The Effect of Government Regulations on Personal Loan Markets: A Tobit Estimation of a Microeconomic Model

Author(s): James R. Barth, Padma Gotur, Neela Manage, Anthony M. J. Yezer

Source: *The Journal of Finance*, Vol. 38, No. 4 (Sep., 1983), pp. 1233-1251
Published by: Blackwell Publishing for the American Finance Association
Stable URL: http://www.jstor.org/stable/2328022
Accessed: 27/11/2009 08:06

THE JOURNAL OF FINANCE • VOL. XXXVIII, NO. 4 • SEPTEMBER 1983

The Effect of Government Regulations on Personal Loan Markets: A Tobit Estimation of a Microeconomic Model

JAMES R. BARTH, PADMA GOTUR, NEELA MANAGE, and ANTHONY M. J. YEZER*

ABSTRACT

The purpose of this paper is to analyze both theoretically and empirically the effect of selected government regulations on a high-risk personal loan market. Unlike previous studies, which have generally relied on a loosely specified theory and then tested this theory with statewide aggregate data, our analysis is based on a more tightly specified model for individual loans which is then tested using statewide disaggregated data. The empirical results indicate that the regulatory effects are not only significant but consistent with our theoretical microeconomic model.

THE PURPOSE OF THIS PAPER is to analyze the effect of selected government regulations on a high-risk personal loan market. This is done by developing a simple model of the supply of and demand for a single high-risk personal loan and then using the model as the basis for our econometric analysis. Due to econometric problems related to the presence of legal rate ceilings on such loans, we derive and estimate reduced-form equations rather than structural equations. However, as will be shown, the market effects of regulations may still be tested against a priori restrictions.[1] The emphasis on individual loan transactions is a distinguishing feature of our study. This permits a more accurate assessment of the consequences of regulation for personal loan markets than is possible using aggregate state data (see, for example, Greer [18, 19] and Benston [9, 10, 11]), because regulatory constraints vary with the specific terms of the loan as well as individual borrower characteristics. As examples, legal rate ceilings typically vary with the amount loaned, and the amount that may be garnished generally depends on each borrower's earnings. In this type of setting, lenders essentially act as multi-product firms selling different loan amounts of varying terms to borrowers

* Professor of Economics, George Washington University and Visiting Scholar, Federal Reserve Bank of Atlanta; Economist, International Monetary Fund; Assistant Professor of Economics, Florida Atlantic University, and Associate Professor of Economics, George Washington University, respectively. We wish to acknowledge the very helpful comments provided by George Benston, Michael J. Brennan, and V. Kerry Smith. This research was funded by a grant from the National Science Foundation. A substantial portion of this paper was written prior to Ms. Gotur's joining the International Monetary Fund; the views presented therein do not necessarily reflect those of the Fund.

[1] There have been other examples of successful application of reduced-form models to testing prior restrictions concerning the effects of regulations on consumer credit markets. See, for example, Goudzwaard [17] and Shay [23], who examine the effect of the legal rate ceiling on risk-taking.

whose creditworthiness varies substantially. It is therefore necessary to examine the supply of and demand for credit on the basis of individual, not aggregate, loan transactions.

The specific government regulations that we examine are restrictions on firm entry into the personal loan market; restrictions on creditor collection practices, or creditor remedies; and regulations governing the use of personal bankruptcy. The effects of these different regulations on both the interest rate and loan amount are estimated based upon recent and detailed finance company data. We also employ a Tobit estimator to take account of the truncation of the range of possible interest rates that may be charged due to legal rate ceilings.

An important and novel feature of this paper is the translation of legal regulations into their economic equivalents. All previous studies (including Greer [18, 19], Benston [9, 10], Aho et al. [1], Barth and Yezer [3], Dunkelberg and De Magistris [14], and Peterson [21]) have relied on discrete dummy variables to represent particular regulations. Our findings strongly demonstrate, however, that the use of dummy variables is inferior to the use of equivalent economic measures. This suggests that our approach may prove useful in future econometric studies of the effects of various types of regulations.

I. The Supply of and Demand for Credit by an Individual Borrower

Lenders are assumed to supply credit to borrowers whose repayments are uncertain, depending on the future value of their collateral.[2] The creditworthiness of an individual borrower is represented by the mean and variance of his collateral. Following Barro [2], default losses occur when the value of collateral falls below the principal and interest outstanding on the loan. Barro shows that the "explicit loan rate and the expected interest cost for the borrower would both rise with the loan (collateral)-value ratio, the competitive rate of interest, and the transactions costs associated with default" [2, p. 455].

The primary collateral in personal loan markets is the future income stream of the borrower which may be garnished or assigned by the lender in case of default. This future income, y_2, is assumed to be a normally distributed random variable whose mean, $\bar{y}_2$, and variance, σ^2, are known to the lender. The ability of the lender to garnish or assign income in case of default is limited by regulation and we assume that the borrower is allowed to retain a constant fraction, c, of his income in case of default.[3] When there is no default, the lender's profit, π_1, may be written as:

$$\pi_1 = (1 + r)L - (1 + i)L - \theta \tag{1}$$

[2] For a more complete and thorough discussion of the theoretical model presented in the text, one may refer to Barth and Yezer [3] and Barro [2].

[3] In practice c may be interpreted as representing a proportion of y_2 as well as services from other assets, such as consumer durable goods that may be offered as security for a loan, which an individual is permitted to retain in the event of a default. For simplicity, we will not treat c in this broader sense in the theoretical analysis since such treatment does not fundamentally alter the conclusions of the model. It is also possible for the borrower to incur some cost from defaulting, such as the reduced ability to acquire future credit or simply psychic disutility. These effects are not considered in the formal model presented here.

where r is the interest rate on the loan, θ is the overhead or fixed operating cost of making and processing the loan, L is the loan size, and i is the cost of capital, which is assumed to be less than r.[4]

In case of default, the lender's profit, π_2, may be written as:

$$\pi_2 = (1 - c)y_2 - (1 + i)L - \theta - \lambda \tag{2}$$

where λ represents any fixed transactions costs incurred by the lender in the event of default. We assume that $0 \leq \lambda \leq (1 - c)y_2$, so that the lender will not spend more on collection procedures than he is likely to collect on any loans in default.

