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Factors Affecting Credit Risk in Personal Lending

THE credit standing of an applicant for a personal loan is investigated intensively because it indicates, within reasonable limits, the likelihood of repayment. It should not be assumed, however, that a bank officer can foretell with certainty how faithfully a borrower will meet his obligations; few applicants have economic prospects so bad that there is not some small chance of repayment, and few are so well situated that there is not some possibility of delinquency or even default. The selection of borrowers must therefore rest on probabilities. On the basis of experience, and to some extent intuition, the loan officer decides which applicants are more likely to default than others or which loans are likely to involve collection costs so great as to render the transaction unprofitable.

Willingness and ability of the borrower to repay the loan are the primary factors to be considered in any appraisal of credit risks. Applicants who may be attempting fraud are clearly undesirable, as are those who, though not strictly dishonest, may appear to be irresponsible. The second criterion, ability to repay, may be tested by several standards: by personal characteristics such as age, sex and family status; and by the borrower's occupational or economic position, income and net worth.

In general, then, the bank is interested in the moral, personal, vocational and financial characteristics of the applicant for a personal loan. The would-be borrower is asked to

supply credit references, banking connections and information concerning his charge accounts, since these give some evidence of his probity. Age, sex, marital status, number of dependents and permanence of residence, are pertinent personal characteristics. The nature of the applicant's occupation, his tenure of employment, and the industry in which he is engaged are clues to his ability to pay. His income, assets (real estate, household goods, automobiles, stocks and bonds) and debts (mortgages, charge accounts and instalment accounts) serve to indicate his financial capacity. These characteristics are all, of course, interrelated. Personal traits affect, and are in turn affected by, an applicant's occupation and earning power. A balanced income-expenditure relationship, or a substantial net worth, reflects not only the borrower's financial capacity but also his prudence and foresight in the management of his affairs.

The following pages are devoted to a statistical analysis of the principal factors affecting credit risk. The information on which the study is based was obtained from a sample of 2,765 applications of persons to whom loans were granted. The data, secured through the cooperation of 21 large banks operating personal loan departments in 16 cities situated in 11 states,[1] are presented in a series of tables giving the distributions of good and of bad loans according to the several risk factors selected. The information covering this group of borrowers pertains only to their financial, personal and vocational characteristics. No direct information was requested on past payment record, legal actions or the quality of references given, and consequently the analysis provides no ade-

[1] The cooperating banks were asked to provide random samples of good and bad loans. Good loans were defined as those which paid out without any special collection difficulty and bad loans as those which either were excessively delinquent or ended in default. The drawing of the samples was subject to only two conditions: (1) that the loans in both samples were made within the same period of time; and (2) that their distributions over that period were nearly identical. Although there is no certainty that the drawing was truly random we have based our conclusions on such an assumption.

quate treatment of what we have called moral characteristics. These may be inferred from the data only insofar as they are suggested by such related factors as stability of employment and of residence, and character of occupation.

PROCEDURE IN THE ANALYSIS OF BAD-LOAN EXPERIENCE

Our sample consists of records of actual borrowers, some of whom repaid their personal loans substantially as scheduled and some of whom did not. Since these borrowers had already passed through a selection process at the hands of credit men, the sample cannot be considered completely representative of the general run of personal loan applicants. The results may suffice to show whether or not credit men should have been more selective than they were, but they do not indicate whether they should have been less selective. There is no way of measuring what proportion of rejected applications would have proved satisfactory if accepted, and it is therefore impossible to eliminate the bias attributable to the prior selection of risks.

The nature of this bias is illustrated in Table 26 which summarizes the reasons for the rejection of 1,713 personal loan applicants by a metropolitan bank. The first two reasons—too much borrowing and weak statement—account for about 50 percent of the total number of rejections and suggest that the vocational and financial characteristics of these prospective borrowers were unsatisfactory. Rejections of this nature might well be expected to bias the sample. On the other hand, rejections for "failure to mention existing loans with other members," a reason which presumably indicates dishonesty or irresponsibility, may not bias the sample appreciably; and the same may be true of the last four items in the table. The reason "poor previous credit record with us or others" may indicate dishonesty or irresponsibility, in

TABLE 26

Percentage Distribution of 1,713 Personal Loan Applications Rejected by a Metropolitan Bank, by Reason for Rejection

REASON FOR REJECTION	PERCENT
Too much borrowing	8.3
Weak statement	43.9[a]
Poor previous record with us or others	17.4
Failure to mention existing loans with other members	21.8
Comaker in open legal account with others	1.5
Borrower in open legal account with others	1.5
Judgment record with our bank	.4
Other reasons	5.2
TOTAL	100.0

[a] This class consists chiefly of applications showing insufficient income, unstable employment, unsatisfactory comakers and the like.

which case these rejections probably are not a source of bias. If, however, rejection attributed to this cause results from financial weakness, it might well bias the sample.

Our study of credit experience is necessarily based on certain arbitrary assumptions. In the first place we have assumed that all loans can be divided into two mutually exclusive classes, one consisting of good loans with which the bank had no special collection difficulty, and one of bad loans which gave rise to one or more of the following collection problems: the bank collected from a comaker; the bank took legal action; the loan was excessively delinquent;[2] the bank charged off the loan.[3] In the second place we have assumed

[2] "Excessive delinquency" was defined as 90 days or more.

[3] In spite of these standardized criteria for characterizing a loan as good or bad, there were inevitably certain borderline cases that could be catalogued as bad loans only arbitrarily. Moreover, there was considerable variation among the samples as to the relative significance of the different types of bad loans. Thus, although legal action or collection from a comaker occurred in 37 percent of the bad-loan cases reported by all banks combined, such treatment was reported by one bank for 96 percent of its cases, and by two others for only 6 percent. See Table B-1.

that each of our supposedly mutually exclusive classes has some distinguishing characteristics, even though in other respects the two samples may be identical.

