What's Draining Your Wallet?

The Real Cost of Credit Card Cash Advances

Joshua M. Frank
Center for Responsible Lending

December 16, 2008

CENTER FOR RESPONSIBLE LENDING

www.responsiblelending.org

About the Center for Responsible Lending

The Center for Responsible Lending is a nonprofit, nonpartisan research and policy organization dedicated to protecting homeownership and family wealth by working to eliminate abusive financial practices. CRL is affiliated with Self-Help, one of the nation's largest community development financial institutions.

Visit our website at **www.responsiblelending.org.**

North Carolina
302 West Main Street
Durham, NC 27701
Ph (919) 313-8500
Fax (919) 313-8595

California
1330 Broadway
Suite 604
Oakland, CA 94612
Ph (510) 379-5500
Fax (510) 893-9300

District of Columbia
910 17th Street NW
Suite 500
Washington, DC 20006
Ph (202) 349-1850
Fax (202) 289-9009

EXECUTIVE SUMMARY

Americans have come to rely on their credit cards as both a form of payment for purchases and a flexible way to borrow cash. The total amount of credit card debt is approaching a trillion dollars. Credit cards are a key source of revenue for financial institutions and usually among the most profitable loan products available today.

Credit card pricing has become highly complex and increasingly difficult for borrowers to follow. Credit card issuers at one time charged a single fixed interest rate to all customers and now charge individual customers several different varying interest rates at once, some of which expire after a short time period, and some rates suddenly changing to "penalty rates" under certain conditions. The number and importance of fees charged to consumers has also grown dramatically.

While there has been significant public discussion of certain hidden fees that are common on credit cards, manipulating how consumers' payments are allocated towards a borrower's balance is another hidden charge that can impose significant costs on the borrower without their knowledge. Borrowers can have balances on the same card at several different rates at once such as a purchase balance, a temporary promotional – or "teaser" – balance and a high-rate cash advance balance. By putting all of the payment toward the lowest rate balance (typically the purchase balance or teaser balance), issuers can in effect substantially raise the interest rates paid by borrowers.

This report demonstrates that this ordering of payments or "payment allocation" policy can be both expensive and confusing for credit card customers who, as a group, have little knowledge of the mechanics or cost. The data analyzed in this report shows that allocating payments to the lowest rate first is harmful to borrowers, highly deceptive, and inconsistent with risk-based pricing. More specifically the study finds the system is stacked against borrowers in the following ways:

- **Payment allocation forces borrowers to pay the highest prices, as much as 7 percentage points higher.** By paying the lower-cost purchase balance first, payment allocation increases the borrower's other balances and effectively raises the total interest paid by the borrower. As a result of payment allocation abuses, some borrowers with credit card debt pay as much as $700 extra each year.

- **Customers are unaware of the significance and impact of these hidden charges.** Only 3% of borrowers surveyed have the knowledge and capacity to evaluate credit card companies' payment allocation policies.

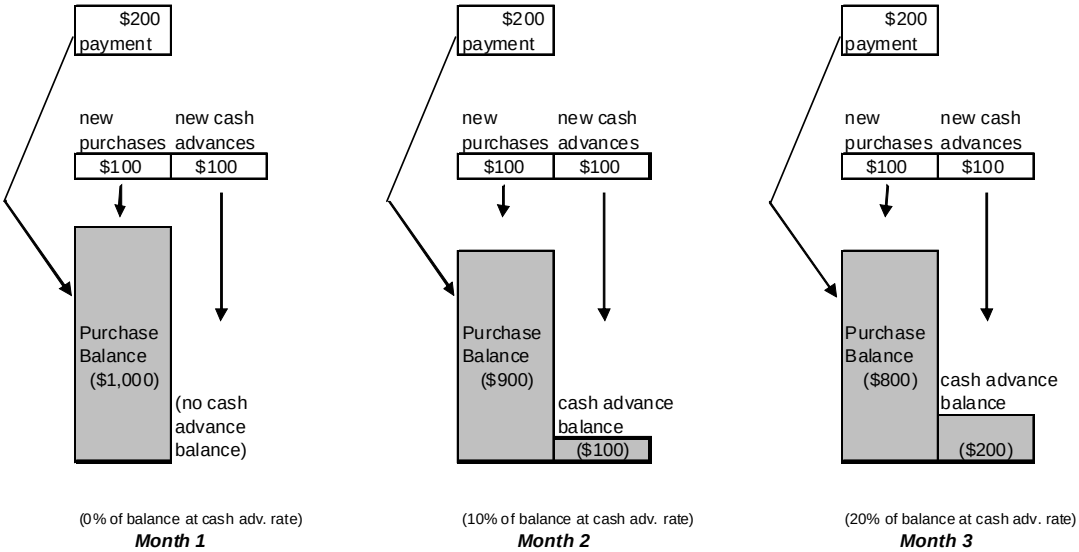
- **Payment allocation distorts risk-based pricing.** When all measures of risk are taken into account, our analysis reveals the **opposite** of risk-based pricing. Lower risk customers pay significantly higher interest rates compared to high-risk borrowers.

The Surprising Impact of Where the Payments Go

For a consumer who uses both cash advances and purchases, a credit card company that allocates a customer's payment to the lowest rate first (LRF) converts almost the entire balance to the cash advance rate.

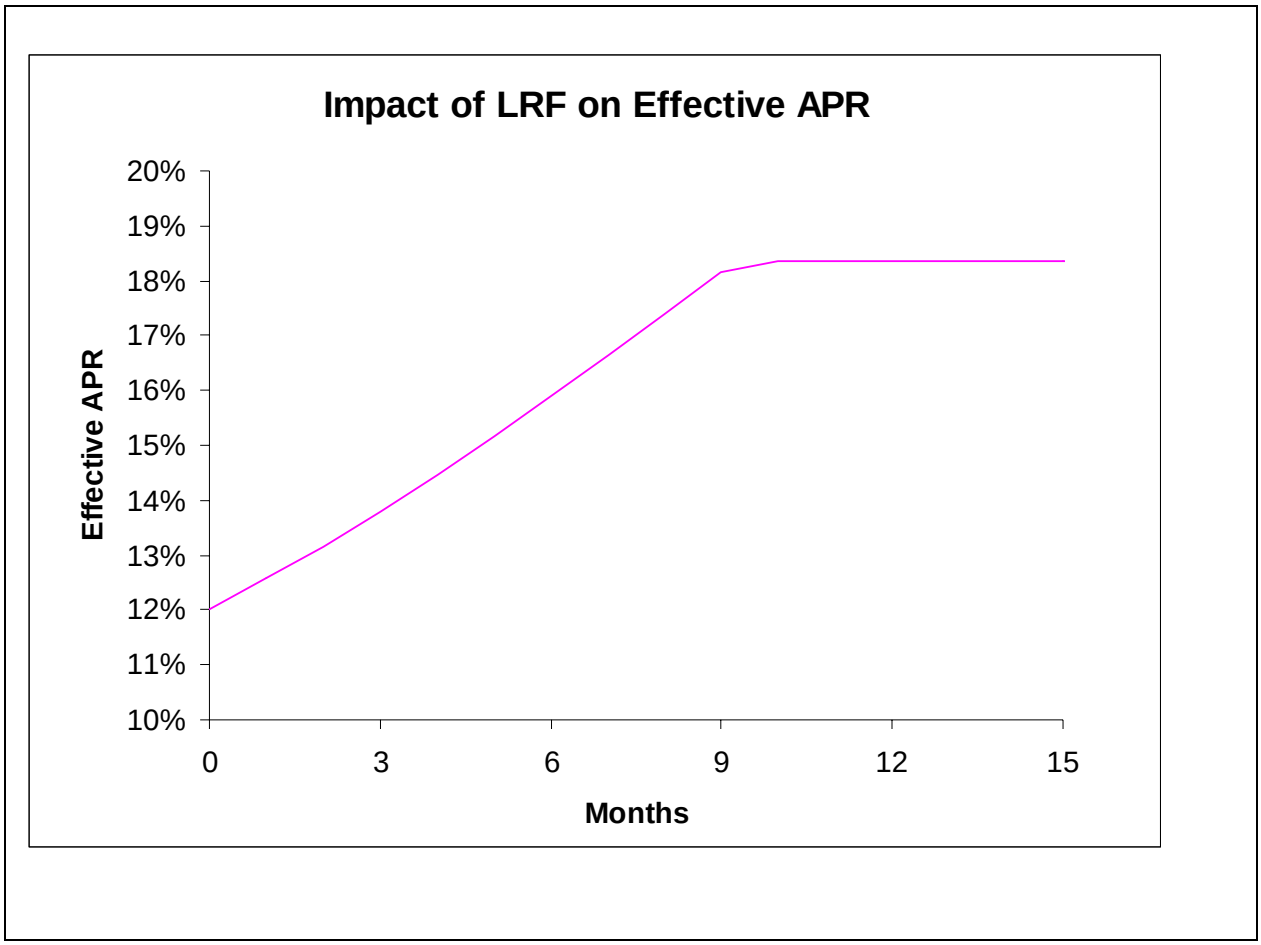
For example, take a consumer who starts with a $1,000 purchase balance and makes cash advances and purchases at an equal rate. More specifically, assume they make a $200 payment each month and take $100 in purchases and $100 in cash advances each month. In month 1, all of their balance is at the purchase rate.

By month 2, the $200 payment applied to their lowest interest rate balance is partially offset by the $100 in purchases, bringing the purchase balance down to $900 (excluding the impact of finance charges). The cash advance balance increases to $100 from new cash advances, which is not offset by any payments applied to this balance.



In month 3, the purchase balance gain declines by $100 to $800 while the cash advance balance increases to $200. By month 10, the purchase balance is down to $100 (where it stays due to new charges each month), and the cash advance balance has increased to $900. Even though the cardholder started with just a purchase balance and makes equal amounts of purchases and cash advances, payment allocation has converted almost the entire balance to a cash advance balance.

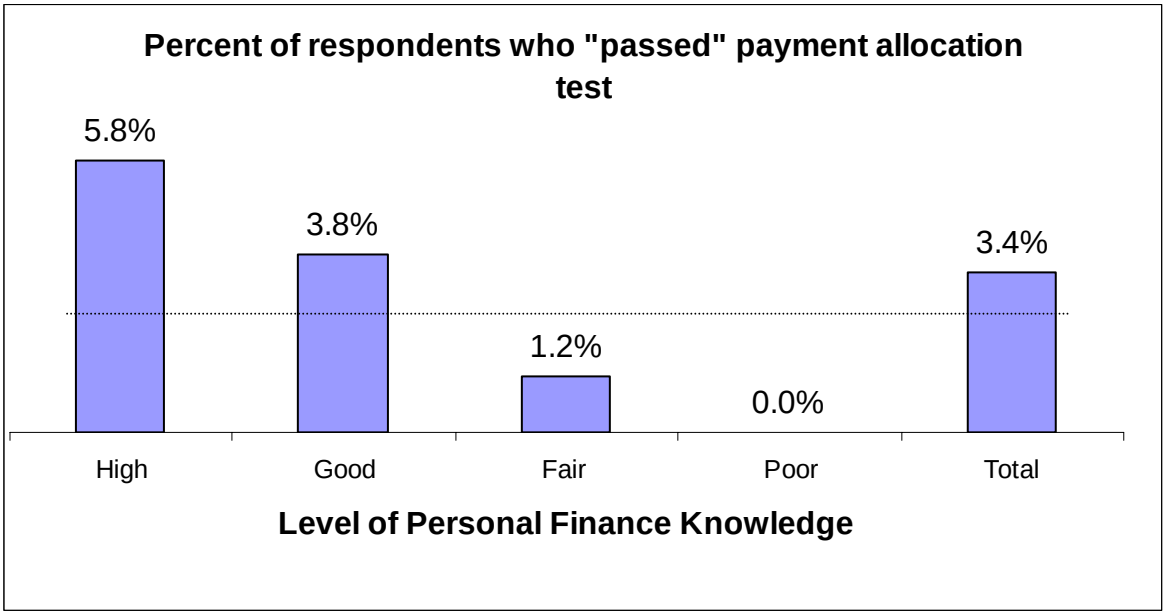
The figure below shows the impact using this same scenario after including finance charges using a cash advance APR of 19% and a purchase APR of 12%. This seemingly minor rule regarding where payments go caused the average interest rate to rise from the 12% to 18.35% in under a year. Also, over 90% of the balance goes to the cash advance rate even though half of the consumer's activity is from purchases. For a consumer with a teaser rate, the impact is even larger.



