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Determining who are the value-creating cardholders presupposes an analysis of returns on equity that are adjusted for both expected and unexpected risks in the appropriately segmented populations.

Value Creation in a Credit Card Portfolio

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DEBRA DRECNIK WORDEN

In these times of upheaval in the banking industry, managers are increasingly likely to question whether their business units create value for shareholders. Industry analysts have argued that once a bank identifies pieces of its retail sector which add or dilute value for its shareholders, it can forge a strategy for each business unit that has a good chance of succeeding. However, measuring the shareholder-value-creation potential of a business unit or product forces the retail banker to think about performance in new and sometimes confusing ways. Traditional measures of performance do not correlate with market value measures. High interest rate margins and earnings per share do not necessarily add up to high stock prices. As the standards for performance measurement in banking shift to return on equity, adjusted for risk, bankers are discovering “some fascinating facts about their business mix.”

The purpose of this analysis is to discover the “facts” about the mix of behavioral types in a credit card portfolio and the way mix impacts shareholder value. We disaggregated the portfolio of standard credit cards of a large regional bank into segments which are defined in terms of the way the cards were used in 1988. The annual profitability of each segment, measured in terms of after-tax return on equity, is estimated. In addition, the performance of a small sample of premium cards is analyzed. The analysis provides insights into the “value drivers” in the portfolio and the value-creation potential of new-card marketing and pricing programs.

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If managers want to determine the value created by a particular lending function, they estimate its incremental cash flows, the amount of the shareholders' investment, and the shareholders' required rate of return. With these data, the managers can determine shareholder value, which is net present value minus allocated capital.

Leemputte and Kearney describe a process for estimating the break-up value or net present value of an existing retail banking business unit. Another method for analyzing the value creation aspects of a lending activity is to estimate the risk-adjusted rate of return on equity capital invested. The amount of equity invested is that required to shield the lender from unexpected losses in the loan portfolio, losses that are not provided for by the regular loss reserve. The capital allocation for unexpected losses may vary across segments of a loan portfolio and can greatly exceed the bank's overall capital-to-assets ratio.

In this analysis of the risk-adjusted return on equity of a standard credit card portfolio, the portfolio was divided into segments defined in terms of the way the cards were used during the year, the size of credit lines, and the age of the accounts. For each segment, total gross income was determined by summing the actual total interest paid during the year, all annual fees, interchange income, and delinquency and overlimit charges paid by each account. Interest and noninterest charges for servicing the accounts were deducted from total gross income. Both charges were estimated as a percentage of the average balance of each account during the year. The interest expense was set equal to 8%, the average two-year constant-maturity Treasury bond rate during the analysis year (1988). In the calculation, the interest expense charged to each account was adjusted to reflect the fact that the account was partially funded by interest-free equity.

**Pricing Covers Average Losses**

For banks of comparable asset size, total operating expenses for the credit card function were 5% of outstandings in 1988. This figure was used in the estimation of operating expenses attributable to each account in the portfolio. Also subtracted from gross income were actual chargeoffs in 1988. The result of these calculations is cash income before taxes.

Theoretically, loans will be priced high enough to allow the lender to cover his expected chargeoffs. The role of the equity capital is to protect the lender from unexpected losses for given types of loans. Prudent credit risk management procedures require that the lender underwrite each loan type or segment of the portfolio with capital equal to a measure of unexpected losses for the relevant class of loans. Following the methodology described by Rose, we set the capital allocation for each segment of the portfolio based on the standard deviation of the distribution of actual chargeoff losses for that segment. Due to data limitations, the amount of unexpected losses was based on experience for only one year. Ideally, the unexpected loss risk would be measured over a number of years.

