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TYPES OF TRANSACTIONS INCLUDED IN OFFERINGS AND EXTINGUISHMENTS

THE BASIC DEBT statistics on offerings and extinguishments examined in the preceding chapter are gross estimates: they measure the gross flows into and out of the stock of outstandings, and the difference between them measures the net change in the stock. In any stock-flow analysis it is also possible to use flow statistics of varying degrees of "netness," all of which will generate the correct estimates of the stock, provided they are mutually consistent.

In this chapter we break down the gross estimates by type of transaction and indicate how certain of the net component series may be combined to give the same estimates of outstandings. The particular series to be developed and analyzed relate to cash and noncash offerings and extinguishments (defined later), and to new-money offerings, refundings, and repayments. These series are needed not only for a proper understanding of the content and behavior of our statistics on gross offerings and extinguishments but also for the derivation of other important flow series and for the analysis of special problems.

SUMMARY OF FINDINGS

Over the period 1900-1943 bonds sold for cash made up approximately 86 percent of the par-amount total of straight bond offerings, and bonds retired by cash payment constituted 75 percent of total extinguishments. Cash offerings, like total offerings, conform invertedly to business cycles, but noncash offerings show no systematic pattern of behavior. Cash extinguishments, like total extinguishments, conform positively, but the noncash component is irregular. Noncash offerings and extinguishments both include a variety of transactions having divergent cyclical patterns.

Between the beginning of 1900 and the beginning of 1944, straight bonds issued for refunding purposes comprised 45 percent of the total par amount of all straight bond offerings, the remaining 55 percent being "new-money offerings." Since total offerings exceeded total extinguishments during this period in the ratio of 1.3 to 1.0, refundings represented 60 percent of total

extinguishments, leaving 40 percent repaid from other sources. Total offerings and its two components, new-money offerings and offerings to refund other issues, all conform negatively to business cycles. On the other side of the ledger, the conformity of total extinguishments is positive but moderately low: one of its components, refundings, shows negative conformity, and the other, repayments, high positive conformity.

In the preceding chapter the net-change series was analyzed as the difference between total offerings and total extinguishments. Since refundings are included in both offerings and extinguishments and cancel out, the net change may also be looked upon as the difference between "new-money offerings" (offerings excluding refundings) and "repayments" (extinguishments excluding refundings).

Some of the problems of controlling the net flow of funds through the bond market are illuminated by that interpretation. Our analysis shows that new-money offerings account for the greater part of the annual variation in the net volume of bond financing; regulation of new-money offerings, therefore, is essential to such control. The so-called selective credit controls might operate accordingly, and so might the more traditional controls through manipulation of interest rates. During most periods since 1900 changes in bond yields have had a perceptible effect on the amount of new-money offerings; at the same time the relationship has been influenced by numerous other factors, such as the volume of business activity, the condition of the stock market, and the corporate tax structure. These factors, too, have influenced the volume of bond repayments, so that the relation between bond yields and the net change in outstandings appears to be somewhat looser than that between bond yields and new-money offerings.

Cash and Noncash Transactions

Unlike other published estimates, our series on gross offerings and extinguishments include noncash as well as cash transactions. The offerings statistics include bonds given in exchange for other bonds, for other securities, and for nonfinancial assets, in addition to bonds sold for cash. Gross extinguishments similarly include the volume of bonds extinguished by exchange for various types of noncash assets (including new bonds), as well as those retired by cash principal repayment. The exchange of bonds for assets

other than cash is by no means infrequent; therefore series covering only cash offerings and extinguishments cannot be used to generate estimates of the par amount of bonds outstanding. Unbiased estimates may be obtained, however, by eliminating from gross offerings and extinguishments only bonds exchanged for other bonds.

The basic breakdowns relating to cash and noncash transactions are presented in Table A-10 (method of offering) and in Table A-11 (method of extinguishment), which are based on complete data for large bonds and on a 10 percent sample for small bonds.[1] Since the distinction between an issue offered or extinguished for cash and one offered or exchanged for some other valuable consideration is not a particularly significant one in itself, the materials presented in these tables serve largely ancillary uses. An illustration is the development of series on gross and net cash flow to and from business corporations from the sale of corporate bonds (Chapter 6).

Cash versus Noncash Offerings

The annual data on cash and noncash offerings in Table A-10 are summarized for all years combined in Table 8. Straight bonds offered during 1900-1943 totaled $71.5 billion, and for slightly over 92 percent of that amount we have complete information on method of offering. Bonds known to have been sold for cash made up almost 80 percent of the total; those reported to have been exchanged for noncash assets made up 13 percent. The largest percentage of cash offerings occurred in the public utility field (83 percent), and the smallest (74 percent) in the railroad field.

Cash offerings are subclassified in Table 8 to show whether the bonds were sold publicly, privately, or to security holders. It was assumed in obtaining the breakdown that cash offerings had been made to the public except as the manual sources gave specific information to the contrary. Private cash offerings include those in which fewer than twenty-five investors participated, in addition to those specifically designated as private in the manuals. Table 8 shows that during the period 1900-1943 inclusive, sales

[1] The small sample figures entering into Tables A-10 and A-11 were first adjusted to the universe totals for small bonds given in Table A-6. Selection of the sample and method of adjustment are described on page 39.

TABLE 8—Percentage Distribution of the Par Amount of Corporate Bond Offerings by Method of Offering, 1900-1943

(DOLLAR FIGURES IN MILLIONS)

		CASH OFFERINGS				NONCASH OFFERINGS						
	Total offerings	*Total cash*	*Sold to public*	*Sold to security holders*[a]	*Sold privately*	*Total noncash*	*Exchanged for bonds*[b]	*Contract modified*[c]	*Exchanged for other securities*[d]	*Exchanged for other noncash assets*	*Information lacking*	*Total offerings*
All industries	100.0%	79.5%	66.8%	5.5%	7.2%	12.9%	5.6%	2.8%	3.8%	0.7%	7.6%	$71,543.9
Railroads	100.0	73.6	61.1	9.5	3.0	18.7	9.6	5.4	3.5	0.2	7.7	18,594.9
Public utilities	100.0	83.3	70.7	4.0	8.6	8.4	4.2	1.7	2.3	0.2	8.3	33,426.2
Industrials	100.0	78.6	65.6	4.4	8.6	15.0	4.2	2.2	6.6	2.0	6.4	19,522.8

Based on totals for all years, Table A-10.

[a] The majority of these bonds were taken up by stockholders.

[b] Includes exchanges for bonds of the obligor or its affiliates.

[c] A contract modification is a change in the maturity date or coupon rate of an outstanding issue; in effect the modified issues constitute new offerings.

[d] Includes bonds offered as dividend payments and to meet construction bills, as well as exchanges for other securities of the obligor or of its affiliates.

to the public accounted for approximately five-sixths of the paramount total of all cash offerings, the remainder being distributed almost equally between private sales and sales to security holders. The relative importance of private placements changed within the period, increasing after the passage of the Securities Act of 1933 during a time of rapid expansion in the volume of funds flowing through the large investment intermediaries (cf. Table A-10). Rail bond offerings were comparatively light after 1933, and it was through private placements of industrial and public utility bonds that the over-all importance of privately sold cash offerings increased.

Virtually all cash offerings to security holders represent sales to stockholders of the obligor. Such offerings were relatively heavy in the first two decades of the century in the railroad group, in the first decade in the industrial group, and in 1928-29 in the utility group (Table A-10). In the 1930's convertible rail bonds were offered to stockholders in relatively large volume by some of the larger roads.[2]

The 13 percent of total straight bond offerings that comprises bonds offered for noncash assets is distributed as follows: 5.6 percent represents bonds exchanged for other bonds; 3.8 percent, bonds exchanged for other types of securities; 0.7 percent, bonds offered for miscellaneous noncash assets; and 2.8 percent, old bonds that underwent "contract modifications." Under a contract modification, the bondholder retains title to his old investment instrument but agrees to a substantive change in the contract relating either to coupon rate or to maturity date. Since the bondholder in effect accepts a new instrument when he accepts the substantive change in the contract, the entire amount of the modified issue is treated here as a new offering, and the old issue as an extinguishment. A contract modification usually results from a "composition" or compromise between the obligor and its creditors, and indicates a default situation. Bond "offerings" through contract modification were particularly heavy in the rail group in 1939-40; over one-quarter of all contract modifications

[2] Convertible bonds are frequently offered to stockholders under the doctrine of pre-emptive rights. The principal rail systems engaging in this type of financing in the thirties were: Baltimore and Ohio (1930); Chicago, Rock Island and Pacific (1930); New York Central (1934 and 1937); Great Northern (1936); Pennsylvania (1937).

