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The New Series

The main features of the new National Bureau time series will be summarized in this chapter. Much of the material here receives more detailed consideration in Part II.

Historical versus Current Series

Compiling historical time series on mortgage terms is vastly different than compiling current series. Many lenders are willing to provide current information as the burden is a small one; consequently, coverage may be wide. The investigator need only collect and process the information provided by the lenders. Once the universe has been defined, furthermore, it is often possible to obtain a current reporting sample that comes close to being representative.[1]

In compiling historical series, in contrast, only a relatively small number of lenders can be covered because the burden of collection is thrust largely on the investigator. As a general rule, lenders who are cooperative in opening up their books expect the investigator to do most of his work at their premises. Any attempt to draw a representative sample would require resources much larger than those available for the present study. A large proportion of lending institutions, furthermore, cannot provide historical records over any extended period, and those that can are hardly representative.[2]

Thus, we were limited in our approach to the problem. We decided to concentrate on a small number of large lenders who could provide a substantial number of observations per institution, who maintained historical records in good order, and whose operations were nationwide

[1] Some imperfections in the sample are inevitable. These arise from the unwillingness of some lenders chosen for the sample to participate and from changes in the structure of the universe. As an important example of the last factor, commercial banks account for a highly variable share of the total residential market.

[2] The practice of maintaining historical records is related to such lender characteristics as size. These characteristics are in turn related to the type of submarket in which the lenders participate.

rather than local. Large life insurance companies met these requirements. This procedure, of course, raised important questions regarding the segment of the market from which our observations come, and the relation of this segment to the remainder of the market. These questions are considered later in this chapter.

General Procedure in Compiling the New Series

The time series contained in this paper are based on samples of loans authorized on one- to four-family homes (hereafter referred to as "residential" loans), drawn from the internal records of large life insurance companies. As a preliminary step, we obtained complete coverage of loans authorized by six companies during February 1960, and by five companies during June 1953. These censuses, each of which involved about 7,100 separate loans, were used in designing the sample and in preparing the tabulation program. (As noted below, cross-section analysis of these data indicated that a tabulation program consisting of simple averages of loan characteristics was preferable to a more complex regression program. Some results of the analysis of our cross-section data are discussed in Appendix B.) When the time series data ultimately became available, we compared the average value of loan characteristics in June 1953 and February 1960 with the values drawn from the two censuses as one of several checks on the reliability of the sample (see Chapter 9).

The sample, which is discussed in detail in Appendix A, covered four of the initial six companies because two companies could not provide data over the entire period. Our sample target was set to provide about 330 loans of each type (FHA, VA, and conventional) per month. Using a standard error of .04 per cent as a rough criterion of statistical reliability, this sample was broadly consistent with the goal of providing monthly FHA and conventional series on a three- or four-region basis, and quarterly FHA and conventional series on a seven- or nine-region basis. The sampling quota could not be met on VA loans during several years when the life insurance companies had very low VA volume. For this reason, as well as the below-market yields of VA loans authorized during such periods of low volume (see below), the VA series turned out to be generally less useful than the FHA and conventional series.

The data are drawn from the finance committee records of the participating companies. As a more or less standardized procedure, com-

mon to all life insurance companies, a record of each individual residential loan is submitted to the finance committee of the company. At the four companies in our sample, the committee meets every week or twice a month. On larger commercial, industrial, or multifamily residential loans, the committee is the authorizing agent of the company. On residential loans, however, lending officers in most cases have authority to commit the company, so that submission of loans to the committee is merely a matter of record. For a large company that authorizes several thousand loans in a month, the finance committee minutes or memoranda for each month would make a sizeable book.

The information available from finance committee records on each residential loan generally includes loan amount, property value, maturity, contract rate, fees paid and received by lender, method of loan acquisition (whether originated directly or acquired through correspondents), service fee on loans obtained from correspondents, and location of property. Data are not available on borrower characteristics or purpose of the loan.

The tabulation program (discussed in Appendix A) involved calculation of monthly and quarterly averages and standard deviations of the following loan characteristics:

1. Loan amount.
2. Value of property.
3. Loan-to-value ratio.
4. Maturity.
5. Contract rate.
6. Net discount. This is fees received less fees paid, expressed as a per cent of the loan amount.
7. Gross effective yield. This is contract rate adjusted for net fees received (or paid).
8. Net effective yield on correspondent loans. This is the effective yield net of the correspondent's service fee.

