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CHAPTER IV

SHORT-TERM INTEREST RATE DIFFERENTIALS

Section 1. A Mechanism of Interaction and the Data

(1) We now widen the scope of our investigations considerably by endeavoring to determine whether there is an interdependence between our short-term interest rates and the six exchange rates among the four countries from which the interest rates were taken. This program can be carried out only in several successive steps in this and the following two chapters, and we shall probably not be able to give exhaustive answers to the various questions which arise because of the high degree of complication encountered. The obstacles are in some instances insurmountable.

The interdependence between these financial fields is, it is generally assumed, achieved by the working of a mechanism which is supposed to link financial markets of various nations. This then would give an indication of transmission of fluctuations.

The *mechanism* we are referring to is the classical one familiar to every student of economics: a rise in the short-term interest rate of country A *may* cause a movement of short-term funds from country B (and possibly from countries C,D, . . .) to A. This will drive up the exchange rate of A in terms of the currency of B (and possibly of C,D, . . .). This movement will be induced only if the rise of the short-term rate of A lifts it sufficiently above that of B, so as to offer a prospect of gain for short-term investment. "Sufficiently" means,[1] of course, that the various factors working against such a transfer are overcome. Among these are the elements of risk on various counts, the cost of the transfer, and of a prospective later repatriation or shift of the funds to a third country, etc. The flow of short-term funds will presumably continue as long as the difference in interest rates invites a profitable transaction. The influx of foreign funds in the money market of A will ease conditions and lower the short-term rate, or, if it stays high, the outflow from B will tighten money and credit conditions there and thus stop the outflow; or there may be any of the possible combinations. But

[1] Here is the field where the difficult notion of the "threshold" becomes applicable, but we are not ready to use it.

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sooner or later the flows will cease until another sufficient difference between short-term rates appears.

It is clear that this flow of short-term capital may have immediate influence upon the total volume and the possible direction of loanable funds in all countries concerned. It increases lendings where they are desired and takes excess funds out of idleness. It affects the economies of all countries between which these flows occur. The medium of the flows consists of bills of exchange, foreign securities, gold, etc., in an order of importance frequently shifting[2] according to the circumstances.

This then is one of the most obvious ways in which financial fluctuations in one country react upon the financial sectors of others. The details depend apparently on the monetary systems of the countries directly concerned as well as upon the influences coming from countries having different monetary standards. We neglect, in general, the second and for the first explore only the period in which all four of our countries were on the gold standard, though the technical adherence to its principle has varied from country to country and within some even over time.

(2) Our *data* are simply the monthly differences between the short-term interest rates used in the previous chapter. For the United States we shall, in general, use the commercial paper rate; wherever the New York call money rate is used, this will be stated separately. The four basic series give six *short-term interest rate differentials,* as they will be called. Occasionally the equivalent term "excess of (say) New York over London" will be used instead. The sign will indicate whether the New York or the London rate was in excess over the other. The choice as to the direction in which the difference is taken was governed by an additional factor, the form of the data for exchange rates with which the differentials will be compared (cf. page 282).

(3) We still have to justify the formation of interest rate differentials from our four basic series. The justification depends on the purpose which the differentials are to serve. Differentials could obviously be computed for various kinds of interest rates, e.g., private discount rate in A against the same in B, or private discount rate in A against call money rate in B, or call money rates in A and B, or against the official central bank discount rate, etc. For special purposes it may also be necessary to consider groups of

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[2] This will be taken up again in Chapter X, where the little-studied role of foreign securities will be subjected to some closer scrutiny.

interest rates. Which of these differentials constitutes a really significant series or group of series depends upon the nature of the transactions examined. Since we are now concerned with the flow of short-term funds between countries, the interest rates must be those most likely to be compared by the investors. There is no a priori reason to assume that money invested in A in a particular form of short-term investment will necessarily be attracted to B by the rate governing precisely the same kind of investment. Instead it may go to another kind of short-term investment. So it is argued that British short-term funds—while oriented at the London private discount rate—were moved to, or repelled from, New York not by the similar and equivalent commercial paper rate, but by the call money rate, which is dependent on stock market activity.

Furthermore short-term funds in A may move to B for long-term investment. Besides the differences with foreign short-term and long-term rates, there is the competition in each home market offered by the long-term rate. Thus it would be necessary to compare our differentials with the four national long-term–short-term differentials (cf. Chapter IX). At the various phases of the business cycle, the pull exercised by the domestic long-term markets upon short-term funds varies, and this pull certainly competes with those exercised by the short-term differentials with rates in foreign money markets. It is well known what tremendous importance many, if not most, theories of the business cycle attribute to the flow of funds from the domestic money markets to the capital markets and to the occasional interruption of this flow—in which latter case measures such as public investment are recommended. It is revealing therefore that there exist but few intensive investigations[3] of the

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[3] Special mention has to be made of at least two authors; cf. J. Tinbergen, "Suggestions on Quantitative Business Cycle Theory," *Econometrica*, Vol. III, No. 3, 1935, p. 241 ff. On page 259 of this interesting and informative paper reference is made to Lorenz, "Eine Differentialgleichung der Wirtschafts-forschung und ihr Integral," *Blätter für Versich.-Mathematik, Beilage zur Zeit-schrift für die ges. Versich.-Wissenschaft*, Vol. XXIX, p. 212. Lorenz attempts to show that month to month changes of long-term rates correlate highly with the *margin* between short-term and long-term rates. This is an interesting beginning of the proper sort, but unfortunately Lorenz' paper is based on a very small sample while the question would require extensive material. Tinbergen only draws attention to this paper and adds no investigation of his own, noting only the significance of the problem and—possibly—stringing a too long chain of causation in his remarks. (Further literature is given in Chapter IX, below.) There is also the possibility of shifting funds from long-term or short-term interest-bearing securities to noninterest-bearing securities such as stocks. Cf. I. Mintz, *Deterioration in the Quality of Foreign Bonds Issued in the United States, 1920–1930*, National Bureau of Economic Research, 1951; and W. B.

differentials of the relevant interest rates whether domestic or foreign. The material has not even been collected in suitable form. The statistical devices which would have to be used could at first remain as simple as ours, although the formation of a theory would require more sophisticated procedures.

Thus it seems that the choice of our four short-term rates is justifiable. In fact these rates were picked in view of their comparability. The additional difficulty which arises from now on is that while in Chapter III we were chiefly concerned with cyclical behavior, i.e., mostly timing, we are now also increasingly dependent on the absolute stand of the rates. This did not matter much before, since a mistake in selection would not necessarily have been serious in view of the fairly close cyclical covariation of all short-term rates in each country. Our data are shown in Chart 18. The differences in the activities to which our rates refer in their respective countries are small, so that the rates can be considered comparable. Thus the differences in their height, i.e., *not* institutional differences, may therefore be viewed as genuinely operative differences. In other words if the rate in London was higher than the Paris rate, this would—with certain specific and important reservations, duly to be examined—indicate a pull on French funds. And this is what we want to find out about.

It is very likely that the majority of short-term international investments was oriented on these rates, and hence on their differences. Finality on these matters cannot be established in view of the paucity of existing records and the apparently well-nigh impossibility of obtaining definite, noncontradictory information. This is one of the several instances in which repeatedly questioned distinguished and highly experienced operators in the field of international short-term investment in New York, London, and elsewhere who still remember parts of the pre-1914 period, flatly contradict one another in a manner which businessmen often find characteristic of economists only.

Section 2. Frequency Distributions, Seasonal Movements, and Specific Cycles

(4) A further description of our data not being called for, we proceed to two characterizations: first, we examine the frequency

Hickman, *The Volume of Corporate Bond Financing since 1900*, Princeton University Press for National Bureau of Economic Research, 1953.

distributions; and secondly, take up the question of seasonal movements. Both properties, together with a remark on the possibility of trends, will provide sufficient general knowledge upon which the analysis of their cyclical behavior can be based.

Table 24 contains the frequency distributions of the seven series,[1] arranged in the same sequence in which the data themselves are used. The measures are the same as those of the basic interest rate distributions (cf. Table 10).[5] The class intervals are uniformly 0.20 per cent, but the number of classes varies widely from 22 classes for Paris over Berlin and Berlin over London to the maximum of 36 for New York over Berlin. The data cover the period January 1876–July 1914, i.e., 463 months, and January 1925–December 1938, 168 months. Seasonally uncorrected data were used and we refrain from repeating the measurement for corrected data. The frequency distributions of the interest rates themselves (cf. Tables 9 and 10) if viewed in the light of the exposition below (page 153) should be enough to answer questions which might occur to a reader but which are not of great consequence in our present deliberations.

The seven distributions throw a great deal of light upon the differentials by showing the wide differences that prevail. To begin with the two averages used—arithmetic mean and median—can now show positive or negative values which necessarily means that the majority of the cases, if positive, were, as the name of the series indicates, an excess of the first-named place; the opposite, if negative.

So we note that out of the common total of 463 months for each series, the relations of Table 25 obtain.[6]

The most striking thing about the prewar figures is the permanency of the New York differences and the singularly small percentage difference for the London-Paris relationship, about which more comments will have to be made later. Paris emerges in this study as the *strongest* financial center in the world before 1914, if the fact that its short-term rate was relatively the lowest is an in-

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[1] That is, the six series referred to above, page 125, plus an additional one, the difference between the New York call money rate and the London open market discount rate.

[5] The means of the differentials are equal to the difference of the means of the short-term rates. Slight divergences are merely due to the rounding of figures.

[6] From now on we shall generally use the place names in lieu of the more cumbersome names of the respective short-term interest rates. No misunderstandings are possible; where they might arise, or where other rates are considered as in later chapters, we shall revert to the previous usage.

TABLE 24

Frequency Distribution, Short-Term Interest Rate Differentials for Six Pairs of Countries, Seasonally Uncorrected Data
(*per cent*)
Prewar, January 1876–July 1914

EXCESS PARIS OVER LONDON		EXCESS BERLIN OVER LONDON	
Class	*Frequency*	*Class*	*Frequency*
−3.00 to −2.81	2	−1.60 to −1.41	2
−2.80 to −2.61	4	−1.40 to −1.21	3
−2.60 to −2.41	1	−1.20 to −1.01	7
−2.40 to −2.21	2	−1.00 to −0.81	21
−2.20 to −2.01	3	−0.80 to −0.61	14
−2.00 to −1.81	7	−0.60 to −0.41	27
−1.80 to −1.61	8	−0.40 to −0.21	27
−1.60 to −1.41	12	−0.20 to −0.01	33
−1.40 to −1.21	16	0.00 to 0.20	35
−1.20 to −1.01	28	0.21 to 0.40	38
−1.00 to −0.81	30	0.41 to 0.60	43
−0.80 to −0.61	38	0.61 to 0.80	41
−0.60 to −0.41	40	0.81 to 1.00	43
−0.40 to −0.21	51	1.01 to 1.20	35
−0.20 to −0.01	38	1.21 to 1.40	28
0.00 to 0.20	32	1.41 to 1.60	25
0.21 to 0.40	30	1.61 to 1.80	18
0.41 to 0.60	28	1.81 to 2.00	12
0.61 to 0.80	37	2.01 to 2.20	5
0.81 to 1.00	24	2.21 to 2.40	4
1.01 to 1.20	20	2.41 to 2.60	1
1.21 to 1.40	5	2.61 to 2.80	1
1.41 to 1.60	5		
1.61 to 1.80	1		
1.81 to 2.00	1		
Total	463	Total	463
Arithmetic mean	−0.23%		+0.49%
Median	−0.21%		+0.51%
Standard deviation	0.87%		0.82%
Coefficient of variation	3.78		1.67

