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**Can Informal Cooperation
Stabilize Exchange Rates?
Evidence from the 1936 Tripartite Agreement**

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1. Introduction

Can an informal agreement among governments to reduce exchange-rate volatility really alter financial market behavior? The Plaza Agreement of September 1985 in which the major industrial countries agreed to steps to limit the rise of the dollar, the Louvre Accord of February 1987 which sought to stem the dollar's fall, and the Toronto Summit of June 1988 at which seven heads of state forswore dollar depreciation and "destabilizing" appreciation of other currencies all have reactivated debate over this perennial question (see Obstfeld, 1990).

There exists no consensus as to the answer. Those skeptical about the efficacy of sterilized intervention insist that the path of exchange rates can be affected only by altering domestic monetary and fiscal policies. International pressure may induce governments to alter monetary and fiscal policies temporarily, but if domestic objectives remain unchanged policymakers will be unwilling to make those changes permanent. Eventually they will reverse course, producing repeated shifts in policy that only aggravate exchange-rate instability. Anticipating the conflict, the markets will force the issue, quickly causing the agreement to break down. Thus, because informal agreements to stabilize exchange rates are difficult to enforce, they are less than credible and prove ineffectual.^{1/}

Surprisingly, there exists no systematic empirical analysis of the impact on financial markets of informal agreements to limit exchange rate fluctuations. This is our motivation for considering the Tripartite Agreement of September 1936. The Tripartite Agreement was an informal agreement to limit exchange rate volatility. It provided the framework for foreign exchange management from the last quarter of 1936 through the second quarter of 1939. In this paper we compare the behavior of foreign exchange markets before and after the Tripartite Agreement. Not only can such a study shed light on the literature on informal

cooperation, but it can contribute to the historical debate over whether policymakers could have done more to minimize exchange-rate instability in the 1930s.^{2/}

Our findings contrast with the assertions of previous historians of the Tripartite Agreement and are at variance with those which would be predicted by critics of informal cooperation. We find that the periods before and after the 1936 agreement were characterized by markedly different behavior of interest rates and exchange rates. Not only were nominal exchange rates less volatile after the Tripartite Agreement, but international real interest differentials were smaller due to a decline in covered interest differentials, exchange risk premia, and real exchange rate variability.

Our presentation of these findings is organized as follows. Section 2 provides an overview of foreign exchange markets in the 1930s and describes the content of the Tripartite Agreement. Section 3 reports our findings on the behavior of foreign exchange rates and interest rates. Section 4 summarizes the results and offers some concluding speculations.

2. Foreign Exchange Markets in the 1930s and the 1936 Tripartite Agreement

The Tripartite Agreement was concluded after five years of experience with floating exchange rates.^{3/} The period of floating was inaugurated by Britain's abandonment of the gold standard in September 1931. For a short time sterling was allowed to float freely; around the beginning of 1932 the Bank of England began to intervene in the foreign exchange market, and starting in the summer of the same year unilateral intervention was undertaken by the British Exchange Equalisation Account (Howson, 1980). Some two dozen countries, including Sweden, the rest of Scandinavia and Japan, followed Britain off gold by the end of 1931. For the time being, the United States and much of the rest of Europe continued to maintain their fixed gold parities and, as a consequence, fixed exchange rates against one

another.

The situation in the foreign exchange market was again transformed when Franklin Delano Roosevelt took the United States off the gold standard in April 1933. Through the end of that year, the dollar depreciated against the remaining gold standard currencies, although it fluctuated volatily around its declining trend. In January of 1934 the U.S. repegged the dollar against the gold currencies. The next major European country to abandon the gold standard was Belgium, which took the action in March of 1935. The remaining members of the Gold Bloc, led by France, the Netherlands and Switzerland, clung to the gold standard through the summer of 1936.

