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CHAPTER X

SECURITY MARKETS AND FOREIGN CAPITAL ISSUES

Section 1. General Characteristics

(1) The previous discussions have established that significant covariations can be observed in the interest rates and exchange rates of different countries. There even exist good reasons for assuming that a mechanism of the transfer of short-term funds operated very much according to traditional theory. The correspondence of our results with common sense, as expressed in the simple theoretical formulations referred to, is most welcome.

But the activities which these time series cover are of limited importance; they express chiefly very short-term capital movements. Nothing is disclosed about the use to which the funds moved from country to country were put. Furthermore the movement of interest rates and of the exchanges are related to other factors ("caused" by them) and that relationship should be described more fully. For that purpose it is necessary to widen the scope of the inquiry by including other fields of financial transactions, especially such as are affected by the transfer of funds, and also those which pull long-term capital movements in their wake.[1]

We consider next therefore the international relationship of

[1] An idea of the enormous complexity of securities markets and the type of research needed (and nowhere yet carried out) is given by the National Bureau of Economic Research in the exploratory reports of its Committee on Research in Finance: *Research in Securities Markets,* 1946; and *Research in the Capital and Securities Markets,* 1954. While a very thorough program is outlined there, it is noteworthy that the contacts with foreign stock markets and the trading of foreign securities in New York or of American Securities abroad find little attention (cf. pages 523 ff. below).

Instead of giving a bibliography on stock markets (which would be of forbidding length), we shall in certain places refer to specific works which have an immediate bearing on particular problems we encounter. We refer the reader however to the brief report of the Twentieth Century Fund, *Stock Market Cycle Research,* Boston, 1930 (prepared by A. F. Burns). It sets forth clearly many of the statistical problems, suggests new studies, and mentions many studies then finished or in progress, without, however, giving any bibliographical aids. The emphasis is essentially on cycles. Chapter VIII contains two pages of observations on international stock market movements.

security markets as represented by the stock exchanges of the leading countries. The interaction of stock markets appears to be very strong. Indeed some economists have even suggested that it is the chief channel through which influences are transmitted internationally. Writers[2] occasionally discuss the entire phenomenon of the international spread of business cycles within passages on the cyclical behavior of stock markets rather than in some other connection. Everyday experience seems to bear out this point, or at least it puts interaction among stock markets very much in the foreground. On different national stock markets the prices of the same shares are as a rule not at variance, owing to perfect arbitrage.

It is therefore natural to extend the notion of the transmission of price changes from the stock markets of one country beyond its boundaries. There is also fresh in memory the sequence of stock market collapses beginning in October 1929 in New York and extending over most of the leading markets abroad. He whose memory reaches back farther could easily point to earlier similar experiences, and if statistical information is used, more such instances seem to emerge. Of course these impressions do not do justice to what is essentially a very complicated and involved phenomenon with many different aspects which only investigations beyond the scope of this study can reveal.

(2) Stock markets are strictly organized markets where professional dealers ("jobbers") as well as the general public, through the intermediary of brokers, sell and buy old and new domestic and foreign securities issued by governments, municipalities, or private corporations. The securities may or may not bear fixed interest. Their prices are for the most part formed under strongly competitive conditions, so that they have often been taken by economists as the prototype of the pricing process when establishing the elements of a price theory for a competitive market. Prices are as a rule not established once each time the market meets, but successively, depending on the continuous change in conditions; but there are exceptions to this.

The commodities traded are different from those in other markets, in that they are probably to a much higher degree subject to expectations and their variations. It is even asserted that the stock market is the one where expectations and the evaluation of chances meet their final test. The stock market generally discounts future events, or in other words anticipates them, and thus does not always

[2] Cf. J. A. Schumpeter, *Business Cycles*, 1939, Vol. II, pp. 666–667.

react at the time when an expected event actually happens, because it has already anticipated its influence by changing the price trend appropriately. However it would be unwise to think that these at any rate rather vaguely described anticipations are always in the right direction.[3] The technical perfection of the security markets does not in the least imply a successful evaluation of the future.[4] The importance this fact has for us lies in the susceptibility of the market to international influences. Some of the numerous stock market disturbances are directly traceable to specific political, potential influences (rumors, speeches, war threats, etc.), as well as to actual events.

The next important characteristic of stock markets is that a major portion of the total volume of new savings of the economy used to flow to it, in order to be invested in old and new securities. The percentage of the new savings thus available differs widely among various countries, depending, among other factors, upon the popularity of the organization of joint stock companies, which is influenced greatly by the legal measures in each country, upon the reinvestment of profits in their own companies, and upon the changes of habits over time.

If long periods of time are studied—and this is the case, if we go back to about 1870—the fact becomes important that the development of the organization of business in the form of joint stock companies differs much from country to country. These companies were very popular in some countries, less in others. The gradual transformation of private firms into joint stock companies does not always alter the amount of capital invested; it does increase the significance of the stock market only if the new shares are traded there.[5] But there is no doubt that this particular form of business organization has grown wherever it has taken root.

[3] There can be no doubt, on a commonsense basis, that the New York stock markets were excessively optimistic in 1929 and excessively pessimistic in 1932–1933.

[4] Cf. A. Cowles 3rd, "Can Stock Market Forecasters Forecast?" *Econometrica*, Vol. I, 1933, pp. 309–324; and J. F. Barbour, "Cowles Studies on the Dow-Theory," *The Analists Journal*, Vol. IV, No. 4, 1948, pp. 11–20. We may here also mention the following undergraduate theses submitted to the department of economics of Princeton University: Anthony T. Spano, *The Accuracy of Stock Market Forecasts, 1947–1952;* Richard A. Yaffa, *The Economic-Psychological Approach to Business Cycle Forecasting*, both in June 1954.

[5] It may be recalled that the shares of the Ford Motor Company, one of the largest industrial enterprises in the world, were not quoted on any stock exchange prior to 1955! The shares of the Standard Oil Company (New Jersey) were introduced on the New York Stock Exchange only in 1920.

The statistical estimation of the amounts of the capital involved (especially as a percentage of the total capital available in banking and industry) would be most important. Little is known except in the most general way, especially for the earlier periods, although some efforts have been made to close the gaps in our information.[6]

Besides the new capital available for investment on the stock exchanges, there is, in the aggregate demand, the amount of old capital which is reinvested after having been withdrawn from other forms of investment. Furthermore securities change hands by being exchanged against other ones. This process too has an influence upon the price trend, if there should be a sufficient concentration on either side of the market. This would be the case, for example, if fixed-interest-bearing securities are offered, while the reinvestment is in stocks with variable dividends, or vice versa. Such an occurrence can be observed statistically by opposite price movements, but the latter need not imply the former whenever it occurs.

An additional factor to be considered is the intervention of credit in the demand for securities.[7] There are at least two stages of this intervention. First, credit may influence in many devious ways the volume of "genuine" savings mentioned above. This possibility has been discussed at some length in the literature, though there do not exist many quantitative investigations.[8] Second, credit may be obtained directly for the purpose of purchasing stock. This would comprise the so-called "margin buying" and brokers' loans. The two are not identical, since for long periods in many countries credit for margin buying could be obtained directly from the banks without the intermediary of stock brokers. The volume of credits thus obtained cannot be statistically determined, although brokers' loans in the United States are known for more recent periods.

Here is a source of instability which has preceded many crises. In some countries on the European continent, it was normal busi-

[6] Cf. especially G. H. Evans, Jr., *Business Incorporations in the United States, 1800–1943*, National Bureau of Economic Research, 1948; and R. W. Goldsmith, *The Share of Financial Intermediaries in National Wealth and National Assets*, National Bureau of Economic Research, Occasional Paper 42, 1954.

[7] There may of course also be other reasons for an increase of demand, such as a reversal of trend away from hoarding. We need not go into this, since statistics on this subject obviously are unavailable. Internal and external gold movements too would have to be considered.

[8] The great difficulties in regard to determining the facts are described in the paper, "Statistics Relating to Capital Formation, a Note on Method," by the Committee of Statistical Experts, League of Nations, Geneva, 1938; cf. also J. M. Keynes' review article, "The Process of Capital Formation," *Economic Journal*, September 1939, pp. 569–574.

ness practice for many banks to advance money for stock exchange speculation, generally on the basis of shares as collateral. This is another form of speculative activity of banks which was often as risky for them as the granting of loans to industries for the long-term that often led to a permanent participation by banks in the management of corporations.[9]

In addition to these sources of demand, there are *foreign funds* to be found on almost all stock exchanges. They are often, if not generally, of a highly unstable nature, and frequently move at slight provocation not only from one kind of security to another but also, often for political reasons, from one country to another. These funds thus invested do not exhaust by any means the total of foreign funds held at the various chief financial centers. We would therefore once more be faced with the problem of separating from the total the percentage which is active on the stock exchanges. This undertaking is doomed to failure because of a total lack of statistics. It is even exceedingly difficult to obtain fairly reliable information about aggregate international capital movements, no matter whether they are short-term or long-term capital.

Investment of funds by foreigners in securities of another country need not always be of a highly unstable nature. Before 1914 foreign government bonds were often held firmly by private investors of different nations. The French investment in Russian securities is one of these cases, but there are many more. What transfers occurred were frequently for the major part between individuals of the same country, rather than a resale to the country of origin or to a third. After World War I the frequency of shift among countries of foreign capital invested at a given stock market increased enormously. However one must distinguish between those influences of foreign capital on a domestic stock market exercised by foreign purchases or sales of securities in the country of the stock market and the holding of the securities there, and those influences which take effect by trading of varying amounts of domestic securities at a foreign stock market.

The problems connected with capital movements are so numerous and complicated that they would have to be taken up in a separate study. Only after they have been examined would it be possible to

[9] This is the well-known difference between European (Continental) and Anglo-American banks. Cf. Adolf Weber, *Depositenbanken und Spekulationsbanken*, Munich, 1902, 3rd ed., 1922; and F. Somary, *Bankpolitik*, Tübingen, 3rd ed. 1934, *passim*, especially Part II.

TABLE 130

Listed International Securities before 1914

1. Distribution of Ottoman funds, 1898, per cent

France	44.9	Turkey	6.4
Belgium	17.9	Holland	4.5
Germany	12.2	Austria-Hungary	1.9
Great Britain	10.9	Italy	1.3

Source: Estimated by Guiccioli and Auboynou and quoted by A. Neymarck, *Bulletin de l'Institut International de Statistique*, Vol. XII, p. 266. Per cent distribution in source erroneous and recomputed by us.

2. Foreign holdings of the Spanish four per cent external loan, 1899, per cent

France	64.6
Great Britain	13.5
Germany	11.7
Belgium	5.2
Holland	3.4
Portugal	1.7

Source: *Op. cit.*, Vol. XII, p. 226. (Results of an official stamping of certificates in 1899.)

3. Portugal, interest payments for government bonds, 1906–1907, per cent

France[a]	41.8
Great Britain	13.7
Germany	14.0
Belgium	0.2
Switzerland	0.3

Source: *Op. cit.*, Vol. XIX, p. 337.

[a] Includes Dutch investors and also Portugese bondholders who, without exception, preferred to cash their dividends in Paris, rather than in Portugal. (Portugal's government became bankrupt in 1892.)

4. Russia

Around 1900, one-fourth of all Russian securities were held abroad, 70 per cent of them by French investors.

Source: *Op. cit.*, Vol. XIII, pp. 148–149.

(*table continues*)

round out whatever picture would be obtained of the interlocking of stock markets.

(3) We consider next another form of influence from abroad, i the introduction of *foreign securities at domestic stock exchanges*

TABLE 130, continued

5. Number of foreign and domestic securities listed on German exchanges

	FOREIGN		GERMAN	
	Bonds	*Shares*	*Bonds*	*Shares*
Augsburg	11	4	37	52
Berlin	158	56	520	914
Bremen	3	2	62	55
Breslau	14	–	63	63
Dresden	13	2	188	211
Frankfurt	197	45	278	269
Hamburg	122	17	173	131
Cologne	11	8	64	121
Leipzig	50	1	99	134
Munich	31	4	89	95

Source: Wormser, p. 221.
No foreign securities on nine other provincial exchanges.

6. Listed and unlisted foreign securities in which transactions took place in Hamburg, 1882–1892
(from the records of payments of the tax on foreign securities.)

	Number	*Nominal Value (millions of marks)*
Listed foreign securities	129	350
Unlisted foreign securities	549	208

Source: Bericht der *Börsenenquête-Kommission*, Berlin, 1892–1893, Appendix, p. 270.
The complete list of securities covered is available in the source.