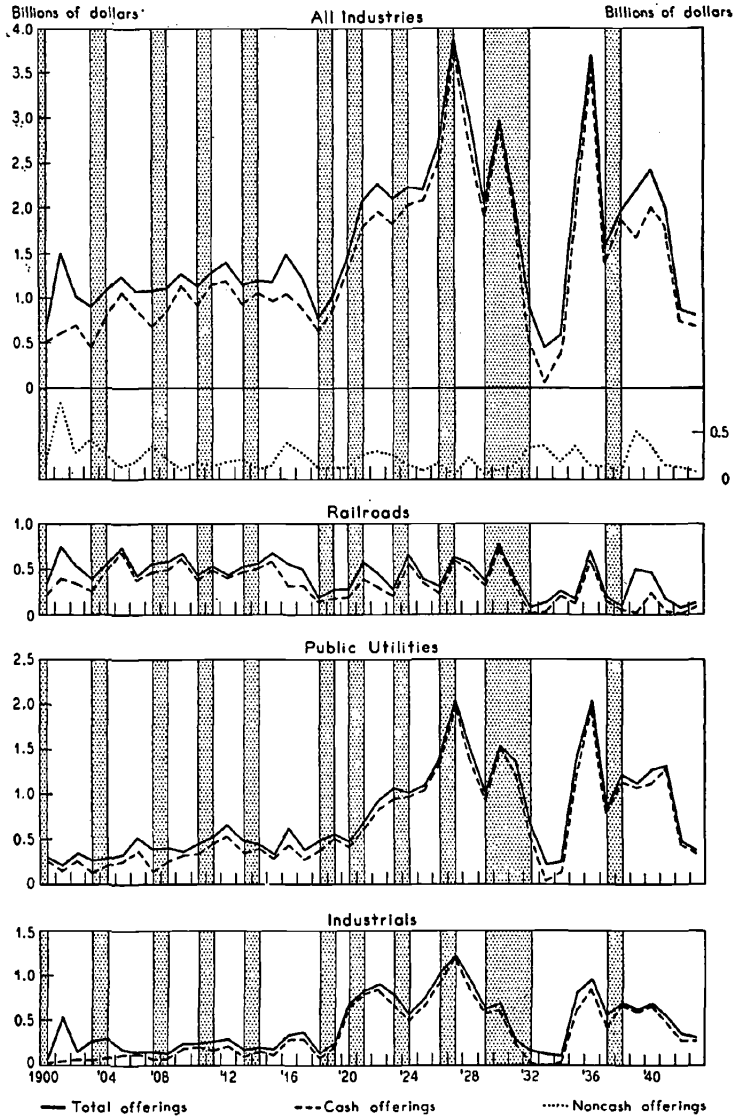
covered by our records occurred in the rail group in that two-year period (Table A-10). The relatively high percentage of industrial offerings that is made up of bonds exchanged for securities other than bonds reflects the large amounts offered to stockholders of smaller concerns by large steel and tobacco companies during their formative years (cf. page 56).

Bonds offered (and bonds extinguished) through contract modification, as well as those explicitly exchanged for other bonds, could be eliminated from the series on gross offerings and extinguishments without affecting the derived net change in outstandings; but it would be necessary to retain the 4.5 percent of total offerings that is made up of bonds offered in exchange for noncash assets other than funded debt (bonds exchanged for other securities and for other noncash assets).

For 7.6 percent of the total amount of offerings the method of offering was unknown (Table 8). By prorating that part between the known cash and noncash offerings on the basis of the observed relationship between them, we obtain an estimate that bonds sold for cash constituted approximately 86 percent of the par amount of straight bond offerings in 1900-1943. Annual estimates of cash offerings made in the same way are plotted against gross offerings in Chart 10. The chart shows that in all cases the two series are highly correlated, which suggests that their cyclical behavior should be quite similar. Actually, the full-cycle conformity indexes for the combined industries and the rails are identical and those for the other two industry groups are alike in sign (Table 9).[3] The full-cycle indexes for cash offerings are all negative and high, but for noncash offerings they are mixed and generally low. In the case of utilities and industrials the noncash offerings appear to counteract to some extent the inverted behavior of cash offerings, weakening the negative conformity of total offerings. The contraction indexes for cash and for total offerings are uniformly negative, and for noncash offerings are

[3] An analysis, from annual data, of the timing of cash offerings of the combined industries at reference-cycle turning points suggests that, like total offerings, they typically expand over cycle stages v-III. Conformity indexes for cash offerings computed on a v-III basis are —40, —80, —37 as against —40, —80, —58 for total offerings (see Chapter 2, footnote 12). In neither case do these indexes show systematic improvement over those of Table 9, which were computed on a v-IX basis.

CHART 10—Total, Cash, and Noncash Offerings of Corporate Bonds, 1900-1943



From Table A-10; straight bonds, yearly totals, par amount.

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

TABLE 9—Conformity Indexes for Cash, Noncash, and Total Offerings of Corporate Bonds: Ten Reference Cycles 1900-1938

	EXPANSION			CONTRACTION			FULL CYCLE		
	Total	*Cash*	*Noncash*	*Total*	*Cash*	*Noncash*	*Total*	*Cash*	*Noncash*
All industries	+20	−20	+40	−80	−80	+40	−68	−68	+47
Railroads	−20	−60	−40	−60	−60	0	−79	−79	−5
Public utilities	+20	0	+20	−40	−80	+20	−16	−68	+37
Industrials	0	0	−20	−40	−60	+20	−5	−47	−16

Based on annual data in par amount, Table A-10. These indexes do not take account of possible leads or lags at reference-cycle turning points.

positive (low) or zero. The expansion indexes are generally low and erratic in sign.

Cash versus Noncash Extinguishments

The basic annual data on cash and noncash extinguishments of straight bonds are presented in Table A-11, with certain additional information on the method of extinguishment. Table 10 summarizes the data for the years 1900-1943 combined, as was done in Table 8 for the data on offerings. A distinction is made between "final extinguishments" and "partial extinguishments."[4] An issue may be extinguished in varying amounts over its lifetime, and all such amounts except the last are termed partial extinguishments. All other extinguishments are final extinguishments.

Straight bonds extinguished during the whole period totaled $54.7 billion, par amount, of which 78 percent represented final extinguishments and 22 percent partial extinguishments. The breakdown by method of final extinguishment shows that the retirements were proportioned as follows: only 16 percent by payment in full at maturity, in contrast to 39 percent by call; 15 percent by exchange, contract modification, or conversion without cash payment (shown in the table as entirely noncash); and 3 percent by exchange or contract modification including cash payment (shown as mixed cash and noncash).

Method of extinguishment was not recorded for partial extinguishments, but the impression gained in working up the data is that the chief part of their total amount came from retirements by means of sinking funds, and a smaller part through conversions into equity shares. Sinking fund retirements have usually taken the form of calls, open market purchases, or retirements by tenders, according to whether the issue was callable and whether selling above or below par.

For public utilities and industrials, retirements by call made up large proportions of the total amount finally extinguished

[4] Information on dates and par amounts of final extinguishments was obtained for most issues from the records of the original Corporate Bond Project, and similar data on partial extinguishments were collected independently by the National Bureau of Economic Research. The procedures followed in estimating dates and amounts of extinguishments when these were not given explicitly in the sources are described in Appendix B.

TABLE 10—Percentage Distribution of the Par Amount of Corporate Bond Extinguishments by Method of Extinguishment, 1900-1943

(DOLLAR FIGURES IN MILLIONS)

		FINAL EXTINGUISHMENTS										
			CASH EXTINGUISHMENTS									
	Total extinguishments	*Total final*	*Total cash*	*Payment in full at maturity*	*Call, purchase, or tenders*[a]	*Noncontractual methods*[b]	*Entirely noncash*[c]	*Mixed cash and noncash*	*No payment*[d]	*Information lacking*	*Partial extinguishments*	*Total extinguishments*
All industries	100.0%	78.1%	57.1%	16.3%	39.0%	1.8%	14.8%	3.4%	0.1%	2.6%	21.9%	$54,681.6
Railroads	100.0	79.4	51.3	34.7	14.9	1.7	20.8	5.4	0.1	1.8	20.6	13,770.2
Public utilities	100.0	82.6	64.8	12.4	50.6	1.8	11.7	2.8	0.1	3.2	17.4	24,003.3
Industrials	100.0	70.6	51.0	6.9	42.2	1.9	14.2	2.7	0.2	2.5	29.4	16,908.1

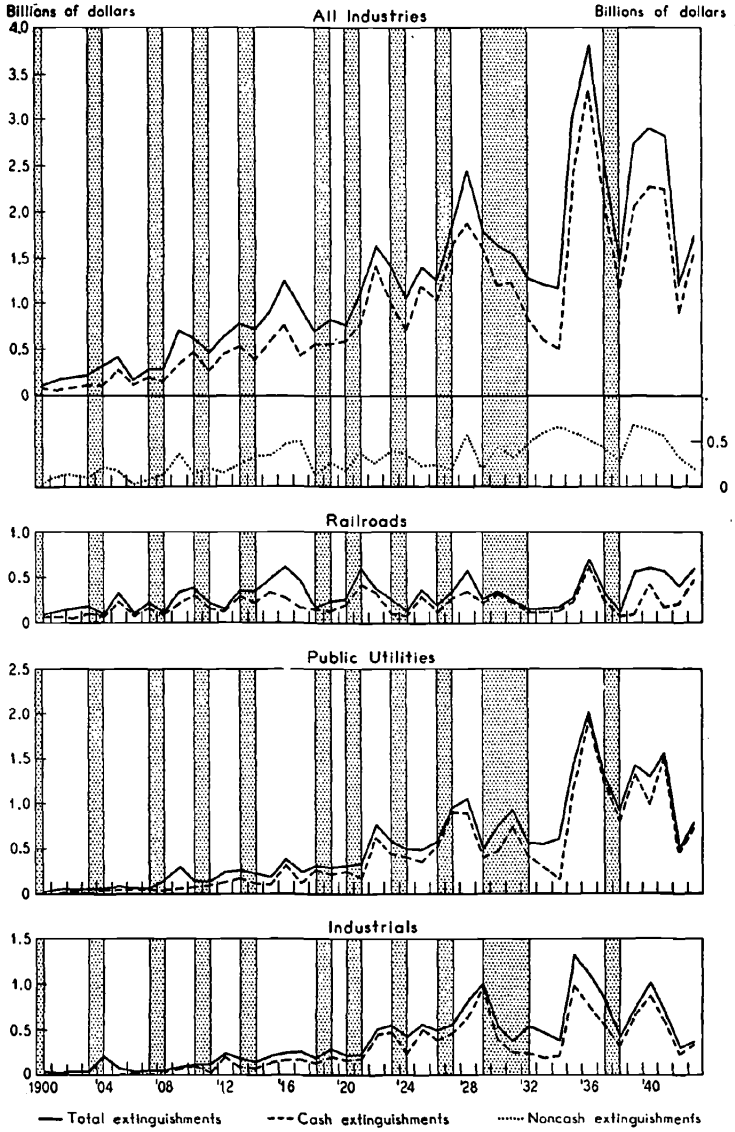
Based on totals for all years, Table A-11.

