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FEDERAL RESERVE BANK OF CLEVELAND

INVESTMENT CHARACTERISTICS OF NEW FOREIGN CAPITAL BORROWED IN THE U. S.

THE USE OF U. S. capital markets by foreign governments and businesses is intermingled with the problems of world trade and aid as well as the continuing development of the economies of all nations. Such matters are presently under discussion at the United Nations Conference on Trade and Development and at the GATT negotiations in Geneva. The United States appears to have countered temporarily the adverse effects of foreign capital borrowing on the balance of payments through the proposed interest equalization tax; but still unanswered is the long-term role of this nation in supplying capital to a developing world and determining the best methods of channeling these funds.

A previous article in the *Economic Review* described the increase in the volume of new capital borrowed in the United States by foreign countries and organizations between 1958 and 1963.¹ In that article, it was shown that no single group or geographical area was primarily responsible for the surge in borrowing in this period. Part of the rise was attributable to industrially developed nations, but not to those of western Europe. Underdeveloped countries did not borrow heavily in the U. S. whereas some nations with established economies based chiefly on agriculture did increase their sales of new

¹ "Foreign Capital Borrowing in the United States" *Economic Review*, Federal Reserve Bank of Cleveland, Cleveland, Ohio, January 1964.

issues. It was also evident that borrowing by private organizations increased more rapidly than the borrowing operations of foreign governments or quasi-governmental organizations.

In addition, the earlier article concluded that there was no single factor which explained the rise in foreign capital borrowing. Some countries came to the U. S. in search of development capital, while others were taking advantage of the established and efficient U. S. market structure and the relatively large supply of capital available here. Other borrowers were either seeking dollars to finance their balance of payments deficits or, occasionally, publicity and contacts in an overseas market. Another determining factor mentioned was the difference between the cost of obtaining investment funds in the United States and in foreign capital markets.

This second and concluding article discusses the characteristics of new foreign issues sold in the U. S. The article examines the types of securities sold by foreigners in the U. S. in the 1958-63 period, maturities and interest rates, and the methods of sale that were used. The study does not, however, concern itself with the sources of funds tapped by foreign borrowers.

TYPES OF ISSUES

The individual issues included in this survey of foreign capital borrowing were grouped into four broad categories. (See Chart 1.) *Bonds and debentures* accounted for more than three-quarters of the total dollar volume of funds raised in the 1958-63 period. More than half of the bonds sold were protected by sinking fund provisions, and 11

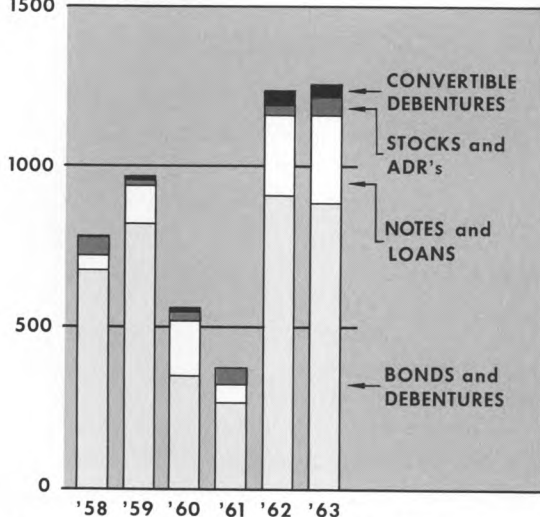
percent of the long-term debt issues were serial bonds.

In addition, a small but increasing proportion of the dollar volume of the debt issues took the form of *convertible debentures*. The volume of such issues rose from a single convertible debenture issue of \$3 million in 1958 to a high of three issues totaling \$46.5 million in 1962. In the most recent years, Japanese firms accounted for the bulk of the convertible securities issued.

Almost 18 percent of the total dollar amount of the capital borrowed in the survey period was acquired by means of *notes and loans*. This type of borrowing also increased, climbing from about \$42 million in 1958 to nearly \$275 million in 1963. The growing use of such intermediate-term sources of capital was probably an outgrowth of the growing proportion of foreign capital issues being

1.

FOREIGN CAPITAL BORROWING
by Types of Issue
Millions of dollars



Source of data: Federal Reserve Bank of Cleveland

privately placed with U. S. investors, rather than being sold publicly. (Private placements totaled nearly \$900 million in both 1962 and 1963.) All of the notes and loans included in this study were privately placed.

A fairly small proportion of the new foreign capital—about 5 percent—was raised through the sale of *stock issues and American Depository Receipts*. The dollar volume of such issues increased in 1958 and 1961, and rose above \$60 million in 1963. Sales of stock by Japanese companies accounted for almost all of the new issues in 1963 and for one-third of the six-year total.

There was also a relationship between the type of issue and the terms of borrowing. Just over half the dollar volume of new capital issues maturing in ten years or less was in the form of notes and loans. Miscellaneous bonds and debentures accounted for another third of these intermediate maturities. Sinking fund bonds made up the largest volume of issues with maturities of more than ten years. Table I shows the average maturity

for the various types of issue, without any weight assigned for dollar value.

While there were some relationships between the methods of borrowing and the geographical location of the borrower, there was not a significant correlation between the two factors. In addition, there was no apparent preference on the part of separate industry groups for any specific type of issue, nor did the business of the borrower seem to determine the length of maturity or the interest cost of the foreign securities sold in the U. S.

INTEREST COSTS

In the six-year period of 1958-63, four-fifths of the dollar volume of new foreign debt issues sold in the United States, for which interest rates were published, carried coupon rates ranging from more than 4½ percent to less than 6 percent. With the exception of State of Israel bonds first placed on the market in 1959, very few of the debt issues carried a rate of 4 percent, but one-tenth of the new capital issues had rates of more than 6 percent. The lowest reported rate was 3¼ percent; the highest, 8 percent.

