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ships to the economy of the future. Rising commodity prices and taxes, and the relatively low level of stock prices, we have seen, have all encouraged bond and discouraged stock 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 will be presented in the volume on which this paper is based. The series are of the interrelated "stock-flow" type used generally throughout the 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 outstanding defaults (new defaults less default settlements). Ancillary estimates are also provided for special categories of new defaults and settlements. More detailed breakdowns by minor industry groups and other classifications will be presented in a later monograph. Chart 7 gives the picture for all industries combined, and the discussion will bring in some of the differences between major industry groups.

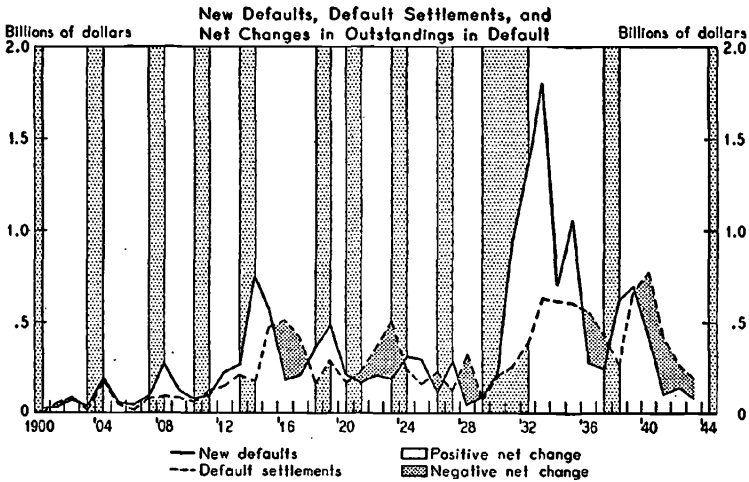
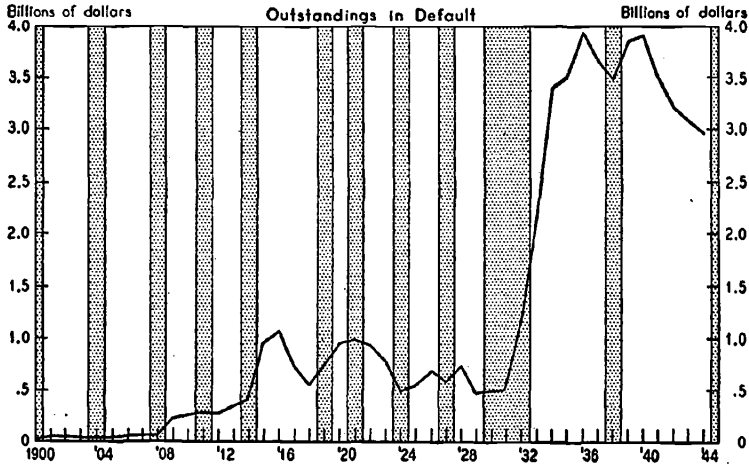
Between 1900 and the onset of the Great Depression the aggregate volume of corporate bonds outstanding in default was quite small, both in absolute and in relative terms. During this period the average par amount of bonds outstanding in default was only \$0.4 billion or 2.7 percent of total outstandings. With the financial difficulties of the early thirties, outstanding defaults climbed rapidly to a peak level in 1936 of about \$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 bonds outstanding in default in the majority of the years from 1900 to 1933. The proportion of rail bonds in default during this period was usually well below that of the other major industry groups, rarely exceeding 4 or 5 percent. Between 1931 and 1940 the status of rail bonds deteriorated rapidly, 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, 26 percent of rail bonds were still in default. The volume of utility bonds outstanding in default was fairly heavy in the early twenties and again in the mid-thirties (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 only 4.8 percent of industrial bonds were in default; for utilities, the proportion was only 3.5 percent. This is in marked 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 outstanding defaults. 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 investors' point of view, a better measure of default

CHART 7—Corporate Bond Defaults: Outstandings, New Defaults, and Settlements, 1900-1944



Data are for all industries combined and include straight issues only, par amount (see Table 3, Appendix). Outstandings in default are January figures; other series are totals for the year.

Shaded areas in the time scale, representing contractions in general business activity, and white areas, representing expansions, are from Arthur F. Burns and Wesley C. Mitchell, *Measuring Business Cycles* (National Bureau of Economic Research, 1946), p. 78.

experience than the absolute volume of defaults is given by the rate at which bonds go to default and the rate at which these 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. During the first three decades of the century, rail bonds had clearly the best record. Their average annual default rate for this 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 these years, but the 3.2 percent average annual default rate for rails compared favorably with the 3.5 percent rate for industrials.

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 proportion of defaulted bonds outstanding at the beginning

of the year that were settled during the year.) Averages of these annual settlement rates for the major industry groups follow:

PERIOD	<i>All industries</i>	<i>Railroads</i>	<i>Public utilities</i>	<i>Industrials</i>
1900-1929	33.2%	28.0%	30.9%	35.8%
1930-1943	14.1	8.4	20.9	27.0

As the table indicates, rail bonds had the lowest settlement rate of the three major industry groups in both periods shown, whereas industrial bonds had the highest. In short, rail bonds went to default slightly less frequently than 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 the present investigation, certain monthly and annual series on interest payments have been developed, primarily for use in national income studies where previously available data of this type have been unusually weak. These statistics, which cover the aggregate volume of interest payments promised by obligors (contractual payments) 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 contractual and actual payment is, of course, the amount of interest in default.

These 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 payments aggregated \$40.8 billion, and

actual interest 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, while 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 the foreign dollar bonds offered in this country during the twenties. As late as 1950 only 58 percent of the debt service on these obligations was being met.

In the preceding paragraphs we have considered such measures of investor experience as default rates, settlement rates, interest receipts, and the period from default to settlement. While each of these statistics measures an important aspect of investor experience, account should also be taken of the price paid for the investment at offering and the value of receipts at extinguishment. Realized yield statistics, which fully reflect all of these payments, and their timing, will be examined in a later report.