Customers are unaware of the consequences of payment allocation. Payment allocation practices capitalize on the knowledge that borrowers lack the information they need to make the decisions about payments that limit their costs. In order for a borrower to make decisions about maintaining balances at different rates and paying down credit card debt, they must understand the following:

1) Different rates are charged for different types of account activity (for example, a separate cash advance rate);
2) The issuer's payment allocation policy;
3) If they are aware of 1 and 2, they still need to be aware of how large an impact this seemingly minor rule can have on a customer's effective interest rate.

In a random national survey of a thousand people, most consumers did not know *each* of these three key points. In fact, only 3% of cardholders surveyed for this study could "pass" a payment allocation test by answering three questions about payment allocation correctly (one addressing each point above). More cardholders could have passed by randomly guessing. The fact that respondents did significantly worse than random suggests that credit card users' expectations are systematically violated, making the policy inherently deceptive



Payment Allocation Distorts Risk-Based Pricing.

This report used computer-simulated accounts to analyze the relationship between risk and APR under different payment allocation policies. Three different measures of risk were studied including payment size, change in balance, and recent cash advance activity**. The lowest rate first policy distorts recent cash advance activity as a risk indicator, for example, by treating a cash advance in an "unforgiving" manner: as long as a customer does not pay their entire balance in full, a cash advance balance will still affect their APR, even if the only cash advance took place ten years ago.**

For every measure of risk tested, the prevailing policy used by issuers causes less efficient risk-based pricing than any other policy alternative. The policy alternatives examined include distributing payments proportionally to the balance, distributing payments equally across balance types, and paying the highest rate first. When these three risk measures are combined into a single scale giving each factor equal weight (designed to statistically mimic a credit score), the prevailing issuer policy shows inverse risk-based pricing while all the other policy alternatives show correct risk-based pricing. This is illustrated in the table below through statistical regression analysis. A negative coefficient for the regressions on the table below indicate risk-based pricing. As indicated, all policy alternatives show proper risk-based pricing, while the alternative used by issuers (LRF) shows inverse risk-based pricing where lower risk consumers receive a higher APR.

How APR Changes with Risk under different Payment Scenarios

	Lowest Rate First (LRF)	Proportional Payment (PP)	Equal Payment (EP)	Highest Rate First (HRF)
Change (percentage points) in APR for a 100 point increase in credit score	0.32	-0.84	-1.07	-1.27

What advantage do issuers get from paying the Lowest Rate First (LRF)?

While paying the lowest rate first is an inefficient and imprecise way to raise rates that also price badly for risk, issuers may have other reasons to favor as the practice because it:

- raises effective rates **while the stated rates the consumers see remain unchanged;**
- takes advantage of known tendencies for people to overvalue the present and over-discount the future by raising rates over time;
- allows issuers to phase out even "lifetime" teaser rates in short order; and
- capitalizes the well-known behavioral bias of "excessive optimism" in consumers since the impact of payment allocation policy depends on whether a consumer carries a balance and whether they take a cash advance.

Policy Recommendations

It is understandable that credit card issuers may sometimes need to raise prices to manage risk. However, when they do, their approach should be transparent and should allow markets to remain efficient. Manipulating where payments are allocated amounts to hidden and deceptive pricing that penalizes lower-risk borrowers and only exists because it is not understood by borrowers.

Due to a borrower's general lack of knowledge and the complexity of payment allocation policy's impact, disclosure is an inadequate solution. Proposed regulations under consideration by federal financial regulators would prohibit the use of the lowest rate first method, which is the most costly to consumers. By requiring issuers to choose among three other allocation options, the proposal represents a potential improvement that would take less advantage of consumers and improve risk-based pricing. However, the concept of consumer choice is meaningless because the evidence strongly indicates that people do not have the information or understanding necessary to choose among issuers with different policies, if major issuers do in fact vary in payment policy in the future. Therefore the optimal public policy would select a single policy and make it uniform throughout the industry. Specifically paying the highest rate first is the optimal policy

since it saves consumers the most money and is the most consistent with risk-based pricing.

Borrower Recommendations

Scrutinize all credit card offers and terms, especially the "fine print"
Don't be fooled by teaser rates and cash advances. Under current policy, teaser rates can last a much shorter term than you might anticipate. A cash advance will raise interest rates for longer than expected—a single cash advance can still raise the interest paid decades later if an account is never paid in full.

Segregate your card use if possible
Customers with enough available credit should use separate cards for borrowing at a promotional rate, making purchases, and taking cash advances. If each credit card has only one type of balance, borrowers can control the allocation of payments by paying the most to the card with the highest rate.

Pay the highest APR balance first
If you are able to segregate your card use, pay anything above the minimum to the card with the highest APR balance first.

BACKGROUND

The debate over the price of credit cards

Credit card pricing has become highly complex and increasingly difficult for borrowers to follow. Credit card issuers at one time charged a single fixed interest rate to all customers and now charge individual borrowers several different varying interest rates at once, some of which expire after a short time period, and some rates suddenly changing to "penalty rates" under certain conditions. The number and importance of fees charged to consumers has also grown dramatically.

There are two schools of thought regarding trends in credit card pricing:

> **View #1) Price complexity is risk-based.** Growing price complexity is a good thing because it allows issuers to charge each customer based on their individual risk. Flexible pricing allows credit card companies to provide products to a wider range of consumers rather than just the least risky. Furthermore, because the

credit card market is competitive, borrowers will not get overcharged by card issuers.

View #2) Price complexity is deceptive. Credit card issuers price strategically, rather than to give the best possible risk-based price to each consumer. They maximize the revenue they can extract from each customer through manipulation of information and exploitation of known cognitive biases and limitations.[1] Pricing systematically exploits biases consumers are known to have, such as tending to focus on short-term rates, and assuming they will not be late on their bills. For example, there is empirical evidence that borrowers may have unrealistic optimism, which can be exploited by issuers.[2] Pricing also takes advantage of any lack of knowledge consumers have by "shrouding" information that is very important to issuer profits, but may be easily overlooked by consumers.[3]

Some researchers have yielded results consistent with view #1, finding that interest rates and late fees appear to vary somewhat with risk.[4] However, they failed to eliminate the possibility that view #2 is correct. Both views are consistent with much of the existing data and many of these existing studies are poorly equipped to differentiate these two perspectives.

This is because deceptive pricing will also tend to vary somewhat with risk, even if risk-based pricing is not the primary goal of issuers. Deceptive pricing varies with risk for a number of reasons. First, the least financially savvy and most vulnerable people will probably be the most susceptible to deception due to a lack of knowledge regarding financial issues and more limitations on their access to credit.[5] These people will also tend to have higher average risk. Second, it has been theorized that issuers use higher prices for riskier consumers[6] (such as very high penalty interest rates when a consumer is late with a payment or has a decrease in their credit score) not to account for risk, but because these consumers no longer have the option to shop around and obtain credit elsewhere. From this perspective, issuers *want* their customers to turn into these higher risk borrowers with few options because from a profitability standpoint, these may be their best customers; these borrowers would almost have to stay with a creditor after receiving a 30% penalty interest rate along with repeated late/over-the-limit fees. Third, issuers are subject to public and regulatory scrutiny, which creates an incentive to justify exploitative pricing by superficially relating it to risk factors.

Credit card pricing may actually be "excuse-based pricing" that is intended to mimic risk-based pricing. For example, even if they are both imposed to simply increase revenue, a "late fee" is likely to generate much less outrage than if issuers imposed a randomly assessed fee or a fee based on an obviously irrelevant characteristic. In addition, fees and rates that are based on risk or alleged bad consumer behavior also reduce any ill-will from those consumers after the fee is imposed. It also makes them more likely to take such an offer of credit in the first place since they believe they can control any negative outcome.

There are ways to differentiate these two pricing motivations. Sometimes, analyzing the rules and policies issuers impose can make the motivation quite apparent. A perfect example of this is how issuers apply a borrower's payments. Studying how these payments are manipulated, two things become quite clear. First, using payment allocation policy to maximize rates is unfair in that the practice is largely unknown to consumers yet it can have a sizable, hidden impact on prices. And second, the order in which issuers pay balances is completely inconsistent with risk-based pricing.

Finding 1: Payment allocation forces borrowers to pay the highest possible prices, as much as 7 percentage points higher.

Credit cards are unusual among loan products because customers pay one amount that is then applied to several balances at different rates. If a consumer had multiple loan balances other than a credit card with a single lender (such as mortgage, a home equity line and a car loan), they would typically make a separate payment for each loan. If they pay above the minimum amount, that consumer can then easily choose which balance to pay down first, often opting to pay the highest interest rate loan first. But a credit card borrower with a separate cash advance, purchase and low-rate short term promotion or "teaser" balance does not get to choose how their payment gets applied. The credit card company chooses. **Not surprisingly, the policy that is in the opposite of the customer's interest is typically the credit card company's choice.** Almost all credit card issuers allocate payments to the lowest interest rate balance first[7] (this policy will be referred to as "LRF" for lowest rate first). In fact, unlike the other bank loan customer, there is not even a minimum payment designated for each balance. Every penny goes to the lowest interest rate balance.

Considering either logic or fairness of how payments should be applied, this may strike many as wrong. After all, if a consumer is volunteering to pay extra to reduce the principal of a loan, should they not have the right to choose which principal to reduce first? The order of payments can have a surprisingly large impact on some consumers. It results in a powerful form of hidden pricing that allows issuers to raise many borrowers' effective APR while leaving the stated rates for each type of balance unchanged.

The Surprising Impact of Where the Payments Go

For a consumer who uses both cash advances and purchases, a credit card company that allocates a customer's payment to the lowest rate first (LRF) converts almost the entire balance to the cash advance rate.

For example, Borrower A starts with a $1,000 purchase balance and makes cash advances and purchases at an equal rate. More specifically, assume they make a $200 payment each month and take $100 in purchases and $100 in cash advances each month. In month 1, all of their balance is at the purchase rate.

By month 2, the $200 payment applied to their lowest interest rate balance is partially offset by the $100 in purchases, bringing the purchase balance down to $900 (excluding the impact of finance charges). The cash advance balance increases to $100 from new cash advances, which is not offset by any payments applied to this balance.

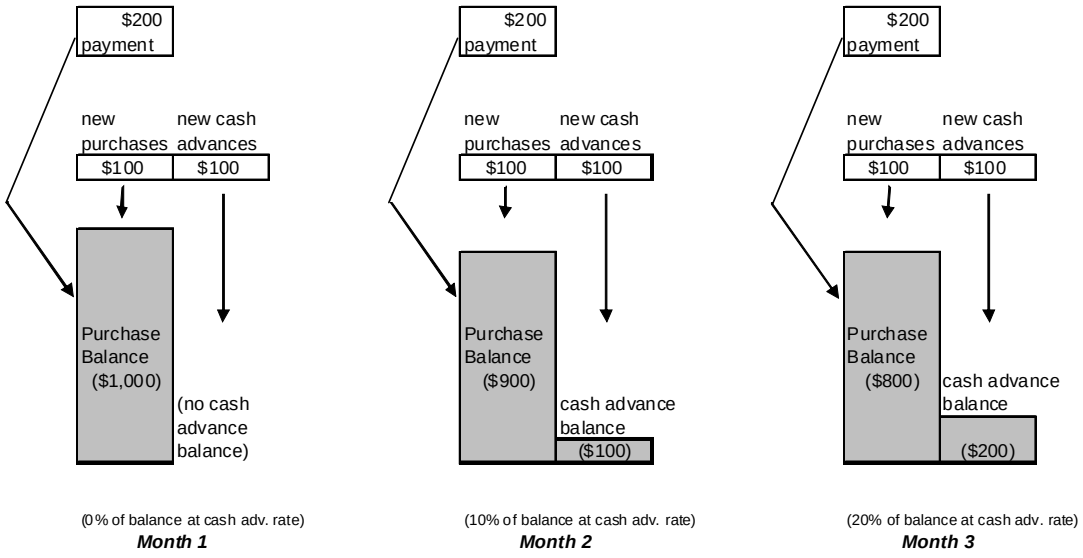


Figure 1

In month 3, the purchase balance gain declines by $100 to $800 while the cash advance balance increases to $200.