A frequency distribution of coupon rates shows a marked concentration of the number of new issues at 5½ percent (see Chart 2). The same concentration is apparent in a distribution of the dollar volume of borrowing. Rates of 5 percent and 5¼ percent also appeared frequently. There was also a predominance of "round-number" coupon rates among foreign issues, i.e., rates quoted in whole or half percentage points; hence, the jagged nature of the frequency curve.

Chart 2 further illustrates the fact that most of the new capital was raised at a coupon

TABLE I

Average Maturity of Selected Foreign Securities Issued in the U. S.

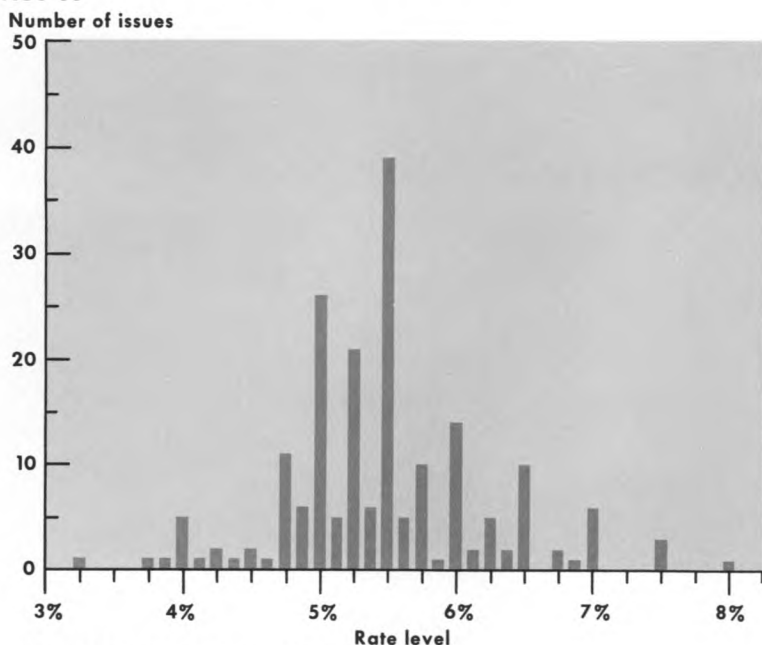
Type of Issue	Average Maturity For Six-Year Period 1958-1963
Notes and loans	12 years
Serial bonds (to final maturity) . . .	13 years
Convertible debentures . . .	15 years
Miscellaneous bonds and debentures*	17 years
Sinking fund bonds	20 years

*Includes mortgage bonds

Source: Federal Reserve Bank of Cleveland

2.

FREQUENCY DISTRIBUTION of COUPON RATES 1958-63



rate of from 5 percent to 6 percent. When the new capital issues are grouped by maturity classes, the same characteristic is apparent, except for maturities of more than 20 years; here the largest dollar volume had rates of 5 percent or less. This seeming inconsistency of the longest maturities carrying lower rates is explained by the fact that Canadian borrowers were responsible for almost all of the dollar volume of long-term borrowing. Canadian governments and businesses were able to borrow in the United States at relatively low rates, in comparison with most other foreign borrowers. As an illustration, Canadian issues accounted for all of the borrowing with rates of 4 percent or less from 1958 through 1963 (with the exception of the State of Israel bond issue), and for 89 percent

of all the dollar volume carrying coupon rates of 5 percent or less.

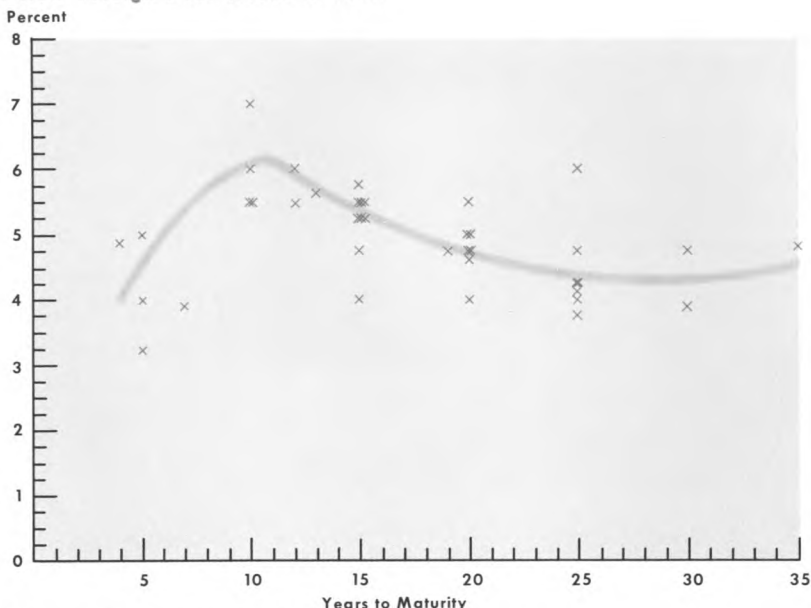
The impact of Canadian participation in U. S. capital markets is also evident in a distribution of coupon rates by the nature of the borrowers.² A major proportion of new debt issues sold by local governments and government corporations carried coupon rates of 5 percent or less because of the preponderance of Canadian securities in those groups. In contrast, most securities issued by other national governments carried coupon rates of 5 percent or more.