These characteristics were tabulated separately for each type of loan, further subdivided as a correspondent or direct loan with breakdowns by state and region.

Reliability of the Series

Two checks on the accuracy with which the sample series represented the experience of the participating companies are discussed in detail in

Chapter 6. One check was to compare the sample data for June 1953 and February 1960 with results of the complete censuses taken in these two months. A second check was provided by a set of monthly yield series compiled by one of the participating companies for its own use which cover *all* authorized loans (rather than a sample). The comparisons support the validity of the sampling procedure employed. Differences between census and sample values were distributed about as sampling theory would predict on the assumption of randomness.

Representativeness of the Series

The four life insurance companies included in the sample were chosen because of their convenience and accessibility. Although they accounted for an appreciable share of total mortgage lending of life insurance companies—generally one-third to two-fifths—there is no basis for an a priori claim that the series are representative of life insurance companies generally.

Nevertheless, there is evidence that the series are in fact representative. Yield differences between individual lenders in our series are small. During a thirteen-month period, furthermore, the NBER conventional loan series overlaps the new FHLBB series which covers a much larger group of companies. Despite differences in the sample, in loan coverage, and in certain definitions, the average loan characteristics in the two series are remarkably similar. In general, yield differences between the two series are smaller than the erratic month-to-month changes within both series.

The reason that the NBER series is broadly representative of life insurance companies is that the companies represented, as well as the industry in general, operate for the most part in the national market. As we shall see in Chapter 5, yield dispersion of mortgages entering the national market, due to differences in loan and property characteristics is small. Scope for individual yield variability, reflecting differences in lender policies, is correspondingly narrow. Transactions by any quantitatively important participant in the market do not deviate very far from those of other such participants.

Loans acquired by life insurance companies, however, are *not* representative of the residential market as a whole. As shown in Table 2-1, life insurance company conventional loans carry lower fees, have longer maturities, are secured by more expensive properties, and are

TABLE 2-1

Characteristics of Conventional First-Mortgage Loans in Eighteen Major Metropolitan Areas Approved by Major Lender Groups, May-December 1963

Lender Group	Contract Interest Rate (per cent)	Fees and Charges (per cent of loan)	Loan-Value Ratio (per cent)	Value of Property (dollars)	Term (years)	Loan Amount (dollars)	Loans on Previously Occupied Homes (per cent of total)
Savings and loan association	6.00	1.03	75.8	21,527	23.2	16,270	66
Commercial banks	5.57	.34	61.6	27,265	18.1	16,609	75
Mortgage companies	5.56	.59	68.5	28,561	24.3	19,229	36
Mutual savings banks	5.46	.20	67.0	22,595	22.6	15,098	67
Life insurance companies	5.50	.18	66.9	31,029	25.4	20,602	31

Source: Federal Home Loan Bank Board.

less likely to be for the purpose of purchasing previously occupied homes than loans authorized by other major lender groups.[3]

Homogeneity of the Series over Time

One fundamental requirement in the construction of any yield series is to maintain an underlying security with reasonably stable yield-determining terms and characteristics. If the nature of the instrument changes over time, it becomes necessary to disentangle the effect of this change upon yield from the effect of changing market conditions.

For example, assume that under any given market conditions the yield on individual conventional loans is given by $Y = C + kT$, where C is a constant and T is a composite measure of ex ante quality, reflecting the maturity, loan-value ratio, borrower credit standing, and the like. For most analytical purposes, a yield series should reflect changes in C, which would arise from shifts in general market conditions, and in k, which would arise from changes in lenders' evaluations of the quality of mortgages having a given bundle of characteristics. The series should *not* reflect changes in T which constitute changes in the underlying instrument.

On series covering outstanding securities that are constantly traded, there is little difficulty in holding T constant over time because the observations always refer to the same instruments. Changes in the yield-determining characteristics of outstanding securities would typically take place very gradually; the period to maturity gradually shortens, for example, or the property securing the loan depreciates. In the case of the well-known outstanding corporate bond averages, this problem is handled with relative ease by making an occasional change in the composition of the bonds in any given classification.