French officials' realization that devaluation of the franc could no longer be avoided prompted them to initiate the negotiations that culminated in the Tripartite Agreement.^{4/} The French wished to devalue the franc by as wide a margin as possible, so as to enhance the competitiveness of French industry, without provoking competitive depreciation by the U.S. and Britain. The U.S. and Britain wished to prevent a depreciation of the franc so large as to significantly erode the competitiveness of domestic industry and to force them to retaliate in kind. All three governments feared that another round of competitive depreciation would amplify exchange rate instability and wished to limit disruptions to financial markets.

The French initially proposed a formal agreement to coordinate exchange rate management internationally. They envisaged a set of rules that would tightly regiment foreign-exchange market intervention by the three countries. Their proposal met with opposition from both British and American officials who, with the experience of the gold standard still foremost in their minds, were unwilling to compromise the independence of domestic policy. The Tripartite Agreement that emerged from negotiations among the three countries was a much more vague declaration than that for which the French had hoped. The

three governments affirmed their desire to cooperate in minimizing exchange rate instability. They vowed to resist the temptation to manipulate exchange rates "to obtain an unreasonable competitive advantage." But beyond declaring their support for the principal of cooperating to minimize exchange rate fluctuations, the three governments committed themselves to no concrete action. Other nations were invited to issue similar statements.

The French immediately devalued the franc, and the Swiss and Dutch quickly followed suit. In negotiations stretching into October 1936, first Britain and France and then the U.S. agreed to steps designed to facilitate foreign-exchange market intervention. They agreed to redeem in gold any foreign exchange their counterparts acquired. Each morning the exchange equalization funds of the three countries announced the price at which they would convert into gold at the end of the day any of their currency accumulated by the other countries. The measure was designed to reduce the risks of intra-daily support operations.

Intervention occurred on a significant scale. Throughout the winter of 1936-37, the French intervened to support the franc and the British intervened to limit the appreciation of sterling. The franc renewed its decline in April of 1937, before being stabilized again toward the end of 1938. Meanwhile, sterling declined against the U.S. dollar by about 5 per cent over the second half of 1938 (Drummond, 1979).

Historians of the period have tended to dismiss the agreement as ineffectual. A typical judgement is that of Drummond (1979, p.2), who asserts that the agreement had no discernible effect, and concludes that "it is hard to see much [evidence of] cooperation in the period 1936-39." Similarly, Sauvy (1967, p.225) argues that the Tripartite Agreement committed central banks to nothing and had no significant impact. Lewis (1949, p.157) is virtually alone in suggesting that it had a significant stabilizing effect on foreign exchange markets. Kindleberger (1973) admits that "for the first time since 1933, exchange rates were

discussed, technical arrangements made, and international co-operation built into the monetary arena," but he does not analyze the effects on market behavior.

Curiously, dismissals of the Tripartite Agreement are not based on a systematic analysis of the behavior of financial market variables in the surrounding periods. It is to such an analysis that we now turn.

3. Findings

The data on spot and forward exchange rates, interest rates and wholesale prices used to analyze financial markets around the time of the Tripartite Agreement are drawn from Einzig (1937) for the period through 1936, and thereafter from the League of Nations' Monthly Bulletin of Statistics (for wholesale prices) and from various issues of The Economist (for other variables). The spot and forward market observations are for the close of business each week. The forward rates are for delivery in 90 days. The interest rates are 90 day market rates of discount for prime bills, reported on a monthly average basis. The wholesale price indices are monthly averages. These monthly averages can be combined with the exchange rate data by generating appropriate-weighted averages of the weekly observations of the latter. Following Einzig, we use sterling as the reference currency throughout.^{5/}

We partition the period into the periods January 1932 - August 1936, before the Tripartite Agreement, and November 1936 - June 1939, after the Agreement. The transition month of September is omitted. Calculations that require lags omit the observations for the initial months of the two periods.

