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I
BOND QUALITY: THE SETTING OF THE PROBLEM

The Prewar Record

In 1958 W. Braddock Hickman's *Corporate Bond Quality and Investor Experience*[1] was published as the second of three volumes in the National Bureau's Studies in Corporate Bond Financing. Hickman examined yields and loss rates on domestic corporate bonds over the years 1900–43, tested different measures of ex ante bond quality against default and loss experience, and estimated yields realized on defaulted bonds for various holding periods. Thus the investor was able to determine what his net gain or loss would have been from investing in bonds of various characteristics and holding them for various periods.

The material for the Hickman study was all "straight corporate bonds" of $5 million or more, issued from 1900 through 1943, plus a 10 per cent sample of issues below that size. Straight bonds are those with fixed income and a single maturity date. Income and serial bonds and all equipment trust certificates were eliminated from the main part of the study because of the complex task of determining the actual yields, as were real estate and finance company bonds.

One of Hickman's most important findings is that, broadly speaking, a diversified portfolio of second-quality issues, even after consideration of default and loss experience, returned a higher yield than a first-quality portfolio.[2]

Hickman noted that several measures of prospective bond quality were relatively efficient indicators of risk of default. Thus, of the bonds issued from 1900 through 1943, the default rate of those rated by agencies in the worst class at offering was seven times that of the best class.[3] Bonds classified in the worst class according to market rating[4]

[1] Princeton University Press for National Bureau of Economic Research, 1958.

[2] See the discussion in Chapter VI.

[3] See *Corporate Bond Quality*, Table 1, pp. 10–11. The agency rating is a composite of the ratings assigned by the investment agencies: Moody's, Fitch, and Standard and Poor's. (Before 1941 separate ratings were given by Poor's and by Standard Statistics.)

[4] The market rating is the difference between the yield of a specified bond and the yield of the highest-quality issues of comparable maturity.

had a default rate three times as large as those rated in the best. The default rate of those that earned their fixed charges the least number of times (the lowest times-charges-earned ratio) was seventeen times as large as the rate of those earning their charges the most times. This over-all experience masked considerably better predictive ability for the various quality measures in particular time periods and given industries. Hickman concedes that the measures are not perfect. He says, "The principal errors of judgment committed by the rating systems arose from a failure to appraise accurately the earnings trends of the different industries and to allow fully for cyclical risks." [5] In spite of this difficulty, these measures of prospective bond quality appear relatively efficient.

More important from the standpoint of the present study are Hickman's findings relating to trends and cycles in observed measures of quality. He found in the 1900–43 data both significant long-term trends and shorter-term cyclical movements bearing a definite relationship to conventional business cycles. When "life-span" default rates [6] are classified by year of offering, both movements are visible.

Hickman suggests that bonds issued in times of relatively high business activity tend to have higher default rates than those offered in years of relatively low activity. He also found that bonds issued in the early 1920's and in the period 1935–43 had the lowest life-span default rates. We have been able to confirm his belief that the record of defaults after 1944 would not change this finding, although up to now there has not been a real test. Bonds issued in the first decade of the century and in 1928–29 and 1933 showed the worst life-span default rates. Hickman reasoned that the tendency of default rates to be high for bonds issued in periods of heavy financing connected with major business cycle movements probably resulted from the fact that "in periods of overconfidence, marginal issues were floated that would not have found a ready market when business was depressed." [7] He noted too that the investment agencies also followed a cyclical course in rating bonds, particularly over the short cycles commonly identified with inventory movements. This is of great importance to the present study since, broadly speaking, the postwar period has so far produced

[5] *Ibid.*, p. 13.

[6] The percentage of par amounts of bond offerings going to default at any time in their "life spans."

[7] *Ibid.*, p. 23.

several short or inventory cycles but no recognizable major cycles.

Hickman also notes that, "Viewed in full perspective, the period of the late twenties and early thirties appears as simply a sharp break in a falling trend in default and loss rates." [8] His prospective measures of quality also show a long-term trend toward improvement, especially for public utility issues. The proportion of par amounts offered bearing superior agency ratings generally rose during the forty-four years analyzed. Earnings coverage of bonds also improved. Contrary indications were generally explained by the miserable performance of railroad and industrial corporation issues in the thirties. While caution is warranted in drawing conclusions over a span of years terminated by seemingly unusual depression years when both the small volume of financing and the reactions from previous catastrophic losses had been evident, it will be worth observing whether the data for the period after 1943 also suggest a long-term improvement in bond quality.

