329	1.96
Employment Index-UK (Lagged 1-Period)	0.33854	0.15114	2.24
Trend	-4.70099	1.91353	2.46
S_1 (Spring)	-10.69219	6.77228	1.58
S_2 (Summer)	-15.80290	6.12305	2.58
S_3 (Fall)	-6.84058	6.50485	1.05

$R^2 = 0.49$ R^2 ADJ. = 0.44 N = 27

Durbin-Watson Ratio = 1.32

at the 5% level. The trend variable and the dummy variable S_2 were also significant. The negative sign of the trend variable indicates that other forces operating with a trend effect were working to the detriment of French trade.

Equation 6 was also estimated using the lag structure discussed above. The results are shown in Table 5-18. The introduction of the income variables in ratio form not only conserved one degree of freedom, but led to improved results in R^2, Durbin-Watson ratio and the t-scores of all explanatory variables. Of the six variables, only the dummy variable S_3 (October-December) was not significant at the 5% level. The TOT and relative income variables carried the correct sign and were significant. The trend variable and dummy variable S_2 remained significant and dummy variable S_1 (January-March) became significant as a result of the modified format.

The results obtained in the estimation of equations 5 and 6 were consistent: In both cases, the TOT (lagged one-month) had a significant influence on the French export surplus. Further, the relationship obtained through the empirical testing verified the a priori contention that decreases in the French export surplus variable were associated with increases in the level of the TOT variable (lagged one-month). Thus conditions causing an increase in the TOT appear to have generated a decrease in the French export surplus and according to Keynesian theory

TABLE 5-18

ESTIMATION OF EQUATION 6 WITH LAGGED TOT

Variable	Regression Coefficient	Standard Deviation	t-Score
Export Surplus-France			
Constant	532.08918	174.84200	3.04
TOT (Lagged 1-Period)	-0.25037	0.08241	3.04
Employment Index Ratio (F_{uk} Lagged 1-Period)	-371.80177	138.01006	2.69
Trend	-4.73797	1.76024	2.69
S_1 (Spring)	-11.65190	5.88682	1.98
S_2 (Summer)	-15.75384	5.85348	2.69
S_3 (Fall)	-6.21832	6.23596	1.00

$R^2 = 0.50$ R^2 ADJ. = 0.46 N = 27

Durbin-Watson Ratio = 1.41

would have a negative effect on income and employment in France.

Summary

A close examination of the intervention activity of the BEEA and FESF during the period 1931-1938 reveals that an unintended result of their policies (designed to stabilize the franc-pound exchange rate) was the destabilization of the TOT.

Further, when destabilizing intervention resulted, it was predominantly "predatory" in nature, i.e. intervention by an agency resulted in a movement in the TOT which favored exports and employment in the country of the intervening agency at the expense of its trading partner.

An empirical investigation supported the theoretical conclusion that trade flows were responsive to the level of the TOT as well as other variables. In the case of trade between France and the U.K. the evidence indicated that the level of the French export surplus was strongly influenced by the level of the TOT.

The BEEA and FESF could therefore be accused of engaging in activities in the exchange market which had severe repercussions beyond those intended. The seemingly simple act of smoothing out undue fluctuations in the exchange rate, or holding the rate between "bands"

conceivably produced detrimental effects on income and employment. To claim that these effects were unintended does not diminish their significance.

In the larger view, the results of this historical study cast doubt over the efficacy of official exchange rate intervention. It seems possible, even likely, that when cognizance is taken of the "larger picture" (the effects of intervention on TOT, income levels and employment), the costs of exchange rate stabilization may far outweigh its benefits.

CHAPTER VI

SUMMARY AND CONCLUSIONS

This study was an investigation of the fluctuations in the franc-pound exchange rate from August 1931 through April 1938 with special emphasis on the effects of the operations of the French and British exchange stabilization funds during this period.

In general, the results of this investigation reinforce the theory that exchange rate movements follow broad movements in the appropriate macrovariables: price, income and money stock levels. Further, non-quantifiable events did at times exert significant influence on the level of the exchange rate. It was also demonstrated that the intervention activities of the exchange stabilization funds (especially the FESF), was significant in determining the level of the exchange rate.

Regarding intervention activity, no evidence of "competitive depreciations" could be found; surprisingly, the relationship between the FESF and BEEA was one of overt cooperation. It was shown, however, that in many

instances, intervention had a destabilizing effect on the terms of trade between France and the United Kingdom. Further, the analysis demonstrated that the level of the export surplus was significantly influenced by the terms of trade. The argument can be extended a priori that the exchange stabilization funds affected employment and income levels through their activities to influence the level of the exchange rate.

In particular, the analysis of fluctuations in the franc-pound exchange rate led to the following conclusions:

Whether individually or in ratio form, French and British price levels were the dominant variables associated with the level of the exchange rate. In an experiment with the fundamental macrovariables in ratio form, stepwise regression showed that the price ratio variable alone had an R^2 of 0.81 while the full model had an R^2 of 0.98 (Table 4-5, Chapter IV). These findings lend strong support to the purchasing-power-parity theory which holds that the primary determinant of a change in the exchange rate is a change of the relative price levels in the two countries.

Income levels in the two countries in ratio form had a significant effect on the exchange rate; singularly, only the French income level was significant. This evidence lends support to the theoretical notion that the marginal

propensity to import is significant and positive (i.e. the income elasticity of demand for imports is positive).

