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Occupational and Employment Variations in Commercial Bank Consumer Credit Risk

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Synopsis:

The purpose of this paper is to determine (i) if credit applicants' occupation and employment characteristics are significantly related to their likelihood of default on consumer loans, (ii) whether relative credit-risk varies over the business cycle for members of different occupational and employment groups, and (iii) whether occupational and employment credit risk are independent (as is usually assumed in credit scoring models) or interdependent.

The paper analyzes data collected by the Federal Reserve System from 1966-71 on approximately 35,000 paid-off and charged-off commercial bank consumer loans. Major conclusions of the analysis are the following. (1) Occupational and employment information are highly useful in determining credit applicants' potential credit risk. Individuals employed in cyclically fluctuating industries or in jobs with more highly variable hours and greater layoff possibilities are relatively more likely to default on their consumer loans than individuals employed in more stable occupations or by employers less affected by cyclical fluctuations.

(2) Relative occupational and employment credit risk varies over time as the business cycle and aggregate credit conditions change. Loans made to individuals employed in financial industries tend to be repaid more slowly when credit conditions are "tight" while the relative credit risk of individuals employed in cyclically sensitive jobs or employment tends to improve or deteriorate in phase with unemployment levels.

(3) Significant interactions exist between occupational and employment related credit risks. Thus, if occupationally related risk and employment related risk are treated interdependently, a more accurate picture of joint occupational and employment credit risk can be obtained. Thus, present credit scoring systems that simply add "independent" risk components potentially could be improved if they first determined (either through the use of "Interaction Detector" computer programs or through the application of statistical tests such as those used in this paper) occupational and employment categories where credit applicant risk was significantly affected by interactions between occupation and employment risk.

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Occupational and Employment Variations in Commercial Bank Consumer Credit Risk

I. Introduction

A. Purpose

The purpose of this paper is to answer the following questions.

(1) Does credit risk vary by occupation and employment? If so, are occupation and employment data valuable predictors of borrower credit risk?

(2) Does credit risk vary differentially over the course of the business cycle for people belonging to various occupational or employment groups?

(3) To what extent, if any, does occupational credit risk vary with employment sources?

These questions are important to answer for the following reasons. First, bills have been introduced in the 95th Congress by representatives Annunzio, Brodhead, and Holtzman that would ban occupation and employment considerations from credit scoring schemes. If these factors are important in determining credit worthiness, a strong case can be made that they should be retained in credit scoring schemes.

Second, if credit risk varies differentially over the course of the business cycle, data drawn from one point in time in the cycle could reduce the efficiency of credit scoring systems based on that data if they were applied at other points in the cycle. Further, if credit risk varies by type of occupation or employment over the business cycle, bank credit managers would be well advised to be more alert to possible credit problems with certain groups during particular phases of the cycle. In particular, bank credit managers might wish to extend credit less liberally to individuals with certain types of occupations or sources of employment if they anticipate a cyclical downturn rather than an upturn--as specific alterations in credit scoring systems based on the state of the economy might prove more efficient than simply raising minimum cut-off score requirements when cyclical downturns are expected.¹ In addition, delinquency-monitoring systems might be adjusted to take account of the state in the cycle in identifying accounts deemed most likely to create significant collection problems.

Finally, if it is found that occupational risks vary with employment sources, then credit evaluation schemes--including many credit scoring schemes--that evaluate a credit applicant's occupational risk and source of employment risk separately and add the results may provide inappropriate evaluations. In that case, bank managers might be better advised to adopt a credit scoring system, that allowed for interactions among various types of occupational and employment risk.

B. Methodology

The data used in this paper were obtained from an extensive Federal Reserve survey conducted in the late 1960s and early 1970s. In this survey participating banks in five regions of the country collected data on approximately ten percent of their paid-off consumer loans. They also collected data on all of their charged-off loans. In total, data on over 30,000 paid-off loans were collected and data on approximately 9,000

¹ An across the board cutback of credit to particular higher-risk groups at certain points in the cycle would likely encounter vociferous opposition and, thus, would not be feasible. However, minor adjustments in credit scoring standards might be feasible--especially in computerized scoring systems.

charged-off loans were collected for the period 1966-1971. Approximately 20 banks participated in this survey and all sampling was done on a random basis. Because the sampling procedures varied among banks and the charged-off loan data were collected on a 100 percent basis while the paid-off data were collected on a ten percent basis, the data from each sample are treated independently in the following analysis.