The Postwar Study, Sources and Methods

Data for public offerings were obtained from Moody's *Bond Survey*, which lists current offerings. These are essentially complete, although, for the purpose of comparison with data on the prewar years, income bonds, equipment trust certificates, real estate and finance company bonds, and foreign obligations were eliminated by editing for most tabulations. Serial issues were also eliminated in some tabulations in conformity with the Hickman practice. Table 1 shows the comparison between public offerings tabulated here and those listed by the Securities and Exchange Commission, with virtually all of the difference being accounted for by income issues.

The problem of determining the adequacy of coverage for direct placements is more complex than that for public offerings. For the greatest part of the period analyzed in the earlier study, direct placements were almost negligible; only from the middle 1930's on did they become important. Even here the direct placements were relatively uncomplicated, compared to the larger public offerings. In the postwar period, however, not only the increase in volume of direct offerings but the proliferation of types of such instruments greatly increased the problem of analyzing quality. A few illustrations of this point will make

[8] *Ibid.*, p. 102.

TABLE 1

Offerings Studied as Proportion of Aggregate Domestic Corporate Bonds, Excluding Financial and Real Estate Issues, 1948-65
(per cent)

Year of Offerings	Publicly Offered Bonds (1)	Directly Placed Bonds (2)
1948	78.2	68.5
1949	82.0	75.7
1950	86.8	83.1
1951	82.9	84.5
1952	86.5	78.6
1953	90.9	82.8
1954	91.0	86.8
1955	83.7	92.0
1956	86.9	94.8
1957	89.5	99.3
1958	95.2	78.2
1959	92.0	90.9
1960	91.9	93.4
1961	90.0	92.5
1962	90.7	101.6
1963	90.5	100.3
1964	87.3	100.8
1965	91.8	88.8
Total	88.9	89.5

Source: Col. 1: Table A-1, col. 4 ÷ col. 3; col. 2: Table A-1, col. 8 ÷ col. 7.

clear why the problem of quality comparisons of direct placements over time has proved so difficult.

Hickman excluded corporate bonds with serial payment provisions from most of his tabulations on quality because he was interested in yield in relation to quality; yield computation is frequently difficult for bonds which are repaid in instalments. The exclusion of serials made little difference in the pre-World War II years; but following the

war, omitting them would have cut the volume by almost half. Blanket exclusion of serials was therefore unjustified in the postwar period, though it meant that strict comparability was not preserved. They are included here. Finally, the postwar period experienced a proliferation of financing methods which has played hob with Hickman's rigid classification of bond characteristics. One can question whether bonds for real estate developments such as shopping centers should be excluded, as they were. The security for these bonds essentially consisted of leases with major national retailing firms which, had they chosen to build directly, would have financed the construction by debentures that would have been included under the Hickman definition. Likewise, should consumer finance company long-term notes be excluded when the borrower was merely a "captive" finance company of a major U.S. durable-goods manufacturer?

Table 1 also compares total direct placements analyzed in this study with the volume recorded by the Securities and Exchange Commission. Differences between totals in this study and the SEC figures are principally caused by lack of publicity about many direct offerings. Our source probably excluded some offerings and included others which were negotiated but not taken down in the year stated or were taken down by banks.[9] In spite of these problems, from 1948 to 1965, 89.5 per cent of the SEC compilation of direct placements is analyzed here. Additional evidence from even more limited studies is also cited at various relevant points.

Evaluation of the Findings

Apart from problems of comparability, how good is the totality of evidence cited here on bond quality in the postwar period? First, let us admit that the quality of a debt instrument cannot be judged independently of the conditions to which it is subject during its life. Thus in Chapter III, where the postwar default record of bonds is discussed, any absolute judgment that the low incidence of default justifies the conclusion of better quality in postwar than prewar bond offerings is obviously questionable. Clearly intertemporal judgments are most difficult in this area. Ex post measures of bond quality—defaults, losses,

[9] A search was made in Moody's manuals for all direct offerings of $10 million or more (and some smaller ones) listed in the *Investment Dealers' Digest* to avoid such erroneous inclusions, but information was not always available.

changes in contract terms—for the most part do not tell how bonds differ in quality over time. Somewhat better are ex ante measures such as earnings coverage, security, and perhaps agency ratings. Here again, however, it is hard to make a priori comparisons of quality over time when conditions are not the same. To illustrate, greater stability of income in the postwar period may mean a given earnings coverage affords greater protection to bondholders now than it would have thirty years ago. Likewise, given security provisions may be more useful in reducing default in the postwar period than they were in the prewar period. Finally, judgments taking into account many factors, such as those embodied in the agency rating, may change quality implications over time even though the definition of Aaa bonds, for example, does not change. In terms of defaults or losses, may not bonds rated Baa in the 1960's be equivalent to Aa offerings of the late 1920's, even though characteristics of coverage, security, and so forth are grossly different? Clearly, part of the quality judgment concerns not the inherent characteristic of the bond but the conditions of the economy—will future depressions be less severe?

