Measuring the Impact of Credit Regulation on Consumers

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The main purpose of this paper is to develop and test a procedure for measuring the impact of credit regulation on consumer credit availability. The two types of regulations considered, rate ceilings and restrictions on creditor remedies, can lead to restrictions in credit availability. The incidence of these restrictions is not random in the population, but is dependent on the characteristics of consumers. The extent of the restriction depends on the severity of the regulations and the degree of successful evasion.

The first sections of the paper are devoted to the construction of a simple model of supply and demand that illustrates how credit is rationed to consumers in a market restricted by regulations. Based on this model, predictions are made which can be tested using consumer surveys conducted in four market areas which differ widely with respect to the regulations of interest. The empirical tests are presented in the final section of the paper.

The Supply of Credit

In order to simplify the analysis, assume that consumer credit is a homogeneous product characterized by a fixed sum of money for a fixed maturity (say, $1,000 for one year). The cost of producing this product can be characterized as a fixed cost, which includes the cost of capital to the firm, overhead costs, paperwork costs and the like, and a variable cost, which is the expected loss on a loan made to a given risk. In this context, the product is viewed as "leased" or rented to the customer. The expected loss on the loan is the expense incurred collecting delinquent amounts and writing off any bad debts. Thus, the firm will "lease" funds according to a risk-price schedule as illustrated in Figure 1 and Equation (1).

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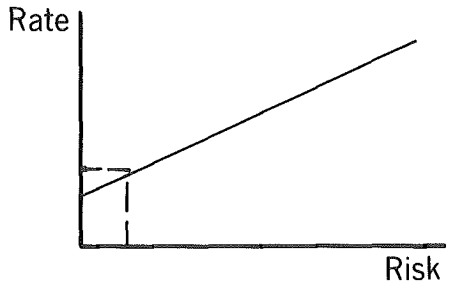
(1) r = r(R)
r = loan rate
R = borrower risk

The higher the riskiness, R, of the borrower, the higher the charge for the loan. For a small competitive lender, the supply of credit to any given risk is very elastic. The firm would make as many loans as demanded at the appropriate rate for the risk of the borrower.[1]

Figure 1
Risk-price curve



A somewhat different approach is to view the lender as the seller of different types of products, incorporating the riskiness of the loan into the production of the product. Thus, a riskier loan is more expensive to produce and must sell for a higher price. Either approach leaves us with the notion of supply curves for each product or each risk class.[2]

If the demand for consumer loans expanded, and lenders in general tried to borrow additional funds to make new loans, the cost of funds to the firms would rise. Thus, for the industry, the overall supply curve for credit is upward sloping.

[1] The average risk of the firm's portfolio, $\bar{R}$, would depend on the stream of applicants coming to the firm. For simplicity, the firm is treated as if it borrows funds for each loan as it is made. All loans are priced to yield the same certainty-equivalent return to the firm (e.g., the same return on investment).

[2] The provision of credit may also have some elements of market segmentation. If firms can differentiate customers in a manner related to differential elasticities of demand, then the firm could charge different prices for the same product. Some studies have identified types of consumers who are less sensitive to interest charges than others (Juster and Shay). Based on these studies, it would appear that classification by risk would identify such consumers with a reasonably high success rate. However, it is clear that riskier customers do in fact cost more to serve. In addition, there is substantial competition among lenders in virtually all major segments of the lending market.

This can also be seen by noting that the ultimate suppliers of loanable funds are in fact consumers, many of whom are also demanders of credit. If, overall, consumers increase their demand, then consumers must also provide the funds for lending (nominal government actions aside). Thus, rates would be bid up attracting funds away from other demanders such as firms and the public sector and inducing some consumers to save more or become savers rather than borrowers.

Risk, R, in this model is taken to be a simple function of a set of consumer characteristics P (such as age, family size, income stability, portfolio variables that may serve as collateral, etc.) and a measure of debt commitments relative to cash flow, the debt payment to income ratio, DP/Y.[3]

(2) $R = R(P, DP/Y)$

DP = monthly debt payment commitment

Y = consumer monthly income

P = consumer demographic and portfolio characteristics

R = borrower risk

Consider the formulation in equation (2), with P and Y (borrower characteristics, wealth holdings and income) held constant. Increasing the amount of debt commitments relative to income raises the borrower's risk classification. Thus, additional amounts of debt are available only at higher prices, so the supply curve facing the individual borrower is also upward sloping. In the simplified example presented here, the borrower faces a transformation of the risk-price curve which depends on how changes in the DP/Y ratio affect risk classifications.

The Demand for Credit

The demand for consumer credit is a derived demand based upon consumers' consumption decisions given their income and wealth (expected income). Using one equation from a stock adjustment system of equations describing consumer behavior (Dunkelberg and Stafford), the demand for new credit can be characterized as a function of consumption and portfolio stock-utilization disequilibria:

(3) $\Delta D = d(D_t^* - D_{t-1}, A_{j,t}^* - A_{j,t-1})$

where A_j represents such variables as the stock of durables, liquid assets and human capital.

*denotes "desired" or expected levels.

t = time period.

[3] In practice, collateral is, in many cases, difficult to acquire and liquidate if legal acceleration and collection of the debt are required. The ratio of debt commitments to income is a good measure of the consumer's ability to meet financial commitments.

Assuming linearity and rearranging terms, the level of debt held at any point in time can be expressed in terms of other portfolio disequilibria and the determinants of D*. This includes the characteristics set P, the relative price of debt, and the level of income.[4] Thus, the level of debt holdings can be expressed as in Equation (4):

(4) $D = D(P, r, Y, a_j)$ where a_j represent the disequilibria in the other behavioral equations in the stock adjustment model.