The other macrovariables tested--money stocks and interest rate differentials--produced mixed results. Individually, neither French nor British money stocks significantly influenced the exchange rate, yet in ratio form the variable was significant. This writer offers no explanation for this curious occurrence. For the individual money stock variables, the high partial correlation with price levels left the possibility that the price variables may have reflected some influence belonging to money stocks. Interest rate differentials were never significant. This result was expected, based on an examination of the Bank of France's discount policy: In response to capital flows which influenced the franc-pound rate, the Bank adjusted the discount rate in an attempt to attract investment funds. At these times, the riskiness of yields on franc-denominated assets increased, which to some extent offset the interest rate incentive and funds did not necessarily flow to the higher interest rate. Although it could not be substantiated by empirical test, the discount on the forward franc probably acted as a deterrent to short-term capital flows. The dominant impression given in the contemporary financial literature was that the forward franc was usually selling below the spot franc. Thus investors who wished to hedge

short-term French investments would not find the higher French interest rate, by itself, a sufficient incentive to send funds to France.

Several non-quantifiable events were tested to determine their effect on the franc-pound rate. Since a number of events did appear significant, it was concluded that the franc did have a certain degree of underlying instability relative to the pound and the dollar. The franc-pound rate, while generally responding to broad moves in macrovariables, was subject to several flights of funds and speculative attacks. For this reason, one cannot conclude from this episode that macrovariables were the only determinants of the exchange rate level.

The analysis of the stabilization funds was the major subcategory of this study. The empirical analysis contained in Chapter IV suggests that the FESF significantly influenced the exchange rate, while the BEEA did not. This is supportive of claims that the BEEA acted only to smooth out undue fluctuations in the exchange rate, but not to resist changes resulting from fundamental economic forces. On the other hand, the FESF attempted to maintain the franc-pound rate within bands and thus on occasion was called on to resist changes due to fundamentals. The significance of the variable representing FESF activity suggests that the Fund did in fact act to resist movements in macrovariables.

A week-by-week analysis of exchange market activity failed to produce a single example of competitive behavior involving the two stabilization funds. On the contrary, there were many occasions when both funds were active simultaneously and they acted in a spirit of cooperation. No support could be found for the claim that the BEEA and FESF engaged in "competitive depreciation."

The effect of the funds' activity on the terms of trade was also investigated. The results showed that to a large degree, the funds' activity produced destabilizing movements in the terms of trade. Using three separate criteria to evaluate the performance of the BEEA and FESF, the results were strikingly similar--by focusing narrowly on the exchange rate, the funds contributed to movements in the terms of trade away from "normal" levels.

The influence of the terms of trade on the export surplus of France (with the United Kingdom) was subjected to an empirical test and the results confirmed the theoretical expectations: Broad movements in the export surplus were associated with changes in the terms of trade. Extending this analysis, it can be concluded that employment (and income and production) levels in France and Britain were influenced by the activity of the two funds even if one assumed that their intent was only to manipulate the exchange rate. Because of the lag in compiling and reporting information on macrovariables which

influenced the exchange rate, the funds could not have known whether a given exchange rate movement was reflecting (a) a movement in macrovariables, (b) a flight of capital and/or speculative attack or (c) some combination of (a) and (b). With regard to the effects their activity had on events other than those occurring in the exchange market, the exchange stabilization funds "operated in the dark."

What are the lessons to be learned from this episode involving managed exchange rates?

Regarding Floating Exchange Rates

When exchange rates are allowed to float, subject to the forces of supply and demand, they tend to follow rather faithfully broad swings in macrovariables--especially relative price levels. This supports basic economic theory regarding floating exchange rate behavior.

Implied above is that floating exchange rate systems are not subject to continuous, wild fluctuations due to capital flights and speculative attacks. On occasion, however, non-quantifiable economic, social and political events were associated with exchange rate movements.

Including both effects, it is concluded that the degree to which exchange rate changes faithfully mirror changes in the appropriate macrovariables is a function of the underlying stability of the particular country's

economic, political, social or military situation. Special cases can be conceived where floating exchange rates would not be appropriate in that they would lead to sub-optimal results.

Regarding Exchange Stabilization Funds

Manipulation of the exchange rate level will influence (unintentionally perhaps) the terms of trade between two countries. This in turn creates the potential for unintended effects on actual trade flows, production, employment and income. This basic problem results from an information lag. Information which is important (if not essential) to managers of the stabilization funds is available only after decisions have been made. It appears that stabilization funds must first know what is the nature of the force they are opposing before they can act without incurring significant economic costs.

The existence of stabilization funds on both sides of the market presents possibilities of both competitive and cooperative behavior. Working cooperatively and with adequate information, stabilization funds can smooth out undue exchange fluctuations and presumably reduce adjustment costs resulting from changes in the terms of trade.