Default occurs whenever the amount owed, $(1 + r)L$, exceeds the amount of future income which the lender can collect in case of default, $(1 - c)y_2$. That is, default occurs whenever

$$y_2 < \frac{(1 + r)L}{(1 - c)} \equiv x \tag{3}$$

Using this default rule, the probability of default, P, may be written as:

$$P = \int_0^x f(y_2)\, dy_2 \tag{4}$$

where $f(y_2)$ is the marginal density function of future income. It may easily be shown that $\frac{\partial P}{\partial L}$, $\frac{\partial P}{\partial r}$, and $\frac{\partial P}{\partial c}$ are all greater than zero. Furthermore, some borrowers may default when income is still sufficient for them to repay the balance due. This occurs when

$$y_2 > (1 + r)L > (1 - c)y_2.$$

Equations (1) through (4) may be combined to derive the expected total profit on an individual loan. Doing this yields:

$$E(\pi) = \int_0^x ((1 - c)y_2 - \lambda)f(y_2)\, dy_2 + \int_x^\infty (1 + r)Lf(y_2)\, dy_2 - (1 + i)L - \theta \tag{5}$$

Assuming free entry into the personal loan market, the interest rate on a loan will be determined by the condition $E(\pi) = 0$. Under this condition an increase in the expected value of future income, $\bar{y}_2$, or a decline in its variance, σ^2, will tend to lower r for a given L. Further, a rise in the loan amount, L, the opportunity cost of funds, i, or transactions costs, as reflected in c, θ, or λ, will raise r. These relationships imply the existence of a credit supply function of the following form:

$$r^S = S(\bar{y}_2, \sigma^2, L, c, i, \lambda, \theta) \tag{6}$$

with $S_{\bar{y}_2} < 0$, $S_{\sigma^2} > 0$, $S_L > 0$, $S_c > 0$, $S_i > 0$, $S_\lambda > 0$, $S_\theta > 0$.

[4] Benston [11] has shown that operating costs are essentially unrelated to the amount loaned, and that these costs are greater than the capital costs in the small personal loan market.

If the personal loan is also secured by physical collateral, then the expected future value of this collateral (taking into account any legal restrictions on its appropriation by the lender as well as transactions costs) would enter the model in a manner similar to income.

The credit demand function is simply modeled as:

$$r^D = D(y_1, \bar{y}_2, \sigma^2, c, L) \tag{7}$$

with $D_{y_1} = ?$, $D_{\bar{y}_2} = ?$, $D_{\sigma^2} = ?$, $D_c > 0$, $D_L < 0$, where y_1 is the current income of the borrower and the other variables are the same as discussed earlier. The only prior information imposed on the demand function is that an increase in c, the fraction of income retained in case of default, or a reduction in L, the loan size, increases the interest rate that borrowers are willing to pay.[5] Clearly, increasing c tends to reduce the amount of collateral at risk and hence should increase demand. Borrowers, moreover, will demand smaller loan amounts when interest rates are high rather than low. The restrictions in Equation (7), along with those in the supply Equation (6), are sufficient to yield strong expectations regarding the effects of selected government regulations in the reduced-form relationships which we subsequently estimate.

Equating the individual credit supply and demand Equations given by (6) and (7) and then solving for the loan amount yields the following reduced-form equation for the amount of the loan:

$$L = L(y_1, \bar{y}_2, \sigma^2, c, i, \lambda, \theta) \tag{8}$$

with $L_{y_1} = ?$, $L_{\bar{y}_2} = ?$ $L_{\sigma^2} = ?$, $L_c = ?$, $L_i < 0$, $L_\lambda < 0$, $L_\theta < 0$.

One may also write the inverse functions of the structural supply and demand equations to determine the effects of the variables in these equations on the loan amount. Doing this yields:

$$L^S = S'(\bar{y}_2, \sigma^2, r, c, i, \lambda, \theta) \tag{9}$$

with $S_{\bar{y}_2} > 0$, $S'_{\sigma^2} < 0$, $S'_r > 0$, $S'_c < 0$, $S'_i < 0$, $S'_\lambda < 0$, $S'_\theta < 0$; and

$$L^D = D'(y_1, \bar{y}_2, \sigma^2, r, c) \tag{10}$$

with $D'_{\bar{y}_1} = ?$, $D'_{\bar{y}_2} = ?$, $D'_{\sigma^2} = ?$, $D'_r < 0$, $D'_c > 0$. Expressions (9) and (10) may now be equated and then solved to obtain the reduced-form equation for the interest rate:

$$r = r(y_1, \bar{y}_2, \sigma^2, c, i, \lambda, \theta) \tag{11}$$

with $r_{y_1} = ?$, $r_{\bar{y}_2} = ?$, $r_{\sigma^2} = ?$, $r_c > 0$, $r_i > 0$, $r_\lambda > 0$, $r_\theta > 0$. A more detailed analysis of the effects of specific variables on both the structural and reduced-form equations presented above is provided in Barth and Yezer [3]. Also, for additional discussion of theoretical and empirical issues in this general area, see Gotur [16] and Manage [20]. In any event, one may conclude that, unless $D'_{\bar{y}_2}$ is positive and greater than $S'_{\bar{y}_2}$, $r_{\bar{y}_2}$ should be negative in Equation (11), and unless $D'_{\bar{y}_1}$ is positive, r_{y_1} should be negative in Equation (11). Furthermore, unless $D_{\bar{y}_2}$ is negative and greater in absolute value than $S_{\bar{y}_2}$, $L_{\bar{y}_2}$ in Equation (8) should be

[5] A more detailed description is provided in Barth and Yezer [3].

positive, and unless $D_{\bar{y}_1}$ is negative, $L_{\bar{y}_1}$ should be positive in Equation (8). An increase in c, the fraction of income that the borrower may retain after defaulting, raises the individual demand for credit and reduces the supply: thus, the equilibrium interest rate rises but the effect on the equilibrium loan amount is ambiguous. The cost of capital, i, the operating cost, θ, and the fixed cost, λ, will affect only the supply schedule. An increase in any of these three variables raises the supply schedule, thereby increasing the equilibrium interest rate and reducing the equilibrium loan amount. Because the direction of the effect of both c and λ in the reduced-form equation for the interest rate is known a priori, it is possible to test the null hypothesis that regulations operating through c and λ have no effect on personal loan markets. Furthermore, entry restrictions that tend to reduce the number of competitors may result in positive profits in Equation (5). If so, this would result in a rise in the supply curve, thereby leading to an increase in the equilibrium interest rate and a reduction in the loan amount.