Holding the characteristics in P and the various disequilibria constant, the consumer's demand for credit can also be given a simple graphical representation in terms of the interest rate, r. However, the formulation presented here does not consider some very complex financial market relationships. Consumers are both the ultimate suppliers and demanders of credit, while government and business, including lenders, play the role of intermediaries of one sort or another. In a fundamental sense, shifts in the credit supply and demand curves will always be in equal but opposite directions. If all consumers want to borrow more against future income for current expenditure, they will save less today. Thus, the supply curve for loanable funds shifts to the left as the demand curve shifts to the right.

For the purposes of this paper, we will consider the supply decision (savings) to have been made exogenously and perhaps with a lag, establishing the total pool of funds available in real terms. The problem of the financial intermediary, then, is to allocate those funds. Each firm behaves as if it can get whatever supply of funds it needs from the market. The intermediary lending to consumers must compete with business and government for available funds. The next section focuses on how this allocation process works and how it is affected by regulations.

Regulation and the Credit Market

The basic model developed in the previous sections suggests that individual consumers can borrow all the money they want as long as they are willing to pay the price required. Why, then, are consumers turned down when they apply for credit? Assuming that lenders can assess risk, R, then any loan demand can be satisfied for an appropriate rate. In this simplified model of lender behavior, restrictions on creditor behavior will result in turndowns. In particular, by limiting the terms of the credit contract or by proscribing lender behavior in such areas as debt collection, regulators effectively deny certain consumers access to credit markets.

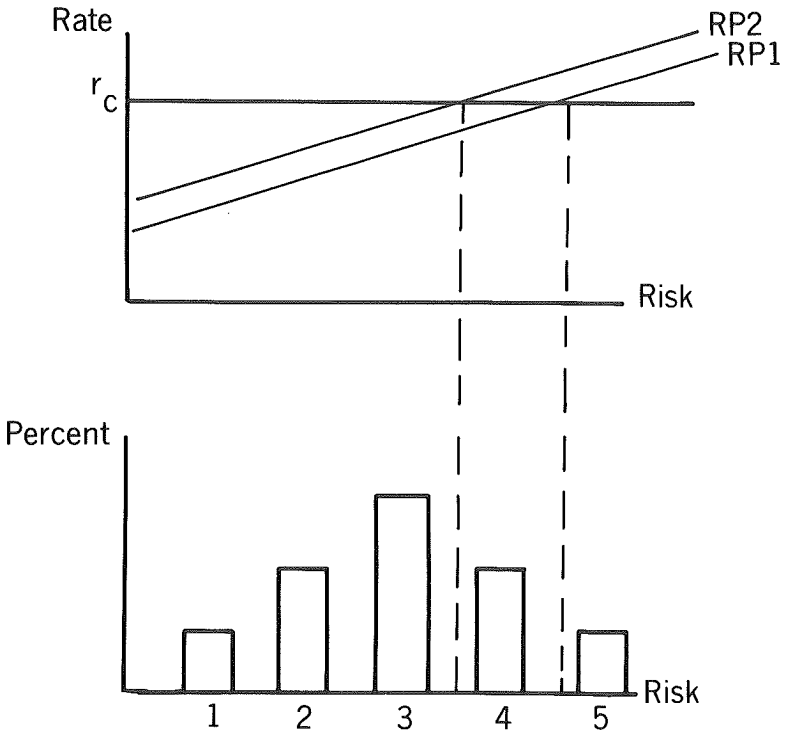
In a market for products such as gasoline, the customer is relatively homogeneous from the producer's point of view. Each consumer requires virtually the

[4] The appropriate measures to use here are human and nonhuman wealth. Those measures have not been developed in the study at this time, so are approximated by current income and variables in P related to human capital, plus a total financial asset variable.

same cost to serve. When shortages develop due to regulation, the allocation of the product is done by queue, with the last in line being "turned down." In credit markets, customers are identifiably different in terms of the costs that they generate. The allocation of available supply will be made by rationing out the most expensive customers whenever interest rate ceilings are imposed.

The rationing process is illustrated in Figure 2. The top half of the figure reproduces the risk-price curve derived earlier. The lower half of the figure assumes a hypothetical population distribution of the characteristic R. In an unrestricted market, virtually all consumers can be served. However, the imposition of a rate ceiling, r_c, makes it uneconomical to provide credit to consumers to the right of R. The cost of serving this group on average is higher than the revenue permitted.[5]

Figure 2



[5] With a continuous risk distribution, the lender would equate expected cost with the rate allowed. This analysis ignores the secondary effects of the decline in credit use (effective demand) on rates and availability to other risk segments and assumes stationary demands. For simplicity, the marginal cost of screening is assumed to be 0 for the firm.

Some of the characteristics of rationed consumers have been documented in simulation studies of the characteristics of "marginal" credit users. The general results showed that even when income did not appear explicitly in the point scoring model, lower income consumers were rejected at a substantially higher rate than their incidence in the population. In a simulation study incorporating a scoring model for a bank credit card, it was found that 95 percent of those disqualified at the margin had reported incomes below $7500 (1967 data), while only 55 percent of the population had incomes as low (Dunkelberg and Smiley). Eighty-six percent of the consumers disqualified by a retail evaluation score had incomes below $7500. The incidence of credit allocation clearly fell disproportionately on the lowest income consumers.