It is scarcely to be expected that banks operating in different regions, serving different classes of customers and following different policies, would have uniform experience. Therefore, for each of the factors to be analyzed, we have supplemented the composite analysis for all banks by an individual analysis for each bank that submitted a sufficiently large sample. These individual analyses, which are presented in Appendix B, indicate the degree of variation among banks and the extent to which the average experience of all banks typifies the experience of any one bank. It will be seen that in some instances the individual samples differ widely from one another, and thus from the average of the composite sample, and that in others the composite findings are valid also for most of the separate banks.

The tables used in the main body of the following discussion are based on the entire sample, comprising 1,468 good loans and 1,297 bad loans. But in these summary tabulations, which represent a combination of the samples of all banks, the separate distributions of good and of bad loans for each bank have been so weighted that the combined sample may be considered to comprise 1,294 good loans and the same number of bad loans.[4] The banks cooperating in this survey were asked to submit approximately equal-sized samples of the two types of loans, because an equal division is most efficiently studied. A group of only two hundred cases, for example, would be large enough to be of some interest if it were divided equally; but if the group contained only two or three bad loans out of two hundred—a proportion which might result from a random drawing from all the loans in a bank's portfolio—it would be useless for our present pur-

[4] For method of weighting see Appendix B, p. 274.

poses.[5] Even though our good-loan sample accounts for a far smaller proportion of all good loans than the bad-loan sample does of all bad loans, a sample of one hundred good loans is just as representative of an indefinitely large universe of good loans as a sample of one hundred bad loans is of an indefinitely large universe of bad loans. This is true because the sampling error, which measures the extent to which a sample may be considered representative of the larger universe, depends on the absolute number of cases in the sample, and not on its proportion to the whole.

The computation of sampling error is an important part of this analysis. If a sample of good loans shows characteristics different from those of a sample of bad loans, it is always possible that the difference is merely a matter of chance; and the smaller the sample the greater is this possibility. Several tests of statistical significance have been devised to determine the limits of probable sampling error. In the present study we applied the Chi-square test,[6] using the 1 percent standard of statistical significance. Accordingly, when we found a difference in the distributions of good-loan and bad-loan samples we did not accept this difference as evidence of a genuine characteristic of the whole body of loans from which the sample was drawn unless we could show that there was no more than one chance in a hundred that a difference substantially as large would be found in a random sample from a universe which actually had no such characteristic. For ex-

[5] But if the difficulty or cost of obtaining samples of one type were greater than that for samples of the other type it would be preferable to have more of the former sample. If, for example, there were reason to suppose that it required much more clerical labor to obtain and tabulate bad-loan as compared to good-loan cases, efficiency would require more good-loan cases than bad.

[6] A complete description of this test would not be pertinent to the present study. A good explanation, with examples and methods of computation, may be found in George W. Snedecor, *Statistical Methods Applied to Experiments in Agriculture and Biology* (Ames, Iowa, 1937) Chapters 1 and 9. See also R. A. Fisher, *Statistical Methods for Research Workers* (London and Edinburgh, 6th ed. 1936) Chapter 4.

ample, if a sample of 100 good loans contained 45 percent of cases without bank accounts and 55 percent with accounts, and if a sample of bad loans contained 55 percent without and 45 percent with bank accounts, it would not be reasonable to infer any relationship between the ownership of a bank account and bad-loan experience, for there is about one chance in seven that such a sample distribution would be due to chance alone. But if the distribution were 40-60 percent in the good-loan sample and 60-40 percent in the bad-loan sample, it would be reasonable to infer such a relationship, for there is not one chance in a hundred that such a distribution could be due only to chance.

The Chi-square test, on which such computations are based, serves as a check only against the chance errors that are likely to occur when small samples are used; it does not guard against clerical errors, misstatements, and ambiguous or incomplete data, which may be found in samples of any size. We have applied this test to the various distributions presented in the following pages. In a few instances the differences in the good-loan and bad-loan distributions proved of doubtful statistical significance or of no significance at all; in each such case this finding is pointed out in the text.

Because of the nature of personal lending it is customary in the business to assume that any applicant is a good risk unless positive evidence can be found to the contrary. In credit analysis it is therefore more important to determine the characteristics of the particularly bad borrowers than it is to determine the characteristics of the good ones. The following tables show the ratio of the percentage of bad loans to that of good loans in each class; this ratio is called the "index of bad-loan experience." Since the ratio or index for all classes combined is 1 (100 percent to 100 percent), a ratio greater than 1 indicates a worse-than-average risk, and conversely. This method gives no indication of the ratio of all bad loans to all good loans in any particular class. If the gen-

eral ratio of all bad loans to all good loans for all classes had been determined by some other means, we could have arrived at a rough estimate of the absolute ratio for any particular class merely by multiplying the absolute general ratio by the bad-loan index for that class; under present circumstances, however, the absolute ratio of bad loans to good could not be calculated.

APPLICABILITY OF FINDINGS

It should be evident from the foregoing discussion of the nature of the data and of the assumptions basic to the analysis, that the results obtained cannot be applied mechanically and without regard for special circumstances. Statistical analyses of the kind we are here attempting are necessarily based on averages and probabilities, and therefore can reveal only tendencies, not certainties. It cannot be too strongly emphasized, moreover, that this study serves only to evaluate the relative merits of actual borrowers, and does not touch upon the qualities of potential borrowers who have been denied or who have never sought loan service. If, as a matter of policy, a bank sought to reduce its losses by cutting down its loan volume, a study of this sort would indicate the most unsatisfactory types of current borrowers, and these could be eliminated first. If, on the other hand, it were the bank's policy to increase volume through the extension of loan service to new classes of borrowers, a study based on actual current borrowers would give but little indication of the characteristics of the better risks. In such a case probably the only feasible procedure would be to make experimental loans to persons of various classes hitherto considered unacceptable; after enough experience had been gained, the more unsatisfactory groups could be eliminated.