The basic analytical procedure used in this paper was as follows. First, the proportions of both "good" paid-off loans² and of "charged-off" loans attributable to each occupational and employment group were determined. Then t-tests were conducted to determine if significant differences existed in the proportions of "good" paid-off and charged-off loans in each occupational and employment category.

Based on those tests, if it was found that a particular occupational group, such as the driver and laborer group, accounted for a significantly greater proportion of all charged-off loans than it does of all "good" paid-off loans, that group was deemed to contain greater than average credit risks.³ Conversely, if another occupational group, such as the professional group, was found to account for a significantly lower proportion of charged-off loans than it did for paid-off loans, that group was deemed to contain better than average credit risks. Similar analyses were conducted with respect to various employment categories.

To analyze whether relative credit risks have changed over time, the data were segregated into annual clusters. Then, for each year a similar analysis was conducted for each occupational and employment group. In that way it could be determined (i) if a particular occupational or employment group was a consistently good or bad credit risk group and (ii) whether the riskiness of that group tended to vary as cyclical and financial conditions varied in the economy over time.

Finally, comparisons were made within occupational groups to see if credit risks varied systematically within each group according to the source of employment. For instance, an analysis was conducted to determine whether professionals employed by manufacturers were better credit risks or worse credit risks, on average, than professionals in general. Similar comparisons were made for all other occupational categories. In this analysis it was hypothesized that occupational credit risk would vary according to the employment source in the same manner as credit risk varied for that employment source in general. If this were indeed the case, credit-scoring schemes that added scores for source of employment to scores for type of occupation would be valid. However, if significant exceptions existed, then such credit scoring schemes (which are commonly used) would evaluate credit risk less efficiently than schemes that treated employment and occupation jointly.⁴

II. The Analysis

A. Univariate Tests for Differences in Occupational and Employment Risk

² Data on "bad" paid-off loans, which accounted for a small proportion of total paid-off loans, were excluded from this study, as it was not clear how individual bank managers decided to classify some paid-off loans as "bad" rather than unequivocally "good." Since only 6 percent of all paid-off loans were classified as "bad," however, it is likely that most respondents to the survey did not classify a loan as "bad" unless it had been seriously behind in its payments at some time.

³ Because we did not analyze data on loan rates simultaneously, the findings in this paper do not generalize to all occupations. In particular, drivers and laborers may have disproportionately high default rates but, if they also paid higher rates on their loans to sample banks, then loans made to them might be equally profitable for individual banks as loans made to other groups. Thus, banks might have willingly accepted riskier members of that occupational class (at a suitably high interest rate) when they granted loans.

⁴ Typical credit scoring schemes (see [1] and [9]) use linearly additive scoring techniques. Thus the points, assigned for any one significant attribute of a credit applicant (such as occupation) are simply added to those assigned to other significant attributes (such as source of employment). An interactive system would add points for combined occupational and employment categories only (i.e.,--rather than adding separate points for "professional occupation" and "manufacturing employment," a single point score would be given for "professionals employed in manufacturing." Similarly, separate point scores might be given for "professionals employed in finance," or any other significant interactive combination of occupation and employment).

1. Purpose

The purpose of these tests is to indicate whether specific items of information on loan applicants' occupational and employment status can provide useful insights into the relative risk that a creditor incurs when he makes loans to different classes of customers.

2. Statistical Tests

The statistical tests assume that loans made to each occupational or employment class, i , are randomly obtained from samples of all good loans and all bad loans. The null hypothesis is that the probability that a loan drawn from the sample of all good loans will be in occupational class i , P_{Gi} equals the probability that a loan drawn from the sample of all bad loans will be in occupational class i , P_{Bi} . The alternative hypothesis is that $P_{Gi} \neq P_{Bi}$.

If $P_{Gi} > P_{Bi}$ and the difference is statistically significant (i.e., the null hypothesis is rejected), we conclude that loans made to occupational or employment class i are of better than average quality--i.e., upon liquidation, they are likely to be represented more frequently among the class of all good loans than among the class of all bad loans. If $P_{Gi} < P_{Bi}$ and the difference is statistically significant, we conclude that loans made to occupational or employment class i are of below average quality.

The data are binomial in nature, i.e., either a good (or bad) loan belongs to occupational class i , or it does not. For large numbers of observations we can assume the sample mean derived from each set of data is approximately normally distributed. Thus, t-tests can be used to determine if the difference between P_{Gi} and P_{Bi} is statistically significant for any occupational or employment classes, i , for which the number of observations is large. The t-statistic used is

$$(1) \quad t = (P_{Gi} - P_{Bi}) / \sqrt{\partial Gi^2 + \partial Bi^2}$$

where P_{Gi} and P_{Bi} are sample means for the "good" and "bad" loan samples, respectively, and ∂Gi^2 and ∂Bi^2 are estimates of the variance of P_{Gi} and P_{Bi} respectively.