(*table continues*)

TABLE 24, continued

EXCESS PARIS OVER BERLIN		EXCESS PARIS OVER NEW YORK	
Class	*Frequency*	*Class*	*Frequency*
−3.40 to −3.21	1	−8.60 to −8.41	1
−2.80 to −2.61	4	−8.40 to −8.21	1
−2.60 to −2.41	5	−6.80 to −6.61	1
−2.40 to −2.21	8	−6.60 to −6.41	1
−2.20 to −2.01	11	−6.40 to −6.21	2
−2.00 to −1.81	16	−6.20 to −6.01	1
−1.80 to −1.61	18	−5.40 to −5.21	1
−1.60 to −1.41	36	−5.20 to −5.01	0
−1.40 to −1.21	42	−5.00 to −4.81	2
−1.20 to −1.01	32	−4.80 to −4.61	1
−1.00 to −0.81	38	−4.60 to −4.41	2
−0.80 to −0.61	48	−4.40 to −4.21	3
−0.60 to −0.41	40	−4.20 to −4.01	3
−0.40 to −0.21	33	−4.00 to −3.81	9
−0.20 to −0.01	31	−3.80 to −3.61	12
0.00 to 0.20	31	−3.60 to −3.41	21
0.21 to 0.40	19	−3.40 to −3.21	27
0.41 to 0.60	20	−3.20 to −3.01	23
0.61 to 0.80	19	−3.00 to −2.81	36
0.81 to 1.00	8	−2.80 to −2.61	31
1.01 to 1.20	2	−2.60 to −2.41	38
1.21 to 1.40	1	−2.40 to −2.21	45
		−2.20 to −2.01	39
		−2.00 to −1.81	30
		−1.80 to −1.61	27
		−1.60 to −1.41	31
		−1.40 to −1.21	22
		−1.20 to −1.01	22
		−1.00 to −0.81	17
		−0.80 to −0.61	3
		−0.60 to −0.41	7
		−0.40 to −0.21	1
		−0.20 to −0.01	3
Total	463	Total	463
Arithmetic mean	−0.72%		−2.40%
Median	−0.72%		−2.34%
Standard deviation	0.83%		1.06%
Coefficient of variation	1.15		0.44

TABLE 24, continued

EXCESS NEW YORK OVER LONDON		EXCESS NEW YORK OVER BERLIN	
Class	*Frequency*	*Class*	*Frequency*
—0.40 to —0.21	3	—2.40 to —2.21	1
—0.20 to —0.01	4	—1.60 to —1.41	2
0.00 to 0.20	5	—1.40 to —1.21	0
0.21 to 0.40	11	—1.20 to —1.01	2
0.41 to 0.60	13	—1.00 to —0.81	2
0.61 to 0.80	12	—0.80 to —0.61	5
0.81 to 1.00	19	—0.60 to —0.41	3
1.01 to 1.20	25	—0.40 to —0.21	5
1.21 to 1.40	27	—0.20 to —0.01	13
1.41 to 1.60	23	0.00 to 0.20	14
1.61 to 1.80	42	0.21 to 0.40	14
1.81 to 2.00	36	0.41 to 0.60	19
2.01 to 2.20	36	0.61 to 0.80	21
2.21 to 2.40	37	0.81 to 1.00	24
2.41 to 2.60	28	1.01 to 1.20	35
2.61 to 2.80	30	1.21 to 1.40	32
2.81 to 3.00	24	1.41 to 1.60	31
3.01 to 3.20	12	1.61 to 1.80	33
3.21 to 3.40	15	1.81 to 2.00	30
3.41 to 3.60	9	2.01 to 2.20	21
3.61 to 3.80	15	2.21 to 2.40	36
3.81 to 4.00	3	2.41 to 2.60	31
4.01 to 4.20	12	2.61 to 2.80	22
4.21 to 4.40	3	2.81 to 3.00	18
4.41 to 4.60	4	3.01 to 3.20	12
4.61 to 4.80	5	3.21 to 3.40	9
4.81 to 5.00	2	3.41 to 3.60	9
5.21 to 5.40	1	3.61 to 3.80	4
5.61 to 5.80	2	3.81 to 4.00	4
6.41 to 6.60	1	4.01 to 4.20	1
6.61 to 6.80	2	4.21 to 4.40	2
6.81 to 7.00	1	4.41 to 4.60	0
9.21 to 9.40	1	4.61 to 4.80	2
		4.81 to 5.00	1
		5.01 to 5.20	1
		5.21 to 5.40	2
		6.41 to 6.60	1
		7.61 to 7.80	1
Total	463	Total	463
Arithmetic mean	+2.17%		+1.68%
Median	+2.06%		+1.65%
Standard deviation	1.21%		1.19%
Coefficient of variation	0.56		0.71

TABLE 24, continued

EXCESS NEW YORK CALL MONEY RATE OVER LONDON OPEN MARKET DISCOUNT RATE

Class	Frequency	Class	Frequency
−2.80 to −2.61	2	2.81 to 3.00	6
−2.60 to −2.41	2	3.01 to 3.20	8
−2.40 to −2.21	2	3.21 to 3.40	6
−2.20 to −2.01	1	3.41 to 3.60	3
−2.00 to −1.81	6	3.61 to 3.80	4
−1.80 to −1.61	2	3.81 to 4.00	3
−1.60 to −1.41	11	4.01 to 4.20	4
−1.40 to −1.21	13	4.21 to 4.40	2
−1.20 to −1.01	14	4.41 to 4.60	3
−1.00 to −0.81	22	4.61 to 4.80	—
−0.80 to −0.61	14	4.81 to 5.00	6
−0.60 to −0.41	13		
−0.40 to −0.21	23		
−0.20 to −0.01	26	5.01 to 5.40	1
0.00 to 0.20	25	5.41 to 5.80	1
0.21 to 0.40	32	5.81 to 6.20	1
0.41 to 0.60	31	6.21 to 6.60	3
0.61 to 0.80	22	6.61 to 7.00	2
0.81 to 1.00	17	7.01 to 7.40	1
1.01 to 1.20	25	7.41 to 7.80	3
1.21 to 1.40	19	7.81 to 8.20	1
1.41 to 1.60	18	8.21 to 8.60	3
1.61 to 1.80	13	8.61 to 9.00	1
1.81 to 2.00	10		
2.01 to 2.20	12	10.61 to 11.00	1
2.21 to 2.40	6	12.61 to 13.00	2
2.41 to 2.60	5	13.01 to 13.40	1
2.61 to 2.80	10	16.61 to 17.00	1
		Total	463

Arithmetic mean	+1.05%
Median	+0.55%
Standard deviation	2.32%
Coefficient of variation	2.21

TABLE 24, continued

Postwar, January 1925–December 1938

EXCESS PARIS OVER LONDON		EXCESS BERLIN OVER LONDON	
Class	*Frequency*	*Class*	*Frequency*
—4.40 to —4.01	1	—0.21 to —0.01	1
—4.00 to —3.61	3	0 to +0.20	5
—3.60 to —3.21		+0.21 to +0.40	5
—3.20 to —2.81	1	+0.41 to +0.60	2
—2.80 to —2.41	4	+0.61 to +0.80	1
—2.40 to —2.01	5	+0.81 to +1.00	2
—2.00 to —1.61	7	+1.01 to +1.20	6
—1.60 to —1.21	11	+1.21 to +1.40	3
—1.20 to —0.81	15	+1.41 to +1.60	9
—0.80 to —0.41	4	+1.61 to +1.80	3
—0.40 to —0.01	12	+1.81 to +2.00	6
0 to +0.40	14	+2.01 to +2.20	12
+0.41 to +0.80	6	+2.21 to +2.40	33
+0.81 to +1.20	15	+2.41 to +2.60	23
+1.21 to +1.60	13	+2.61 to +2.80	7
+1.61 to +2.00	17	+2.81 to +3.00	15
+2.01 to +2.40	8	+3.01 to +3.20	8
+2.41 to +2.80	12	+3.21 to +3.40	7
+2.81 to +3.20	4	+3.41 to +3.60	10
+3.21 to +3.60	8	+3.61 to +3.80	5
+3.61 to +4.00	1	+3.81 to +4.00	1
+4.01 to +4.40	1	+4.01 to +4.20	1
+4.41 to +4.80	3	+4.21 to +4.40	
+4.81 to +5.20	3	+4.41 to +4.60	1
		+5.81 to +6.00	1
		+7.41 to +7.60	1
Total	168	Total	168
Arithmetic mean	+0.67%		+2.35%
Median	+0.83%		+2.38%
Mode	+1.15%		+2.44%
Standard deviation	1.94%		1.03%
Coefficient of variation	+2.90		+0.44

(table continues)

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TABLE 24, continued

| EXCESS PARIS OVER BERLIN | | EXCESS PARIS OVER NEW YORK | |
Class	Frequency	Class	Frequency
−10.40 to −10.01	1	−2.80 to −2.41	7
−7.60 to −7.21	1	−2.40 to −2.01	12
−7.20 to −6.81		−2.00 to −1.61	14
−6.80 to −6.41	1	−1.60 to −1.21	12
−6.40 to −6.01	2	−1.20 to −0.81	18
−6.00 to −5.61		−0.80 to −0.41	6
−5.60 to −5.21	1	−0.40 to −0.01	10
−5.20 to −4.81	4	0 to +0.40	5
−4.80 to −4.41		+0.41 to +0.80	10
−4.40 to −4.01	4	+0.81 to +1.20	6
−4.00 to −3.61	13	+1.21 to +1.60	14
−3.60 to −3.21	14	+1.61 to +2.00	14
−3.20 to −2.81	13	+2.01 to +2.40	12
−2.80 to −2.41	13	+2.41 to +2.80	11
−2.40 to −2.01	9	+2.81 to +3.20	6
−2.00 to −1.61	20	+3.21 to +3.60	4
−1.60 to −1.21	11	+3.61 to +4.00	
−1.20 to −0.81	6	+4.01 to +4.40	
−0.80 to −0.41	7	+4.41 to +4.80	3
−0.40 to −0.01	6	+4.81 to +5.20	4
0 to +0.40	13		
+0.41 to +0.80	7		
+0.81 to +1.20	7		
+1.21 to +1.60	4		
+1.61 to +2.00			
+2.01 to +2.40	6		
+2.41 to +2.80	4		
+2.81 to +3.20	1		
Total	168	Total	168
Arithmetic mean	−1.70%		+0.40%
Median	−1.84%		+0.40%
Mode	−2.12%		+0.40%
Standard deviation	2.14%		1.94%
Coefficient of variation	−1.26		+4.85