(*table continues*)

They can be of all categories (government or private bonds, stocks, etc.) and, as will be seen in Table 130, trading in them often assumes major proportions. The prices of these securities are subject to the business conditions and the prospective profits of the companies in the respective countries where they are domiciled and do business, or both. The prices depend, if they are government bonds, on the credit standing of these governments, i.e., among other things, on their financial policy, and on the interest rates on the stock exchanges where they are traded. These constitute however only some of the influences working upon the prices of these securities. They are also subject to the price tendencies of the respective domestic issues against which they can be exchanged. Hence we find profit expectations and long-term interest rates of

TABLE 130, continued

7. Nominal value of securities included in the "official list" of the London Stock Exchange, Dec. 30, 1999.

British securities:	*Nominal value (millions of £)*	*Per cent*
Government funds	559	
Municipal bonds and securities guaranteed by the government	342	
Corporations[a]	1,791	
Total	2,692	33.7
Colonial securities:		
Government and municipal funds[b]	340	
Railroads	251	
Total	591	7.4
Foreign securities:		
Government securities	3,123[c]	
American railroads	972	
Other foreign railroads	622	
Total	4,717	59.0
Grand Total	8,000	100.0

[a] Including foreign and colonial (see, for instance, subgroup "tea and coffee plantations").
[b] Including some foreign municipal bonds.
[c] Including funds payable in London (987).

8. Nominal value of securities officially listed in Paris on Feb. 28, 1900

French securities:	*Nominal value (millions of francs)*
Rentes	25,827
Railroads	17,476
Miscellaneous	15,876
Total	59,179
Foreign securities:	
Government loans	59,119
Corporations	8,332
Total	67,452

The French securities include many French companies operating abroad, for instance: banks include colonial banks; canals include Suez; railroads and streetcars include North and South American railways (Santa-Fe, Venezuela); gasworks include Gas of Bucharest, Ghent; iron and steel include Russian metal works; mines include Spanish, Russian, and colonial mines; and municipal bonds include cities in colonies.

(*table continues*)

TABLE 130, continued

9. Securities listed on the Amsterdam Stock Exchange, 1875–1914

	Government funds	*Municipal bonds*	*Banks*	*Industrials*[a]	*Shipping*	*Railways*[b]	*Tobacco*	*Petroleum*	*Rubber*	*Tea*	*Miscellaneous*	*Lottery bonds*	*Total*
						January 5, 1875							
Holland	4	5	4		5	17					7	4	46
Dutch Colonies			5			2					1		8
Western Europe[c]	11					2						1	14
Northern Europe[d]	1												1
Germany											1	2	3
Austria-Hungary	6		2			5						8	21
Balkans[e]	4					1						1	6
Russia[f]	22		1			20						3	46
Africa	2												2
Asia													
United States	11					63					4		78
Canada, Cuba, Mexico	2												2
Central and South America													
Argentina													3
Brazil	3												8
Other	8												
Total	74	5	12		5	110					13	19	238

(*continues on next seven pages; notes at end*)

TABLE 130, continued

9. Securities Listed on the Amsterdam Stock Exchange, 1875–1914

	Government funds	*Municipal bonds*	*Banks*	*Industrials*[a]	*Shipping*	*Railways*[b]	*Tobacco*	*Petroleum*	*Rubber*	*Tea*	*Miscellaneous*	*Lottery bonds*	*Total*
						January 3, 1885							
Holland	9	12	25	4	15	43					20	6	134
Dutch colonies			8			6					3		17
Western Europe[c]	15					3						4	22
Northern Europe[d]	8		1										9
Germany	2		3									2	7
Austria-Hungary	10		5			5						10	30
Balkans[e]	9					1						2	12
Russia[f]	37		2			33						2	74
Africa	3												3
Asia													
United States	3		1			98					4		106
Canada, Cuba, Mexico	2	1				3							6
Central and South America													
Argentina													
Brazil	6												
Other	5					1							7
Total	109	13	45	4	15	193					27	26	432

TABLE 130, continued

9. Securities listed on the Amsterdam Stock Exchange, 1875–1914

	Government funds	*Municipal bonds*	*Banks*	*Industrials*[a]	*Shipping*	*Railways*[b]	*Tobacco*	*Petroleum*	*Rubber*	*Tea*	*Miscellaneous*	*Lottery bonds*	*Total*
						January 1, 1890							
Holland	5	24	42	5	16	49					39	8	188
Dutch Colonies			11			13	11				20		55
Western Europe[c]	15					6					3	6	30
Northern Europe[d]	8		1			2							11
Germany	2		3									2	7
Austria-Hungary	12		7			10					1	11	41
Balkans[e]	8											2	10
Russia[f]	34		4			45						2	85
Africa	3			3									6
Asia													
United States	3		4	2		123					8	1	141
Canada, Cuba, Mexico	1	1				9							11
Central and South America													
Argentina	1	1				1							3
Brazil	8	2				2					1		13
Other	8					2							10
Total	108	28	72	10	16	262	11				72	32	611

TABLE 130, continued

9. Securities listed on the Amsterdam Stock Exchange, 1875–1914

	Government funds	*Municipal bonds*	*Banks*	*Industrials*[a]	*Shipping*	*Railways*[b]	*Tobacco*	*Petroleum*	*Rubber*	*Tea*	*Miscellaneous*	*Lottery bonds*	*Total*
						January 1, 1895							
Holland	4	27	69	13	17	49					46	7	232
Dutch Colonies			13			18	22				39		92
Western Europe[c]	21	1				12					3	7	44
Northern Europe[d]	8		1			1							10
Germany	5		3									1	9
Austria-Hungary	14		9			10					3	13	49
Balkans[e]	12					3						2	17
Russia[f]	48		4	1		53						2	108
Africa	4		1	1								1	7
Asia											9	1	173
United States	2		8	3		150							17
Canada, Cuba, Mexico	7	1				9							
Central and South America													
Argentina	1	1				1							3
Brazil	4	2				3					1		10
Other	6					2					3		11
Total	136	32	108	18	17	311	22				104	34	782

TABLE 130, continued

9. Securities listed on the Amsterdam Stock Exchange, 1875–1914

	Government funds	*Municipal bonds*	*Banks*	*Industrials*[a]	*Shipping*	*Railways*[b]	*Tobacco*	*Petroleum*	*Rubber*	*Tea*	*Miscellaneous*	*Lottery bonds*	*Total*
						January 1, 1900							
Holland	3	43	102	27	24	48		8			52	7	314
Dutch Colonies	2		13	16		35	38	11			50		165
Western Europe[c]	22	1	2	4		13		4			4	9	59
Northern Europe[d]	7	2	2					1				1	11
Germany	7	1	8	2							5	14	20
Austria-Hungary	17	3	21			10						2	70
Balkans[e]	15					3						3	20
Russia[f]	56		4	3		49						1	115
Africa	4		2	2		3							12
Asia	5												5
United States	2		5	4		147					7	1	166
Canada, Cuba, Mexico	9	1				9							19
Central and South America													3
Argentina	2	1									2		15
Brazil	8	2				3							16
Other	9			2		2					3		
Total	168	54	159	60	24	322	38	24			123	38	1,010

TABLE 130, continued

9. Securities listed on the Amsterdam Stock Exchange, 1875–1914

	Government funds	*Municipal bonds*	*Banks*	*Industrials*[a]	*Shipping*	*Railways*[b]	*Tobacco*	*Petroleum*	*Rubber*	*Tea*	*Miscellaneous*	*Lottery bonds*	*Total*
						January 3, 1905							
Holland	3	55	158	48	38	62		9			87	7	467
Dutch Colonies	2		14	26		45	39	14			50		190
Western Europe[c]	16	1	2	6		15		7			5	11	63
Northern Europe[d]	6	5	3										14
Germany	10	2	9	2		1		1				1	26
Austria-Hungary	14	4	19		1	9					5	13	65
Balkans[e]	26					3						2	31
Russia[f]	79	2	4			38						3	126
Africa	2		1	2		2					1	1	9
Asia	7												7
United States	2		1	10		168					8	1	190
Canada, Cuba, Mexico	11	1				12					1		25
Central and South America													
Argentina	2												2
Brazil	15			1		3					1		20
Other	10			2		3					3		18
Total	205	70	211	97	39	461	39	31			161	39	1,353

TABLE 130, continued

9. Securities listed on the Amsterdam Stock Exchange, 1875–1914

	Government funds	*Municipal bonds*	*Banks*	*Industrials*[a]	*Shipping*	*Railways*[b]	*Tobacco*	*Petroleum*	*Rubber*	*Tea*	*Miscellaneous*	*Lottery bonds*	*Total*
						January 3, 1910							
Holland	3	78	188	81	39	66		11			70	7	543
Dutch Colonies	2		14	27		36	48	17	5		52		201
Western Europe[c]	16		3	11		17	1	8			6	10	72
Northern Europe[d]	6	6	4									1	16
Germany	10	2	8	5		1							27
Austria-Hungary	14	4	23		1	9					5	13	69
Balkans[e]	27					4						2	33
Russia[f]	83	4	4			42		1				3	137
Africa	2		2	3							3	2	12
Asia	17												17
United States	1		2	44	4	189					13	1	254
Canada, Cuba, Mexico	12		3	2		12					1		30
Central and South America													
Argentina	3	4	1			1							9
Brazil	27	3		1		2							33
Other	10			2		3					3		18
Total	233	101	252	176	44	382	49	37	5		153	39	1,471

TABLE 130, concluded

9. Securities listed on the Amsterdam Stock Exchange, 1875–1914

	Government funds	*Municipal bonds*	*Banks*	*Industrials*[a]	*Shipping*	*Railways*[b]	*Tobacco*	*Petroleum*	*Rubber*	*Tea*	*Miscellaneous*	*Lottery bonds*	*Total*
						January 2, 1914							
Holland	4	105	253	118	37	68		12			87	7	691
Dutch Colonies	2	5	15	29		41	40	17	33	9	74		265
Western Europe[c]	15		7	14		12	1	9	3		7	10	78
Northern Europe[d]	7	3	4										19
Germany	10	2	7	5		1						1	26
Austria-Hungary	20	4	28	1	1	9					5	15	83
Balkans[e]	36	1				1		4				2	44
Russia[f]	86	6	8			39		2				3	144
Africa	3		2	1		1					4	2	13
Asia	12	2											14
United States	1	2	2	67	4	198		2	1		24	1	302
Canada, Cuba, Mexico	13		4	7		15					1		40
Central and South America													
Argentina	4	5	2			1							12
Brazil	33	3		1		6							43
Other	14			2		3					3		22
Total	260	143	332	245	42	395	41	46	37	9	205	41	1,796

Original source: 1875 and 1885: *Nieuw Algemeen Effectenblad*, Amsterdam, 1890–1919: *Gids by de Pryscourant*, Amsterdam.

Immediate source: L. Brenninkmeyer, *Die Amsterdamer Effektenbörse*, Berlin, 1920, Appendix.

[a] Includes mining.

[b] Includes trolley-cars.

[c] Great Britain, France, Spain, Italy, Portugal, Switzerland.

[d] Denmark, Norway, Sweden.

[e] Bulgaria, Serbia, Rumania, Turkey, Bosnia-Herzegovina.

[f] Includes Poland and Finland.

these countries interrelated. The degree of interrelatedness will depend upon the number of different foreign securities and on the amount of domestic capital investment in them.[10] It certainly cannot be expressed in simple terms. The reverse influence also holds. Changes of profit expectations abroad, or of the various interest rates, will produce a corresponding price change in the foreign securities. This price movement will transmit itself through numerous channels to the prices of domestic securities.

If the foreign securities are *payable in a foreign currency or in gold,* then the variations of the exchanges of the two respective countries also become price determining factors. This played a very big role after 1914, when fluctuating exchange rates were common. However even before 1914 fears were sometimes felt about the stability of exchange rates, though not to the same extent. During the year preceding the Baring crisis of 1890 the instability of the Argentine exchange was an important factor causing German investors in Argentine shares to sell their holdings. British investors then were slower in making such adjustments, a fact that contributed to the extent of the Baring crisis in Great Britain.

There are other instances of fears about the maintenance of exchange rates. European investors had doubts as to the stability of the dollar exchange after the passage of the Sherman Silver Purchase Act and began large-scale sales of American securities to investors in the United States, thus withdrawing gold from this country, a process which became cumulative. The continued silver campaign of Bryan further contributed to that movement.

Sometimes securities issued in one country are redeemable, or interest and dividends are payable, as the case may be, also in the currency of another country. After World War I this became a frequent practice with far-reaching consequences, not foreseen at the time of issue. It was not restricted to government bonds, but applied even to industrial shares, e.g., in Austria, which were then often held abroad. This brought exchange rate expectations and developments into the price relationships of these securities to those of others priced only in the domestic currency.

(4) There is still another form in which a domestic stock exchange may reflect business conditions abroad. This is through securities issued by companies doing business in foreign countries, perhaps exclusively, or to some major extent. In the first case these

[10] Cf. Ilse Mintz, *Deterioration in the Quality of Foreign Bonds Issued in the United States, 1920–1930,* National Bureau of Economic Research, 1951.

