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THE VOLUME
OF CORPORATE BOND FINANCING
SINCE 1900

INTRODUCTION AND SUMMARY OF FINDINGS

WHAT have been the broad trends in the aggregate volume of corporate bonded indebtedness in the United States since 1900? How do present levels compare with those of the past? What shifts have occurred in the major industry and size components of this aggregate and in the position of corporate bonds relative to other types of indebtedness? What are the principal factors influencing the volume of new bonds offered to investors and the volume of old bonds extinguished? In particular, how have these debt series behaved during business cycles and over longer periods? And what implications does their behavior have for our understanding of the relation between interest rates and corporate financing? Finally, what has been the aggregate experience of investors in corporate bonds as reflected in cash interest receipts, in the volume of bonds going to default, and in the time required to settle default situations?

Answers to these questions are to be attempted on the basis of new materials on corporate bond financing. The coverage of our investigation is broadly limited to bonds issued by domestic profit-seeking corporations in the railroad, public utility, and industrial fields, and to the parts of such issues that are held by domestic investors (individuals and financial intermediaries). We exclude bonds issued by the financial and real estate groups, by government, and by eleemosynary and other non-profit-seeking organizations. Bonds held by government and by the issuing corporation are excluded also, as are domestic bonds payable in a foreign currency.

A corporate bond is a long-term, negotiable debt instrument running between the issuing corporation and the bondholder. The most popular type is a "straight" bond, which has a fixed coupon rate and single maturity date; such issues account for approximately 90 to 95 percent of the total par amount for all types. Bond issues may also mature serially (serial bonds); interest payments may vary in some predetermined way with earnings (income bonds); or the issues may be offered explicitly for the purchase of such equipment as the rolling stock of railroads, street railways, etc. (equipment obligations); but these minor types of

issues account in the aggregate for only about 5 to 10 percent of the principal amount of bonded debt outstanding.[1]

Trends in Corporate Bond Outstandings

Our special compilations of data on outstandings of issues of all types cover the period January 1900 to January 1944, and reasonably reliable extrapolations can be made backward to 1876 and forward to the beginning of 1951.[2] By piecing together these data, we find that outstandings traced out a very simple trend over this seventy-five-year period, essentially like that shown on Chart 2 (page 44) for straight bonds. Since rail debt, which is the only part that can be shown before 1900, was such a large proportion of the total in the early years, we infer that the funded debt of all industries moved upward continuously from 1876 to 1896 with the rail debt, and, after a possible dip in the following year, again moved upward to 1900. There followed a continuous increase from $6 billion to a peak of $32 billion, for issues of all types, at the beginning of 1932. Outstandings then turned downward, and except for a brief reversal in 1938 continued their fall to a trough of $24 billion at the close of World War II. After that they shot upward, reaching an all-time high of about $36 billion at the beginning of 1951.

Over the period 1900-1944, for which we have reasonably full data, the curve of total outstandings, and of each of the major industry components, described somewhat less than one full swing upward and downward, following patterns of long-term growth roughly similar to those observed in many other economic time series. An initial period of rapid growth was followed successively in each case by gradually retarded growth up to a peak and by mild contraction.

Over shorter periods within the years 1900-1944, bond outstandings behaved somewhat less regularly than this summary

[1] These percentages characterize the period 1900-1944, but the presumption is that the minor types of issues have recently increased in relative importance. Approximately half of all corporate bonds offered during 1948-51 were placed directly with investors (Securities and Exchange Commission, *Privately-Placed Securities—Cost of Flotation*, Washington, 1952, p. 5), and it is known that a large proportion of these (again possibly as much as one-half) were in serial form.

[2] Except as otherwise noted, data on outstandings refer to the situation at the beginning of the year.

statement would indicate. But such movements against the trend as were observed were not sufficiently pronounced to disturb the underlying pattern. It is suggestive that the high growth rates that followed World War II were similar to those observed around the turn of the century. Moreover, these rates already show some signs of tapering off; but this does not necessarily mean, of course, that the past pattern of growth and retardation will be repeated.

Although no systematic attempt was made during the investigation to trace the effects of the many factors governing the broad movements in corporate bond outstandings, it is tempting to speculate about them in this summary statement. Among the factors that have clearly played an important role are: general economic and technological developments in industry; the increasing size of business concerns; fluctuations in the price level; corporate liquidity, earnings, and taxes; and the condition of the capital markets. It may be of interest to comment on each of these at least generally.

Industrial Development

Broad industrial developments have had a pronounced effect on the capital requirements of business and hence on the volume and composition of outstanding obligations. Generally speaking, industries with relatively heavy fixed-capital requirements (those having high ratios of plant and equipment accounts to total assets) have been the most dependent on long-term financing. For example, during the present century the railroads have had ratios of fixed assets to total assets ranging narrowly around 90 percent, and ratios of book value of stocks and bonds to total assets ranging closely around 70 percent.[3] Comparable ratios for the electric light and power industry are respectively 80 percent and 80 percent; for large manufacturing corporations, 60 percent and 60 percent; and for large trade, 45 percent and 55 percent.[4] Again speaking generally, industries with relatively heavy

[3] As used here, "book value" includes the par value of bonds and of stocks having par value, and the stated value of no-par stocks. Proprietary reserves and surplus accounts are excluded.