By month 10, the purchase balance is down to $100 (where it stays due to new charges each month), and the cash advance balance has increased to $900. Even though the cardholder started with just a purchase balance and makes equal amounts of purchases and cash advances, payment allocation has converted almost the entire balance to a cash advance balance.

Figure 2 below shows the impact using this same scenario after including finance charges using a cash advance APR of 19% and a purchase APR of 12%.[8] This seemingly minor rule regarding where payments go caused the average interest rate to rise from the 12% to over 18% in under a year, increasing finance charges by over 50%. Also, over 90% of the balance goes to the cash advance rate even though half of the consumer's activity is from purchases. If the lender was making a 3% rate of return on assets on this customer, they now have more than tripled their return on assets for this customer to 9%, just by choosing a particularly favorable payment policy

.

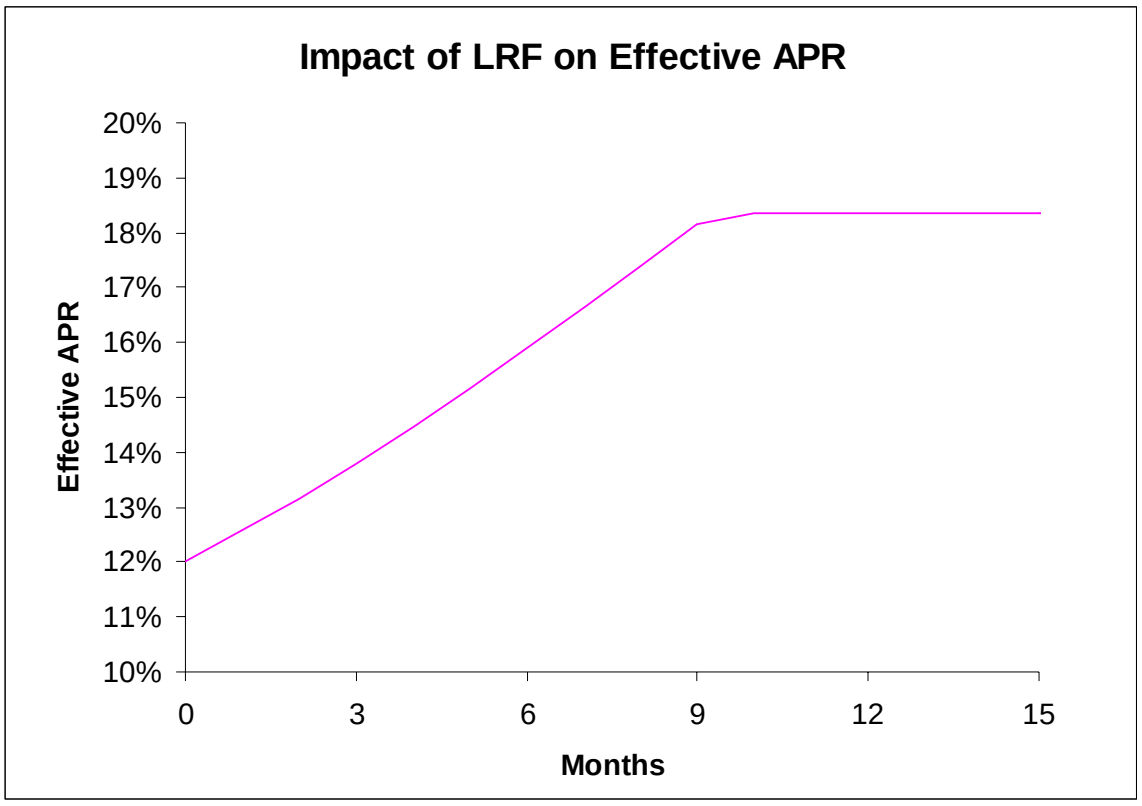


Figure 2

The cost to certain consumers can be very great. In the example above, for simplicity the balance was assumed to be $1,000. But if we assume the same interest rate change for a customer that already carries $10,000 in balances, after a year the total extra interest paid by the customer is $635. If a consumer had little extra discretionary income to start with, this difference in interest can be enough to make it impossible for them to cover basic necessities.

LRF also adds to the deceptiveness of promotional rates (such as a 0% six month teaser rate on balance transfers) by making them seem more attractive than they are. Since these low rates get paid off first, consumers will often think they are getting a longer-lasting benefit from promotional rates than they actually do. It has been reported that even people with MBA's have been "fooled" by lenders' manipulation of where payments go, thinking they would get much more benefit from a balance transfer than they actually received.[9]

To see how this works, consider the same scenario as before, only this time, instead of starting with $1,000 at the purchase rate, we start with $1,000 at a promotional 0% rate. As shown in Figure 3, both the purchase and cash advance balance initially rise while the

promotional rate gets paid off. But the promotional rate is paid off within the first six months. After that, the cash advance balance rises while the purchase balance declines. Eventually, the exact same interest rate of 18.35% is reached. But in this case, the interest rate leap went a lot further— from an initial rate of 0% to over 18% within 10 months. It is also interesting that with 0% promotional rate for six months, the lender could have made it a 0% rate for 18 months or even the life of the balance (as some issuers are doing now)[10] and it would not have made a penny's difference for this borrower. Because the promotional rate is paid first, in this case it does not last six months anyway.

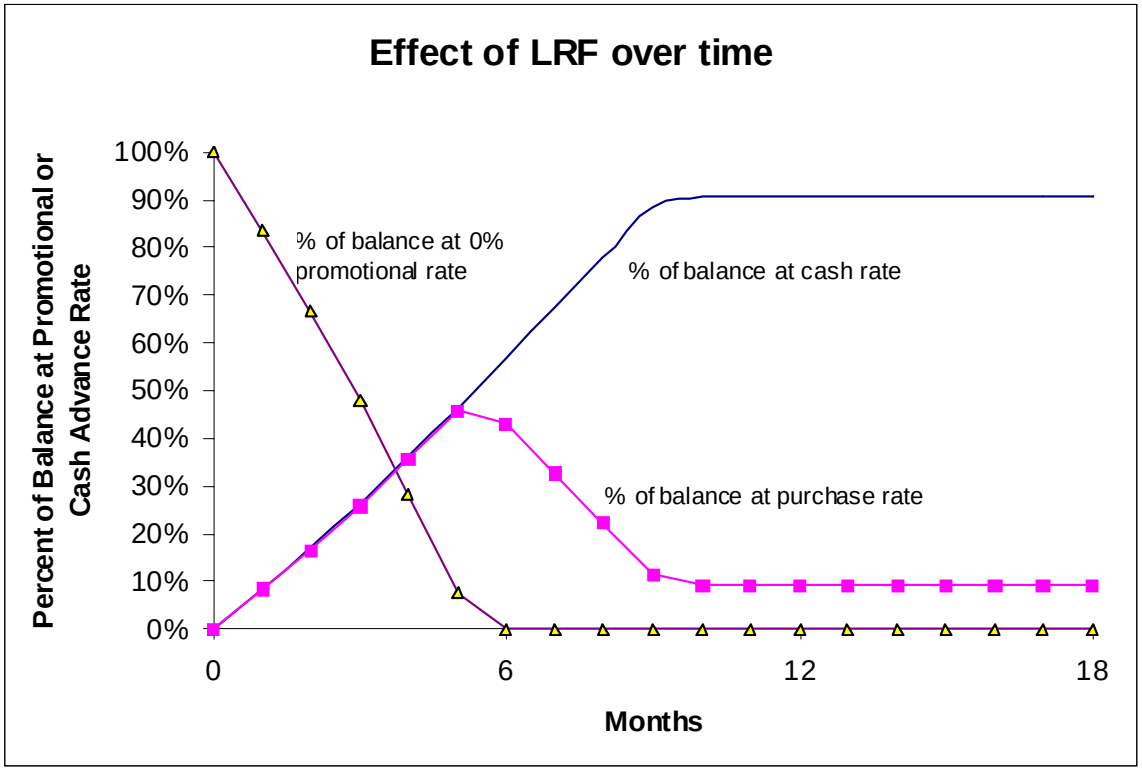


Figure 3

In general, for a customer that regularly has significant activity in multiple balances (e.g. both purchase and cash advance activity), the LRF rule for applying payments effectively pushes almost all of the balance over time into the highest APR.[11] If consumers had control of their payment and chose to pay the highest rate first (HRF), the exact opposite would happen, with almost all of the balances eventually moving to the lowest APR. Purchase and cash advance APR's tend to vary substantially for most credit card issuers, with one study finding that the average purchase APR for bank-issued credit cards was 12.11% while the average cash advance rate was 19.10%.[12] **This implies that a seemingly innocuous change in payment policy can change the APR by up to 7 percentage points.**

For a household with an average amount of credit card debt of $10,678 this would imply an increase in their total cost of credit card debt of $700 just from changing where their payments go.[13] If there is a teaser rate involved, the impact can be even greater.

Since many customers use only one type of activity on a credit card (for example making only purchases), the impact on the average customer will be smaller than this. In fact, the impact of payment allocation is so complex and opaque that the precise aggregate impact is impossible to determine without knowing the dynamics of activity for each individual accountholder.[14] However, as a whole one thing is clear. The LRF policy, to the extent that it affects APR, always raises the average APR of customers, increasing costs to households.

A Monte Carlo simulation confirmed that the LRF policy both raises interest rates and results in unpredictable pricing. This methodology creates a large number of computer simulated accounts with characteristics defined by random distributions intended to mimic real-world scenarios and then runs statistical analysis on this sample (methodology for the Monte Carlo Simulation is described in more detail in Appendix B).

Using the LRF rule for determining where payments go significantly increased the interest rate compared to any alternative method of allocating payments. While the level of magnitude of the APR impact is somewhat sensitive to the simulation parameters, the relationship between APR and other risk variables discussed later is not sensitive to these parameters.[15] In addition, interest rates tend to vary more under the LRF policy in a way that is **not** related to risk. Instead, this increased rate variation is caused by the idiosyncratic relationship between APR and behavior under LRF. With LRF, interest rates vary greatly based on account behavior characteristics that have nothing to do with risk,[16], and in ways that are very difficult for the typical consumer to predict.

Finding 2: • Customers are unaware of the significance and impact of these hidden charges. Only 3 percent surveyed understand how payment allocation works.

While many people with some knowledge of the credit card industry know about the use of short-term rates, unexpected rate hikes (for cause and otherwise), and fees to make consumers think they are getting something cheaper than it actually turns out to be, the manipulation of how payments are applied gets relatively little attention. And it is perhaps the most deceptive and powerful mechanism to increase prices without calling attention to the fact. For a borrower to understand the power of payment allocation, they must have knowledge of three distinct things:

1) They must be aware that they are being charged different rates for different types of account activity (for example, a separate cash advance rate);

2) They must be aware of the issuer's payment allocation policy;
3) If they are aware of 1 and 2, they still need to be aware of how large an impact this seemingly minor rule can have on a customer's effective interest rate.