"domestic" securities are virtually equivalent to foreign ones from the economic point of view. Sometimes however these companies are attached to truly domestic mother companies, and their dividend policy is then determined not exclusively according to the profits realized abroad. Rather it is formulated in conjunction with domestic affairs of the mother company, in a way which cannot easily be determined by outsiders, in which case they would be also economically domestic, though technically at first sight equivalent to foreign securities. There are numerous instances of this, e.g., gold mining, oil, shipping shares, etc.

Government bonds may also show some complications aside from those mentioned earlier which are due to currency variations. These securities are sometimes guaranteed by other governments or groups of governments. In these cases not two, but possibly more, currencies have to be taken into account—only however when the debtor country is likely to default. Such guarantees became of practical importance in the period after 1922 with certain League of Nations operations, but in general they are rare.

(5) Though the statistical data on which this chapter is based are fragmentary, as regards the *volume* of securities trading, it appears that international migration of securities assumed considerable proportions in the years before World War I, and played a significant role in the international transmission of business cycles through their effects on the movements on the stock exchanges. This section will cite some of the statistics for illustrative purposes; they cannot serve for more because of their doubtful validity.

For 1874 R. L. Nash[11] estimated that funds of foreign governments traded in London surpassed the total amount of all British and colonial securities listed (£3.6 billion against £2.2 billion).[12]

In Paris the situation was similar. In 1891, 549 out of 928 securities listed in Paris (Parquet) were foreign securities. Eighteen European countries were represented by 67 different government bonds alone, and 13 non-European countries contributed 31 government securities.[13] Alfred Neymarck estimated[14] that the share of foreign securities among French holdings was about one-third. For 1891 Théry[15] thought that France had 21,000 million francs

[11] *Fenn's Compendium on the English and Foreign Funds, Debts, and Revenues of All Nations*, London, 1874, p. v.

[12] This should be borne in mind below for judging the significance of any British share price index.

[13] *Bulletin de l'Institut International de Statistique*, Vol. VI (1), pp. 205 ff.

[14] In various reports published in *ibid.*

[15] E. Théry, *Les Progrès Economiques de la France*, Paris, 1909, p. 307.

invested in foreign securities, an amount that rose to 37,150 million francs by 1907. For the same years foreign holdings of French securities were estimated at 6,230 million and 6,824 million francs respectively. For the end of December 1908 we have Neymarck's estimate of foreign securities (including government bonds) at the Paris Bourse of 67,645 million francs, compared with 65,738 million francs of domestic securities.[16]

Among the lesser creditor countries of Europe, Holland[17] occupied a particular position. During the period 1875–1914 more than half the security holdings of Dutch investors consisted of foreign securities. As early as 1865, 89 foreign securities were listed, but only 24 Dutch and 3 colonial securities; in Amsterdam the number of Russian securities traded nearly equaled that for all of Holland. In 1895, 232 Dutch, 92 colonial, and not less than 458 foreign securities (including 150 American and 48 Russian railways) were dealt in. During the twenty years before the outbreak of World War I foreign securities lost some ground, but in January 1914 Dutch securities still were less than half the official list—691 against 265 colonial and 840 foreign, among which were 302 United States securities.

For the international influence of a stock exchange the position which its country occupied in the world economic system was more important than the number of foreign shares listed.[18] Though practically no foreign shares were dealt in on the New York Stock Exchange, its tendency was anxiously watched by the European speculators. And though Dutch and Belgian exchanges were swamped by foreign securities, they exercised little influence of their own and usually followed the movements of the exchanges of the major countries whose securities were listed there.[19]

It appears that many crisis factors were of international origin and affected all bourses at the same time (see Chart 71). The frequently reappearing war scare in Europe in many cases halted

[16] "French Savings and Their Influence upon the Bank of France and upon French Banks," appendix to M. Patron, "The Bank of France," *National Monetary Commission*, 1910. The difference in estimates is larger than can be accounted for by the time difference. Patron himself states that England owned foreign securities amounting to 55,000 million francs, but gives no further source. For 1903 the Administration des Domaines estimated the total of French investments abroad at 29,855 million francs, but these were not held only in the form of securities (Cf. Patron, p. 13n).

[17] All data for Holland are from L. Brenninkmeyer, *Die Amsterdamer Effektenbörse*, Berlin, 1920.

[18] See H. Gebhard, *Die Berliner Börse*, Berlin, 1928, pp. 130–131, footnote 2.

[19] See T. Renz, *La Bourse des Valeurs Mobilières à Bâle*, 1933, p. 100.

simultaneously the expansionary movement, or provoked on all bourses a brisk contraction (1887, 1912). *Expansionary* movements seem to have originated often on one exchange (usually as a result of a turn in general business) and then to have affected favorably the tendency of exchanges in other countries. Here again the distinction between "major" and "minor" countries is necessary; an expansion in France would spread to Holland, Belgium, or Switzerland, and usually to German exchanges too, but a local recovery in, say, Belgium would not affect Paris or London significantly. Historical studies frequently record how panics on one exchange spread to others, but usually explain recovery in terms of an improvement in general economic conditions in the respective country and abroad, not as a spread of mere optimism from exchange to exchange.[20]

Major contractions and speculative crashes occurred simultaneously on all European exchanges (1873, 1882, 1884, 1890, 1895, 1900, 1907, 1912), though their intensity was usually different. In addition the stock exchanges of each country had their particular movements of domestic origin, e.g., in connection with the nationalization of railroads in Germany and Switzerland, the collapse of the French copper corner, etc., but in the annals of every exchange, movements which were connected with simultaneous crises on other European exchanges were more frequent than similar events of local origin.

No adequate statistical data are available to estimate the volume and character of international securities arbitrage operations. For example, Patron states that in 1890 Britain sold huge quantities of United States rails in Paris, both stocks and bonds, later repurchased by America.[21] Théry and others state that the Bank of England was powerless "to prevent the flurried and anxious English market from flooding the Paris market with international securities."[22] But more definite estimates are lacking.[23]

Though only relatively few brokerage firms were engaged in the arbitrage business proper, many brokers and bankers were con-

[20] But compare the influence of American outlook on Canadian movements in R. B. Bryce, "The Effects on Canada of Industrial Fluctuations in the United States," *Canadian Journal of Economics and Political Science*, August 1939. Cf. also E. Marcus, *Canada and the International Business Cycle, 1927–1939*. New York, 1954.

[21] *Op. cit.*, p. 96*n*.

[22] Théry, *op. cit.*, p. 286.

[23] The literature indicates that arbitrage operations in Europe were conducted mostly with government securities. American-European arbitrage was almost exclusively in United States railroad shares and bonds.

nected with the marketing of American securities abroad. It is significant for the close relation between the transoceanic flow of American securities and the United States foreign trade balance that the reporters of the *Commercial and Financial Chronicle* frequently linked the alleged volume of securities sold in or repatriated from Europe with exports of cotton, wheat, or tobacco. The weekly reports on the foreign exchange market frequently mentioned the (alleged) direction and the (alleged) magnitude of this flow of securities. It seems that bankers specializing in foreign exchange operations were particularly active in foreign trading with American securities.[24]

In addition to arbitrage operations, New York Stock Exchange brokers often took advantage of lower interest rates in London by transferring to that city large lines of stock and carried them for speculative purposes.[25] In some instances American railroad builders paid their British suppliers with bonds rather than cash, which were later bought back when the new railroads began to yield profits.

(6) There exist for each of the four countries—United States, Great Britain, France, and Germany—a number of stock price indexes from which one has been selected as serving our purpose best, i.e., the longest monthly series for the period to 1914 (cf. the appendix to this chapter). In this respect there are differences: the American, British, and German indexes start in 1877, 1867, and 1870 respectively, whereas the monthly French index is available only from 1897 (although the Paris Bourse was of considerable importance during the preceding years).

None of the selected series (shown in Chart 71) contains foreign shares, though they did form a large part of all securities transactions. Therefore the indexes might be taken to represent the movement of domestic share prices. Even this is true to only a limited extent; stocks of companies doing business abroad, through exports or by operating plants in foreign countries, might reflect foreign business conditions more than domestic. Timing and amplitude of the price movement of these shares may be governed by foreign rather than by domestic business cycles. If there are many such shares in the index, any number of tendencies—of the same kind, or neutralizing each other—may be brought into the domestic picture.

[24] See, for example, the *Chronicle*, March 5, 1881, p. 242.
[25] Th. York, "International Dealings in Securities," *Administration*, Vol. II, 1921, p. 520.

The American index is probably little exposed to these influences during the years 1870–1914, this country then being a debtor country depending heavily for its industrial development upon the influx of foreign capital. Its exports were mainly agricultural, which involved few joint stock companies listed in New York. American railroad shares, which were the dominant type of issue traded until about 1909, are free from the above-mentioned international complications, also because of the absence of transit traffic, which complicates the picture in most European countries with the exception of England, where however no railroad shares are included in the index. But in the latter country the hauling of freight for export makes the railroads dependent upon the foreign activities of domestic firms more than in the United States, where the percentage of export freight was small before 1914 (in spite of bulky grains) and most certainly has not risen to significance even after World War I.[26]

The British index contains a (varying) number of transportation shares. They do not include railroads, but shipping, bus lines, docking establishments, and communication companies. Shipping business obviously depends to a high degree on economic conditions abroad. In the other groups, too, the British index contains many firms doing business abroad, in keeping with the fact that British "internal" business conditions can hardly be separated from these external influences during the period considered. In the two continental countries the situation is not quite the same, French business probably being more domestically determined than that of Germany.

Section 2. Cyclical Behavior and Covariation of Stock Market Prices in Four Countries

(7) There is an obvious but deep interest in determining the cyclical behavior and covariation of the share price indexes because of the traditionally high significance that stock market events in important countries have for others. Furthermore there are the flows of investible funds the main forces of which we examined in connection with interest rate differentials. It will also be important to make as complete a list of stock market panics and collapses for

[26] A proof can be obtained by considering the export quota of the total production. Passenger traffic in the United States is of course almost entirely domestic and, before the war, played a large role in the profits of some railroads.

TABLE 131

Number and Duration of Specific Cycles of Share Price Indexes of Four Countries

(seasonally uncorrected except Great Britain, 1925–1932)

	NUMBER OF:			AVERAGE DURATION[a] OF: (*months*)			AVERAGE PER CENT[b] DURATION OF SPECIFIC CYCLES	
	Expansions	*Contractions*	*Full cycles*[c]	*Expansions*	*Contractions*	*Full cycles*	*Expansions*	*Contractions*
	Prewar: February 1878–August 1913, 426 months							
Great Britain	5	4	4	35.6	50.8	89.0	41.2	58.8
France[d]	2	2	1	47.0	27.5	45.0	63.1	36.9
Germany	4	4	3	59.0	34.3	90.7	63.2	36.8
United States	9	9	8	24.3	17.3	38.3	58.4	41.6
	Postwar: January 1925–December 1932, 96 months							
Great Britain	—	1	—	—	38	—	—	—
France	2	1	1	21	3	19	87.5	12.5
Germany	1	2	1	16	35.5	76	31.1	68.9
United States	—	1	—	—	33	—	—	—

[a] Durations of only complete cycle expansions and contractions are included in their respective columns.

[b] The percentages are calculated from a base equal to the average duration of cycles only when the number of full cycles is the same as the number of expansions and contractions.

[c] Only complete cycles are counted; parts of cycles at both ends of a series are dropped. Cycles are measured from trough to trough. Similarly only complete expansions and contractions are counted in their respective columns.

[d] France only from January 1898 to August 1913, 188 months.

each country as we can, to establish their possible international ramifications, and to examine to what extent the indexes reflect these occurrences. Because of the alleged sensitivity of stock markets to future developments we shall also consider leads and lags between countries, in spite of the limitations both as to the quality of the indexes and the reluctance to attribute significance to leads and lags when cycle determination itself is open to many doubts (cf. Chart 72).

For the prewar period, American share prices show twice as many specific cycles as any of the other countries' series (cf. Table 131), eight full cycles between February 1878 and August 1913, compared with four for Great Britain and three for Germany. (The French series is not comparable, as it started in January 1898.) All but Great Britain show longer average expansions than contrac-

tions. Because of the greater number of cycles, the American series has the shorter duration both for the expansion and contraction phases, a relationship similar to that for the reference cycles.

The postwar period is too short to justify generalization. Only two of the countries—France and Germany—record a full cycle between January 1925 and December 1932, though, in contradiction with each other, the former is in expansion for seven times as many months as it is in contraction, whereas the latter country shows a greater number of months in the contraction phase.

If we compare each country's specific share price cycle with its respective reference cycle, we find that with one exception—postwar Great Britain, where the distribution is random—the two cycles are in the same phase for the majority of the months (cf. Table 133). The best agreement is for postwar United States, while prewar France (January 1898–August 1913) shows almost as high a percentage—76.0 per cent and 75.5 per cent respectively, both significant.