One aspect of the quality problem has not been faced up to at all—the question of valuation of losses and the possibility of offsets by gains. For example, an institutional investor may suffer losses on some investments, which may be offset by unexpected gains on other assets. Hickman found the presence of a substantial number of bonds redeemed prior to maturity at a call premium. The result was a substantial windfall gain which, according to Hickman's calculations, increased the realized yield of lower-rated issues above that of prime-quality issues.[10]

It is possible that the total returns realized on issues bearing convertible rights, warrants, and other noninterest benefits in the postwar period should be taken into account in determining the quality of bond offerings. Quite likely many investors have realized benefits from convertibles and warrants attached to bonds out of all proportion to their losses on bond offerings.

Finally, in this compilation of factors making for problems in judging quality, one step has been taken as given—the relation between ex ante

[10] This finding has been challenged by Harold Fraine, who suggests that the premium on bonds called prior to maturity should be offset against the lower yields available on reinvestment at reduced rates. See Harold G. Fraine and Robert H. Mills, "Effect of Defaults and Credit Deterioration on Yields of Corporate Bonds," *The Journal of Finance,* September 1961, pp. 423–434.

and ex post quality measures. For this, reliance has been placed on the evidence produced by Hickman, although it is not known whether this judgment is valid. It may be that intangibles of credit selection, amortization of principal payments, and contract modification have substantially changed the default and loss likelihood of bonds of given characteristics when judged by earnings coverage, agency rating, security, and market rating. Here it is particularly important to note that the three factors listed above—credit selection, amortization of principal, and contract modification—are closely associated with the greatly enlarged practice since prewar times of placing bond issues directly with the ultimate holders.

Practically all direct placements have some prepayment provision, whether in the form of serial maturities or sinking funds. Because of the small number of holders, the distinction is almost meaningless and often cannot be made from the available information. To maintain comparability with the Hickman study, which includes straight bonds placed publicly or privately (directly), with or without sinking fund provisions, but excludes serial bonds, separate tabulations have been provided which include and exclude direct placements. The exclusion of direct placements reduces the total par amount by over 40 per cent. Publicly placed serial bonds were issued in very small amounts after 1943 and have been included in certain tables. While the prepayment arrangements may have had an effect on the relation between ex ante and ex post measures of quality, this effect may not have been much different from that of the many sinking fund bonds issued in the twenties, thirties, and early forties.

A final word is necessary about terminology and measurement. Most of the tables have gone back to 1944 and 1945 in order to link up with Hickman's data, and use of the term "postwar" should be understood to include these war years. It has been necessary to make a few comparisons using a smaller number of years, since the data, for the most part compiled by government agencies, did not cover the full period.

In the light of incomplete data, a changed composition of bonds, and economic conditions quite different from the prewar period, how can the reliability of this study be evaluated? We are fairly well convinced that our conclusions on quality changes in the postwar period are correct. We are less sure of the comparisons with earlier periods, but by no measure reject the evidence that quality in general has

improved. Finally, we are quite unsure of the absolute measures of quality; i.e., that 95.6 per cent of all bonds offered in the postwar period are of investment quality or that only 0.2 per cent of postwar bond issues have defaulted. These are our own evaluations; the reader is cautioned not to treat the findings uncritically.

Characteristics of Postwar Bond Financing

The early postwar years were characterized by growing public confidence—though not completely without doubts—that financial affairs and institutions' practices were fundamentally "sound." While a recognizable undercurrent of speculation flourished at times, considerable progress seemed to have been made both in perfecting the tools of investment analysis and the institutions themselves, as compared with the 1920's. Until the late 1950's, it is probably fair to say, few doubts assailed investors. Sharp breaks in the stock market in connection with President Eisenhower's health; the development of Russian space vehicles; failure or near failure of major commercial real estate developments; the collapse of the new-issue market in 1962; isolated brokerage, savings-and-loan, and banking failures; and greater foreclosures in mortgage markets all add to the feeling that perhaps conditions are basically less changed than generally realized. Still, the corporate bond area has been relatively untouched by the failures that earlier plagued this financing instrument.