Given the knowledge required of the customer, it is not hard to see that many might make mistakes in assessing the impact of lenders manipulating how payments are applied. There is evidence that people frequently make mistakes with much less complex credit card issues such as being late or overlimit and that financial mistakes are more common among low-income people.[17] As it turns out, **survey results show that most consumers do not know the correct answer to each of the above three items, and when you combine them, only a tiny fraction (3%) of the population understands the impact of payment allocation.**[18]

Awareness of rate differences

In connection with this research, an independent telephone survey of 1,006 random respondents was conducted in September, 2008. Respondents who did not have a credit card were excluded from the results. A detailed description of the methodology along with additional noteworthy survey results are included in Appendix A. Despite the fact that virtually all the very large credit card issuers charge a different rate for cash advances, public awareness that their card has multiple rates is surprisingly low. In fact, many major research studies on credit card rates often treat cards as if they had a single rate, and even the Federal Reserve makes this assumption: Two of the Fed's most used data sources for credit cards, the Survey of Consumer Finances and the Survey of Credit Card Plans, still report data as if credit cards have a single rate.

Most credit card users surveyed did not know that the cash advance interest rate is different from other rates on their card, with 48.8% stating the correct answer, 16.9% believing the rate was the same, and 34.3% stating that they were unsure if it was different (see Table 1). People with good or excellent knowledge of personal finance were more likely to know that the rate is different than people with fair or poor knowledge.[19] Even among people with "good" or "excellent" knowledge, almost half of the respondents did not know the correct answer.

Table 1

	Knowledge of Personal Finance				
	Excellent	Good	Fair	Poor	**Total**
Know Cash Advance Rate Is Different	46.6%	54.7%	43.3%	26.9%	48.8%
Believe Rate is the Same	22.3%	13.8%	17.1%	26.9%	16.9%
Not Sure	31.1%	31.5%	39.6%	46.2%	34.3%

Figure 4 compares some groups of credit card users based on their knowledge of cash advance rates. One might expect people who used cash advances to be more knowledgeable than other credit card users. However, while they scored slightly higher on this question, there was no statistically significant difference between the two groups, and almost half of cash advance users did not know the rate was different. People with

higher levels of education—defined as having an Associate's degree or higher—were significantly more likely to be aware of the rate difference. (Although even among people with a postgraduate degree, only 56% were aware of the rate difference.) People with lower incomes (defined as less than $40,000) were significantly less likely to be aware of the rate difference than people with higher incomes.

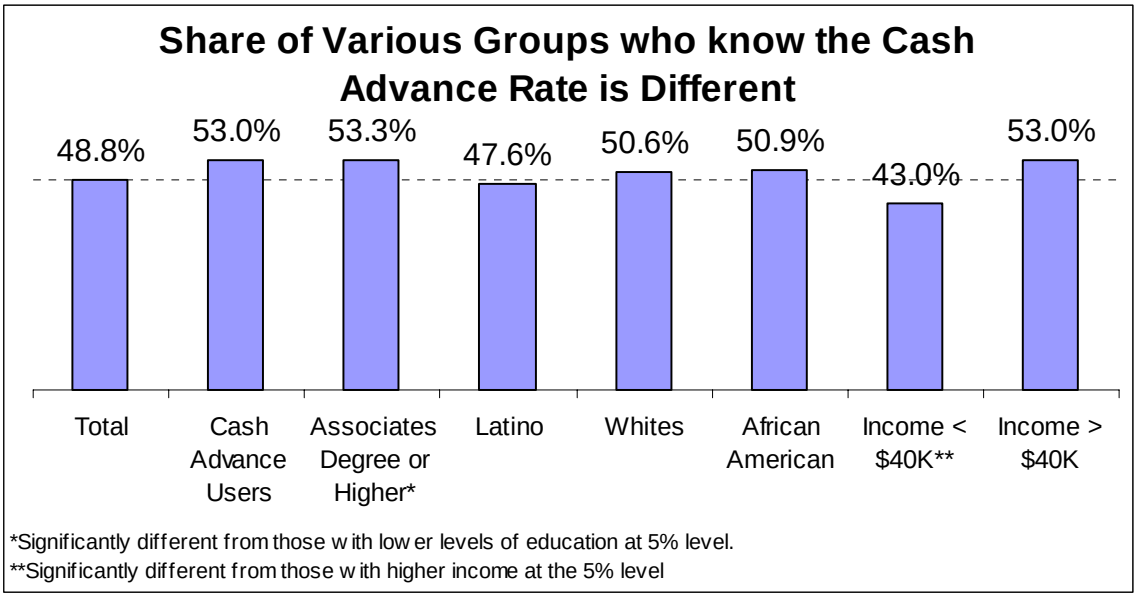


Figure 4

Awareness of Issuer's Current Payment Allocation Policy

Where an issuer applies a borrower's payment is one of the detailed disclosures of practices that is typically not featured prominently in the application or solicitation materials.[20] Two samples of relevant account terms from major issuers and how they are disclosed are shown in Appendix C. Given the lack of prominent disclosure and the complexity of payment allocation policy, it is not surprising that many people are unaware that almost all issuers apply payments to the consumer's lowest rate first. But what may be surprising from the survey results is just how many people did not know the key information necessary to understand the implications of payment allocation policy. As Figure 5 indicates, only 6.9% of respondents were aware that the introductory rate balance is paid first.

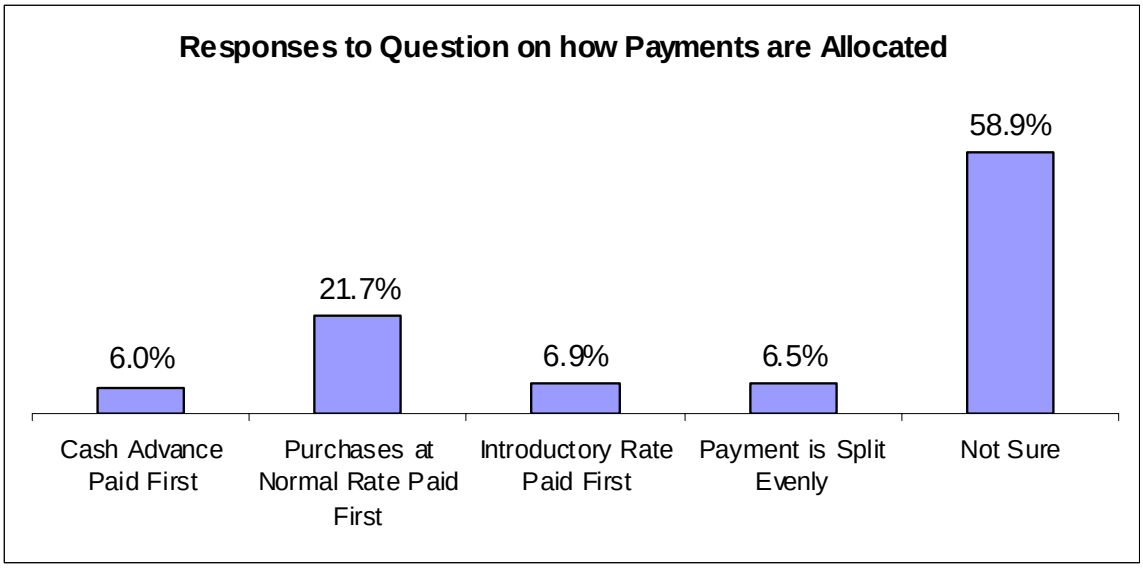


Figure 5

Excluding people who said they were not sure, still only 17% of respondents who chose a definitive response chose correctly. Since there are four possible responses, even guessing randomly a respondent should be able to get the right answer 25% of the time. In fact, not only did most people not get the right answer, but the responses to this question were significantly worse than random at the 99% confidence level. If the results were no better than random, this is equivalent to saying the possibility cannot be ruled out that respondents are guessing and nobody knows the correct answer. When the results are *worse* than random, this suggests that credit card users' expectations are systematically violated. In other words, the policy is inherently deceptive.

As Table 2 shows, those people with more knowledge of personal finance were more likely to choose the right answer.[21] However, even people with excellent knowledge of personal finance only selected the correct answer 16.5% of the time.

Table 2

	Knowledge of Personal Finance			
	Excellent	Good	Fair	Poor
Know Promotional Rates are Paid First	16.5%	5.7%	3.7%	4.0%
Not Sure	48.5%	58.5%	65.8%	60.0%
Other Answers	35.1%	35.8%	30.4%	36.0%

Figure 6 gives some additional trends regarding which credit card users knew that low promotional rate balances were paid first. While promotional rate users were significantly more aware of this, the overwhelming majority (roughly 90%) still did not know the correct answer. This suggests that issuer manipulation of which balances are paid first can make teaser rates especially deceptive by misleading most teaser rate users into thinking they are getting a better deal than is the case. Cash advance users, despite

being adversely affected by use of the LRF rule, were not more aware than other credit card users of the order in which payments are applied. Higher education levels were significantly associated with a higher rate of correct responses. Latinos were significantly less likely to know the correct answer than all other respondents. African Americans also tended to know the correct answer less often than other respondents, though this difference was not statistically significant.

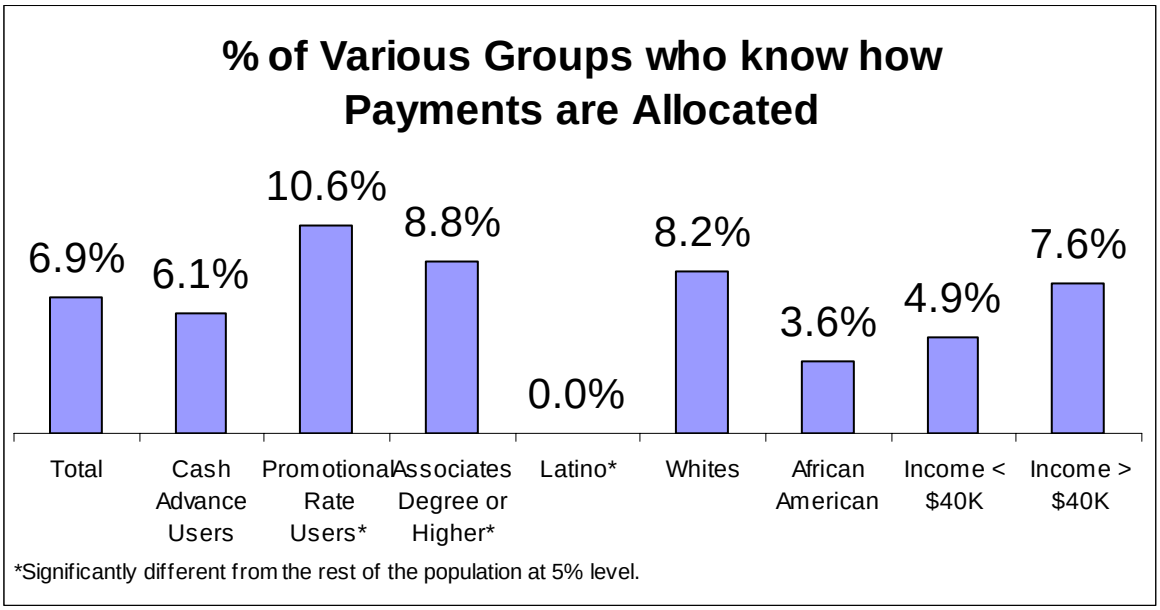


Figure 6

Awareness of the Impact Payment Allocation Can Have

Even among the small minority of consumers who know that they are charged different rates and know how payments are allocated, this knowledge does them little good if they do not recognize the large the impact of payment allocation policies. The impact of payment allocation policy depends on detailed predictions of just what kind of account activity will take place along with complex calculations based on those forecasts. As the survey results show, even when credit card users are given a relatively simple, known scenario, with fixed starting balances and no account activity other than constant payments, most underestimate the impact of changing where a payment is applied.