There are other important considerations which must not

be neglected in any interpretation of the results of this analysis—especially the interrelationships between credit risks, volume of business and profits. The tables presented in the following pages show numerous classes of borrowers which are distinctly below average in the sense that they contain a larger proportion of all the bad loans than of all the good loans. For example, the class of unskilled and semi-skilled laborers (Table 31) accounts for 11.1 percent of the bad loans and for only 5.8 percent of the good loans, but a credit official would not be likely to decide to refuse loans to all such workers merely because the group as a whole stood below average. On the contrary, he would have to weigh the advantage of eliminating the 11.1 percent of bad loans against the disadvantage of eliminating the 5.8 percent of good loans. Since the number of good loans in the bank's portfolio is much larger than the number of bad loans, elimination of 5.8 percent of the former would involve a greater reduction of volume than cutting out 11.1 percent of the latter. A decision to eliminate any given class of borrowers would depend on other factors, for example the rate charged on loans or the ordinary costs of handling loans in addition to the estimated bad-debt loss for the class in question.

Considerations such as these—we shall not attempt to present an exhaustive list—suggest how the findings should be modified in regard to particular circumstances. It is possible, however, to apply a statistical test in order to determine which factors are in general the more reliable indicators of risk. The Chi-square test serves to eliminate certain factors for which there is no statistical evidence of significance, but it sheds no light on the relative importance of the factors that do appear to be significant.

In order to show their relative merits as risk indicators, we have computed for each of the factors under consideration

a very rough gauge called the "index of distribution difference" or simply the "efficiency index." Such computation is a relatively simple procedure.

For any given factor the various classes constituting the distribution may be recombined into two general groups, those whose index of bad-loan experience shows them to be worse than average, and those which appear from the index to be average or better than average. The worse-than-average group will contain a certain percent of the bad loans and a somewhat smaller percent of the good loans.

The efficiency index is the difference between these two percentages, and is equivalent to the difference between the percentages of good and of bad loans in the group made up of average and better-than-average loans. If this index is 0, obviously all classes are average classes, and the distribution of good loans is identical with that of bad loans; therefore if any class of borrowers is rejected, the same percentages of good loans and bad loans will be eliminated. If the index is 100, the better-than-average group contains all the good loans and the worse-than-average all the bad loans; thus rejection of any worse-than-average class would eliminate only bad loans. The nearer the index stands to 100 the greater is the difference between the percentage of bad loans and the percentage of good loans that would be eliminated if a worse-than-average class were rejected.

When the various risk factors are compared, those with the larger indexes of distribution difference are those with the greater differences between the good-loan and bad-loan distributions, and hence they are the factors to be regarded as the more reliable indicators of credit risk. This index, then, provides a rough estimate of the reliability of any factor as an indicator of credit risk, although the degree of reliability is necessarily conditioned by various modifying influences.

FACTORS AFFECTING CREDIT RISK

Personal Characteristics of Borrowers

We have examined for their bearing upon credit experience such personal characteristics of borrowers as age, sex, marital status, number of dependents and duration of residence. Percentage distributions of our good-loan and bad-loan samples, and indexes of bad-loan experience, are shown according to these characteristics in Tables 27, 28, 29 and 30.

It appears from an analysis of borrowers' ages that this factor is significantly related to credit risk. The index of bad-loan experience for borrowers over 50, as shown in Table 27, is only 0.58, while that for borrowers between 21 and 25 years of age is 1.15. Not only is this difference too large to be attributed to sampling error, but it is confirmed by the tabulations of the individual bank samples.[7] This observed relationship must nevertheless be weighed against other circumstances, since age as a factor in credit risk is necessarily related to and modified by other factors, such as marital status, income, occupation, tenure of employment, permanence of residence and the like. Indeed the apparent connection between bad-loan experience and age of borrower may reflect in large measure the indirect influence of these other factors.

Credit risk seems to be affected also by the sex of borrowers, as is shown in Table 28, but its relation to marital status is at best questionable. The index of bad-loan experience for married men is 1.08 and for single men 1.37, and the corresponding indexes for women are 0.44 and 0.43. The comparatively favorable credit index for women as compared with that for men may be due, however, to other factors. Women are more commonly employed in clerical positions, which are among the better-risk occupations, and there are relatively few women borrowers in the wage-earning class, which comprises comparatively poorer risks. The fact that women bor-

[7] See Table B-2.

TABLE 27

Percentage Distribution of Good-Loan and Bad-Loan Samples, by Age of Borrower[a]

AGE OF BORROWER	LOAN SAMPLE		INDEX OF BAD-LOAN EXPERIENCE[b]
	Good	Bad	
21–25	12.4	14.2	1.15
26–30	19.8	20.2	1.02
31–35	17.1	20.8	1.22
36–40	15.3	18.1	1.18
41–45	13.2	11.8	.89
46–50	9.6	7.9	.82
Over 50	12.6	7.0	.58
TOTAL	100.0	100.0	1.00
Effective number of cases reporting information[c]	1,267	1,250	
Percent not reporting information[d]	2.2	3.5	
Index of distribution difference[e]	8.7		

[a] Based on a sample of 1,468 good loans and 1,297 bad loans obtained from the personal loan departments of 21 banks in 16 cities in 11 states. Individual bank samples are presented separately in Appendix B; they were consolidated for this table and subsequent tables by weighting of each bank's good-loan and bad-loan distributions, so that the combined sample may be considered to comprise the same number (1,294) of good and of bad loans.

[b] Ratio of the bad-loan percentage to the good-loan percentage.