Restricting creditor remedies raises the cost of collecting debts. In addition, average losses increase in each risk group because remedies become less effective or more expensive to use. This is equivalent to shifting the risk-price curve to RP2 (Figure 2). With no effective rate ceiling, all borrowers would simply be charged enough more for their credit to cover the higher cost and/or losses. With an effective ceiling, however, the firm must again turn to rationing to adjust its costs to allowable revenue. In a similar manner, an increase in the cost of any of the inputs to the lending process such as labor or the cost of funds will shift the risk-price curve upward, resulting in rationing.

The model generates a large number of predictions about credit use when restrictions are placed on lender behavior. In markets where regulations are more restrictive, turndown rates will be higher and the proportion of consumers with debt will be lower. These effects will be modified to the extent that the evasion is successful. The more restrictive the regulations, the lower will be the average debt per borrower, particularly in the higher risk classes.[6] Where restrictions have differential impacts on lenders, relatively more credit will be extended by the less restricted firms or by those that can evade the restrictions at a lower cost. For example, banks and retail firms may have similar risk-price functions. However, retailers can more easily subsidize their credit operations from general revenues, lowering their effective risk-price curves relative to banks and increasing their market share.

A general test of the effects of regulation (net of evasion) on credit use is provided by using the least restricted of the four markets as a benchmark for comparing the effects of regulations in the other markets. Illinois represents the least restricted market, with the exception of rather tight restrictions on finance company loans in excess of $1,500. Louisiana is another candidate, since, although it has very strong remedy restrictions, it has very high ceilings which might, overall, qualify it as the least restricted market.

The reduced-form equation specified in (4) is estimated for all Illinois consumers as in (5). The resultant set of regression coefficients (β^*) are then used to generate an expected level of debt for consumers in each of the remaining three

[6] Given P and Y, raising D alters the risk class of the consumer. Restrictions prevent this movement at the margin and prevent borrowers with too high a risk level from additional borrowing.

markets (6). This step produces an estimate of debt use, D^e, for consumers in these markets which would be expected if these consumers operated in a market like that existing in Illinois.

(5) For Illinois, $D^* = \beta^* \ x^* + u$

where x^* represents the predictor variables for Illinois in Equation (4), β^* is the vector of parameters for Illinois

D^* = amount of debt owed by Illinois consumers

(6) For the remaining markets:

$D^e = \beta^* \ x$

where x represents the characteristics of consumers in the remaining three markets

D^e = the level of debt holdings expected for each non-Illinois consumer

(7) For the remaining markets:

$S = D - D^e$

where D = actual debt owed by consumers in the remaining markets

S = the difference between actual debt holdings and levels predicted by Illinois parameters

The supply effect of restrictions is then approximated by the difference between actual debt holdings in these three markets (D) and the expected level of debt holdings based on Illinois parameters (D^e) as in (7). This difference is denoted as S. If Illinois is the least restrictive state, then the mean value of S should be negative in each of the three remaining markets. If the elements of S are stratified by income decile or risk class within markets, the mean value of S should become more negative with decreasing income or increasing risk. The best (least risky) customers in each market are more likely to receive roughly equal treatment (i.e., be less affected by the restrictions). If, in fact, Louisiana is a less restrictive state, the mean value of S will be positive. If this is the case, Louisiana consumers will have more debt than similarly situated Illinois consumers.

These estimates of regulatory-induced supply effects may be compromised by at least two factors. Most important is the extent of evasion. Other things equal, the stronger the restriction, the more incentive there is for evasion. The most likely forms of evasion are the use of indirect credit and loans from friends, pawn shops and other less easily regulated lenders. A retail firm can issue a contract at the statutory ceiling. Then the firm can sell the paper to a financial institution at a discount and recover the difference in the price of the merchandise. In a study of the Arkansas situation, it was found that the time price of goods was virtually identical in Arkansas and surrounding states, but cash prices were much higher. (Lynch and Hardin).

In examining the differences in credit availability between markets, we begin implicitly with the basic premise that if transactions costs are zero, then, through evasion of one sort or another, similarly situated consumers will tend to use about the same amount of installment credit. This means that in spite of regulations, consumers would have the same levels of installment debt, each market approaching the condition it would have attained in the absence of regulatory interference. Since evasion is in fact costly and imperfect, differences between markets will be observed, but they will not be as striking as they would be under conditions in which the regulations imposed were fully effective.

A second factor of concern is that systematic differences in demand are not fully accounted for. Consumers in one market may be systematically more averse to or in favor of credit use. This is not captured by the demographic and financial variables used. The study will eventually permit the analysis of attitudes toward credit use which will allow empirical control for such factors. Those data were not available for this analysis.

Results

The data used to test the propositions derived from the model were collected through personal interviews with 3572 families in four market areas. The markets were selected to be maximally different with respect to creditor remedy restrictions and rate ceilings but minimally different with respect to such factors as industrial base, blue collar/white collar mix, economic environment, and market isolation. The cities selected and their position in the regulatory matrix are shown in the table below.

Regulations:	Restrictive Remedies	Less Restrictive Remedies
Low Rate Ceilings	Racine-Kenosha Wisconsin	Little Rock Arkansas
High Rate Ceilings	Lake Charles Louisiana	Waukegan-North Chicago Illinois

Approximately 1000 interviews were taken in Wisconsin and Illinois, the major matched pair of markets in the study. Approximately 750 interviews were taken in each of the secondary matched markets. The overall response rate was approximately 65 percent. The interviews were taken during the first six months of 1979. Analytically, it is possible to pool data down columns or across rows to study the effects of restricted creditor remedies or low rate ceilings respectively. Each of the four cells can be used to estimate the partial effects of each type of regulation.