The extent of agreement varies slightly from prewar to postwar, again with the exception of Great Britain. The United States shows a higher percentage of agreement after the war than in either of the prewar periods selected; Great Britain and France show less postwar agreement, while Germany's agreement improves after the war only if compared with the shorter prewar period (1898–1913). The only marked change is that for Great Britain; for 1878–1913 it was in similar phases during 63.8 per cent of the period; for 1898–1913 the figure improves to 70.2 per cent; but for the postwar it drops to 50 per cent.

The good correspondence between the movement of stock price indexes and reference cycles is not surprising. It must be noted that our count is affected by the fact that lags and leads are not considered; the covariation might be greater if the typical lead of stock prices were taken into account.[27] A comparison of the specific cycle and reference cycle turning points (Tables 132 and 1) enable the reader to carry out further measurements (see also below Tables 137 and 138 for lags among the stock price cycles).

[27] The average lead (−) or lag (+) relative to the reference cycle was, in months:

	Peak	*Trough*
United States	−5	−6
Great Britain	−7	+3.5
Germany	−4.5	−6
France	−6	−2

TABLE 132

Dates by Months of Specific Cycles of Stock Market Price Indexes of Four Countries, Prewar and Postwar, Seasonally Uncorrected[a]

UNITED STATES		GREAT BRITAIN	
Peak	*Trough*	*Peak*	*Trough*
May 1872	June 1877	Oct. 1873	July 1879
June 1881	Jan. 1885	Jan. 1880	Nov. 1887
May 1887	June 1888	Oct. 1889	Apr. 1892
May 1890	Dec. 1890	Feb. 1900	Aug. 1904
Aug. 1892	Mar. 1895	Feb. 1907	Mar. 1909
Sept. 1895	Aug. 1896	Apr. 1911	June 1914[b]
Apr. 1899	Sept. 1900		
Sept. 1902	Oct. 1903		
Sept. 1906	Nov. 1907		
Dec. 1909	July 1910		
Sept. 1912	Dec. 1914		
			Jan. 1919[c]
July 1919	Aug. 1921	Jan. 1920	Oct. 1921
Mar. 1923	Oct. 1923	June 1923	July 1924
Sept. 1929	June 1932	Feb. 1929	June 1932
Feb. 1934	Mar. 1935		
Mar. 1937	Apr. 1938		
Oct. 1939			

GERMANY		FRANCE	
Peak	*Trough*	*Peak*	*Trough*
Nov. 1872	June 1877		Jan. 1898[d]
Aug. 1881	Nov. 1885	Apr. 1900	Feb. 1904
Dec. 1889	Nov. 1891	Feb. 1907	Nov. 1907
May 1899	Oct. 1901	Sept. 1912	July 1914[b]
Sept. 1905	July 1908		
Sept. 1912	Dec. 1913[b]		
	June 1924		Mar. 1919
Jan. 1925	Dec. 1925	Apr. 1920	Apr. 1922
Apr. 1927	Apr. 1932	Oct. 1924	May 1925
		Sept. 1926	Dec. 1926
		Feb. 1929	May 1933
		July 1933	

[a] Seasonally corrected for Great Britain, 1925 to 1932.
[b] Last month available before World War I.
[c] First month available after World War I.
[d] First month available.

TABLE 133

Phase Comparison of Share Price Indexes and Respective Reference Cylces

	SAME PHASE IN:			Different phase	SAME PHASE IN:		
	Expansions	Contractions	Total		Expansions	Contractions	Total
	(MONTHS)				(PERCENTAGES)		
Prewar: February 1878–August 1913, 426 months							
Great Britain	141	131	272	154	33.1	30.8	63.8
Germany	190	103	293	133	44.6	24.2	68.8
United States	187	122	309	117	43.9	28.6	72.5
Prewar: January 1898–August 1913, 188 months							
France	98	44	142	46	52.1	23.4	75.5
Great Britain	78	54	132	56	41 5	28.7	70.2
Germany	86	35	121	67	45.7	18.6	64.4
United States	88	47	135	53	46.8	25.0	71.8
Postwar: January 1925–December 1932, 96 months							
France	35	35	70	26	36.5	36.5	72.9
Great Britain	13	35	48	48	13.5	36.5	50.0
Germany	18	45	63	33	18.8	46.9	65.6
United States	40	33	73	23	41.7	34.4	76.0

Tables 134 and 135 deal with international comparisons of share price cycles. Table 134 shows evidence of international solidarity. For example, postwar American and British share prices are in the same phase 92.7 per cent of the months. The four markets are in the same phase 45.8 per cent of the months, also a highly significant figure. With the exception of the comparisons involving the German series, there was a greater percentage of phase agreement after than before the war.

It is of interest to note that among the two-nation comparisons, the prewar British–United States couple shows up with the lowest percentage of agreement. After World War I, as already mentioned, these two gave the best agreement. This reverses the trend of disintegration observed in all previous series, where there was always less correspondence after World War I. It would be interesting, if it could be done quantitatively, to see whether the improving trend in phase agreement was the result of America's decreasing role as a debtor. However, even at this stage, a generalization connecting creditor-debtor relations with the agreement of share price move-

TABLE 134

Phase Comparison of Specific Cycles of Share Price Indexes

	SAME PHASE IN:			Different phase	SAME PHASE IN:			Different phase
	Expansions	Contractions	Total		Expansions	Contractions	Total	
	(MONTHS)				(PERCENTAGES)			
Prewar: February 1879–August 1913, 426 months								
U.S.–Great Britain–Germany	95	75	170	256	22.3	17.6	39.9	60.1
Great Britain–Germany	152	122	274	152	35.7	28.6	64.3	35.7
Great Britain–U.S.	107	95	202	224	25.1	22.3	47.4	52.6
Germany–U.S.	200	89	289	137	46.9	20.9	67.8	32.2
Prewar: January 1898–August 1913, 188 months								
U.S.–France–Great Britain–Germany	47	25	72	116	25.0	13.3	38.3	61.7
France–Great Britain–Germany	55	38	93	95	29.3	20.2	49.5	50.5
Great Britain–Germany	55	48	103	85	29.3	25.5	54.8	45.2
Great Britain–U.S.	59	40	99	89	31.4	21.3	52.7	47.3
Great Britain–France	85	66	151	37	45.2	35.1	80.3	19.7
Germany–U.S.	93	41	134	54	49.5	21.8	71.3	28.7
Germany–France	86	38	124	64	45.7	20.2	66.0	34.0
U.S.–France	98	38	136	52	52.1	20.2	72.3	27.7
Postwar: January 1925–December 1932, 96 months								
U.S.–France–Great Britain–Germany	13	31	44	52	13.5	32.3	45.8	54.2
France–Great Britain–Germany	13	38	51	45	13.5	39.6	53.1	46.9
Great Britain–Germany	22	38	60	36	22.9	39.6	62.5	37.5
Great Britain–U.S.	56	33	89	7	58.3	34.4	92.7	7.3
Great Britain–France	42	40	82	14	43.8	41.7	85.4	14.6
Germany–U.S.	22	30	52	44	22.9	31.3	54.2	45.8
Germany–France	13	43	56	40	13.5	44.8	58.3	41.7
U.S.–France	42	33	75	21	43.8	34.4	78.1	21.9

ment is doubtful. For example, in the shorter prewar period (1898–1913) the three comparisons involving the main creditor nation—Great Britain—show both the best agreement (with the creditor nation France, 80.3 per cent) and the lowest (with the United States, 52.7 per cent) of the six comparisons made.

It is of course a question whether covariation of these indexes should be expected at all and whether it should be higher for one phase rather than for another. If there is interaction, it will certainly show in the simultaneous occurrence of panics and the like.

But it is also known—especially from the experience of the 1920's—that some stock markets declined because others rose, not because they became depressed (cf. Table 132). Such contrary movements extend sometimes over several months, a fact which accounts for the lower conformity. Covariation may therefore be high between two markets that in this sense are both subject to influences from a third, with which they would then have a low correspondence. All this is related to the time unit of the measurement and the speed with which influences spread from one market to another, as in previous cases. On the whole therefore extreme care in interpretation is required; the commentary merely illustrates the facts which are too few and too diversified to yield a theory.

Table 135 shows the concentration and dispersion of the *turning points* of the share price indexes. It will be noted that the average deviation of the lower turning point is greater than that of the upper turning point. and that the coinciding peaks are a higher percentage of all peaks than the coinciding troughs are of all troughs. In other words the sharpness of the upper turning point may result in greater solidarity than the more gradual upswing. The same was observed in other instances for different activities. Since these upper turning points do not necessarily coincide with panics, they may be even better correlated. All this points back to the analysis of the "effort" series (Chapter VII) and the dates found there, and forward to section 3 below where panics are considered.

Table 136 gives the *sign correlations*, covering comparisons of month-to-month movements of share prices. A high coefficient at the proper probability level indicates a great similarity of movement between two successive months. Although some such indication is present in all but one of the groups (postwar Great Britain and Germany), in none is there a similarity of movement even as high as for two-thirds of the monthly changes. The values nowhere reach the highest observed in other sign correlations, especially with exchange rates and short-term interest rates where $C \geqq 0.400$ with $p < 0.001$ was not uncommon (Table 137).

Neither is there any clear similarity in the patterns of these two, as could perhaps be expected. But the interrelations which necessarily must exist among these markets are probably of a much deeper nature than has been revealed thus far. This noncyclical measurement takes care of earlier observations about the economic reasons for not expecting strong covariation among stock market price indexes. Here it is seen that the low correspondence is *reduced* further when the definition of a specific cycle is *not* applied.

TABLE 135

Concentration and Dispersion of Specific Cycle Turning Points of Share Price Indexes

	COINCIDING PEAKS[a]			
	Average peak[b]	*Mean deviation (months)*	*Average mean deviation (months)*	*Percentage coinciding*
	February 1878–August 1913, 426 months			
Three countries[c]	Jan. 1881	3.00	4.78	79
	Jan. 1890	2.67		
	Aug. 1899	4.22		
	July 1906	6.44		
	Mar. 1912	7.56		
	January 1898–August 1913, 188 months			
Three European countries[d]	Dec. 1899	4.44	6.52	100
	Aug. 1906	7.56		
	Mar. 1912	7.56		
	January 1898–August 1913, 188 months			
Four countries[e]	Dec. 1899	5.25	5.79	92
	Aug.-Sept. 1906	5.75		
	May. 1912	6.38		

	COINCIDING TROUGHS[f]			
	Average trough[b]	*Mean deviation (months)*	*Average mean deviation (months)*	*Percentage coinciding*
	February 1878–August 1913, 426 months			
Three countries[c]	Sept. 1891	6.00	5.67	33
	July 1908	5.33		
	January 1898–August 1913, 188 months			
Three European countries[d]	July 1903	13.77	9.55	100
	July 1908	5.33		
	January 1898–August 1913, 188 months			
Four countries[e]	May 1908	6.00	6.00	40

Average mean deviation of coinciding peaks as per cent of Corresponding average for troughs

Three countries[c]	84%
Three European countries[d]	68%
Four countries[e]	97%

[a] Coinciding peaks: within the range of peaks is no trough.

[b] The arithmetical mean of the coinciding peaks or troughs is computed. If the average falls exactly between two months, both months are reported. If the average falls more closely into one month, only this month is reported.

[c] United States, Great Britain, Germany.

[d] France, Great Britain, Germany.

[e] United States, France, Great Britain, Germany.

[f] Coinciding troughs: within the range of troughs is no peak.

TABLE 136

Sign Correlation of Share Prices of Various Countries

	N	*Z*	*p*	*C*	*Rank to C*
		Prewar			
January 1870–December 1913					
Germany–Great Britain	527	315.0	$p > .00001$	0.195	3
January 1899–December 1913					
Germany–France	179	103.0	$0.06 > p > .07$	0.151	5
January 1871–December 1913					
Germany–United States	515	290.0	$p > .01$	0.126	6
January 1871–June 1914					
United States–Great Britain	521	307.5	$p > .001$	0.180	4
January 1899–June 1914					
Great Britain–France	185	118.0	$p > .001$	0.276	1
January 1899–July 1914					
United States–France	186	112.0	$p > .01$	0.204	2
		Postwar			
December 1924–December 1934					
Germany-Great Britain	120	57.5	—	−0.041	6
December 1924–July 1935					
Germany–France	127	65.5	$0.74 > p > .75$	0.031	5
December 1924–July 1935					
Germany–United States	127	70.5	$0.25 > p > .26$	0.110	3
December 1924–December 1934					
United States–Great Britain	120	76.0	$p > .01$	0.267	1
December 1924–December 1934					
Great Britain–France	120	66.0	$0.32 > p > .33$	0.100	4
December 1924–December 1938					
United States–France	168	104.0	$p > .01$	0.238	2

N = number of pairs of differences observed.

Z = number of times change of price showed same sign (zero change counted as one-half).

p = probability that an observed deviation from the expected value as great or greater is due to chance.