II. Data and Measurement of Variables

The data used in the estimation of the two reduced-form Equations (8) and (11) are contract information on individual personal loan transactions concluded in 45 states during the period January 1975 through August 1977. This data set was compiled by the firm of Ernst and Ernst under the auspices of the National Consumer Finance Association by taking a random sample of active personal loan accounts from the master files of nine major consumer finance companies. These firms accounted for approximately 40% of the $20.1 billion in personal loans outstanding in the industry as reported by the Federal Reserve Board at the end of 1977. The actual sample consisted of 6,876 personal loan accounts that were carried as open accounts as of August 31, 1977. After eliminating those accounts for which data were missing, the final sample used in this study consisted of 6,692 individual personal loan transactions.

This recently assembled and unique data set provides information on various borrower characteristics, loan type, size and maturity of loan, interest rate charged, and type of collateral for the personal loan transactions which constitute a large portion of total consumer finance activity. The cross-section of 45 states provides substantial variation in the legal environment in which these companies operate, variation which is necessary to examine the effect of government regulations on the terms of personal loan contracts.

There are nine theoretical variables in our microeconomic model for which we need empirical proxies. Two of these variables are the dependent variables (r and L) and seven are the independent variables (y_1, $\bar{y}_2$, σ^2, c, i, λ, and θ). We now discuss the theoretical variables and their empirical proxies in turn, except for θ, which we treat as a constant and thus captured by the intercept term. (For convenience, a glossary of the variables is included at the end of the paper.)

A. Interest Rate (r) and Loan Amount (L)

The interest rate, r, was measured by the annual percentage rate appearing in each individual contract, and the loan amount, L, was measured by the amount

financed in the contract. These two variables will serve in turn as the dependent variables in our estimated reduced-form equations.

B. *Current Income* (y_1), *Mean of Future Income* ($\bar{y}_2$), *and Variance of Future Income* (σ^2)

The following variables were used as measures of present income, y_1, and as proxy variables reflecting the mean, $\bar{y}_2$, and variance, σ^2, of future income: current disposable income, YD, and its square, YD2; the borrower's outstanding debt, DEBT, and its square, DEBT2; the age of the borrower, BAGE, and its square, BAGE2; the marital status of the borrower, DMARRY; and borrower class which was identified by two 0-1 dummy variables—FB, for former borrowers, and PB, for present borrowers. Based upon our theoretical model and the accompanying discussion, the income and debt variables are predicted to be negatively related to the interest rate and positively related to the loan amount. The signs of the other variables are ambiguous. Squared terms for the current income, debt, and age variables were included in the regression equations to allow for possible nonlinear effects of these variables.

C. *Fraction of Income Borrower May Retain in Case of Default* (c) *and Fixed Transactions Costs Incurred by the Lender in Case of Default* (λ)

Our data set also provided partial measures, which were supplemented by variables from additional data sources discussed below, for c and λ. In particular, a series of dummy variables indicated the purpose of the loan, denoting specifically whether the borrower intended to purchase an automobile, AUTO, household appliance, HHG, or other durable good, OTHER.[6] In addition, a similar series of dummy variables characterized the type of collateral pledged to secure the loan. Three dummy variables, AUTOC, HGC, and OTHRC, were specifically included to indicate whether collateral was in the form of an automobile, household goods, or other major consumer durable, including a mobile home or real property, respectively. A dummy variable, COSIGN (set equal to 1 in the presence of a cosigner and zero otherwise) was also included to distinguish cases in which a cosigner added security to the loan. Both the collateral and cosigner variables were expected to be associated with lower values of c and λ, so that we predict the variables to be negatively related to the interest rate and positively related to the loan amount.

In addition to the economic factors which influence c and λ, there are legal influences on these variables, including regulations governing wage assignment, garnishment, late charges, and bankruptcy. Past studies of the effects of such regulations on credit markets have relied solely on 0-1 dummy variables to characterize the extent of regulation. However, economic theory suggests that these legal factors influence the supply of credit through their quantitative effect

[6] Information from the company files provided evidence that the proceeds of the loan were intended for use in purchasing these consumer durable goods. Of course, borrowers may misrepresent their reasons for seeking credit and, to that extent, measurement errors may be introduced in the purpose of loan variables.

on borrower liability and collection costs in the event of default—the c and λ effects modeled here. The maximum amount of wages assignable to a lender in case of default, for example, is a complex function of borrower characteristics, including income and the terms of the loan. This means that the impact of a particular state law governing wage assignment varies from one loan transaction to another within the same state. The use of simple dummy variables for entire states ignores this specification issue and thus tends to introduce errors-in-variables bias into the estimated regulatory effects.

Three continuous variables were calculated for each loan in our sample to quantify the economic effects of regulations governing garnishment, wage assignment, and late charges. To determine the merits of this particular approach, we also present results for the discrete representation of these same regulations. All of the legal variables included in this study were created on the basis of extensive legal research, relying mainly on the *Consumer Credit Guide* [12] and the *Cost of Personal Borrowing in the United States* [13]. The values of the regulatory variables were cross-checked with previous published reports. In cases where there were discrepancies or inadequate information to provide a definite interpretation of a particular regulation governing a given transaction, the appropriate state regulatory agency was consulted.[7]

The expected effects of the creditor remedy variables included in this study may be deduced from our theoretical model of the supply of and demand for personal loans. Specifically, late charges increase the amount that may be collected in case of delinquency or default, thus decreasing c and λ. Late charges are represented by LATEPER which is a 0-1 dummy variable equal to unity when late charges are permitted and LATE which is the continuous economic counterpart, equal to the legal maximum late charge that could be collected if the first loan payment were 20 days late. In contrast to LATEPER, the value of LATE was calculated separately for each loan in our sample. Both of these variables are predicted to be negatively related to the interest rate and positively related to the amount financed. Restrictions on both garnishment and wage assignment directly increase c and λ, and are represented by a series of 0-1 dummy variables ranging from NOGAR, which is equal to unity when both remedies are completely restricted, to RESWAGE, which is equal to one when there is a slight restriction on wage assignment only. These variables are predicted to be positively related to the interest rate. To the extent that these variables are stronger proxies for λ than for c, and since L_λ is negative, they may also be expected to be negatively related to the loan amount, even though L_c cannot be signed unambiguously, as shown in Equation (8).