[c] This is not strictly a definite number of cases, but rather a conservative indication of the size of the sample for the purpose of determining sampling error. The percentage distributions of these totals are averages weighted so that the good-loan samples of individual banks constituting the average are roughly of the same size as the bad-loan samples. The composite average distributions may be considered to be based on a number of cases at least as large as the number here given. The "effective number" excludes cases not reporting and will differ from the total number (1,294) from table to table.

[d] Number of cases not reporting, in percent of the number reporting. A percentage computed in this way is more comparable with the distribution percentages than one based on the total number of loans.

[e] This index, which is a percentage, represents the proportion of each percentage distribution for which there is no counterpart in the other. For example, if a given class interval contains 10 percent of the good loans and 15 percent of the bad loans, the smaller of the two percentages may be considered as common to both distributions, and the difference, 5 percent, may be regarded as belonging exclusively to the bad-loan distribution. The sum of the smaller percentages of all classes, deducted from 100, is an index of the difference between the two distributions; it is also equal to half the sum of the differences, or the sum of the differences in all the worse-than-average classes, or the sum in all the better-than-average classes. It is necessarily 0 percent if the two distributions are identical in form, and it approaches 100 as they become more and more dissimilar. See above, pp. 117-18.

rowers engage in better-risk occupations serves partly, though by no means entirely, to explain their better credit records. The differences in the indexes for married and for single men, and for married and for single women, are not statistically significant. Thus on the basis of these figures marital status cannot be regarded as a relevant consideration.

TABLE 28

Percentage Distribution of Good-Loan and Bad-Loan Samples, by Sex and Marital Status of Borrower[a]

SEX AND MARITAL STATUS OF BORROWER	LOAN SAMPLE		INDEX OF BAD-LOAN EXPERIENCE
	Good	Bad	
Married			
Male	61.4	66.3	1.08
Female	5.0	2.2	.44
Single			
Male	16.1	22.1	1.37
Female	11.6	5.0	.43
Others[b]	5.9	4.4	.75
TOTAL	100.0	100.0	1.00
Effective number of cases reporting information	1,294	1,294	
Index of distribution difference	10.9		

[a] See footnotes to Table 27.
[b] Includes persons divorced, separated, widowed and not reporting.

The number of the borrower's dependents seems to have little bearing on his behavior as a debtor. For persons with no dependents the index of bad-loan experience shown in Table 29 is 0.83; for borrowers with one or more dependents it is greater, but not sufficiently to suggest that number of dependents is an important risk factor. The average number of dependents is 1.5 in the good-loan sample, and 1.8 in the bad-loan sample.

TABLE 29

Percentage Distribution of Good-Loan and Bad-Loan Samples, by Number of Borrower's Dependents[a]

NUMBER OF BORROWER'S DEPENDENTS	LOAN SAMPLE		INDEX OF BAD-LOAN EXPERIENCE
	Good	Bad	
0	29.4	24.4	.83
1	27.1	25.5	.94
2	21.2	21.6	1.02
3	12.5	17.9	1.43
4	6.8	6.7	.99
5 and over	3.0	3.9	1.30
TOTAL	100.0	100.0	1.00
Effective number of cases reporting information	1,152	1,135	
Percent not reporting information	10.6	12.3	
Index of distribution difference	6.7		

[a] See footnotes to Table 27.

TABLE 30

Percentage Distribution of Good-Loan and Bad-Loan Samples, by Stability of Borrower's Residence[a]

YEARS AT PRESENT ADDRESS	LOAN SAMPLE		INDEX OF BAD-LOAN EXPERIENCE
	Good	Bad	
0– 1	13.5	21.6	1.60
1– 2	14.5	18.8	1.30
2– 3	13.7	16.0	1.17
3– 6	21.1	20.2	.96
6–10	10.1	7.2	.71
10 and over	27.1	16.2	.60
TOTAL	100.0	100.0	1.00
Effective number of cases reporting information	1,249	1,240	
Percent not reporting information	3.6	4.3	
Index of distribution difference	14.7		

[a] See footnotes to Table 27.

Stability of borrower's residence, as covered in Table 30, may be regarded as an indication of risk. The index of bad-loan experience is 0.60 for borrowers who have maintained a continuous residence for 10 years, and rises steadily to 1.60 for those who have dwelt at the same address for less than one year. This difference, though not marked, is confirmed by 10 of the 12 individual bank samples.[8]

Vocational Characteristics of Borrowers

Vocational characteristics, while dependent to a certain degree on personal attributes, may be regarded for purposes of this analysis as essentially distinct. They include the nature of the borrower's work or occupation, the nature of his employer's business (or his own, if he is self-employed) and his tenure of employment.

It was not a simple matter to classify good and bad loans by occupation of borrower. For one thing, the small size of the sample necessitated a division into rather broad occupational groups comprising a somewhat heterogeneous collection of specific occupations. Then too, statements concerning borrowers' occupations were frequently ambiguous or entirely lacking, so that many loans were difficult to classify by any occupational grouping. Such cases had to be classed as miscellaneous or placed arbitrarily in the class that seemed most appropriate. Although the number of cases classified as miscellaneous is less than 5 percent in both loan samples, a much larger proportion of the cases might properly have been allocated to any one of several groups.

Table 31, which presents these data arranged according to the index of bad-loan experience, must therefore be viewed with circumspection. The professional group stands at the top of the list, with an index of 0.58, and the wage-earner group, with an index of 1.52, at the bottom. Among the sub-groups the lowest indexes of bad-loan experience are those

[8] See Table B-5.