[a] The term "purchase" refers to purchases in the open market; the term "tenders" to purchases through advertised bids.
[b] Includes issues extinguished by payment in full after maturity or by payment in less than contractual amount.
[c] Includes issues extinguished by conversion, exchange, or contract modification.
[d] Securities adjudged worthless.

over 1900-1943; for rails the proportion was small. (Callable bonds averaged only 56 percent of the aggregate par amount of rail bonds outstanding, but nearly 90 percent of utility and of industrial outstandings.) On the other hand, retirements by payment in full at maturity were the predominant method of final extinguishment for rails. The rails also had the highest percentage for noncash extinguishments, which we know to represent mainly the amounts involved in exchanges and contract modifications arising from the high incidence of rail defaults. (See the distribution of noncash rail offerings in Table 8.) The volume of partial extinguishments was relatively heavy for the industrial group, owing to the more general use of sinking fund and conversion provisions in industrial bond financing.

The derivation of estimates of the par amount of bonds extinguished by cash repayment of principal is analogous in procedure to the derivation of estimated cash offerings and will be described fully in Chapter 6. We estimate that cash repayments of principal accounted for 75 percent of the total par amount of all bonds extinguished during the period studied; the comparable figure for offerings is 86 percent. Annual estimates of cash extinguishments are plotted against those for total extinguishments in Chart 11. While the spread between the two graphs is somewhat greater than that in Chart 10 for offerings, the two series for extinguishments are about as well correlated as those for offerings, in every case but that of the rails. (Correlation coefficients between total and cash extinguishments are: +0.99 for all industries, +0.79 for rails, +0.98 for utilities, and +0.97 for industrials.) The proportion of cash extinguishments of rail bonds in the total amount of all rail extinguishments for the period 1900-1943, inclusive, is smaller than comparable proportions for the other two industry groups. Moreover, the proportion of noncash extinguishments to the total of all extinguishments, i.e. the relative spread between the series shown in Chart 11, is subject to wider annual variations for rail bonds than for bonds of the other two industry groups. The spread was unusually large for rail bonds in 1915-17, 1923, 1928, and 1939-42, principally because of the large volume of exchanges and contract modifications arising in those years from the settlement of default situations. The fairly wide spreads for the industrial group in 1904, 1924, and 1932-36 and for the public utility group

CHART 11—Total, Cash, and Noncash Extinguishments of Corporate Bonds, 1900-1943



From Table A-11; straight bonds, yearly totals, par amount.

Shaded areas represent contractions in general business activity and white areas represent expansions (Burns and Mitchell, op.cit., p. 78).

in 1908, 1933-34, and 1940 are attributable to a similar cause. The spread for the utility group in 1909, 1928, and 1930, on the other hand, is explained by the large volume of bonds converted into common stock in those years.

In view of the very high correlation between cash and total extinguishments, we should expect these series to behave similarly during business cycles. Total extinguishments, it was concluded in Chapter 2, exhibit positive but low conformity with cycles in general business activity, rising during expansion stages (or falling at a less rapid rate than during contractions) and falling during contraction stages (or rising at a less rapid rate than during expansions).

The annual conformity indexes derived in Chapter 2 are compared in Table 11 with the corresponding indexes for cash and noncash extinguishments. The full-cycle indexes for the cash series show a small but systematic heightening of positive conformity for the combined industries and for each of the major industry groups. With the exception of the rails, all of the noncash indexes are negative. We conclude that the positively conforming cash component in total extinguishments is offset in part by the negatively conforming noncash component, so that total extinguishments exhibit low positive conformity.

It will appear from the analysis in the next chapter that the positive conformity of cash extinguishments is partly attributable to the fact that many business corporations begin to refinance funded debt through the stock market during the last stages of business contractions, continue such refinancing throughout the early stages of business expansions (note the high positive expansion indexes for cash extinguishments), and desist from it during all except the last stages of business contractions.[5] The negative conformity of noncash extinguishments arises from the fact that this series is largely composed of involuntary contract modifications and exchanges, which rise during business contractions with the volume of bonds going to default (note the negative contraction indexes for the noncash series). The rail-

[5] As we have seen, annual data on total extinguishments for the combined industries suggest that this series has I-III conformity (see Chapter 2, footnote 12). Cash extinguishments constitute a large proportion of the total and behave similarly. Annual conformity indexes for cash extinguishments of the combined industries computed on a I-III basis are +64, 0, +60.

TABLE 11—Conformity Indexes for Cash, Noncash, and Total Extinguishments of Corporate Bonds: Ten Reference Cycles 1900-1938

	EXPANSION			CONTRACTION			FULL CYCLE		
	Total	*Cash*	*Noncash*	*Total*	*Cash*	*Noncash*	*Total*	*Cash*	*Noncash*
All industries	+20	+60	−20	+20	+40	−40	+5	+37	−37
Railroads	+40	+40	+20	+40	+60	0	+16	+37	+16
Public utilities	+40	+60	+10	−20	−20	−20	+5	+37	−26
Industrials	+60	+60	+20	+20	+30	−10	+26	+37	−26

Based on annual data in par amount, Table A-11. These indexes do not take account of possible leads or lags at reference-cycle turning points.

roads constitute an exception, the reason being, as will appear in Chapter 5, that rail bond defaults are not well correlated with the business cycle.

New-money Offerings, Refundings, and Repayments

A large proportion of the total amount of noncash offerings represents nothing more than the replacement of old bond issues with new. We have seen that all bonds offered in exchange for other bonds and all contract modifications might be deducted from gross offerings and extinguishments without affecting the derived volume of outstandings. But such exchanges and contract modifications comprise only a small part of the group of financial transactions whereby old bonds are replaced by new, all of which might be treated similarly. Many cash offerings—even though they may appear to the investor as new offerings—actually are of this type: the proceeds are used simply to retire old bonds either at maturity or by call.

From the standpoint of corporations as debtors, all such transactions are properly viewed as "bond refundings," which wash out of gross offerings and extinguishments, leaving outstandings unchanged.[6] On that view, only the difference between total offerings and bond refundings constitutes a net flow of new bonds into the stock of outstandings, and only the difference between total extinguishments and bond refundings constitutes a net flow of old bonds out of the stock. In accordance with the usage of the financial press, the net inflow will be referred to as "new-money offerings." The net outflow, hitherto uninvestigated and for which there is no comparable term, will be referred to as "repayments."

An analysis of corporate debt statistics into new-money offerings, refundings, and repayments may proceed at several different levels, depending upon the degree of financial integration assumed in the economy. If we are willing to consider the entire nonfinancial corporate sector as a consolidated accounting unit and to neglect important shifts in corporate indebtedness within that sector, then a positive net change in outstandings may be

[6] Since our estimates refer only to straight bonds, bond refundings will include only straight bonds refunded into other straight bonds; canceled out of both offerings and extinguishments, they leave straight-bond outstandings unchanged.

interpreted as measuring the par amount of new-money offerings, and a negative net change as measuring the par amount of repayments. "Refundings" in this consolidated sense would then be equivalent to the total volume of extinguishments when the net change is positive, and to the total volume of offerings when the net change is negative. That is, when the annual volume of offerings exceeds that of extinguishments, all extinguishments in that year may be considered refundings; when the annual volume of extinguishments exceeds that of offerings, all offerings in that year may be considered refundings.

When the gross debt statistics presented in the preceding chapter are interpreted in this way, it appears, for example, that in 1927, of the $3.9 billion par amount of straight bonds offered (the highest annual amount during the period studied), $2.1 billion (the net change in outstandings) represented "new money" and $1.8 billion (total extinguishments) represented "refunding." On the other hand, the 1936 offerings of $3.7 billion, though they were the second highest on record, were exceeded by extinguishments of $3.8 billion, so that the net change was negative. In effect the whole amount of offerings in 1936 went to "refund" other issues, and in addition a small amount of proceeds procured from other sources ($0.1 billion) went to repay funded debt.

That approach is the appropriate one if we are interested solely in the changing indebtedness of the corporate sector vis-à-vis all other sectors, but it is defective if we are interested in internal shifts within the corporate debt structure. Under the consolidated approach, new-money offerings of Corporation A may be completely offset by repayments of Corporation B, so that neither amount shows up in the consolidated statistics on receipts and payments. In order to give full effect to such shifts in corporate indebtedness we need to trace the purpose of each individual offering to determine whether the funds were used simply to refund other issues or whether there was an actual increment in the funds at the disposition of the borrowing corporation.