Two additional regulatory variables were calculated for each loan in our sample to measure the maximum amount of the borrower's monthly income that could be garnished, GAR or assigned by the lender, WAGE. GAR was determined on the basis of a detailed examination of existing statutes governing garnishment in each state. It was found that states may: (1) simply prohibit garnishment, (2) specify minimum federal exemption levels, (3) allow a flat exemption from garnishment based on a multiple of the minimum wage, or (4) allow exemptions

[7] Additional information on the coding of the economic and legal variables is available on request.

conditional on specified family needs. Using this legal information as well as the borrower's monthly disposable income where appropriate, the maximum dollar amount that could be garnished, GAR, was calculated for each loan. Similarly, WAGE was calculated for individual loan transactions based on state regulations governing wage assignment. In states where wage assignment is not prohibited, it is usually limited to a maximum dollar amount or maximum percentage of income, where the limit may vary by loan size, family size, or type of loan law governing the loan transaction.

Based on the two continuous variables, GAR and WAGE, a single variable, GWAGG, defined as the larger of GAR and WAGE, was calculated for each loan. GWAGG is therefore the maximum monthly payment for which the borrower is liable under either garnishment or wage assignment and provides a continuous measure of the economic effects of restrictions on garnishment and wage assignment. It should be emphasized here that our results are based on 6,692 separate observations of government regulations governing individual loans rather than simply 45 separate observations—one for each state—which have been used in all previous studies. In any event, GWAGG is predicted to be negatively related to the interest rate and positively related to the amount financed.

The theoretical variable c is also measured, in part, by bankruptcy variables designed to reflect differences in the ease of concluding a bankruptcy across states. One measure, SBKRPT, is the number of straight nonbusiness bankruptcies per 100,000 population by state for 1976.[8] Another measure, TBKRPT, is the total of straight nonbusiness bankruptcies and Chapter XIII (wage earner plan) bankruptcies per 100,000 population by state for 1976. The ready availability of straight bankruptcy should directly increase c. To the extent that Chapter XIII bankruptcy does not remove the liabilities of the borrower, however, there should be no incremental contribution to raising c when TBKRPT rises above the level of SBKRPT. Indeed, higher levels of Chapter XIII bankruptcies may reflect an inability of borrowers to renounce debt and hence lower c.[9] We thus generally predict that SBKRPT will be positively related to the interest rate, whereas TBKRPT is predicted to be negatively related to the interest rate. The signs of the coefficients of both variables are ambiguous with respect to the loan amount.

D. Cost of Capital (i)

The cost of capital variable, i, is measured by the finance company paper rate, FCP, for the month in which the loan was made.[10] This variable is predicted to be related positively to the interest rate and negatively to the amount financed.

[8] A straight bankruptcy differs from a Chapter XIII bankruptcy in the following sense. A debtor filing for straight bankruptcy loses most of his assets, with certain exemptions that vary widely across states, and is discharged of all his debts, except certain nondischargeable obligations and those incurred by fraud. In a Chapter XIII bankruptcy, the court-appointed Referee in Bankruptcy acts as a consolidator of debts and collection agency. The debtor retains his assets but must pay his obligations to the extent that the referee considers feasible over a period of three years. Then the debtor is discharged of all obligations.

[9] Benston [9] has used similar measures of the bankruptcy laws.

[10] Data for the finance company paper rate, FCP, were obtained from the *Federal Reserve Bulletin* [15].

E. Entry Restrictions

In order to assess the impact of government regulations which restrict entry into the high-risk personal loan market and thus enable lenders to make greater than competitive profits, a measure of such restrictions was also included in our empirical analysis. Specifically, CA1 was set equal to one in states where so-called "Convenience and Advantage" legislation limits entry and zero otherwise. This variable is predicted to be positively related to the interest rate and negatively related to the amount financed. Unfortunately, it was not possible to construct a continuous economic measure reflecting this regulatory variable as was the case with the creditor remedy variables, LATE and GWAGG, discussed above.

F. Legal Rate Ceiling and Truncation

Estimation of the reduced form Equations (8) and (11) for the interest rate and the loan amount also requires information on the legal rate ceiling. Thus, for each loan, APRLMT, the rate ceiling applicable was calculated based on the relevant state laws. Implementing this procedure involved comparing the annual percentage rate, amount financed, and maturity of each loan in the sample to the usury rate schedules and formulas in the *Cost of Personal Borrowing in the United States* [13]. In cases where states had multiple usury ceilings governing a particular loan amount, the relevant usury ceiling was determined from other terms of the transaction, such as the term of loan or the type of collateral. For about 10% of all loan transactions, the terms were consistent with more than one rate ceiling. In these cases, the lower ceiling was used. The usury rate ceiling in the empirical work reported here varies with each and every observation in the sample. It is not a simple statewide average rate which only varies from state to state. Table I presents descriptive tabulations of our sample, including (1) a statewide distribution of loans transacted at interest rates below the corresponding legal rate ceiling, and (2) statewide data used to measure the government restrictions affecting entry of new firms, garnishment, wage assignment, and late charges.

It should be noted that the existence of a binding usury ceiling will cause the coefficients estimated by ordinary least squares (OLS) to be biased because the interest rate is truncated by the ceiling. The error term in this case has a truncated normal rather than a full normal distribution. To deal with this potential problem, a Tobit (see Tobin [24]) estimator was used to estimate the reduced-form equation for the interest rate, r. For purposes of comparison, this equation was also estimated by OLS using only nonlimit observations, or loans with interest rates below the legal rate ceiling. These estimation results based upon the 2,239 transactions which were below the rate ceiling are therefore also reported. Interestingly enough, the OLS results are generally in close agreement with the Tobit estimation results based upon the entire sample of 6,692 loans.[11]

[11] In response to a referee's request, the reduced form for r was also estimated by OLS using the entire sample. The results were essentially unchanged, indicating that OLS is quite robust, perhaps because of our large sample.