Table 1 presents two regressions. The first column relates total installment debt holdings for all consumers in all four markets to the characteristics included

TABLE 1

Dependent Variable: Outstanding Installment Debt

	All Families (N=2248)		Illinois (N=623)	
	Percent of Sample	Coefficient (Std. Error)	Percent of Sample	Coefficient (Std. Error)
Approximate Income Quintile				
Lowest	19	−831(188)*	17	−800(358)*
Second	19	−578(167)*	22	−674(309)*
Third	23	—	24	—
Fourth	25	699(157)*	24	496(307)*
Highest	14	1388(197)*	13	1400(398)*
Asset Quintile				
Lowest	19	−709(247)*	23	−905(550)*
Second	20	−262(195)	18	−798(497)*
Third	21	—	18	—
Fourth	20	33(167)	22	209(333)
Highest	20	−637(182)*	19	−1036(366)*
Risk Quintile				
Lowest (highest risk)	26	620(166)*	24	1109(326)*
Second	21	3(168)	20	49(324)
Third	19	—	22	—
Fourth	18	−653(177)*	17	−495(341)
Highest (lowest risk)	16	−1083(197)*	17	−1052(379)*
Housing Status				
Owns home	68	—	63	—
Rents, furnished	8	50(257)	9	209(378)
Rents, unfurnished	22	−194(200)	26	−22(500)
Other	2	−452(427)	2	−191(803)
Age of Head				
Under 25	14	−188(207)	17	147(402)
25-34	25	−91(165)	24	−171(339)
35-44	19	—	20	—
45-54	13	−68(191)	10	−3(396)
55 or more	29	−402(185)	29	−50(360)
Marital Status/ Dependents				
Single/some	4	−372(281)	6	−459(476)
Single/none	6	−217(237)	10	−384(384)
Married/some	68	—	59	—
Been married/some	16	−203(165)	18	−220(302)
Been married/none	6	−446(227)*	7	−837(440)*
Restrictive Remedies[1]	—	−58(108)	—	—
Low Rate Ceilings[1]	—	−235(108)*	—	—
Constant	—	2396(227)*	—	2171(427)*
R^2 *(SE)*	—	.18(2452)	—	.20(2509)
Mean	—	$1590(2700)	—	1490(2750)

*Significant at the 10% level, two-tail test.

[1] State dummies, excluding Illinois, gave the following results:

Wisconsin	−275(136)*
Arkansas	120(147)
Louisiana	402(168)*

in the reduced-form equation.[7] Rather than using component parts of the risk measure, R, which are already in the equation from the demand side, an operational measure of risk based on a point score evaluation model (see Appendix A) was used in the hope of better representing the supply effects in the equation.

The actual measure of risk used includes as an input the ratio of monthly debt payments to monthly income. Since people who recently incurred a substantial amount of debt are likely to have high monthly payments, the ex post calculation of the risk measure may explain the positive association observed between risk and the total amount of debt owed. Excluding debt incurred in the 1978-79 period in constructing the risk measure, and then developing an equation to predict extensions during that period may prove to be a better approach to estimating the impact of regulations. For consumers who had debts at the beginning of 1978 but paid them off during the year these risk measures would be biased downwards. In general, the specification of the P vector should be improved.[8]

Two dummy variables were included in the first regression, one representing the markets with low rate ceilings and the other representing the two markets with restrictive remedies. Only the rate ceiling dummy coefficient was significant, although both carried the expected negative sign. Other things equal, consumers in low rate markets had less debt than their counterparts in markets where high ceilings were imposed.

The same regression was then estimated for Illinois consumers only. The results are shown in the second column of Table 1. These coefficients were used to generate predicted levels of debt holdings for consumers in the other three markets. The differences between actual debt holdings and expected levels based on Illinois parameters are summarized by risk class in Table 2.

As expected, the level of debt actually held in each market was lower than that expected based on Illinois parameters. Overall, and in most risk classes, the average difference between actual holdings and those expected is negative. Since the cell sizes become quite small in some risk classes, the mean values can be substantially affected by a few unusual cases. The standard deviations are all large, and none of the mean values in the three markets are statistically different from each other. This variance will be substantially smaller once the data have been corrected for processing errors (transcription errors, business debts mistakenly included, etc.).

This same experiment was performed using only the riskiest consumers in each market. Since highly qualified consumers may not be affected by regulations in any of the markets, their inclusion in the analysis may obscure the effects of regulations which have their primary incidence at the margin of the

[7] No measures of portfolio disequilibria were available for the analysis. These disequilibria may not be identically distributed in the markets since they depend, in part, on credit restrictions.

[8] Measures of portfolio disequilibria were not available for the analysis, although the reduced-form equation contains many of the determinants of desired stocks. Unless the omission bias is substantially different across markets, the comparisons should be relatively unaffected.