[4] Data for railroads are from *Statistics of Railways*; for the private electric light and power industry from *U.S. Census of Electrical Industries*; for manufacturing and trade from sample data, covering 84 large manufacturing

fixed-capital requirements have been the largest issuers of corporate bonds. Thus, until very recently the ratio of the long-term debt of the railroads to their total assets has stood at or near 40 percent. Approximately the same figure applies to the electric utilities, but the ratio stands at only about 10 percent for large manufacturing corporations and at about 2 percent for large trade.

It is clear, then, that those developments that have encouraged the expansion of industries with heavy fixed-capital requirements have also encouraged corporate bond financing. The railroads expanded rapidly between 1876 and 1900, and their funded debt expanded apace; at the beginning of the century, as may be seen in Chart 3, page 46, rail bonds accounted for nearly 80 percent of the total of all straight corporate bonds outstanding. By then the railroads were largely "in being," so that rail debt subsequently grew much less rapidly than that of the other industry groups, and now (in 1951) it accounts for only about one-quarter of total outstandings.

At the beginning of the century, public utilities (mostly street railways at that time) accounted for 16 percent of outstanding bonds, industrials making up but 5 percent. Like the rails, the public utilities are heavy users of fixed capital. Along with rapid technological developments in the electric light and power industry, and the expansion of street railway and telephone and telegraph systems, went an increasing use of the corporate bond as a device for capital financing. These developments were so rapid that public utility outstandings expanded over tenfold between 1900 and 1932, while for rails the increase was only twofold. And though public utility debt contracted only a little more rapidly than rail debt from then until the close of World War II, the postwar expansion was much greater. From 16 percent of total outstandings at the beginning of the century, the share of public utility bonds in corporate bonded debt has increased to more than 50 percent, the remainder being almost equally divided between rails and industrials.

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corporations and 27 large trade corporations, collected by the National Bureau of Economic Research.

Growth in Corporate Size

The influence of growth in the size of corporations on outstandings is somewhat more difficult to trace statistically, principally because comprehensive data on size of firms and their indebtedness are not available for most of the period studied. But sample data for large and small manufacturing concerns, collected by the National Bureau of Economic Research, give a clue to the effect of increasing size. During 1926-35 the large concerns (those with total assets exceeding $10 million) had a ratio of aggregate funded debt to aggregate total assets of about 10 percent, while for the small concerns (with assets of less than $250,000) the ratio was about 5 percent, so that an increase in average size seems to encourage the wider use of bond financing. Doubtless this is due in good part to the fact that large corporations generally have relatively heavier fixed-capital requirements than small concerns, and freer access to the organized securities markets.

Besides exerting a stimulating effect on outstandings, the growth in the size of corporations issuing bonds has brought about a rise in the average size of issue (Chart 5, page 54). Between 1900 and 1944 the average size of straight issues for the combined industries increased from $2.3 million to $8.5 million. Rail issues increased at an almost uniform rate over this period from an average size of $3.0 million at the beginning to $11.7 million at the end. The average utility issue ranged narrowly between $1.0 million and $1.5 million during the first two decades of the century but increased rapidly thereafter until it stood at $8.1 million by 1944. Industrial issues had a somewhat more checkered history, with no systematic tendency for their size to increase until about 1940.

So far as we can determine, the principal factor underlying the rise in average size of issue was an increase in average size of enterprise through corporate consolidation rather than a rise in the size of the productive unit per se. The effects of consolidation are most easily traced in the railroad field, where the funded debt of the merged roads was systematically refunded into large "blanket-mortgage" issues, and in the public utility field in cases where large issues of holding companies replaced small issues of operating companies. The average size of industrial issues rose abruptly between 1900 and 1904 because of the formation of the

giant trusts, several of which were financed principally by bond issues. These large issues were subsequently retired and smaller companies entered the bond market, with the result that the average size of industrial issues shrank by 50 percent between 1904 and 1912.

Price Level Changes

In addition to their many other effects, prices have two direct effects on bond financing. Generally speaking, the higher the price level at the time of financing, the greater will be the volume of financing required by a given firm. Second, the higher the level of current prices, the lower the burden of past financing. No systematic attempt was made to eliminate these price influences from the series utilized in our investigation; certain technical problems, such as the selection of the correct price index and the complexity of an appropriate weighting system, make this unfeasible. A rough adjustment for price level changes suggests that while the dollar volume of corporate funded debt increased threefold between 1900 and 1920, debt in real terms was about the same at the end of the period as it had been at the beginning.[5] There were, of course, important changes within the period: debt in terms both of current and of constant dollars more than doubled by 1914; by 1920, though the current figures showed a further increase, debt in constant dollars had fallen back to its 1900 level. From 1920 until 1932 debt in current dollars increased by only 60 percent, but the increase in terms of constant dollars was much greater—250 percent—because of declines in the price level at the beginning and end of the period. Because of the rise in the price level after 1932, the contraction in constant dollar debt through the end of World War II was even sharper than in the current dollar figures. It is particularly suggestive that, notwithstanding the abrupt run-up in the dollar volume of outstandings after World War II, the deflated total in 1951 was about

[5] The movements of wholesale prices are shown alongside those of corporate bond outstandings in Chart 2, page 44. For the period 1913-51 we used the Bureau of Labor Statistics index of wholesale prices for all commodities other than farm products and foods (January prices, 1926 = 100). For earlier years, this index was estimated from movements in the BLS "all commodities" index.

equal to that for such years as 1946, 1923, and 1910, and was less than half of the deflated dollar volume at the peak year, 1932.