Table 1 summarizes for the two periods the behavior of the percentage change in the spot rate (precisely, the log spot rate over the log spot rate lagged). Its mean value declines

TABLE 1
Measures of Exchange Rate Volatility
(in percent)

COUNTRY	PERIOD 1 MEAN	PERIOD 2 MEAN	PERIOD 1 STAND DEV	PERIOD 2 STAND DEV
	Nominal Spot Rate Differential -- $\log(\text{spot}(t+1)/\text{spot}(t))$			
U.S.	2.16743	0.46401	3.41676	0.43298
France	1.27520	1.89894	1.33514	3.85277
Belgium	1.85953	0.46762	4.58648	0.43946
Netherlands	1.33049	0.45632	1.31328	0.57132
Switzerland	1.35384	0.39533	1.32546	0.42895
Group	1.59730	0.73644	2.75587	1.77397

Notes: Period 1 in January 1932 to August 1936. Period 2 is October 1936 to June 1939.
The British pound is the reference currency.

Source: See text.

by more than 50 per cent in the period following the Tripartite Agreement. France is a notable exception to the rule: the average monthly percentage change in the franc/pound rate increases by 50 per cent across periods. However, the difference in means is not statistically significant at the 90 per cent confidence level for France. For all of the other countries but Belgium, the decline in means is statistically significant at the 95 per cent level.

The next two columns of Table 1 show that the standard deviation of our measure of spot rate volatility declined by more than a third after the Tripartite Agreement. The decline is general and statistically significant: for every country the null hypothesis of equal variances across periods is rejected at the 95 per cent confidence level. Again, France is a notable exception to the rule of declining volatility: the standard deviation of the franc/pound rate triples after the Tripartite Agreement (and the increase is statistically significant at the 95 per cent level).

To shed further light on the implications of these changes for international financial markets, we follow Frankel and MacArthur (1988) and Eichengreen (1989) in exploiting the identity linking international interest rate differentials to exchange rates. The real interest rate differential is defined as:

$$r - r^* = (i - \pi) - (i^* - \pi^*) \quad (1)$$

where r is the real interest rate, i is the nominal interest rate, and π is the inflation rate. Asterisks denote the values of these variables in the foreign country.

Adding and subtracting the forward discount f_d and the expected rate of depreciation of the domestic currency, Δs^e , yields:

$$r - r^* = (i - i^* - f_d) + (f_d - \Delta s^e) + (\Delta s^e - \pi - \pi^*) \quad (2)$$

The exchange rate is defined throughout as units of foreign currency per unit of the reference currency, in this case the British pound. The first term on the right-hand side of (2) is the covered interest differential. In the absence of transactions costs, information costs, capital controls, risk of future capital controls and default risk, the mean and variance of this component of the real interest differential should be negligible. Given the political nature of the decision to impose capital controls, we follow Frankel and MacArthur in referring to this term as "political risk."

The second term on the right-hand side of (2) is the exchange risk premium. The forward discount on foreign exchange need not equal the expected rate of depreciation of the foreign currency if investors demand compensation for the risks of exchange rate changes.^{6/}

The third term is expected real depreciation.^{7/} Only if the expected rate of depreciation of the nominal exchange rate equals the expected inflation differential will purchasing power parity hold in an expectational sense. If the rate of depreciation of the domestic currency is expected to exceed the difference between domestic and foreign inflation rates, for example, the real exchange rate of the home country is expected to depreciate. The purchasing power of domestic goods over foreign goods is expected to decline. To induce investors to hold assets that yield a return denominated in domestic goods, they must be compensated by a higher real interest rate.

In the empirical analysis that follows we use the actual future spot rate as a proxy for the expected future rate and actual inflation as a proxy for expected inflation.^{8/} The first panel of Table 2 displays the mean and standard deviation of the real interest differential before and after the Tripartite Agreement. For every country, the mean of the real interest differential declines in absolute value after September 1936. The standard deviation also declines uniformly. But the change in these measures of the behavior of real interest

TABLE 2
Real Interest Differentials and Their Decomposition
(in percent)