Estimates of the sampling variance of P_{Gi} and P_{Bi} respectively can be obtained by noting that, for large numbers of observations, they can be approximated by

$$(2) \quad \partial Gi^2 = (P_{Gi})(1 - P_{Gi})/(n_G - 1) \text{ and}$$

(3) $\partial Bi^2 = (P_{Bi})(1 - P_{Bi})/(n_B - 1)$, where n_G and n_B are the number of loans in the "good" and "bad" loan samples, respectively.⁵

B. Analysis of Occupational and Employment Risk from 1966-1971

1. Occupational Risk

Table 1 presents data on the proportionate representation of various occupational categories among good loans and bad loans in each of several periods from 1966-1971 and for the total period 1966-1971. It also presents data on the difference in the proportion of each occupational class represented among good loans and bad loans in each period and t-statistics that can be used to evaluate the significance of those differences.

⁵ See Cochran, William G. Sampling Techniques. New York: John Wiley and Sons, Inc., 1963, 50-51.

Major implications of Table I are summarized below. Loans made to managers or foremen were significantly better-than-average risk loans over the entire period and in each sub period considered. However, the relative advantage of this occupational class fell in 1969 and 1971 as their representation among defaulters rose and their representation among good loans fell slightly during and immediately following the Nov. 1969-Nov. 1970 cyclical downturn.

Skilled or craft workers generally were about average credit risks in all periods and for the 1966-71 period as a whole.

Loans made to drivers or laborers were significantly riskier than average in all periods considered. Overall, their representation among charged-off loans were nearly twice as high as their relative representation among "good" paid-off loans. The magnitude of the t-statistic associated with this difference is sufficiently great to suggest that this category alone could explain much of the total variance in relative default risk on consumer loans.

Loans made to professionals were significantly less likely than average to fall in the default category than to be paid-off well. This relationship held through each sub period and for the period as a whole. Professionals' performance was particularly good relative to other occupational categories in the period of high unemployment, which accompanied and immediately followed the 1969-70 recession.

Office or sales workers tended to be significantly better-than-average credit risks both for the period as a whole and in nearly every sub period considered. The only exception was in the 1966-68 period when there was no indication that the null hypothesis that their representation among defaults would equal their representation among good loans should be rejected.

Loans made to consumers in the "All Other" occupations category were better than average default risk loans for the period as a whole and in each sub period except in the early stages of the recession, from mid-1969 to mid-1970.

Loan reports with uncodable or lacking answers for the occupational categories were better than average default risk loans in general. This relationship was highly variable, however. Further, because well over half of the total loans sampled were obtained from the 1969-71 period, the overall better-than-average performance of this "occupational" category may have merely reflected the fact that this category was substantially less risky than average during the recession. Because nothing is known about the nature of these responses, it is difficult to generalize about the significance of these results. Possibly banks record less data on new loan applications from established customers who have been known to repay their debts promptly in the past.

Overall, it appears that the occupational categories with the greatest income stability and least likelihood of unemployment were the best risk categories while the occupational categories with the greatest income instability and greatest likelihood of unemployment were the highest risk categories. Thus, the professional and manager and foreman categories, where unemployment rates and salaries vary the least over a cycle, ranked among the best credit risk loan customers, while drivers and laborers, who are most likely to be subject to layoffs or cuts in weekly hours and earnings, were substantially worse than average credit risks. Similarly, skilled or craft workers who are less likely than laborers to be laid off but are somewhat more likely to than office workers to be subject to layoffs or unexpected cuts in salary due to lack of overtime or shortened work weeks, were average in their credit performance, while office workers were somewhat better than average in their loan performance.

2. Employment Risk

Table 2 presents data on the proportion of good loans and bad loans accounted for by various "source of employment" categories for the 1966-71 period, and also for various sub periods. Those data indicate that loans made to individuals employed in manufacturing were riskier than average. This was true not only for the period as a whole, but also for each sub period considered. The relative credit riskiness of such loans was most pronounced in periods of economic downturn, such as from mid-1969 to mid-1971.

Loans to individuals engaged in construction also were significantly riskier than average. This was consistently true over time. The sole exception in our data was in the 1966-68 period (when they were still higher than average risk but the difference was not statistically significant).