APPENDIX A

Table A-1

FRANC-POUND EXCHANGE RATE (FRANCS/POUND)

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		87.450	86.063	81.844	74.750	74.781	105.125	149.025
Feb		87.719	87.219	78.156	74.282	74.938	105.062	153.000
Mar		91.688	87.313	77.325	72.125	74.825	106.156	158.313
Apr		95.175	87.350	77.938	73.150	75.000	108.281	161.275
May		92.750	85.344	77.219	73.750	75.375	110.375	
Jun		92.844	85.938	76.625	74.750	76.156	110.781	
Jul		90.725	85.300	76.469	74.719	75.781	128.325	
Aug	124.000	88.813	84.469	76.250	75.000	76.200	132.844	
Spe	117.650	88.625	80.975	74.975	75.188	76.719	138.438	
Oct	98.850	86.775	80.094	74.406	74.500	105.091	147.000	
Nov	95.000	83.625	81.469	75.688	74.700	105.250	147.250	
Dec	86.281	83.900	83.625	75.125	74.750	105.125	147.188	

Table A-2

WHOLESALE PRICE INDEX-FRANCE (1913=100)

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		439	411	405	350	359	528	636
Feb		446	404	400	343	372	533	631
Mar		444	390	394	335	376	550	634
Apr		439	387	387	336	371	552	643
May		438	383	381	340	374	550	
Jun		425	403	379	330	378	557	
Jul		430	401	374	322	391	582	
Aug	488	415	397	371	330	403	603	
Sep	473	413	397	365	332	420	630	
Oct	457	412	397	357	342	471	628	
Nov	447	414	403	356	348	491	622	
Dec	442	413	407	344	354	519	631	

Table A-3

WHOLESALE PRICE INDEX-UK (1913=100)

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		89	85	89	88	92	103	108
Feb		88	84	89	88	92	104	106
Mar		88	83	88	87	92	107	104
Apr		86	83	88	88	92	109	103
May		85	84	87	88	92	111	
Jun		83	86	88	88	93	111	
Jul		83	87	87	88	94	112	
Aug	84	84	87	89	88	95	111	
Sep	84	86	88	88	90	96	111	
Oct	88	85	88	88	91	98	111	
Nov	89	85	88	88	91	98	109	
Dec	89	85	88	88	91	101	108	

Table A-4

RATIO OF WHOLESALE PRICE INDICES (FRANCE/U.K.)

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		4.93	4.84	4.76	3.98	3.90	5.22	5.89
Feb		5.07	4.81	4.49	3.90	4.04	5.13	5.95
Mar		5.05	4.70	4.48	3.85	4.09	5.14	6.10
Apr		5.10	4.66	4.40	3.82	4.03	5.06	6.24
May		5.15	4.56	4.38	3.86	4.07	4.95	
Jun		5.12	4.69	4.31	3.75	4.06	5.02	
Jul		5.18	4.61	4.30	3.77	4.16	5.20	
Aug	5.81	4.94	4.56	4.17	3.75	4.24	5.43	
Sep	5.63	4.80	4.51	4.15	3.69	4.38	5.68	
Oct	5.19	4.85	4.51	4.06	3.76	4.81	5.66	
Nov	5.02	4.87	4.58	4.05	3.82	5.01	5.71	
Dec	4.97	4.86	4.63	3.91	3.89	5.14	5.84	

Table A-5

INDEX OF FRENCH EMPLOYMENT LEVEL (1929=1000)

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		895	869	864	807	806	827	841
Feb		876	864	859	803	807	835	839
Mar		873	868	861	801	813	843	842
Apr		875	871	864	818	819	849	845
May		881	884	869	829	826	856	
Jun		890	893	871	837	828	865	
Jul		889	896	870	842	826	869	
Aug	978	889	899	867	842	828	869	
Sep	977	889	903	868	845	831	870	
Oct	968	900	900	860	839	830	865	
Nov	952	890	891	849	830	830	870	
Dec	933	886	871	837	822	832	851	

Table A-6

INDEX OF U.K. EMPLOYMENT LEVEL (1929=1000)

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		914	905	966	984	1013	1094	1101
Feb		918	910	973	987	1026	1101	1103
Mar		934	921	985	1011	1040	1108	1110
Apr		927	930	993	1012	1056	1124	1111
May		918	941	998	1014	1069	1125	
Jun		917	954	996	1017	1070	1137	
Jul		909	953	993	1020	1078	1138	
Aug	897	905	959	996	1024	1085	1142	
Sep	910	900	967	1003	1025	1088	1141	
Oct	922	916	972	999	1031	1091	1138	
Nov	930	914	975	999	1032	1094	1128	
Dec	938	923	979	1003	1037	1095	1115	

Table A-7

INDEX OF INDUSTRIAL PRODUCTION-FRANCE (1913=100)

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		106	100	106	93	97	101	99
Feb		100	103	105	93	99	103	96
Mar		98	104	104	93	101	104	95
Apr		95	107	103	93	102	105	93
May		94	109	101	92	102	104	
Jun		93	111	99	93	98	102	
Jul		92	112	98	93	98	100	
Aug	121	93	111	97	93	93	91	
Sep	118	94	110	95	94	95	97	
Oct	117	95	108	94	95	98	100	
Nov	114	97	107	94	95	99	101	
Dec	111	98	106	93	96	100	102	

Table A-8

RATIO OF FRENCH TO U.K. EMPLOYMENT LEVEL (1929=1.000)