TABLE 31

Percentage Distribution of Good-Loan and Bad-Loan Samples, by Occupation of Borrower[a]

OCCUPATION	LOAN SAMPLE		INDEX OF BAD-LOAN EXPERIENCE
	Good	Bad	
Professions	11.2	6.5	.58
Teachers, nurses, doctors, technicians, lawyers	*8.0*	*3.6*	*.45*
Artists, actors, musicians, miscellaneous professions	*3.2*	*2.9*	*.91*
Clerical	42.8	34.1	.80
Typists, stenographers, accountants, etc.	*24.2*	*10.6*	*.44*
Retail salespersons	*4.0*	*3.7*	*.93*
Other clerical: agents, messengers, etc.	*8.0*	*8.6*	*1.08*
Outside salesmen, commercial representatives	*6.6*	*11.2*	*1.70*
Policemen, firemen, etc.	2.4	2.0	.83
Proprietors	13.0	13.2	1.02
Retail dealers	*2.6*	*2.5*	*.96*
Others	*10.4*	*10.7*	*1.03*
Managers and officials	8.0	10.2	1.28
Wage-earners	19.6	29.8	1.52
Skilled labor	*8.7*	*11.5*	*1.32*
Drivers	*2.4*	*3.6*	*1.50*
Unskilled and semi-skilled labor	*5.8*	*11.1*	*1.92*
Service trades	*2.7*	*3.6*	*1.33*
Miscellaneous	3.0	4.2	1.40
TOTAL	100.0	100.0	1.00
Effective number of cases reporting information	1,294	1,294	
Index of distribution difference	19.1		

[a] See footnotes to Table 27.

of such clerical workers as typists, stenographers, accountants (0.44), and of such professional workers as teachers, nurses, doctors, technicians, lawyers (0.45); the highest are those of unskilled and semi-skilled wage earners (1.92) and of outside salesmen and commercial representatives (1.70). The tendency of professional persons to constitute a better-than-average risk group and of wage-earners to be worse-than-average risks is confirmed by 11 out of 12 of the individual bank samples.[9]

It is difficult also to analyze bad-loan experience according to the industry in which the borrower or his employer is engaged, and the indications mentioned here must be subject to the same reservations that apply to the data on occupational distribution. Table 32 suggests that from the standpoint of credit risk the best industrial affiliations are utilities, professional services, independent hand trades and public service, for which the indexes are 0.67, 0.68, 0.71 and 0.76 respectively. The groups with the worst indexes are building trades (1.71) and miscellaneous transportation (1.51); still below average but considerably better than the two just mentioned are domestic and personal service (1.19) and manufacturing (1.13). The trade group, as a unit, occupies an intermediate risk position (1.05), but its sub-group containing employees of banks and other financial institutions has the lowest index in the table (0.55).

Like stability of residence, tenure of employment (analyzed in Table 33) seems to indicate better-than-average credit risks. For persons holding the same position ten years or more the index of bad-loan experience is 0.59, as compared with 2.28 for those whose employment tenure was less than one year; the same relationship obtained in all individual bank samples.[10] It should be recalled that borrowers in the lower age groups appear to be less favorable credit risks than

[9] See Table B-6.
[10] See Table B-8.

TABLE 32

Percentage Distribution of Good-Loan and Bad-Loan Samples, by Industrial Affiliation of Borrower[a]

INDUSTRIAL AFFILIATION OF BORROWER	LOAN SAMPLE		INDEX OF BAD-LOAN EXPERIENCE
	Good	Bad	
Utilities[b]	9.9	6.6	.67
Professional service	6.8	4.6	.68
Independent hand trades	2.1	1.5	.71
Public service	13.0	9.9	.76
Trade	33.0	34.6	1.05
Wholesale and retail	*14.6*	*17.7*	*1.21*
Banking and brokerage	*5.5*	*3.0*	*.55*
Other forms of trade[c]	*12.9*	*13.9*	*1.08*
Manufacturing	18.5	20.9	1.13
Domestic and personal service	4.8	5.7	1.19
Miscellaneous transportation[d]	3.7	5.6	1.51
Building trades	1.4	2.4	1.71
Miscellaneous	6.8	8.2	1.21
TOTAL	100.0	100.0	1.00
Effective number of cases reporting information	1,294	1,294	
Index of distribution difference	11.6		

[a] See footnotes to Table 27.
[b] Railroad, bus and steamship transportation, communication (other than postal), gas and electric utilities.
[c] Real estate, insurance, advertising, printing and publishing, etc.
[d] Taxi and trucking service, garage service, auto repair, filling stations, etc.

those in the upper age groups; and since a short tenure of employment is more often than not associated with youth, the high index for short tenure classes may be attributable in part to the lower average ages of the borrowers in these classes.

TABLE 33

Percentage Distribution of Good-Loan and Bad-Loan Samples, by Borrower's Tenure of Employment[a]

YEARS IN PRESENT OCCUPATION[b]	LOAN SAMPLE		INDEX OF BAD-LOAN EXPERIENCE
	Good	Bad	
0–1	5.7	13.0	2.28
1–2	7.4	11.1	1.50
2–3	9.5	12.4	1.31
3–6	18.5	24.4	1.32
6–10	19.3	15.7	.81
10 and over	39.6	23.4	.59
TOTAL	100.0	100.0	1.00
Effective number of cases reporting information	1,226	1,216	
Percent not reporting information	5.5	6.4	
Index of distribution difference	19.8		

[a] See footnotes to Table 27.

[b] Each level is inclusive of the lower figure and exclusive of the upper.

Financial Characteristics of Borrowers

For borrowers from commercial banks, the relation of bad-loan experience to income contrasts with that disclosed in findings for both personal finance companies and sales finance companies.[11] In the present study the indexes of bad-loan experience (Table 34) show no income class that departs markedly from the average. The lowest index is 0.68 for the group with annual incomes of $4800 and over, and the highest is 1.15 for persons with $1200-1800. One might conclude from this table that there is a tendency for bad-loan experi-

[11] See National Bureau of Economic Research (Financial Research Program), *Personal Finance Companies and Their Credit Practices* by R. A. Young and Associates (1940) Chapter 4, pp. 96-99, and National Bureau of Economic Research (Financial Research Program), *Sales Finance Companies and Their Credit Practices,* by W. C. Plummer and R. A. Young (1940) Chapter 7.