Table I

Characteristics of Sample Data on Loan Transactions and Government Regulations by State

State	Number of Observations Below Limit	Percentage of Observations Below Limit	CA1[a]	LF1[b]	WA[c]	GA[d]
Alabama	41	40	1	1	1	0
Arizona	29	32	0	1	0	0
California	106	8	0	1	0	0
Colorado	32	29	0	1	1	0
Connecticut	33	35	1	1	1	0
Delaware	7	35	0	1	1	0
Florida	169	54	1	0	1	1
Georgia	34	30	1	1	1	0
Idaho	36	68	0	1	1	0
Illinois	67	20	1	1	0	0
Indiana	139	56	0	1	1	0
Iowa	59	35	1	1	1	0
Kansas	14	17	0	1	1	0
Kentucky	48	43	1	1	0	0
Louisiana	48	48	0	1	1	0
Maryland	23	15	1	0	1	0
Massachusetts	37	39	1	1	1	0
Michigan	33	11	1	0	0	0
Minnesota	5	12	1	1	0	0
Mississippi	23	43	1	1	0	0
Missouri	26	15	0	1	1	0
Montana	12	44	0	1	1	0
Nebraska	6	10	1	1	0	0
Nevada	17	33	1	1	1	0
New Hampshire	1	4	1	0	1	0
New Jersey	69	28	1	0	1	0
New Mexico	17	31	1	1	0	0
New York	220	63	1	1	1	0
North Carolina	77	57	1	1	1	0
North Dakota	9	47	0	1	1	0
Ohio	153	48	1	1	1	0
Oklahoma	22	35	0	1	1	0
Oregon	23	33	1	1	1	0
Pennsylvania	207	44	0	1	1	1
Rhode Island	1	6	1	0	0	0
South Carolina	26	45	1	1	1	1
South Dakota	8	53	0	1	1	0
Texas	165	40	0	1	1	1
Utah	19	83	0	1	1	0
Vermont	8	40	1	1	0	0
Virginia	80	47	1	1	0	0
Washington	47	47	1	1	0	0
West Virginia	20	50	1	1	1	0
Wisconsin	18	24	0	1	0	0
Wyoming	5	38	0	1	1	0
Total	2,239	33.5				

[a] CA1 = 1 if Convenience and Advantage clause restricting entry of new firms is permitted in the state; 0 otherwise. Source: Seelig [22].

[b] LF1 = 1 if late charges permitted; 0 otherwise. Source: Consumer Credit Guide [12].

[c] WA = 1 if wage assignment restricted; 0 otherwise. Source: Consumer Credit Guide [12].

[d] GA = 1 if garnishment prohibited; 0 otherwise. Source: Consumer Credit Guide [12].

III. Empirical Results

Table II presents the estimation results for various specifications of the reduced-form equation for the interest rate. Given our special interest in regulatory effects, three distinct models of the reduced-form interest rate equation were estimated: (1) a model that contains no regulatory variables, (2) a model that contains only variables providing a discrete representation of the regulations, and (3) a model that contains both discrete and continuous variables representing the effects of the regulations. All of these models were estimated by OLS, using only observations below the usury ceiling, and by a Tobit estimator, using all observations and assuming truncation at the legal rate ceiling.[12] Since the results for these two estimators are quite similar, they will be discussed jointly rather than separately. In general, the coefficients of the economic and collateral variables have the anticipated signs and are significant. The effect of income, YD and YD2, on r is negative in the relevant range of the sample (Table III). Debt, DEBT and DEBT2, also has a negative effect on r in the relevant range (Table III), most likely reflecting a positive association between debt and expected future income. The collateral variables have estimated coefficients indicating that factors which lower c and/or λ will tend to lower the interest rate.

Overall, the *discrete* legal variables measuring the regulation of late charges, garnishment, and wage assignment do not have coefficients consistent with prior expectations. Only LATEPER, the dummy variable for late charges permitted, has a coefficient with the expected negative sign with any consistency. The set of dummy variables which indicate an increasing restriction on garnishment and wage assignment when going from least restricted, RESWAGE, to most restricted, NOGAR, not only have coefficients with the "wrong" negative signs (for the appropriate Tobit estimator, not the inappropriate OLS estimator) but also have relative magnitudes that are the reverse of prior expectations. In contrast, the *continuous* legal variables, LATE and GWAGG, which represent this same set of regulations, consistently have significant coefficients whose sign and magnitude are quite reasonable given our prior expectations based on the theoretical model developed earlier. The estimated coefficients in Table II imply that either a \$10/month increase in the amount of income that could be garnished or assigned or a \$1 increase in monthly late charges lowers the interest rate by about one-half of a percentage point. The performance of these continuous legal variables confirms our basic hypothesis that translating a complex legal restriction into an economic measure is an important aid in estimating the effects of such regulations.

The discrete variable representing the presence of "Convenience and Advantage" legislation, CA1, has the expected positive effect on r in the OLS results

[12] Note that the third model contains both discrete and continuous variables reflecting regulations governing late charges, garnishment, and wage assignment. The continuous variables alone are not sufficient to characterize these regulations completely because they do not identify uniquely the effects of a total ban on a creditor remedy. For example, GWAGG is zero both in cases where the loan was made in a state where garnishment was banned and where garnishment was permitted, but, given borrower earnings, the calculated amount of monthly earnings garnishable was equal to zero. Inclusion of the discrete variables in the third model thus allows these two situations to be distinguished.

Table II

Ordinary Least Squares (for Nonlimit Observations) and Tobit Estimates of the Economic and Legal Determinants of the Annual Percentage Rate (r) on Individual Personal Loans at Finance Companies[a]

	Type of Estimator					
	OLS			TOBIT		
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)
Borrower characteristics and interest costs						
Constant	36.269[b]	34.440[b]	34.032[b]	45.106[b]	44.679[b]	43.837[b]
	(1.324)[c]	(1.325)	(1.247)	(1.406)	(1.389)	(1.281)
YD	−0.0040[b]	−0.0036[b]	−0.0010	−0.0027[b]	−0.0029[b]	−0.0008
	(0.007)	(0.0007)	(0.0007)	(0.0008)	(0.0007)	(0.0007)
YD2($\times 10^{-3}$)	0.0010[b]	0.0009[b]	0.0003[d]	0.0005[d]	0.0005[d]	0.0002
	(0.0003)	(0.0003)	(0.0002)	(0.0003)	(0.0003)	(0.0003)
DEBT($\times 10^{-2}$)	−0.0140[b]	−0.0200[b]	−0.0126[b]	−0.0168[b]	−0.0204[b]	−0.0110[b]
	(0.0046)	(0.0043)	(0.0041)	(0.0049)	(0.0045)	(0.0042)
DEBT2($\times 10^{-6}$)	0.0055[b]	0.0068[b]	0.0050[b]	0.0062[b]	0.0069[b]	0.0045[b]
	(0.0020)	(0.0019)	(0.0018)	(0.0023)	(0.0022)	(0.0019)
BAGE	−0.2458[b]	−0.2211[b]	−0.2084[b]	−0.1944[b]	−0.1497[b]	−0.1504[b]
	(0.0500)	(0.0467)	(0.0440)	(0.0529)	(0.0487)	(0.0460)
BAGE2	0.0026[b]	0.0024[b]	0.0022[b]	0.0019[b]	0.0015[b]	0.0015[b]
	(0.0006)	(0.0006)	(0.0005)	(0.0006)	(0.0006)	(0.0005)
DMARRY	−0.1726	−0.3056	−0.3030	−0.7275[b]	−0.6441[b]	−0.5493[b]
	(0.2107)	(0.1967)	(0.1850)	(0.2166)	(0.2004)	(0.1856)
FB	0.0186	0.2889	0.4414	0.4218	0.5855[d]	0.7209[b]
	(0.3208)	(0.2995)	(0.2818)	(0.3319)	(0.3063)	(0.2839)
PB	−1.530[b]	−1.159[b]	−0.8088[b]	−1.5776[b]	−1.056[b]	−0.6853[b]
	(0.2100)	(0.1966)	(0.1861)	(0.2179)	(0.2025)	(0.1878)
FCP	−0.2546	−0.1247	−0.1265	−1.171	−0.8926	−0.8293
	(0.1799)	(0.1679)	(0.1579)	(0.1903)	(0.1762)	(0.1628)
Credit used to purchase						
AUTO	0.4227	0.4703	0.3735	−0.5474	−0.3493	−0.3431
	(0.6294)	(0.5876)	(0.5526)	(0.6700)	(0.6241)	(0.5745)
HHG	−1.721[b]	−1.333[b]	−1.520[b]	−1.244[d]	−0.9878	−1.234[b]
	(0.6674)	(0.6239)	(0.5871)	(0.6942)	(0.6417)	(0.5946)
OTHER	−1.252[b]	−1.079[b]	−1.195[b]	1.243[b]	−0.7918[b]	−0.9682[b]
	(0.4035)	(0.3768)	(0.3546)	(0.4207)	(0.3880)	(0.3579)