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		0.970	0.960	0.894	0.820	0.796	0.756	0.764
Feb		0.954	0.949	0.883	0.814	0.787	0.758	0.761
Mar		0.935	0.942	0.874	0.792	0.782	0.761	0.759
Apr		0.944	0.937	0.870	0.808	0.776	0.755	0.761
May		0.960	0.939	0.871	0.818	0.773	0.761	
Jun		0.970	0.936	0.874	0.823	0.774	0.761	
Jul		0.978	0.940	0.876	0.808	0.766	0.764	
Aug	1.090	0.982	0.937	0.870	0.822	0.763	0.761	
Sep	1.074	0.988	0.962	0.865	0.824	0.764	0.762	
Oct	1.050	0.983	0.926	0.861	0.814	0.761	0.760	
Nov	1.024	0.974	0.914	0.850	0.804	0.759	0.771	
Dec	0.995	0.960	0.890	0.834	0.793	0.760	0.763	

Table A-9

RATIO OF FRENCH INDUSTRIAL PRODUCTION TO U.K. EMPLOYMENT LEVEL

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		0.116	0.110	0.110	0.095	0.096	0.092	0.090
Feb		0.109	0.113	0.108	0.094	0.096	0.094	0.087
Mar		0.105	0.113	0.106	0.092	0.097	0.094	0.086
Apr		0.102	0.115	0.104	0.092	0.097	0.093	0.084
May		0.102	0.116	0.101	0.091	0.095	0.092	
Jun		0.101	0.116	0.099	0.091	0.092	0.090	
Jul		0.101	0.118	0.099	0.091	0.090	0.088	
Aug	0.135	0.103	0.116	0.097	0.091	0.086	0.080	
Sep	0.130	0.104	0.114	0.095	0.092	0.087	0.085	
Oct	0.127	0.104	0.111	0.094	0.092	0.090	0.088	
Nov	0.123	0.106	0.110	0.094	0.092	0.090	0.090	
Dec	0.118	0.106	0.108	0.093	0.093	0.091	0.091	

Table A-10

MONEY SUPPLY-FRANCE (MM FRANCS)

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		120919	118621	111443	111516	108362	116992	121641
Feb		119624	118463	110915	121508	108141	116123	122282
Mar		117765	120259	112404	113729	110404	116211	126715
Apr		118703	118647	111321	111570	109271	114227	128393
May		117244	117412	109738	111905	111228	113427	
Jun		117018	119015	111974	110855	110128	113553	
Jul		118149	117524	111711	109060	110653	117830	
Aug	115626	116060	114562	112007	110156	108775	116693	
Sep	114310	118831	116211	113026	110355	108363	120658	
Oct	120611	118402	113910	110799	111407	114226	122044	
Nov	119562	188793	112443	111461	109853	114118	119670	
Dec	122747	121519	114386	113441	108099	117297	123585	

Table A-11

MONEY SUPPLY-U.K. (MM POUNDS)

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		1164	1333	1341	1409	1563	1706	1763
Feb		1121	1311	1299	1386	1525	1672	1715
Mar		1160	1303	1289	1375	1530	1674	1706
Apr		1142	1322	1292	1397	1562	1663	1717
May		1164	1336	1303	1405	1582	1678	
Jun		1228	1381	1336	1469	1650	1741	
Jul		1272	1370	1344	1492	1672	1737	
Aug	1239	1263	1364	1318	1468	1655	1723	
Sep	1242	1267	1359	1325	1478	1677	1731	
Oct	1215	1272	1352	1338	1464	1681	1727	
Nov	1164	1284	1350	1355	1481	1687	1718	
Dec	1132	1362	1407	1449	1565	1755	1739	

Table A-12

RATIO OF FRENCH TO U.K. MONEY SUPPLY

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		103.88	88.99	83.10	79.15	69.33	68.58	69.00
Feb		106.71	90.36	85.38	87.67	70.91	69.45	71.30
Mar		101.52	92.29	87.20	82.71	72.16	69.42	74.28
Apr		103.92	89.75	86.16	79.86	69.96	68.69	74.78
May		100.73	87.88	84.22	79.65	70.31	67.60	
Jun		95.29	86.18	83.81	75.46	66.74	65.22	
Jul		92.88	85.78	83.12	73.10	66.18	67.84	
Aug	93.32	91.89	83.99	84.98	75.04	65.71	67.73	
Sep	92.04	93.79	85.51	85.30	74.67	64.62	69.70	
Oct	99.27	93.08	84.25	82.80	76.10	67.95	70.67	
Nov	102.72	92.52	83.29	82.26	74.17	67.65	69.66	
Dec	108.43	89.22	81.30	78.29	69.07	66.84	69.08	

Table A-13

% INTEREST RATE DIFFERENTIAL (r_f-r_{uk})

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		-2.71	-2.27	-1.18	-0.94	1.34	-1.08	-0.21
Feb		-2.49	-1.49	-0.61	-0.72	0.89	0.70	-0.20
Mar		-2.38	-1.21	-0.34	-0.79	0.79	0.78	-0.39
Apr		-2.33	-1.45	-0.48	-0.74	2.11	0.75	-0.13
May		-2.25	-1.67	-0.61	-0.33	2.62	0.68	
Jun		-2.29	-1.95	-1.06	2.83	2.66	1.66	
Jul		-2.18	-2.07	-1.37	1.12	0.34	1.83	
Aug	-2.81	-2.58	-1.94	-1.35	0.07	0.05	0.72	
Sep	-3.22	-2.38	-2.25	-1.55	-0.24	0.43	0.15	
Oct	-2.59	-2.30	-2.10	-1.58	-0.29	-0.42	0.22	
Nov	-2.82	-2.44	-1.53	-1.39	0.97	-1.01	-0.05	
Dec	-2.80	-2.27	-1.11	-1.18	3.00	-0.97	-0.38	