TABLE 34

Percentage Distribution of Good-Loan and Bad-Loan Samples, by Annual Income of Borrower[a]

ANNUAL INCOME OF BORROWER[b]	LOAN SAMPLE		INDEX OF BAD-LOAN EXPERIENCE
	Good	Bad	
Under $1200	11.9	11.0	.92
1200–1800	28.4	32.8	1.15
1800–2400	28.1	28.1	1.00
2400–3000	13.7	14.2	1.04
3000–3600	7.7	6.2	.81
3600–4800	5.5	4.5	.82
4800 and over	4.7	3.2	.68
TOTAL	100.0	100.0	1.00
Effective number of cases reporting information	1,260	1,240	
Percent not reporting information	2.7	4.3	
Index of distribution difference	5.0		

[a] See footnotes to Table 27.
[b] Each level is inclusive of the lower figure and exclusive of the upper.

ence to improve slightly with income level, but the change is neither regular nor sufficently marked to be significant.

Although these composite data seem to indicate at least that bank credit men take adequate account of borrower income in selecting personal loan risks, there appears to be considerable variation in the samples of individual banks.[12] For some, credit experience tends to improve as income increases; for others it seems to become worse. In this connection we may observe that certain banks, as a matter of policy, grant no loans to persons in the very low income classes; one metropolitan bank, for example, restricts its personal loan facilities almost exclusively to applicants with annual incomes over $1000, and principally to those with incomes

[12] See Table B-9.

above $1200. From the corresponding studies of customers of personal finance and sales finance companies one might infer that such a restrictive policy would eliminate income groups whose index of bad-loan experience is likely to be high. It is more difficult, however, to explain why the higher-income groups do not show up as better credit risks than they appear from this sample. Borrowers' income may well be a less valuable gauge of credit risk than stability of income. The information presented in Table 34 refers to the statement of income at the time of application for credit, but does not show that the income stated was maintained for the duration of the loan. If stability of income is more significant than amount, the factors that reflect stability, such as duration of present employment and nature of occupation, may possibly constitute a more important guide to credit risk than amount of income.

It is generally considered that the amount of a borrower's income determines the amount of loan he can repay without difficulty. Hence Table 35 presents a distribution of the good and bad loans according to amount of note in percent of annual income. Since most of the loans in this sample were made on a 12-month basis this classification is virtually equivalent to a classification according to monthly payment in percent of monthly income. One would expect a high frequency of default when there is a high ratio of monthly payment to income, for such a ratio indicates a considerable burden upon the borrower; indeed, some banks have limited their loans to what they consider the maximum ratio consistent with safe return. It is rather surprising, therefore, to find that the distributions in Table 35 afford scant evidence that low note-income ratios result in better risks. When the note is no more than 4 percent of annual income the index of bad-loan experience is 0.90; when the note is between 15 and 19 percent of income the index is 0.89, though when it is 20 percent or more the index is 1.27. These differ-

TABLE 35

Percentage Distribution of Good-Loan and Bad-Loan Samples, by Amount of Note in Percent of Annual Income of Borrower[a]

AMOUNT OF NOTE IN PERCENT OF ANNUAL INCOME OF BORROWER	LOAN SAMPLE		INDEX OF BAD-LOAN EXPERIENCE
	Good	Bad	
0– 4	9.8	8.8	.90
5– 9	39.6	40.6	1.03
10–14	26.6	25.0	.94
15–19	12.9	11.5	.89
20 and over	11.1	14.1	1.27
TOTAL	100.0	100.0	1.00
Effective number of cases reporting information	1,254	1,235	
Percent not reporting information	3.2	4.8	
Index of distribution difference	4.0		

[a] See footnotes to Table 27.

ences are not sufficiently great—nor is the trend from low to high sufficiently consistent—to indicate significance. Moreover, the individual samples show marked variation.[13] In general, the findings suggest that bank personal loan departments adhere to such a conservative lending policy that they rarely overtax the borrower's capacity to repay.

The items relevant to the borrower's balance sheet—his assets and liabilities—are covered in Table 36. On the asset side there are four items which seem to be fairly closely related to bad-loan experience: life insurance, bank accounts, real estate and securities. Any one of these items indicates better-than-average risk, and this indication is confirmed, in general, by the individual bank samples.[14] For borrowers with life insurance the index of bad-loan experience is 0.88,

[13] See Table B-10.
[14] See Table B-11.

TABLE 36

Percentage Distribution of Good-Loan and Bad-Loan Samples, by Selected Asset and Liability Items of Borrower[a]

	PERCENTAGE DISTRIBUTION				INDEX OF BAD-LOAN EXPERIENCE		INDEX OF DISTRIBUTION DIFFERENCE	EFFECTIVE NUMBER OF CASES REPORTING INFORMATION	NUMBER NOT REPORTING IN PERCENT OF TOTAL NUMBER	
	Good Loans		*Bad Loans*							
	Yes	No[b]	Yes	No[b]	Yes	No[b]			Good	Bad
Asset Items										
Life insurance	81.8	18.2	71.4	28.6	.88	1.57	10.4	1,294	3.0	7.1
Bank account	44.6	55.4	21.5	78.5	.48	1.42	23.1	1,294	5.5	11.1
Real estate	27.3	72.7	13.3	86.7	.49	1.19	14.0	1,294	[c]	[c]
Securities	5.4	94.6	2.0	98.0	.37	1.04	3.4	718	12.6	15.3
Automobiles	45.5	54.5	42.5	57.5	.93	1.05	3.0	824	30.2	25.0
Household goods	47.8	52.2	40.6	59.4	.85	1.14	7.2	824	37.7	39.5
Liability Items										
Charge account	45.2	54.8	35.6	64.4	.79	1.18	9.6	1,294	6.7	15.2
Instalment account[d]	27.8	72.2	33.9	66.1	1.22	.92	5.1	1,294	12.2	13.5

[a] See footnotes to Table 27.
[b] Includes those not reporting.
[c] Borrowers not reporting real estate were considered as persons not owning real estate.
[d] Includes sales finance and personal loan debt.

and for those without it and those not reporting the index is 1.57. Borrowers reporting bank accounts show an index of 0.48, and those without bank accounts or not reporting have an index of 1.42. The indexes for owners of real estate and securities are 0.49 and 0.37, and for non-owners 1.19 and 1.04 respectively. Of these four assets life insurance is the most common (reported by 82 percent of the good-loan sample and 71 percent of the bad-loan sample), followed in order by bank accounts (reported by less than half of the good-loan and less than one-fourth of the bad-loan sample), real estate (reported by slightly more than one-fourth and one-eighth of the two groups respectively) and securities (reported by very small fractions in both samples).