In the case of series covering new issues, the problem cannot be handled as easily because individual instruments entering the series must be completely different from one month to the next. Mortgage yields necessarily cover new issues. Unlike bonds, it is not possible to construct mortgage yield series on the basis of transactions in a few outstanding issues. Whereas a given bond issue is divided up into many individual bonds, which are widely held and for which regular market quotations exist, the individual mortgage is small and indivisible; few

[3] Differences in the characteristics of federally underwritten loans acquired by major lender groups probably are less pronounced.

mortgages, furthermore, are exchanged in the market more than once.

An obvious method of dealing with this problem is to set up cross-classifications covering the most important yield-determining characteristics on which data are available. A more efficient method is the regression procedure used by Avery Cohan in his study of directly placed bonds.[4] In this procedure, fixed values of a large number of yield-determining characteristics are plugged into a series of regression equations, each equation relating yield to bond characteristics during a given period (usually a quarter). Changes in yield from period to period thus reflect changes in the constant term of the equation and in the coefficients of the bond characteristics, but the average values of the characteristics themselves are held constant.

In general, a regression-type adjustment is *needed* when the underlying yield data have a substantial degree of cross-section variability and the mix of important, yield-determining characteristics is unstable. (If the mix changes systematically over the cycle, or if there are underlying trends, the series will have cyclical or secular bias. Erratic instability in the mix of characteristics would create erratic series, but they would have no systematic bias.) An adjustment is *feasible* only if sufficient collateral data are available to explain a good part of the cross-section variability. The mortgage loan series collected for this study did not meet these criteria.

1. Cross-section yield variability on life insurance company mortgage loans is relatively small. On a quarterly basis, the standard deviation of our conventional yield series ranged generally from .10 to .30 per cent during the period 1951–63. On FHA and VA loans, it tended more toward the lower end of that range. This may be compared with the standard deviation of Avery Cohan's sample of directly placed bonds during 1951–61, which ranged generally from .30 to .60 per cent on industrials, and from .20 to .50 per cent on public utilities. As we show in Chapter 5, yield variance on conventional mortgage loans is smaller for life insurance companies than for other major mortgage lender groups. The variance of life insurance company loans is not so small, however, as to invalidate a regression-type adjustment if there were systematic changes in important yield determinants on which we have data.

2. Over the cycle, those measurable loan and property characteristics that change systematically are not important yield determinants. As

[4] Avery B. Cohan, *Yields on Corporate Debt Directly Placed,* New York, NBER, 1967.

noted in Chapter 3, loan-value ratios and maturities on life insurance company loans do vary systematically over the cycle. Our cross-section regressions show, however, that the yield implication of this variability is negligible. This will become evident below when we consider the yield implication of *secular* changes in loan characteristics, which were larger than the cyclical changes but did not appreciably affect yields.

On the other hand, those characteristics that do have a significant effect on yield do not change systematically over the cycle. The principal source of explained yield variability in our data is the location of property and identification of the individual lender. To test whether shifts in the geographical and lender mix affected cyclical yield variability, we recalculated conventional yields for each turning-point quarter on the assumption that loan distribution among thirty-six separate strata—four lenders and nine regions—was the same as in the previous turning-point quarter. The results, shown in Table 2-2, indicate that cyclical changes in lender and geographical mix had a negligible effect on over-all cyclical yield variability.

Thus, our data contain no cyclical biases that are removable by a regression-type adjustment.

There remains the possibility of cyclical bias associated with systematic cyclical changes in unknown yield determinants, such as bor-

TABLE 2-2

Cyclical Changes in Conventional Mortgage Yields
With Actual and Fixed Weights, 1951 – 63

Cyclical Rise (R) or Decline (D)	Actual Weights	Fixed Weights	Yield Change Attributable to Changes in Weights
I 1951 to I 1954 (R)	.49[a]	.48[a]	+.01
I 1954 to IV 1954 (D)	-.15	-.14	-.01
IV 1954 to I 1958 (R)	.97	.94	+.03
I 1958 to IV 1958 (D)	-.23	-.19	-.04
IV 1958 to III 1960 (R)	.65	.65	0
III 1960 to IV 1963 (D)	-.59	-.60	+.01

Note: Weights refer to the relative importance of 36 lender-region groups.