Corporate Liquidity, Earnings, and Taxes; Capital Market Conditions

Along with other factors corporate earnings, corporate cash balances, tax considerations, and the condition of the equity market have had an important influence on corporate bond outstandings. Throughout most of the period of secular expansion 1900-1932, cash balances appear to have been drained off by expanding inventories and trade credit, so that corporations necessarily resorted to the banking system for short-term funds and to the stock and bond markets for fixed-capital requirements. During the thirties the situation was reversed. In the industrial field, and to some extent among utilities as well, inventories and trade credit contracted, while capital programs were deferred; thus cash balances partly were used to repay debt obligations, and outstandings of all maturities declined.[6] At the same time, corporations hampered by comparatively heavy fixed charges and low cash throw-off from operations, for example many railroads and street railways, were unable to meet payments on their outstanding bonds. Many of these obligations were later settled by part payment in stock or by write-downs, which furthered the decline in bond outstandings.

Throughout World War II the net cash receipts of railroads expanded markedly, and again many railroads were able to retire debt. In other fields, expanding cash requirements induced by the war effort were met partly out of swollen cash balances inherited from the thirties, and partly through federal advances and prepayments to war contractors, deferral of tax liabilities, and increased retained earnings. When the enormous capital expansion programs got under way at the close of the war, the wartime sources proved inadequate, and corporations turned again to the capital markets. Small and medium-sized corporations had recourse to the banking system for their external financing; large corporations financed themselves principally by direct

[6] The banking side of this story is discussed by Neil H. Jacoby and Raymond J. Saulnier in *Business Finance and Banking* (National Bureau of Economic Research, Financial Research Program, 1947), pp. 10-13.

placements of bond issues with financial intermediaries, thus causing bond outstandings to rise abruptly. The rise in corporate tax rates and the deductibility of interest charges in arriving at taxable income, the growing institutionalization of savings, the upward surge of commodity prices, and the relatively low level of stock prices as compared with bonds, all served to encourage bond and discourage stock financing during the postwar period.

The Position of Corporate Funded Debt Relative to Total Debt: Elements of Stability and Elements of Change

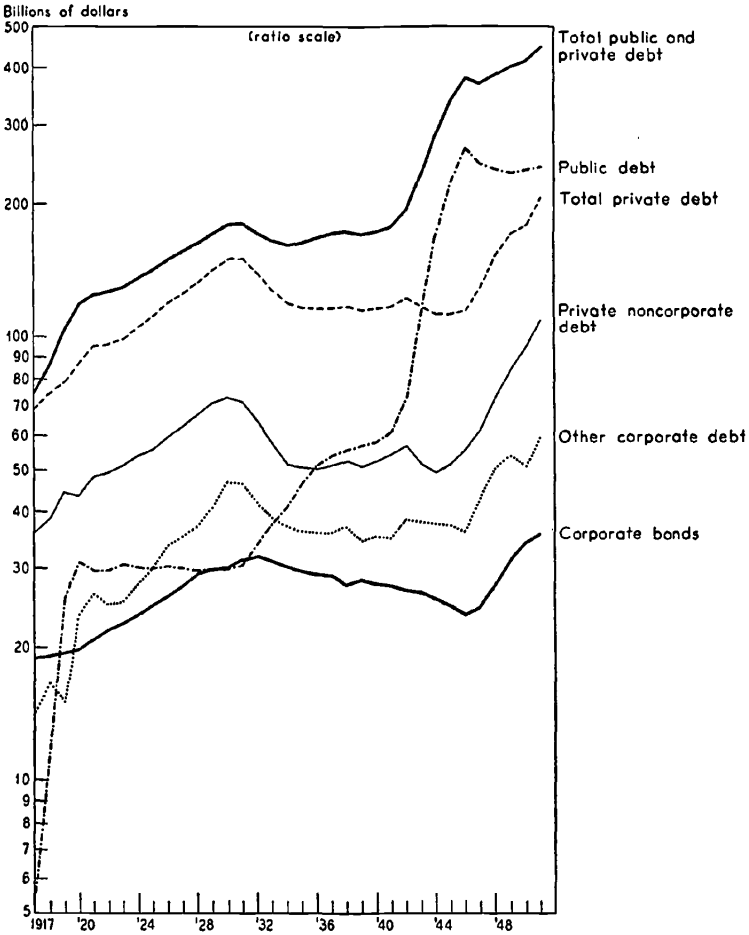
Two things stand out clearly when one examines the position of corporate bonds relative to other types of debt by means of Chart 1. The first is the stability in the composition of private debt; the second is the enormous rise in the ratio of public to private debt.

These observations are based on a comparison of our data with net debt estimates of the Department of Commerce. On the chart, total corporate debt is broken down into bonds and "other corporate debt," in which are included short-term debt and such unfunded long-term items as direct mortgage loans, receivers' certificates, term loans, and other long-term notes to banks.[7] As the chart indicates, bonds and other corporate debt have moved similarly since 1917, the latter being slightly more volatile principally because of variations in short-term debt. With minor exceptions, corporate bonds have usually accounted for about two-thirds of corporate long-term debt (not shown separately on the chart), and the long-term debt of corporations has constituted about two-thirds of their total debt.