COUNTRY	PERIOD 1 MEAN	PERIOD 2 MEAN	PERIOD 1 STAND DEV	PERIOD 2 STAND DEV
Real Interest Differential				
U.S.	0.61532	0.06585	1.32879	1.12366
France	-1.64067	-1.12997	2.21160	2.03789
Belgium	-1.46173	-1.11513	2.18049	1.22550
Netherlands	-0.86992	0.34910	2.06803	0.93357
Switzerland	-1.09293	-0.32111	1.35710	1.05007
Group	-0.88999	-0.40187	1.87242	1.33354
Covered Interest Differential				
U.S.	0.19195	0.45711	0.96160	0.28043
France	-2.48265	-4.20929	3.29565	2.13711
Belgium	-1.66384	-1.94894	1.45423	1.90471
Netherlands	-1.18707	0.46164	2.48296	0.61095
Switzerland	-1.44836	-0.21593	1.96062	0.31618
Group	-1.31799	-1.09108	2.18677	1.32265
Exchange Risk Premium				
U.S.	-1.91982	0.24225	7.43654	1.39429
France	1.85784	-3.67758	2.77484	7.89823
Belgium	-0.86558	1.09700	9.37814	2.32905
Netherlands	1.70135	0.07196	2.87109	1.29003
Switzerland	1.63063	0.03466	2.79571	1.13580
Group	0.48088	-0.44634	5.77946	3.81326
Real Exchange Rate Depreciation				
U.S.	2.41866	-0.58466	7.82943	1.18081
France	-1.24874	7.13144	3.37703	8.23338
Belgium	1.222110	-0.45058	10.27559	1.64350
Netherlands	-1.38603	0.15069	3.20454	1.48766
Switzerland	-1.25842	-0.12181	3.04140	1.44705
Group	-0.05048	1.22502	6.28985	3.90361

(continued on next page)

TABLE 2
(continued)

PERIOD 1:	1932.01 to 1939.08 for	Covered Interest Differential
	1932.02 to 1936.08 for	Real Forward Discount
	1932.02 to 1936.05 for	Exchange Risk Premium, Real Exchange Depreciation, and Real Interest Differential
PERIOD 2:	1936.10 to 1939.06 for	Covered Interest Differential
	1932.11 to 1936.06 for	Real Forward Discount
	1932.11 to 1936.03 for	Exchange Risk Premium, Real Exchange Depreciation, and Real Interest Differential

Source: See text.

differentials is statistically significant less than half the time (for the Netherlands and Switzerland in the case of the mean and for Belgium and the Netherlands in the case of the standard deviation).^{9/} While these results generally support the hypothesis that financial markets were significantly better integrated internationally after the Tripartite Agreement than before, the significance of the statistical evidence is mixed.

Which components of the real interest differential in eq. 2 are responsible for the change? The second panel of Table 2 shows the behavior of the covered interest differential. Its standard deviation declines substantially after the Tripartite Agreement. That decline is evident in the data for every country but Belgium. The change in standard deviations is statistically significant for every country but Belgium. The null of no change is rejected at the 90 per cent level for France and at the 95 per cent level for the other countries.

The results for the mean covered interest differential are less straightforward. The mean declines on average after the Tripartite Agreement, but by a relatively small margin, reflecting the fact that the average covered interest differential, while falling for three countries, rises for three others (France, the U.S. and Belgium). The only three countries for which the change in means is statistically significant at the 95 per cent level are France, Netherlands and Switzerland; revealingly they are the three countries in our sample that remained on the gold standard through the entire period leading up to the Tripartite Agreement. The results for the Netherlands and Switzerland suggest that fears that their governments would impose capital controls to defend the exchange rate were more prevalent so long as they remained on the gold standard than subsequently. Of the gold bloc countries, only in France did the fear of capital controls not diminish after 1936. The French differential reflects measures actually taken by the French government, including a tax on French funds previously held abroad but repatriated after September 1936, but presumably

also fears of additional controls and taxes on short-term capital flows under the Popular Front Government formed after the spring 1936 elections.