Collateral						
AUTOC	−1.646[b]	−1.837[b]	−1.299[b]	−2.088[b]	−2.245[b]	−1.489[b]
	(0.2419)	(0.2269)	(0.2157)	(0.2545)	(0.2371)	(0.2218)
HGC	−1.630[b]	−1.913[b]	−1.486[b]	−1.761[b]	−2.123[b]	−1.515[b]
	(0.1888)	(0.1785)	(0.1699)	(0.1974)	(0.1832)	(0.1723)
OTHRC	−2.195[b]	−2.537[b]	−2.389[b]	−1.827[b]	−2.414[b]	−2.111[b]
	(0.3924)	(0.3665)	(0.3447)	(0.4073)	(0.3758)	(0.3465)
COSIGN	−1.750[b]	−1.504[b]	−1.178[b]	−1.542[b]	−1.251[b]	−1.001[b]
	(0.4406)	(0.4118)	(0.3879)	(0.4548)	(0.4217)	(0.3916)
Legal variables						
SBKRPT		0.0382[b]	0.0413[b]		0.0301[b]	0.0353[b]
		(0.0047)	(0.0045)		(0.0051)	(0.0047)
TBKRPT		−0.0195[b]	−0.0247[b]		−0.0056	−0.0162[b]
		(0.0046)	(0.0043)		(0.0048)	(0.0045)
CA1		0.6968[b]	1.003[b]		−0.6481[b]	−0.0180
		(0.2265)	(0.2149)		(0.2230)	(0.2088)
NOGAR		−0.5995[b]	−3.528[b]		−3.165[b]	−6.229[b]
		(0.3023)	(0.3375)		(0.3141)	(0.3398)
NOWAGE		−2.023[b]	−2.861[b]		−4.043[b]	−4.893[b]
		(0.2355)	(0.2307)		(0.2425)	(0.2314)
RESWAGE		1.637[b]	1.412[b]		−0.8036[b]	−0.6414[b]
		(0.2460)	(0.2361)		(0.2498)	(0.2381)
LATEPER		−1.016[b]	0.2868		−2.807[b]	−0.9976[b]
		(0.2928)	(0.3077)		(0.2891)	(0.3015)
GWAGG			−0.0590[b]			−0.0659[b]
			(0.0041)			(0.0040)
LATE			−0.3912[b]			−0.5883[b]
			(0.0688)			(0.0714)
N	2239	2239	2239	6692	6692	6692
R-square	0.1795	0.2908	0.3735			
F-statistic	28.280	37.412	50.166			

[a] Dependent Variable = Annual Percentage Rate.
[b] 5% level of significance.
[c] The figures in the parentheses denote the standard errors of the coefficients.
[d] 10% level of significance.

Table III

Evaluating the Effects of Nonlinear Regressors Using the Results in Table II[a]

		OLS Estimates			Tobit Estimates		
Variable	Mean (S.D.)	(1)	(2)	(3)	(4)	(5)	(6)
YD	$907 (405)	$2,000	$2,000	$1,666	$2,700	$2,900	$2,000
DEBT	$3,225 (3,432)	$12,727	$14,706	$12,600	$13,548	$14,783	$12,222
BAGE	37 yr (12)	47 yr	46 yr	47 yr	51 yr	50 yr	50 yr

[a] In all cases, at the mean of the sample, dr/dYD, dr/dDEBT, and dr/dBAGE are negative. The values in the table are the critical values of YD, DEBT, and BAGE at which the signs of these derivatives switch from negative to positive. The mean of the dependent variable, r is 24.1% and its standard deviation is 4.67. The mean amount financed, L, is $1,350 and its standard deviation is $933.

reported in Table II but not in the Tobit results. Unfortunately, it was not possible to construct a continuous economic measure of the extent to which such a regulation restricts competition and thus the loan terms in various states. Finally, continuous measures of the effects of bankruptcy rates on the equilibrium interest rate have the expected coefficients. The positive and significant effect of SBKRPT on r is consistent with the hypothesis that higher rates of straight bankruptcy raise c. The negative and significant coefficient of TBKRPT, on the other hand, implies that as Chapter XIII bankruptcy becomes more frequent, compared with straight bankruptcy, c is lower. This is consistent with the hypothesis that finance company losses on Chapter XIII bankruptcies are lower than those on straight bankruptcies.

Table IV presents the estimation results for different specifications of the reduced-form equation for the amount financed, L. As was the case for the reduced-form equation for r, three models were estimated to show the successive effects of adding first the discrete regulatory variables and then the continuous regulatory variables to the basic economic variables. Once again, the economic and collateral variables generally have the anticipated signs and are significant. Income, YD and YD2, does not always have a positive effect on loan amount, but this is consistent with the possibility that the demand for finance company loans decreases as income rises. Debt has a positive effect on loan size throughout the relevant range of the sample. The collateral variables all have strong positive effects, indicating that factors which lower c and λ increase the amount financed. It is important to emphasize this particular empirical result because the regulatory variables also influence the reduced form for L through changes in c and λ. Although it is true that the sign of L_c could not be determined a priori in Equation (8), the empirical evidence based on the coefficients of the collateral variables in Table IV suggests that L_c is negative.