Table 2 shows that in the years 1948–65 corporate bond offerings totaled $122.4 billion, or over 70 per cent more than was offered in the period 1900–43. This is all the more remarkable because of the ability of firms to generate their own capital, as will be seen later. A major change had also occurred by industry. Railroad offerings and even those of other transportation firms in the postwar period had become only a minor part of the total instead of one-quarter as in the earlier period.[11] Utility offerings constituted almost the same proportion in these two periods. Since, as Hickman has shown, railroad bonds were quite distinctive both in ex ante measures and in ultimate quality experience, the virtual disappearance of straight bond obligations of railroads helps

[11] Equipment trust certificates are omitted throughout this paper as they were in the prewar study. They are generally of much shorter maturity and the specific security more easily liquidated than true railroad bonds. For this reason, their exclusion is felt to be legitimate.

TABLE 2

Major Differences in Prewar and Postwar Corporate Bond Offerings, 1900-65
(dollars in millions)

	1900-43	Per Cent	1948-65	Per Cent
Industry composition				
Railroads (transportation)	18,595	26.0	13,933	11.4
Public utilities	33,426	46.7	53,749	43.9
Industrials	19,523	27.3	54,682	44.7
All offerings	71,544	100.0	122,364	100.0
Public and direct placements				
Public offerings	66,425	92.8	66,045	54.0
Direct placements	5,119	7.2	56,319	46.0
All offerings	71,544	100.0	122,364	100.0
Convertibles and nonconvertibles[a]			1956-65	
Convertibles	7,088	9.9	7,418	7.7
Nonconvertibles	64,456	90.1	89,311	92.3
All offerings	71,544	100.0	96,729	100.0

Source: W. Braddock Hickman, *The Volume of Corporate Bond Financing since 1900,* Princeton for NBER, 1953, Table A-10, pp. 284 ff., and *Statistical Measures of Corporate Bond Financing since 1900,* Princeton for NBER, 1960, Table 118, p. 211; and SEC, June 1966 release on Corporate Securities Offered for Cash in the United States and various releases in Statistical Series on Corporate Securities Offered for Cash Sale.

[a]Convertible = convertible into common stock. The data on convertibles and nonconvertibles include bonds of financial and real estate issuers, which are excluded from other sections of the table.

to explain some of the observed changes in bond quality between the two periods.

The most important difference between bond offerings in the 1900–43 period and later was the development of direct offerings. Whereas only 7 per cent of all bond offerings in the earlier period had been placed directly, a shade under half of the value of corporate bond issues in the postwar period were directly placed. As Table 3 shows, direct place-

TABLE 3

Direct Placements as Percentage of Total Bond Offerings, 1900-65

Period	Per Cent
1900-09	2.8
1910-19	3.8
1920-29	0.6
1930-33	2.2
1934-39	16.6
1940-49	32.7
1950-59	42.8
1960-65	50.4

Source: 1900-39: Hickman, *Volume of Corporate Bond Financing,* Table A-10, pp 284 f. (straight bonds only); 1940-49: *ibid.*, plus this study's Table G-1; 1950-65: Table A-1 (SEC figures for Total Minus Financial and Real Estate).

ments were insignificant before the enactment of the Securities Act of 1933, when they immediately became important and have continued gradually to increase.

Other comparisons between prewar and postwar bond offerings are more difficult to come by. It is interesting to note, however, that the general impression that convertible bonds have been much more important than formerly is not sustained by the evidence, admittedly covering less than the full span of postwar years. There is little difference in the proportion of bond issues that are convertible into common stocks for the two periods, as may be seen in Table 2.

Not only the types of corporate bonds have changed since the period covered by Hickman; bonds have also changed in their relative importance in the economy. Large as the absolute value of bond financing was in the postwar period, it was becoming a relatively less important means of financing. Table 4 shows for the period 1946–65 that bonds and notes constituted 10 per cent of nonfinancial corporation financing in comparison with 20.5 per cent in the 1901–12 period, 14 per cent from 1923 to 1929, and an actual negative figure (because of net retirements) in the 1930's. The major offsetting change that has occurred to make up for the diminished sale of corporate bonds has been greater internal financing (except in the 1934–39 period) and greater use of