Accordingly, by means of specially gathered information on purpose of offering, total offerings of straight bonds have been broken down into new-money offerings and refundings, and, similarly, total extinguishments into refundings and repayments.

The resulting estimates, along with certain variants of the series, are presented annually by major industry group in Table A-12.

The content and flexibility of the table may readily be understood from the following equations and definitions:

(1)	Total offerings	= Bond refundings + gross new-money offerings.
(2)	Total extinguishments	= Bond refundings + bond repayments.
(3)	Net change in outstandings	= Total offerings — total extinguishments = Gross new-money offerings — bond repayments.

"Bond refundings" include "involuntary" and "voluntary" bond refundings. Involuntary refundings include all contract modifications and all exchanges for the purpose of correcting or avoiding a default; voluntary refundings include all other exchanges and all cash offerings the proceeds from which are used to retire straight bonds at maturity or by call.

"Gross new-money offerings"—the difference between total offerings and bond refundings—include "other refundings" and "net new-money offerings." The term other refundings refers to bonds offered to retire preferred stock or unfunded long-term debt. (Bond refundings plus other refundings are referred to in Table A-12 as "total refundings.") Net new-money offerings include (1) bonds offered for the construction or purchase of new plant, equipment, and improvements; for the acquisition of existing property; for the expansion of net working capital; and for general corporate purposes (the foregoing items being grouped in Table A-12 as "net new-money offerings for nonfinancial purposes") and (2) bonds offered to acquire securities for affiliation or investment.

"Bond repayments" include bonds retired with funds procured from any source other than the bond market, bonds extinguished by exchange for other than straight corporate bonds, and small amounts of bonds adjudged worthless.[7] In other words, bond

[7] It should be recalled that all series considered here are "par-amount" series, not "cash" or "market-price" series. Cash series are presented in Chapter 6, and account will be taken of market prices of assets received at extinguishment in a forthcoming volume. In the present chapter, extinguished bonds are considered as "repaid" when not refunded into new bonds, despite

repayments include all extinguishments other than bond refundings.

The several series lend themselves to different uses. Gross new-money offerings and bond repayments, obtained by netting out bond refundings from total offerings and total extinguishments, are of interest in analyzing the behavior of the net change in outstandings. In particular, they may be used to determine which elements are primarily responsible for annual variations in the net change and which respond most effectively to interest rates. The relevance of these matters to the problem of control over outstandings has been suggested in Chapter 2, and will be discussed more fully after the derivation of the data in Table A-12 has been described and the behavior of the several series has been examined.

To obtain a rough indication of the volume of capital formation financed through the bond market, we have netted out of total offerings not only bond refundings but also other refundings (i.e. bonds offered to retire securities other than bonds) and security acquisitions. The residual, net new-money offerings for nonfinancial purposes, is an imperfect measure of the volume of funds obtained through the bond market and used for capital formation, since it includes funds used for the acquisition of existing properties and for the expansion of net working capital.[8] Nevertheless it is a fair approximation of the volume of funds available through the bond market for construction of plant and equipment—though not necessarily so used—and is about as refined an estimate as can be obtained from the limited data the manual sources provide.

The breakdown of bond refundings into voluntary refundings and involuntary refundings is useful not only for cyclical analysis but also for study of interest rates. The presumption is that the part of refundings which is voluntary on the part of corporate obligors is more closely associated with the level of interest rates than is the involuntary part.

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the fact that the value received may have been less than par. Similarly, bonds received in a refunding operation may not have been worth par. In the par-amount series, no account is taken of write-downs or charge-offs to market values.

[8] Net working capital is defined as cash plus other current assets less current liabilities.

Derivation of Estimates

The series in Table A-12 were constructed from information on purpose of offering contained in the Corporate Bond Records, supplemented by certain data gathered in an independent search of primary sources. The Corporate Bond Project had attempted to obtain a detailed breakdown of the purpose to which the proceeds from each offering were to be put.[9] We found, however, that only 50 percent of the offerings (measured by total par amount) had a definite single purpose, or group of purposes sufficiently similar to fall under a single heading in the Project code. For 6 percent no information on purpose was available, and for the remaining 44 percent only the predominant one among multiple purposes had been recorded. By sacrificing detail and by a further search of the original sources, we were able to obtain the full information needed for a simplified code for 83 percent of the total par amount of all offerings after adjustment for sample size.

To construct the various series, it was necessary to classify offerings by purpose into only five categories: (1) voluntary bond refundings, (2) involuntary bond refundings, (3) other refundings, (4) net new-money offerings for nonfinancial purposes, and (5) security acquisitions. Full information was obtainable from the Corporate Bond Records on item 2 (involuntary bond refundings, i.e. bonds offered through contract modification or exchange to correct or avoid a default), and item 4 (net new-money for nonfinancial purposes) was derived as a residual. Three items remained to be determined: voluntary bond refundings, other refundings, and security acquisitions. As a practical matter, it proved convenient to obtain the voluntary bond refundings from total bond refundings by subtracting out the involuntary group.

Little difficulty was encountered in obtaining from the data in Table A-10 a breakdown of all known noncash offerings into the required classifications: bond refundings, other refundings, or acquisition of securities. The percentage distribution of these amounts was then determined for each year-industry group and

[9] Separate codes were provided for each of the items mentioned in the definitions given on page 107: bonds offered to retire preferred stock, to retire nonfunded long-term debt, to acquire existing properties, to construct or purchase new plant, equipment, or improvements, etc.

applied against the total of estimated noncash offerings to yield the final noncash breakdown.

For control purposes two separate breakdowns were derived for cash offerings, the first being based on the information for single-purpose offerings available in the Corporate Bond Records, and the second on information obtained by pooling the multiple- and single-purpose offerings (that is, by treating multiple-purpose offerings as if they were entirely for the predominant purpose). Each set of estimates was then combined with the corresponding noncash estimates, and the resultant two series were compared by year-industry group to detect any marked discrepancies. For an additional check, the total of the refunding and acquisition estimates as indicated by the single-purpose series was expressed as a ratio of the corresponding estimates obtained by pooling the single- and multiple-purpose data. When the estimates differed by more than 10 percent in any year-industry group, the large multiple-purpose offerings were investigated in detail to determine the amounts of offerings to be distributed among the various purposes. A final search of the source materials was made for all large offerings that had originally been coded as "information lacking" with respect to purpose. By these means it was possible to bring the discrepancy between the two series well below the 10 percent level in each year. The adjusted single-purpose estimates are presented in Table A-12 as the final estimates.

Although these estimates make full use of all information contained in the Corporate Bond Records plus additional data obtained through an independent search of manual sources, the final series are much more liable to error than are any of the other series presented in this volume. The justification for presenting them is that they are the best obtainable with the resources and source materials at our disposal, and provide information of a type hitherto unavailable, yet basic to an understanding of the behavior of corporate debt statistics.[10]

[10] No attempt was made to obtain monthly breakdowns for these series similar to the ones developed for total offerings and extinguishments. Experience in working up the annual series suggested that to do so would have involved a heavy expenditure of labor for a questionable final product.

Structure and Secular Behavior of the Series

A summary view of the standing of the various series relating to new-money offerings, refundings, and repayments may be obtained from Table 12, which was derived by combining the estimates from Table A-12 for the years 1900-1943 inclusive. Of the total of $71.5 billion par amount of straight bonds offered during this period, almost 48 percent went to refund securities of one type or another (45 percent to refund bonds, and 3 percent to retire unfunded debt and preferred stock). The railroads and utilities used for refunding purposes a somewhat higher percentage of the proceeds from their offerings than did industrial concerns. The high proportion for the rails was due partly to the heavy involuntary refundings arising from railroad defaults and partly to the large volume of voluntary refundings of rail bonds at maturity. The utilities had the highest percentage of voluntary bond refundings and industrials had the lowest. From the discussion on page 99 it may be remembered that extinguishments by call made up sizable proportions of total extinguishments for the utility and industrial groups. The relatively small proportion of voluntary refundings for the industrials thus indicates that to a large extent the called bonds of that group were actually repaid with funds procured from sources other than the bond market. The utilities, by comparison, refunded into new bond issues a greater proportion of the amount extinguished by call.

Gross new-money offerings (total offerings minus bond refundings) constituted 55 percent of the offerings of the combined industries and were proportionately highest for industrials. The unequal differences in the percentages for gross and net new-money offerings among the several groups are accounted for by the varying percentages representing bonds offered to refund securities other than bonds. The statistics on net new-money offerings for nonfinancial purposes indicate that at most 43 percent of the proceeds of all offerings of the combined industries was used to defray expenses relating to capital formation. Industry differences here are surprisingly small, though otherwise as expected: the proportion is lowest for the railroads, which had largely been constructed by 1900, and highest for the more dynamic industrial group.

A fairly high proportion of the proceeds from all offerings (9 percent) was used for financial purposes, i.e. for the acquisition of securities for affiliation or investment. The proportion is highest for industrial corporations, principally because several of the large industrial trusts formed at the beginning of the century were financed by exchange of bonds for stock of the merged corporations. It is lowest for public utilities, despite the fact that during the twenties 10.5 percent of the total par amount of their offerings went for acquisition of such securities.[11]

Of the total of $54.7 billion par amount of bonds extinguished during 1900-1943, refundings accounted for 59 percent and repayments for only 41 percent. The proportions of refundings for the utility and rail groups were both large (approximately two-thirds of total extinguishments in each case). For utilities the refinancing, as we have seen, was largely voluntary, through extinguishments by call; for rails, more of the voluntary refunding occurred when bonds reached maturity, and there was heavy involuntary refinancing after defaults. The comparatively small proportion of refundings for the industrial group (40 percent of the total amount of extinguishments) and large proportion of repayments (60 percent) reflect principally the rapid repayment of industrial debt after 1929.