The *discrete* legal variables, LATEPER, NOGAR, NOWAGE, and RESWAGE, yield no more promising results in the reduced form for L than they do for r. More specifically, LATEPER, which is equal to unity when late charges are permitted—the latter condition being associated with lower values of c and λ—has a negative effect that is in conflict with the implications of the results

obtained for the collateral variables. The set of dummy variables representing restrictions on garnishment and wage assignment, NOGAR, NOWAGE, and RESWAGE, moreover, often have coefficients with incorrect (positive) signs.

In contrast, the *continuous* legal variables, LATE and GWAGG, have coeffi-

Table IV

Ordinary Least Squares Estimates of the Economic and Legal Determinants of the Amount Financed (L) for Individual Personal Loans at Finance Companies[a]

	Type of Estimator—OLS		
Independent Variables	(1)	(2)	(3)
Borrower characteristics and interest costs			
Constant	2874.78[b]	3052.68[b]	2158.80[b]
	(159.405)[c]	(157.684)	(143.873)
YD	0.1867[b]	0.148[d]	−0.177[b]
	(0.0799)	(0.077)	(0.070)
YD2($\times 10^{-2}$)	0.0048[d]	0.0016	0.0009
	(0.0027)	(0.0030)	(0.0031)
DEBT	0.056[b]	0.048[b]	0.035[b]
	(0.004)	(0.004)	(0.004)
DEBT2($\times 10^{-7}$)	−8.221[b]	−7.003[b]	−4.704[b]
	(1.521)	(1.455)	(1.312)
BAGE	13.219[b]	12.121[b]	16.642[b]
	(5.312)	(5.076)	(4.573)
BAGE2	−0.112[d]	−0.098[d]	−0.154[d]
	(0.064)	(0.061)	(0.055)
DMARRY	91.057[b]	69.148[b]	56.401[b]
	(21.250)	(20.390)	(18.372)
FB	−61.326[d]	−33.464	−56.877[b]
	(32.522)	(31.088)	(28.010)
PB	119.976[b]	141.54[b]	108.755[b]
	(21.708)	(20.768)	(18.722)
FCP	9.258	26.525	27.288
	(18.969)	(18.138)	(16.335)
Credit used to purchase			
AUTO	38.633	31.855	24.630
	(66.033)	(63.124)	(56.851)
HHG	−255.257[b]	−223.216[b]	−143.943[b]
	(71.639)	(68.440)	(61.672)
OTHER	−143.690[b]	−114.105[b]	−69.837[d]
	(42.805)	(40.916)	(36.87)
Collateral			
AUTOC	457.450[b]	379.076[b]	280.790[b]
	(25.338)	(24.421)	(22.139)
HGC	291.399[b]	239.082[b]	172.349[b]
	(20.125)	(19.551)	(17.696)
OTHRC	212.002[b]	128.688[b]	94.293[b]
	(41.168)	(39.544)	(35.626)
COSIGN	160.972[b]	148.750[b]	145.634[b]
	(45.181)	(43.212)	(38.961)

Table IV—*Continued*

Independent Variables	Type of Estimator—OLS (1)	(2)	(3)
Legal variables			
APRLMT	−106.560[b]	−125.313[b]	−95.623[b]
	(2.081)	(2.142)	(2.075)
SBKRPT		8.405[b]	6.075[b]
		(0.546)	(0.499)
TBKRPT		−4.899[b]	−1.741[b]
		(0.504)	(0.462)
CA1		144.570[b]	50.245[b]
		(22.447)	(20.828)
NOGAR		−9.048	588.983[b]
		(32.878)	(35.010)
NOWAGE		−228.792	67.764[b]
		(25.437)	(24.113)
RESWAGE		379.088	248.823[b]
		(26.066)	(24.947)
LATEPER		−29.385	−437.092[b]
		(28.099)	(29.619)
GWAGG			12.154[b]
			(0.428)
LATE			164.559[b]
			(7.532)
N	6692	6692	6692
R-square	0.49	0.54	0.62
F-statistic	357.64	308.69	409.98

[a] Dependent Variable = Amount Financed.
[b] 5% level of significance.
[c] The figures in the parentheses denote the standard errors of the coefficients.
[d] 10% level of significance.

cients whose sign, significance, and magnitude are in close agreement with prior expectations. The empirical results imply that either $10 of additional monthly income that could be garnished or assigned or a $1 increase in monthly late charges increases the loan amount by about $150.

In sum, the continuous representation of the regulatory restrictions in both the interest rate and loan amount equations indicates that the ability to analyze the effects of such regulations is greatly enhanced if discrete dummy variables are supplemented by variables reflecting the economic effects of those regulations measured in continuous dollar terms. These findings may explain the failure of other studies to detect "reasonable" effects produced by credit or loan market regulations. For example, Benston [9, p. 153] in the pioneering study in this area, concluded, based on the use of discrete dummy variables for wage assignment, confession of judgment, garnishment, and holder-in-due-course, that "... the data measure no consistent or reliable adverse effects of restriction on creditors' remedies." He admits, moreover, that an "explanation is that the dummy variables do not actually measure what they purport to measure" (p. 65).

IV. Summary and Conclusions

In this paper we presented a microeconomic model of the demand for and supply of personal loans. More specifically, a simple two-period model was developed under conditions of uncertainty and then used to assess the effect of various government regulations on the interest rate and loan amount in a high-risk personal loan market. The regulations examined included those governing late charges, garnishment, wage assignment, entry of finance companies into the market, and personal bankruptcy. Using the theoretical model, reduced-form equations for the equilibrium interest rate and loan amount for an individual loan transaction were derived. In most cases, it was possible to place prior restrictions on the effects of regulations in the reduced-form equations. Using econometric techniques to deal with the special problems raised by the presence of a binding legal rate ceiling, reasonable and significant quantitative estimates of the effects of these regulations were obtained. A distinguishing feature of our estimation effort was the translation of discrete legal regulations into continuous economic measures. It was shown that this approach to measuring legal regulations has many advantages over a discrete approach and thus could have important applications in future analyses of the effects of government regulations.