TABLE 2

Mean Difference between Actual and Expected Debt Holdings

	All Consumers		
Risk Class	Wisconsin	Arkansas	Louisiana
Lowest 5%	−870(2800)	−410(2430)	350(2790)
Next 5%	−700(2680)	−420(2620)	−540(2760)
Second decile	−1100(2730)	70(3020)	−1000(2640)
Third decile	90(2340)	470(2450)	320(2860)
Fourth decile	−528(2100)	−210(2150)	280(2950)
Fifth decile	−90(3300)	−290(1990)	320(2540)
Sixth decile	−330(2100)	90(3410)	−180(3600)
Seventh decile	−120(3500)	−80(2040)	−210(1600)
Eighth decile	−670(1170)	−610(1210)	−160(1980)
Ninth decile	−520(1340)	60(1980)	−220(1340)
Tenth decile (lowest risk)	−300(1390)	−360(1330)	−410(1250)
All	−440(2430)	−130(2390)	−150(2510)
N	959	748	663

(standard deviation)

accepted credit risk distribution. As a simple test of this possibility, the riskiest 40 percent of the consumers in Illinois were selected and the prediction equation re-estimated. The results are shown in Tables 3 and 4. Overall, and in each risk classification, high risk Wisconsin consumers had less credit than similarly situated Illinois consumers. Arkansas and Louisiana consumers also had less credit. Thus, consumers in the market with both restrictive rate ceilings and remedies had less credit than their counterparts in any of the other markets. Again, however, the standard errors are very large relative to the mean values. No means are statistically significant at the 10 percent level in spite of the large differences observed in Wisconsin.

When viewed as a percent of expected debt holdings, actual debt holdings appear to be relatively lowest in Wisconsin, where the average ratio of actual to expected debt holdings was .72 (Table 5).[9] Among the riskiest 40 percent of each market, the Wisconsin ratio was .83, compared to about 1.0 in each of the other markets (Table 6). This result is consistent with the view that if remedies are less restricted as in Arkansas, higher risk consumers are more likely to obtain credit, even with a low rate ceiling. Similarly, if rates are high enough, as in

[9] In this case, the measure of the supply effect is computed as the ratio of D, actual debt holdings, to D^e, expected debt holdings based on Illinois parameters.

TABLE 3

Dependent Variable: Outstanding Installment Debt

	Illinois High Risk[1] (N=274)	
	Percent of Sample	Coefficient (Std. Error)
Approximate Income Quintile		
Lowest	35	−1019(740)
Second	21	−1189(536)*
Third	20	–
Fourth	16	345(562)
Highest	8	2783(822)
Asset Quintile		
Lowest	16	−1081(1119)
Second	24	−914(1118)
Third	26	–
Fourth	26	−19(629)
Highest	8	−1800(839)*
Risk Quintile		
Lowest (highest risk)	54	1180(385)*
Second	46	–
Housing Status		
Owns Home	47	–
Rents, furnished	14	382(1159)
Rents, unfurnished	36	390(1096)
Other	3	150(1467)
Age of Head		
Under 25	28	−82(613)
25-34	41	−693(533)
35-44	20	–
45-54	7	−289(851)
55 or more	4	250(999)
Marital Status/Dependents		
Single/some	7	−305(826)
Single/none	15	−355(586)
Married/some	58	–
Been married/some	14	−632(609)
Been married/none	6	−871(826)
Constant		2558(719)*
R^2 *(SE)*		.19(2983)
Mean		2038(3188)

*Significant at the 10% level, two-tail test.

[1] Based on the highest 40% of the risk distribution measured by credit score.

TABLE 4

Mean Difference between Actual and Expected Debt Holdings

High Risk Consumers[1]

Risk Class	Wisconsin	Arkansas	Louisiana
Lowest 5%	−910(2970)	−370(2560)	330(2980)
Next 5%	−810(2600)	−410(2580)	−590(2850)
2nd Decile	−1250(2840)	−50(3050)	−1190(2720)
3rd Decile	−60(2390)	440(2610)	390(2890)
4th Decile	−620(2220)	−310(2200)	160(3090)
All	−700(2590)	−120(2650)	−220(2960)
N	415	360	281

[1] Based on the highest 40% of the risk distribution in each market. Expected debt level based on Illinois consumers.

(standard deviation)

TABLE 5

Mean Ratio of Actual Debt Holdings to Expected Holdings

All Families

Risk Class	Wisconsin	Arkansas	Louisiana
Lowest 5%	.74(1.54)	.90(1.20)	1.10(1.06)
Next 5%	.72(.92)	.77(1.00)	.73(1.13)
2nd Decile	.67(1.00)	.97(1.15)	.58(.97)
3rd Decile	1.01(1.38)	1.58(2.48)	1.05(1.83)
4th Decile	.67(1.00)	.81(1.31)	1.02(1.45)
5th Decile	.83(1.49)	.76(1.42)	.95(1.42)
6th Decile	.74(.98)	1.05(1.77)	.79(1.85)
7th Decile	.91(2.06)	1.10(2.13)	.88(1.75)
8th Decile	.64(1.77)	.85(2.10)	.68(1.38)
9th Decile	.39(1.30)	1.25(2.50)	.58(1.39)
10th Decile (lowest risk)	.60(1.55)	.51(.97)	.68(1.70)
All	.72(1.39)	.96(1.68)	.82(1.48)
N	905	692	617

(standard deviation)

TABLE 6

Mean Ratio of Actual Debt Holdings to Expected Holdings
High Risk Consumers[1]

Risk Class	Wisconsin	Arkansas	Louisiana
Lowest 5%	.66(1.24)	1.08(1.51)	1.24(1.24)
Next 5%	.70(.84)	.80(1.19)	.85(1.70)
2nd Decile	.76(1.45)	.98(1.15)	.58(.99)
3rd Decile	1.07(1.64)	1.59(2.51)	1.22(1.98)
4th Decile	.85(1.69)	.89(1.69)	1.27(2.18)
All	.83(1.46)	1.06(1.66)	1.00(1.67)
N	399	346	272

[1] Based on the highest 40% of the risk distribution in each market. Expected debt level based on Illinois consumers.

(standard deviation)

Louisiana, to compensate lenders for risks taken, risky borrowers can still obtain credit, even if it is relatively more difficult to collect debts.