**The Benefits of Diversification**

This capital allocation does not define the optimal leverage for a bank seeking to satisfy the "worst case" requirement for equity funding. Rose argued that if loan losses were distributed normally, the allocation of risk capital equal to two standard deviations of losses would cover the bank against unexpected losses about 98% of the time, provided the future replicated the past. But two times the standard deviation of loan losses may overestimate unexpected losses since losses across various segments are probably not perfectly correlated. Given the extent of geographic and demographic diversification in most credit card portfolios, we would allocate capital equal to one standard deviation of the mean loss experience.

In the final calculation of the after-tax return on equity, the average income earned for each segment of the portfolio was adjusted by a 40% tax factor and divided by the allocated capital amount for that segment. The resulting risk-adjusted rate of return was then compared with the hurdle rate of the bank to determine whether the business justified tying up shareholders' funds. We assumed that the after-tax hurdle rate for bank equity in 1988 was 15%.

The analysis was performed using a sample of credit card accounts randomly selected from the
population of active accounts in the portfolio of a large midwestern commercial bank. The portfolio contained accounts representing households from every region of the country but was concentrated in the Midwest. The data base included the date the account was opened and all account activity for 1988. All accounts included in the sample were open before 1988 and were active during the year, but could have been closed or charged off by year end. Segments of the portfolio were defined in terms of how the accounts had been used in 1988.

Incorporating Delinquencies

While the allocation of risk capital for each segment of the card portfolio was derived from an assessment of the risk of unexpected loss in that segment, or the standard deviation of the distribution of 1988 charged-off dollars, other more traditional measures of account risk were included in the summary statistics for each segment but were not included in the calculation of net income for each segment.

These risk measures were (a) percent delinquent – the proportion of the 1988 account life in which a payment was past due for at least 30 days; average value for all accounts, and (b) percent overlimit – the percent of the 1988 account life in which an outstanding balance exceeded the approved line of credit; average value for all accounts in the segment.

Measures of account activity provided for each segment were the average percent of the total credit line used during the year (1988 average balance/credit line), and the average percent of the 1988 account life that a balance was revolved.

Institutional Pricing. The method by which the cards are priced obviously has a profound impact on the rate-of-return analysis. The pricing schedule for this portfolio was similar to that for the bulk of bank credit cards outstanding in 1988. The majority of the accounts were standard Visa and MasterCard cards with an annual fee of $12 or $15 and an annual percentage rate of 16.8% on cash advances and 19.8% on merchandise purchases. The issuer provided a 30-day grace period on all merchandise purchases, but not on cash advances. The premium cards in the sample had an adjustable interest rate with an annual fee of $35. For all accounts, the late fee and the overlimit fee were $10 per incident. In the analysis, the merchant interchange fee was 1.3% of total merchandise purchases.

The Return on Equity for the Portfolio. The bank credit card industry defined its profitability targets for credit card portfolios in terms of the after-tax return on assets. The American Bankers Association’s 1989 Credit Card Report indicated that medium-size banks ($300 million to $1 billion in assets) had an average after-tax return-on-assets target of 1.2%, while banks above $1 billion in assets set that target at 3.11%. Others have estimated that commercial banks had an after-tax hurdle rate of return on equity of 15% to 20% during 1988. At a tax rate of 40%, the portfolio analyzed here produced an after-tax return on assets of 2.58% and an after-tax return on equity (ROE) of 12.05%.

The disappointing level of equity returns is directly attributable to the large capital allocation for unexpected losses, which equaled 35% of average account balances – a staggering yet, for this year, a correct figure. Most banks would, of course, require less equity and therefore may have acceptably profitable returns. In this year, however, the portfolio was not creating shareholder value for this institution. Let us now proceed to an analysis of the profitability of discrete segments of the portfolio.

Value Creation – Revolvers vs. Convenience Users. Most cards are priced so that the cardholder may avoid paying interest if the entire balance is paid within the grace period. Thus, only those cardholders who actually revolve a balance pay interest. The profitability of a credit card portfolio depends vitally on the mix of revolvers and nonrevolvers. In 1988, 58.5% of this sample paid interest at some time during the year. This is comparable to industry figures that indicate that about 60% of account holders in 1988 revolved.