Rough stability is also exhibited in the relationship between corporate and private noncorporate debt. (In the private noncorporate category are included the debt of unincorporated business units, real estate mortgage debt of individuals, and consumer debt.) Before 1931 these two components of private debt were approximately equal, but from then until the close of World War II noncorporate debt was lower. In the postwar period this relationship was reversed, mainly because of the sharp rise in residential mortgages. Between the beginning of 1946 and the

[7] The Department of Commerce estimates include, and our bond estimates exclude, the debt of financial and real estate corporations. Hence the difference—other corporate debt—covers, besides the items listed, an undetermined amount of bonds of the financial and real estate groups.

CHART 1—Total Debt of the American Economy and Its Major Components, 1917-51



On the vertical scale, equal distances represent equal ratios of change.

All series other than corporate bonds are Department of Commerce estimates of net public and private debt after adjustment to exclude corporate reserves for taxes, dividends, etc. (Survey of Current Business, September 1945, p. 12, October 1950, pp. 9-15, and September 1951, pp. 20-24).

Corporate bonds are par amount of outstandings, January figures, for issues of all types; from Table A-1.

On coverage of "other corporate debt" see footnote 7 opposite.

beginning of 1951, private noncorporate debt increased by 98 percent, corporate short-term debt by 73 percent, total corporate debt by 59 percent, and corporate bonds by only 52 percent.

Public debt rose enormously over the thirty-four years up to 1951, the over-all percentage increase being more than twice that for the total debt of the American economy. Thus there occurred, in contrast with the relative stability of the various components of private debt in most years, a marked shrinkage in the ratio of private to public debt. In 1917, corporate debt accounted for about 44 percent of total debt (public and private), and private noncorporate debt for about 48 percent, so that the private components together accounted for about 92 percent, and public debt for only 8 percent. Thereafter, except for a minor reversal in the twenties, the share of the public sector in total debt moved gradually upward until it stood at 34 percent just before World War II. In the years of heavy war financing by the federal government the share of the public sector increased much further, reaching its high point, 70 percent of total debt, at the close of the war. Since then a pronounced expansion in the dollar volume of private debt and a moderate contraction in public debt have lowered the share of public debt to 54 percent of the total (at the beginning of 1951).

The position of corporate bonds has also changed drastically. We estimate that they accounted for about 25 percent of total debt in the years immediately preceding World War I and for only 6 percent at the close of World War II. Since then, their share, like the shares of the other components of private debt, has expanded slightly. At the beginning of 1951 they accounted for about 8 percent of total debt.

Relations between Bond Offerings and Extinguishments

The volume of funded debt outstanding at any moment measures on the one hand the total indebtedness of business corporations arising from their past offerings of corporate bonds (less repayments), and on the other hand the volume of past savings held in this form by the investing public. To interpret the behavior of these "stock" figures, we must study the "flows" by which they are generated.

For this purpose the net and gross flows into and out of the "stock" of bond outstandings have been measured at various

levels. Our basic gross estimates are monthly and annual series of total offerings (including bonds offered both for new-money purposes and for refunding old bonds), and of total extinguishments (including both bonds actually extinguished in an economic sense and those refunded into new bonds).[8] The difference is the net change in outstandings, which, when added to the volume of bonds outstanding at the beginning of a period, generates the series on outstandings described in the preceding section. Separate estimates of the volume of refundings (old bonds refunded into new bonds) enable us to transform the two gross flow series into series on new-money offerings (total offerings less refundings) and on net repayments (total extinguishments less refundings). All of these series are measured in terms of par amounts (the principal amount promised by the obligor at maturity); in addition, three cash series are utilized. We have measured the gross cash proceeds obtained by business corporations from the sales of their bonds, the gross cash payments at extinguishment, and the difference between these, or net cash receipts of corporations from sales of bonds.

During the period 1900-1943 inclusive, for which we have full information, the total par amount of straight bonds offered to (and purchased by) the investing public aggregated $72 billion, while total extinguishments of straight bonds aggregated $55 billion. Thus the net change in outstandings was only $17 billion. Refundings accounted for $32 billion of total offerings or extinguishments; it follows that only $40 billion or 55 percent of total offerings was for new-money purposes, and that only $23 billion or 41 percent of the total volume of bonds extinguished was actually repaid without refunding.

During the years 1900-1943 the gross amount of cash received by business corporations from the sale of bonds was $60 billion, or 84 percent of the par amount of total offerings. The remaining 16 percent was accounted for principally by bonds offered in

[8] "Total extinguishments" include bonds retired through maturity, call, conversion, exchange, payment of bondholders after liquidation, or a change in the contract not provided for in the original indenture, such as an extension of the maturity of the issue or a change in the coupon rate. Extinguished bonds are said to be "refunded" to the extent that they are replaced by new bonds of the original obligor, or of a successor corporation or affiliate of the original obligor; all other extinguished bonds are said to be "repaid."

direct exchange for old bonds. On the other side of the ledger, the gross amount of cash paid out by business corporations at extinguishment was $40 billion, or 73 percent of the par amount of total extinguishments. The remaining 27 percent was accounted for largely by direct exchange of old bonds for new bonds. It follows that the net cash realized by business corporations from sale of bonds was about $20 billion over the whole period, while the net change in par amount of outstandings was only $17 billion: bonds were in effect "sold" at approximately a 20 percent premium over the amounts repaid to investors. We find, however, that in most years the net cash flow corresponds closely to the net change in outstandings. We may therefore focus attention largely on the behavior of the net change in outstandings, for which our estimates are most reliable, with reasonable assurance that the corresponding cash flows are moving in the same direction.