Less definite indications of credit risk are two other types of assets which are sometimes reported. For the owners of automobiles and of household goods the indexes of bad-loan experience are 0.93 and 0.85 respectively, and for non-owners they are 1.05 and 1.14. These indexes, like those for the four types of assets mentioned above, suggest that ownership makes for a better risk than non-ownership, but since in both cases information was lacking for a large fraction of the total number of borrowers, these findings cannot be considered particularly significant.

Two types of liabilities are analyzed also in Table 36. The index of 0.79 for borrowers carrying charge accounts, as compared with 1.18 for those who do not, indicates that the former are better risks; the index of 1.22 for those with instalment accounts, as compared with 0.92 for those without, shows exactly the opposite for instalment debtors. But since the individual bank samples yield contradictory results,[15] and since a large number of cases reported no information, these liabilities should not be regarded as significant factors in themselves. They do, however, permit the bank to benefit from the recorded experience of other creditors.

[15] See Table B-11.

Characteristics of the Loan

In an examination of factors contributing to credit risk, consideration must be given not only to characteristics of the borrower but also to certain features of the loan transaction itself. Among these are the amount of the loan, the security for the loan, the duration of the repayment period, and the purpose for which the loan is made.

The first of these four considerations, the amount of loan, already treated in its relation to the borrower's income, is not shown to be significantly related to bad-loan experience. Table 37 gives indexes of bad-loan experience which are very much the same for all note amounts over $100; notes of less than $100 appear worse than average. In general these findings are contrary to the results of similar analyses of credit

TABLE 37

Percentage Distribution of Good-Loan and Bad-Loan Samples, by Amount of Note[a]

AMOUNT OF NOTE[b]	LOAN SAMPLE		INDEX OF BAD-LOAN EXPERIENCE
	Good	Bad	
Under $100	6.8	10.8	1.59
100– 200	42.2	40.2	.95
200– 300	19.4	19.5	1.00
300– 400	15.7	15.3	.97
400– 500	5.2	4.8	.92
500–1000	9.2	7.8	.85
1000 and over	1.5	1.6	1.07
TOTAL	100.0	100.0	1.00
Effective number of cases reporting information	1,289	1,294	
Percent not reporting information	.4	..	
Index of distribution difference	4.2		

[a] See footnotes to Table 27.

[b] Each level is inclusive of the lower figure and exclusive of the upper.

risk for personal finance companies where, with the exception of loans of the maximum size ($300), charge-off experience seems to be worse for the larger debt.[16] It should be emphasized, however, that in both of these analyses the findings are far from conclusive.

The distribution of loans according to type of security in Table 38 shows but one point of interest: loans made on the

TABLE 38

Percentage Distribution of Good-Loan and Bad-Loan Samples, by Type of Security[a]

TYPE OF SECURITY	LOAN SAMPLE		INDEX OF BAD-LOAN EXPERIENCE
	Good	Bad	
Single-name	18.6	14.9	.80
One comaker	18.7	17.3	.93
Two comakers	47.3	45.4	.96
Three or more comakers	8.2	14.6	1.78
Other (mostly automobile chattel mortgage)	7.2	7.8	1.08
TOTAL	100.0	100.0	1.00
Effective number of cases reporting information	1,294	1,294	
Index of distribution difference	7.0		

[a] See footnotes to Table 27.

security of three or more comakers, for which the index is 1.78, seem to be relatively poor risks. This does not mean that an applicant is a bad risk if he can produce a large number of comakers; it indicates, rather, that banks make a practice of requiring additional comakers from persons they prejudge to be poor risks or from those who originally offered comakers with unsatisfactory credit standing. Conversely, it should not be supposed that single-name security is better than comaker security merely because it shows a slightly

[16] R. A. Young and Associates, *op. cit.*, Chapter 4, pp. 96-99.

lower index of bad-loan experience; the probabilities are that banks grant single-name loans only to borrowers whom they consider better-than-average risks.

It will be observed from Table 39, which shows the distribution of loans according to length of contract, that well over three-fourths of all the loans represented by the sample matured in 12 months. It may be that the lower-than-average indexes of bad-loan experience for loans running less than 12 months are indicative of a general tendency, but this is by no means certain in view of the inconsistencies of the individual samples.[17]

TABLE 39

Percentage Distribution of Good-Loan and Bad-Loan Samples, by Length of Loan Contract[a]

CONTRACT LENGTH[b] (in months)	LOAN SAMPLE		INDEX OF BAD-LOAN EXPERIENCE
	Good	Bad	
1– 6	3.8	2.4	.63
7–11	7.3	5.8	.79
12	78.2	80.8	1.03
13–17	3.6	4.6	1.28
18 and over	7.1	6.4	.90
TOTAL	100.0	100.0	1.00
Effective number of cases reporting information	1,278	1,275	
Percent not reporting information	1.3	1.5	
Index of distribution difference	4.4		

[a] See footnotes to Table 27.

[b] Each level is inclusive of the lower figure and exclusive of the upper.