Respondents were given a credit card account scenario and were asked whether moving the purchase balance to a zero percent rate or changing where the payment was applied would save them more money. For people who did not know that the rates were different or how payments were allocated, an introductory statement briefly clarified standard industry practices. The question in its entirety is shown in Appendix A.[22] The correct answer to the question is that changing where the payment is applied will save considerably more money than taking the promotional rate.

There were only two possible responses. As Figure 7 shows, only 43.8% of respondents choose the correct answer. Since 50% could get the right response randomly, the responses were actually significantly worse (statistically at the 1% level) than random. Responses generally improved with higher levels of knowledge of personal finance.[23] However, no group had even 50% of the responses correct, the amount one would expect randomly.

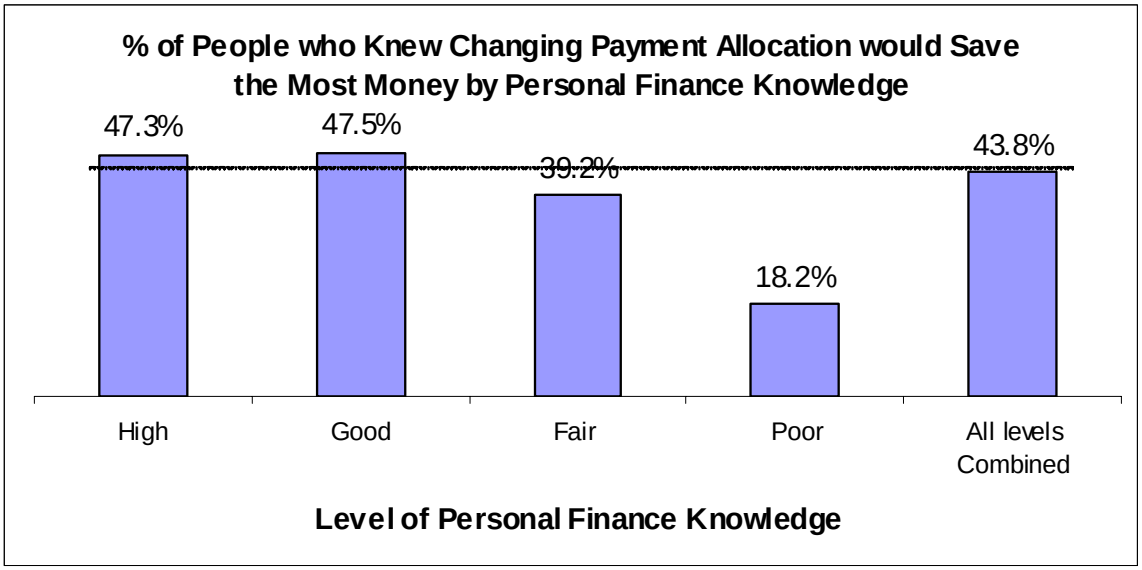


Figure 7

As Figure 8 indicates, cash advance and promotion/teaser rate users did not differ significantly from others in their responses. People with more education were significantly more likely to get the correct answer, and African Americans were significantly less likely to get the correct answer.

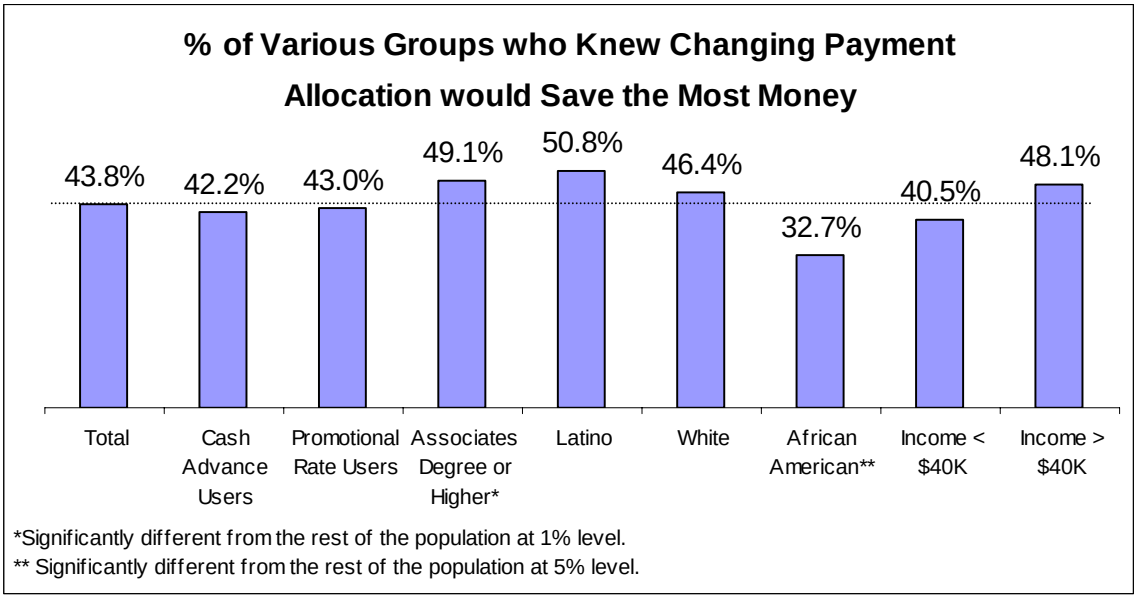


Figure 8

Combined Awareness

As stated previously, for consumers to assess the likely impact of issuer manipulation of where payments go, they must know that APR's differ, know the issuer's payment allocation policy, *and* understand the financial impact of payment allocation policy. In terms of the survey, this implies they need to know the answer to all three of the questions from the prior sections. **The percent of respondents who got all three questions right was only 3% after removing people who did not respond to a question or had no credit cards.** Other than stating outright that they do not know, the first question had 2 possible responses, the second question had 4 possible responses, and the third question had 2 possible responses. Therefore, if a respondent were to randomly pick one of the substantive answers, the percent responding correctly would be 6.25% (50% x 25% x 50%.) Significantly more people (at the 0.1% statistical level of significance or margin of error) could have gotten the correct answer if they had picked one of the substantive answers at random for each question. Clearly, with only 3.4% of people knowing the correct answers (and even this group possibly selecting the answer at random), the way lenders manipulate where payments are applied is very poorly understood by consumers.

As indicated in Figure 9, consumers with higher levels of personal finance knowledge were more likely to get all three questions right.[24] However, even the most knowledgeable group would have been better off guessing randomly, with only 5.8% of people answering all three questions correctly.

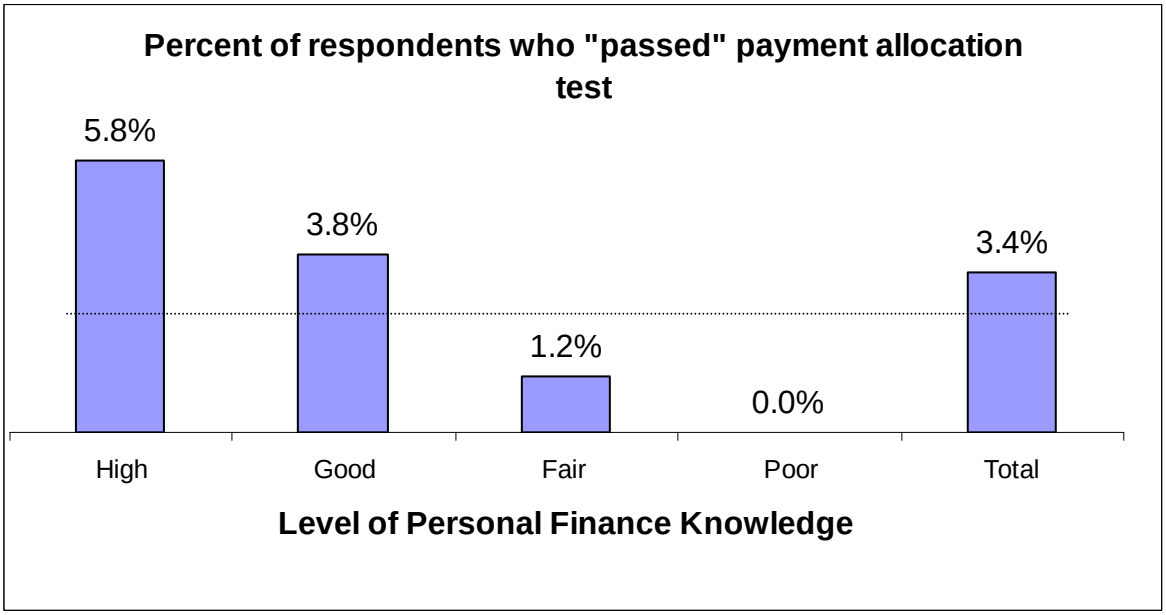


Figure 9

People who used cash advances got all three answers right 5.0% of the time, and those who used promotional rates got all three answers right 3.7% of the time. Neither of these differences were statistically significant from the general population.

The knowledge level regarding this topic may virtually be zero based on the fact that credit card users did not know the answer to the above three questions any better than if they had guessed at random. That credit card users in several areas made guesses that were worse than random suggests that not only do they lack knowledge, they would naturally guess to be true is also wrong. Simply put, credit card issuers' manipulation of how payments are applied is inherently misleading and deceptive.

Finding 3: • Payment allocation distorts risk-based pricing. The least risky borrowers pay the most.

Credit card issuers argue that a significantly higher interest rate for cash advances is reasonable based on risk-based pricing. There might be some justification for this argument. Though cash advances are used by all kinds of customers in a variety of situations, there may be a tendency for consumers to take cash advances when they are facing cash flow problems or financial difficulty in general. Cash advances might also be used when people lack the income to pay their minimum payments and instead juggle money between issuers, taking a cash advance from one credit card and using it to pay minimum payments on other cards. It is certainly possible that the greater portion of a consumer's balance that comes from cash advances, particularly recent advances, the riskier the customer.

However, CRL has found that LRF payment allocation policy is not consistent with this view of risk. Using three different measures of risk and four different payment policies, our research shows that using the LRF order of applying payments actually causes pricing to be less related to risk than if issuers used a different policy. The three measures of risk used here are size of payments, changes in balances, and recent cash advance activity. The four payment policies examined are "lowest rate first" (LRF), which is the current policy for almost all credit card issuers, "proportional payment" (PP) where payments are applied proportionally to the current balance, "equal payment" (EP) where payments are divided in equal amounts among the existing balances, and "highest rate first" (HRF) which is presumably what most consumers would choose if they were able to designate where their payments went.

Table 3 presents correlations between APR and these various measures of risk using the simulated accounts. Table 4 gives results for a weighted multiple regression between APR and these various risk factors. Since APR with any payment policy tends to rise over time, this was also included as an explanatory variable to more fully specify the model. The results for Table 3 and Table 4 will be interpreted in detail in the sections covering each risk variable below. **The important conclusion is that through analysis of either simple correlations or more complex regression models, the LRF payment policy performs far worse at capturing risk regardless of the variable used. In fact, in two of the three cases, under the LRF method, APR moves inversely with risk.**

Table 3

Correlation between APR and Risk measures under different Payment Allocation Policies

Policy	Size of Payments	Change in Balance	Cash Advance Activity
Expected sign for risk-based pricing	*negative*	*positive*	*positive*
Lowest Rate First (LRF)	0.253	-0.083	0.247
Proportional Payment (PP)	0.118	0.038	0.362
Equal Payment (EP)	0.097	0.080	0.361
Highest Rate First (HRF)	-0.005	0.073	0.375

Note: All results statistically significant. Correlations weighted by balance. All variables are yearly totals sum of values (or differences for balance change).