Why interest-bearing assets denominated in U.S. and Belgian currency commanded a larger covered interest premium after 1936 than before is not clear. Neither the U.S. nor Belgium imposed significant capital controls between 1936 and mid-1939. In their cases, the rise in the mean covered interest differential may reflect the positive probability attached to future imposition of capital controls at home, relative to the probability of such an event in Britain, the country against whose interest rate the differential is computed.^{10/}

The third panel of Table 2 shows the absolute value of the exchange risk premium declined substantially between periods in every country but France and Belgium. The same is true of the standard deviation of the risk premium for each country but France. The change in the standard deviation of the risk premium is statistically significant at the 95 per cent level for every country. This is strong evidence that the Tripartite Agreement reduced the perceived riskiness of foreign exchange market transactions. That France is an exception is not surprising. After a period of relative stability, the franc renewed its decline against the dollar and the pound in the second half of 1937. Table 1 shows that the franc rate was far-and-away the most volatile exchange rate against sterling in the post-Tripartite Agreement period. The behavior of the risk premium confirms that these movements in the franc were not adequately incorporated into forward rates.^{11/}

The final panel of Table 2 shows the behavior of the real exchange rate. The average real depreciation, in absolute value terms, is smaller after the Tripartite Agreement than before for every country but France. The same is true of the standard deviation of the change in the real exchange rate. The decline in the standard deviation of the change in the real exchange rate is statistically significant for every country at the 95 per cent level. Increased

nominal exchange rate stability produced an increase in real exchange rate stability everywhere it occurred. Only for France was there no decline in nominal exchange rate variability and hence no decline in real exchange rate variability after 1936. Insofar as reductions in the magnitude of exchange rate fluctuations, by reducing uncertainty about the purchasing power of different currencies, improved the integration of commodity markets, they also enhanced the integration of financial markets.

4. Concluding Observations

Our empirical analysis of the behavior of financial markets before and after the Tripartite Agreement has documented significant differences across periods. This is contrary to the presumptions of most historians of the agreement and of the skeptics of the efficacy of informal cooperation. We find that nominal exchange rates were less volatile after the Tripartite Agreement than before. So were international real interest differentials, which suggests that international capital market integration improved with the stabilization of nominal exchange rates. The decline in the level of real interest differentials reflected mainly a decline in the covered interest differential. The decline in the variability of the real interest differential reflected declines in the covered interest differential, the exchange risk premium and the rate of expected real depreciation alike. Thus, the informal cooperation of the Tripartite Agreement appears to have successfully reduced the volatility not only of nominal exchange rates but of real interest differentials, exchange risk premia and expected real exchange rate changes as well.

The exception to the rule is France. In France, as the Bank for International Settlements noted in 1938 (p.18), domestic policy was not adapted to stabilize the exchange rate. The authorities intervened to stabilize the foreign exchange value of the franc on a

number of occasions (October 1936-April 1937, June-July 1937, October-December 1937, and the second half of 1938), but each of its stabilization operations proved temporary.

Government budget deficits and wage increases persisted throughout the period (Drummond, 1979). It is not surprising that the franc depreciated secularly between 1936 and 1939 and that the series of temporary stabilizations increased the variability of its rate of decline. The French experience contrasts with that of Belgium, where a French-style attack on the currency in May 1938 was met by an increase in the central bank discount rate and credit rationing by the central and commercial banks, which succeeded in stabilizing the currency.^{12/}

Thus, the experience of the Tripartite Agreement sends a mixed message: cooperative agreements to facilitate foreign exchange intervention may exercise a stabilizing influence over exchange rates, but only if domestic policy is first adapted in a direction consistent with the targets of intervention.