A similar interest rate pattern is apparent when new issues are grouped by the stage of economic development of the borrowing nation. Three-fifths of the total indebtedness incurred by industrial countries carried rates ranging between 5 and 6 percent; there were no new issues with rates of 4 percent or less for these nations. Over half of the borrowing by underdeveloped nations was arranged at rates of over 6 percent, with very few issues carrying a rate of 5 percent or less. In contrast, the group of agriculturally developed nations—led by Canada—issued nearly one-half of the dollar volume of their new debt with rates of 5 percent or less. Almost all of those lower-yield issues were Canadian.

² *Ibid.* pp. 7 & 8.

3.

**COUPON RATES and MATURITIES
of New Foreign Debt Issues in 1958**



Source of data: Federal Reserve Bank of Cleveland

An attempt was made to construct a series of annual yield curves using the coupon rates on new foreign borrowing from 1958 through 1963. In most of the years the peak of the curve fell at maturity lengths of ten to twelve years, with rates in the very long-term range equaling the short- and intermediate-term coupon level. Chart 3 is fairly typical of the six annual curves. The tendency of Canadian organizations to borrow on a long-term basis and the ability of that country to obtain low interest terms in their U. S. borrowing probably accounts for the skewed shape of the yield curves.

While the type and maturity length of an issue and the nature of the borrower im-

portantly affect the interest cost of the borrowing, credit conditions at the time of issue are also a major factor. In 1958, the first year covered in this study, borrowing costs in the United States had declined to a relatively low level. A business recession had developed in 1957, reaching a trough in April 1958, and domestic interest rates declined sharply between late 1957 and mid-1958. In the second half of that year, however, there was a recovery in market yields that was equally as sharp, and the general rise in rates continued through 1959. In 1960 interest rates in the U. S. declined moderately to a level that was maintained for an unusually long period, lasting until mid-1963. At that time

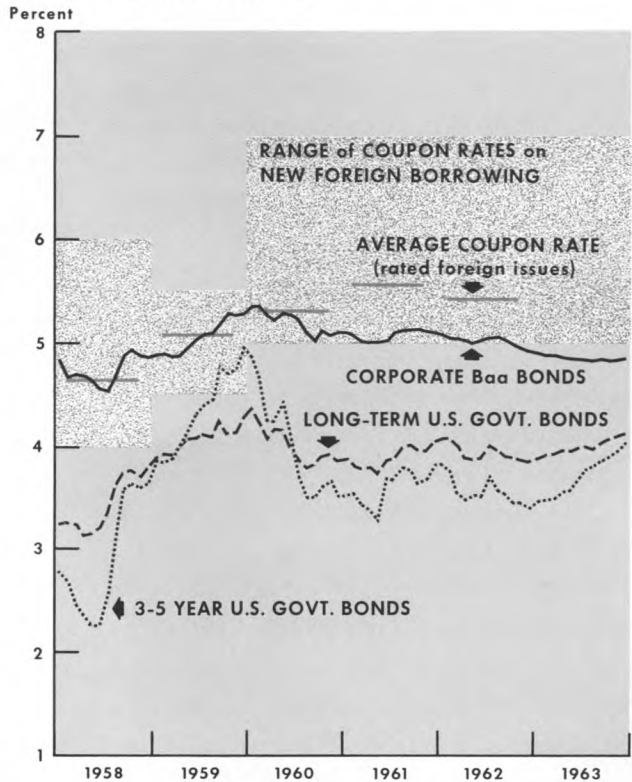
domestic interest rates were close to the level that had existed at the end of 1957.

Against this background, the trend of rates on new capital borrowing in the U. S. by foreigners followed an expected pattern. In 1958 such rates moved within a range of 4 to 6 percent, reflecting the relatively easy credit conditions in U. S. capital markets. The following year of business recovery resulted in an entirely different pattern, as the yield curve for "foreign" rates was reduced to a spread of 4½ to 5½ percent. The narrowed spread during a business expansion no doubt reflects the inability or refusal of financial institutions or markets to meet the credit needs of marginal borrowers. On the other hand, these demands are frequently satisfied during periods of credit expansion as reflected in the wider rate spread. In 1960 credit conditions shifted again with the onset of another business recession, and the spread for coupon rates on foreign issues again widened. The range of rates was still relatively high in 1960 because U. S. credit policy had been designed to prevent sharp declines in short-term interest rates as a deterrent to further deterioration in the U. S. balance of payments. With very few exceptions, rates on foreign borrowings continued in the 5 to 7 percent range through 1963.³

³ The gradual rise in U. S. interest rates that occurred in the second half of 1963 did not affect the cost of foreign borrowing substantially because few foreign issues were sold or placed after the interest equalization tax was proposed in July.

4.

RATES on FOREIGN BORROWING in the U.S. and SELECTED U.S. INTEREST RATES



Source of data: Federal Reserve Bank of Cleveland

INTEREST RATE DIFFERENTIALS

In Chart 4 market interest rates on domestic debt issues in the U. S. are presented in order to illustrate, in part, the market conditions under which foreign capital was raised. The general range of coupon rates on foreign issues is shown by the light area on the chart from 1958 through 1963. It is apparent from the chart that foreign borrowing costs were high in relation to concurrent yields on U. S. domestic issues. Several explanations can

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be offered: as a group, the foreign issues may not have matched the quality of the U. S. issues and as a result may have carried a higher rate; the predominance of long-term issues within foreign borrowing may have resulted in a higher range of rates; and finally, it is probable that many foreign issues bore relatively higher rates in order to overcome U. S. buyer resistance to investing in another nation.