Overall, loans to individuals engaged in retail and wholesale trade tend to be somewhat better than average credit risk loans. However, this result appears to be solely due to the fact that such loans were much better-than-average risk in the mid-1968 to mid-1969 boom period. During other periods in the economy, loans to individuals engaged in retail and wholesale trade were approximately average in terms of their relative credit riskiness.

Loans made to individuals engaged in banking, finance and real estate were generally of better-than-average risk. This was particularly true during periods when interest rates were not generally high. However, from mid-1968 to mid-1970, when credit conditions were generally fairly tight, interest rates were generally high, and the stock market was declining, these loans accounted for a lower proportion of all good paid-off loans than was true in the periods immediately preceding and following the 1968-70 period. Because of the lowered payoff rate in the 1968-70 period the credit performance of banking, finance, and real estate loans was not significantly better than average at that time.

Loans made to government civilian employees were of significantly better-than-average credit risk over the period as a whole. They were also of better-than-average risk in every sub period except 1966-68. At that time unemployment in the economy was quite low. As unemployment rose during and subsequent to the 1969-70 recession, the relative credit worthiness of loans made to government employees tended to rise.

Such a small number of loans were made to Armed Forces personnel and farmers that it was difficult to determine whether they were better-than average credit risk loans in general. Based on available data it appears that, overall, loans made to both groups were about average in their relative risk. However, in 1966-68 loans made to farmers appeared to be somewhat less risky than average, whereas in 1968-69 they seemed to be somewhat more risky than average. Due to the limited number of loans made to farmers this may have reflected statistical aberrations. However, it might also reflect change-s in crop conditions between various years. At any rate, the loans made to farmers do not appear to vary significantly in credit risk with changes in the economy as a whole--albeit, their representation among defaulted loans did tend to rise during the 1968-70 period of tight money.

Loans made to individuals with "other" employment sources include loans made to self-employed or retired individuals. A large proportion of all professionals, managers and sales people fell in this category (see Table 3). Generally this category is associated with significantly better-than average credit risk performance as a result. The only exception to this rule was during the trough of the recession, from mid-1970 to mid-1971, when this group's credit performance was no longer significantly better than average.

The loans for which no employment source response or uncodable information was given were less risky than average. This was so primarily because during the recession period, from mid-1969 on, these loans were substantially less risky than average. Prior to that time they were not significantly different from average in

credit risk. One possible explanation why such loans were superior credit risks is that, like similar loans in the occupational category, they may be made to ongoing bank borrowers, with whom the bank loan officer is already familiar. Given good past repayment performance, he may feel no need to ask for additional information on the loan application.

Overall, analysis of credit risk over time by source of borrower's employment indicates that people employed in certain industries tend to be below-average credit risks, while people employed in other industries tend to be better than average credit risks. In addition, loans made to people with certain sources of employment tend to be better than average credit risks during periods of high unemployment while loans made to people with other sources of employment tend to be worse than average credit risk loans during that time. Finally, certain employment source categories appear to be somewhat sensitive to money market conditions. In particular, the banking, finance and real estate categories lost their preferred credit risk status due to reduced repayment rates on loans during periods when money conditions were generally tight and credit was expensive.

3. Variations in Relative Occupational Default Risk by Source of Employment

Categorizing loan applications separately by source of employment and occupational default risk may give misleading results if significant interactions exist between those categories such that a combination of those categories gives a different result than additive risk factors associated with each individual category. For example, if a credit applicant were given a penalty on a credit scoring system for being associated with a manufacturing industry, because individuals associated with manufacturing industries tended to be higher than average credit risks, such a penalty might not be appropriate in his particular case. In particular, in this section we show that loans made to professionals and managers and foremen employed in manufacturing were less risky than loans to professionals or managers or foremen, in general. Thus, rationally, those occupational groups should obtain a premium rather than a penalty, from a credit scoring system once it is ascertained that they are employed in manufacturing. This presumes, of course, that the relative default risk for their particular occupational category has already been taken into account.

Table 3 was constructed in order to determine whether significant interaction exists between sources of employment and occupation. In Table 3 each row shows for a specific occupation the relative default risk for members of that occupation who were employed in various ways. Thus, row one shows the relative frequency with which managers or foremen were likely to default and pay off their loans well if they were employed in manufacturing, construction, retail/wholesale trade, etc. Summing across each row accounts for 100 percent of all good loans made to people in that occupation and 100 percent of all bad loans made to people in that occupation. Also differences in "good" repayment and charge-off propensities are measured and tested for their significance as in Tables 1 and 2. However, the relative default risk shown for any particular occupation and employment group is measured relative to total good and bad loans made to all other people in that occupation only.