TABLE 24, continued

EXCESS NEW YORK OVER LONDON		EXCESS NEW YORK OVER BERLIN	
Class	*Frequency*	*Class*	*Frequency*
−2.80 to −2.61	1	−10.00 to −9.81	1
−2.60 to −2.41	1	−6.80 to −6.61	1
−2.40 to −2.21	1	−6.60 to −6.41	
−2.20 to −2.01		−6.40 to −6.21	
−2.00 to −1.81	1	−6.20 to −6.01	1
−1.80 to −1.61	1	−6.00 to −5.81	
−1.60 to −1.41	1	−5.80 to −5.61	
−1.40 to −1.21		−5.60 to −5.41	
−1.20 to −1.01		−5.40 to −5.21	
−1.00 to −0.81		−5.20 to −5.01	
−0.80 to −0.61	3	−5.00 to −4.81	
−0.60 to −0.41	5	−4.80 to −4.61	2
−0.40 to −0.21	20	−4.60 to −4.41	
−0.20 to −0.01	19	−4.40 to −4.21	1
0 to +0.20	35	−4.20 to −4.01	3
+0.21 to +0.40	20	−4.00 to −3.81	5
+0.41 to +0.60	20	−3.80 to −3.61	
+0.61 to +0.80	9	−3.60 to −3.41	
+0.81 to +1.00	8	−3.40 to −3.21	1
+1.01 to +1.20	11	−3.20 to −3.01	2
+1.21 to +1.40	2	−3.00 to −2.81	11
+1.41 to +1.60	5	−2.80 to −2.61	13
+1.61 to +1.80	3	−2.60 to −2.41	6
+1.81 to +2.00	1	−2.40 to −2.21	30
+2.01 to +2.20	1	−2.20 to −2.01	14
		−2.00 to −1.81	29
		−1.80 to −1.61	4
		−1.60 to −1.41	4
		−1.40 to −1.21	5
		−1.20 to −1.01	7
		−1.00 to −0.81	3
		−0.80 to −0.61	7
		−0.60 to −0.41	5
		−0.40 to −0.21	10
		−0.20 to −0.01	3
Total	168	Total	168
Arithmetic mean	+0.24%		−2.11%
Median	+0.18%		−2.10%
Mode	+0.03%		−2.08%
Standard deviation	0.71%		1.22%
Coefficient of variation	+2.96		−0.58

(table continues)

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TABLE 24, concluded

EXCESS NEW YORK CALL MONEY RATE OVER LONDON OPEN MARKET RATE	
Class	*Frequency*
−3.60 to −3.41	1
−3.40 to −3.21	1
−3.20 to −3.01	2
−3.00 to −2.81	1
−2.80 to −2.61	1
−2.60 to −2.41	
−2.40 to −2.21	
−2.20 to −2.01	
−2.00 to −1.81	1
−1.80 to −1.61	
−1.60 to −1.41	
−1.40 to −1.21	
−1.20 to −1.01	4
−1.00 to −0.81	
−0.80 to −0.61	6
−0.60 to −0.41	9
−0.40 to −0.21	11
−0.20 to −0.01	13
0 to +0.20	34
+0.21 to +0.40	16
+0.41 to +0.60	34
+0.61 to +0.80	5
+0.81 to +1.00	2
+1.01 to +1.20	4
+1.21 to +1.40	3
+1.41 to +1.60	2
+1.61 to +1.80	1
+1.81 to +2.00	
+2.01 to +2.20	2
+2.21 to +2.40	2
+2.41 to +2.60	2
+2.61 to +2.80	4
+2.81 to +3.00	1
+3.01 to +3.20	1
+3.21 to +3.40	
+3.41 to +3.60	
+3.61 to +3.80	3
+3.81 to +4.00	1
+4.01 to +4.20	
+4.21 to +4.40	1
Total	168

Arithmetic mean	0.33%
Median	0.20%
Mode	−0.06%
Standard deviation	1.21%
Coefficient of variation	3.67

TABLE 25

Relative Heights of Short-Term Rates Expressed as Percentages
of the Total Period[a]

Pairs of Countries	Prewar[b]	Postwar[c]
London higher than Paris	62.2	36.9
Berlin higher than Paris	81.9	76.2
New York higher than Paris	100.0	47.6
New York higher than Berlin	96.1	00.0
New York higher than London	98.9	67.3
Berlin higher than London	72.8	99.4

[a] All data are seasonally corrected except for Paris–Berlin, Paris–New York, and New York–Berlin after World War I when the data showed no seasonal fluctuations.
[b] January 1876 to July 1914 inclusive.
[c] January 1925 to December 1938 inclusive.

dication of strength. This conclusion will be supported later. It seems to contradict the generally held opinion that London was the world's money center.[7] There are ways, however, to reconcile these two views: for that it will be necessary to distinguish between the stocks of capital and gold, etc. (in Paris), and the machinery for setting monetary funds into motion and getting them to the critical places in time (the function of London).

For the post–World War I period we find Berlin—not surprisingly—in nearly all cases higher than New York and London, but there is no longer any one center as uniquely placed as Paris was before 1914 in the sense of having consistently the lowest rate. The frequency distributions for 1925–1939 bring this out clearly.

If the interest rates were independent, one would expect the variance of the differential to equal the sum of the variances of the two rates. If the rates are correlated, the variance of the differential will be less than this sum. Hence it is of interest to compare the two, as in Table 26. In every case the differential is less variable than would be expected if the rates were independent.

So far we have discussed seasonally uncorrected data (except in Table 25). Table 27 shows the seasonal indexes for the six series (1876–1939) using the American commercial paper rate only. Both

[7] This ought to be compared with the situation for long-term rates, where the opposite is the case. Cf. the discussion on page 495 ff. and Table 123; Table 124 gives a comprehensive picture of all types of interest rates and their differentials discussed in this work.

TABLE 26

Actual and Expected Variances of the Short-Term Interest Rate Differentials

	Actual standard deviation of differentials	Estimated standard deviation of differentials if rates were independent[a]
	Prewar	
Paris–London	0.87	1.33
Berlin–London	0.82	1.56
Paris–Berlin	0.83	1.24
Paris–New York	1.07	1.28
London–New York	1.19	1.59
Berlin–New York	1.17	1.52
London–New York (call money)	2.18	2.76
	Postwar	
Paris–London	1.94	2.37
Berlin–London	1.03	2.53
Paris–Berlin	2.14	2.30
Paris–New York	1.94	2.32
London–New York	0.71	2.54
Berlin–New York	1.22	2.47
London–New York (call money)	1.21	2.89

[a] Computed as $\sigma^2 + \sigma_b^2$ from Table 24.

pre- and postwar are covered, but for Paris–Berlin, Paris–New York and New York–Berlin there are no seasonal fluctuations after 1925. The method of computation is, as before that of the National Bureau of Economic Research, but the indexes of this table are not directly comparable with those of others, notably not with Table 11. The reason for this is that the present indexes are additive, while the former are multiplicative. This means that the present table indicates in each month how much has to be added (or subtracted) from the uncorrected percentages—in which the differentials appear—in order to get the corrected differentials.

As to the duration of the cycles we refer solely to Tables 28 and 29, where we note mainly the comparative equality in the length of both phases in the majority of cases.

In general the short-term differentials lagged behind the reference cycles of the countries concerned. This reflected, of course, the lag of the short-term interest rates themselves, as noted in the pre-

ceding chapter. This lag of the differentials was least noticeable relative to the French reference cycles.

The American relationships also showed some deviations, the United States–British differential leading at the trough of the pre-1914 British reference cycles and the United States–German differential showing some lead at the trough of the pre-1914 United States reference cycles.

At this point we refer the reader to Chart 6 in which is shown, for each of the four money centers separately, a curve indicating whose the maximum differential was in each market. In other words we record the greatest difference prevailing each month and indicate that other of the three markets against which it applied. These curves show in which direction and to which extent a pull on short-term funds was exercised. From the fact that notably in the early years it was often the *same* other center against which a maximum difference obtained, we derive a notion of relative strength and weakness of markets (which we shall also measure by other means elsewhere). When at least the place names change frequently, as is often the case for London, we may state that we deal with a more "normal" situation, i.e., one where a considerable give-and-take is the rule. Furthermore the same conclusion would be drawn when there is a frequent change from positive to negative differences. In that case we may say that money flows most likely alternated between the given center and the stated respective counterpart. The appearance, on the other hand, of one and the same market with always the same sign, for several years without interruption, is an indication of malfunctioning and lack of response. This is true, e.g., for London–Paris for 1906–1913 when London was always at its highest (of all) against Paris. Even more notable is the relationship New York–Paris for a much greater number of years. The period after World War I shows again the great break that occurred, both in regard to the stability of relationships (not a sign of equilibrium!) and the extent of the deviations where the latter previously had tended to narrow.

Section 3. The Absolute Maxima

It is now necessary to examine the *absolute maxima* of the differentials—as we call them in distinction from the *local extrema,* i.e., those observed when rates in a particular money market are compared with those in each of the others. In this way we expect to

TABLE 27
Seasonal Indexes of Short-Term Interest Rate Differentials, 1876–1939

MONTHS	PARIS–LONDON	PARIS–BERLIN					BERLIN–LONDON			PARIS–NEW YORK[a]		NEW YORK[a]–BERLIN JULY			NEW YORK[a]–LONDON	
	1887–1913	1876–1883	1884–1890	1891–1899	1900–1906	1907–1914	1877–1888	1889–1900	1901–1913	1876–1895	1896–1914	1876–1883	1884–1892	1899–1914	1877–1890	1891–1913
Jan.	+0.12	+0.30	+0.21	+0.31	+0.65	+0.58	−0.15	−0.15	−0.53	+0.27	+0.49	+0.05	+0.02	+0.06	−0.27	−0.38
Feb.	−0.09	+0.75	+0.39	+0.67	+0.63	+0.21	−0.76	−0.67	−0.48	+0.40	+0.42	+0.49	−0.01	0	−0.57	−0.50
Mar.	−0.01	+0.59	0	+0.40	+0.03	−0.35	−0.48	−0.13	+0.12	−0.12	+0.04	+0.91	+0.06	−0.24	+0.08	−0.04
Apr.	+0.38	+0.35	+0.23	+0.63	+0.55	−0.43	+0.14	−0.16	−0.14	−0.14	+0.35	+0.48	+0.01	+0.12	+0.39	0
May	+0.18	+0.31	+0.21	+0.24	+0.04	+0.12	+0.03	−0.19	+0.15	+0.31	+0.26	−0.18	−0.03	−0.19	0	−0.23
June	+0.42	−0.05	−0.23	−0.07	−0.30	−0.15	+0.58	+0.63	+0.49	+0.24	+0.22	−0.64	−0.47	−0.42	+0.07	+0.14
July	+0.62	−0.02	+0.47	+0.41	+0.18	+0.31	+0.59	+0.22	+0.19	+0.51	−0.02	−0.80	+0.17	+0.31	+0.12	+0.63
Aug.	−0.08	+0.05	+0.35	−0.13	−0.17	−0.03	−0.25	−0.15	+0.07	−0.25	−0.55	+0.15	+0.53	+0.44	+0.19	+0.67
Sept.	−0.26	−0.87	−0.31	−0.65	−0.50	−0.30	+0.20	+0.26	+0.35	−0.80	−0.69	−0.14	+0.37	+0.24	+0.19	+0.71
Oct.	−0.30	−0.77	−0.33	−0.45	−0.23	+0.06	+0.22	+0.04	−0.14	−0.39	−0.38	−0.14	+0.01	+0.23	+0.23	+0.13
Nov.	−0.48	−0.49	−0.39	−0.60	−0.31	−0.27	+0.12	−0.06	−0.23	−0.16	−0.07	−0.15	−0.25	−0.23	+0.12	−0.63
Dec.	−0.47	−0.18	−0.70	−0.78	−0.58	−0.60	−0.20	+0.43	+0.15	−0.20	−0.11	−0.03	−0.41	−0.33	−0.17	−0.51
Total deviations	3.41	3.24	2.54	2.90	2.46	2.36	3.72	3.14	3.04	2.82	2.36	3.42	2.00	1.72	2.77	4.55

[a] New York commercial paper rate.