C = coefficient of covariation.

The fact that the indexes correspond often as well with the reference cycles, i.e., with domestic conditions, as with each other disappoints the expectation that the stock markets form a more closely knit community than is apparent. However foreign shares are not considered by the indexes and interaction need not be of the simple kind that would cause these indexes to move in the same direction.

(8) As a rule we did not study *leads and lags* of series beyond

some adaptation of the measures of sign correlation in some instances.[28] Stock prices, however, are generally thought to herald movements in general business within a country. Furthermore increased activity in one center may foreshadow the same in another country, but the relations may be highly unstable. For example, while a boom in London may produce one in New York later, a depression in New York may precede one in London, etc. Leads or lags may arise only in connection with the rate of change in each market and with the absolute level of prices in the other markets. With no formal hypothesis to be formulated a priori, or on the basis of the regularities thus far found in this work, it is necessary to approach in a purely empirical manner the question whether leads and lags exist. In particular the question whether leads and lags could be expected in monthly series poses itself again. The main difficulty is once more that a month is a long interval of time for fast reacting markets, so that true lags may be hidden by choosing this time interval, although this is somewhat doubtful, especially in the light of Table 135. Also the lagging of our series will undoubtedly be affected greatly by the insufficiency in the international make-up of the indexes, which was discussed at length above.

With all these and other reservations in mind, we show in Tables 137 and 138 comprehensive measurements, based on the specific cycles of the four series. Table 137 shows separately for the prewar and postwar periods the lags and leads of the peaks and troughs. The respective turning points themselves are also entered (cf. Table 132). The righthand columns show exhaustively the leads and lags (in months) of the American, British, and German stock price indexes relative to the others. Table 138 gives the summary representation in which, for all pairs of countries, the numbers of leads, lags, and coincidences are shown as well as the average duration of the former two.

Before discussing the results of the measurements it should be pointed out that the least reliable relationship involves the United States, in view of the large number of "extra" cycles there (before World War I) and the corresponding difficulty of selecting the "corresponding" cycles in the paired country. Some peaks and troughs have to be skipped. It is reasonable to use only those dates nearest to the peaks and troughs of the paired country, but the skipped American peaks and troughs stand by themselves in isolation. Are those actually used in the counts the more important

[28] For example, Table 73.

TABLE 137

Correspondence of Stock Price Cycles in Four Countries

DATES OF PEAKS AND TROUGHS IN STOCK PRICES				LEAD (−) OR LAG (+) IN MONTHS OF:					
				AMERICAN STOCK PRICES RELATIVE TO:			BRITISH STOCK PRICES RELATIVE TO:		GERMAN STOCK PRICES RELATIVE TO:
United States	*Great Britain*	*Germany*	*France*	*British*	*German*	*French*	*German*	*French*	*French*
			PREWAR PEAKS						
May 1872 (1)	Oct. 1873 (3)	Nov. 1872 (2)		−17	−6		+11		
June 1881 (2)	Jan. 1880 (1)	Aug. 1881 (3)		+17	−2		−19		
May 1887									
May 1890 (3)	Oct. 1889 (1)	Dec. 1889 (2)		+7	+5		−2		
Aug. 1892									
Sept. 1895									
Apr. 1899 (1)	Feb. 1900 (3)	May 1899 (2)	Apr. 1900 (4)	−10	−1	−12	+9	−2	−11
Sept. 1902									
Sept. 1906 (2)	Feb. 1907 (3½)	Sept. 1905 (1)	Feb. 1907 (3½)	−5	+12	−5	+17	0	−17
Dec. 1909									
Sept. 1912 (3)	Apr. 1911 (1)	Sept. 1912 (3)	Sept. 1912 (3)	+17	0	0	−17	−17	0
			POSTWAR PEAKS						
July 1919 (1)	Jan. 1920 (2)		Apr. 1920	−6		−9		−3	
Mar. 1923 (1)	June 1923 (2)	Jan. 1925 (4)	Oct. 1924 (3)	−3	−22	−19	−19	−16	+3
			Sept. 1926						
Sept. 1929 (4)	Feb. 1929 (2½)	Apr. 1927 (1)	Feb. 1929 (2½)	+7	+29	+7	+22	0	−22
Feb. 1934 (2)			July 1933 (1)			+7			
			PREWAR TROUGHS						
June 1877 (1½)	July 1879 (3)	June 1877 (1½)		−25	0		+25		
Jan. 1885 (1)		Nov. 1885 (2)			−10		+24		
June 1888 (4)*	Nov. 1887 (3)*			+7					
Dec. 1890 (1)	Apr. 1892 (3)	Nov. 1891 (2)		−16	−11		+5		
Mar. 1895									
Aug. 1896									
Sept. 1900 (1)		Oct. 1901 (2)			−13				
Oct. 1903 (1)	Aug. 1904 (3)		Feb. 1904 (2)	−10		−4	+34	+6	−28
Nov. 1907 (1½)	Mar. 1909 (4)	July 1908 (3)	Nov. 1907 (1½)	−16	−8	0	+8	+16	+8
July 1910									

TABLE 137, concluded

			POSTWAR TROUGHS							
Aug. 1921 (1)	Oct. 1921 (2)		Apr. 1922 (3)	−2		−8		−6		
Oct. 1923 (1)	July 1924 (3)	June 1924 (2)	May 1925 (4)	−9	−8	−19	+1	−10		+7
		Dec. 1925	Dec. 1926							
June 1932 (2½)	June 1932 (2½)	Apr. 1932 (1)	May 1933 (4)	0	+2	−11	+2	−11		−13

Note: The numbers in parentheses indicate the apparent order of the turning points.

[a] Presumably the foreign revivals started by the first American upturn in January 1885 helped to stem the recession after May 1887 and caused the upturn of June 1888.

TABLE 138

Summary: Leads and Lags of Stock Prices in Four Countries

	AMERICAN STOCK PRICES RELATIVE TO:						BRITISH STOCK PRICES RELATIVE TO:				GERMAN STOCK PRICES RELATIVE TO FRENCH	
	BRITISH		GERMAN		FRENCH		GERMAN		FRENCH			
	Peak	*Trough*	*Peak*	*Trough*	*Peak*	*Trough*	*Peak*	*Trough*	*Peak*	*Trough*	*Peak*	*Trough*
Prewar, number of:												
leads	3	4	3	4	2	1	3	0	2	0	2	1
coincidences	0	0	1	1	1	1	0	0	1	0	1	0
lags	3	1	2	0	0	0	3	5	0	2	0	1
Average lead (−) or lag (+), mos.	+1.5	−12.0	+1.3	−8.4	−5.7	−2.0	−0.2	+19.2	−6.3	+11.0	−9.3	10.0
Postwar, number of:												
leads	2	2	1	1	2	3	1	0	2	3	1	1
coincidences	0	1	0	0	0	0	0	0	1	0	0	0
lags	1	0	1	1	2	0	1	2	0	0	1	1
Average lead (−) or lag (+), mos.	−0.7	−3.7	+3.5	−3.0	−3.5	−12.7	+1.5	+1.5	−6.3	−9.0	+9.5	−3.0
Whole period, number of:												
leads	5	6	4	5	4	4	4	0	4	3	3	2
coincidences	0	1	1	1	1	1	0	0	2	0	1	0
lags	4	1	3	1	2	0	4	7	0	2	1	2
Average lead (−) or lag (+), mos.	+0.8	−8.9	+1.9	−6.9	−4.4	−8.4	+0.2	+14.1	−6.3	−1.0	+9.4	+3.5

domestically or internationally? There is no answer to this and other basic questions merely on the basis of the present observations. Furthermore the prewar observations are based on a larger sample which makes the averages more representative.

The following comments summarize some of the information in Tables 137 and 138:

(1) *Prewar peaks.* There were as many leads as lags of United States stock prices in relation to the British. In respect to German and French the American stock price cycles more often led or coincided. The same pattern holds for the British cycles in regard to the two continental ones, and Germany's cycles always led or coincided with the French.

(2) *Postwar peaks.* There is not much disturbance of the pre-World-War-I setup. There is no clear change in the average length of the lead or lag duration, which varies for the peaks in prewar from 9.3 months to 0.2 months and in the postwar period from 9.5 to 0.7 months.

(3) *Prewar troughs.* The United States in all instances lagged only once, Britain lagged always behind France and Germany, while the latter country once led and once lagged compared with France. This is a somewhat clearer and perhaps more significant picture than the one obtaining for peaks.

(4) *Postwar troughs.* The American relation to the three others is reproduced, but in the British case there are two lags against Germany but three leads against France. There is no change in the relations between the German and French cycles. The average length of prewar trough lead or lag duration varies between 19.2 and 2.0 months, in postwar between 12.7 and 1.5 months, i.e., a narrowing.

Looking at the averages for the period as a whole, we can say that the American cycle tended to lead in the upturn from the troughs, while before the war Britain led in the downturn from the peak. France lagged behind both America and Britain, except in the trough phase before World War I, when she led Britain. The only marked changes from prewar to postwar were: (1) a slight prewar lag at the peak of the German relative to the British series, changing to a slight lead (of 1½ months) after the war; and (2) the prewar French lead over the British, changing to an even greater lag after the war (a seven months' lead changing to a nine months' lag).

Considering the smallness of our sample, generalizations are

exceptionally hazardous. Tentatively we can say that the downturns before World War I started in the United States or Great Britain, while the prewar upturns almost all started in the United States, as did two of the three after the war. France generally lagged behind the other countries, while Germany was in a middle position.

The uncertainties in these patterns however should not be disregarded. In some cases the matching of the cycles would change the lead or lag, and the averages as well. For example, did the American peak of May 1887 lead the German one of December 1889, or (as we have assumed) did the latter lead the May 1890 American peak? We have selected those two nearest each other chronologically, but that may not be justified. On the other hand the British trough of March 1909 was linked with the more distant American trough of November 1907, rather than the nearer July 1910, because it was felt that the 1906–1907 cycle was probably more widespread in its repercussions. There are lags as long as thirty-four months (between the British trough of August 1904 and the German trough of October 1901). Can we safely assume that it took that long to transmit the cycle influence? These and other doubts compel us to regard the results as very tentative, requiring a great deal of further investigation. There can be no doubt that what is described in these simple measurements is "true." But there is also no doubt that the apparently simple, intuitively clear notion that one event "follows" another—even leaving aside whether it is a *propter hoc*, instead of merely a *post hoc*—involves complicated and far-reaching assumptions. Analysis of business cycles, as available in the literature, does not offer guidance in the present circumstance and relying on common sense alone can be very misleading. This applies particularly to situations of a high degree of complexity where it is not at all clear what "common sense" means.

Section 3. Statistically Determined Turning Points, and Panics on Stock Markets

(9) The direct comparison of the cycles of four stock price indexes in section 2 yielded some surprising information: in spite of the length of the monthly series there were few cycles, although the series describe markets notorious for wide swings and often sudden movements of even catastrophic proportions. It is furthermore commonplace to assume that the markets of different countries interact very closely. Now it is easy to find fault with the

indexes themselves. We have seen that their coverage is inadequate inasmuch as foreign securities are omitted. Besides there are many other stock markets that should be included for reasons of possible interaction, because at one time or another they have played a big role, sometimes even exceeding that of the stock markets of large countries. Among those to be considered at varying periods would be: Vienna, Amsterdam, Zürich, Brussels, Milan, and Basel. For these places sufficient indexes do not exist and what is available does not take good account of foreign securities, which are precisely those stocks in which they traded most heavily.

Since this situation cannot be remedied quantitatively at present—it would be an expensive project of vast proportions—we do two things at once: we broaden the basis of our observations by considering also the stock markets of Vienna, Zürich, and Amsterdam, but do this in a nonquantitative, i.e., nonnumerical, way. As a consequence we shall no longer look for a correspondence of entire cycles, a procedure which is clearly tantamount to employing a rather intricate hypothesis. We shall instead relax our requirements and choose a more direct and simpler approach. It consists in concerning ourselves with the peaks and troughs in stock market activity, taking our information from far wider records than those offered merely by the indexes, and checking the latter against this general information. Or in other words: we shall try to establish a complete series of panics or other crises involving chiefly the security markets and check the indexes against that list. It will be found that the indexes do not always reflect them in a way corresponding to the other indications and descriptions used. Such a test requires of course passing upon the merits of this other material.

In order to give names to the two kinds of occurrences, we call the specific cycle peaks and troughs determined by the National Bureau technique "statistical," and the other—generally very sudden—disturbances based on further records simply "panics." We do not wish to suggest, by choosing this word, that the downturns which we find by this old and common procedure were invariably panicky in a narrower sense of runs, disasters, etc. Many of them were of this nature, however, and wherever necessary we shall register this additional psychological fact separately. It is more difficult—lacking figures—to indicate their magnitude, though a quantitative measurement would be of primary importance. However it is precisely the stock price index which is devised to establish such a numerical value. But our task is more modest, namely, first to

determine whether all the (nonstatistically determined) panics coincide in all cases with the peak or trough position of the indexes, and only secondly to raise the additional question of a quantitative correspondence regarding magnitude of change.