As noted earlier, one way to evade the impact of low rate ceilings is to provide credit through indirect lenders such as retail stores or dealers. The dealer can lend to the consumer at the ceiling rate, and then rediscount the paper to a financial institution at the prevailing market rate. The cost difference can be made up in the price of the goods or services sold on credit.

The relative importance of indirect credit in Arkansas can be seen in Tables 7 and 8. Forty-nine percent of all the credit extended in Arkansas is through stores and dealers, compared to an average of 29 percent in all other markets. Banks, finance companies, and credit unions[10], the major direct lenders, generated only 41 percent of the dollar credit volume in Arkansas, compared to 67 percent in the three other states. After the paper is resold, Arkansas direct lenders end up with 77 percent of the debt, compared to 86 percent in the three other markets. So, about the same proportion of debt is held by the direct lenders in each of the four markets, but almost twice as large a share is generated by indirect lenders in Arkansas as in the other three states.

In Louisiana, where rate ceilings are quite high, stores and dealers retain almost half of the credit they generate, compared to 38 percent in Wisconsin, 36 percent in Illinois, and 34 percent in Arkansas (Table 8). The ratios of debt held by an institution to debt sourced by that institution are highest in Arkansas. The ratio for Arkansas banks is 1.36, compared to an average of 1.28 in the other markets. Arkansas finance companies held over $9 in debt for every dollar they generated compared to an average of about $2 in the other markets. Clearly,

[10] In Arkansas, *federally* chartered credit unions have been lending at 12 percent rather than at the state limit of 10 percent.

where rate ceilings are particularly restrictive, indirect credit becomes a major method of evading the effects of the ceiling.[11]

As further evidence of the importance of indirect credit as a device for evading the impact of rate ceilings, Table 9 shows that Arkansas consumers more frequently regard dealers as the easiest place to obtain credit. Credit is certainly harder to get in Arkansas, as is shown by Table 10. Twenty-eight percent of the consumers in Arkansas have been turned down for credit at one time or another. Most of these turn-downs were at banks or stores and dealers (Table 11).

Conclusions

It is a bit early in the analysis to draw many firm conclusions about the findings from such a large study. The basic objective of this paper was to apply one particular methodology to the problem of estimating the effects of regulations on the availability of consumer credit. Operationally, the procedure produced very reasonable predictions and the results were consistent with priors about the expected effects of regulations, although market evasion of the intended regulatory effects may have clouded the precision of the estimates.

One major difficulty is the measure of risk used. The only real supply variable in the equation is determined after the borrowing has taken place, making recent borrowers look "riskier" than others. If this bias is consistent across markets, perhaps the difficulties are minimal. Some simultaneity is also present in that lower credit availability means lower payment-to-income ratios and, ceteris paribus, less risky members in the population. Using a measure of risk developed outside of any of the markets may provide inaccurate weightings of this aspect of risk. Other risk measures should be used to examine the sensitivity of the findings to the measure of risk selected.

APPENDIX A

The model used to measure risk for this paper was developed in a state not included in the analysis. The following variables were used to construct the point score for each individual. The exact weights used are not shown because of confidentiality.

Age of applicant
Years at current address
Age of automobile
Monthly automobile payments
Checking and savings account references
Finance company references
Savings and Loan Association references
Credit card references
Ratio of monthly debt payment to monthly income

[11] This form of evasion introduces numerous subsidies, including support of the credit operation by cash purchasers.

TABLE 7

Market Share

	Wisconsin			Illinois		
	Sourced[2]	Held[3]	Direct[4]	Sourced	Held	Direct
Banks	41	52	50	39	49	51
Dealers	23	9	10	30	11	13
Finance Companies	8	12	9	6	16	8
Credit Unions	21	23	27	22	23	28
Employers	*	*	*	*	*	*
Other[1]	7	4	4	3	1	*
	100%	100%	100%	100%	100%	100%

	Arkansas			Louisiana		
	Sourced	Held	Direct	Sourced	Held	Direct
Banks	27	37	45	38	46	48
Dealer	49	16	26	34	16	19
Finance Companies	3	29	4	9	19	11
Credit Unions	11	11	18	16	17	19
Employers	1	*	*	*	*	*
Other[1]	9	7	7	3	2	2
	100%	100%	100%	100%	100%	100%

[1] "Other" lenders includes friends, relatives, pawn shops, etc.

[2] The borrower reported signing the documents for the loan agreement at this institution.

[3] The borrower reported making payments to this institution.

[4] The borrower makes payments to and signed loan documents at this institution.

TABLE 8

Ratio of Debt Held to Debt Sourced

	Wisc.	Ill.	Ark.	La.
Banks	1.31	1.29	1.36	1.24
Dealers	.38	.36	.34	.47
Finance Companies	1.47	2.77	9.54	2.07
Credit Unions	1.06	1.11	1.01	1.07
Other	.60	.18	.73	.66

TABLE 9

Consumer Perceptions of the Easiest Place to Get Credit

Lender	Wisconsin	Illinois	Arkansas	Louisiana
Banks	19%	19%	21%	18%
Dealers	16	22	26	20
Finance Companies	33	28	15	45
Credit Unions	28	26	33	12
Friends	1	2	1	*
Other	*	1	1	*
No answer	3	2	3	4
	100%	100%	100%	100%

*less than .5%

TABLE 10

Percentage of Consumers in Each Market Rejected for Credit

	Market			
Rejected for Credit	Wisconsin	Illinois	Arkansas	Louisiana
Yes	15%	19%	28%	12%
No	85	81	72	87
No answer	*	*	*	1
Total	100%	100%	100%	100%
n	1006	1030	787	749

*Less than .5%

Although the regression equation was used to predict the level of expected debt controls for many consumer characteristics, comparisons would be less acceptable if the distribution of the risk measure was widely different in one or more of the markets. After the risk measure was computed for each individual, the scores were ordered from low to high for all 3572 consumers and divided into quintiles. The distribution of the quintile measures is shown in Table A-1. The distributions are quite similar, and a CHI SQUARE test on the table produced a significance level of .11, supporting the observation that the distributions are not radically different.

TABLE 11

Percentage of Consumers Rejected for Credit In Each Market by Source of Credit Rejection

Source of Credit	Market			
	Wisconsin	Illinois	Arkansas	Louisiana
Inappropriate	84%	81%	72%	88%
Bank	5	6	11	4
Dealer or Store	5	6	11	5
Finance Company	3	3	2	2
Credit Union	1	2	*	*
Employer	*	*	*	*
Friends	*	*	*	*
Other	2	2	4	1
Total	100%	100%	100%	100%
n	1006	1030	787	749

*Less than .5%

TABLE A-1

Distribution of Credit Score by Market

Credit Score[a]	Market			
	Wisconsin	Illinois	Arkansas	Louisiana
Lowest 20%	22.5%	22.6%	27.8%	25.1%
Second	21.4	20.3	19.4	17.2
Third	19.0	20.2	20.2	18.8
Fourth	18.0	18.6	16.5	20.8
Highest 20%	19.1	18.3	16.1	18.1
	100%	100%	100%	100%

CHI Square = 18.01, .11 level of significance (12 d.f.)

[a]The credit source was computed for all 3572 cases. Then the entire population was divided into quintiles.

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Discussion

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The papers presented this morning by Bill Dunkelberg and Chip Peterson represent the first tiny peeks at the data they and their associates have collected as part of their research into the impact of government regulation in the area of consumer financial services. This large project, sponsored by the National Science Foundation and actually begun in 1976, is potentially one of the most important empirical studies ever undertaken in this field. However, the papers we have today must be classified as highly preliminary. While it seems appropriate to provide preliminary results of large projects at conferences such as this, I am sure the authors will agree that these papers represent only the briefest glimpse of the potential information from this study.

Because these papers are part of the same project, it seems reasonable, first, to offer some general comments about the two of them together. These papers address a question – the impact on credit markets of government-imposed restrictions such as rate ceilings – that is as old as economic analysis itself. In recent years there have been many studies of restrictions on consumer credit markets; Peterson references a number of them in his paper. In general, these studies take one or two of three possible approaches: theoretical analysis, empirical study of lenders and the supply of credit, and analysis of consumer surveys. The difference between these studies and the Dunkelberg, Peterson *et al.* project is that the latter combines all three approaches for the first time. So far, these researchers have generated some theoretical papers and have undertaken two massive surveys – one of creditors and the other of consumers – in four local markets chosen for regulatory diversity. These surveys should provide data of a kind not previously collected on portfolios of both lenders and borrowers in local markets. Not even the National Commission on Consumer Finance, which intensively studied rate ceilings and other questions in 1971 and 1972, undertook either a local-market survey of creditors or a broad survey of consumers.

As mentioned, these two papers represent the first peek at the data collected in the two surveys; however, like other peeks, these papers by themselves do not leave the reader fully informed. One will look in vain through the Peterson paper, for example, for answers to such simple questions as how many creditors were found in each local market and how the distributions of types and sizes of creditors vary by regulatory climate. Similarly, the Dunkelberg paper, which

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examines the consumer survey, could profit immensely from addition of simple comparative tables. Without them, probably the strongest general impression that emerges from these papers is that they do not reveal the scope and breadth of this research or its potential importance. The authors might contend that the purpose of these papers is more limited empirical analysis; but if so, they do themselves an injustice. Although fuller exposition may not have been possible in the short period between survey completion and the date of the conference, it still seems worth undertaking.

After some introductory discussion reviewing the reasons for selecting the four local markets surveyed, Peterson reviews, very briefly, some theoretical background concerning the impact on credit availability of rate ceilings and restrictions on creditors' remedies. In this section he correctly points out that rate ceilings and remedy restrictions, if effective, will affect both demand and supply, but that the exact nature of market adjustment is unclear. Possibilities include: (1) adjusting credit availability to riskier customers; (2) altering collection policies; (3) cross-selling other products such as credit insurance; (4) raising the prices of goods sold on credit; (5) requiring more collateral, co-signers, or higher downpayments; (6) changing production methods in other ways. A series of regression equations is then estimated, which provides the basic analysis in the paper.

All of Peterson's findings are consistent with expectations from theory, and they provide some insight into the kinds of adjustments that take place in constrained markets. These adjustments include lower rates where ceilings are binding but higher rates when creditors' collection remedies are restricted. The rate effect from limiting remedies appears greatest on unsecured loans, which Peterson suggests are the riskiest. He reports some support for the notion that higher automobile downpayments accompany restrictive rate ceilings and that the average size of personal loans at banks is larger when rate ceilings are binding. He contends, reasonably, that the latter result might be expected because low ceilings will make banks less enthusiastic about extending small loans where the small amount of revenue will be less likely to cover the fixed cost of credit investigation and loan acquisition. He also reports some other results where the statistical evidence is not strong enough to pass stringent tests. In these cases he lists the results with less confidence. Nevertheless, none of his findings are either anomalous or inconsistent with hypotheses about the likely effects of constraints in consumer credit markets.