Analysis of the interrelationships among the various bond series yields some pertinent information on a practical matter, that of the selection of an appropriate series to be used as an indicator of the net volume of bond financing. In many credit markets, namely those where old loans run off rather smoothly and the volume of refunding activity is not large, a series on new credit granted (analogous to our total offerings) is a reliable index of net credit change. The volume of refunding activity in the bond market, however, is large, and bond offerings statistics must be interpreted with caution. In 1936, for example, total offerings reached unusually high levels, but the proceeds of nearly all of these offerings were used simply to refund outstanding issues. Since repayments exceeded new-money offerings, outstandings actually declined. In 1918 the reverse situation obtained: total offerings were held to a low level by the Capital Issues Committee, but new-money offerings exceeded repayments, so that the volume of outstandings actually rose.

Clearly the best measure of the impact of bond financing on the economy is either the net change in outstandings or the closely related series on net cash flow. Unfortunately, our data for these series terminate at the end of 1943, and estimates for later years are not yet available.[9] Analysis of new-money offer-

[9] Estimates of net cash flow are being prepared by the Securities and Exchange Commission but have not yet been released for general use. The

ings, which measures the gross volume of bonds offered for new-money purposes, shows that this series is rather highly correlated with the net change in outstandings. During the period studied, about five-eighths of the year-to-year variation in the net change in outstandings can be imputed to changes in new-money offerings and only about three-eighths to repayments. To put it differently, new-money offerings moved in the same direction as the net change in 33 of the 43 movements registered by our annual data. It follows that a series on new-money offerings, such as that currently prepared by the *Commercial and Financial Chronicle*, may be of use as a rough indicator of the direction of change in outstandings until more precise statistics become available.

Interest Rates and Bond Financing

The interrelated statistics developed in our investigation should prove useful in the analysis of the relationships between interest rates and bond financing. A preliminary examination of movements in high-grade bond yields, net changes in outstandings, and gross new-money offerings, which is all that is undertaken at present, will suffice to show that these relationships are complicated, and to indicate some promising leads for further investigation. The series exhibit both long-run drifts and shorter ups and downs (Chart 13, page 125). Here we shall concern ourselves mainly with the former; in the next section we summarize the principal conclusions obtained from analysis of the short-run movements.

To the extent that bond yields (the cost of long-term money) are effective regulators of the demand for bond financing, the higher the yield, the lower will be the net change in outstandings; and conversely, the lower the yield, the higher will be the net change in outstandings. Chart 13 shows that between 1900 and 1920 the trend in bond yields was upward while that of both new-money offerings and the net changes in outstandings was on the whole downward. During 1920-32 bond yields moved sharply downward and then leveled off (rising sharply in 1931-32), while new-money offerings and net changes in outstandings first rose

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SEC has kindly permitted us to use these estimates for purposes of extrapolating net changes in bond outstandings for the years 1944-50 (cf. Chapter 6).

rapidly and then fell. From 1932 to 1945 bond yields declined almost continuously, while new-money offerings and net changes rose during 1933-38 and then declined irregularly. After World War II, yields moved moderately upward through 1948 and downward through 1950, while over the same years the net changes rose and fell enormously.

Although some of these movements suggest that interest rates operated to restrict the demand for long-term money, it is also true that corporations borrowed most in the twenties when interest rates were above average levels, and less in earlier and later periods when interest rates were lower. For the period 1900-1950 as a whole, it is evident that the relation between interest rates and bond financing was affected significantly by other strategic forces influencing the demand for long-term money. For example, in the period 1900-1919 stock prices were generally higher than they had been at most times in the late nineteenth century, so that the situation was conducive to stock rather than bond financing. Again, during World War I the bond market was controlled and this reinforced the effect of the rise in interest rates during the war. When control was lifted, bond yields rose rapidly, yet the decline in stock financing after 1919 induced a substantial advance in bond financing. During the twenties the upward trend in business activity, no doubt reinforced by the decline in bond yields, stimulated bond financing until 1927; but in 1927-29, while business activity continued upward, bond financing fell off abruptly as interest rates stiffened and stock financing boomed. In the depressed thirties, despite the low level of interest rates and of stock financing, bond financing was at an extremely low ebb. Finally, in the postwar years the upward trend of business activity, a corporate tax structure favoring bonds rather than stocks, and a relatively unfavorable market for new stock financing all contributed to the boom in bond financing.

A full-dress analysis of all factors affecting bond financing would carry us well beyond the scope of the study. For the present we conclude simply that the observed long-run movements in bond yields were not in themselves sufficient to explain satisfactorily the observed movements in bond financing. This, of course, does not mean that bond yields play no role in determining the demand for long-term money, nor does it establish that associated changes in money rates in other markets, or credit

conditions in general, may not have far-reaching effects. Moreover, even if bond financing should, upon detailed investigation, prove to have been relatively insensitive to the rather moderate changes in bond yields that have occurred in the past, the possibility that large and rapid movements might have more pronounced effects should not be overlooked.