In addition, many foreign issues were sold at a discount, i.e., sold for less than par value, thereby providing the buyer with an effective yield that exceeded the coupon rate. In 1958, for example, 22 of the 39 financing operations involved a sale price below par. The number of such discounted issues declined in the succeeding three years, as the total number of foreign borrowing decreased, but then increased moderately in 1962 and 1963. The average difference between the effective yield and the coupon rate for the six-year period was 0.20 percent. The average differentials were smallest in 1958 and 1960, both

years in which there was a sharp but unsustainable drop in U. S. interest rate levels.

Few of the new foreign issues were sold in the U. S. at a premium, i.e., at a price in excess of par value; only 9 issues were sold at a premium in the six years covered by the study. In addition, the discount in yield was quite small, amounting to only 0.11 percent. There did not appear to be any pattern in sales or placements that were made at a premium.

QUALITY RATINGS

Another characteristic of the foreign capital issues tabulated in the study was the existence of investment ratings applied to the issues. About one-fourth of the dollar volume of foreign issues carried an investment rating and the number of rated issues declined over the six-year period because of the increase in the proportion of issues privately placed. It is possible, however, to determine an average coupon rate for rated versus nonrated foreign debt securities for 1958 through 1962, as shown in Table II.

TABLE II
Characteristics of Rated and Nonrated Foreign Securities Issued in the U. S.

Year	Rated			Nonrated		
	Average coupon rate	Average dollar size	Average maturity	Average coupon rate	Average dollar size	Average maturity
1958	4.63%	\$20.2 mil.	17.6 yrs.	5.35%	\$13.1 mil.	13.2 yrs.
1959	5.08	35.0	23.1	5.36	15.6	15.9
1960	5.30	20.8	23.0	5.75	10.6	18.3
1961	5.56	17.5	20.0	5.52	7.7	9.7
1962	5.42	26.7	18.3	5.73	21.0	16.0

Source: Federal Reserve Bank of Cleveland

With the exception of 1961, rated issues carried lower coupon rates, on the average, than the issues without ratings during the five-year period despite the fact that rated issues had substantially longer maturity lengths. Presumably, rated issues have a higher investment quality and thus can be sold publicly at a lower interest cost.

RATE COMPARISONS

Even using the average coupon rate for rated issues only, foreign borrowers paid a relatively high price for capital in the U. S. The comparative cost of capital here may not have been the principal attraction for many of these foreign borrowers. To illustrate this point, comparisons have been made for five nations that used the U. S. markets between 1958 and 1963 relating their costs of borrowing in the U. S. to their domestic interest rate levels.⁴ U. S. borrowing includes capital raised by both governments and businesses and placed both publicly and privately. Rates in the United States are averages (where applicable) of the coupon yields on new issues during the year.

Australian borrowing in the U. S. was chiefly for purposes of financing the operations of the Commonwealth. Although almost all of the new issues floated in the U. S. had maturities of 20 years, the best available domestic rate to use for comparison is the series on 12-year Australian government bonds, published by the International Monetary Fund. In all but one of the six years in the period under review, coupon rates ob-

tained in the U. S. by Australia were higher than concurrent average domestic rates. The difference between coupon rates in the U. S. and market yields in effect in Australia at the time of the borrowing ranged from plus 21 basis points in favor of the U. S. to minus 60 basis points, i.e., in one month the rate in the U. S. was 21 basis points below the Australian rate, while in another borrowing, the U. S. rate was 60 basis points above the Australian level.

Belgian borrowing was also restricted to the national government, with a common maturity of 15 years. The statistical series on long-term government bond yields in Belgium is the series on 4 percent *rentes* ("unified debt" bonds with no maturity), published by the IMF. In this case, the rates obtained in the U. S. were substantially above domestic yields, with an average spread of one percentage point during the month of each borrowing operation.

New capital obtained in the U. S. by Canada was raised by a wide variety of governmental units and businesses. For comparison purposes, domestic rate averages of Canadian market yields on 40 bonds, including those issued by provinces, cities, public utilities, and industries, have been used.⁵ It is apparent from the table that Canadian borrowers obtained lower interest rates in the U. S. than were available in Canada in five of the six years from 1958 through 1963. Because few of the new Canadian issues sold in 1961 were governmental, the average rate obtained in the U. S. that year may not be representative.

⁴ The borrowing of four of these nations in the U. S. was discussed in some detail in the January 1964 *Economic Review* article.

⁵ This series is compiled by McLeod, Young, Weir, & Company of Toronto and Montreal.

TABLE III
Annual Interest Rates on Foreign Borrowing
in the United States and in Foreign Markets

Year	Australia		Belgium		Canada		Japan		Norway	
	Rate in U. S.	Domes- tic Rate	Rate in U. S.	Domes- tic Rate	Rate in U. S.	Domes- tic Rate	Rate in U. S.	Domes- tic Rate	Rate in U. S.	Domes- tic Rate
1958	4.88	4.97	—	4.57	4.32	4.93	—	7.90	5.38	4.76
1959	5.50	4.91	5.25	4.27	5.10	5.63	5.00	7.90	—	4.61
1960	5.25	4.99	—	4.30	5.25	5.81	7.25	7.91	5.75	4.58
1961	5.50	5.27	5.50	4.36	5.66	5.55	5.50	7.60	5.50	4.64
1962	5.50	4.92	5.25	4.26	5.02	5.51	6.32	7.48	5.50	4.66
1963	5.00	4.60	—	4.97*	4.98	5.46	6.09	7.48	5.38	4.63
Average spread in favor of U. S. rates										
	+0.33		+1.04		-0.43		-1.64		+0.85	

* Change in statistical series

Note: "Rate in U. S." is the average coupon yield on new capital issues sold or placed in the U. S. capital markets. The domestic rates are: for Australia, Belgium, and Norway, the series on long-term government bonds as published by the International Monetary Fund; for Japan, the average yield on 7-year industrial bonds published by the Bank of Japan; and for Canada, the 40-bond yield average compiled by McLeod, Young, Weir and Company.