The annual series for gross new-money offerings, bond refundings, and bond repayments are plotted in Chart 12. It will be recalled that gross new-money offerings less bond repayments equal the net changes in outstandings, which when cumulated over the years generate the series on outstandings. The upper panel of the chart shows bond refundings plotted against total offerings and total extinguishments for the combined industries. The differences between total offerings and bond refundings (i.e. gross new-money offerings) and between total extinguishments and bond refundings (i.e. repayments) are plotted in the lower panels of the chart for the combined industries and for each of the major industry groups.

In almost every year up to 1944, bond refundings for the combined industries comprised the major share of total extinguishments. But in total offerings, refundings were less important, up to 1933, than were new-money borrowings. It is the refunding

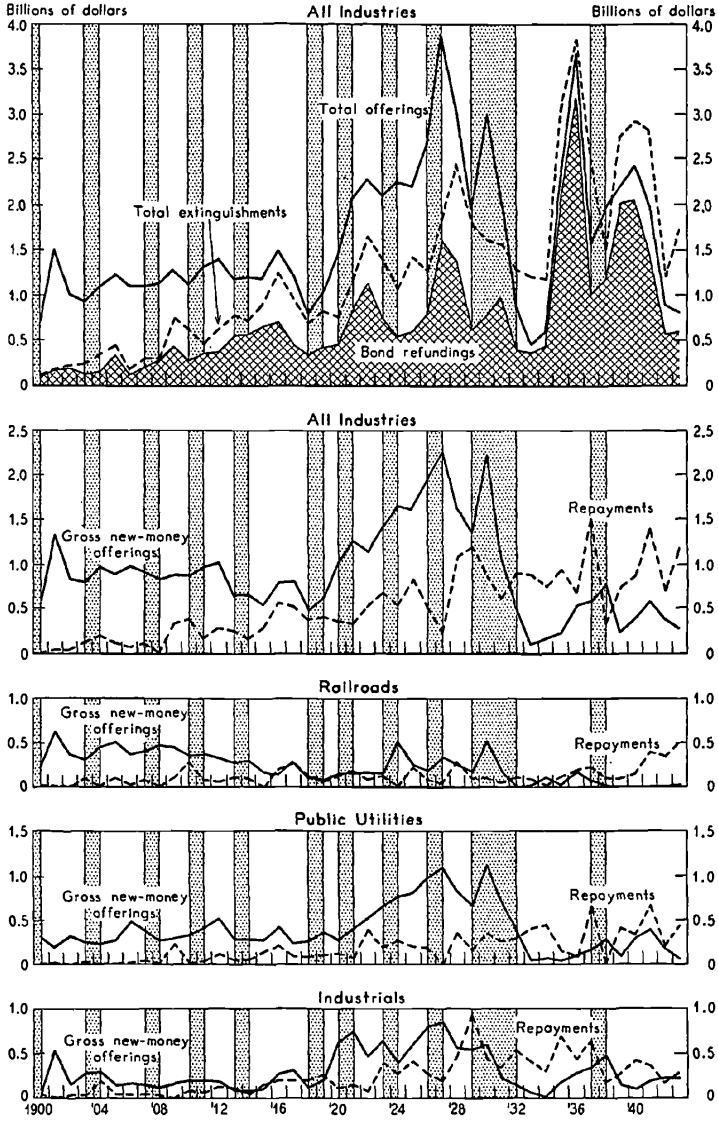
[11] In this period, the proportion was almost as high for industrials (10.3 percent) but was considerably lower for rails (6.8 percent).

TABLE 12—Percentage Distribution of the Par Amount of Corporate Bond Offerings and Extinguishments by Purpose of Offering or Extinguishment, 1900-1943

	PERCENT OF OFFERINGS									PERCENT OF EXTINGUISHMENTS	
	REFUNDINGS					NEW-MONEY OFFERINGS					
		BOND					NET				
	Total	*Total*	*Voluntary*	*Involuntary*	*Other*	*Gross*	*Total*	*For non-financial purposes*	*For financial purposes*	*Bond refundings*	*Bond repay-ments*
All industries	47.8%	45.0%	38.1%	6.9%	2.8%	55.0%	52.2%	43.4%	8.8%	58.9%	41.1%
Railroads	50.4	48.3	35.6	12.7	2.1	51.7	49.6	40.3	9.3	65.1	34.9
Public utilities	50.8	49.3	44.6	4.7	1.5	50.7	49.2	42.0	7.2	68.7	31.3
Industrials	40.2	34.5	29.6	4.9	5.7	65.5	59.8	49.0	10.8	39.8	60.2

Based on totals for all years, Table A-12.

CHART 12—Offerings, Extinguishments, and Refundings of Corporate Bonds, and Gross New-money Offerings and Repayments, 1900-1943



From Table A-12; straight bonds, yearly totals, par amount.

Shaded areas represent contractions in general business activity and white areas represent expansions (Burns and Mitchell, op.cit., p. 78).

component common to total offerings and extinguishments that accounts in large part for the positive correlation between them (cf. Table 5).

The general impression obtained from the chart for the combined industries is one of considerable instability in the annual series, with repayments undergoing somewhat smaller year-to-year variation than new-money offerings. Bond repayments had in general an upward trend over the period covered by the data, both for the combined industries and for each major industry group. No simple trend can be detected in new-money offerings.

For the combined industries, new-money offerings were fairly high and stable between 1902 and 1912, and were somewhat lower and slightly more erratic from then until 1918. After World War I there was a sharp rise in the volume of new-money offerings, which continued up to the peak of $2.2 billion in 1927. The rise was then interrupted by the stock market boom of 1928-29; but after the collapse of that market new-money offerings again climbed abruptly, reaching the previous peak level, $2.2 billion, in 1930. During the depressed thirties, new-money offerings for the combined industries were generally below bond repayments, and the volume of outstandings declined. The level of repayments for the combined industries continued above that of new-money offerings through the early years of World War II, owing largely to the improved liquidity position of the railroads and the consequent repayment of rail debt during that period.[12]

Throughout most of the period studied, public utilities raised substantial amounts of new money through the bond market. Up to about 1915 the railroads contributed equally with the utilities to the total of new-money financing, but after that time industrial concerns displaced the railroads. The heavy plant and equipment outlays of the twenties are reflected in the higher levels of new-money borrowing by public utility and industrial corporations in those years. The recovery of all groups except the railroads after 1932 is reflected in a modest rise in the volume of new money borrowed in the late thirties.

[12] During World War II there was no direct control over security flotations comparable to the restrictions laid down by the Capital Issues Committee of World War I.

Cyclical Behavior of the Series

A rough analysis of the behavior of new-money offerings, refundings, and repayments over business cycles may be made visually from Chart 12. Bond repayments clearly have high positive conformity with cycles in general business activity, generally rising between reference troughs and peaks and falling between reference peaks and troughs. Less readily apparent is the moderate negative conformity of gross new-money offerings and bond refundings. The cyclical behavior of these series, and of several of their important variants, is brought into sharper focus by means of the conformity indexes presented in Table 13.

Except in the case of industrials, the full-cycle indexes for gross new-money offerings indicate moderate negative conformity; thus they provide some evidence to the effect that business corporations in financing their capital expenditures resort to the bond market during business contractions but prefer to tap other sources of funds during business expansions. Further evidence in the next chapter will show a complementary relationship between stock and bond financing: when general business activity is expanding, corporations typically turn to the stock market for funds, and during contractions they usually rely on the bond market. In Table 13 the evidence of the inverted movement of new-money offerings over business cycles becomes somewhat more conclusive in the series where all financial uses of the proceeds of offerings have been netted out and only the net volume of funds available for nonfinancial purposes is considered. The full-cycle conformity indexes are thereby improved for the combined industries and for railroads and utilities, but again the industrials show low positive conformity with business cycles. In general the inverse conformity of the two new-money series appears to be somewhat more pronounced for contraction than for expansion phases of the cycle; the same is true of the net change in outstandings.