The data do indicate that a secular decline in interest rates may have a pronounced long-run cumulative effect on bond financing. As interest rates decline, bonds rising above call price are successively refunded into lower-yielding obligations. It follows that a secular decline in interest rates, such as occurred in the thirties, will ultimately lower the interest burden on debtor corporations, thus tending to increase profit margins and to encourage general corporate expansion. However, the process of refunding an appreciable portion of outstanding debt is a time-consuming one. We find, for example, that the impact of the downward revision of interest rates in the thirties was not fully felt until the postwar period of credit inflation.

Another implication of a secular decline in interest rates is that the associated reduction in debt burden may occur most promptly and be greatest for firms having the most favorable earnings records and prospects. In the late thirties, for instance, firms in the industrial and utility groups reduced their interests costs considerably while the railroads, partly because of their low credit standing and partly because many of their bonds were noncallable, effected only a slight reduction. The railroads, however, were able to reduce their interest costs in the forties by the refunding and repayment of debt.

Finally, the results of a secular decline in interest rates must also be judged from the point of view of the investor. The downward adjustment of interest rates in the thirties and early forties reduced the burden of corporate funded debt, as measured by the ratio between interest actually paid and outstandings, from 4.6 percent in 1932 to 3.7 percent in 1943. This decline of nearly 20 percent in interest costs, while desirable from the point of view of the debtor corporation, represented an equal decline in the income received by corporate bond investors.

These findings contribute something to our understanding of the influence of the long-term rate of interest on the net flow of funds to industry through the bond market, and suggest some of

the difficulties with monetary theories that posit a uniform and simple causal relationship between bond yields and bond financing. The relationship so far as it is observable in our data appears neither very simple nor very stable. Further evidence to this effect will be summarized in the next section.

Cyclical Fluctuations in Corporate Bond Financing

The series on corporate bond outstandings, although influenced by the business cycle, is dominated by trend movements. The business cycle affects more strongly the net change in outstandings and the related series on offerings and extinguishments.

Total offerings of corporate bonds and each of the two component series—bonds offered to refund other bonds, and bonds offered to raise new money—exhibit negative conformity to the business cycle (Chart 17, page 153). This means that as the pace of general business activity quickens, the volume of bonds offered in the market typically falls; contrariwise, as the pace of general business activity slackens, the volume of bonds offered typically rises. The same behavior characterizes the gross cash proceeds obtained by corporations from sale of bonds. On the other hand, total bond extinguishments, bond repayments (total extinguishments less refundings), and gross cash payments by corporations at extinguishment all show the reverse pattern of behavior. Typically they are positively conforming series, rising during business expansions and falling during business contractions.

The cyclical behavior of the net change in outstandings (which, as we have seen, may be interpreted either as the difference between total offerings and extinguishments or as the difference between new-money offerings and repayments) is governed by the behavior of its components. During business cycle expansions, offerings usually fall while extinguishments rise, so that the net changes in outstandings fall. Conversely, during business cycle contractions, offerings rise while extinguishments fall, so that the net changes in outstandings rise. Roughly the same pattern characterizes the net cash flow to the corporate sector of the economy from sale of corporate bonds. Thus, both net cash receipts and net par amount of bond financing are inverted with respect to the pace of general business activity.

These findings throw new light upon the familiar theory that "credit," in a generic sense, plays a dominant role in the business

cycle, expanding during business expansions and contracting during business contractions. While total credit doubtless does behave in this way, clearly distinctions need to be drawn among its various components. Many types of financing—for example short-term and stock financing—appear to behave in the way theory would indicate; but bond financing runs a contrary course and thus acts, so to speak, as a stabilizing force.

Some idea of the stabilizing role of the bond market during business cycles may be gained by comparing turning points in the bond and stock series with turning points in general business cycles. If we take a stand at the point in the general business cycle at which stock offerings turn upward, the financial process appears typically to unfold as follows. Soon after the upturn in stock offerings and while general business activity is still falling, the net changes in bond outstandings turn downward. The immediate cause is a rise in extinguishments, possibly induced by the repayment of some funded debt from the proceeds of stock offerings. Since certain corporations are still financing their capital programs via the bond market at this time, bond offerings continue to rise through early business expansion. As stock prices become increasingly attractive, corporations turn from bond to stock financing; bond offerings turn downward; and the net changes in bond outstandings continue to fall. These movements persist until a late stage in business expansion, when stock offerings and stock prices fall. In the next stage, proceeds from the stock market are no longer obtainable for the retirement of bonds; bond extinguishments turn downward; and the net volume of bond financing begins to rise. Bond offerings continue to fall, however, since the bond market moves sympathetically with the stock market at this point. Soon after the business peak, the bond market stabilizes, and bond offerings turn upward, thus reinforcing the rise of the net changes in outstandings. These movements continue until late in business contraction, when the stock market recovers. The entire process is then re-enacted—with a difference—during the next business cycle. The many variations from one cycle to another, necessarily neglected here as a number of individual cycles are merged in an idealized story, will come under examination later.