If default risk were independent and additive, one would expect that individuals employed in areas with significantly higher-than-average default risks would also be likely to have significantly above-average default risk, regardless of occupation. Thus, one would expect that individuals employed in the manufacturing, construction, and retail/wholesale trade areas would all tend to have significantly higher than average default risk relative to other individuals with similar occupations. Conversely, one would expect that people employed in the banking, finance and real estate category, the government civilian category, the self employed and other category, or the no-answer or uncodable-answer categories would all be better than average credit risks regardless of their occupation. However, analysis of Table 3 shows that this is not the case.

The most significant exceptions to the proposition that occupational and employment source credit risks are additive⁶ are shown by the analysis of the manufacturing and the banking, finance and real estate categories. In particular, managers or foremen employed in manufacturing were significantly better-than-average credit risks than managers or foremen in general, even though the manufacturing category has been characterized as being a higher credit risk category than other employment-source categories. Furthermore, professionals employed in manufacturing tend to be significantly better than average credit risks than professionals in general. Conversely, professionals employed in the banking, finance and real estate area tend to be poorer credit risks than professionals in general. This is true in spite of the fact that loans made to individuals in the banking, finance and real estate employment category (see Table 2) were generally found to be less risky than loans made to individuals with other sources of employment. Also, in the banking, finance and real estate area, skilled or craft workers were somewhat worse than average credit risks, albeit the difference is statistically significant only at the 90 percent confidence level. Similarly, office or sales workers employed in the banking area were slightly worse than average credit risks even though, in general, loans made to individuals with similar employment were significantly better than average risk loans. Several other cases exist where the credit risk for members in particular occupations, who are employed in a certain manner, is not equal to the credit risk of all employees employed in that manner. However, none of these differences are statistically significant.

Overall, the data presented in Table 3 suggests that significant interactions between occupational and employment credit risks exist. As a result, credit scoring schemes that simply add scores for occupational and employment categories, using the implicit assumption that any interactions between the categories are not important, will not determine credit worthiness as efficiently as more sophisticated systems.

Typical credit scoring schemes use the additivity assumption without allowing for possible interactions of this sort. See, for instance, Boggess [1], Ewert and Chandler [4], Weingartner [9], Smith [7], and Myers and Forgy [6] for references on credit scoring procedures. However, computer programs are available such as the "Automatic Interaction Detector" program [8] that can determine whether significant interactions exist among the various independent variables used to evaluate credit performance. The analysis presented in Table 3 suggests that such programs can profitably be used to improve the accuracy of credit scoring analysis.

III. Conclusions

The data analyzed in this study indicate that highly significant differences existed in relative credit risk among bank loans made to various occupational and employment groups. In particular, loans made to drivers and laborers were among the most risky, while those made to professionals, managers and foremen, and office or sales workers were of lower than average risk. Sources of employment associated with above-average credit-risk loans included manufacturing, construction, and retail and wholesale trade. Sources of employment associated with below average relative credit risk included government-civilian employment and banking, finance, and real estate.

Overall, these effects were statistically very strong. Thus, they suggest that occupational and employment information adds significantly to loan officers' abilities to evaluate credit risk, particularly since such information provides useful insights into the probable future income stability (and capacity to repay debt) of various loan applicants. Because few substitutes exist that would provide equally valuable information on future income stability, if occupational and employment information were banned from use in credit scoring systems

⁶ Credit scoring systems typically assume that different attributes of credit risks are additive (see, for instance, [1], [3], and [9]). Thus, positive or negative points associated with occupation would typically be added to positive or negative points for employment since the point values are determined in a multivariate context. Some degree of interaction may be embodied in the point scoring categories, but it is not likely to be large unless occupational and employment interactions are explicitly taken into account.

by legislative fiat, almost certainly creditor's abilities to evaluate future consumer credit risks would be significantly reduced.

Results of this study also suggest that variations occur in the relative riskiness of certain occupations or professions over time. During some periods of the business cycle, the relative credit risk of certain occupational or employment groups may be higher or lower than at other times. Cyclical variations in relative risk occur in most employment and several occupational categories. In addition, during periods when interest rates are high and credit conditions are generally "tight," it appears that loans made to individuals engaged in banking, finance and real estate are repaid less quickly than at other times.