TABLE 27, concluded

MONTHS	PARIS–LONDON		PARIS–BERLIN	BERLIN–LONDON			PARIS–NEW YORK[a]	NEW YORK–BERLIN	NEW YORK–LONDON	
	1925–1929	1930–1939	1925–1939	1915–1924	1925–1933	1934–1939	1925–1939	1915–1939	1914–1933	1934–1939
Jan.	+0.11	−0.22	original data are used	0.0	−0.07	+0.09	original data are used	original data are used	−0.09	+0.06
Feb.	−0.14	−0.03		−0.02	−0.42	+0.11			−0.03	+0.09
Mar.	−0.36	+0.23		+0.12	−0.10	+0.06			+0.07	+0.02
Apr.	−0.33	+0.40		+0.20	−0.15	+0.06			+0.20	+0.04
May	−0.15	+0.48		+0.20	+0.08	+0.06			+0.16	+0.03
June	0.0	+0.67		+0.09	+0.24	0.0			+0.14	−0.13
July	−0.01	+0.20		−0.05	+0.16	−0.18			−0.02	+0.01
Aug.	+0.18	−0.16		−0.06	+0.10	0.0			−0.15	+0.04
Sept.	+0.27	−0.33		−0.05	+0.13	0.0			+0.05	−0.03
Oct.	+0.10	−0.43		+0.04	+0.07	+0.01			+0.03	−0.03
Nov.	+0.25	−0.33		−0.15	−0.06	+0.07			−0.17	+0.04
Dec.	+0.13	−0.50		−0.02	+0.05	−0.14			−0.15	−0.16
Deviations	2.01	0.98		0.86	1.63	0.83			1.26	0.68

[a] New York commercial paper rate.

TABLE 28
Specific Cycles of Short-Term Interest Rate Differentials, 1877–1914

EXCESS NEW YORK COMMERCIAL PAPER RATE OVER LONDON DISCOUNT RATE		EXCESS BERLIN PRIVATE DISCOUNT RATE OVER LONDON DISCOUNT RATES		EXCESS PARIS OPEN MARKET RATE OVER LONDON DISCOUNT RATE	
Peak	*Trough*	*Peak*	*Trough*	*Peak*	*Trough*
	Aug. 1878		Oct. 1878	Oct. 1876	Oct. 1878
Sept. 1879	Feb. 1882	Oct. 1879	July 1883	Nov. 1880	July 1883
July 1884	Apr. 1885	June 1885	Sept. 1887	Oct. 1885	Nov. 1890
July 1887	Oct. 1890	Jan. 1896	Apr. 1898	Nov. 1894	Nov. 1896
July 1893	July 1894	Feb. 1899	Sept. 1902	May 1897	Apr. 1898
Aug. 1896	Aug. 1900	Oct. 1904	May 1906	Feb. 1899	Dec. 1899
Nov. 1902	Aug. 1904	Apr. 1908	Apr. 1910	Nov. 1904	Nov. 1906
Mar. 1908	Oct. 1911			Sept. 1908	Apr. 1910
				Nov. 1911	July 1912
				Feb. 1914	

EXCESS PARIS OPEN MARKET RATE OVER NEW YORK COMMERCIAL PAPER RATE		EXCESS NEW YORK COMMERCIAL PAPER RATE OVER BERLIN OPEN MARKET DISCOUNT RATE		EXCESS PARIS OVER BERLIN OPEN MARKET RATE	
Peak	*Trough*	*Peak*	*Trough*	*Peak*	*Trough*
	Oct. 1877		Nov. 1878		Nov. 1877
Jan. 1879	Aug. 1879	Aug. 1879	Jan. 1882	Nov. 1881	Dec. 1882
June 1881	Mar. 1883	Sept. 1883	Apr. 1885	Dec. 1888	Nov. 1890
Sept. 1885	July 1887	Sept. 1887	Oct. 1890	Jan. 1892	Sept. 1893
Dec. 1888	Dec. 1890	July 1893	Dec. 1893	Nov. 1894	Nov. 1899
Apr. 1892	July 1893	Aug. 1896	Dec. 1898	July 1902	Dec. 1907
Oct. 1894	Oct. 1896	Sept. 1902	Nov. 1904	Dec. 1908	June 1913
Dec. 1898	Aug. 1903	May 1906	May 1908		
Nov. 1904	Dec. 1907	June 1910	Nov. 1911		
Dec. 1908	July 1910				
Nov. 1911	Oct. 1912				

TABLE 29

Number and Duration of Specific Cycles of Short-Term Interest Rate Differentials, 1878–1914[a]

	NUMBER OF:			AVERAGE DURATION OF SPECIFIC CYCLES (*months*)			AVERAGE PER CENT OF DURATION OF SPECIFIC CYCLES	
	Expansions[b]	*Contractions*[b]	*Full cycles*	*Expansion*	*Contraction*	*Full cycle*	*Expansion*	*Contraction*
New York–London Aug. 1878–Oct. 1911	7	7	7	28.1	28.7	56.8	49.4	50.4
Paris–New York Jan. 1879–Nov. 1911	9	9	9	18.8	25.0	43.8	42.9	57.1
New York–Berlin Aug. 1879–June 1910	7	7	7	28.9	24.0	52.9	54.6	45.4
Berlin–London Oct. 1878–Apr. 1910	6	6	6	32.2	30.8	63.0	51.1	48.9
Paris–London Oct. 1876–Feb. 1914	9	9	9	26.1	23.7	49.8	52.4	47.6
Paris–Berlin Nov. 1881–Dec. 1908	5	5	5	28.8	36.2	65.0	44.3	55.7

[a] No specific cycles have been determined for the postwar period.
[b] The distinction between expansions and contractions is arbitrary.

obtain information about the greatest pull exercised by interest rates in each month on the short-term funds of all our (international) money markets, when these are viewed together.

We expect to find information about two things:

(a) A series of absolute maxima should corroborate our general information essentially about *world* tensions in money markets coincident with great international crises; in addition they may perhaps reveal further tensions not generally recorded. All this is subject to the restrictions which must be imposed upon time series of this kind (cf. Chapter I, section 2, and Chapter VII below for an application).

(b) The absolute maxima should show a downward trend factor which would corroborate our general information about a systematic development of the money markets in the direction of greater unification. This would also make the hypothesis plausible

CHART 6

Differential Maxima of Short-Term Interest Rates, Prewar and Postwar, 1876–1914, 1925–1938

Maximum Differential of Paris over New York, over Berlin, and over London
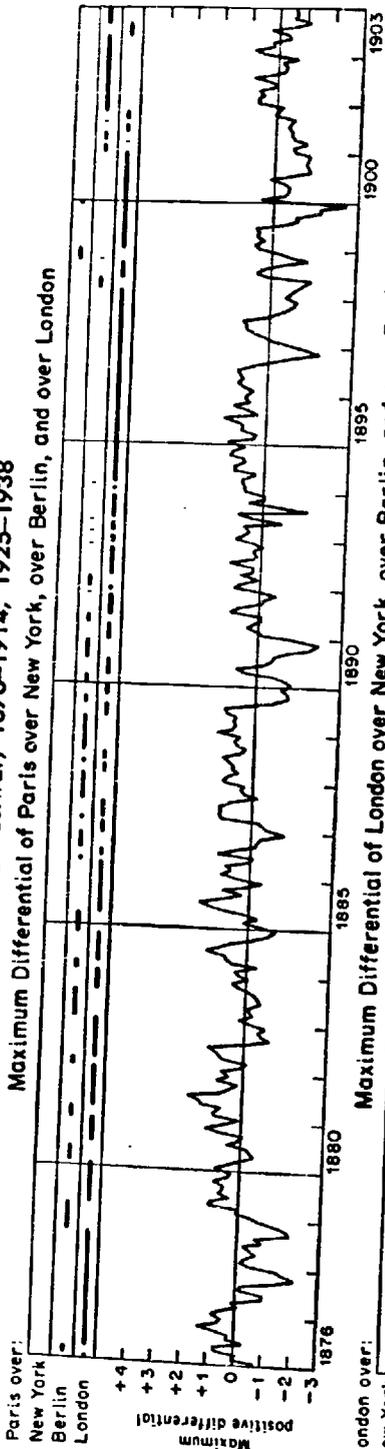
Maximum Differential of London over New York, over Berlin, and over Paris
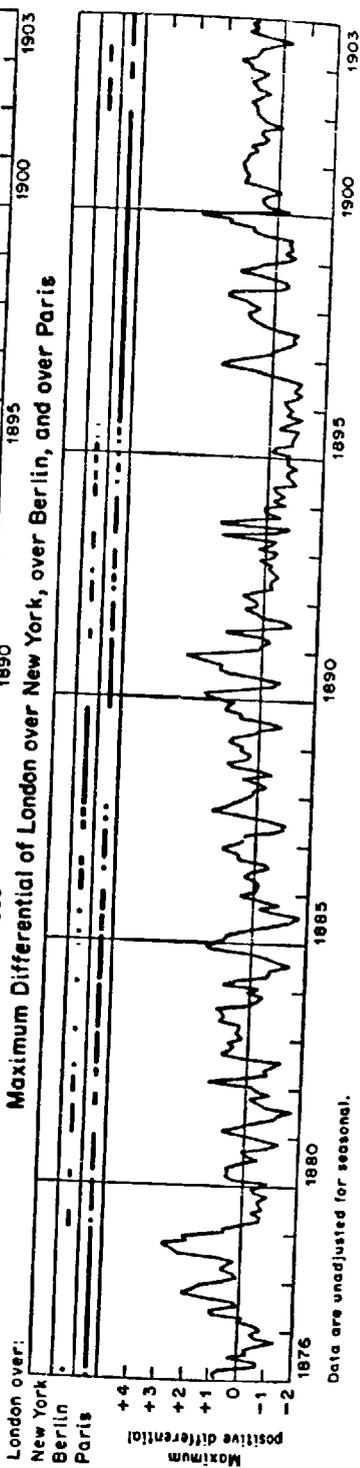
Data are unadjusted for seasonal.