Source: Federal Reserve Bank of Cleveland

Nevertheless, the Canadian experience contrasts with that of Australia and Belgium.

Norwegian borrowers, all governmental, also paid higher rates in the U. S. than were being charged in their own capital markets. For Norway, the U. S. spread over rates on 12- to 15-year government bonds ranged from 35 to more than 100 basis points. In contrast, the Japanese differential, using yields of 7-year industrial bonds published by the Bank of Japan, favored their borrowing in the United States by a very wide margin. Japan and, to a lesser extent, Canada probably reflect the capital market situation in countries experiencing a high growth rate. Higher interest rate levels are also typical

of many underdeveloped areas with a shortage of investment capital and less developed financial markets. In the case of Australia, Belgium, and Norway, the supply of investment capital available domestically may have been so limited that the higher cost of borrowing in the U. S. did not act as a deterrent. In fact, several studies of the relationship between interest rate differentials and foreign borrowing in this country indicate some insensitivity to interest rate levels.⁶

⁶ A number of studies on foreign capital borrowing in the United States were published in 1962 and 1963. Among those that dealt with the question of comparative interest rates are:

Bell, Philip, "Private Capital Movements and the U. S.

It might also be pointed out that interest rates in most of the other capital supplying nations of the world are as high as or higher than the levels obtained by foreign borrowers in the U. S. For example, market rates on public authority bonds in Germany ranged from 5½ percent to nearly 7 percent in the 1958-63 period, while monthly yields on long-term government issues in Great Britain varied from 4.72 percent to 6.59 percent. In the Netherlands, Switzerland, and Sweden, yields on government bonds were below 5 percent but access to the capital markets of these nations is severely restricted. It should be remembered that the government bond rates used as comparisons represent the lower range of borrowing costs in the individual countries. Foreign borrowers would probably be faced with higher rates. To illustrate, some Commonwealth countries borrowing in Great

⁶ (continued)

Balance of Payments Position", *Factors Affecting the United States Balance of Payments*, Joint Economic Committee, U. S. Congress, 1962.

Gemmill, Robert F., "New Foreign Bond Issues in the U. S. Market", *Federal Reserve Bulletin*, Board of Governors of the Federal Reserve System, May 1963.

Kaufman, George G., "Foreign Long-Term Borrowing in the United States", *Business Conditions*, Federal Reserve Bank of Chicago, September 1963.

Kenen, Peter B., "Towards an Atlantic Capital Market", *Lloyds Bank Review*, Lloyds Bank Limited, July 1963.

Meek, Paul, "United States Investment in Foreign Securities (excluding Canadian and IBRD Issues)", *U. S. Private and Government Investment Abroad*, edited by R. F. Mikesell, University of Oregon Books, 1962.

Rothwell, Jack C., "Foreign Borrowing in the U. S.", *Business Review*, Federal Reserve Bank of Philadelphia, November 1962.

TABLE IV
Underwriting Spread on New Foreign Issues Sold in U. S.
(Annual Averages)

Year	Spread	Number of relevant issues
1958	0.29%	9
1959	0.22	6
1960	0.20	4
1961	0.23	6
1962	0.25	8
1963	0.20	5
Average for 6-year period	0.23%	

Source: Federal Reserve Bank of Cleveland

Britain in 1963 obtained coupon rates that were half a percentage point higher than the existing yields on long-term British governments, and those countries were considered favored borrowers.

UNDERWRITING COSTS

Interest costs, whether represented by coupon rates or effective yields, do not account for all of the borrowing costs incurred by an organization raising funds in the capital markets. There are a number of other fees that must be paid, e.g., underwriting costs, taxes, and legal fees. It is generally accepted that such marketing costs have been quite low in U. S. markets, probably because of the high degree of organization and efficiency. The interest equalization tax proposed last year would have the effect of increasing borrowing costs for the countries that have not been granted an exemption from the tax.

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Underwriting and administrative costs vary rather widely for foreign borrowers in the U. S. The interest cost to the borrower was not available for many of the new foreign issues tabulated in this study. When available, however, it was possible to compute the underwriting spread by subtracting the re-offering yields. Such spreads do not include all marketing costs such as legal fees and local taxes, but do give an indication of the extra costs of borrowing in this country. The data are presented in Table IV.

While the number of issues represented in Table IV is only a small part of total new issues covered by the study, the sample is sufficient to draw some conclusions. Underwriting spreads on Canadian securities were smaller than for most other countries. In addition, spreads on Australian borrowing of about 0.22 percent were somewhat lower than the Belgian and Norwegian averages of 0.28 percent.⁷ The rather curious relationship between the size of the average spread and the number of applicable issues is probably due to the fact that borrowing by less frequent visitors to the U. S. markets was high in 1958 and 1962; apparently the underwriting spread for these nations was higher than for the more frequent borrowers such as Norway and Australia.

Were the underwriting spreads incurred in the U. S. more of a burden to the borrowers

⁷ The Norwegian average, in turn, can be broken down into an average spread of 0.26 percent on borrowing by the Kingdom of Norway and 0.31 percent on new issues sold by the city of Oslo.

than similar costs in other capital markets of the world? To the contrary; from the scant information that is available, the U. S. ranks the lowest in these borrowing costs among the major nations.⁸

CONCLUSION

It appears that the bulk of new foreign capital reviewed in this study was raised in the United States for three reasons: acceptability, accessibility, and availability. Because the U. S. dollar is a key currency, funds raised in dollars are widely accepted in international commerce. Add to this the tremendous need for capital that exists in the world, and the stage is set for substantial demands for dollar funds. It is recognized that the United States has the most efficient capital markets with the fewest restrictions on prospective borrowers. Moreover, available investment funds in the United States are much larger than the amounts available in foreign capital markets.