Table 4

Relationship between APR and Risk under different Payment Allocation Policies using Multiple Regression Analysis

	Lowest Rate First (LRF)	Proportional Payment (PP)	Equal Payment (EP)	Highest Rate First (HRF)
Size of Payments	0.147	0.039	0.038	-0.072
sign consistent w/risk-based pricing (y/n)	*no*	*no*	*no*	*yes*
Change in Balance	-0.088	-0.044	-0.007*	-0.050
sign consistent w/risk-based pricing (y/n)	*no*	*no*	*no*	*no*
Cash Advance Activity	0.243	0.359	0.342	0.382
sign consistent w/risk-based pricing (y/n)	*yes*	*yes*	*yes*	*yes*
Year	0.221	0.093	0.045	0.031

Notes: All coefficients are standardized coefficients, meaning they are based on variables with a standard deviation of 1
Payments and cash advances are yearly totals, APR is yearly average and change in balance is yearly difference.
All coefficients are significant at the 0.1% level except items noted with an asterisk (which were not significant).

Size of Payments

One possible measure of risk that credit card issuers may be interested in is the size of payments made. If two consumers have the same level of activity, one that consistently makes large payments is probably less risky than a customer who only makes minimum payments. This is because the consumer making the large payments has demonstrated the capacity to pay off the debt. Therefore, all other things being equal, the consumer making large payments should pay a lower interest rate on their debt (in addition to having a lower balance).

But it is easy to see that this is not what happens. Consider Borrower A discussed previously who has a $1,000 cash advance balance and a $1,000 purchase balance and who has $100 in both cash advance and purchase activity each month. When they made a $200 payment each month, their cash advance balance went up by about $100 while the purchase balance declined each month. But now consider Borrower B who makes a $300 payment each month. Their purchase balance goes down more quickly, but the cash advance balance does not. As shown in Figure 10, the purchase balance goes down by $200 each month while the cash advance balance goes up by $100 each month. By month 3, 25% of their balance is at a cash advance rate (compared to Figure 1 where only 20% of the balance was at a cash advance rate in month 3). Borrower B, by making larger payments, is punished with a higher effective interest rate. They pay more per dollar borrowed. The opposite would happen to someone who just makes the minimum payment of $20. Their purchase balance would be $960 by month 3, and only 17% of their balance would be at the cash advance rate. The lowest effective interest rate goes to the person making only the minimum payment.

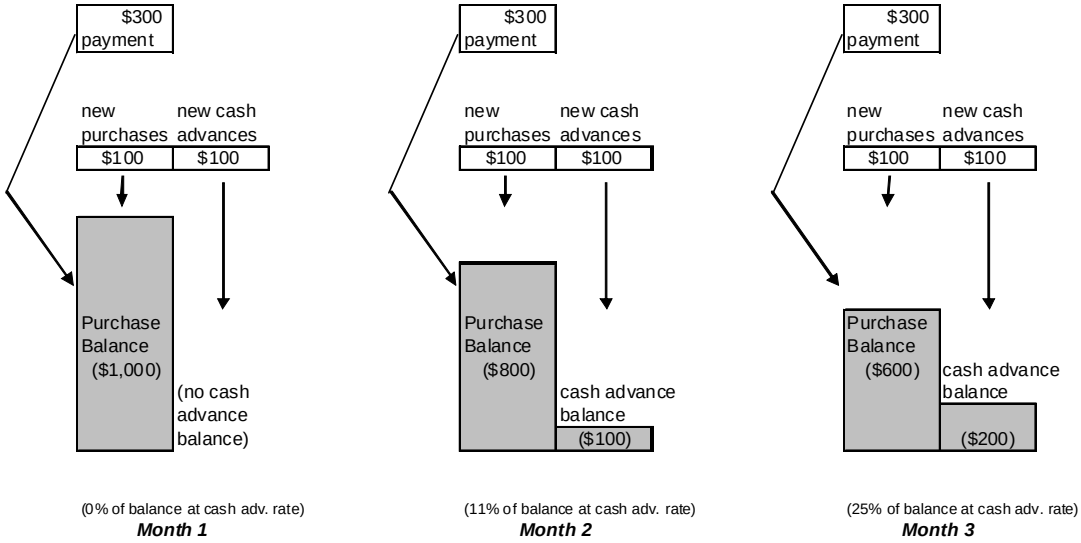


Figure 10

In fact, the speed at which the balances shift is proportional to the size of the payment. Figure 11 shows the percent of balance at the cash advance rate over time for various payment rates. As indicated, by month 18 with a 10% payment rate the blended APR will be 18.67% while for a consumer who just makes the minimum payment, their blended APR is 15.35%. In other words, **the higher the payment made, the faster the balance gets converted from purchase to cash advance, and the higher the APR paid by the consumer. The card user is in effect punished with a higher APR for making larger payments.**[25]

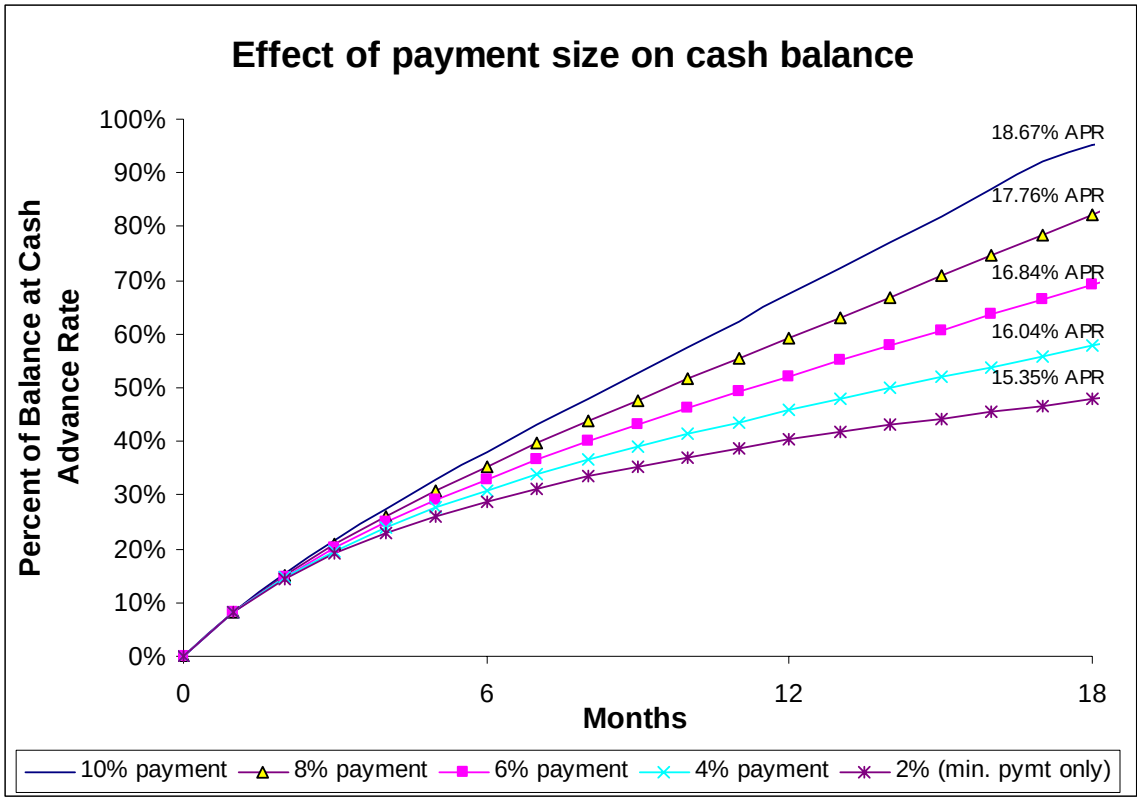


Figure 11

If we compare the LRF policy to an highest rate first (HRF) policy, with the HRF policy and a minimum payment the cash advance balance goes up by $60 and the purchase balance goes up by $100, a shift of $40 towards the purchase rate. This is just the opposite of what happens with LRF. A higher payment will cause the balance to shift faster, so with an HRF policy in this scenario, the customer's APR declines faster when they make a larger payment, consistent with the riskiness of the consumer.

Figure 12 shows payment rate versus APR for various payment rates using a scenario where there is a starting purchase balance of $1,000 and $100 in activity for both cash advances and purchases each month. For the LRF policy, APR rises as the payment rate rises, inconsistent with customer risk. For the HRF and EP policies, APRs fall (at least at low payment rates for HRF) as payment rate rises. For PP, APR is relatively flat (but rising slightly) in relation to payment rate. It is also noteworthy that HRF results in the lowest APR and LRF the highest APR regardless of the payment rate.

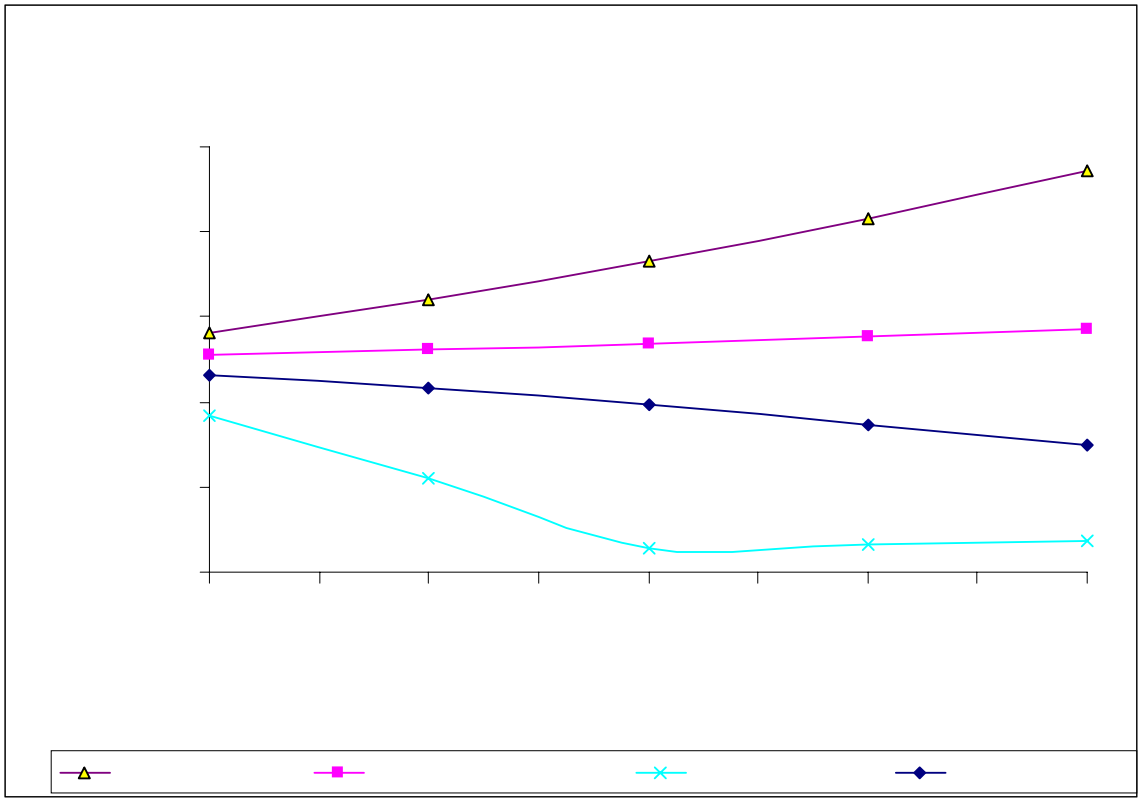


Figure 12

The simulation results confirm the expected relationship. Using simple correlations (shown in Table 3), the LRF policy has an inverse relationship to what one would see with risk-based pricing, with higher payments (i.e. lower risk) correlated with higher APR's. This is also true for the PP and EP policies. However, this inverse relationship was by far the strongest for the LRF policy. The HRF method (the policy most favorable to borrowers) was the only one that showed the correct risk/price relationship, with higher payments (lower risk) being associated with a lower APR.