CHART 6, concluded

Maximum Differential of Paris over New York, over Berlin, and over London

Paris over:
New York
Berlin
London

+4
+3
+2
+1
0
-1
-2
-3

Maximum positive differential

1902   1905   1910   1914

1925   1930   1935   1938

Maximum Differential of London over New York, over Berlin, and over Paris

London over:
New York
Berlin
Paris

+4
+3
+2
+1
0
-1
-2

Maximum positive differential

1902   1905   1910   1914

1925   1930   1935   1938
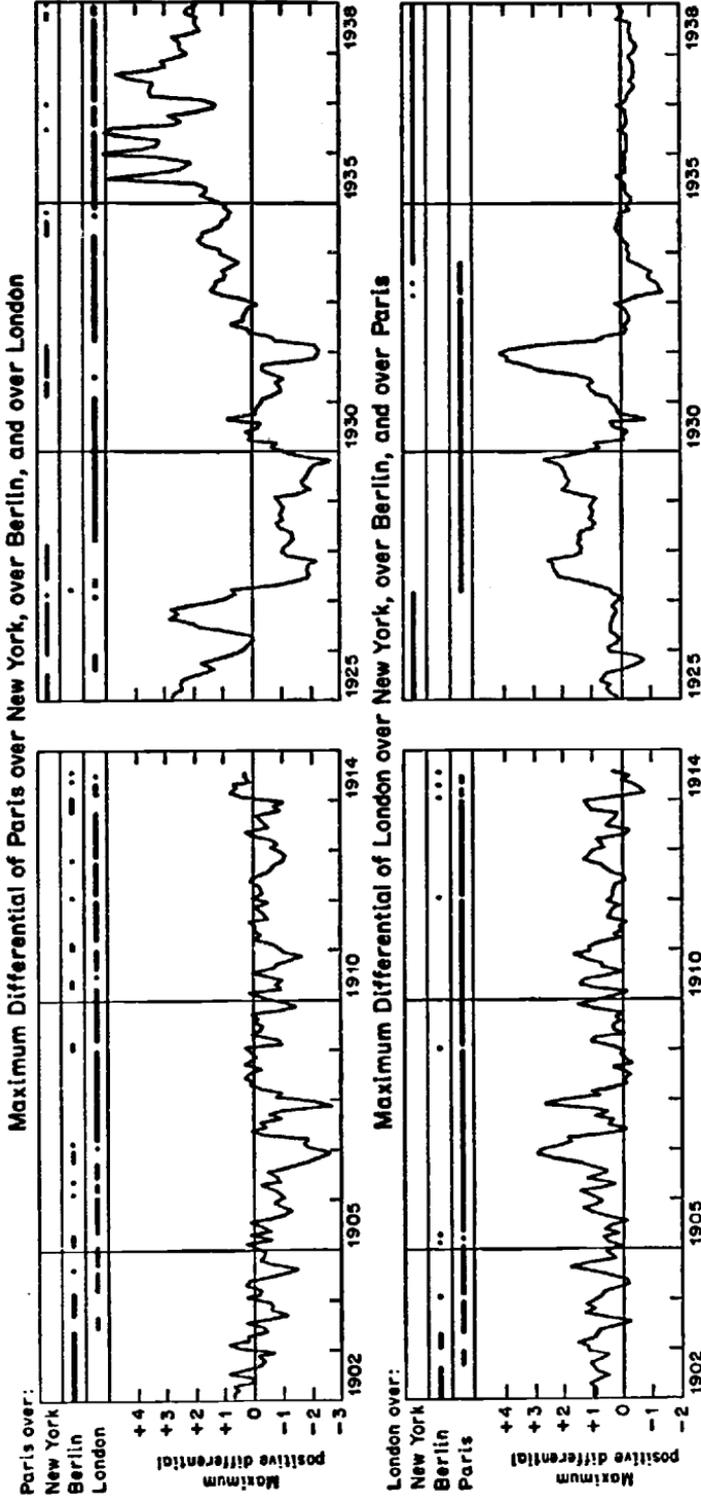
Data are unadjusted for seasonal.

Dots or lines on top of the chart identify the money market producing the maximum.
Source: NBER interest rate series.

that during the time covered by our statistics the volume of international short-term lending increased, as is indeed often assumed.

The data are obtained from the same set of figures used before, i.e., they are taken from the differentials which are uncorrected for seasonal variations (if any). The values are necessarily always positive, since they show the greatest existent gaps between the highest and lowest interest rates of each successive month (cf. Tables 30 and 31, yearly data).

Although artificially constructed, these series do not lack direct intuitive meaning: while obtained by a process of selection from six relative positions of four original series, the absolute maxima indicated to each operator in the short-term capital market the strength of the greatest pull and its direction. All this is under the assumption that interest rates really did decide such flows, though not necessarily to the exclusion of other factors, such as exchange rates, differences in price levels, etc. Such comparisons were constantly made on all markets by the interested parties. To what extent they influenced their actions is of course an additional question.

When we set out to determine the most likely flows among money markets, by restricting ourselves to four we neglect the flows to and from others. The four markets taken were undoubtedly the largest before 1914 and still overweighed all others after 1925, although some new markets had become larger (notably Zürich and Amsterdam). Thus the inclusion of, say, St. Petersburg and Vienna, would have resulted in still higher absolute maxima than those of New York over one of the three European markets. But it would be hard to conclude that such a differential would have described the strongest pull, in spite of the possibility of these higher interest rate countries also being on the gold standard. The risk factor more or less allows us to classify the various countries into groups. There is therefore little doubt that most large countries before 1914 outside our four could definitely not be included in this tabulation. With all the reservations it entails, we can speak of the most likely flows of funds and of largest and smallest interest rate gaps in the world, though dealing only with our four money markets.[*]

In interpreting we make two initial observations:

First. World War I brings a sharp change, as before. In the prewar period a seldom broken absolute maximum existed between

[*] Similar calculations were made for long-term interest rate differentials. Cf. Chapter IX, section 4, especially Charts 63 and 64 showing the trend.

TABLE 30

Absolute Maxima of Short-Term Interest Rate Differentials for Six Pairs of Countries, Seasonally Uncorrected Data

(annual values)

Year	Maxima maximorum	Countries	Months	Minima maximorum	Countries	Months	Range	Average
				Prewar				
1876	4.76	NY-L	Oct.	2.55	NY-B	Feb.	2.21	3.46
1877	5.35	NY-P	Oct.	2.25	NY-P	May	3.10	3.58
1878	4.09	NY-P	Jan.	1.74	NY-P	July	2.35	2.85
1879	4.75	NY-L	Sept.	1.62	NY-P / NY-B	Jan. / Feb.	3.13	3.41
1880	3.64	NY-L	Jan.	2.35	NY-P	June	1.29	3.10
1881	3.28	NY-B	Mar.	1.67	NY-L	June	1.61	2.40
1882	3.60	NY-P	Oct.	1.28	NY-L	Jan.	2.32	2.62
1883	3.88	NY-P	Mar.	2.12	NY-P	July	1.76	3.03
1884	4.78	NY-L	July	2.34	NY-P	Mar.	2.44	3.28
1885	2.72	NY-L	June	1.33	NY-L	Apr.	1.39	2.17
1886	4.00	NY-P	Sept.	2.22	NY-L	Jan.	1.78	2.96
1887	4.86	NY-P	Sept.	2.23	NY-P	Feb.	2.63	3.85
1888	3.93	NY-L	Apr.	1.47	NY-B	Dec.	2.46	2.87
1889	3.45	NY-P	Oct.	2.29	NY-L	May	1.16	2.93
1890	4.49	NY-P	Dec.	2.34	NY-P	June	2.15	3.11
1891	4.06	NY-L	Aug.	2.40	NY-B	Apr.	1.66	3.08
1892	3.70	NY-L	Sept.	2.07	NY-L	June	1.63	2.72
1893	9.36	NY-L	July	1.96	B-P	Dec.	7.40	5.02
1894	2.73	NY-L	Sept.	1.63	NY-B	Feb.	1.10	2.07
1895	4.16	NY-L	Oct.	1.98	NY-L	May	2.18	2.87
1896	6.89	NY-L	Aug.	2.78	B-P	Dec.	4.11	4.73
1897	2.58	NY-L	May	1.19	NY-P	Feb.	1.39	2.13
1898	3.81	NY-P	Apr.	1.31	NY-P	Jan.	2.50	2.32
1899	2.76	L-P	Dec.	1.00	B-P	July	1.76	1.90
1900	2.30	NY-P	Oct.	0.99	B-P	Apr.	1.31	1.61
1901	3.25	NY-P	Sept.	1.16	L-P	Feb.	2.09	1.89
1902	3.72	NY-P	Sept.	2.15	NY-B	Feb.	1.57	2.83
1903	3.72	NY-P	Aug.	2.08	NY-P	May	1.64	2.95
1904	2.99	NY-P	Sept.	1.55	NY-P	Nov.	1.44	2.11
1905	2.97	NY-P	Sept.	1.50	NY-P	Jan.	1.47	2.33
1906	3.97	NY-P	Sept.	2.36	NY-P	Jan.	1.61	3.00
1907	3.99	NY-P	Dec.	2.08	NY-P	June	1.91	3.00
1908	3.15	NY-P	Mar.	1.61	NY-L	Dec.	1.54	2.31
1909	2.79	NY-P	Aug.	1.48	NY-B	Jan.	1.31	2.22
1910	3.43	NY-P	July	2.13	NY-P	Jan.	1.30	2.64
1911	2.03	NY-P	Aug.	0.86	NY-P	Oct.	1.17	1.50
1912	2.81	NY-P	Oct.	0.57	NY-B	Jan.	2.24	1.69
1913	2.40	NY-P	Aug.	0.81	NY-P	Jan.	1.59	1.83
1914	1.95	NY-B	July	1.28	NY-B	May	0.67	1.59
				Postwar				
1925	4.69	B-NY	Jan.	2.37	B-NY	Dec.	2.32	3.77
1926	2.72	P-NY	Oct.	0.67	B-NY	Apr.	2.05	1.78

TABLE 30, continued

Year	Maxima maximorum	Countries	Months	Minima maximorum	Countries	Months	Range	Average
1927	4.87	B-P	Oct.	0.54	P-NY	Feb.	4.33	2.70
1928	4.08	B-P	Apr.	2.90	B-P	Dec.	1.18	3.52
1929	4.00	B-P	May June	2.30	B-P	Jan.	1.70	3.40
1930	2.80	B-P	Dec.	1.14	B-P	Aug.	1.66	2.10
1931	10.20	B-P	Aug.	2.86	B-P	Jan.	7.34	5.22
1932	5.19	B-P	Jan.	2.77	B-L	Dec.	2.42	3.74
1933	3.46	B-L	Aug.	2.72	B-L	Dec.	0.74	3.19
1934	3.16	B-L	Nov.	2.87	B-L	Jan.	0.29	2.98
1935	5.15	P-L	Dec.	2.40	B-L	Oct.	2.75	3.20
1936	5.05	P-L	May	2.25	B-NY	Dec.	2.80	3.30
1937	4.64	P-L	July	2.26	F-L	Dec.	2.38	3.31
1938	2.72	P-L	Apr.	2.13	B-NY	Sep.	0.59	2.36

NY = New York
L = London
P = Paris
B = Berlin

New York and one of the European markets. In the period after World War I we find Berlin generally taking the place of New York as the center with the highest rates, chiefly over Paris but frequently—and for long stretches—also over London, especially from 1932 onward.

Second, there exists an unmistakable downward trend shown in free-hand and based on the absolute and second maxima in the absolute maxima before World War I (see Chart 7, in which the uppermost curve plots their annual averages). This then confirms in a striking manner our expectation expressed above under (b). Now it is generally accepted by economists that when the volume of corresponding capital movements is increasing, the interest rate differential between markets—domestic or foreign—must be decreasing, each one being a function of the other.[1] In any case the hypothesis that there may be a high inverse correlation between a downward trend of short-term interest rates and the—statistically unknown—volume of foreign lending would seem to find support.

(5) For the postwar years there is, beginning in 1925, a clearly

[1] The possibility might exist that this may instead be due to a narrowing of the gold points. We find good reasons to doubt this (see pages 141 f). Besides, if the gold points had narrowed, a greater flow of capital would still have been the consequence for countries with extensive trade relations.