[a]Contract rate.

Source: NBER series.

TABLE 2-3

Effect on Conventional Yield of Changes in Loan Characteristics Between 1951 and 1963, Using June 1953 Regression Weights

	Change in Characteristic[a]	Change in Yield (basis points)
Maturity (months)	+93	-2.1
Loan value (percentage points)	+7.7	1.2
Property value (dollars)	+10,000	-3.2
Individual lender mix (4 lenders)		+2.6
Geographical region mix (9 regions)		.0
Total		-1.5

[a]Uses average 1951 and 1963 values except for geographical region which refers to first quarter of 1951 and last quarter of 1963.

Source: NBER series.

rower characteristics. The quantitative importance of such bias would be very small, however, simply because the unexplained variability in absolute terms is so small.[5]

3. The problem of homogeneity over the entire 1951–63 period appears similar to that of systematic cyclical change. Although there were pronounced trends in maturity and property value, yield corrections based on coefficients for these variables derived from cross-section regressions would not have affected the level of the series in any appreciable way. As an example, the average maturity on conventional loans rose from about 217 months in 1951 to 310 months in 1963. Applying the coefficients drawn from the June 1953 regression,[6] this would have reduced yield by .02 percentage points. As shown in Table 2-3, the yield changes implied by secular changes in the other characteristics are of the same general order of magnitude and tend to offset each other. There is thus no reason to believe that our series

[5] We are inclined to believe, although this cannot be demonstrated, that this unexplained yield variance is due to a complex of factors associated with small individual loan transactions, where borrower and lender have incomplete information and where rates are subject to some degree of indeterminacy associated with bargaining. Such influences would be essentially random.

[6] Use of the February 1960 coefficients gives very similar results.

contain any appreciable secular bias arising from changes in characteristics, and a regression-type adjustment would not change the series appreciably.

Interestingly, the cyclical behavior and trend of Avery Cohan's yield series on directly placed bonds was not changed in any significant way by his regression adjustment, despite the fact that his data had much greater cross-section variability than ours and that his collateral data were able to explain a much larger proportion of total variability.[7]

A yield series may, of course, be influenced by changes in the weights attached by lenders to any given set of objective characteristics of the instrument, as well as by changes in the characteristics themselves. (In the equation $Y = C + kT$, k may change as well as T.) We do not have measures of k over the cycle, but we do know that cyclical changes in delinquencies and foreclosures on residential mortgages held by life insurance companies have been very small (Chapter 3); on conventional loans, there has been no cyclical pattern at all. It is a reasonable inference that if business cycles are so mild as to have little effect on the repayment experience of mortgages in portfolio, the k applicable to new mortgages will not change very much.

Over the 1951–63 period as a whole, there are indications that the kT on conventional loans declined. This is suggested by a reduction in the yield differential between conventional and FHA mortgages, as discussed in Chapter 4. If secular changes in the characteristics of conventional mortgages did not appreciably affect yields, as was suggested above, presumably the decline in yield differential reflects a secular decline in k. This would be a natural consequence of persistently good repayment experience.

Methods of Loan Acquisition

Life insurance companies acquire mortgage loans in two ways: through direct origination (termed "direct" loans), or through purchase from correspondents who originate and usually service the loan (termed "correspondent" loans). The new series cover both, and data are presented on a combined basis as well as separately.

Chapter 6 discusses the analytical advantages and disadvantages of statistical series on direct and correspondent loans. The connection of direct loans with property transfers creates ambiguity in the definition

[7] Cohan, p. 21.

of fees and charges, since payments to the lender may be associated with the property transfer as well as the credit transaction. In contrast, all recorded payments to or by the lender in correspondent loans are connected with the credit transaction; the property transfer is out of sight. Since all direct loan charges by large life insurance companies are quite small, however, the problem is not of great practical importance.

On the other side of the ledger, correspondent loans involve a servicing transaction as well as a credit transaction, and the terms of one may affect those of the other. Prior to 1959, this problem was largely theoretical as well; a standard service fee of .50 per cent generally prevailed. After 1959, variability arose in service fees between individual companies, and shifts within the company mix affected average gross yields on correspondent loans, although the effect was small and not systematic. This problem can be avoided by measuring the yield net of the service fee. Because data are not available on the servicing costs of direct loans, however, net yields on correspondent loans cannot be made comparable to direct loan yields.