APPENDIX TABLE
Real Interest Differentials and Their Decomposition
Using Ex Ante Measures of Expected Inflation and Depreciation

(in percent)

COUNTRY	PERIOD 1 MEAN	PERIOD 2 MEAN	PERIOD 1 STAND DEV	PERIOD 2 STAND DEV
Real Interest Differential				
U.S.	0.56149	0.02728	0.52451	0.46818
France	-2.01903	-1.26396	1.18354	1.21016
Belgium	-1.53870	-1.42661	0.79589	0.99672
Netherlands	-1.04979	0.41012	1.49625	0.65871
Switzerland	-1.35176	-0.35627	0.59514	0.39355
Group	-1.07955	-0.52188	0.99017	0.80819
Exchange Risk Premium				
U.S.	-2.07541	0.26371	5.57587	1.00732
France	1.98789	-3.88857	0.56229	5.52794
Belgium	-0.93130	1.16217	5.30380	2.20629
Netherlands	1.77782	0.02718	0.87298	0.29629
Switzerland	1.71347	0.07627	1.37704	0.35481
Group	0.49449	-0.47184	3.52690	2.70755
Real Exchange Rate Depreciation				
U.S.	2.59085	-0.66863	6.23423	0.61332
France	-1.40418	7.20512	1.22548	5.95086
Belgium	1.28166	-0.60235	6.34781	1.15612
Netherlands	-1.43783	-0.13614	1.06262	0.64485
Switzerland	-1.33631	-0.25702	1.45102	0.35697
Group	-0.06116	1.10820	4.09626	2.74476

Notes: Periods are defined as in Table 2
 Covered interest differential is identical to Table 2.

Source: See text and footnote 8.

FOOTNOTES

1. As Funabashi (1988, p.244) concludes, "Instead of achieving the consensual agreement of the G-5, policy coordination has in most instances depended on a series of deals within the context of the G-2 or G-3. The possibility of backsliding, overcommitting, or renegeing has continually threatened the credibility of these deals, in some instances removing incentives to further cooperation." The implication, according to Funabashi, is clear: steps must be to formalize international management of the exchange markets and to render the rules of the regime more easily enforceable.
2. The most important contribution to the literature in which it is argued that exchange-rate instability contributed to the economic difficulties of the first half of the 1930s remains Nurkse (1944).
3. We provide here only the briefest description of foreign exchange markets in the 1930s. A detailed account, in the context of the experience of the 1920s, is found in Eichengreen (1990).
4. The succeeding paragraphs on the negotiation of the Tripartite Agreement draw on Clarke (1977) and Eichengreen (1985).
5. Under the assumption that triangular arbitrage holds, we recalculated our measures of financial market performance using other currencies, notably the franc, as the reference currency. We cite these results below where they point to significantly different conclusions.
6. A large literature discusses the magnitude of the exchange risk premium in recent years. See Meese and Rogoff (1988).
7. Following Frankel and MacArthur, we refer to the sum of the exchange risk premium and expected real depreciation as the real forward discount.
8. This facilitates comparison with previous studies for other portions of the interwar period (e.g. Batchelor, 1980) which discuss the forward rate-future spot rate differential in terms of the efficiency of forward markets and the exchange rate depreciation-inflation differential in terms of deviations from purchasing power parity. We also constructed forecasts of the inflation, differential and the rate of expected depreciation by projecting them, in turn, on the same information set used for these purposes by Frankel and MacArthur. As shown in the appendix table, this brought about no significant change in the results.
9. The differences in means for the Netherlands and Switzerland are both significant at the 95 per cent level, as is the difference in variances for the Netherlands. The difference in variances for Belgium is only significant at the 90 per cent level.
10. The Belgian authorities intervened to stabilize the belga against gold throughout 1937. Over the course of the year, the Belgian trade deficit widened, which may have given rise to fears of capital controls. Bank for International Settlements (1938), p.23. For details on

exchange control in the 1930s, see League of Nations (1939).

11. The large standard deviation for Belgium is due to temporarily large average values in January-March 1935, the months immediately preceding the country's devaluation. We also constructed forecasts of the inflation differential and the rate of expected depreciation by projecting them, in turn, on the same information set used for these purposes by Frankel and MacArthur. As shown in the appendix table, this brought about no significant change in the results.

12. Details on the Belgian episode are provided in Bank for International Settlements (1939), pp.21-22.

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