It will be observed from the foregoing sequence of events that the stock market complements the bond market over business

cycles. On the average, when the ratio of stock to bond prices moves upward from one cycle stage to the next, the ratio of bond financing to stock offerings usually moves downward (see Chart 19, page 167). And conversely, when the ratio of stock to bond prices moves downward, the ratio of bond financing to stock offerings moves upward. This finding is in agreement with the view that the differential costs of financing in the two markets determine the relative volumes of financing. The significant point is that bond prices alone (or bond yields alone) appear to play a relatively minor role in this story. Indeed, during the cycle, the net borrowings of the corporate sector are frequently heavier when bond yields are high than when bond yields are low. Moreover, bond prices and the net changes in outstandings move in the same direction during parts of the cycle, and in the opposite direction during others. Detailed study of monthly data reveals that the timing relationships can be viewed in either of two ways: (1) the net changes consistently lead the corresponding turns in bond prices by fairly long intervals; or (2) the net changes lag behind the opposite turns in bond prices, also by fairly long intervals. These complex timing relationships cannot be adequately explained, we believe, by any simple theory of the response of bond financing to bond yields, or without reference to the dominating influence of the stock market and the business cycle. The explanation appears to be that the cyclical timing of the net change in outstandings is the resultant of the distinctive timing of its two components, the positive component (new-money offerings) more or less synchronous with bond prices, and the negative component (repayments) synchronous with stock prices and the business cycle. The latter appears to dominate the timing of the net change so that the net change has its peak at or near the business trough and its trough at or near the business peak. Since bond prices usually reach peaks in midexpansion and troughs in midcontraction, the net change in bond outstandings thus leads the corresponding turns in bond prices (or lags the opposite turns). If this view is correct, it is necessary to substitute a theory of differential money costs for a bond yield theory in order to account for the cyclical behavior of the bond market.

Much empirical research remains to be done before we can obtain a well-rounded picture of the behavior of money and

credit during business cycles.[10] What, for example, happens to bank credit and short-term interest rates in each cycle stage, and what is the relationship of these factors to funded debt and equity funds? How are these various credit series influenced by the changing cash requirements of business corporations over the cycle? One may conjecture that as business expands, cash is absorbed increasingly into inventories and trade credit; that corporations replenish their depleted cash accounts through the banking system and the stock market; and that surplus funds obtained from these sources are used to retire funded debt. During business contractions, on the other hand, the stock market ceases to be an attractive source of funds; banks allow marginal loans to run off; and the gap is partially filled through the liquidation of inventories and trade credit and the flotation of bonds.

The foregoing analysis describes the typical behavior of bond financing during the cycles of the period 1900-1938. An important exception, however, occurred after the stock market collapse of 1929. At first the net volume of bond financing increased in the usual way, but in late 1931 the bond market broke badly as the result of a tightening of the money markets and a general deterioration of credit. The bond market therefore could not perform its typical contracyclic function at the business trough of 1932. During the next cycle, 1932-38, and on through the wartime cycle, 1938-46, bond financing again followed its typical pattern, moving downward during business expansions and upward during business contractions. During the following transitional cycle, 1946-49, however, the series again behaved atypically. Indeed, in that cycle the net volume of bond financing reached an all-time high in 1948 at the crest of the business expansion. The postwar experience raises important questions as to the applicability of the earlier relationships to the economy of the future. Rising commodity prices and taxes, the relatively low level of stock prices, and the growing volume of institutional funds seeking investment, we have seen, have all encouraged bond and discouraged stock

[10] A contribution in this direction has recently been made by Ilse Mintz in *Deterioration in the Quality of Foreign Bonds Issued in the United States, 1920-1930* (National Bureau of Economic Research, 1951). Mrs. Mintz observed a complementary relation between flotations of foreign bonds and of domestic stocks in the cycles of the twenties.

financing since the war. Similar changes have affected the relationship between stock and bond financing in the past and may well affect it in the future.

Aggregate Default and Settlement Experience on Corporate Bond Investments

A corporate bond default is defined as the failure to pay principal or interest promptly when due. Comprehensive data on corporate bond defaults in major industry and size groups are presented in this volume, and more detailed breakdowns will be examined in a later one. The series are of the interrelated "stock-flow" type used generally throughout our investigation. They provide annual estimates of the volume of bonds outstanding in default, of new defaults, of default settlements (bonds previously in default that were restored to good standing, extinguished through reorganization, etc.), and of the net change in outstandings in default (new defaults less default settlements). Ancillary estimates are provided for special categories of new defaults and settlements.

Between 1900 and the onset of the Great Depression the aggregate volume of corporate bonds outstanding in default was quite small, both in absolute and in relative terms (Charts 22 and 23, pages 190 and 191). During this period the average annual par amount of outstandings in default was only $0.4 billion, or 2.7 percent of total outstandings. With the financial difficulties of the early thirties, outstanding defaults climbed rapidly to a peak level in 1936 of almost $4 billion, or 15 percent of outstandings. Although there was a mild improvement in 1936-37, the situation again deteriorated and the amount outstanding in default in 1940 was about as large as in 1936. After that, default settlements generally exceeded new defaults, so that the volume of outstanding defaults declined.

Since rail bonds dominated the market for corporate bonds over most of the first three decades of this century, one would expect them to occupy a predominant position in corporate bond defaults. Actually, they accounted for less than half of the total volume of bond outstandings in default in the majority of the years from 1900 to 1933. The proportion of rail outstandings in default during this period was usually well below the ratios for the other major industry groups, rarely exceeding 4 or 5 percent.