(10) The notion of a panic is at first too vague to be used without further qualifications. It occurs often in the literature,[29] especially in the numerous older writings which frequently sprang from the observation of rather violent occurrences on stock exchanges that spread to other fields of financial and industrial activities. Bankruptcies in finance usually followed fairly soon.

It is therefore best not to rely on essentially verbal statements, often made under the impression of the day. Instead we give a brief description of those phenomena, sufficient to establish the fact that the stock markets have been upset to such a degree as to impress contemporary commentators, and often also later recorders, and to justify characterizing these disturbances as panics.

Panics can occur during any phase of the cycle, though they might be expected toward the crest of the expansionary movement and shortly after. In the second part of the nineteenth century sudden disturbances at times other than the crest were noted, seemingly due chiefly to intensive speculative activity of influential financiers, to the creation of corners, pools, and the like. Such operations have thrown markets into confusion and brought about a collapse of prices at a time when the general market situation did not seem vulnerable. These price falls were then quickly overcome. In other instances panics occurred at or near the upper turning point of business cycles, thereby initiating a downward movement of prices from which there was no such speedy recovery.

Panics will hardly ever be observed at the lower turning points, though it must be noted that there are some attributable to random political influences (dangers of war, political scandals, etc.) which may make themselves felt at any time of the cycle.

Among the characteristics common to all of them are the *concentrated, massive sales of securities with secondary regard for the prices currently realized.* The desire to get rid of the securities expresses the belief that less rapid sales would only result in still greater losses. Pressure is exercised to repay brokers' loans and to

[29] But no precise statements are to be found anywhere. Even the classical surveys in Palgrave's *Dictionary of Political Economy*, in the *Encyclopaedia of Social Sciences*, and the *Handwörterbuch der Staatswissenschaften*, contain only vague references to "fear," "hyperspeculation," "mass failures," "crashes" and the like. It is not necessary to reproduce these statements.

put up more margin. Banks will make great efforts to withdraw credits that might have gone directly or indirectly to the stock market. Liquidity of assets is held to be of much greater importance than loss of capital. These beliefs are of a contagious nature, extending often beyond those securities which may have been shown to be worthless, e.g., because of fraud, a frequent reason in the nineteenth century. The movement is likely to carry over to securities of good standing, and also to persons who were originally not affected by the price fall of the bad securities.[30] In the latter case a quieter estimation of their value will lead to a more or less rapid recovery of the "sound" stock. Political events, e.g., financial breakdown of a foreign government, will of course chiefly affect securities issued in the particular country or stock where dividends and interest are payable in a particular currency.

Another symptom frequently observed is the rise of short-term interest rates caused by the great craving for liquidity. It should be possible therefore to find reflections of panics in movements of these money series where they may appear as mere random disturbances.[31] In particular a stock market panic in one country might be reflected in another only by rising short-term interest rates.

In the above we could have used the word crisis instead of panic, but the former word is used in a much wider sense, and is certainly not better defined. But it should be made clear that we are not thinking exclusively of the most spectacular occurrences, and that we intend to use the word for somewhat milder disturbances of the stock markets, too. We need a word more narrowly describing the phenomenon of crisis on the stock market, and for this purpose the word panic is more suitable, although we have stressed that we do not think of using it for only the most extreme forms of a break in stock market prices, but for noticeable disturbances important enough to have produced the general impression, among those

[30] We speak only of *sales*. But clearly these are *purchases* by another party. Why then do people buy when prices are falling rapidly, and there is a great chance of a further fall? It would be most interesting to discover who buys when prices are falling—it would be easier to see why sales are made in rising markets. The identification of the buyers' and sellers' groups in sharply changing markets would contribute greatly to our understanding of expectations, etc. Such a study has, to the best of my knowledge, never been undertaken; it would undoubtedly be most revealing and rewarding, but I have not, so far, succeeded in persuading fellow-economists to embark on this project.

[31] This illustrates that what may be random for one series is often the product of other phenomena reaching certain quantitative magnitudes, not necessarily in a random fashion. It would be unwise to eliminate random changes from the series on general principles.

actively concerned, that a major unfavorable event had taken place.

However imprecise the notion of panic is, it is here meant to relate to the stock market primarily. There have been panics in the economic life of nations, e.g., in currency, commodities, etc., that have not been as great upsets on the *stock markets* as other events which were more technically associated with the latter, e.g., because a prominent bank may have been involved, etc. For that reason Table 139 contains only a selection from all possible panics that might prove to be interesting for the determination of the international picture. A well-known disturbance in New York in 1903–1904, the "rich man's panic," is not listed, although even termed a panic in most works, because it was a slow, steady fall in stock prices, lacking entirely fast selling for liquidity purposes. This shows the uncertainty of the terminology.

(11) In the subsequent comparison of the dates of these panics with the respective stock price indexes, we do not necessarily look for their coincidence with *upper turning points* of the statistical series. Peeks and panics need not coincide. But if the existence of a panic of some magnitude at a given time can be satisfactorily established through acceptable descriptive sources then we must expect a sharp *downward* movement of the stock price index at exactly the same date no matter what the phase. The degree of decrease of the index and—possibly—its duration should then be a quantitative expression of some of the features of the corresponding panic.

Since we do not necessarily require absolute correspondence between the date of a panic and a *peak* of a specific cycle of our four indexes, we are freed from reconsidering the difficulties of ascertaining these peaks. Still less is it necessary to insist on a coincidence of a panic with a trough, although this will be produced if the panic is transitory, short-lived, interrupts an upward movement, and also is reflected by the index. This shows that no very rigid rules can be laid down about the reflection of panics by our series. The limitation is not nearly as bad as it may seem to be, because the evidence to be presented and discussed below is sufficiently strong, even as matters stand now, to prove the restricted value of the indexes for establishing the correlation of the event with its alleged measure.

In Table 139 and Chart 72 only *years* are given for the panics. This differs from our usual insistence on monthly data and does not take care of the fact that the outbreak of a panic may even have

TABLE 139

International Stock Exchange Panics[a]

1873	Collapse after Gründerjahre in Germany, begun in May with panic in Vienna; collapse of American Railroad speculation (September); less effect upon London, even less on Paris; one of the worst stock exchange panics on record; clear evidence of transmissions throughout the year extended to Amsterdam and Zürich
1875	Separate, possibly independent, breakdowns on the exchanges of London (political) and Paris (Crédit Mobilier)
1878	London (bank failure)
1879	Paris and New York (independent, in this order)
1880	New York (Reading failure), influence on London; Berlin and Vienna with mutual influences
1881	Paris and New York (both panics minor)
1882	Crash of Union Générale in Paris, first class panic there; panics in Berlin, Vienna, Amsterdam, and Zürich, some influence also on London
1884	New York, bank failures, frauds uncovered, sharp but short panic with few repercussions abroad except on London dealings in American securities
1887	Separate, independently caused panics on all European stock markets; later complex interactions which cannot be traced adequately caused chiefly by political tensions and war fever
1889	Paris, collapse of French copper corner with New York affected
1890	Baring incident in London, panics in Paris, Berlin, and thence in Vienna; panic in New York in mutual relation with London
1891	Panic in Austria, carried over to Germany with influence on Paris
1893	New York, collapse of National Cordage Co., one of the worst American panics; influence on London and Germany, but no panic recorded there
1895	Collapse of international speculation in South African gold shares; panics in London, Paris, Berlin, Vienna, Amsterdam, Zürich, center in Paris with influences on all European markets; no influence on New York where independent panic due to war scare (possible intervention in Venezuela); Vienna particularly affected by Paris and New York panics; large sale of foreign-held American securities
1899	Local, brief panic in New York; no repercussions known
1900	Panic in Berlin (mining shares), influences upon Vienna; failure of London & Globe Finance Co. but no panic in London
1901	Collapse in New York of Northern Pacific corner; large selling in New York especially by foreigners in short position; influences upon London, but no panic there
1904	Severe panics in Berlin and Paris over rumor and outbreak of war between Russia and Japan; influences upon London; foreign selling in New York but no panic there
1907	Two very severe panics in New York, the first with severe panic induced in Berlin and Amsterdam, less severe in Paris none in London; panic in Vienna; many interlocking influences among all stock markets noted
1912	Panics in Paris and Vienna at the outbreak of Balkan War, leading to panic in Berlin; influences upon London only indirect

TABLE 139, concluded

International Stock Exchange Panics[a]

1914	Ultimatum and later outbreak of World War I with panic and closing of stock exchanges in Europe; closing of London exchange without preceding panic, but other influences; no panic in New York but closing of stock exchange
(1921)[b]	
1929	Panic of large proportions in New York—several waves; influences on all other stock exchanges but nowhere outright panics
1931	Closing of many exchanges, strong mutual influences originating from Vienna, then from Berlin, and finally from London; nowhere a real panic in the preceding sense

[a] This table is one of the bases for Chart 71, where the interaction is more fully demonstrated (see the final Appendix for further chronological information). The cources used are trade journals, such as *Commercial & Financial Chronicle*, *Statist*, *Economist*, works on stock exchanges, economic histories; some of these are listed in the various pertinent chapters of this book. We repeat that a list of panics is not necessarily a list of crises or depressions or both.

[b] This year falls outside the periods considered in this work and the uncertain events such as inflation, etc. on the stock exchanges are therefore not counted.

been associated with a particular day, if not hour. But the descriptive material is of such varying character for the different countries that it was best to refrain from making a very fine measurement. The main interest is, at any rate, the general pattern of international simultaneity and perhaps interconnectedness of panics; both must first be established in principle. Considerable historical research would be required to use the procedure adapted here for monthly comparison.

Chart 72 and Table 139 collect what seems to be as complete a list of panics as can be established without engaging in substantial historical studies involving primary material. This is not our task. The chart will however serve to bring out a number of important features: (1) in not less than twenty of the forty-one years from 1873–1914 panics occurred at least in one of the seven countries considered. The total number of panics is a high incidence for the seven countries considered. For the time after World War I a minimum of two more years has to be added, maintaining the high percentage of the total number of years. A definition different from ours would perhaps have produced somewhat changed numbers, but those listed here seem to be well established.

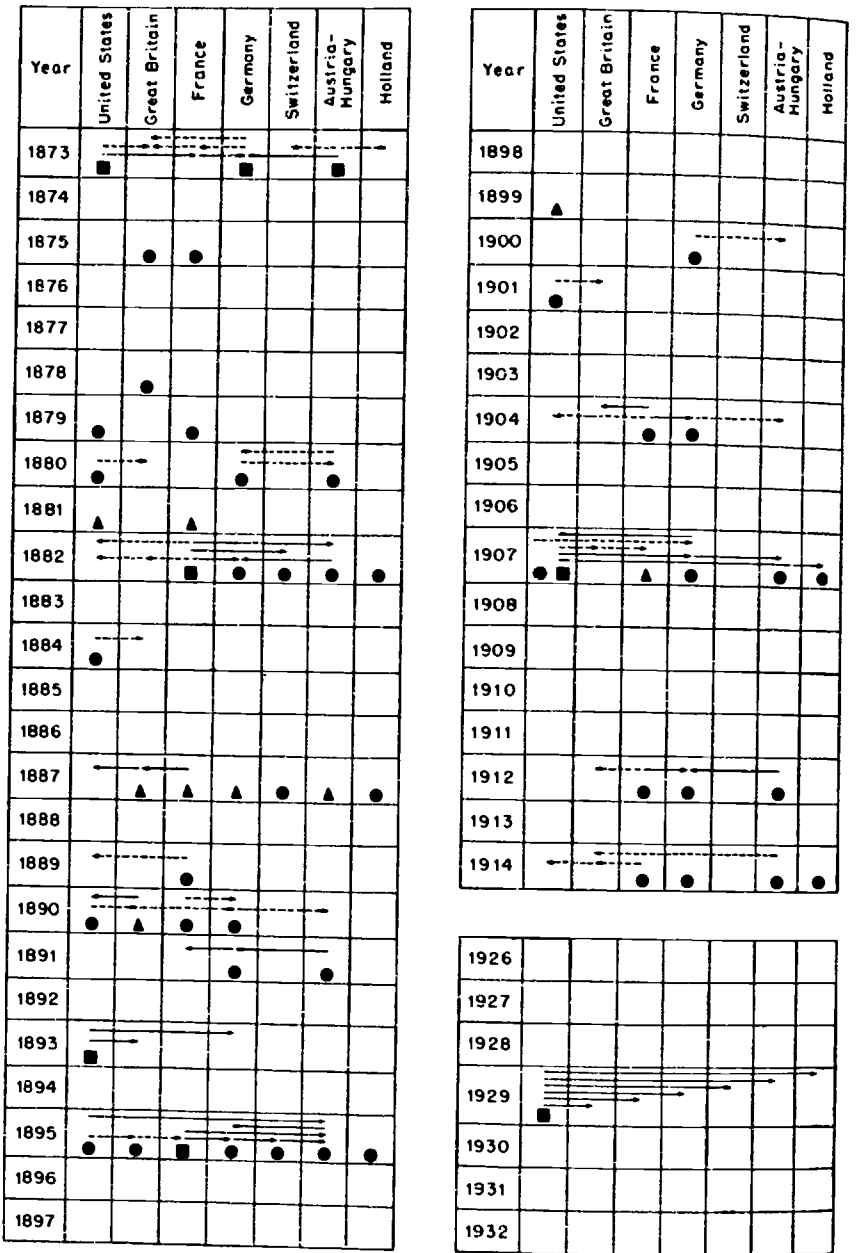
The interpretation of the *chart* is simple: a circle indicates a domestic panic of proportions sufficiently large to warrant recog-