A number of qualifications must necessarily be attached to any interpretation of the analysis of loans according to intended use of funds, or reason for borrowing. In the first place, the statement made by the applicant may not be alto-

[17] See Table B-14.

gether true, and it cannot easily be checked by a bank. In the second place, the reported reasons are frequently too diverse for classification. It is customary to classify the intended uses of funds according to standard categories—refinancing of old indebtedness, medical expense, purchase of automobile, business needs and the like—but actually a great many loans cannot be fitted into any one of these categories. One bor-

TABLE 40

Percentage Distribution of Good-Loan and Bad-Loan Samples, by Intended Use of Funds[a]

INTENDED USE OF FUNDS[b]	LOAN SAMPLE		INDEX OF BAD-LOAN EXPERIENCE
	Good	Bad	
Taxes	3.5	1.1	.31
Vacation	3.8	2.2	.58
Household	11.7	7.0	.60
Help for relative	2.8	1.8	.64
Purchase of automobile	12.0	9.9	.83
Miscellaneous	20.4	19.8	.97
Medical and dental	13.3	15.6	1.17
Business	6.6	8.0	1.21
Purchase of clothing	1.7	2.2	1.29
Consolidation of debts	24.2	32.4	1.34
TOTAL	100.0	100.0	1.00
Effective number of cases reporting information	1,294	1,294	
Index of distribution difference	12.4		

[a] See footnotes to Table 27.

[b] Because so many cases gave a combination of two or more reasons the following system of classification was adopted. Under "consolidation of debts" were included only those cases giving consolidation of debts or general refinancing as the only purpose of borrowing. Under the other headings were included cases giving only the reason indicated by the heading, or giving that reason in combination with consolidation of debts or refinancing. All other combinations—as for example, taxes and vacation—were classified under "miscellaneous," which includes also miscellaneous single reasons and a few cases not reporting reasons.

rower, an accounting-machine mechanic, intended to use the funds borrowed to "purchase a new trumpet and join union"; another wanted a loan for dental expenses and a vacation; a third sought to pay off a loan company and buy spring clothes. Since there are too many possible combinations of reasons to permit a separate classification for each combination, some sort of arbitrary scheme had to be devised for the present purpose. Table 40 presents such an arrangement, with the categories proceeding from low to high indexes of bad-loan experience. The variation in bad-loan experience is considerable, but the significance of this variation is open to some question. The individual samples do not provide substantial confirmation of the indications of the composite sample.[18]

RELATIVE IMPORTANCE OF RISK FACTORS

From the foregoing tabulations a number of items of information requested on the application blanks made out by successful applicants for personal loans appear to be relevant indicators of credit risk. These items are not, of course, the only ones that can be held to be pertinent; there are some on which no information was obtained but which bankers nevertheless regard as significant. There are others which might be supposed to be important but which turned out to be of slight relevance in our analysis of credit factors, possibly because they had been fully taken into account by the bank officers who made the initial selection of borrowers. Successful lending necessitates a knowledge of the relative importance of as many credit risk factors as can be isolated, and in making a final decision on a loan application the responsible officer must give due weight to each factor.

Some notion of the bankers' views regarding the problem of risk selection is afforded by Table 41, which represents

[18] See Table B-15.

responses from 126 banks to a request for an appraisal of the relative importance of several credit factors other than income. The various factors are listed in the order of importance indicated by these estimates, which was determined by an arbitrary method of weighted scoring. As arranged in the table, the most important factors are those relating to finan-

TABLE 41

Relative Importance of Factors Other Than Income in the Appraisal of a Loan Applicant's Credit Standing, as Estimated by 126 Banks

CREDIT FACTOR	NUMBER OF BANKS REPORTING			WEIGHTED SCORE[b]
	First Place	Second Place	Third Place[a]	
Financial characteristics	25	30	30	413
Assets	*5*	*5*	*5*	*84*
Liabilities	*15*	*12*	*10*	*183*
Income balance	*5*	*13*	*15*	*146*
Vocational characteristics	23	32	34	400
Work performed	*4*	*8*	*9*	*100*
Industry and employer	*1*	..	*3*	*17*
Stability of employment	*18*	*24*	*22*	*283*
Past payment record	20	24	15	254
Character and reputation	30	10	11	235
Credit rating	18	11	6	161
Personal characteristics	3	9	10	121
Age	..	..	*3*	*21*
Marital status	..	*2*	..	*18*
Number of dependents	*3*	*6*	*6*	*70*
Stability of residence	..	*1*	*1*	*12*
Loan characteristics	7	10	6	108
Security	*5*	*5*	*1*	*53*
Duration	*2*	*5*	*5*	*55*

[a] Fourteen banks did not list any factor in third place.

[b] Determined for the first five rankings as follows: first place was rated 5, second 4, third 3, fourth 2, fifth 1.

cial strength; only slightly less important are vocational characteristics. The borrower's past payment record, which falls in third place, is closely related to character and reputation, which comes fourth; if these two were grouped together the combined group would take first place.

A table of this sort must be interpreted with caution because of the wide variation in the use of certain terms. Thus when the bank uses the term "credit rating," it may mean character and reputation or past payment record, or it may refer to the bank's own credit appraisal based on all available information.

It is clear from Table 41 that there is considerable diversity of opinion as to what factors are relatively more important. There is, however, some evidence of uniformity in the whole set of judgments. Just over half of the 126 reporting banks listed stability of employment in one of the first three places; 61 gave similar prominence to past payment record and 51 to character and reputation.

In our detailed analysis of credit risks the factors of character and past payment record, which are apparently considered important by bankers, were omitted because no direct data on these characteristics of borrowers were available. Of the factors treated in the analysis, the following, in estimated order of importance, were found to be the most significant indicators of credit risk: possession of a bank account, stability of employment, nature of occupation, permanence of residence, ownership of real estate and industrial affiliation.