As Table 4 shows, when a more sophisticated statistical analysis in the form of a multiple regression is run, the exact same relationship is found. LRF, PP, and EP policies all show a highly significant relationship that is the opposite of risk-based pricing. However, the LRF policy is still by far the worst policy. A higher payment causes about 5 times as much of an APR increase under an LRF policy compared to the PP and EP policy. Once again, the HRF policy is the only one to show proper risk-based pricing

Change in Balance

A second important measure of risk is change in balance. In fact, FICO scores (a common measure of credit risk used by lenders) use indicators of new account activity as a measure of risk in part to spot consumers who are likely to have rising debt levels.[26] A

rising level of debt may be an indicator that a customer is losing control of their financial situation and may soon become unable to make their loan payments.[27] FICO scores also utilize indicators of current debt level as an indicator of credit risk.

Once again, the LRF order of applying payments causes pricing to move in the opposite direction of risk. To understand this, think of the change in debt as a reflection of the balance between new account activity (i.e. new purchases, cash advances and balance transfers) and payments. When payments are large relative to new account activity, balances are declining. When new account activity is large relative to payments, balances rise. Although credit card accounts normally require a minimum payment, consider a hypothetical credit card account with no payment being made on it. In that case, the order in which payments are applied obviously does not matter. The ratio of cash advance and purchase balances will reflect the ratio of cash advance to purchase activity.[28] But as payments grow large relative to activity, the ratio of balances increasingly reflects payment policy. In other words, when account activity dominates (i.e. balances rising), the APR reflects that activity. **However when payments dominate (i.e. balances falling), the APR will be increased due to LRF policies which consistently distort rates upward.**

The simulation results once again confirm the expected relationship. Using simple correlations (shown in Table 3), the LRF policy shows an inverse relationship between risk as measured by change in balance and APR (with APR being higher for lower risk accounts). All alternative policies (PP, EP and HRF) show proper risk-based pricing for this variable.

Table 4 shows slightly different results for the multiple regression. After accounting for the impact of other explanatory variables, all policies show some degree of inverse risk-based pricing with riskier accounts (based on balance change) receiving lower APR's.[29] However, once again, the worst policy in terms of risk-based pricing was the LRF policy. The LRF policy had the strongest inverse risk-based pricing, with a coefficient more than twice the value of any other policy (this difference was statistically significant). Unlike for the other risk factors, for this particular variable HRF was not the best policy. Instead, EP was the best policy here (i.e. the one that had the least inverse risk-based pricing).

Cash Advance Activity

The premise for a higher interest rate on cash advances is that cash advances are more risky, and that large, recent cash advance activity in particular may be a sign of high risk. When a consumer uses cash advances, they will pay a higher interest rate for some period of time, regardless of the order in which payments are applied. The question is how the prevailing issuer policy of LRF affects the relationship between interest rate and cash advance activity compared to other possible payment policies.

LRF distorts the relationship between cash advance activity and interest rate for two reasons. First, LRF maximizes interest rates by tending to convert all balances to cash advances, regardless of the level of cash advance activity, weakening the correlation between the level of cash advance activity and interest rates. Figure 13 shows the percent of an account balance that is at the cash advance rate over time for consumers who have different mixes of activity.[30] The account activity is assumed to be fixed at $200 a month, with only the mix of cash advances vs. purchases in that monthly total shifting.

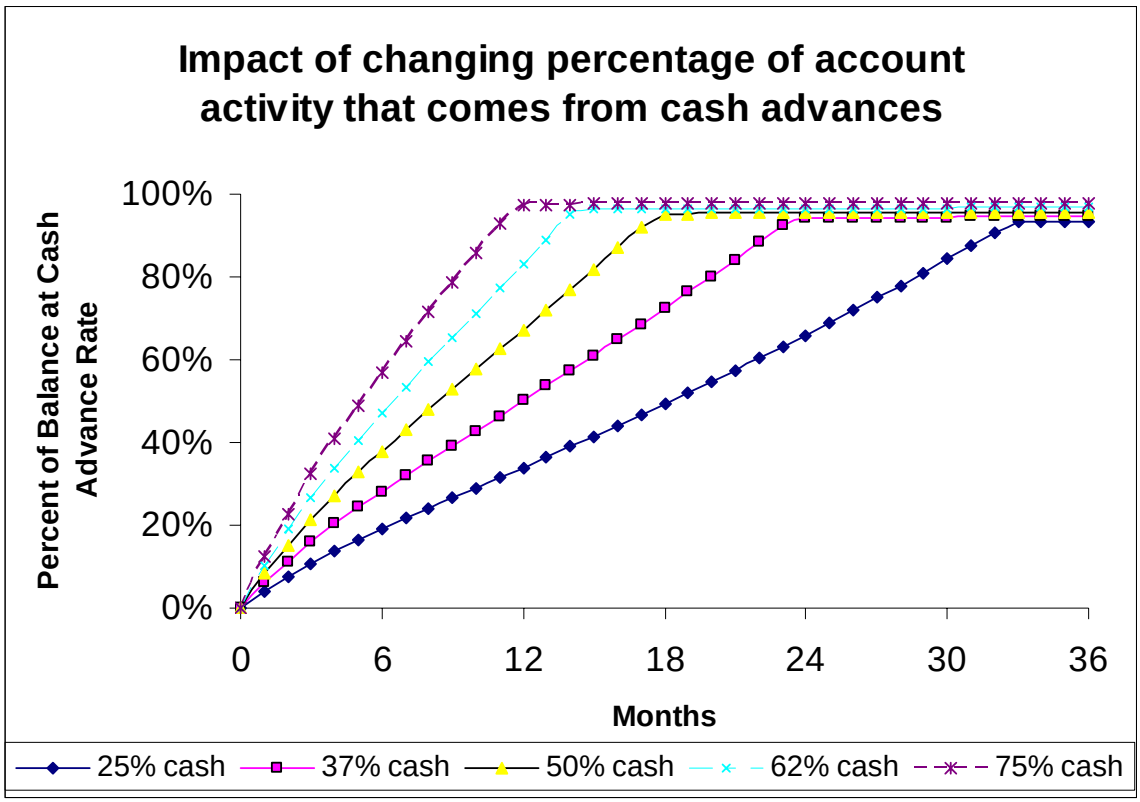


Figure 13

Regardless of whether a consumer has 25% cash advance activity every month (75% purchases) or 75% cash advance activity (25% purchases), over 90% of the balance eventually moves to the cash advance rate. The only question is how long it takes to completely convert the balances to from purchase to cash advance. Obviously, if over 90% of the balance eventually is at the cash advance rate regardless of how much cash advance activity takes place, the long-term relationship between pricing and risk (as defined by the level of cash advance activity) is distorted.

The second way the risk-price relationship in terms of cash advance activity is distorted is that it fails to account for when a cash advance took place. In a sense, the LRF policy is intended to be unforgiving. **No matter when a cash advance (or other high rate activity) took place, it stays on the balance sheet the longest—as long as a customer does not pay their entire balance in full, that cash advance balance will still be there, even if the only cash advance took place ten years ago.** This manipulates the interest

rate to increase revenue for issuers, but it distorts risk since the fact that a borrower took one cash advance a decade ago has nothing to do with their riskiness today.

Figure 12 shows the unforgiving nature of the LRF policy for a customer who takes a single $1,000 cash advance and then makes purchases only every month thereafter.[31] With the LRF policy, the single cash advance taken still determines the interest rate for over 90% of the balance even 5 years later (the same would be true 10 or 20 years out). With an HRF policy, on the other hand, the cash advance balance disappears in slightly under a year, which is more consistent with when the risk of that cash advance should no longer be relevant. The EP policy eliminates the cash advance balance as well, but it takes about twice as long as the HRF policy. With a proportional payment (PP) policy, the cash advance balance goes down quickly, but does not disappear completely (after 5 years it is 0.5% of the balance).

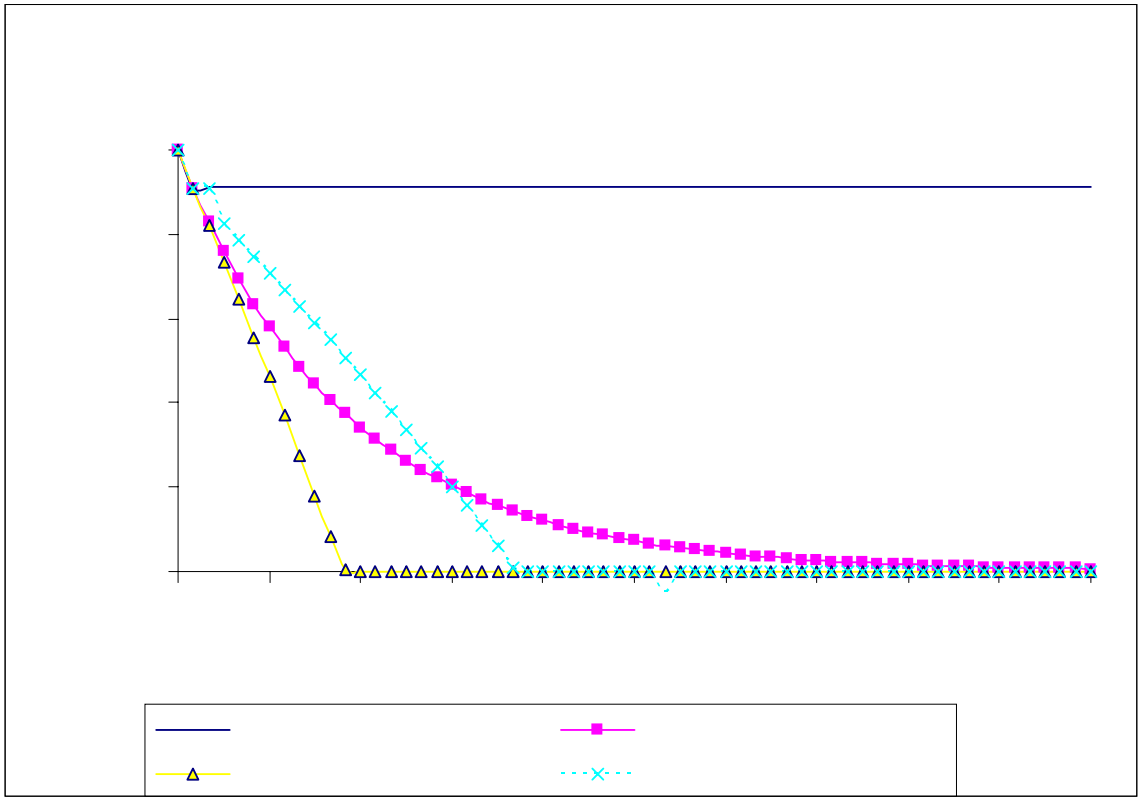


Figure 14

For the simulation results, using simple correlations (shown in Table 3), all four policies show a relationship between cash advance activity and risk consistent with risk-based pricing, with more cash advance activity associated with a higher APR. However, this is inevitable since the cash advance APR is always higher in the simulation than the other APR's, so more cash advances will lead to a higher APR to some extent. The real question is whether a particular payment policy distorts or maximizes the relationship between cash advance activity and APR. As the correlation coefficients indicate, the LRF policy shows the weakest correlation between cash advance activity and APR,

suggesting that it is once again the worst policy for risk-based pricing. HRF shows the strongest relationship.

Table 4 indicates multiple regression results for cash advances are consistent with the correlation coefficients. LRF shows the weakest relationship between risk and cash advance (as measured by the regression coefficient). While these regression coefficients do not differ as dramatically as the simple correlations, the difference between the LRF coefficient and the other three policies are statistically significant, and in the expected direction (i.e. LRF shows the weakest risk-based pricing for cash advances). The important point is that LRF once again the worst possible policy for risk-based pricing to an extent that is *economically* significant.