Between 1931 and 1940 the status of rail bonds deteriorated markedly, the percentage in default climbing from 0.5 to 27.9. Moreover, very few of the rail defaults had been settled by the end of the period covered by our records: at the beginning of 1944, the proportion of rail outstandings in default (26 percent) was still nearly as high as in 1940. The volume of utility bonds outstanding in default was fairly heavy in the early twenties and again in the midthirties (about 8 percent and 7 percent, respectively), largely because of the poor performance of street railways in these years. With industrial bonds the greatest difficulties came in the early thirties, the volume of defaults climbing from $0.1 billion in 1931 to $1.1 billion in 1934, or from 2 to 24 percent of industrial outstandings. By 1944, however, all but $0.1 billion of the defaults had been settled. At that time the percentage of industrial outstandings in default was only 4.8; and for utilities, the comparable figure was only 3.5. This is in sharp contrast to the rails.

As in the case of the net change in outstandings and its two components—offerings and extinguishments—the effects of the business cycle are clearly apparent in the series on new defaults, default settlements, and net changes in outstandings in default. The net change in outstanding defaults in any year is highly correlated with the volume of new defaults, and both series show high negative conformity to the business cycle, reaching peaks at or near business troughs, and troughs at or near business peaks. The volume of default settlements lags behind new defaults, but the lag is irregular owing to extreme variations in the length of time required to settle distress situations through corporate reorganization, etc. The latter series, therefore, shows positive but low conformity with business cycles.

From the investor's point of view, a better measure of default experience than the absolute volume of defaults is given by the rate at which bonds go to default and the rate at which defaults are settled. As measured by the average annual default rate calculated over the entire period 1900-1943, default experience was best on utility bonds and poorest on bonds in the industrial group (Table 22, page 208). During the first three decades of the century, rail bonds had clearly the best record. Their average annual default rate for that period was only 0.9 percent, as against 1.5 percent for utilities and 2.1 percent for industrials.

This relative performance was reflected in conservative investment opinion in the period before the Great Depression, when rail bonds were favored while industrials were frowned upon by conservative investors, by the compilers of the legal lists of bonds eligible for savings bank and trust fund investment, and by the investment rating agencies.

On the basis of the depression experience, there was a pronounced shift in investor preferences from rail bonds to utilities and industrials. According to their average annual default rate calculated over the years 1930-43, utility bonds had much the best experience (a default rate of 1.6 percent per annum), and they came to occupy a preferred position as outlets for funds seeking low-risk investment. Trends in outstandings since World War II, and present market-yield differentials, indicate that industrial bonds are now also a preferred class of investment, while rail bonds have taken a decidedly secondary position. It will therefore surprise some investors to learn that the default experience with rail bonds during the depressed thirties was actually superior to that with industrials. Both rail and industrial bonds did poorly in those years, but the average annual default rate for rails (3.2 percent) was lower than that for industrials (3.5 percent).

In seeking an explanation for the superior market performance of industrial bonds as compared with rails in recent years, one must take into account the fact that the rate at which bonds go to default measures only one aspect of over-all investor experience. Our analysis of default rates was therefore supplemented by a parallel analysis of annual settlement rates. (The annual settlement rate is the ratio of the par amount of settlements during a year to the par amount of outstandings in default.) As is indicated by Table 23 (page 210), rail bonds had the lowest settlement rate of the three major industry groups during the thirties, whereas industrial bonds had the highest. In short, rail bonds went to default at a slightly lower rate than did industrials, but remained in default over much longer periods.

In general, the statistical records on settlement rates emphasize the importance of the average level of earnings in the settlement of defaults. Industrial corporations' earnings were unstable in the thirties, but recovered rapidly, and many of their bonds were quickly restored to good standing. From these findings we infer

that defaults were settled more quickly by obligors having a relatively simple capital structure, and by obligors not subject to close public regulation, than by others.

Another measure of investor experience with corporate bonds is provided by the record of interest payments on funded debt. In our investigation certain monthly and annual series on interest payments have been developed, primarily for use in national income studies where previously available data of that kind have been unusually weak. These statistics, which cover the aggregate volume of interest payments promised by obligors (contractual charges) and the volume of interest actually paid (actual payments), also throw light on the ability of business enterprise to service funded debt. The difference between interest charges and payments is, of course, the amount of interest in default.

The series amplify and confirm our findings as to industrial differences in corporate bond defaults. They also show that, despite the unusual financial disturbances of the Great Depression, the record of American business enterprise in servicing its funded debt has been remarkably good. Between January 1900 and January 1944 contractual interest charges aggregated $40.8 billion, and actual payments $38.4 billion. Thus over 94 percent of all contractual interest was paid during this period, leaving only 6 percent in arrears. Moreover, in none of the years in question did the portion of contractual interest actually paid fall below 84 percent, and in 32 of the 44 years it exceeded 95 percent. This record does not take account, of course, of reductions in contract rates through corporate reorganizations. It appears remarkable, however, when compared with that of foreign dollar bonds publicly offered in this country. As late as 1952 only 55 percent of the debt service on these obligations was being met.

Default rates, settlement rates, interest receipts, and the period from default to settlement each measure an important aspect of investor experience. It remains for a later stage of the investigation to examine prices paid for investments at offering, values of receipts at extinguishment, and the realized yields.