Finally, the analysis indicated that occupational and employment credit risks are not simply additive. In particular, even though manufacturing is characterized by worse-than-average credit risks in the aggregate, professionals, managers and foremen engaged in manufacturing tend to be better (rather than worse) credit risks than professionals, managers and foremen engaged in manufacturing in general. Other exceptions also exist.

Thus, our analysis suggests that simple linearly additive credit scoring schemes may not assess credit risk as efficiently as possible. They possibly could be materially improved by using techniques such as the "Automatic Interaction Detector Program [8]" to determine whether it would be wise to include interactive categories in credit scoring models. If so, different points would be assessed for professionals engaged in manufacturing than for professionals employed in other ways. Other adjustments would be required for other significantly interactive categories.

Additional implications of our analysis are that, due to cyclical changes in relative credit risk, assessments of relative risk based on data applicable to a short time period may not be entirely appropriate for assessing relative risk at some other phase of the business cycle, or under altered financial market conditions. Finally, estimates of decay rates on the efficiency of credit scoring systems (see Long [51) can potentially be biased by failure to take into account the fact that relative credit risks are likely to change cyclically as well as secularly.

Table 1: Differences in Occupational Representation Among "Good" Paid-off and Charged-off Bank Consumer Loans, 1966-1971

Occupational Class	mid-1966 mid-1968	mid-1968 mid-1969	mid-1969 mid-1970	mid-1970 mid-1971	mid-1966 mid-1971
1. Manager or Foreman					
% among all good loans	15.03	15.52	14.66	14.87	15.00
% among all bad loans	7.97	8.76	10.57	11.40	10.75
Difference	- 7.06	- 6.76	- 4.09	- 3.47	- 4.24
(T-statistic for Difference)	(4.94)*	(7.00)*	(4.51)*	(6.65)*	(10.83)*
2. Skilled or Craft Worker					
% among all good loans	21.34	21.59	27.75	22.23	23.01
%, among all bad loans	26.65	21.36	26.70	23.07	23.70
Difference	+ 5.31	- 0.23	- 1.05	+ .85	+ .68
(T-statistic for Difference)	(2.39)*	(0.17)	(0.84)	(1.27)	(1.33)
3. Driver or Laborer					
%/ among all good loans	15.73	12.09	10.96	11.57	12.07
% among all bad loans	28.25	25.29	25.09	25.17	25.32
Difference	+12.52	+13.20	+14.13	+13.61	+13.25
(T-statistic for Difference)	(5.59)*	(9.66)*	(12.17)*	(21.31)*	(26.43)*
4. Professional					
% among all good loans	8.98	9.33	7.80	9.55	9.11
% among all bad loans	3.88	5.18	3.96	4.85	4.68
Difference	- 5.11	- 4.15	- 3.84	- 4.70	- 4.43
(T-statistic for Difference)	(4.90)*	(5.47)*	(6.30)*	(12.33)*	(15.68)*
5. Office or Sales Worker					
% among all good loans	14.31	14.04	14.75	12.13	13.29
% among all bad loans	13.44	11.80	11.99	10.44	11.04
Difference	- 0.87	- 2.25	- 2.76	- 1.70	- 2.25
(T-statistic for Difference)	(0.50)	(2.11)*	(2.93)*	(3.44)*	(5.79)*
6. All other occupations					
% among all good loans	15.96	19.72	13.06	17.31	16.87
% among all bad loans	11.62	16.62	13.91	15.41	15.10
Difference	- 4.34	- 3.10	+ 0.85	- 1.90	- 1.77
(T-statistic for Difference)	(2.63)*	(2.53)*	(0.87)	(3.29)*	(4.02)*
7. Uncodable or No Answer					
% among all good loans	8.66	7.71	11.02	12.34	10.66
% among all bad loans	8.20	10.99	7.79	9.66	9.41
Difference	- 0.46	+ 3.28	- 3.23	- 2.68	- 1.24
(T-statistic for Difference)	(0.33)	(3.29)*	(4.07)*	(5.55)*	(3.44)*

+ The periods noted only approximately reflect the dates at which the loans were liquidated. Instead of a liquidation date, the data show only a data processing date. Thus, several months may elapse between the date a loan was liquidated at the participating commercial bank and the date the loan was processed at the appropriate Federal Reserve Bank.