TABLE 31

Minima of Short-Term Interest Rate Differentials for Six Pairs of
Countries, Seasonally Uncorrected Data

(annual values)

Year	Maxima minimorum	Countries	Months	Minima minimorum	Countries	Months	Range	Average
				Prewar				
1876	1.26	B-P	Oct.	0.03	P-B	Feb.	1.23	0.52
1877	1.06	B-L	Sept.	0.14	P-L	Apr.	0.92	0.45
1878	0.48	L-P	May	0.10	B-L	Apr. July	0.38	0.26
1879	0.90	P-L	Oct.	0.00	P-B	Mar.	0.90	0.37
1880	0.81	P-L	Oct.	0.02	L-B	Apr.	0.79	0.23
1881	0.43	B-L	Sept.	0.05	B-P	Aug.	0.38	0.19
1882	0.67	P-L	Dec.	0.10	B-P	Mar. June	0.57	0.28
1883	0.46	P-L P-B	July Nov.	0.03	L-P	Dec.	0.43	0.21
1884	0.73	L-B	Nov.	0.03	B-P	Aug.	0.70	0.36
1885	0.58	B-P	June	0.06	P-B	July	0.52	0.25
1886	0.53	B-L	July	0.03	B-Y.	Jan. Apr.	0.50	0.18
1887	0.41	B-L	July	0.01	B-L	Jan.	0.40	0.20
1888	0.46	P-B	Aug.	0.08	B-L	Apr.	0.38	0.23
1889	0.89	L-P	Dec.	0.01	B-L	May	0.88	0.37
1890	1.03	B-L	Dec.	0.13	L-B	Oct.	0.90	0.52
1891	0.72	B-P P-L	June July	0.03	L-P	Feb.	0.69	0.21
1892	0.56	P-B B-L	July	0.02	L-P	Feb.	0.54	0.21
1893	0.76	B-P	July	0.02	L-P	Dec.	0.74	0.36
1894	0.58	B-P	Sept.	0.03	B-P	Dec.	0.55	0.26
1895	0.81	P-L	Dec.	0.12	B-P	May	0.69	0.47
1896	0.99	B-P	June	0.06	L-P	Sept.	0.93	0.60
1897	0.58	B-P	May July	0.05	NY-B	Jan.	0.53	0.34
1898	0.53	L-B	Apr.	0.07	NY-B	Jan.	0.46	0.24
1899	0.53	NY-P	June	0.02	NY-P	Jan.	0.51	0.16
1900	0.33	B-NY	Mar.	0.03	B-NY	July	0.30	0.17
1901	1.49	B-L	June	0.04	P-L B-NY	Mar. Oct.	0.45	0.19
1902	0.52	L-B	Dec	0.02	P-B	May	0.50	0.22
1903	0.65	L-P	Feb.	0.12	L-B	Sept.	0.53	0.36
1904	0.63	B-L	Sept.	0.14	B-P B-L	Apr. July	0.49	0.28
1905	0.69	L-P	Dec.	0.02	L-B B-L	Mar. Oct.	0.67	0.23
1906	0.52	B-L	Mar.	0.11	B-L	Jan.	0.41	0.30
1907	0.76	NY-B	Dec.	0.03	B-L	Jan.	0.73	0.34
1908	0.78	L-P	Jan.	0.03	P-L NY-B	May	0.75	0.24

TABLE 31, concluded

Year	Maxima minimorum	Countries	Months	Minima minimorum	Countries	Months	Range	Average
1909	0.62	B-L	Dec.	0.01	L-P	Jan.	0.61	0.25
1910	0.77	B-L	Sept.	0.01	P-L	July	0.76	0.23
1911	0.38	B-L	Aug.	0.03	L-B	Feb.		
					L-P	May	0.35	0.16
1912	0.75	B-L L-P	Sept.	0.01	P-B	Jan.	0.74	0.25
1913	0.46	L-B	Nov.	0.04	NY-B	May	0.42	0.20
1914	0.34	NY-B	Mar.	0.01	L-P	May	0.33	0.16
				Postwar				
1925	0.66	L-NY	May	0.03	P-L	Dec.	0.63	0.38
1926	0.31	B-L	May	0.01	P-L	Feb.	0.30	0.15
1927	0.43	L-NY	Aug.	0.01	B-NY	Jan.	0.42	0.23
1928	1.04	L-P	Aug.	0.07	NY-L	Mar.	0.97	0.66
1929	0.78	NY-L	May	0.03	L-NY	Oct.	0.75	0.42
1930	0.84	NY-L	Feb.	0.06	P-L	Apr.	0.78	0.25
1931	1.77	L-NY	Nov.	0.01	NY-L	June	1.76	0.59
1932	1.38	B-L	Jan.	0.09	P-L	July Nov.	1.29	0.40
1933	0.74	NY-P	Mar.	0.00	NY-P	Oct.	0.74	0.29
1934	0.28	NY-L	Nov.	0.01	L-NY	May	0.27	0.12
1935	0.39	NY-L	Jan.	0.01	NY-L	June Dec.	0.38	0.16
1936	0.20	NY-L	Jan. May	0.07	L-NY	June	0.13	0.17
1937	0.45	NY-L	Aug. Oct.	0.12	P-B	Dec.	0.33	0.34
1938	0.37	P-B	Apr.	0.00	L-NY	Oct.	0.37	0.20

P = Paris
B = Berlin
L = London
NY = New York

rising trend,[10] first up to 1931 when England went off the gold standard and Germany had introduced what is fully equivalent— exchange control; the trend continues unmistakably throughout the remaining years. We note again that, especially in the later period, the four countries manipulated their interest rates to a large extent. Sometimes this was done jointly even during the gold standard period as was the case between England and the United States in 1927 when the famous "easy money" policy was initiated. Never-

[10] Cf. Chapter IX, Charts 63 and 64 for the long-term rates.

CHART 7

Annual Averages of Short-Term Interest Rate Differentials, Prewar and Postwar, 1876–1914, 1925–1938
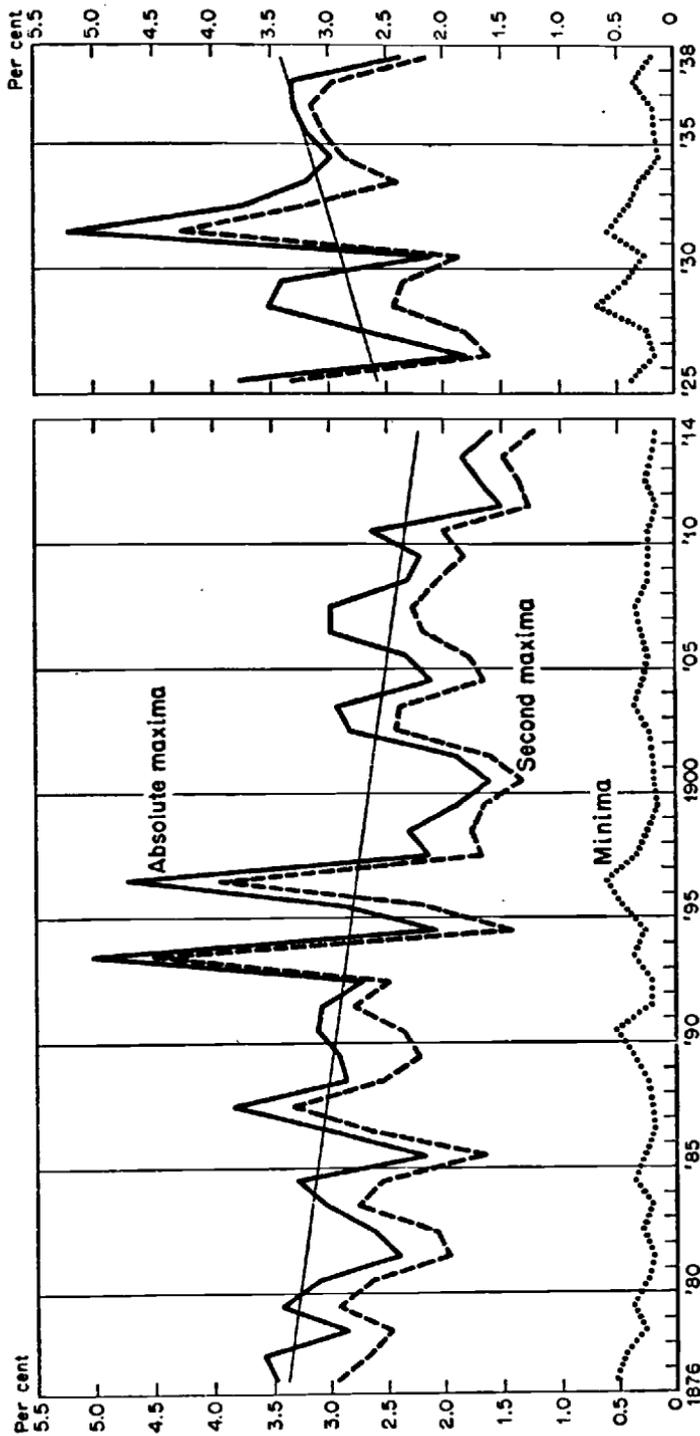
The second maxima is the average of the second highest values.

Source: Tables 30 and 31.

theless the outcome was an over-all rise in the maximal differentials, as revealed by Chart 7.

It might seem natural to conclude that short-term capital movements must have declined to an increasing extent as interest rates rose, just as previously we concluded the converse. Such a statement would seem rash in the light of our general information, which is however unfortunately not based on very good statistics. We know that up to 1931 there was an enormous flow of short-term funds, largely from the United States to Great Britain and to the continent, and also from Great Britain to the continent. This flow was of the traditional nature in the sense that it went from countries with low interest rates to those with higher rates. It was both a short-term and long-term movement. In spite of its extent and duration, the level of the absolute maxima kept on rising, at least as far as its trend is concerned.

After 1931 there came a return movement of these funds, though it was perhaps not large enough to have decisive influence upon the structure of short-term interest rates. In addition there arose a new movement, that of "hot money," consisting of very liquid funds that moved partly outside our four markets—although affecting every one of them in one way or another—chiefly by inclusion of the Swiss and Dutch markets. The picture is further complicated —and extended beyond the scope of the present statistics—by the rise in gold production and the great flow of gold to the United States due to the deliberate devaluation of the dollar. The fact remains that there were huge short-term capital movements and it is quite likely that they were not smaller than those in the years preceding the outbreak of war in 1914.

"Hot money" moved essentially for political reasons, among which we include the fear of devaluation of the various currencies. It moved counter to the interest rates, attracted by low ones as promising political stability and repelled by high or rising rates as heralding political upsets, confiscation, and devaluation. It was, so to say, money *hors commerce*," but nevertheless it profoundly influenced the general situation. This money was frequently obtained by changing from long-term holdings into short-term funds before they were moved; frequently they were movements of securities, accumulation of balances abroad from exports, etc. These flows tended to drive up the short-term rates where they were already high and to decrease them further in the other markets. We shall have to return to the problems which

this causes in our study on several other occasions (cf. pp. 154 ff.).

It would be erroneous, however, to believe that before 1914 there were no movements of short-term funds from high interest rate levels to low ones. Frequently debtor countries like Russia and Japan had gradually to transfer funds to Berlin, London, and Paris in view of impending coupon payments for their loans. These transfers were made irrespective of the momentary position of short-term rates. There had to be a deliberate sacrifice of interest. The Italian monetary policy too operated in a similar way when remittances of emigrants were not generally transferred to Italy, but instead allowed to accumulate at low interest in banks abroad. These funds were chiefly used for payment of Italian imports,[11] their ultimate destination.

(6) The trends observed are in interest rates, which are percentage figures. There seems to be a widespread opinion among economists that trends are very unlikely—or even impossible—where interest rates are involved.[12] And here they occur—complicating matters still further—even in the relative positions of four interest rates of an equal number of countries! This indicates once more how very careful one should be in making negative statements.

We state now the following alternative possibilities:

(a) A downward trend of the absolute maxima can be due to the fact that one interest rate, which for a long time stood above the others, showed a downward trend itself. This could be the case for the American rate, which gradually may have fallen to the level of the others. Obviously this is the simplest possibility. The New York rate would consistently appear as the highest component in the maximum-minimum pair, which makes up the absolute differential.

(b) A downward trend of the absolute maxima can be due to the fact that the consistently highest interest rate remains at the given level and the lowest interest rate rises trendlike to the level of the next lowest rate. Naturally the rates lying in between the extreme ones may also move upward, or there may be a slow downward movement of the highest rate, but the narrowing of the difference is not any longer due—as under (a)—to its movement alone, etc. In short it is clear that a great complexity of

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[11] This is well described in the important work by F. Somary, *Bankpolitik*, 3rd rev. ed. Tübingen, 1934, pp. 115–116.
[12] Though cf. Ricardo and the declining rate of "profits."

movements is possible, of which (a) is only a particularly simple limiting case.