Table A-14

FESF INTERVENTION DUMMY VARIABLE - REGULAR

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		0	0	-1	0	0	1	1
Feb		0	0	0	-1	0	0	1
Mar		0	0	0	0	1	0	1
Apr		0	0	0	0	1	1	0
May		0	0	-1	0	1	0	
Jun		0	0	0	0	0	1	
Jul		1	0	0	0	-1	1	
Aug	0	0	0	0	0	0	1	
Sep	0	1	0	0	0	0	1	
Oct	0	0	0	0	0	0	-1	
Nov	0	0	0	0	0	1	-1	
Dec	0	0	0	0	0	1	-1	

Table A-15

FESF INTERVENTION DUMMY VARIABLE - HIGH POWERED

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		0	0	-1	0	0	5	2
Feb		0	0	0	-1	0	0	1
Mar		0	0	0	0	1	0	3
Apr		0	0	0	0	2	1	0
May		0	0	-1	0	1	0	
Jun		0	0	0	0	0	3	
Jul		+1	0	0	0	-2	1	
Aug	0	0	0	0	0	0	2	
Sep	0	+1	0	0	0	0	2	
Oct	0	0	0	0	0	0	-3	
Nov	0	0	0	0	0	3	-1	
Dec	0	0	0	0	0	1	-1	

Table A-16

BEEA INTERVENTION DUMMY VARIABLE - REGULAR

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		0	-1	0	-1	1	0	0
Feb		0	0	0	-1	1	0	0
Mar		0	-1	-1	-1	1	0	0
Apr		0	0	0	0	1	1	0
May		0	1	-1	1	1	0	
Jun		0	-1	-1	1	1	0	
Jul		0	0	-1	0	-1	-1	
Aug	0	0	0	-1	1	1	0	
Sep	0	0	0	-1	-1	1	1	
Oct	0	0	0	1	-1	0	0	
Nov	0	0	0	0	1	0	0	
Dec	0	0	0	0	1	0	0	

Table A-17

BEEA INTERVENTION DUMMY VARIABLE - HIGH POWERED

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		0	-1	0	-1	2	0	0
Feb		0	0	0	-3	1	0	0
Mar		0	-1	-1	-2	2	0	0
Apr		0	0	0	0	4	1	0
May		0	1	-3	1	2	0	
Jun		0	-3	-4	1	3	0	
Jul		0	0	-3	0	-2	-1	
Aug	0	0	0	-3	3	2	0	
Sep	0	0	0	-1	-1	3	1	
Oct	0	0	0	1	-2	0	0	
Nov	0	0	0	0	2	0	0	
Dec	0	0	0	0	1	0	0	

Table A-18

SEASONAL DUMMY VARIABLES - SPRING, SUMMER AND FALL (SSF)

	1931	1932	1933	1934	1935	1936	1937	1938
	SSF	SSF	SSF	SSF	SSF	SSF	SSF	SSF
Jan		000	000	000	000	000	000	000
Feb		000	000	000	000	000	000	000
Mar		000	000	000	000	000	000	000
Apr		100	100	100	100	100	100	100
May		100	100	100	100	100	100	
Jun		100	100	100	100	100	100	
Jul		010	010	010	010	010	010	
Aug	010	010	010	010	010	010	010	
Sep	010	010	010	010	010	010	010	
Oct	001	001	001	001	001	001	001	
Nov	001	001	001	001	001	001	001	
Dec	001	001	001	001	001	001	001	

Table A-19

D_1 DUMMY, UNITED STATES DOLLAR DEVALUATION

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		0	0	1	0	0	0	0
Feb		0	0	0	0	0	0	0
Mar		0	0	0	0	0	0	0
Apr		0	1	0	0	0	0	0
May		0	1	0	0	0	0	
Jun		0	1	0	0	0	0	
Jul		0	1	0	0	0	0	
Aug	0	0	1	0	0	0	0	
Sep	0	0	1	0	0	0	0	
Oct	0	0	1	0	0	0	0	
Nov	0	0	1	0	0	0	0	
Dec	0	0	1	0	0	0	0	

Table A-20

D_2 DUMMY, THE PARIS RIOTS

	1931	1932	1933	1934	1935	1936	1937	1398
Jan		0	0	0	0	0	0	0
Feb		0	0	1	0	0	0	0
Mar		0	0	1	0	0	0	0
Apr		0	0	0	0	0	0	0
May		0	0	0	0	0	0	
Jun		0	0	0	0	0	0	
Jul		0	0	0	0	0	0	
Aug	0	0	0	0	0	0	0	
Sep	0	0	0	0	0	0	0	
Oct	0	0	0	0	0	0	0	
Nov	0	0	0	0	0	0	0	
Dec	0	0	0	0	0	0	0	