A change in interest rates on new foreign issues probably has its most important influence on those issues that can be postponed or shifted into another capital market, but the number of such issues may be limited. Some observers anticipate a sudden surge in new foreign issues in the U. S. capital markets following either enactment or defeat of the interest equalization tax proposal.

⁸ See, for example, Kenen, Peter B. "Towards an Atlantic Capital Market," *Lloyds Bank Review*, July 1963.

A FURTHER NOTE ON CITY INDUSTRIAL PATTERNS

AN EARLIER STUDY of seven major cities found that "convergence" had taken place in the economic makeup of those cities.¹ That is to say, the composition of employment in the seven cities between the Census years 1950 and 1960 had been altered so that the industrial profile of each of the cities was becoming more like the others, but without necessarily giving up its individual specialty. Because the seven cities included in the study were too few in number to establish definitive statistical relationships, the convergence thesis was offered only as an hypothesis. The purpose of the present article is to test the hypothesis further by examining data for 19 additional cities, bringing the total to 26 selected cities.

SELECTION OF CITIES

The 26 cities selected for this study are shown in Table I. They are all in the Eastern or North Central regions of the United States with the exception of Baltimore, which is assigned by Census to the Southeast, but is sufficiently similar to the other cities to be included here. New York, Chicago, and Washington are omitted; New York and Chicago are excluded because their predominance in size tends to obscure comparisons of industrial composition, and Washington because occupational patterns are unique. With these important exceptions, the list includes cities that range in size from Philadelphia, with nearly 4 million in its metropolitan area, down to Syracuse, N. Y., with about 350,000.

The unit of the study is the Standard Metropolitan Statistical Area. (The earlier study, by

¹ Cutler, A. T., *Changing Economic Profiles of Selected U. S. Cities*, Federal Reserve Bank of Cleveland, October 1962.

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contrast, was in terms of the "urbanized area" unit.) The second column of Table I shows the populations of the 26 SMSA's as of 1950, in descending order of population. The first column shows the percentage increases in population between 1950 and 1960.²

Examination of Table I indicates that there was no "convergence" effect in population, i.e., the smaller cities did not gain relatively more in population and the larger cities did not gain relatively less. Nor was there a reverse relationship.³ Although the population statistics do not conform to the convergence hypothesis, they do indicate the general nature of the 26 cities being discussed in this article.

DURABLE GOODS EMPLOYMENT

A test of the convergence hypothesis in durable goods employment is presented in Table II. The data are arranged so that the first column can be taken as the dependent variable, and the second as the independent variable. The second column shows employment in durable goods manufacturing in 1950

² For this table, as with all following tables, it was necessary to make adjustment for changes that occurred between the two Census periods in the geographical coverage of a number of SMSA's. Figures for counties that had been added to or subtracted from the coverage during the interval were subtracted from, or added to the figures reported for the SMSA as defined by the 1960 Census. For certain of the New England SMSA's the adjustment process required an estimation by ratio methods, insofar as specific county or township data were lacking.

³ A two-variable linear correlation, with column 1 as the dependent variable, yields an r value of $-.09$ and an r^2 value of only $.007$, which is far below the level of significance.

in each of the metropolitan areas as a percentage of total employment. The first column shows the change in that percentage between 1950 and 1960. For example, in 1950 Detroit had 40.6% of its total employment in durable goods manufacture, but in 1960 it had 33.7% (not shown in table). The *change* in share (a decline of 6.9%) is recorded in the first column. The individual metropolitan areas are arranged in order of the first column

TABLE I
Population

SMSA (as of 1950)	% Change in Population 1950-60	Population in 1950 (thousands)
Philadelphia, Pa.	18.3%	3,671
Detroit, Mich.	24.8	3,016
Boston, Mass.	7.4	2,370
Pittsburgh, Pa.	8.7	2,213
St. Louis, Mo.-Ill.	18.6	1,681
Cleveland, Ohio	22.6	1,466
Baltimore, Md.	22.5	1,337
Minneapolis- St. Paul, Minn.	28.0	1,117
Buffalo, N. Y.	20.0	1,089
Cincinnati, Ohio-Ky.	18.5	904
Milwaukee, Wis.	18.9	871
Kansas City, Mo.-Kan.	27.6	814
Providence, R. I.	7.3	737
Indianapolis, Ind.	26.4	552
Youngstown, Ohio	20.6	528
Albany-Schenectady- Troy, N. Y.	10.5	515
Columbus, Ohio	35.8	503
Rochester, N. Y.	20.1	488
Dayton, Ohio	36.1	457
Allentown-Bethlehem- Easton, Pa.	12.3	438
Akron, Ohio	25.4	410
Springfield- Holyoke, Mass.	15.7	407
Toledo, Ohio	15.4	396
Wilkes-Barre- Hazleton, Pa.	-11.5	392
Hartford, Conn.	29.1	358
Syracuse, N. Y.	23.7	342

figures, ranging from the largest declines in the durable goods shares, through the smaller declines, and up through the increases.

It is seen by inspection that there was a tendency for cities that had large relative declines in employment in durable goods manufacturing to be those with relatively large shares in durable goods at the beginning of the period. Likewise, the cities that showed marked gains in durable goods manufacturing (near the bottom of the table) were in general those with a relatively small specialization in durable goods manufacturing for either Census year. Correlation analysis confirms the statistical significance of the relationship.⁴

OTHER EMPLOYMENT CATEGORIES

A similar pattern emerges in respect to employment in nondurable goods manufacturing, employment in finance, and employment in services. Data for these three categories are consolidated in Table III, which shows, as does Table II, the *changes in share* of total employment that occurred in each category. In this table, however, the various metropolitan areas are arranged in a standard alphabetical order.