The standard accounts in the sample were segmented into four groups based on the proportion of times the balance was revolved in 1988. (See Table 1.) While it is desirable to increase revolver activity from an income-generating point of view, the data in Table 1 indicate that all measures of credit risk increase in proportion to the amount of time a customer revolves. And, as would be expected, the amount of allocated capi-
Table 1: Card Use Performance of Customers, Classified According to Percent of Time Revolving

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Percent of 1988 Account Life Revolved</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>% Credit Line Used</td>
<td>6.2</td>
</tr>
<tr>
<td>% Of 1988 Account Life Revolved</td>
<td>0</td>
</tr>
<tr>
<td>% 1988 Account Life Delinquent</td>
<td>1.6</td>
</tr>
<tr>
<td>% 1988 Account Life Overlimit</td>
<td>0.3</td>
</tr>
<tr>
<td>% Accounts Charged Off in 1988</td>
<td>1.1</td>
</tr>
<tr>
<td>Standard Deviation of $ Chargeoffs</td>
<td>127.04</td>
</tr>
<tr>
<td>Before-Tax Net Income $</td>
<td>7.91</td>
</tr>
<tr>
<td>After-Tax Return on Equity %</td>
<td>3.75</td>
</tr>
</tbody>
</table>

N= 7528, Arithmetic Mean Values

The analysis required to hedge against unexpected losses, which is the standard deviation of chargeoff losses, also increases as the accounts are more heavily revolved. However, only the heavy-revolver segment of the portfolio (more than 75% percent of the year) produced sufficient cash flow to justify the capital required, given the risk of the segment. (The allocated capital for the second group was zero because there were no chargeoffs, eliminating the possibility for calculating a ROE. However, average income for these accounts was positive.) The performance measure for the other two segments indicates that shareholder value is actually being destroyed, given the current pricing strategy for credit cards.

The analysis of return on equity suggests a need for repricing credit card services for nonrevolvers. Many in the industry would argue that the activity of the nonrevolver reduces the average cost of all transactions, generating higher profitability for the entire portfolio. Some might argue that the nonrevolver account is also a low-cost account to service because of its limited bad-debt and collection expenses. However, the average balance for the nonrevolver segment was only one-eighth the size of that of the heavy-revolver segment. As the operating costs were assigned in proportion to average balances, the ROE figures for each segment already incorporate the operating costs that are associated with the nonrevolving segment.

Ways to increase nonrevolver profitability include raising the annual fee, assessing a per-transaction charge, increasing the interchange rate, and eliminating the grace period. In the current competitive environment, none of these alternatives would seem palatable. But if shareholder-value creation is the objective, nonrevolvers must either be shifted to debit cards (with lower unexpected losses) or charged fees high enough to reduce their drag on overall profitability.

Value Creation – High-Balance Revolvers. The previous analysis argues for the targeting of active revolvers to improve the value-creating potential. But some banks have identified cardholders who revolve a large percentage of their credit line as high-risk and have thus terminated such accounts. To assess the validity of such a strategy in a risk-adjusted-return framework, accounts that revolved a balance more than 75% of the time were segmented into two groups – those that revoked less than one-half of their available credit line and those that revoked more than half. (See Table 2.)

All measures of credit risk were dramatically higher for the “high-balance revolver.” The capital allocation for this segment was more than 10 times higher than that for the low-balance revolver, while the income derived from the high-balance revolver was only 50% greater. Nevertheless, the ROE for the high-balance revolver was acceptable.
It is clear from these data that efforts to reduce loss uncertainty from high-balance revolvers, perhaps through closer monitoring of credit limits, should improve risk-adjusted profitability. However, indiscriminate termination of these accounts is probably not a good idea.