Table A-21

D_3 DUMMY, THE FLIGHTS FROM THE FRANC

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		0	0	0	0	1	0	0
Feb		0	0	0	0	0	0	0
Mar		0	0	0	1	0	0	0
Apr		0	0	0	1	0	0	0
May		0	0	0	1	0	0	
Jun		0	0	0	0	0	0	
Jul		0	0	0	0	0	0	
Aug	0	0	0	0	0	0	0	
Sep	0	0	0	0	1	0	0	
Oct	0	0	0	0	1	0	0	
Nov	0	0	0	0	1	0	0	
Dec	0	0	0	0	1	0	0	

Table A-22

D_4 DUMMY, THE DEFLATION POLICY OF THE LAVAL ADMINISTRATION

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		0	0	0	0	0	0	0
Feb		0	0	0	0	0	0	0
Mar		0	0	0	0	0	0	0
Apr		0	0	0	0	0	0	0
May		0	0	0	0	0	0	
Jun		0	0	0	0	0	0	
Jul		0	0	0	-1	0	0	
Aug	0	0	0	0	-1	0	0	
Sep	0	0	0	0	-1	0	0	
Oct	0	0	0	0	0	0	0	
Nov	0	0	0	0	0	0	0	
Dec	0	0	0	0	0	0	0	

Table A-23

D_5 DUMMY, THE ELECTION AND SOCIAL REFORMS OF THE POPULAR FRONT GOVERNMENT

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		0	0	0	0	0	0	0
Feb		0	0	0	0	0	0	0
Mar		0	0	0	0	0	0	0
Apr		0	0	0	0	0	0	0
May		0	0	0	0	0	0	
Jun		0	0	0	0	1	0	
Jul		0	0	0	0	1	0	
Aug	0	0	0	0	0	1	0	
Sep	0	0	0	0	0	1	0	
Oct	0	0	0	0	0	0	0	
Nov	0	0	0	0	0	0	0	
Dec	0	0	0	0	0	0	0	

Table A-24

D_6 DUMMY, THE PAUSE IN THE SOCIAL REFORMS

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		0	0	0	0	0	0	0
Feb		0	0	0	0	0	-1	0
Mar		0	0	0	0	0	-1	0
Apr		0	0	0	0	0	-1	0
May		0	0	0	0	0	-1	
Jun		0	0	0	0	0	0	
Jul		0	0	0	0	0	0	
Aug	0	0	0	0	0	0	0	
Sep	0	0	0	0	0	0	0	
Oct	0	0	0	0	0	0	0	
Nov	0	0	0	0	0	0	0	
Dec	0	0	0	0	0	0	0	

Table A-25

D_7 DUMMY, THE "PANIC" REGARDING THE FRENCH TREASURY

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		0	0	0	0	0	0	0
Feb		0	0	0	0	0	0	0
Mar		0	0	0	0	0	0	0
Apr		0	0	0	0	0	0	0
May		0	0	0	0	0	0	
Jun		0	0	0	0	0	1	
Jul		0	0	0	0	0	1	
Aug	0	0	0	0	0	0	1	
Sep	0	0	0	0	0	0	1	
Oct	0	0	0	0	0	0	0	
Nov	0	0	0	0	0	0	0	
Dec	0	0	0	0	0	0	0	

Table A-26

D_8 DUMMY, THE DECLARATION OF RAMBOUILLET

	1931	1932	1933	1934	1935	1936	1937	1938
Jan		0	0	0	0	0	0	0
Feb		0	0	0	0	0	0	0
Mar		0	0	0	0	0	0	0
Apr		0	0	0	0	0	0	0
May		0	0	0	0	0	0	
Jun		0	0	0	0	0	0	
Jul		0	0	0	0	0	0	
Aug	0	0	0	0	0	0	0	
Sep	0	0	0	0	0	0	0	
Oct	0	0	0	0	0	0	-1	
Nov	0	0	0	0	0	0	-1	
Dec	0	0	0	0	0	0	-1	

APPENDIX B

Table B-1

FRENCH "REAL" NET EXPORTS TO U.K.

	1931	1932	1933	1934	1935	1936	1937	1938
First Quarter		17.644	-7.345	5.761	9.122	24.511	4.554	24.764
Second Quarter		-13.872	-1.957	0.525	11.580	16.728	6.981	9.265
Third Quarter		-1.159	5.212	7.114	14.453	25.947	7.017	
Fourth Quarter	57.835	2.165	14.239	15.432	19.451	17.162	20.805	

Table B-2

TERMS OF TRADE ($P_{f/P_{uk}}$ x 1/ER)

	1931	1932	1933	1934	1935	1936	1937	1938
First Quarter		0.0570	0.0550	0.0570	0.0530	0.0536	0.0491	0.0390
Second Quarter		0.0542	0.0538	0.0564	0.0520	0.0537	0.0457	0.0372
Third Quarter		0.0556	0.0545	0.0553	0.0493	0.0559	0.0408	
Fourth Quarter	0.0542	0.0573	0.0559	0.0533	0.0512	0.0474	0.0390	

Table B-3

U.K. INDEX OF LEVEL OF EMPLOYMENT

	1931	1932	1933	1934	1935	1936	1937	1938
First Quarter		922	912	975	994	1026	1101	1105
Second Quarter		921	942	996	1014	1065	1129	1112
Third Quarter		905	960	997	1023	1084	1140	
Fourth Quarter	930	918	975	1000	1033	1093	1127	