Also, unequal number of loans were processed in each period. In particular, in the 1966-68 period, 3892 "good" paid-off and charged-off loans were processed; in 1968-69, 7164 loans were processed; in 1969-70, 6864 loans were processed; in 1970-71, 19,196 loans were processed. In total 37,116 "good" paid-off and charged-off loans were processed from 1966-71, with most of those loans processed in later years as more sample banks joined the study. Because of the limited number of loans processed in the early years, data for 1966-68 were combined.

*Significant at the 95 percent confidence level.

Table 2: Differences in Source of Employment Representation Among Paid-off and Charged-off Bank Consumer Loans, 1966-1971

Employment Source	mid-1966 mid-1968	mid-1968 mid-1969	mid-1969 mid-1970	mid-1970 mid-1971	mid-1966 mid-1971
1. Manufacturing					
% among all good loans	33.04	30.79	35.78	33.89	33.47
% among all charged-off loans	38.27	33.96	46.66	40.61	40.76
Difference	+5.23	+3.17	+10.88	+6.72	+7.29
(T-statistic for Difference)	(2.13)*	(2.07)*	(7.74)*	(8.75)*	(12.29)*
2. Construction					
% among all good loans	3.62	3.80	4.25	4.06	3.99
% among all charged-off loans	5.47	5.72	7.66	6.22	6.38
Difference	+1.85	+1.91	+3.41	+2.16	+2.40
(T-statistic for Difference)	(1.63)	(2.60)*	(4.75)*	(5.96)*	(8.42)*
3. Retail, Wholesale Trade					
% among all good loans	8.25	7.74	9.72	9.72	9.12
% among all charged-off loans	9.57	11.62	9.52	9.91	10.04
Difference	+1.31	+3.38	-0.20	+0.18	+0.91
(T-statistic for Difference)	(0.89)	(3.81)*	(0.24)	(0.39)	(2.52)*
4. Banking, Finance, Real Estate					
% among all good loans	3.33	2.42	2.50	3.32	2.98
% among all charged-off loans	1.82	1.70	2.04	2.68	2.40
Difference	-1.51	-0.72	-0.46	-0.64	-0.58
(T-statistic for Difference)	(2.13)*	(1.65)	(1.11)	(2.43)*	(3.03)*
5. Government Civilian					
% among all good loans	5.15	4.81	4.77	4.45	4.67
% among all charged-off loans	5.47	2.86	2.47	2.61	2.76
Difference	+0.31	-1.95	-2.29	-1.84	-1.92
(T-statistic for Difference)	(0.27)	(3.43)*	(4.72)*	(6.67)*	(8.93)*
6. Armed Forces					
% among all good loans	0.55	0.53	0.34	0.55	0.51
% among all charged-off loans	0.91	0.63	0.19	0.49	0.47
Difference	+0.36	+0.10	-0.15	-0.05	-0.03
(T-statistic for Difference)	(0.76)	(0.38)	(1.18)	(0.48)	(0.37)
7. Farming					
% among all good loans	0.35	0.15	0.11	0.09	0.14
% among all charged-off loans	0	0.63	0.24	0.04	0.15
Difference	-0.35	+0.48	+0.13	-0.05	+0.01
(T-statistic for Difference)	(3.47)*	(1.98)*	(1.01)	(1.50)	(0.19)
8. Other Employment Source					
% among all good loans	40.37	44.57	33.26	35.25	37.50
% among all charged-off loans	33.94	37.18	27.63	34.32	33.44
Difference	-6.43	-7.39	-5.64	-0.93	-4.06
(T-statistic for Difference)	(2.67)*	(4.68)*	(4.38)*	(1.24)	(7.02)*
9. Uncodable or Absent Response					
% among all good loans	5.33	5.19	9.26	8.67	7.63
% among all charged-off loans	4.56	5.72	3.58	3.12	3.60
Difference	-0.77	0.53	-5.68	-5.55	-4.02
(T-statistic for Difference)	(0.72)	(0.70)	(9.29)*	(16.59)*	(15.87)*

+ The periods noted only approximately reflect the dates at which the loans were liquidated. Instead of a liquidation date, the data show only a data processing date. Thus, several months may elapse between the date a loan was liquidated at the participating commercial bank and the date the loan was processed at the appropriate Federal Reserve Bank.

Also, unequal number of loans were processed in each period. In particular, in the 1966-68 period, 3892 "good" paid-off and charged-off loans were processed; in 1968-69, 7164 loans were processed; in 1969-70, 6864 loans were processed; in 1970-71, 19,196 loans were processed. In total, 36,116 "good" paid-off and charged-off loans were processed from 1966-71, with most of those loans processed in later years as more sample banks joined the study. Because of the limited number of loans processed in the early years, data for 1966-68 were combined.