The Risk-Adjusted Return on Premium Cards. Premium credit cards were an important innovation of the last five years. These cards generally offer a high credit limit, a relatively low or adjustable interest rate, and a high annual fee relative to that charged for standard bank cards. One would expect credit standards to be stricter for premium cards, and the lower interest rate should be attractive to those intending to use the card, not convenience. As a result, the premium card segment should produce a high risk-adjusted rate of return.

The performance of the premium accounts in the sample was compared with that for standard accounts with similarly high credit lines ($5,000 or more). The summary statistics are presented in Table 3. As expected, premium cardholders were more likely to revolve a balance and used a higher percentage of the available credit line than did standard cardholders. However, all the risk measures for the premium cards exceeded those for the standard ones, and the standard deviation of losses was more than twice as high. The risk-adjusted return on equity for the premium card was well below the hurdle rate (only 9%). In contrast, standard accounts with large credit lines provided a return that was above the hurdle rate (nearly 17%).

The inferior performance of the premium card program may be attributed to a difference in the age of accounts. Banks generally do not offer a high credit line to a standard cardholder unless he is a very good credit risk or is a long-standing customer. The low credit risk measures in the standard card segment may simply reflect the effects of account aging. In fact, the average age of the premium accounts was 19 months, while that for the standard high-balance accounts was 64 months.

Thus, while the ROE for the premium cards was disappointing, it is possible that a portfolio of “aged” premium cards might be as profitable as one of standard cards with high credit lines. The following section provides more information on the relationship between the age of the account and profitability.

Risk-Adjusted Returns by Age of Account. Card issuers have generally observed a relationship between account age and the incidence of credit difficulty. Lenders expect delinquency rates for new accounts to peak in their second year. To isolate the impact of account age, the portfolio was segmented into four groups on the basis of age of account and profitability.
All measures of risk peak at the 13-to-24 month age group, including the measure of unexpected losses. The risk-adjusted return increased with account age but did not exceed the hurdle rate until the accounts were more than 60 months old.

These data suggest the high-return potential of programs for retaining existing accounts. In their concentration on portfolio growth through new account solicitation, card issuers have, in all likelihood, dramatically reduced their return on equity. In contrast, those who cultivated their existing accounts may have created more shareholder value, albeit with lower portfolio growth. Note that the increased value of the mature account derives primarily from the lower amount of equity required to hedge unexpected losses. In an analysis of commercial loans, Rose found that investment-grade “blue chip” loans provided the highest return on equity for a similar reason.

The objective of bank managers is to create shareholder value in each product or function of the bank. To do less is to invite failure. However, most managers are not accustomed to measuring the value-creating potential of bank products. Using a methodology described by Rose, we calculated the risk-adjusted after-tax return on equity for segments of a credit card portfolio. While the overall portfolio provided an attractive return on assets, the return on allocated equity was below the hurdle rate, probably because the variance of losses in this particular year was unusually high.

Segmentation of the portfolio provided evidence that, on average, accounts that did not revolve a balance at least 75% of the time destroyed shareholder value. However, among high revolvers, those who revolved less than half their credit lines were sensationally profitable, while those revolving more than half their lines exceeded the bank’s hurdle rate by only one point. Further, premium cards earned a return well below the average for the portfolio and dramatically lower than the return provided by standard cards with similarly high credit limits. The weak performance of the premium card segment appeared to reflect the low average age of accounts. Our final segmentation revealed that the risk-adjusted return increased with the age of the account, but was above the hurdle rate only for those accounts that were more than five years old.

The analysis demonstrates that the strategy of offering large credit lines at low fees and rates to cardholders who have not absolutely demonstrated their creditworthiness causes high unexpected losses without offsetting income growth. But programs designed to retain existing accounts are likely to add considerable value to the portfolio. This profitability analysis does not provide justification for cracking down on those who revolve a high percentage of their lines most of the time.
To build value, credit card portfolio managers must consider the implications of their strategies for both income and unexpected losses. As all credit card portfolios are not the same, the results of this analysis may not be generalizable, but the value of the insights gained is clear.

Notes