Table B-4

FRENCH INDEX OF LEVEL OF EMPLOYMENT

	1931	1932	1933	1934	1935	1936	1937	1938
First Quarter		881	867	861	804	809	835	841
Second Quarter		882	883	868	828	824	857	850
Third Quarter		889	889	868	843	828	869	
Fourth Quarter	932	892	887	849	830	831	862	

Table B-5

TERMS OF TRADE - LAGGED ONE MONTH

	1931	1932	1933	1934	1935	1936	1937	1938
First Quarter		0.0555	0.0574	0.0556	0.0528	0.0518	0.0487	0.0391
Second Quarter		0.0552	0.0541	0.0573	0.0526	0.0541	0.0480	0.0387
Third Quarter		0.0559	0.0539	0.0574	0.0505	0.0541	0.0434	
Fourth Quarter	0.0488	0.0552	0.0553	0.0548	0.0503	0.0521	0.0401	

Table B-6

U.K. INDEX OF LEVEL OF EMPLOYMENT - LAGGED ONE MONTH

First Quarter		932	913	973	991	1025	1097	1106
Second Quarter		926	931	992	1012	1055	1119	1113
Third Quarter		910	955	995	1020	1078	1139	
Fourth Quarter	921	910	971	1000	1029	1091	1136	

Table B-7

FRENCH INDEX OF LEVEL OF EMPLOYMENT - LAGGED ONE MONTH

	1931	1932	1933	1934	1935	1936	1937	1938
First Quarter		901	873	865	816	813	831	844
Second Quarter		876	874	865	829	819	852	845
Third Quarter		889	896	869	840	827	868	
Fourth Quarter	996	893	898	859	838	830	868	

Table B-8

SEASONAL DUMMY VARIABLES (S_1 = 1ST QUARTER, S_2 = 2ND QUARTER, S_3 = 3RD QUARTER)

	1931	1932	1933	1934	1935	1936	1937	1938
	$S_1S_2S_3$	$S_1S_2S_3$	$S_1S_2S_3$	$S_1S_2S_3$	$S_1S_2S_3$	$S_1S_2S_3$	$S_1S_2S_3$	$S_1S_2S_3$
First Quarter		1 0 0	1 0 0	1 0 0	1 0 0	1 0 0	1 0 0	1 0 0
Second Quarter		0 1 0	0 1 0	0 1 0	0 1 0	0 1 0	0 1 0	0 1 0
Third Quarter		0 0 1	0 0 1	0 0 1	0 0 1	0 0 1	0 0 1	
Fourth Quarter	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	

BIBLIOGRAPHY

BIBLIOGRAPHY

Public Documents and Special Reports

Federal Reserve Board. Federal Reserve Bulletin. Vols. XVII-XXIV (1931-1938). Washington, D.C.: Government Printing Office, 1931-1938.

Great Britain. House of Commons Papers. Trade and Navigation (United Kingdom). Vol. 52 (XVII-XXVI). 1931-1938.

Articles and Periodicals

Allely, J. S. "Some Aspects of Currency Depreciation," Canadian Journal of Economics, 5:387-402, August 1939.

Bernstein, E. M. "Exchange Rates under the Gold Standard," Journal of Political Economy, 48:345-56, June 1940.

Chand, G. "The Exchange Stabilization Funds: Their Function and Future," Indian Journal of Economics, 20:535-43, April 1940.

Chang, T. C. "The British Balance of Payments, 1924-1938," Economic Journal, 57:475-503, December 1947.

Chang, T. C. "The British Demand for Imports in the Inter-War Period," Economic Journal, 56:188-207, June 1946.

Dulles, E. L. "The French Franc in 1935," Harvard Business Review, 14:146-60, No. 2, 1936.

Eastman, H. C., and Stykolt, S. "Exchange Stabilization in Canada, 1950-1954," Canadian Journal of Economics, 22:221-33, May 1956.

Eastman, H. C., and Stykolt. "Exchange Stabilization Once Again," Canadian Journal of Economics, 24:266-72, May 1958.

The Economist. January 1930-December 1938.

Harris, S. E. "British and American Exchange Policies," Part I and II, Quarterly Journal of Economics, 48:471-510, May 1934; 48:686-726, August 1934.

Hawtrey, R. G. "French Monetary Policy," Economica, 3:61-71, February 1936.

Hawtrey, R. G. "Stabilization of the Franc and French Foreign Trade," Economic Journal, 44:729-30, December 1934.

Hodgson, J. S. "An Analysis of Floating Exchange Rates: The Dollar-Sterling Rate, 1919-1925," Southern Economic Journal, 249-57, October 1972.

Kalecki, M. "The Lessons of the Blum Experiment," Economic Journal, 26-41, March 1938.

Kemp, Tom. "The French Economy under the Franc Poincare," The Economic History Review, Second Series XXIV, No. 1, 1967.

Kindleberger, C. P. "Competitive Currency Depreciation between Denmark and New Zealand," Harvard Business Review, 12:416-26, July 1934.

Kindleberger, C. P. "Exchange Stabilization Further Considered: A Comment," Canadian Journal of Economics, 23:408, August 1957.

Li, C. M. "The Effect of Depreciated Exchange upon Merchandise Movements," Quarterly Journal of Economics, 49:495-502, May 1935.