Correspondent and direct loans are not strictly comparable on a gross yield basis, but the elements of noncomparability are small and tend to be offsetting. Thus, service fees paid to correspondents appear to be generally higher than servicing costs of large companies that do their own servicing. On the other hand, net origination costs are borne by the correspondent on correspondent loans and by the company on direct loans. A pragmatic case for combining direct and correspondent loans is based on the view that any residual element of noncomparability is small. This view is supported by the fact that gross yield differences between correspondent and direct loans are no larger than intercompany differences in net yield on correspondent loans alone.

Timing of the Series

For analytical purposes, mortgage yield series should be dated as of the time when binding transaction terms are established. In the case of residential loans by life insurance companies, this usually is the date when an authorized officer of the lending institution approves the application of a correspondent, builder, or ultimate borrower (mortgagor). Such approval represents a commitment to make a loan under specified conditions within some stipulated period (the "commitment

period"). The NBER series are dated as of the day of finance committee meetings, termed the "authorization date." With some exceptions to be noted, this date lags the true transaction date by only two or three weeks.

In contrast, the date when funds are disbursed and the loan closed may lag the transaction date by from one to twelve months or even longer. In Chapter 7, we show that time series based on the date of disbursement lag series based on the date of authorization by one to six months.

Cases arise where the transaction date precedes the date of approval of the loan application. On some direct loans, the transaction date may precede by several months the date when the formal loan application is approved. Builders planning a large tract development require some assurance of credit availability before submitting of a formal loan application, and this constitutes a sort of "moral commitment" that the lender respects. The number of such loans in our sample, however, was not large enough to have had any significant effect on the timing of series covering direct loans.

A more complex problem arises when a correspondent commits himself to a builder or mortgagor before obtaining a commitment from the company, and the terms in the correspondent's commitment influence the terms of the transaction between the correspondent and the company. Thus, if market yields rise after the correspondent extends a commitment and before he can obtain a commitment from the company, the company under some circumstances might accept the lower yield in the correspondent's commitment. It is not always clear whether such cases should be classified as a "recording lag," wherein the true transaction date is really the date of the correspondent's commitment rather than the date of the company's commitment, or a "behavioral lag," wherein the company's behavior is constrained by concern for continuity in its operations with correspondents. In any case, Chapter 4 presents evidence that correspondent loan series are somewhat more sluggish than direct loan series.

The Concept of Effective Yield

Mortgage interest rates should be calculated to take account of fees paid and received by the lender (or what amounts to the same thing, the price of the instrument), a concept we have termed "effective

yield." On FHA and VA loans especially, the contract rate alone has little significance, since it is almost always the current maximum rate allowable and may stay unchanged for long periods. In the short run, market changes take the form of changes in the price of the instrument. On conventional loans, the contract rate is free to vary, but it has long been felt that the rate itself tends to be sluggish, so that marginal changes in market conditions may be better revealed in an effective yield series. The new NBER series are all on an effective yield basis.

One technical problem involved in constructing yield series, discussed in Chapter 5, is that some assumption must be made regarding prepayment of principal. Most mortgages are paid in full prior to maturity, and this affects the yield; the more so, the more the price deviates from par. For some analytical applications, the prepayment assumption may affect results while for others it will not. (For some purposes it is necessary to distinguish the expected yield, based on the assumed prepayment, from the realized yield, which would be based on the actual prepayment. The series in the paper refer, of course, to expected yields.)

The usual practice in calculating yield is to assume a prepayment period equal to average life in the past based on termination experience. We find that the use of past average life, assuming the extrapolation is correct, provides a biased estimate of yield because of the nonlinear relationship between yield and mortgage life. When discounts or premiums are large, the bias is substantial.

Because termination experience indicates that longer-maturity mortgages have longer lives, some observers vary the prepayment assumption with the face maturity. We have not done this, since there is reason to believe that the relationship between life and face maturity during the period covered by the available data on termination experience was affected by the upward ratcheting of interest rates. We also have found that a single prepayment assumption is easier to work with. A ten-year assumption has been employed in all yield calculations, and we provide the data needed to recalculate yield on other assumptions for anyone wishing to do so.