Rising trends, such as observed for the postwar period, are taken care of by inverting these statements.

Now it is clear that there is nothing spurious in these changes. But there is a difference in significance and there remains an additional question.

In case (a) there is a genuine narrowing of interest rates. A rate is coming down to the level of the others—which perhaps are also falling. This is the development one would be looking for, rather than one of the more complicated nature of (b). It would show up in the statistics by the constancy of the two place names for which the maximum is observed over very long periods of time. It is indeed the case for the New York–Paris relationship.

The study of the data is best made from Charts 7 and 8 which also show the possible free-hand trends for both prewar and postwar periods. While the discussion will refer to some of the underlying monthly data, the chart is drawn for yearly data only. Chart 7, showing the averages, indicates the above-mentioned clear reversal in trends for pre- and postwar; while this is different for the ranges where no such definite trend materializes.

(7) For the absolute maxima we find the complete absence of any seasonal movements.[13] This is interesting in view of the fact that the six differentials themselves did produce seasonals, which we eliminated for some of our purposes. It would seem to indicate that the maximal tension between the international money markets, to the extent to which it is described by our data, is of such high lability as to exclude any annual regularity, which must be the product of rigidities in the markets. The wide fluctuations are proof of this lability, so that the absence of seasonals is not simply the outcome of a great steadiness in these market situations.

Recalling how these differentials are derived, seasonal variations cannot even be expected on empirical grounds. There are too many variables involved, and even if one of them had a most strongly pronounced seasonal variation, it would in all likelihood be neutralized by the other variables, unless all of them were practically stable. If cycles of short duration were observed they would be most interesting, but hardly seasonals. In short, even though the money markets of individual countries may be strongly exposed

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[13] The series was obtained from seasonally uncorrected data. For remarks about the seasonals in the underlying series cf. Chapter III, section 3.

CHART 8

Annual Ranges of Short-Term Interest Rate Differentials, Prewar and Postwar, 1876–1914, 1925–1938
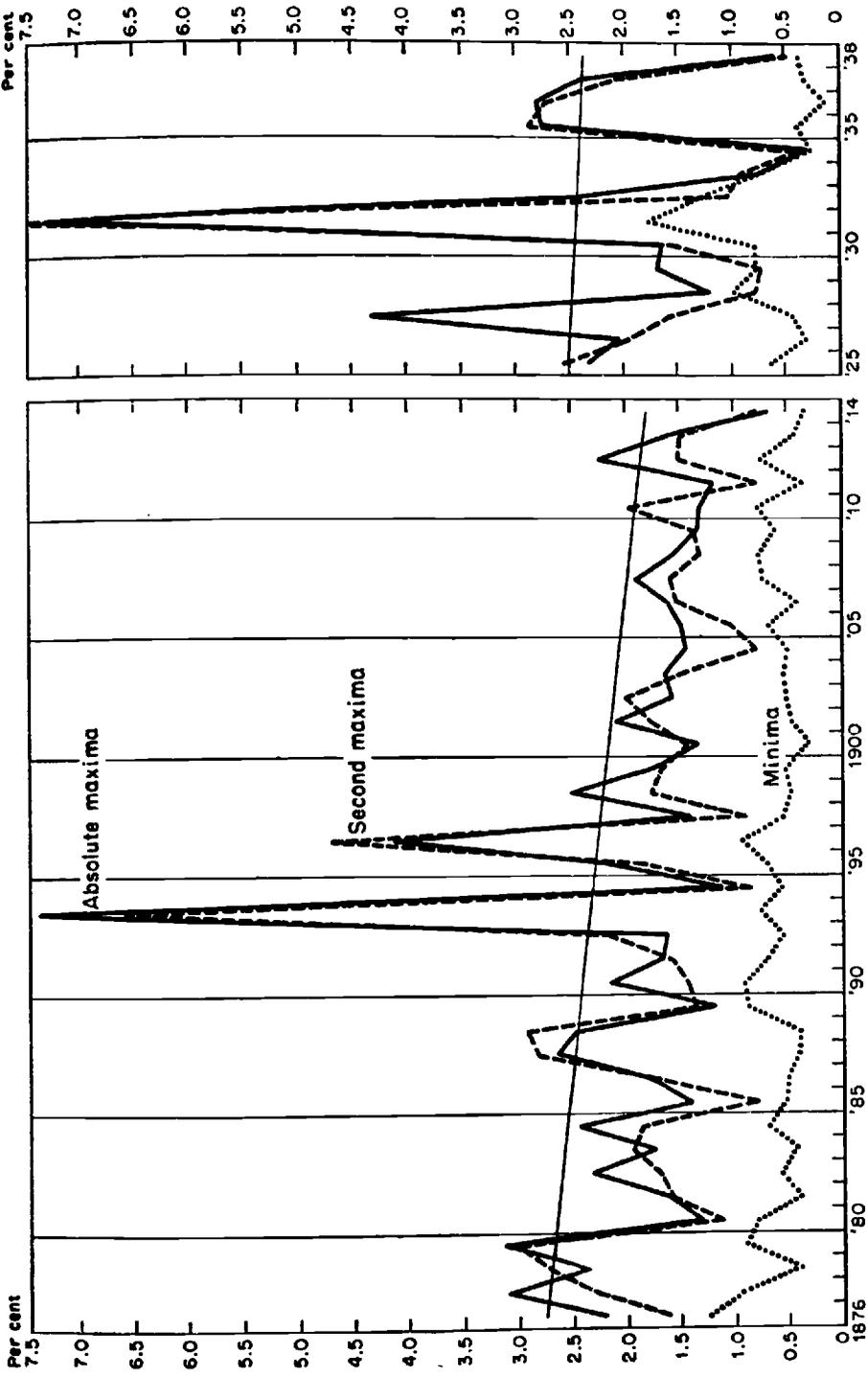
The second maxima is the average of the second highest values.

Source: Tables 30 and 31.

to seasonal influences, and even though this may still be true for the relations of some pairs of countries, the phenomenon disappears when all six pairs are viewed together. The fact that for these reasons we cannot normally expect seasonal variations in the final series is sufficient justification for our taking seasonally uncorrected data.[14]

(8) Regarding the over-all developments in these money market relationships we observe:

First, the great majority of absolute maxima refer, before 1914, to a pair of rates in which the New York rate stands above one of the three European rates. While the particular European market referred to frequently changes, a given relationship remains stable for a few months at a time. This is not true to the same extent when —a quite exceptional occurrence—two European rates stand at the absolute maximum below the American rate. This happens first in August 1878, for London and Paris with 2.32 per cent; the next instance, this time for Berlin and Paris, does not occur until November and December 1893 with 2.17 per cent and 1.96 per cent respectively; but from 1897 on there are more such events until the beginning of 1901; and only in the last three years before World War I is there a repetition of this.

When our series shows sharp rises and falls and high peaks, then it appears that a real tension on the international markets prevailed. These were the times when large-scale transfers of short-term funds, foreign securities, and gold were probably taking place. And they would indicate such tension not only between two countries but for the entire setup.

We give only a few illustrative examples here, our chief aim in presenting the statistics being the demonstration of the trends discussed above.

In the first place, there is the highest prewar maximum in July 1893 for New York–London with 9.63 per cent. The American reference cycle peak had been reached in January 1893 while the British economy was on the long downswing beginning in September 1890 and lasting until February 1895. Germany and France too were experiencing a contraction, though in different stages. It is clear that New York at that time, with great money stringency,

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[14] On the other hand the differential New York–Paris has seasonal variations and the absolute maximum is often identical with that series. But the point is that there are periods when it is registered for New York–London, etc., thus upsetting the seasonal regularity. And we are not interested much in short periods of five to ten years and their possible seasonals.

even with a premium on money, and all the other signs of the peculiarly sharp American crises, was making great efforts to counteract European withdrawals of capital and even to obtain additional gold. In that sense it was an international crisis, and there was a strong influence coming from the United States. The reference cycles alone do not show this.

Second, consider an exceptionally small absolute maximum, the one registered in April 1900 for Berlin–Paris with 0.99 per cent.[15] The smallest difference between any two of all six pairs was then 0.01 per cent; certainly this was a month in which the interest rates of the world were close together! What was the constellation of the reference cycles? The American economy was on a downswing, the trough to be reached in December of that year. Of the three European countries Germany and France had both passed their peaks in March, and Great Britain was to reach it in June. In all these countries the interest rates were high even if for different reasons, but we cannot reach any conclusion from these relationships one way or the other about international movements or crises. But this maximum was shortlived, since in August the most frequent relationship, i.e., New York–Paris, was back with 1.57 per cent and, after an interruption in September by Berlin–Paris with 1.79 per cent, reached its maximum of that year with 2.30 per cent, which is among the more frequent values.[16]

The persistence of wide gaps is a phenomenon that will occupy us still further, when the question will be raised whether they are compatible with the gold standard and the implicit close interaction of the various countries. The reader will notice that there are almost always very considerable differences and that this hardly conforms with the expectations one might obtain from the literature.

Our data of the absolute maxima, which show such great fluctuations and very frequent turns, could now be used—in spite of the above limitations—to help determine international financial crises. We prefer to postpone this discussion, however, until Chapter VII, where the same question will be approached from a different angle. Then we shall be ready to pull the various threads together in order to see whether they show a reasonable pattern.

[15] This is not the smallest of the prewar absolute maxima. That occurred in January 1912 for New York–Berlin with 0.57 per cent, the United States then having a trough and Germany going through an expansion.

[16] These interesting details disappear naturally in the charts which use only annual averages; but space prevents use of all information.

(9) After World War I the picture changes radically. There is indeed in the fourteen years up to 1938 not one single instance in which the absolute maximum again is found for New York over any other country. Instead New York is now in several instances the market with the lowest rate. Even in the years of great crisis in the United States, New York does not appear in these statistics; possibly this is a measure of greater severity elsewhere. The biggest gap most often involves Berlin; it is then above chiefly Paris or London. From November 1935 to April 1938, excepting only the last three months of 1936, a further, most significant change occurs, since then Paris over London constitutes the absolute maximum of all differentials. This shows a profound turn in financial affairs, since the absolute amount of the differential was by no means small (the yearly averages are higher than in most of the prewar years); if the difference had been small, it would be a very different matter altogether.

We have here a really profound change in relationships, not a spurious one which might be due to the much smaller sample available for the postwar years. This confirms similar observations about a structural change in financial relations after the war which were made on various earlier pages.

The post–World War I period is itself not homogeneous because of the devaluations beginning in 1931. The fact that Paris had the highest rate over London from November 1935 on reflects the growing difficulties which France encountered in her efforts to stay on gold when faced with the British policy of fluctuating exchanges. The French devaluation, when it finally came in 1936, had hardly any influence upon the international structure of short-term interest rates. Not only did the Paris–London gap remain the largest, but it stayed at a high level compared with the immediately preceding years. Compared with the last years preceding 1914 the maximum gap is twice as high as the average.

So the fact that our postwar sample is really to be broken into two separate parts does not affect the conclusions from the data when they are taken as a whole. This is rather remarkable in view of the magnitude of the change which devaluation represents. During this period every government tried to reduce interest rates as much as possible, and in some countries though they were brought to levels never attained before or never held for a longer period, the money markets remained far more widely apart than in the years preceding World War I. The situation

therefore was that before 1914 there were low rates not widely different from one another; after 1925 there were low rates in some countries, but the over-all differences were greater than ever. Before 1914 nothing was heard to the effect that the equalization of short-term interest rates had placed the various countries, or at least their central banks and money markets, continuously under heavy external strain. This argument or interpretation (though not based on extensive statistical studies) appeared only in the later 1920's when the money rates were fast moving farther and farther apart.