Marjolin, R. "Reflections of the Blum Experiment," Economica, 5:177-91, May 1938.

Pumphrey, L. M. "The Exchange Stabilization Account of Great Britain, 1932-1939: Exchange Operations," American Economic Review, 32:803-816, December 1942.

Reddaway, W. B. "The New Exchange Rates," Economic Record, 12:187-94, December 1936.

Sauvy, A. "The Economic Crisis of the 1930's in France," Journal of Contemporary History, IV, 4:21-35, O tober 1969.

Schwob, P. A. "A Reply to Mr. Hawtrey," Economica, 3:72-77, February 1936.

Schwob, P. A. "French Monetary Policy and Its Critics," Economica, 2:277-97, August 1935.

Schwob, P. A. "Reflections on the Stabilization of the Franc and French Foreign Trade," Economic Journal, 44:509-12, September 1934.

Solomon, Robert. "The French Stabilization Fund," Federal Reserve Bulletin, 35-9, January 1950.

Thomas, L. B. "Behavior of Flexible Rates: Additional Tests from the Post-World War I Episode," Southern Economic Journal, 40:167-82, October 1972.

Wynne, W. H. "The French Franc, June 1928-February 1937," Journal of Political Economy, 45:484-516, August 1937.

Books and Unpublished Materials

Anderson, B. M. Economics and the Public Welfare. New York: Van Nostrand. 1949.

Brown, W. A., Jr. The International Gold Standard Reinterpreted. New York: National Bureau of Economic Research. 1940. Volumes I & II.

Bryant, R. C. "Empirical Research on Financial Capital Flows," in Peter B. Kenen (ed.), International Trade and Finance: Frontiers for Research. Forthcoming, Cambridge University Press.

Caves, R. E., and Jones, R. W. World Trade and Payments. Boston: Little, Brown and Company. 1973.

Clement, M. O., Pfister, R. L., and Rothwell, K. J. Theoretical Issues in International Economics. Boston: Houghton Mifflin Company. 1967.

Einzig, Paul. A Dynamic Theory of Forward Exchange. 2nd Ed. New York: St. Martin's Press. 1967.

Einzig, Paul. A Textbook on Foreign Exchange. New York: St. Martin's Press. 1966.

Einzig, Paul. The History of Foreign Exchange. New York: St. Martin's Press. 1970. 2nd Ed.

Einzig, Paul. The Sterling, Dollar, Franc Tangle. New York: Macmillan Company. 1933.

Friedrich, Klans. International Economics: Concepts and Issues. New York: McGraw Hill Book Company. 1974.

Gilbert, Milton. Currency Depreciation and Monetary Policy. Philadelphia: University of Pennsylvania Press. 1939.

Goldberger, A. S. Econometric Theory. New York: John Wiley and Sons, Inc. 1964.

Haberler, Gottfried. Prosperity and Depression. London: Allen and Unwin Ltd. 1958.

Harris, Seymour. Exchange Depreciation. Cambridge: Harvard University Press. 1936.

Hodgson, J. S. "An Analysis of Exchange Rate Behavior under a Managed Floating Regime." Unpublished manuscript, University of Oklahoma. 1975

Hodgson, J. S. "Fluctuations of the Pound Sterling, 1919-1925." Ph.D. dissertation, University of Virginia. 1971

Hodson, H. V. Slump and Recovery. London: Oxford University Press. 1938.

Hoel, P. G. Introduction to Mathematical Statistics. New York: John Wiley and Sons, Inc. 1962.

Hudgins, M. W. "Currency Exchange Rate Fluctuations under a System of Stabilization Funds: The Case of the Pound-Dollar Rate, 1931-38." Ph.D. dissertation, University of Virginia. 1973.

Hudgins, M., and Whitaker, J. K. "The Exchange Equalization Account and Sterling: An Empirical Study of the Floating Pound of the 1930's." Unpublished manuscript, University of Virginia. 1974.

Johnston, J. Econometric Methods. New York: McGraw-Hill Book Company. 1972.

Kemp, Tom. The French Economy, 1913-1939. New York: St. Martin's Press. 1972.

Kindleberger, C. P. International Economics. Homewood, Illinois: Richard D. Irwin, Inc. 1968.

Leamer, E. E., and Stearn, R. M. Quantitative International Economics. Chicago: Aldine Publishing Co. 1973.

Morton, W. A. British Finance, 1930-1940. Madison: University of Wisconsin Press. 1943.

Nurske, Ragnar. International Currency Experience. League of Nations. 1944.

Paris, J. D. Monetary Policies of the United States, 1932-1938. New York: Columbia University Press. 1938.

Root, F. R. International Trade and Investment. Cincinnati: South-Western Publishing Company. 1973.

Thursby, M. C. "The Resource Reallocation Costs of Fixed and Flexible Exchange Rate Systems." Unpublished Ph.D. dissertation, University of North Carolina. 1974.

Waight, Leonard. The History and Mechanism of the Exchange Equalization Account. Cambridge: Cambridge University Press. 1939.

Wolfe, Martin. The French Franc between the Wars. New York: Columbia University. 1951.

Yeager, L. B. International Monetary Relations. New York: Harper and Row. 1966.

Miscellaneous

The International Labor Review. 1931-1933.

The Statistical Yearbook. League of Nations. 1931-1938.

World Economic Survey. League of Nations.