Combining the Risk Factors: Results for a Pseudo-Credit score

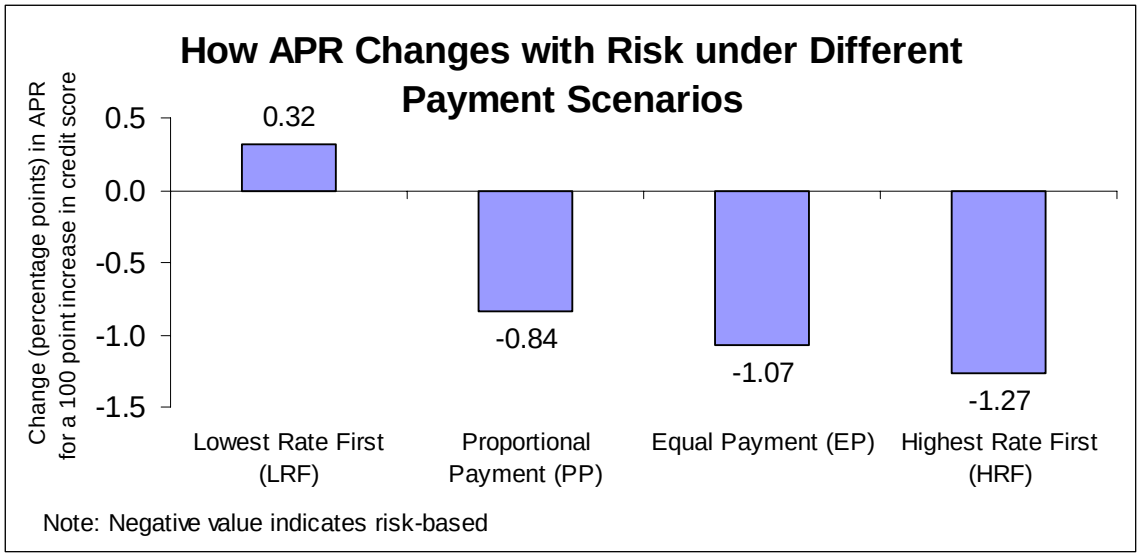
In order to more fully understand the relationship between risk and payment allocation policy and to aggregate the combined risk factors into a single measure, a pseudo-credit score was constructed that gave equal weight to each of the three risk factors discussed. The pseudo-credit score was designed to approximate the structure of common credit scores used by lenders, with a higher score representing lower risk and a mean and range roughly the same as that of a FICO score. More details on the construction of the credit score are available in Appendix B.

As indicated in Table 5, the LRF policy showed a highly significant relationship with pseudo-credit score, but it was in the opposite direction of risk-based pricing. If the credit score increased by 100 points (making the customer less risky), the APR rose by 32 basis points (or 0.32 percentage points).[32]

Table 5

How APR Changes with Risk under different Payment Scenarios

	Lowest Rate First (LRF)	Proportional Payment (PP)	Equal Payment (EP)	Highest Rate First (HRF)
Change (percentage points) in APR for a 100 point increase in credit score	0.32	-0.84	-1.07	-1.27



All three of the alternative payment allocation policies also show a significant relationship between risk and APR, but for each of these policies, higher risk accounts receive a higher APR, consistent with risk-based pricing. HRF showed the strongest risk-based pricing, with a 100 basis point increase in pseudo-credit score leading to a 127 basis point (1.27 percentage point) decline in APR. The relationships were robust over a variety of changes to the regression specification.[33]

Using three different measures of risk and one combined measure, we see that the relationship between pricing and risk suggests that somehow price competition has failed. If competition has not failed, LRF would be driven from the market by methods of applying payments that better match price to risk. Instead, pricing seems to be an attempt to maximize APR in a surreptitious and deceptive way. This suggests in particular that there are information shortfalls and cognitive limits on consumers that cause competition to fail. The survey results also bear this out.

CREDIT CARD COMPANIES BENEFIT FROM PAYMENT ALLOCATION

Paying the Lowest Rate First (LRF) can be beneficial to issuers not because it is efficient or rational pricing, but because it capitalizes on consumer behavioral weaknesses and lack of knowledge

We already know the LRF payment allocation method does not price based on risk. We also know that issuers have more efficient and predictable alternatives for raising prices, so what are the benefits to issuers of using this policy? The LRF payment allocation policy does have a number of potential benefits for issuers including:

-**Maximizes APR**: Of any possible policy, paying of the lowest rate first will always lead to the highest combined APR for each consumer.[34] Maximizing APR may seem like an

obvious goal for issuers, but keep in mind that issuers can simply offer credit at a higher APR if they want to increase the rate. The advantage of LRF is it acts as a hidden rate increase.

-Converts balance to cash advance (or the highest customer rate) over time, while stated rate remains the same: This goes hand-in-hand with maximizing APR, however, it is important as a distinct point in that the way LRF maximizes APR reveals a lot regarding its popularity among issuers. By converting balances to higher rate categories, LRF can raise rates while the stated rates the consumers see remain unchanged. The rate shown on a statement for promotional, purchase, and cash advance balances looks exactly the same. To even see that the average APR they pay has been affected, a customer would need to perform a weighted average APR calculation (and comparison).

-Causes rates to rise over time: One added benefit for issuers is that LRF causes rates to go up over time as balances are converted to cash advance. The regression results from Table 4, show a statistically significant positive relationship between APR and year for the LRF method, with APR increasing 55 basis points a year. The other policies also show a positive relationship between time and APR, but they are much weaker. The change over time in APR for the HRF policy is about 10 times lower than for the LRF policy.[35] It has been argued that credit card companies prefer to charge lower initial rates and raise them over time to exploit consumer biases[36]. These biases include discounting of future cash flows that underweights the more distant future, and excessive optimism about whether consumers will need to borrow in the future. Just like a short-term promotional interest rate, to the extent that consumers even notice the impact of LRF, it could complement a general marketing strategy of making up-front prices low, and raising prices in the future.

-Makes teaser rates seem better than they are: The fact that LRF reduces the cost of teaser rates is clearly recognized by issuers. In fact, in response to proposed reforms that would require issuers to stop using the LRF policy, industry representatives argued that it would curtail the use of teaser rates in the market place. The essence of the issuers' argument is that they cannot afford to give teaser rates unless those rates disappear more rapidly than the stated teaser rate period. In effect, issuers are admitting that current rules for applying payments makes teaser rates deceptive and that teaser rates need to continue to be deceptive to stay in existence.

-Causes rates to change based on behavior that consumers may discount: It has been argued that one advantage of late fees, overlimit fees, and penalty interest rates is that the costs are only incurred by borrowers in certain negative circumstances, and that consumers underestimate the likelihood of those circumstances applying to them.[37] Just like underestimating the chance that they will pay late, borrowers also might underestimate the chance that they will take a cash advance. Therefore, to the extent that consumers understand the impact of LRF, they may still underestimate how likely it is to impact them.

IMPLICATIONS FOR CURRENT POLICY AND RECOMMENDATIONS

The distortions generated by the payment allocation practice attracted proposals for reform in Congress during the past session, and from federal financial regulators. As of the publication of this report, **federal regulators are considering a proposal that would prohibit as an unfair practice the lowest rate first payment allocation method. It would instead require that credit card issuers allocate payments above the minimum payment in a manner no less beneficial than one of the three methods: highest rate first, equal amounts, or proportional to the balances to which each rate applies.** The issuer could allocate the minimum payment in the manner it chooses.

If adopted, the proposed rule would represent a significant improvement. However, given the immunity of this accounting mechanism to informed choice and market competition, and the costs to consumers, the best policy is simply to require that payments be allocated to the highest rate balances first.

Despite the opposition of the industry to the proposed reforms, **there is no legitimate argument to keep payment allocation policy unregulated.** An ABA-sponsored study gives the counterargument made by issuers: "Changing the way payments are allocated would have several adverse effects. Most obviously, issuers would curtail low introductory rate offers. But perhaps the most significant would be that average rates would rise for all customers, harming those who only occasionally use their credit card for borrowing and increasing the cost of using credit across the economy. Again, this is not unlike the balloon metaphor explained above. Imposing a particular "stacking order" for payments is the functional equivalent to squeezing a balloon: the air (read: interest rates or fees) is just shifted to the other side of the balloon (read: to other consumers)."[38] This argument requires that markets be competitive and that the way issuers price products be clearly understood by consumers, both of which the results here show to be untrue. In addition, even if prices do rise to compensate, honest, transparent higher pricing is better than prices that are equally high but function through deception. Furthermore, even if net average prices for consumers did not change, since other methods of applying payments correlate pricing better with risk, changing policies would still improve market efficiency resulting in net social benefits.

The results here suggest that regulation preventing LRF payment allocation policy is necessary since market competition cannot be expected to lead to the selection of an optimal payment allocation policy. Markets will not lead to the optimal solution because policy outcomes require complex calculations, current policy is not even known by most consumers and is not disclosed prominently on account terms, and because currently borrowers do not have a choice of policies even if they did try to shop around.

After an extensive search, only three major issuers were found that explicitly apply payments using a method other than LRF. One is State Employee's Credit Union in North Carolina, another is a bankcard offered by Nordstrom's, and the third is an issuer in the UK named Nationwide.[39] Therefore, while it is unlikely a consumer will find

issuers with alternative allocation policies on their own, such alternative policies can be viable.

Both policy initiatives under consideration would eliminate a pure LRF policy, giving issuers a number of other options. These options include the proportional payment (PP), equal payment (EP), and highest rate first (HRF) options discussed here. Another interesting component of possible policy changes is that minimum payments may be treated differently. Issuers may be able to use an LRF policy for the minimum payment, while balances in excess of the minimum payment would have to follow an HRF, PP, or EP rule (at the issuer's discretion).

Table 6 gives an APR comparison of the full range of payment policy options by age of account using the Monte Carlo simulation data. This table is similar to prior results, except that additional scenarios are included where the minimum payment is treated differently than the remainder of the payment[40] All of the policy options have proper risk-based pricing unlike current issuer policy. But the effectiveness of that risk-based pricing can still vary considerably across policy choices. Furthermore, the benefit to consumers in terms of APR improvement varies considerably across policies, with the worst policy for consumers (other than the currently policy) only having 37% of the benefit for consumers as the HRF policy. Treating the minimum payment differently can have a significant impact on outcome. Excluding the minimum payment from the new rules reduces the APR benefit of each of these policy changes to consumers by between 27% and 41%.[41] For PP and EP policies, the minimum payment exclusion reduces the extent to which pricing is risk-based. Interestingly, for the HRF policy, adding a minimum payment exclusion slightly increases the extent to which pricing is risk-based.

Table 6
Summary of Policy Option Impact (from simulation results)

		Proportional Payment (PP)	Equal Payment (EP)	Highest Rate First (HRF)
Minimum Payment Same	Risk Score Correlation	-0.149	-0.177	-0.235
	Risk Score Regression Coefficient	-83.6	-107.1	-127.2
	APR gain over LRF as % of HRF*	58%	62%	100%
Minimum Payment Different	Risk Score Correlation	-0.096	-0.096	-0.251
	Risk Score Regression Coefficient	-59.4	-25.1	-148.8
	APR gain over LRF as % of HRF*	37%	37%	73%

Note: All correlations and regression coefficients significant at 0.1% level. Results weighted by balance.
* Percentage is the net APR benefit to consumers (i.e. APR reduction from the LRF method) compared to the best possible method for consumers (HRF).

Regardless of minimum payment exclusion, the HRF policy is the most favorable to consumers in terms of pricing. It is also the rule for applying payments that best correlates pricing with risk.

While the policy options under consideration are a significant improvement over the current LRF policy, the optimal policy recommendation would be to require issuers to

use an HRF policy on all balances. Perhaps the minimum payment could be exempted from this policy, but the minimum payment should utilize a PP policy at worst rather than an LRF policy. Besides being better for consumers and more efficiently correlating price with default risk, this policy is also "fair" in comparison to other borrowing options. More specifically, this would mimic the comparable situation described in the introduction of a consumer having separate accounts with a bank at each APR.

The other options outside of LRF are less beneficial to consumers. While on their surface PP and EP policies seem "fair" (and are certainly better than existing policy), in another sense it is less than fair to the borrower since if they had several distinct accounts, they could put all of their extra payment toward the highest rate. The other policy options also result in savings for consumers that are only between 37% to 62% as large as the saving from a pure HRF policy. