

---

# FRBSF WEEKLY LETTER

Number 91-42, November 29, 1991

## Solving the Mystery of High Credit Card Rates

The behavior of credit card interest rates has befuddled many observers. The rates seem high, relative to other interest rates, currently averaging about 12 percentage points above the Treasury bill rate. In addition, whereas market interest rates have declined significantly since the early 1980s, credit card rates have not moved down significantly. Indeed, the spread between the Treasury bill rate and credit card rates has doubled in that time.

The credit card industry has not offered a good explanation of the behavior of credit card rates. In light of the high level of credit card rates, therefore, about half the states have imposed usury limits on credit card rates. While credit card issuers have been able to avoid these restrictions in many cases by moving their activities to other states, other policy makers recently have proposed national rate caps. It is important to know whether such usury laws are justified.

The purpose of this *Weekly Letter* is to present a simple view of credit card rate-setting that produces the high and insensitive rate structure observed. The model is used to reproduce the actual historical performance of credit card rates. The conclusion is that high and invariant credit card rates are not necessarily evidence of a failure of competition in the credit card market. This calls into question the advisability of usury restrictions.

### The credit card market

Credit cards are both payment and credit devices. Cardholders can use them in lieu of cash for a variety of retail transactions. At any given time, a bit fewer than half of all cardholders also use them to access a revolving credit line of a preset amount. The use of credit cards as a payments device is growing at the rate of about 10 percent per year. The amount of credit card debt outstanding is growing at about a 6 percent annual rate and represents about 30 percent of all consumer installment credit.

Providers of "interchange" services (such as MasterCard and Visa) transmit payment information between the cardholder's and the merchant's banks. However, the issuing institution sets the card's terms, including the interest rate, the grace period, annual fees, penalties, and most other card features. While there are relatively few suppliers of interchange services, according to the Nilson Report there are at least 5,000 credit card issuers in the United States (excluding private label variations of these cards). In addition, entry into the business is relatively easy, with individual retailers and other commercial entities of even modest size offering credit card plans.

### Resolving a conundrum

The existence of this many suppliers normally would be expected to lead to aggressive price competition. Yet, credit card rates appear to be very sticky, responding sluggishly, if at all, to trends and fluctuations in other market interest rates. The volatility of credit card rates is less than one-fifth that of Treasury Bill rates, for example, and the correlation between the two interest rates over the past 10 years has been less than 0.1.

In addition, as pointed out by Ausubel (1991) and the Board of Governors (1991), the rate of return to banks on credit card assets appears to be high relative to the return observed for other bank assets. Yet actual loss (charge-off) rates do not appear to be very high, averaging below 3 percent for most of the past decade—seemingly too little to justify a 12 percent premium over riskless rates.

All of this evidence is seen as being consistent with abnormally high profits in credit card lending, in sharp contrast to what would be expected given the structure of the industry.

To resolve this conundrum, it is necessary to focus on the nature of the debt created by using the revolving credit feature of a credit card. In particular, credit card debt is unsecured debt;

---

# FRBSF

when a customer uses a credit card in a purchase and does not pay off the balance within the grace period, the issuing bank acquires an unsecured loan. That is, neither the merchandise purchased, nor any other asset of the cardholder, may be repossessed easily by the lender to ensure payment.

The obvious reason for this feature is that for small transactions, the additional contractual steps involved in establishing title as part of the loan agreement would be costly. (Such steps do make sense, on the other hand, for larger denomination installment credit, such as auto loans or home equity lines.)

The only avenue open to the lender to obtain repayment from delinquent cardholders is to proceed in court against the general assets or income of the cardholder and to report the delinquency to credit rating agencies. In the former case, the transactions costs conceivably could be large relative to outstanding balances, which average only about \$1,200 per card in 1990 (using data from the market for credit card-backed securities). The threat of impaired credit ratings serves to discipline the user against excessive use of the card, but does not actually assist in recovery of outstanding balances.

## Modeling credit card debt

Finance theory provides a way of pricing risky debt using options pricing theory, by recognizing that the default potential of a loan essentially implies the existence of a financial option. Using such models, it can be shown that the value (to the lender) of such a loan depends on more than just the market interest rate; in particular, the loan value declines with increases in the riskiness of the cardholder's net worth (which provide the ultimate security of the loan) and with decreases in collateralization.

If the issuing bank can predict the risk accurately, of course, it can charge a higher initial interest rate on the credit to compensate for the additional risk. However, even if the bank knows the risk beforehand, its ability to control the riskiness of the borrower, once the borrower has the credit, is limited. Indeed, once the borrower has the funds at an agreed upon price, he has a strong incentive to use it under conditions that are most favorable to him—namely, when his net worth is impaired. The issuing bank has limited ability to

identify when these conditions prevail and to exercise control over its exposure.

Banks can (and do) impose limits on credit card credit as a means of controlling exposure. In addition, credit card companies try to identify consumer segments that pose lower risks of default (and these selective issuers charge lower rates). But within any consumer segment, the lender can never be certain how leveraged the borrower has become because of other obligations, and because of the lack of collateralization, must assume "worst case" exposure within each segment.

## Implications

The primary, practical solutions to this so-called "moral hazard of lending" dilemma are (1) to collateralize the loan (a possibility likely foreclosed because of the title cost considerations expressed above), or (2) to price the loan assuming maximum risk exposure. That is, credit card debt interest rates must be set very high in order to compensate the issuer for the fact that users will adjust their risk in response to the price of the credit.

Indeed, if there were no way to limit the moral hazard problem, no rate would be high enough. (As a practical matter, of course, the reputational costs associated with a bad credit rating help cap extreme behavior of borrowers.) The result is that under conditions of poor collateralization, lenders must charge considerably higher credit card rates than when lending is secured, even to "creditworthy" segments. (In addition, it can be shown theoretically that the rate on a poorly collateralized loan is insensitive to variations in riskless rates.)

The resultant use of high rates implies that credit card debt will be "overpriced" for households that pose low risks of default. These households will tend not to use the revolving credit features of their cards, but rather to use them mainly as transactions devices. (In practice, slightly more than half of all cardholders use the cards without running credit balances.) They will be primarily sensitive to annual fees and the grace period, an implication consistent with observations of credit card marketers cited by Ausubel.

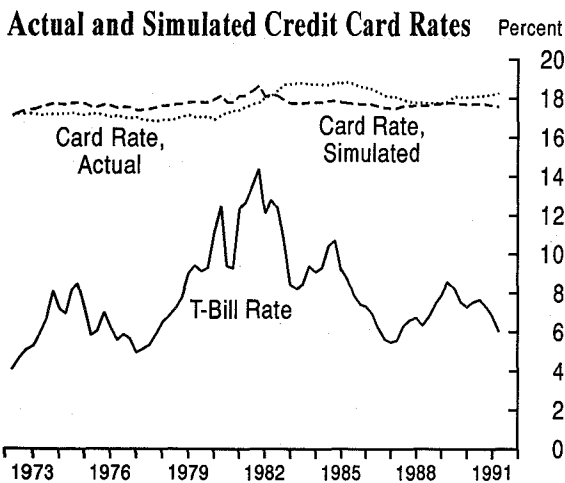
"Riskier" households, on the other hand, will self-select into using the credit feature of their cards because, for them, the rate premium is attractive given the costs to them of alternative credit. Although the charge-off rate for these borrowers will be accordingly high, the average across all outstanding balances is reduced by those who choose to pay at the end of the grace

period, partly explaining the low, actual charge-off rates.

### Simulating credit card pricing

The options pricing model described above can be stated mathematically, and its parameters estimated by varying them until they best fit the historical experience of credit card rates. Through such an exercise, we can determine (1) if it is possible for the model to match actual credit card pricing and (2) if the parameters are consistent with the assumptions of the nature of credit card debt. In particular, we can see whether it is priced assuming a low level of collateralization and high marginal risk.

The author performed this exercise, using a simple Black-Scholes type representation of collateralized debt. Actual short-term interest rates were used, with all other parameters of the model selected using an optimization technique to find the best fit of the modeled rates to actual credit card rates. The results, presented in the Chart, show that it was easy to fit the options-based model to the actual data, even if it is assumed that the risk exposure of the lender has not varied over this time period. (In addition, there is no attempt to control for the removal of interstate usury controls in 1982.)