TABLE 4

Structural Changes in Sources of Financing of Nonfinancial Corporations, 1901-65

Source of Financing	Percentage of Total Source of Funds			
	1901-12 (1)	1923-29 (2)	1934-39 (3)	1946-65 (4)
Internal				
Total	55.2	54.7	97.6	69.6
Capital consumption allow.	37.9	39.8	124.8	43.7
Net saving	17.3	14.9	-27.3	25.9
External				
Total	44.8	45.3	2.4	30.4
Borrowing, total	30.8	25.9	-6.6	26.7
Short-term	8.0	4.3	1.0	14.2
Long-term	22.5	21.6	-7.6	12.5
Bonds and notes	20.5	14.2	-5.2	9.6
Mortgages	2.0	7.4	-2.4	3.0
Equity securities	14.0	19.4	9.0	3.7
Total	100.0	100.0	100.0	100.0
Total (billion dollars)	40.0	86.1	28.9	831.8

Source: Cols. 1–3: all except long-term borrowing from Raymond W. Goldsmith, *The Flow of Capital Funds in the Postwar Economy,* New York, NBER, 1965, Table 37; bonds and notes and mortgages, computed from Goldsmith, *Financial Intermediaries in the American Economy Since 1900,* Princeton for NBER, 1958, Table 53. Col. 4: Board of Governors of the Federal Reserve System, Flow of Funds, Table 4D, in May 1966 *Bulletin;* F/F Levels, May 3, 1966; F/F Annual, November 6, 1965, and 1963 Supplement. Short-term borrowing includes bank loans, n.e.c., trade debt, and an estimated portion of other loans. The remainder is included in bonds and notes.

Note: Figures do not necessarily add to total because of rounding.

short debt (bank and trade loans). Of all external financing, however, bonds now constitute about one-third, surprisingly close to their importance in the 1920's although less so than in the 1901–12 period.

One more comparison will show how significant these findings are. Table 5 shows what proportion long-term corporate debt represents

TABLE 5

Relative Importance of Selected Components of Public and Private Debt, Selected Years, 1916-65
(per cent)

Year	Corporate Long-Term Debt	Individual and Noncorporate Mortgage Debt (Nonfarm)	Federal Debt	State and Local Debt
1916	3.5	10.2	1.5	5.4
1921	24.9	9.4	17.0	4.8
1926	24.7	14.2	11.4	6.3
1931	27.7	17.0	10.2	8.5
1936	23.6	13.5	20.9	9.0
1941	20.6	12.9	26.6	7.7
1946	10.4	8.2	5.8	3.4
1951	12.7	12.9	4.2	4.4
1956	14.1	17.1	31.9	6.0
1961	15.8	20.1	26.2	6.9
1965	16.4	22.5	21.3	7.3

Source: U.S. Department of Commerce, Bureau of the Census *Historical Statistics of the U.S., Colonial Times to 1957*, Washington, 1960, p. 664; and *Survey of Current Business*, May 1966, p. 12.

of public and private debt at the beginning of each five-year period since the series originated in 1916. If these figures are correct, corporate long-term debt is nowhere near as large a factor in the total debt structure as it was when America entered World War II, although it has been creeping up slightly in the postwar period. On the other hand, mortgage debt of individuals is considerably higher than in 1941.

It has been difficult to provide a direct comparison with Hickman's study to determine how bond quality compares prewar and postwar, and at the same time to describe accurately the quality characteristics of contemporary corporate bonds. The question arises, if Hickman's simplifying steps, such as the elimination of serial bonds, lack of specific examination of convertibles and warrants, and exclusion of finance and real estate bonds, are also followed in the postwar period, how representative is the area studied of the universe of corporate bonds?

This is known: corporate bonds are a less important means of financing business than they were in the period prior to the 1930's, when internal funds were less adequate. Corporate bonds are also a smaller proportion of public and private debt.

In view of the problems of this study, what can be said about the accuracy of the general findings? Probably the changes indicated here are in the correct direction, but judgments as to absolute quality levels of bond instruments or of institutional holdings of such bonds *en masse* are hazardous. At best, the hazard of financial catastrophe arising from unsoundness of corporate bonds is probably less than it has been in previous times, not only because most quality indicators, as will be seen, give indication that bonds are better instruments than during some years of the prewar period but also because neither the relative importance of corporate bonds as a financing medium nor their importance as a part of the investment structure is as great as in the Hickman period.

The major development in the corporate bond field in the postwar period has been the growth of direct placements. These offerings, being essentially private contracts between the borrower and lender, have less homogeneity than, and in many other respects do not resemble, public offerings. In any case, there are few data in public sources describing them. For this reason, a major effort has been made to compile and describe a number of quality measures of direct placements and to do what could be done to make these measures comparable to those available on public issues. If this task were not undertaken, it could be legitimately charged that our statements on quality referred to only part of the universe of corporate bonds.