In sum, it is hoped that these results will stimulate others to examine credit or loan markets at a more microeconomic level.[13] One possible innovation would be to modify our approach to consumer demand by having the consumer consider explicitly the variation of the interest rate with loan size along an iso-profit curve. Obtaining better data on the credit terms available from competing lenders may also improve the ability to estimate effects of regulations restricting entry. But most importantly, more effort should be made to quantify various legal regulations which affect credit markets and to use the appropriate econometric techniques for dealing with the special truncation problems created by the presence of a binding legal rate ceiling.

Glossary of Variables

L	= Amount financed
r	= Annual percentage rate of interest
YD	= Disposable income in dollars per month
YD2	= Square of YD in thousands of dollars
DEBT	= Total nonmortgage debt outstanding precredit
DEBT2	= Square of DEBT in ten thousands of dollars
BAGE	= Borrower age (in years)
BAGE2	= Square of BAGE
DMARRY	= 1 if married; 0 otherwise
FB	= 1 if former borrower; 0 otherwise
PB	= 1 if present borrower; 0 otherwise
FCP	= Finance company paper rate at time of loan

[13] For other recent examples, see Barth et al. [4–8].

Credit used to purchase

AUTO = 1 if auto or recreational vehicle; 0 = no
HHG = 1 if household goods; 0 = no
OTHER = 1 if other goods; 0 = no

Collateral

AUTOC = 1 if auto collateral; 0 = no
HGC = 1 if household goods collateral; 0 = no
OTHRC = 1 if other goods collateral; 0 = no
COSIGN = 1 if cosigner other than spouse; 0 = no

Legal variables

APRLMT = Legal interest rate ceiling (usury limit)
SBKRPT = Straight bankruptcies by state per 100,000 population
TBKRPT = Total bankruptcies by state per 100,000 population
CA1 = 1 if Convenience and Advantage clause; 0 otherwise
NOGAR = 1 if both wage assignment and garnishment prohibited; 0 otherwise
NOWAGE = 1 if wage assignment prohibited and garnishment permitted; 0 otherwise
RESWAGE = 1 if garnishment permitted and wage assignment revocable; 0 otherwise[14]
LATEPER = 1 if late fees permitted; 0 otherwise
GWAGG = The greater of the maximum legal amount assignable on the loan and the maximum legal monthly garnishment (in dollars)
LATE = Maximum legal late charge permitted (in dollars)

REFERENCES

1. M. Aho, J. Barth, J. Cordes, and A. Yezer. "Impact of Regulation on Cost and Availability of Credit." *Journal of Consumer Credit Management* 10 (Winter 1979), 66–79.
2. R. Barro. "The Loan Market, Collateral, and Rates of Interest." *Journal of Money, Credit and Banking* 8 (November 1976), 440–56.
3. J. Barth and A. Yezer. "The Economic Impact of the Federal Trade Commission Proposals for Credit Contract Regulations on the Cost and Availability of Consumer Credit." Washington, DC: Bureau of Social Science Research, Inc., 1977.
4. J. Barth, J. Cordes, and A. Yezer. "Financial Institution Regulations, Redlining and Mortgage Markets." In *The Regulation of Financial Institutions.* Conference Volume 21, Federal Reserve Bank of Boston (April 1980), 101–43.
5. ———. "Redlining in Housing Markets: Mortgages and Minorities in the U.S." *The Journal of Social and Political Studies* (Winter 1980), 221–42.
6. ———. "Federal Government Attempts to Influence the Allocation of Mortgage Credit: FHA Mortgage Insurance and Government Regulations." *The Economics of Federal Credit Activity.* Washington, DC: The Congressional Budget Office, 1981.
7. ———. "An Analysis of Informational Restrictions on the Lending Decisions of Financial Institutions." *Economic Inquiry*, forthcoming.
8. ———. "FHA Mortgage Insurance and High Risk Mortgage Lending: Some Lessons for Policy." *Housing Finance Review*, forthcoming.

[14] An employer need not comply with a revocable wage assignment. Thus wage assignment is presumably less effective as a remedy where the lender must rely on voluntary compliance by the employer.

9. G. Benston. "The Costs to Consumer Finance Companies of Extending Consumer Credit." *Technical Studies*, Washington, DC: The National Commission on Consumer Finance, 1973, Vol. II, pp. 1–158.
10. ———. "Risk on Consumer Finance Company Personal Loans." *Journal of Finance* 32 (May 1977), 593–607.
11. ———. "Graduated Rate Ceilings and Operating Costs by Size on Small Consumer Cash Loans." *Journal of Finance* 32 (June 1977), 695–707.
12. *Consumer Credit Guide.* Chicago: Commerce Clearing House, Inc., 1976.
13. *Cost of Personal Borrowing in the United States.* Boston: Financial Publishing Co., 1977.
14. W. Dunkelberg and R. De Magistris. "Measuring the Impact of Credit Regulation on Consumers." *The Regulation of Financial Institutions.* Federal Reserve Bank of Boston, 1979, 44–62.
15. *Federal Reserve Bulletin.* Washington, DC: Board of Governors of the Federal Reserve System, various issues (1975–1977).
16. P. Gotur. "A Theoretical and Empirical Analysis of a Regulated Consumer Credit Market." Unpublished doctoral dissertation: George Washington University, October 1981.
17. M. Goudzwaard. "Price Ceilings and Credit Rationing." *The Journal of Finance* 23 (March 1968), 177–85.
18. D. Greer. "An Econometric Analysis of the Personal Loan Credit Market." *Technical Studies.* Washington, DC: The National Commission on Consumer Finance, 1973, Vol. IV, pp. 37–126.
19. ———. "Rate Ceilings and Loan Turndowns." *Journal of Finance* 30 (December 1975), 1376–83.
20. N. Manage. "Regulated Personal Loan Markets and Econometric Problems: An Empirical Analysis." Unpublished doctoral dissertation: George Washington University, July 1981.
21. R. Peterson. "Effects of Creditor Remedies and Rate Restrictions." *The Regulation of Financial Institutions.* Federal Reserve Bank of Boston (1979), 24–43.
22. S. Seelig. "Convenience and Advantage Clauses as a Barrier to De Novo Entry by Bank Holding Companies in the Consumer Finance Industry." *Journal of Economics and Business* 31 (Winter 1978), 124–129.
23. R. Shay. "Factors Affecting Price, Volume, and Credit Risk in the Consumer Finance Industry." *Journal of Finance* 25 (May 1970), 503–15.
24. J. Tobin. "Estimation of Relationships for Limited Dependent Variables." *Econometrica* 26 (January 1958), 24–36.