The prewar period—in spite of recurrent disturbances—was characterized by great economic development. Though we are not able to make cogent comparisons on an absolute basis, there will be little opposition to that statement when we compare the situation with that after the war (especially for Europe, but also for the United States, if the entire period up to 1938 is considered). It is not at all clear in what way the gold standard had impeded this general development, i.e., whether it would have been greater had there been a regime giving each country greater autonomy over its short-term interest rates (assuming that the gold standard does not give a desirable degree of autonomy).

Most noteworthy in the postwar development is that after the devaluation of the French franc the high interest rate level in France did not fall. From the middle of 1935 until April 1938, with only a few exceptions, the Paris rate was not only considerably higher than the London rate, but this gap was the maximal gap among all short-term rates. A devaluation does not necessarily bring interest rates down and the abolishment of the gold standard did not alter tendencies that had begun to develop during its brief postwar regime, tendencies, moreover, which run entirely counter to those of the prewar period.

So we see: during a gold standard we may have a movement toward greater uniformity of the levels of short-term rates with reduction of the levels; we may also have a movement toward less uniformity, some rates falling, others remaining high; and the latter tendency may continue beyond the period during which the gold standard was in operation.

We further note that the highest *average* of the absolute maxima, 5.22 per cent, is registered for 1931, the second highest, 5.02 per cent in 1893. In the first instance we are confronted with the great German crisis, which produced 10.20 per cent difference in August

1931 over Paris; in the second it was the severe American crisis, which produced 9.36 per cent difference in July 1893 over London. Germany was only nominally on the gold standard in the summer of 1931.

Section 4. Cyclical Aspects and the Equilibrium Problem

(10) Our statistics have one outstanding feature, i.e., the appearance of rather *permanent differences in short-term interest rates.* This showed in the frequency distributions and is evident from Charts 18 to 23 (Chapter VI), which show the differentials together with exchange rates.

Despite the perfection of arbitrage and the narrow range of changes of costs of transfers, short-term interest rates when the world was on the gold standard were only rarely completely equalized. This may not be surprising for brief periods, although reaction speeds are high in this field; but it is remarkable to find comparatively large permanent differences. For the entire period 1876–1914 the Paris rate was always more than 1 per cent below the New York rate. Of course there were institutional differences between the Escompte *hors* Banque in Paris and New York prime commercial paper, which may partly account for this phenomenon. The Paris and London rates, on the other hand, show plus and minus alterations, although they too tended to stay above or below the zero mark often for considerable periods at a time. The reasons for the more permanent differences are manifold; we shall try to indicate some of those which in fact appear to obstruct the working of the previously discussed mechanism.

Similar differences in excess of probable costs of transfers are encountered, as is well known, for interest rates between various money markets of one and the same country. This too contradicts the teachings of economic theory—especially price theory—of the conventional kind which claims to have shown that prices *for the same commodity* must be equalized where there is free communication, as there is between domestic money markets, and when monopoly is absent. Monopoly hardly existed in money, either in the domestic or international sphere.[17]

Capital flows occurred certainly between Paris and New York during the prewar period and in *both* directions. So the permanent

[17] Excepting such occasional effective central bank control as is mentioned below.

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difference did not block them. Therefore it was apparently a widening or closing of these "permanent" margins rather than the alternation from positive to negative differences in the case of London–Paris that was probably the essential cause. On the other hand capital movements never closed the permanent gaps where they existed. This indicates a lack of response quite out of keeping with traditional theory, and we must therefore look for such reasonable arguments as will help to enlighten us about these permanent margins.

There are at least four remarks to be made which are not fully separable from each other.

First, there are systematic factors. Sometimes a margin of given magnitude will quickly disappear, and sometimes it will take much more time before a change—presumably, but not solely, a transfer of funds—sets in or a reaction becomes effective.

Second, there are frequently also other than systematic reasons for the lack of response of money markets to the appearance of short-term differentials, though on other occasions differentials produced a shift of funds with the subsequent narrowing of the margin and removal of stress on the exchange rates. Sometimes a great money market may show very low short-term rates, and no transfer of funds to another country may be recorded or be expressed in the movement of exchange rates, because the flotation at home of a large domestic or long-term foreign loan may be known to be imminent, offering better prospects than a short-term foreign investment.

A particularly interesting example is offered by France in the 1880's before the flotation of a large Russian government loan. The short-term rates in Paris remained very low because in anticipation of that issue much French capital was held in liquid form. Indeed it is even reported that foreign capital flowed to France for exactly the same reason, thus increasing the general liquidity still further.[18]

In all this as well as in its systematic aspects, as mentioned in the first remark, "expectations" play a large role. But no devices are now known that would allow a reliable statistical measurement (or even less satisfactory nonstatistical description) of these expectations. This holds true although in economic theory much has been written lately about expectations. But the attending

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[18] Flows toward low interest rate centers became a frequent occurrence in the postwar period; but they were not unknown even before 1914.

logical problems are grave. Furthermore the empirical bases of many writings are generally quite obscure and few attempts have been made to establish them.[19]

Third, it is known that central banks often had a hand in such matters. Lack of capital flow may therefore be due to control and intervention in the money markets. Control will more frequently operate toward preventing an outflow of capital from a country and can hardly bring about an inflow. Such controls were applied before 1914, though to a lesser extent than after World War I. Political considerations and matters of prestige played a great role in that regard. This is true for both short-term and long-term flotations. For example, British treasury bills would not be issued abroad, although the rate elsewhere might be more favorable at the moment. This would be against long-term considerations, national prestige, etc. But the United States was sometimes forced to sell bills in Paris.

Fourth, there is the risk factor. It would be very tempting to go into a detailed discussion here, but we must forego it for reasons of space and proportion. Our own procedure can be only a very simple one, using a notion of "risk" which is intuitively clear and comprehensible to the operators who engage in international finance and whose behavior is to be described.

Both principal factors in the mechanism carry a risk. The exchange risk depends at least on two elements, one of which is negligible during the adherence to the gold standard; it is the possibility of an embargo on gold, i.e., a violation of the rules.[20] The second is a function of the position of the exchange rate when a transaction is considered. If the foreign money is expensive, it can (only) become cheaper and vice versa. By how much it can

[19] As far as the theoretical side of expectations is concerned cf. J. von Neumann and O. Morgenstern, *Theory of Games and Economic Behavior,* Princeton University Press, 1944, 3rd ed., 1953, p. 30, and the further references there. Cf. also O. Morgenstern, "Vollkommene Voraussicht und Wirtschaftliches Gleichgewicht," *Zeitschrift für Nationalökonomie,* Vol. VI, 1934. The first-named publication shows that the role of expectation and information may be quite different from that now assigned it by most economic theorists. Mention ought to be made of the work of Friedman, Savage, and Marschak: M. Friedman and L. J. Savage, "The Utility Analysis of Choices Involving Risk," *Journal of Political Economy,* Vol. LVI, 1948, pp. 279–304; and J. Marschak, "Rational Behavior, Uncertain Prospects and Measurable Utility," *Econometrica,* Vol. 18, 1950, pp. 111–141; and much of the ensuing discussion in the literature, in particular, J. Savage, *The Foundations of Statistics,* Wiley, 1954.

[20] Excepting the more probable and more frequent deviation such as the gold premium in France and other chicanery by other nations.

move in either direction depends on the gold points at the time. It is clear that a given short-term interest rate differential offers a *varying* inducement to shift funds, depending on the simultaneous exchange risk.

The *interest rate* itself involves and to some extent expresses risk elements. Interest and risk have been found to be related, and until now almost indissolubly mixed up. At any rate the best that can be done is a classification of various interest-bearing investments according to the best judgment of the financial community. Then it is generally assumed that a smaller rate expresses—for the same kind of investment—a smaller risk factor. Also it is thought that short-term investments are less risky than long-term, which would undoubtedly be an entirely unwarranted generalization. So the ordinary "business risk" is absorbed in the rate of interest and involves all the uncertainties arising from a business transaction. But for the differentials there are the risks attaching to both types of investment and the expense and inconvenience of having to make adjustments. Besides, comparisons are made in several directions simultaneously and also with long-term rates. A full account becomes obviously too complicated for analysis with ordinary means.

What matters here is that because of this close relationship of risk and interest—whatever its precise nature may be—the risk factor is bound to emerge prominently in the comparison of interest rates in different countries that involve transactions affecting them all.[21] Since we will deal with the exchange rate risk—which is the normally dominant one—in some more detail, we add only two remarks about the more general risk which may find expression in the position or the movement of the differential under consideration:

(a) The troublesome permanent difference between interest rates of the same kind is probably due to risk. Where the rate is higher, there are most likely conditions of less stability, of general insecurity, doubtful or expensive law enforcement, etc. Such might have been the case in New York before 1914 if compared with the exceptionally high standards in London or even those in Paris. This and the geographical distance is the simplest explanation of the permanent differentials. To what extent it is an explanation and not only another name for, i.e. at best a definition of, the phenomenon, the reader may decide.

[21] For further discussions of risk, see Chapters V and IX.

(b) Occasionally specific situations can be identified when there was an increase in the odds put on the risk. These will often coincide with those critical times which figure in our search for international crises. Instances where an identification was possible so far as expectations and state of information were concerned, were mentioned previously. In the same manner it is possible to point out political stress, war dangers, etc., which would change the general risk distribution. One is reminded of the Algeciras incident, the Boer War, the Balkan War, rumors of war, all of which had such repercussions.

(11) The preceding four remarks were intended to describe the most essential properties of short-term interest rate differentials when they do not behave as postulated by current theory. We conclude this chapter by two further observations which refer to some *limitations of our statistical information.*

So far we have envisaged only a direct transfer of funds from A to B if conditions warranted it. But it is possible that an interest rate differential may be used differently, depending upon the other connections of these two money markets. For example, when the Berlin-over-Paris rate differential rose, it often happened that French funds in London were transferred in London itself to German account, no direct movement across borders taking place anywhere. Yet the Berlin money situation became less tight, and the stress upon the German exchange rate was eased or disappeared. Such occurrences are variously reported or hinted at, but we have absolutely no quantitative estimation of these transfers. We are thus not able to indicate how frequently they occurred, what the magnitudes involved were, and whether an improvement in the exchange rate was due to a direct or an indirect transfer of funds. In other instances a direct transfer from one country to another is required, which—if statistics were available—would show up in capital movements between the two countries while the transfer of accounts within a third would not. Thus the annoying lack of statistics on short-term capital movements has to be viewed in the light of the fact that even very good statistics would cover only a part of the phenomenon. It is a peculiarity of many empirical economic investigations—especially of this one—that sometimes good statistics exist in one area while none are to be had in the complementary fields, although all would be required for the drawing of valid conclusions.

Finally there is at least one more complicating factor. Many of our comparisons so far, and more to come, concern pairs of countries.

If these countries had no other international contacts, in these or other fields, it would be reasonable to expect that one should be able to read off from the statistics of interest-rate differentials and exchange rates whether a movement of short-term funds is indicated. It would then be possible to have confidence that these statistics together could fill the gap left by the nonexisting capital movement statistics. However the contacts of these countries are multiple and include also countries not here considered. When long-term capital movements are also taken into consideration—we saw above their essential relationship to short-term movements—countries in an early state of development play a large role while they are less important for short-run shifts of funds. The reasons for the limitation of this study to the four countries were set forth above and there is no reason to deviate from our plan now.