Bond refundings also show inverted movements over business cycles. The full-cycle conformity indexes for refundings are negative for all groups but utilities, and are moderately high for the combined industries. Thus it appears that business corporations use the bond market for refunding purposes as well as for new money to an increasing extent during business contractions and

TABLE 13—Conformity Indexes for Offerings, Extinguishments, and Net Changes in Outstandings of Corporate Bonds, and for New-Money Offerings, Refundings, and Repayments: Ten Reference Cycles 1900-1938

	Expansion	*Contraction*	*Full cycle*	*Expansion*	*Contraction*	*Full cycle*	*Expansion*	*Contraction*	*Full cycle*
	Gross new-money offerings			*Voluntary bond refundings*			*Total offerings*		
All industries	+20	−40	−47	+40	−40	−47	+20	−80	−68
Railroads	−40	−20	−47	−20	−20	−37	−20	−60	−79
Public utilities	−20	−20	−26	+20	−60	−26	+20	−40	−16
Industrials	+20	−20	+5	+20	−80	−47	0	−40	−5
	Net new-money offerings for nonfinancial purposes			*Involuntary bond refundings*			*Total extinguishments*		
All industries	0	−60	−58	0	+20	+16	+20	+20	+5
Railroads	−40	0	−58	0	+20	+5	+40	+40	+16
Public utilities	−20	−60	−47	0	−20	−16	+40	−20	+5
Industrials	+40	0	+16	0	+30	+21	+60	+20	+26
	Bond refundings			*Bond repayments*			*Net change in outstandings*		
All industries	+20	−60	−47	+40	+60	+58	−20	−80	−68
Railroads	−20	0	−16	+80	+60	+89	−60	−60	−68
Public utilities	+40	0	+5	+60	+20	+37	−20	−40	−26
Industrials	+20	−60	−26	+40	+40	+37	+20	−40	−5

Based on annual data, Table A-12. These indexes do not take account of possible leads or lags at reference-cycle turning points.

to a decreasing extent during business expansions. The relatively high negative contraction index for the combined industries suggests a fairly systematic reliance on bond refinancing during business contractions. That the tendency of business corporations to decrease their refunding operations in prosperity and to increase them in depression is largely a voluntary one is made evident in Table 13 by removing from bond refundings all involuntary refundings associated with default settlements. The full-cycle conformity indexes for the resulting series, voluntary refundings, are systematically negative, the sign of the utility index having turned from plus to minus. From the magnitude of the contraction indexes it appears that there is a pronounced tendency for voluntary bond refundings to rise during business contractions.

Bond repayments, as is evident from Chart 12 as well as Table 13, show high positive conformity both over expansion and contraction phases and over the full cycle. The implied general pattern of corporate behavior with respect to bond financing during business cycles may therefore be summarized as follows: During business expansions, corporations raise funds from sources other than the bond market both for capital expenditures and for the refinancing of funded debt (bond repayments rise and new-money offerings and refundings fall); during business contractions, on the other hand, they resort to the bond market both for new capital funds and for refinancing (bond repayments fall and new-money offerings and refundings rise).[13]

The total offerings series examined in the preceding chapter showed pronounced negative conformity with business cycles for the combined industries and for the rails, and lower negative conformity for the utilities and industrials. The reason for the inverted behavior of total offerings may now be explained in terms of the behavior of the component series just observed. Both new-money offerings and bond refundings exhibit negative conformity

[13] So far as can be determined from annual data, gross new-money offerings typically expand over stages V-IX and bond repayments over stages I-V. On the other hand, bond refundings typically expand over stages V-III; their annual conformity indexes computed on that basis are −20, −60, −47. The timing of bond refundings corresponds fairly well (invertedly) with bond yields, which (on a monthly basis) typically rise over cycle stages III-VI or III-VII.

with business cycles for the combined industries and for rails. On the other hand, for the utilities and industrials the full-cycle conformity indexes of the component series have opposite signs, so that their contributions to total offerings are partially offsetting.

The conformity of the annual volume of total extinguishments with business cycles appeared low and positive, both for the combined industries and for each of the major industry groups. The reason for the behavior of total extinguishments is now also made clear by the data of Table 13. Bond repayments, which average around 40 percent of total extinguishments, have high positive conformity with business cycles, whereas bond refundings, the other component of total extinguishments, have moderately high negative conformity. Hence the components partially offset each other when the data are considered on an annual basis, so that the annual totals exhibit only low positive conformity. We shall see in the next chapter, however, that the conformity of total extinguishments improves when monthly series are used and allowance is made for leads and lags at business cycle turning points.

Influence of New-money Offerings and Repayments on Net Changes in Outstandings

It was observed in Chapter 2 that the annual net volume of new bond financing (the net change in bond outstandings) is not accurately indicated by total offerings. In general, total offerings and total extinguishments are fairly highly correlated because of the inclusion of bond refundings in both series, and their range of variation is approximately equal (that is, the ratio of their variances is close to unity). By implication, an increase in offerings must frequently be coupled with an offsetting increase in extinguishments so that little or no change occurs in the net volume of bond financing. As a matter of fact, it was found that, except for the rails, the correlation coefficients between the annual series for total offerings and net changes were not significantly different from zero (Table 5).

The same approach may be used to analyze the influence of gross new-money offerings and bond repayments on net changes in outstandings, and Table 14 supplies the requisite measures of

correlation and variance. All of the correlation coefficients for new-money offerings and net changes are positive and significant; those for bond repayments and net changes are negative and significant. That is, the net changes in outstandings usually move in the same direction as gross new-money offerings and in the opposite direction from bond repayments. The correlation coefficients for new-money offerings and repayments are in all cases

TABLE 14—Correlation Coefficients and Variance Ratios for Gross New-money Offerings, Repayments, and Net Changes in Outstandings of Corporate Bonds, 1900-1943

	All industries	*Railroads*	*Public utilities*	*Industrials*
Correlation coefficients				
New-money offerings and repayments	−0.13	−0.44[a]	0.00	+0.21
New-money offerings and net changes	+0.83[a]	+0.91[a]	+0.84[a]	+0.65[a]
Repayments and net changes	−0.67[a]	−0.77[a]	−0.55[a]	−0.60[a]
Ratios of variances[b]				
New-money offerings to repayments	1.77	2.49[c]	2.45[c]	1.10

Based on annual data, Table A-12.

[a] A coefficient of this size or larger would be obtained by chance in less than 5 out of 100 trials if drawn from a population in which the variables are uncorrelated.

[b] For a discussion of the variance and variance ratio, see Chapter 2, footnote 14 and the statistical note referred to there.

[c] A variance ratio of this size or larger would be obtained by chance in less than 5 out of 100 trials if drawn from a population in which the variables have equal variances.

below the corresponding coefficients for total offerings and extinguishments (cf. Table 5), because the common component in the two gross series—refundings—has been removed; and are not significantly different from zero except for the rails. And where there is evidence that new-money offerings and repayments are virtually independent of one another, we may conclude that the year-to-year variation in the net changes in outstandings, as measured by the sample variance, is approximately equal to the

sum of the year-to-year variations in new-money offerings and repayments.[14]

The observed variance of new-money offerings for the combined industries is about one and three-quarters that of the variance of repayments, and thus the variance of the net change in outstandings is about two and three-quarters that of repayments, on the assumption that new-money offerings and repayments are independent. (Their negative correlation coefficient is only 0.13.) Under that assumption, approximately five-eighths (1.77/2.77) of the variation in the net volume of bond financing is attributable to the variation in new-money offerings while only three-eighths is accounted for by bond repayments.[15] Clearly, the volume of new-money offerings has a substantial effect upon, and is a fairly reliable index of, the net volume of bond financing for the combined industries.

The same line of reasoning holds with even greater force in the case of the public utilities. For this industry group, observed new-money offerings and repayments are entirely independent of each other and the sample variance of the former is but little short of two and one-half times the variance of the latter. It follows that approximately 70 percent of the observed variation in the net change in outstandings is attributable to new-money offerings and only 30 percent to repayments. In the case of the industrials, the influence of new-money offerings on the net change in outstandings is not nearly so pronounced: the fluctuations in repayments are approximately equal to those in new-money offerings, and the two series have low but positive correlation (+0.21). The implication is that a given change in offerings was on occasion offset by a similar change in repayments. Approximately 45 percent of the observed variation in the net change in industrial outstandings (1.10/2.10, with allowance for the positive correlation) is attributable to new-money offerings.

[14] A general demonstration of this proposition for accounting identities of the type

$$\text{Net change} = \text{New-money offerings} - \text{Repayments}$$

has been given in the statistical note ending Chapter 2.

[15] Since the observed correlation coefficient for new-money offerings and repayments is close to zero, approximately the same results are obtained by calculation of "coefficients of determination," i.e. the squares of the correlation coefficients for the net change and its two components.

Railroad financing falls into a special category, as became evident in the earlier discussion of the influence of gross offerings and extinguishments on the net change in outstandings. The sample variance of new-money offerings for the rails is approximately two and one-half times the variance in repayments; thus new money would account for just over five-sevenths of the variation in the net change in outstandings (2.49/3.49), provided that new-money offerings and repayments were uncorrelated. In fact, however, these series show moderately high negative correlation, so that a rise in new-money offerings is frequently reinforced by a fall in repayments. In other words, a given increment in gross new-money offerings has both a direct and an indirect effect on the net change in outstandings, the former being equal to the increment in new-money offerings and the latter to the associated decrement in bond repayments. The proportion of the observed variation in the net change in outstandings attributable to new-money offerings is therefore nearer to eight-tenths than to five-sevenths.[16]

The reason for the negative correlation between new-money offerings and repayments for railroads is that both series are highly correlated with the business cycle, one inversely, the other positively (Table 13). For the other industry groups the differences in cyclical conformity of the two series are smaller. A possible explanation is that the cash requirements of different railroads are roughly synchronous over the cycle, so that funds flow to and from the group rather as if it had a single pocketbook. For an individual corporation—or for any fixed group of corporations with similar cash requirements—a negative correlation between new-money offerings and repayments could reasonably be assumed, since the two series should respond oppositely to the

[16] The above analysis takes no account of the possibility of sampling deviations of these statistics from their true values. The analysis, however, was checked by means of 95 percent confidence regions, and the conclusions were found not to be materially affected. For the joint distribution used to obtain the confidence regions, see the statistical note ending Chapter 2. In Table 14, correlation coefficients are indicated as significant when their related confidence regions do not cover the origin. Variance ratios are indicated as significant when their corresponding regions do not include unity.