CHART 72

International Stock Exchange Panics, 1873–1932

■ First magnitude panic
● Second magnitude panic
▲ Third magnitude panic

—— Strong influence
------ Weaker influence



Source: Table 139.

nition, but less strong in comparison with those marked by a square. A triangle, as distinguished from a circle, indicates a minor domestic panic, possibly the after-effect of an earlier disturbance of the same kind. Panics marked by a square are in the nature of a disaster and are never isolated; repercussions are then *always* reported on other stock exchanges.[32] These are shown by solid or broken arrows pointing to the country affected. A solid arrow indicates a strong influence, a broken arrow a weaker one. Sometimes an arrow is shown to a country without a panic. This means simply that panicky influences made themselves felt toward the country in which the arrow's tip falls, but—according to our information—they were absorbed in the country affected without leading to a rout on the exchange. This may have been because of the weakness of the influence, or because it came at a time when the affected exchange was not easily thrown out of balance or, finally, because of the imposition of controls maintaining or restoring confidence. The classical case for the latter possibility is the Baring incident in London (1890), which did not degenerate into a full crisis.

The basis for inclusion of a certain date as a panic was always a description, by at least one authority, of events that fall within the above broad definition. We did not let ourselves be guided by the indexes, but rather propose, in the following, to check these two against each other. Since both sources are impure it is not possible, once and for all, to decide whether one sort of information is better than the other. In fact even if the index should not register a panic at the cycle turning points, it might do so in the phase between them. Therefore we shall make an occasional direct comparison (cf. Chart 71). It will always involve a conflict of information, impossible of resolution in the light of present information, though we shall be inclined to place more confidence in the ordinary, literary sources than in the statistical compilations. But even here great difficulties arise. For example, the 1893 panic in the United States was severe on the New York Stock Exchange. We show an influence upon London. However, Clapham, always writing with authority, does not report any influence[33] in spite of the fact that the bank rate was frequently changed and even a gold standard scare existed in the United States. Of course the absolute height of

[32] For each country only one exchange is taken. Purely domestic repercussions, e.g., from Berlin to Frankfurt, from Lyon to Paris, etc., are not mentioned.

[33] *The Bank of England*, Vol. II; neither does he mention the Globe failure in 1900.

the rate, never exceeding 5 per cent, might indicate that nothing much had happened or was threatened. But we know that the bank had other means available, and nothing is known about how they were used.

In the period before 1914 there are three major panics characterized by the simultaneous occurrence of squares in several countries. They are the years 1873 (Gründer crisis), 1895 with its collapse of gold speculation, war scares, and political upheavals, and 1907 with its great crisis which is perhaps the event most to the liking of the student, because it offers almost every feature the textbooks tend to mention. It is also the best known crisis, because a number of competent studies exist for several countries. After World War I there are also two entries of this sort, 1921 and 1929, with 1931 playing an uncertain role. The first was the crisis of the war's end, while 1929 needs no further explanation.[34] In 1937 sharp decreases of stock prices occurred, but the inclusion of this year in the previous categories is somewhat doubtful. It is not even certain that it should be mentioned for the United States alone.

The chronologies in the appendix of this book give the general framework within which each panic must be seen. Therefore it is not necessary either here or in Chart 71 to be more specific about the often important political connotation.

There is a difference in the incidence of panics in the various countries. Before 1914 France is listed ten times, exceeding by two even the United States. This is not surprising, considering the highly unstable character of French politics and some big scandals of various kinds (Dreyfus, Panama). Yet it does not necessarily contradict the fact of the great influence of the Bank of France, or its policy of great gold hoards, and a (nominally) stable rate of discount. The bank was not strong enough or used its influence badly, the gold hoards did not help (they were not used decisively), and political scandals were apparently more important than the interest rate. Holland and Switzerland are mentioned only five times. This may however be due to a difference in the kind of data. 1877 and 1912 are particularly interesting: in the first year all six European countries register a panic but there are no clear influences of one upon another to warrant an arrow in the chart; this was the war scare, due to the signing of the Triple Alliance of Germany, Austria-

[34] In no case did the panics break out precisely at the same moment of time; often only a few days would intervene. This is immaterial for our purposes which do not require such microscopic observations.

Hungary, and Italy, which upset the power balance in Europe. America was not affected, war and Europe then being still very far away. The second was the outbreak of the Balkan War, which involved the stock exchanges of the four great European powers, but not those of Holland and Switzerland. That of 1895 registers for all countries, yet only the European stock markets are interaffected, the center of the disturbances being in Paris, where a great collapse of the speculation in gold shares occurred, which apparently spread to the other markets, all directly engaged in holding gold shares. New York, where African gold shares meant nothing, had its autochthonous scare because of the threat by President Cleveland to risk war over Venezuela, a possibility that however quickly vanished. There are also two completely isolated American panics, of 1884 and 1899, for which there is no evidence of a sufficiently strong emanation to others to require our arrows. Arrows were however inserted for the panic of 1893, without the need to mark the decrease produced elsewhere as panicky in those centers. The only other instance of an isolated panic, with no panicky ramifications, is the Globe panic in London in 1900. Although the records are at variance, we have decided to consider the Globe affair a panic.

So we find that panics are very rarely isolated. They occur sometimes in several countries simultaneously, caused by a common factor, mostly fear of war in that case. As a rule they are strongly interconnected. The picture for the interwar years is very similar to that of the classical period and need not be specially described. While internationally traded securities have a direct significance in transmitting sharp price drops, undoubtedly purely psychological factors also play an important part,[35] although this is admittedly a vague statement in the absence of any deeper psychological analysis of such phenomena. It is hard to see how a rigorous study could be made, given the present state of psychology.

All these panics constitute major disturbances not only where they occurred but also, by way of ramification, in those economies that apparently remained unaffected as far as their stock market levels are concerned. In the countries directly affected, exchange rates, interest rates, their differentials with other markets, all would have to register these disturbances; seldom would the disturbances stay even within the monetary field, although cases of such isolated

[35] On page 14 we spoke of "transmission by imitation," and we find here an important instance where this idea appears plausible.

TABLE 140

Index of Stock Prices in Four Countries

Index of All Common Stock Prices in the United States
(1935–1939 = $100)

Year	Open	High	Low	Close	Points of unusual fluctuation
1873	42.7	43.1 (Feb.)	33.7 (Nov.)	36.9	
1880	42.7	48.9 (Dec.)	39.9 (May)	48.9	Apr. 43.3; May 39.9
1881	51.7	54.9 (June)	50.3 (Dec.)	50.3	
1884	43.3	44.5 (Feb.)	36.2 (June, Nov., Dec.)	36.2	
1889	43.6	45.9 (Sept.)	43.3 (Apr.)	44.4	
1890	44.9	47.0 (May)	38.3 (Dec.)	38.3	Oct. 42.4; Nov. 39.4
1893	46.9	45.9 (Feb.)	34.1 (Aug.)	36.9	
1895	35.4	40.2 (Sept.)	35.0 (Feb.)	36.1	
1899	50.9	54.2 (Apr.)	50.3 (Dec.)	50.3	Nov. 54.0
1901	59.0	71.0 (June)	59.0 (Jan.)	66.4	July 66.2
1904	55.9	68.8 (Dec.)	54.2 (Mar., May)	68.8	
1907	79.9	79.9 (Jan.)	52.3 (Nov.)	54.9	July 68.1; Aug. 63.0; Sept. 62.2; Oct. 5[illegible]
1921	60.4	62.1 (Dec.)	54.8 (Aug.)	62.1	May 60.5; June 55.7
1929	195.6	237.8 (Sept.)	159.6 (Nov.)	162.4	
1931	118.5	128.4 (Mar.)	61.0 (Dec.)	61.0	Apr. 115.3; May 103.5; Aug. 100.8
1937	133.5	136.7 (Feb.)	85.7 (Dec.)	85.7	Sept. 86.3; Oct. 73.7

Source: Cowles Commission and Standard and Poor's Corporation.

Index of Prices of Industrial Shares in Great Britain*
(June 1913 = £100)

Year	Open	High	Low	Close	Points of unusual fluctuation
1873	124.7	128.4 (Oct. Feb.)	124.7 (Jan.)	126.8	Nov. 125.6
1875	119.8	119.8 (Jan., Mar.)	110.7 (Dec.)	110.7	May 119.5; June 115.7
1878	97.9	97.9 (Jan.)	86.9 (Dec.)	86.9	Aug. 96.5
1880	107.1	107.1 (Jan.)	99.6 (June)	102.2	
1882	102.5	102.5 (Jan.)	95.2 (Dec.)	95.2	
1887	89.1	89.1 (Jan.)	82.0 (Nov.)	86.0	
1890	104.3	104.3 (Jan.)	96.5 (Dec.)	96.5	
1895	105.8	117.5 (Oct.)	105.8 (Jan.)	116.3	
1900	152.6	156.6 (Feb.)	145.5 (Dec.)	145.5	Apr. 155.0; May 153.9; June 149.4 July 147.0
1904	128.2	132.1 (Dec.)	126.7 (Aug.)	132.1	
1907	141.4	141.6 (Feb.)	130.2 (Nov.)	130.5	Mar. 137.7; July 136.2; Aug. 134.8
1912	144.8	147.9 (Sept.)	141.8 (July)	143.7	Apr. 145.6; May 143.8 June 143.0; July 141.8
1929	145	147 (Feb.)	122 (Nov.)	123	
1931	93	95 (Mar.)	77 (Sept.)	83	Apr. 93; May 80

Source: Royal Economic Society, *Memorandum 47*, June 1934.
* End of month.

TABLE 140, concluded

Index of Stock Prices in Germany
1913 = 100M, prewar
1924–1926 = 100RM, postwar

Year	Open	High	Low	Close	Points of unusual fluctuation
1873	94.8	100.8 (Mar.)	73.1 (Dec.)	73.1	Apr. 99.0; May 86.8 June 88.0; July 81.6
1879	41.4	63.6 (Dec.)	41.4 (Jan.)	63.6	
1880	67.0	70.4 (Feb.)	62.0 (May)	63.1	
1882	67.9	69.8 (Aug.)	65.1 (Feb.)	66.7	Nov. 68.3
1887	67.8	68.3 (Oct.)	61.9 (Feb.)	67.4	Nov. 66.1
1890	99.7	99.7 (Jan.)	84.1 (Nov., Dec.)	84.1	Feb. 94.9; Mar. 89.5 Apr. 86.5
1895	83.2	95.2 (Oct.)	83.2 (Jan.)	88.4	Nov. 90.7
1900	100.1	102.2 (Mar.)	87.1 (Sept., Oct.)	88.4	Apr. 101.6; May 98.6 June 94.7; July 90.1
1904	92.9	100.1 (Dec.)	90.3 (Mar.)	100.1	
1907	101.8	101.8 (Jan.)	90.1 (Aug.)	90.9	Feb. 100.7; Mar. 96.8 Apr. 96.0; May 95.1 June 92.5; July 92.2
1912	105.5	107.4 (Sept.)	100.7 (Dec.)	100.7	
1929	146.6	146.6 (Jan.)	115.2 (Dec.)	115.2	Sept. 132.4; Oct. 124.7 Nov. 119.8
1931	81.8	92.4 (Apr.)	53.8 (Dec.)	53.8	May 83.0; June 75.9

Source: Institut für Konjunkturforschung.

Index of Stock Prices in France
(1913 = 100fc)

Year	Open	High	Low	Close	Points of unusual fluctuation
1904	64	72 (Nov., Dec.)	63 (Feb.)	72	
1907	81	82 (Feb.)	76 (June, Oct., Nov.)	77	
1912	97	105 (Sept.)	93 (Oct.)	101	
1929	544	548 (Feb.)	461 (Nov.)	463	Mar. 535; Apr. 518 Sept. 518; Oct. 489
1931	365	373 (Feb.)	221 (Dec.)		Aug. 304; Sept. 269

Source: Société Statistique de Paris, *Journal*, Feb. 1929.

upsets are known especially for the United States. Some of these other fields would also react in a violent manner, considering the delicacy of balance and the high volatility attributed to the financial variables. The previous chapters offer ample material for checking these influences or, at least, if these cannot be ascertained specifically, the simultaneous occurrence of disturbances. The reader will note that some variables are indeed affected, notably the short-term rate. From the point of view of that series these events may appear as random, since they do not fall into line with its own cyclical behavior—another illustration of how difficult a proper notion of randomness is.