More importantly, however, the parameters of the underlying model are consistent with the representation of credit card debt as costly-to-service, unsecured credit extended to relatively high-risk borrowers. Specifically, the loan seems to be

priced as if the lender perceived the debt as poorly collateralized or costly to service, and the variance of the borrower's net worth as high. (As a point of reference, the implied variance is similar to the variance in the S&P 500 returns.) As a check on the internal consistency of the simulation exercise, the term of the credit card debt was also estimated, rather than assumed, as a part of the empirical exercise. The implied term of the credit card debt in the model is about four years, in the range of the terms implied in secondary market sales of credit card debt.

### Conclusion

In Ausubel's very thorough study of the credit card market, he concludes that cardholders were "irrational," acquiring the cards with no intention of ever using them, but ending up incurring large credit card balances and debt service costs. The implication of the analysis here is that no such irrationality need be invoked. Rather, the high, and insensitive, credit card rates are consistent with the pricing of risky credits in an atmosphere of moral hazard and costly collateralization or service. The fact that credit card issuers that do offer lower rates do so only to more carefully selected consumer segments also is consistent with the risk management model employed here.

This alone, of course, does not prove that the credit card market is as competitive as it should be. However, the current performance of credit card rates is completely consistent with the model used in this Letter. This suggests that attempts to reduce credit card rates through usury legislation will have the effect of exposing banks to increased risk, and reducing the availability of consumer credit. This is a curious policy direction in an economy already plagued by weak financial institutions and sluggish credit growth.

**Randall J. Pozdena**  
Vice President

### References

- Ausubel, L. 1991. "The Failure of Competition in the Credit Card Market." *American Economic Review* (March) pp. 50-81.
- Board of Governors of the Federal Reserve System. 1991. "Profitability of Credit Card Plans: Second Annual Report to Congress."

Opinions expressed in this newsletter do not necessarily reflect the views of the management of the Federal Reserve Bank of San Francisco, or of the Board of Governors of the Federal Reserve System. Editorial comments may be addressed to the editor or to the author. . . . Free copies of Federal Reserve publications can be obtained from the Public Information Department, Federal Reserve Bank of San Francisco, P.O. Box 7702, San Francisco 94120. Phone (415) 974-2246, Fax (415) 974-3341.

P.O. Box 7702  
San Francisco, CA 94120

**Research Department  
Federal Reserve  
Bank of  
San Francisco**

**Index to Recent Issues of *FRBSF Weekly Letter***

<b>DATE</b>	<b>NUMBER</b>	<b>TITLE</b>	<b>AUTHOR</b>
5/17	(91-20)	Recession and the West	Cromwell
5/24	(91-21)	Financial Constraints and Bank Credit	Furlong
5/31	(91-22)	Ending Inflation	Judd/Motley
6/7	(91-23)	Using Consumption to Forecast Income	Trehan
6/14	91-24	Free Trade with Mexico?	Moreno
7/5	91-25	Is the Prime Rate Too High?	Furlong
7/19	91-26	Consumer Confidence and the Outlook for Consumer Spending	Throop
7/26	91-27	Real Estate Loan Problems in the West	Zimmerman
8/16	91-28	Aerospace Downturn	Sherwood-Call
8/30	91-29	Public Preferences and Inflation	Walsh
9/6	91-30	Bank Branching and Portfolio Diversification	Laderman/Schmidt/ Zimmerman
9/13	91-31	The Gulf War and the U.S. Economy	Throop
9/20	91-32	The Negative Effects of Lender Liability	Hermalin
9/27	91-33	M2 and the Business Cycle	Furlong/Judd
10/4	91-34	International Output Comparisons	Glick
10/11	91-35	Is Banking Really Prone to Panics?	Pozdena
10/18	91-36	Deposit Insurance: Recapitalize or Reform?	Levonian
10/25	91-37	Earnings Plummet at Western Banks	Zimmerman
11/1	91-38	Bank Stock Risk and Return	Neuberger
11/8	91-39	The False Hope of the Narrow Bank	Pozdena
11/15	91-40	The Regional Concentration of Recessions	Cromwell
11/22	91-41	Real Wages in the 1980s	Trehan

The *FRBSF Weekly Letter* appears on an abbreviated schedule in June, July, August, and December.