The analysis also does not take account of possible changes in the correlation coefficients over time. Since the series have undergone various trends, shifts in this respect are not at all unlikely.

changing cash requirements of the firm. That assumption, while perhaps fairly appropriate for the railroads, is less so for our industrial and public utility groups, which include many heterogeneous corporations and have a high turnover of individual firms.

Impact of Interest Rates on Net Changes in Outstandings, New-money Offerings, and Refundings

The finding that the net changes in outstandings, while not closely associated with total bond offerings, are rather highly correlated with, and fluctuate over roughly the same range as, the new-money component of offerings has two implications for monetary policy. One is that efforts to restrain or encourage bond financing will generally be effective if they influence the new-money component of total offerings, although the effects may be offset for a time by changes in repayments. The other is that a series on new-money bond offerings, such as the one currently compiled by the *Commercial and Financial Chronicle*, may be used as a rough indicator of the efficacy of such a program, at least until better data become available. The second point is important in practice, since current estimates of the net change in bond outstandings are not published by any agency.

Under the system of selective credit control recently exercised by the National Voluntary Credit Restraint Committee, bond offerings were restricted to cases in which the proceeds were to be used largely for defense production purposes. To the extent that total new-money offerings were effectively restrained (and repayments unaffected) by this voluntary program, our analysis suggests a corresponding restraint upon the net change in bond outstandings. There is, in addition, the possibility of influencing bond financing under the program of general credit restraints undertaken by the Board of Governors of the Federal Reserve System, but the influence will depend in part upon the degree to which bond financing is affected by broad changes in the availability and cost of credit. General credit controls operate largely through the market for short-term funds; higher money rates in that market tend to induce similar changes in long-term interest rates, and the latter, in the opinion of the Board of Governors, have significant results in the market for investment funds.

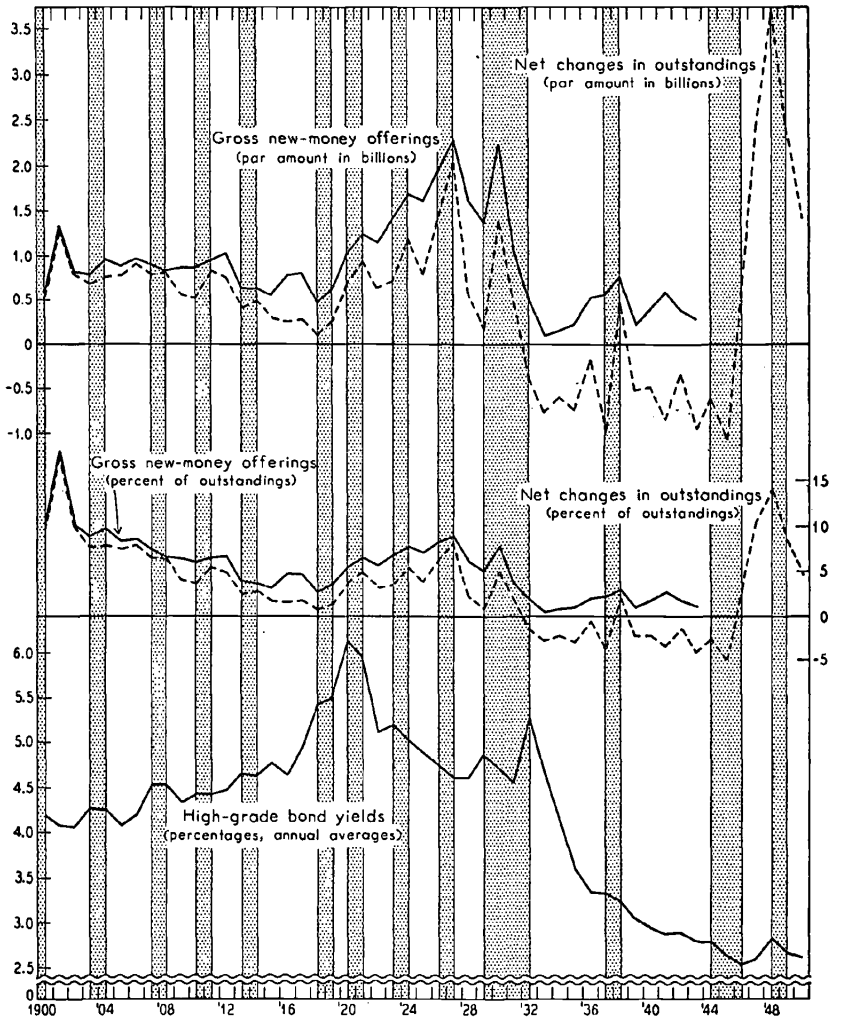
The most recent statement of the Board of Governors' views on the relationship between bond yields and bond financing appears

in its reply to Question F-31 of the Patman Committee Questionnaire.[17] According to the Board of Governors, "Institutions operating primarily in the long-term credit market, such as life insurance companies and mutual savings banks, are affected in much the same way as commercial banks by a tightening in credit and the accompanying increase in the rate of interest." Under those conditions such institutions "will generally exercise greater caution in . . . purchasing private securities and will develop more hesitancy in accepting marginal applications for credit." Investment banking institutions also are held to be particularly sensitive to changes in interest rates "and may be expected to discourage security flotations while interest rates are adjusting to higher levels." Finally, it is maintained that interest costs are particularly significant in certain fields such as housing and public utilities. In these areas "a comparatively small increase in interest rates can have a substantial effect in decreasing or postponing the demand for capital."

Some data bearing on the possible relationship between interest rates and the volume of bond financing are presented in Chart 13, which compares high-grade bond yields with the net change in outstandings and with the closely related series on gross new-money offerings. Gross new-money offerings, it should be recalled, represent the aggregate volume of new-money financing of business corporations considered individually, while the net change measures the same quantity when the corporate sector of the economy is considered as a consolidated unit. (That is, the net change is equivalent to gross new-money offerings of borrowing corporations less repayments of other corporations.) Although the series on gross new-money offerings includes not only funds used for capital expenditures but also certain financial items (bonds offered to refund securities other than straight bonds, to purchase stock, etc.), it is presumably more closely related to capital formation than is the net change. Another of our series—net new-money offerings for nonfinancial purposes—is conceptually even more closely related to capital formation; but since it behaved similarly to gross new-money offerings during all except the first few years of the period covered by our basic

[17] Joint Committee on the Economic Report, *Monetary Policy and the Management of the Public Debt*, Joint Committee Print, 82nd Congress, 2nd Session (1952), Part 1, pp. 368-83 *passim*.

CHART 13—High-grade Bond Yields versus Gross New-money Offerings and Net Changes in Outstandings of Corporate Bonds, 1900-1950



Bond yields are averages of Standard and Poor's Corporation high-grade railroad, public utility, and industrial yield series, with centered twelve-month averages of outstandings based on Tables A-13 and A-2 as weights. Gross new-money offerings and net changes are yearly totals from Tables A-12 and A-2 respectively, for straight bonds; percents of outstandings were computed from twelve-month averages of outstandings based on Table A-13.

Shaded areas represent contractions in general business activity and white areas represent expansions (Burns and Mitchell, op.cit., p. 78).

series, and since our estimates of it are less accurate, it is not analyzed separately. The first pair of series shown in the chart is expressed in par amounts; the second pair has been adjusted for changes in the extent of the market by dividing the original series by annual averages of outstandings. It is important to distinguish the long-run drifts in the series from the shorter ups and downs. The material of Chapter 4 will illuminate the short-run movements observable in the chart, and at present, therefore, attention is drawn chiefly to the long-run drifts.

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. Generally speaking, Chart 13 suggests that such a relationship held from 1900 through 1919. The trend in bond yields was on the whole upward over the two decades, while the trends both of new-money offerings and of net changes in outstandings (adjusted and unadjusted series) were downward. (The correlation coefficients for bond yields and the net changes are —0.78 for the unadjusted series and —0.75 for the adjusted series; the corresponding coefficients for bond yields and new-money offerings are —0.62 and —0.73.)[18] On the other hand, analysis of incomplete data covering the preceding twenty years (not shown on the chart) indicates that bond financing drifted downward with bond yields in that period; that is, the series were positively correlated.[19] Over the years 1920-32 bond yields moved sharply downward and then leveled off (rising abruptly in 1931-32), while new-money offerings and net changes in outstandings first rose rapidly and then fell. (The conflicting

[18] Although correlation coefficients are influenced by short-term as well as long-term movements in the data, they are used here as a convenient device for making trend comparisons. Conclusions based on the correlation coefficients were checked graphically and by comparison with averages of the data calculated over successive business cycles. In general the results are substantially consistent. They are not, however, altogether consistent with comparisons of short-run movements, which will be made in Chapter 4.

[19] Compare balance sheet data given in Poor's railroad manual for 1900 and Macaulay's series for yields of American railroad bonds, adjusted for economic drift (F. R. Macaulay, *Some Theoretical Problems Suggested by the Movements of Interest Rates, Bond Yields and Stock Prices in the United States since 1856* [National Bureau of Economic Research, 1938], p. A-141).

trends within the period result in low correlation coefficients for bond yields and the net changes: only —0.20 for the unadjusted series and +0.02 for the adjusted series, 1920-31. For bond yields and new-money offerings the comparable coefficients are —0.56 and —0.17.) During 1932-43, a period of abrupt fall in interest rates, the net changes were again virtually uncorrelated with bond yields, while new-money offerings showed only a moderate tendency to be inversely associated with yields. (The coefficients are —0.02 and +0.06 for the unadjusted and adjusted net-change series respectively, and —0.25 and —0.34 for new-money offerings.) Finally, in the postwar period bond financing ruled at unusually high levels, while bond yields were unusually low, but the series were positively correlated, both rising to peaks in 1948 and falling thereafter. (The coefficients are +0.17 for the unadjusted and +0.13 for the adjusted net-change series; data for new-money offerings are not available but presumably would show movements similar to those of the net changes.)