Another important set of series to be consulted is that of the *effort series*, presented and discussed in Chapter VII. We forego a description since those charts show clearly how well the panics are reflected. To the (considerable) extent that they are represented, the confidence in the measures devised there grows. Since those series show also other periods of tension for which, in turn, we have at present no general descriptive material of the kind that led to the establishment of the panic dates, we may conclude that these other periods also have a real meaning and are not merely the result of some perverted calculations. It will be for the economic historians to provide more descriptive material.

(12) The question remains as to *how well our indexes reflect these panics*. A comparison of the reported panics (Table 139) with our indexes (Table 140 and Chart 71) shows very high agreement in the sense that reported panics show up as sharp drops in prices of securities. (It must be remembered that our series are monthly averages, so that the sharpness of price movements is somewhat less than a daily or even weekly series would register.)

There are a few exceptions however. Neither the 1881 nor the 1882 panics show up. The New York series does not show the effect of the 1889 collapse of the French copper corner. In 1900 the indexes show a wide movement in Germany and London, whereas the accounts tell of panic in Berlin but not in London. The reported 1904 panics are not indicated in our series, while the London series indicates a greater influence in 1907 than is explained by the contemporary accounts.

The qualitative description, summarized in Table 139 and Chart 72, leaves no doubt that during times of panic, or at least when great stresses prevailed, active transmission of the *same type* of

events occurred. In other words sharp falls in prices of securities had a tendency to spread from one country to another. The movement took little time, occasionally only no more than a few days or weeks. The various stock markets represented therefore a rather homogeneous set of economic activities. They were interconnected so that they could affect each other if the system was disturbed in a manner that has never been fully described. The present survey too offers only scant hints as to the nature of the investigations that would have to be carried out. There are good reasons to assume that a description which would satisfy scientific standards which we must adhere to in the future can never be given for the past, because of the loss and scarcity of the sources, and of the lack of contemporary, truly scientific observation.

Section 4. Foreign Capital Flotations

(13) Domestic and foreign influences meet on the security markets in perhaps their most important form through the flotation of capital issues. Capital is offered and demanded from both sources and for both purposes. It would therefore be of primary importance to collect and interpret the necessary statistics and to compare the findings with the interest rates, exchange rates, and the rest of the data. A great deal of labor has indeed been spent in the course of this work, and many series were gathered, examined, and rejected. The hope that ultimately a condensed report could be given came to naught. There are two reasons:

(a) The field is so large that only a thorough description with a presentation of the proper background could have any value. Space forbids this undertaking in the present work, which is already voluminous.

(b) Even the exploration of the field actually undertaken has shown conclusively that the material does not yield the information required. Not only are the data frequently of highly doubtful value, but they are also actually lacking or purely imaginary for some countries. Where they do exist, as for England before 1914 or for the United States after 1935, they give aggregative information which does not answer our questions. The main troubles are the same previously encountered: we have figures of specious accuracy which stand in splendid isolation in a vast field about which otherwise only the vaguest kind of information exists. The statistics of

different countries cannot be fitted together. Great gaps and gulfs separate them from each other and from the figures otherwise available.

In that respect it is the same as with the foreign securities. Even if we knew how much capital was floated at a specified time in London for the United States, we do not know *when* the purchases of *what* materials were made, *who* bought the new issues, i.e., capital from *what* countries in London, in *what* shares, at *what* rate the proceeds of the issue were used, in *which* country, etc.—all questions about which much ought to be known to give the figures meaning in regard to the description of the phenomenon of the transmission of effects and economic conditions. Completeness in these matters is obviously unattainable, but a *minimal structure of information* is needed which cannot be established at present. Presumably it will never be possible to reconstruct for the past; it might be possible to build up such patterns for the future.

It is thus the magnitude of the task which keeps us from attacking this problem. Other writers have done valuable work in describing capital issues, and it is from a basic reconsideration of their attempts that a new start would have to be made. Besides the much neglected point of the *pattern of information* in these writings, it would also be necessary to bring the even more neglected considerations about the *accuracy of economic information* to the foreground.

The previously used statistics of interest rates, exchange rates, and their various derivatives, together with stock prices, had the advantage of being *symbols* of vast transactions. It would in each case have been better to know the transactions themselves, i.e., the magnitude of the short-term and long-term capital flows, their origins and directions, the stock market transfers from one country to another. These "symbols" were only a substitute and their study made it virtually impossible, save by indirect argument, to establish anything about the interaction of the different national economic spheres. In the field of foreign capital flotations not even such symbols are available. This then is the final reason why we do not choose to push the investigation further in this direction at the present juncture.[38] These remarks make it also clear why the balance of payments approach is not followed up in this investigation. As can be surmised, the argument applied to that case is almost identical.

[38] The extensive material collected may be published at another time.

APPENDIX

DESCRIPTION OF SHARE PRICE INDEXES OF THE UNITED STATES, GREAT BRITAIN, GERMANY, AND FRANCE

United States. The Cowles Commission Index[1] of all common stocks, which is available from 1871, was used in this case. Although the total number of stocks included varies over the period 1871–1938, yet all industrial and public utility common stocks and about 93 per cent in market value of the railroad stocks traded on the New York Stock Exchange were taken up in the index for the period 1871–1917. Subsequent to 1917, about 96 per cent of the market value of stocks listed on the New York Stock Exchange which are "sufficiently active" for regular sales were taken up in the index. After 1924 important stocks traded on the New York Curb Exchange and a few other stock exchanges were also included.

The figures "are 'spliced' to monthly averages of the weekly Standard Statistics indexes which begin in 1918 or later, with 1926 = 100, so that the figures currently published by the latter organization may be used without adjustment in bringing up to date the various indexes in this series. The price relative for each issue in an index receives a weight equal to the product of the price per share by the number of shares outstanding. All necessary adjustments have been made for changes in the number of shares outstanding."[2]

The Index[3] was revised for the period after 1917, and the base 1935–1939 = 100 was adopted.

Great Britain. The London and Cambridge Economic Service[4] has computed an index including 26 to 80 stocks, with base middle of 1890 = 100, for the period 1867–1914. No weights were assigned.

The "Kitchin Index"[5] for 20 unweighted industrials, base 1913 =

[1] Alfred Cowles, 3rd, and Associates, *Common-Stock Indexes, 1871–1937*, Principia Press, 1938, pp. 66–67.
[2] *Ibid.*, p. 3.
[3] Standard and Poor's Corporation, *Long Term Security Price Index Record*, pp. 5–6.
[4] *Royal Economic Society, Memorandum No. 47*, June 1934, "An Index Number of Securities 1867–1914," by K. C. Smith and G. F. Horne.
[5] London and Cambridge Economic Service, 1923 and ff.

100, is available for the period 1919–1924. The relative importance assigned to different industries was based on the results of the 1907 Census of Production.

A. L. Bowley, G. L. Schwartz, and K. C. Smith[6] calculated averages for about 90 British industrial shares, grouped into 14 classes, base 1924 = 100, for the period after 1924. Within each class the relatives were weighted according to issued capital. The groups were again weighted in accordance with the relative importance of net output of industries in 1924. Due regard was given to changes in the nature of the security, e.g., splitting of shares, bonuses, rights, etc.

Germany. The Institut für Konjunkturforschung[7] published three separate indexes of stock prices for Germany covering the periods: (a) 1870–1899, (b) 1890–1913, (c) 1924–1935. As to (a): for this period the index is an unweighted index of representative stocks, base 1913 = 100. As to (b): for 1890–1913 the base 1913 = 100 was retained, but the shares were weighted in accordance with the nominal capital. As to (c): actually the Statistiches Reichsamt is responsible for the computation of the share price index for the period 1924–1935. However the same shares were included in the index (about 300), and the method of weighting also corresponds to that described above. The base was shifted to 1924–1926 = 100.

France. Jean Déssirier[8] is responsible for the calculation of a monthly unweighted average of French share prices for the period 1898–1938, base 1913 = 100. Price quotations near the end of the month were used.

A general index was computed from a series of indexes covering short periods of time and a varying number of securities. From 1898 to July 1900, 17 securities were included, and in 1914 the number included was 25.

This general index was compared by the National Bureau of Economic Research with the annual index of 54 security prices published in the *Journal de la Société de Statistique de Paris* in May 1928. Since the movements were very similar, and on account of the fact that the latter series is comprehensive, the former series was adjusted slightly to equate its annual averages to that of the annual series.

[6] Royal Economic Society, *Memorandum No. 28*, February 1931.

[7] *Vierteljahrshefte zur Konjunkturforschung, Sonderheft* 36, 1934. pp. 98–99, and issues of *Wirtschaft und Statistik* after this date.

[8] *Indices Généraux du Mouvement Economique en France de 1901 à 1931*, pp. 126, 159, and successive issues of *Bulletin de la Statistique Générale.*

For 1919–1925 securities in 25 groups, taken up in the index, were included with base 1901–1910 = 100. The base was then converted to 1913 = 100. From the beginning of 1926 a new index was calculated from the base 1925 = 100,[9] and January 1926 of this new index was then equated to the above-mentioned index with base 1913 = 100. From January 1926 the index comprised 288 securities in 20 groups, and from 1929 300 securities in 22 groups.

These four indexes cover different ground due to the differences in the economies. All include industrial, mining, and public utility shares. In the American index railroads make up by far the most important group; indeed the view was often expressed that before World War I railroad shares alone give a correct picture of American stock exchange activity, and consequently indexes composed solely of them have frequently been used. In other countries their role is minor but not negligible, as in France; in Germany they disappear from the index in 1889, due to the nationalization of the main railroads. They do not occur at all in the British index, although railroads had not yet been nationalized.

The situation regarding railroad shares illustrates a typical difficulty: their exclusion from the American and French indexes would certainly violate the picture, since these shares figured very prominently in both countries and the statistical equivalence obtained by the indexes would not be an economic one. On the other hand no German railroad shares existed after 1889;[10] the state-owned railroads themselves had not disappeared but rendered services to the German economy not much different from that given by the American ones to the American economy. So in no way is it possible to obtain formal statistical equivalence, and the indexes have to be taken as they are. Instead we must assume that they correctly describe the happenings at the respective stock markets and that it should be our task to compare and correlate these descriptions, rather than to insist upon identical instruments for description. Similar difficulties arise with other components: banks are included in the three European indexes, but excluded in the American. The German index even contains shares of three mortgage banks, whose activities are not likely to reflect easily international influences.

[9] The reason being that, as the index moves away from the base period, different stocks begin to be weighted differently on account of diverging price trends.

[10] Excepting those of a few secondary railroads.

We summarize our position therefore as follows: our first step was most naturally to examine the covariation of those stock price indexes which, in their respective countries, are considered as best reflecting stock market activity. Therefore the indexes have to be taken as they are; we cannot consider it as our task to improve upon them. We were however able to point out certain deficiencies, going in two directions (in some cases): (a) that they do not give a complete enough picture even of the purely domestic aspects of stock market activity, and (b) that they are only of restricted value for tracing international influences; the latter fact is particularly serious, if (a) is also true (as is the case notably for the United States). When such conditions obtain, it is quite clear that we cannot expect that the figures of the indexes are convenient summaries of the conditions they are supposed to represent.

TABLE 141

Groups Covered by Four Stock Price Indexes[a]

	United States	*Great Britain*	*Germany*	*France*
Industrial	yes	yes	yes	yes
Mining	yes	yes	yes	yes
Railroads	yes	no	until 1889	yes
Banks	no	no	yes	yes
Department stores	yes	yes	no	yes
Building	yes	yes	yes	no
Stocks from unlisted departments	yes	no	no	no

[a] "Yes" indicates that the group is not excluded by definition. It does not mean that stocks of that group have actually been used in the compilation of the index for the *entire* period covered by the respective indexes.

Table 141 indicates the groups covered by the four stock price indexes; the table has to be interpreted in the sense that shares of the respective fields of economic activities have, at one time or another, been included in the composition of the indexes. This was not always the case from the beginning and during the entire period for which they are available. If the groups were broken down still further this would become quite clear: in the British index, for example, electrical companies are included only since 1900; evidently there were no such companies before that time considered to be sufficiently important. The same applies to other countries and also to other industries or services.

The number of stocks in each group also underwent considerable changes. In the British index, for example, the total increases from 26 in 1870 to 180 in 1910; there was a rise in all categories except transportation stocks. A full presentation of these matters will hardly contribute to the discussion in the chapter above.