Probably the greatest problem with the Peterson paper is its preliminary nature. Aside from the general difficulty, already mentioned, that both papers could benefit from addition of tables of frequencies and descriptive statistics, Peterson might also undertake additional statistical analysis. For example, he contends that the "basic assumption" of his analysis is that a pair of dummy variables indicating either low rate ceilings or restrictive remedies "could be used to determine if systematic differences existed in the behavior of similar creditors operating in different regulatory environments." However, this formulation assumes an additive model, although it seems more likely the effects are interactive. Examination for interaction effects might sharpen the statistical results

and provide better insights into the operation of constrained credit markets. Along the same lines, more subtle formulation of the dummy variables to account for distinctions in regulations affecting various credit forms in the states, might produce further interesting findings. The present formulation, which applies one equation with the same two dummy variables to every form of credit, seems too confining. In studying markets where adjustments may be subtle, a gross approach may miss some of the target. Also, the equation itself might be refined. The principal equation, outlined in footnote 2 of the paper, employs the unusual approach of including observations with missing data on the dependent variable and accounting for them with another independent dummy variable. Because this "missing data dummy" artificially improves goodness of fit, Peterson declines to report goodness-of-fit measures like R^2. It is not entirely clear, though, what is gained by this approach. If data are missing from some creditors for some types of loans because these creditors do not make these loans, the argument might be made that these firms are outside the limited universe being studied and the cases should be excluded. If, instead, these cases are part of the universe but they do not make these loans because of some constraint, it seems a more refined approach may be needed. It simply seems unlikely that the present approach adds any useful information.

The Dunkelberg-DeMagistris paper provides a first look at the consumer survey. This survey, undertaken in the same local markets and roughly at the same time as the creditor survey, represents the initial attempt at matching a consumer survey regarding credit matters with a corresponding creditor survey. The consumer survey is also the largest survey concerning consumers and credit regulations ever attempted, with more than 3,500 personal interviews. In time, a wealth of information should result from this phase of the project.

Like the Peterson paper, the Dunkelberg-DeMagistris paper introduces the empirical analysis with some theoretical discussion. Unlike the Peterson paper, though, this paper constructs a simple model for illustrative purposes. Both supply of and demand for credit are discussed along with the potential impact of government regulation. The theoretical analysis is followed by empirical work, which again highlights linear regressions. Although a few interesting tables are provided, space and time limitations apparently precluded extensive description of population characteristics. As with the credit survey, fuller review of this information is likely to reveal many findings that are interesting in themselves.

The theoretical discussion in the paper appears quite simple and straightforward, although it contains the usual kinds of ambiguities found in any early draft. Costs are expressed as a function of risk, which means that lenders' willingness to bear risk is a direct function of the rate ceiling. As a result, the supply of credit from both a firm and the industry is a positive function of the rate ceiling, and the supply curve is upward sloping. Unfortunately, the paper talks around this point somewhat, and in one place it seems to suggest that the upward-sloping supply curve results solely from the rising marginal costs of funds. Further consideration of firm effects and industry effects in a second draft of the paper would probably have eliminated problems of this kind. Ambiguities are also present in the sections on credit demand and market regula-

tion. For example, the section on credit demand appears to confuse somewhat the analysis of the individual case with the analysis of aggregate demand. The following section on market regulation implies that "characteristics" of "marginal" credit users will be discussed, but then only income in "point scoring models" is mentioned. Point scoring is not even defined and income is not the variable used in the paper's discussion of risk. Again, problems of this kind could be clarified in a later draft of the paper.

According to the authors, their theoretical model suggests a number of predictions about credit use when restrictions are placed on lender behavior: (1) turndown rates will be higher and the proportion of consumers with debt will be lower; (2) average debt per borrower will be lower, particularly in the higher risk classes; and (3) relatively more credit will be extended by the less restricted firms and by those that can evade the restrictions. To study these possibilities the authors employ the interesting approach of estimating a reduced-form equation using data from the least restricted state of their four (Illinois) and then using the parameters to make predictions about consumers in the other states. If the other states are more restrictive and the model is correct, then the restrictions should manifest themselves in the form of differences between predicted conditions and actual conditions in the restricted states. In addition, the differences should be most pronounced in the riskiest classes of consumers.

In general, the authors' statistical results are consistent with their expectations. The authors note a number of potential problems – including possible evasions of the restrictions, systematic differences in demand, and apparent inadequacy of the risk proxy employed – but these difficulties do not obscure the general thrust of the results. In many ways the results are exciting because they represent the first evidence from a micro consumer survey of the comparative effects of state credit regulations.[1] Again, however, the paper could have been crisper had there been more time for the authors to refine the analysis after receiving the data. Particular attention might have been given to studying the measure of risk used in the analysis. In its present form the risk measure used produces somewhat confusing results. Furthermore, it is not clear from the text or appendix how the risk measure was actually constructed. Certainly, the authors did not have accurate data on all the measures suggested in the appendix as used in constructing the risk measure. This problem compounds confusing findings.

In sum, the authors of these papers have provided only a glimpse of the huge structure and results of their project. While the papers may not provide all the answers, they certainly whet the appetite. While preparing a monograph takes somewhat longer, I encourage the authors to continue their work. The potential importance of their findings makes it worth the further wait.

[1] Eisenbeis and Murphy [1] used results of a consumer survey to study the impact of rate regulation in Maine, but this new project is both larger and useful in making comparisons among four states. In later work the authors might be able to use these data to generalize the work of Eisenbeis and Murphy.

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