Nondurable Goods Employment. The first two columns of Table III apply to employment in nondurable goods manufacturing. Here, because of the alphabetical arrangement of the cities, the convergence effect is not readily apparent (as in Table II). Nonetheless, it is there, with the roles of the respec-

⁴ Using the first column as the dependent variable, the coefficient of correlation (*r*) is $-.77$ and the coefficient of determination (r^2) is $.59$.

Statistically, this is significant when examined in terms of the F-ratio.

tive cities being altered. Among the cities that were strongest in nondurable goods manufacturing in 1950, Providence, Phila-

TABLE II
Durable Goods Employment
as Share of Total

SMSA (as of 1950)	Change in Durable Goods Mfr. as % of Employment 1950-60	Employment in Durable Goods Mfr. as % of Total Employment 1950
Detroit, Mich.	-6.9%	40.6%
Dayton, Ohio	-6.7	31.8
Youngstown, Ohio	-4.1	44.9
Albany-Schenectady- Troy, N. Y.	-4.0	19.7
Toledo, Ohio	-3.3	29.7
Buffalo, N. Y.	-1.6	26.3
Cleveland, Ohio	-1.3	29.4
Pittsburgh, Pa.	-1.1	31.5
Syracuse, N. Y.	-0.5	26.1
Springfield- Holyoke, Mass.	-0.2	21.2
Rochester, N. Y.	+0.2	31.2
Indianapolis, Ind.	+0.2	20.3
Cincinnati, Ohio-Ky.	+0.7	17.9
Milwaukee, Wis.	+1.1	28.6
Columbus, Ohio	+1.3	16.2
St. Louis, Mo.-Ill.	+1.6	16.6
Philadelphia, Pa.	+1.8	16.1
Kansas City, Mo.-Kan.	+1.9	10.5
Allentown-Bethlehem- Easton, Pa.-N. J.	+2.0	25.1
Minneapolis- St. Paul, Minn.	+2.0	12.7
Baltimore, Md.	+2.3	17.5
Hartford, Conn.	+2.6	25.3
Providence, R. I.	+2.8	20.8
Boston, Mass.	+2.8	12.6
Akron, Ohio	+3.5	12.3
Wilkes-Barre- Hazleton, Pa.	+4.8	4.7

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delphia, and Boston showed appreciable declines in nondurable goods employment as a share of total employment over the 1950-60 interval. At the other end, cities such as Pittsburgh, Detroit, Dayton, and Columbus, where the nondurable goods share was low in 1950, showed appreciable *gains* in that share during the ten-year interval. The results of the correlation test confirm this for the nondurable goods relationship.⁵

Employment in Finance. The second pair of columns in Table III represents the Census category "finance, insurance and real estate." Cities that were outstanding in the share of employment represented by this category in 1950 included Hartford, Boston, Minneapolis, and Columbus. One of the four showed a decline in share between 1950 and 1960 and the other three showed relatively small gains. At the other end, cities with relatively small employment in finance in 1950, Rochester, Allentown-Bethlehem-Easton, and Youngstown, scored relatively large gains over the ten-year interval. The correlation measurement for this pair of series is significant at the 95% probability level.⁶

Employment in Services. The convergence effect is less marked in employment in services than in other sectors. (See the third pair of columns of Table III.) As used here, "services" include several Census items, including employment in business and repair services, in entertainment and recreational services, and in professional and related

⁵ The r value $-.70$ and the r^2 value $.48$ are again significant, according to the F-table.

⁶ The r value is $-.65$ and the r^2 value is $.42$.

services. (Government employees such as school teachers are not included.)

The three cities for which employment in services was an outstandingly high proportion of total employment in 1950 were Boston, Columbus, Minneapolis. The "change in share" for those cities between 1950 and 1960 tended to be on the low side. At the other end, the cities that were low in the services component in 1950 (including such steel or coal mining cities as Youngstown, Allentown - Bethlehem - Easton, and Wilkes - Barre-Hazleton) showed increases over the ten-year interval that were not substantially different from those of the "high service" cities. Thus, in this area, the convergence effect is somewhat blurred.

Under such circumstances, use of correlation analysis becomes particularly significant. The test shows a much smaller degree of relationship than the ones previously described.⁷

HIGH SPECIALIZATION AREAS

In the case of highly specialized metropolitan areas, it is appropriate and feasible to deal in terms of particular industries rather than with broad categories such as "durable goods manufacturing" or "nondurable goods manufacturing." The 11 SMSA's that are presented in Table IV have an outstandingly high degree of specialization in a particular industry.⁸ This is highlighted in the second

⁷ The r value is $-.42$ and the r^2 value only $.17$. According to the F-table, the relationship is scarcely more than could be considered significant at the 95% probability level.

⁸ The selection of the 11 cities is based on measurements of specialization described in Gunnar Alexandersson, *The Industrial Structure of American Cities*. University of Nebraska Press, 1956.