* Significant at the 95 percent confidence level.

Table 3: Variations in Relative Occupational Default Risk by Source of Employment

Occupation	Manu- facturing	Con- struction	Retail Wholesale Trade	Banks, Finance, Real Est.	Govern- ment Civilian	Armed Forced	Farming	Self Employed and Other	Un- codable or No Answer	Total
1. Manager or Foreman										
% among all good loans	28.17	4.57	17.92	4.24	1.78	0.17	0.12	38.65	4.40	100
% among all bad loans	20.89	9.23	23.44	3.61	0.85	0.11	0.11	38.49	3.29	100
Difference	- 7.27	+4.66	+ 5.52	-0.63	-0.93	-0.06	-0.01	- 0.16	-1.11	0
(T-statistic for Difference)	(4.87)*	(4.68)*	(3.68)-	(0.93)	(2.56)*	(0.48)	(0.10)	(0.09)	(1.69)	
2. Skilled or Craft Worker										
% among all good loans	55.49	8.27	5.15	0.51	2.59	0.18	0.09	24.48	3.24	100
%, among all bad loans	56.74	11.11	5.63	0.91	1.76	0.33	0.05	22.65	0.81	100
Difference	+ 1.26	+ 2.84	+ 0.48	+0.40	-0.82	+0.15	-0.04	- 1.83	-2.42	0
(T-statistic for Difference)	(1.01)	(3.70)*	(0.84)	(1.77)	(2.36)*	(1.09)	(0.74)	(1.73)	(8.24)*	
3. Driver or Laborer										
%/ among all good loans	47.48	4.78	7.27	0.47	4.02	0.09	0.29	32.15	3.46	100
% among all bad loans	57.23	5.91	7.88	0.27	2.06	0.18	0.13	25.79	0.76	100
Difference	+ 9.75	+1.13	+0.61	-0.20	-1.96	+0.09	-0.16	- 6.36	-2.70	0
(T-statistic for Difference)	(7.21)*	(1.83)	(0.85)	(1.25)	(4.34)*	(0.89)	(1.31)	(5.19)*	(7.43)-	
4. Professional										
% among all good loans	16.34	2.02	2.84	2.33	12.95	5.45	0.12	60.21	2.64	100
% among all bad loans	12.56	4.83	6.28	4.59	8.70	4.83	0.24	60.87	1.45	100
Difference	- 3.78	+2.81	+3.44	+2.26	-4.26	-0.06	+0.12	+ 0.66	-1.20	0
(T-statistic for Difference)	(2.11)*	(2.57)+	(2.78)*	(2.10)*	(2.77)*	(0.17)	(0.50)	(0.25)	(1.79)	
5. Office or Sales Worker										
% among all good loans	20.60	1.31	19.48	10.63	5.65	0.27	0.08	37.86	4.13	100
% among all bad loans	20.70	2.56	22.13	10.76	4.00	0.41	0.10	37.91	1.43	100
Difference	+ 0.10	+1.26	+ 2.65	+ 0.13	-1.65	+0.14	+0.02	+ 0.05	-2.70	0
(T-statistic for Difference)	(0.07)	(2.33)-	(1.79)	(0.11)	(2.26)*	(0.65)	(0.20)	(0.03)	(5.39)*	
6. All other occupations										
% among all good loans	13.93	1.85	5.21	2.31	7.04	2.41	0.53	59.56	2.16	100
% among all bad loans	23.92	2.16	6.41	1.71	5.37	1.49	0.30	58.20	0.45	100
Difference	+ 4.99	+ .31	+1.20	- .60	-1.68	-0.92	-0.23	- 1.36	-1.71	0
(T-statistic for Difference)	(3.88)*	(0.71)	(1.62)	(1.46)	(2.36)*	(2.34)*	(1.26)	(0.90)	(6.28)*	
7. Uncodable or No Answer										
% among all good loans	31.40	1.84	5.33	1.13	1.95	0.20	0.03	16.26	41.85	100
% among all bad loans	45.26	4.49	5.49	0.75	2.00	0.50	0.25	16.83	24.44	100
Difference	+13.86	+2.64	+0.16	-0.38	+0.05	+0.29	0.22	0.57	-17.41	0
(T-statistic for Difference)	(7.09)*	(3.42)*	(0.17)	(1.05)	(0.09)	(1.12)	(1.20)	(0.38)	(9.83)	

* Significant at the 95 percent confidence level.

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