Although some of the movements traced in Chart 13—particularly those during the first quarter-century—suggest that interest rates operated to restrict the demand for long-term money when they rose and to encourage it when they fell, evidently the strength of the relationship has varied over the years. Moreover, scanning the period 1900-1943 as a whole, one sees that corporations borrowed most in the twenties when interest rates were above average levels, and less in other years when interest rates were low. (Over the full period the correlation coefficients for bond yields and the unadjusted and adjusted net-change series are +0.49 and +0.29, respectively; for bond yields and new money, +0.41 and +0.26.)[20] Thus it is clear that in the period covered by our data the response of bond financing to interest rates was affected significantly by other strategic forces influencing the demand for long-term money. For example, in 1900-1919 stock prices were generally higher than they had been at most

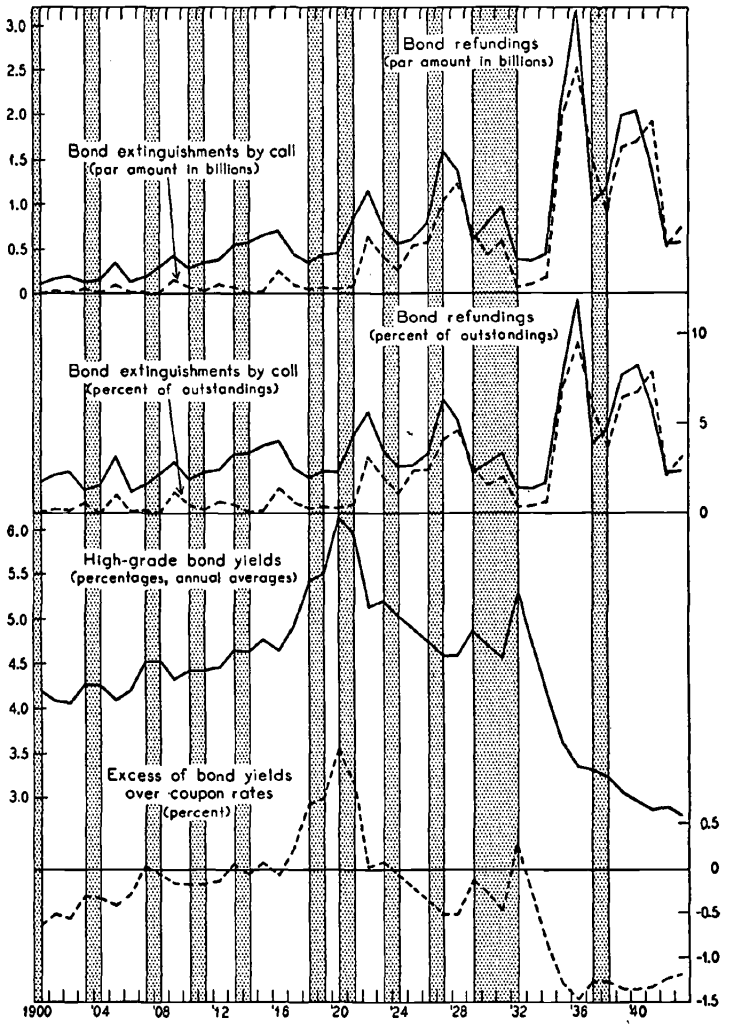
[20] Curiously, the correlation between bond yields and bond financing for the full period 1900-1943 is positive, despite the fact that the correlation for each of the three subperiods is negative. The dangers in an unguarded use of the correlation coefficient are demonstrated further by the fact that when data for the postwar period are included (which in themselves show a low positive correlation), the correlation for the full period 1900-1950 sinks practically to zero, namely, to +0.06 and +0.12 for the unadjusted and adjusted net-change series.

times in the late nineteenth century, and this encouraged stock rather than bond financing. During World War I the bond market was controlled, which reinforced the effect of the wartime rise in interest rates. Bond yields rose rapidly after the war, but stock prices were low and encouraged bond rather than stock financing. The general expansion in business activity and the decline in bond yields during the twenties stimulated bond financing until 1927; but in the late twenties bond financing fell off abruptly while business activity continued upward and stock financing boomed. In the late thirties bond financing was at an extremely low ebb, despite a low level of interest rates and of stock financing. Moreover, the increasing volume of bond repayments began to exercise a marked effect on the net change in outstandings and to obscure the influence of interest rates, which operate primarily on the new-money component of the net change. In the period following World War II, bond financing was encouraged not only by low interest rates but also by rising commodity prices, the corporate tax structure, and high dividend yields on stocks.

The influence of bond yields on refunding activity in the bond market is clear. As is well known, old issues are frequently called and replaced by new issues solely in response to a favorable change in the rate of interest. In periods of falling interest rates high-grade callable bonds generally move toward their call prices but are restrained from rising much beyond them by the risk of call. At such times, savings in interest costs can be obtained by obligors through calling bonds and refunding them into lower-coupon issues. Normally, therefore, we should expect the volume of bonds extinguished by call to respond inversely to a change in bond yields. The same relationship should hold for bond refundings to the extent that they represent extinguishments by call rather than at maturity.

Chart 14, which shows annual volumes of bond refundings and bonds extinguished by call (adjusted and unadjusted series) plotted against bond yields, confirms expectations as to the relationships among the series. At the beginning of the century the majority of outstanding obligations were noncallable rail bonds; and up to 1920, as interest rates rose, most callable bonds dropped well below their call prices. Therefore few bonds were called in the period 1900-1919, and although the short-run movements of

CHART 14—High-grade Bond Yields and Excess of Yields over Coupon Rates versus Corporate Bond Refundings and Extinguishments by Call, 1900-1943



Bond yields are averages of Standard and Poor's Corporation high-grade railroad, public utility, and industrial yield series, with centered twelve-month averages of outstandings based on Table A-13 as weights; coupon rates are computed from data in Tables A-13 and A-25 (see Chapter 6, footnote 21). Bond refundings and bonds extinguished by call are yearly totals from Tables A-12 and A-11 respectively, for straight bonds; percents of outstandings were computed from twelve-month averages of outstandings based on Table A-13.

Shaded areas represent contractions in general business activity and white areas represent expansions (Burns and Mitchell, op.cit., p. 78).

yields and refundings were often in opposite directions (as will appear in Chapter 4), the upward trend in yields was not matched by a declining trend in refundings. (The correlation coefficients for bond yields and bonds extinguished by call during 1900-1919 are only +0.12 for the unadjusted series and —0.03 for the adjusted series.) From 1920 through 1943 the trend of interest rates was generally downward, and as bonds rose to their call prices, substantial amounts were called and refunded into lower-coupon bonds. For the period 1920-31 the correlation coefficients for yields and bonds extinguished by call are —0.76 for the unadjusted series and —0.72 for the adjusted; for the period 1932-43 the corresponding coefficients are —0.59 and —0.62; and for the full period, 1900-1943, they are —0.59 and —0.60. These results are statistically significant and confirm theoretical expectations.[21]

A minor improvement in the analysis may be effected by substituting in place of the yield series the difference between the average coupon rate on outstanding obligations and the yield on high-grade bonds. (See the graph at the bottom of Chart 14.) The transformation is suggested by the fact that a bond necessarily sells below par and hence below call price when its yield exceeds its coupon rate, and above par and hence near its call price under the converse condition. Use of the transformed series systematically improves the correlations between the series for yields, refundings, and extinguishments by call after 1920; for earlier years no significant improvement results, because up to 1920 relatively few high-grade bonds were callable.

A complete analysis of all of the factors influencing bond financing is beyond our scope. The general impression obtained from Chart 14 is that a fall in the rate of interest will induce a large volume of bond refundings and of bond extinguishments by call; and, as will appear from the analysis of interest charges in Chapter 6, an appreciable saving by corporate obligors may ultimately result. Moreover, a change in interest rates may have an appreciable effect on total offerings, since bond refundings are included in the total. On the other hand, bond refundings do not

[21] The correlations of bond refundings with bond yields are similar to those of bonds extinguished by call, but less marked. They improve only slightly when the comparison is based on voluntary refundings (as defined on page 107) rather than on total refundings.

influence the net volume of bonds outstanding, and therefore the relationship between interest rates and refundings is of little concern from the standpoint of credit control. Chart 13 indicates that the observed movements in bond yields have had a perceptible influence on new-money offerings, yet were not in themselves sufficient to explain satisfactorily the observed movements in the net volume of bond financing. This means simply that certain variables other than interest rates were of predominant importance in particular periods and would have to be taken into account in any thoroughgoing analysis of the effects of interest policy. Such an analysis might well reveal a strong relationship between bond yields and bond financing, all other things being equal. Moreover, variables associated with bond yields, such as the availability of total credit, and money rates in other markets, might prove to have far-reaching effects on the economy even if bond yields alone were found to play a modest role. Our analysis does indicate, however, that the actual relationship between bond yields and bond financing is neither very simple nor very stable; in practice, other things have not remained equal. More evidence to the same effect will be presented in the next chapter.