TABLE III
Nondurable Goods, Finance, Services

SMSA (As of 1950)	Change in Nondurable Goods as Share of Employment 1950-60	Employment in Nondurable Goods as % of Total Employment 1950	Change in Fin.-Ins.-R.E. as Share of Employment 1950-60	Employment in Fin.-Ins.-R.E. as % of Total Employment 1950	Change in Services as Share of Employment 1950-60	Employment in Services as % of Total Employment 1950
Akron, Ohio	-7.4%	36.3%	+0.55%	2.61%	+2.8%	15.4%
Albany-Schenectady- Troy, N. Y.	-0.8	12.9	+0.61	3.09	+4.6	16.2
Allentown-Bethlehem- Easton, Pa.-N. J.	-2.3	24.1	+0.58	1.88	+2.2	13.7
Baltimore, Md.	-0.9	12.1	+0.49	4.14	+0.5	19.2
Boston, Mass.	-2.4	15.8	+0.32	5.82	+2.0	21.2
Buffalo, N. Y.	-0.5	13.8	+0.48	3.06	+2.4	16.0
Cincinnati, Ohio-Ky.	-0.4	14.8	+0.52	4.23	+0.3	19.2
Cleveland, Ohio	+0.1	10.8	+0.42	3.65	+1.8	17.1
Columbus, Ohio	+1.7	7.0	+0.14	5.19	+3.6	20.7
Dayton, Ohio	+2.8	9.3	+0.46	2.38	+3.3	15.3
Detroit, Mich.	+1.0	6.0	+0.57	3.27	+4.1	15.1
Hartford, Conn.	-0.6	7.2	-0.55	12.12	+0.8	17.6
Indianapolis, Ind.	-1.5	12.3	+0.88	4.99	+0.8	18.1
Kansas City, Mo.-Kan.	-0.8	13.0	+0.51	5.28	+1.4	18.4
Milwaukee, Wis.	-2.3	13.6	+0.59	3.74	+1.6	15.5
Minneapolis-St. Paul, Minn.	-2.4	11.9	+0.57	5.56	+2.1	20.4
Philadelphia, Pa.	-2.3	20.2	+0.36	4.31	+1.6	17.8
Pittsburgh, Pa.	+0.4	6.2	+0.63	3.27	+3.4	15.8
Providence, R. I.	-7.4	25.8	+0.31	3.08	+2.2	14.6
Rochester, N. Y.	-1.8	13.2	+2.09	1.55	+3.1	16.4
St. Louis, Mo.-Ill.	-2.2	16.8	+0.62	4.11	+2.2	17.1
Springfield-Holyoke, Mass.	-4.0	22.5	+0.98	3.80	+2.2	16.6
Syracuse, N. Y.	-0.7	9.1	+0.87	3.98	+1.8	19.0
Toledo, Ohio	+0.3	8.5	+0.63	2.88	+4.1	15.8
Wilkes-Barre-Hazleton, Pa.	+3.6	22.6	+0.79	2.09	+2.6	13.7
Youngstown, Ohio	+0.7	3.7	+0.65	1.98	+3.3	13.7

TABLE IV
Employment in Specialty Industries

SMSA and Specialty	% Change in employment in specialty 1950-1960	Employment in specialty as % of total employment 1950	Employment in specialty as % of total employment 1960
Wilkes-Barre-Hazleton, Pa.			
Mining	-81%	22.6%	4.9%
Providence, R. I.			
Textile mill products	-51	17.9	8.4
Detroit, Mich.			
Motor vehicles and equipment	-27	28.1	18.5
Albany-Schenectady-Troy, N. Y.			
Electrical machinery	-26	11.2	8.1
Akron, Ohio			
"Other nondurable goods" (includes rubber)	-10	31.7	23.9
Pittsburgh, Pa.			
Primary metals (includes steel)	-9	18.3	16.2
Allentown-Bethlehem-Easton, Pa.			
Primary metals	-3	12.1	8.1
Youngstown, Ohio			
Primary metals	-2	27.2	24.2
Dayton, Ohio			
Machinery	+5	22.0	18.2
Rochester, N. Y.			
"Other durable goods" (includes photo equipment)	+10	19.4	18.7
Milwaukee, Wis.			
Machinery	+13	15.7	16.1

column where the number employed in a specialty industry is shown as a percent of total employment. The third column gives the corresponding percentage for 1960. The first column, which shows the percentage change in employment in the specialty industry between 1950 and 1960, governs the order of the listing of the cities. (The percentage changes in column 1 are not changes in shares, but are changes in employment. Thus, for example, in Detroit there were 27% fewer employees in the motor vehicle and equipment industry in 1960 than there were in 1950.) Employment declines in many

of these cities were substantial, with percentage decreases in the specialty ranging from 81% in the case of mining in Wilkes-Barre-Hazleton to 2% in steel in Youngstown.

Not all centers, however, had declines in employment in the specialty industry; for example, in Dayton, Rochester, and Milwaukee, the specialty industries registered increases. But, on the other hand, in two of the three cities a relative decline did occur in employment in the specialty industry (compare the second and third columns of the table). Only one SMSA out of the 11 in the table registered an increase in employment in

the specialty industry when measured as a share of total employment, namely, Milwaukee, Wisconsin, where the machinery industry accounted for 15.7% of total employment in 1950 and 16.1% of total employment in 1960.

CONCLUSIONS

The evidence cited above supports the earlier view that the industrial compositions of cities in the Eastern and North Central regions tended during the nineteen fifties to become more like each other. This phenomenon is simply a tendency that represents the net outcome of many economic forces. But the magnitude and velocity of such a ten-

dency should not be exaggerated in that the specializations of various cities remain; Pittsburgh is still an important center of steel making, despite the relative decline of steel; Detroit is still the capital of auto manufacture, despite some dispersion to other auto centers. The individuality of American cities thus remains, with a tendency to become more like each other thus far only blurring slightly the individual contours of the cities involved.

Further research is obviously needed to answer questions implicitly raised by this study. For example, what patterns have emerged in other parts of the country? In decades other than the nineteen fifties? Is the tendency of the nineteen fifties a new phenomenon?

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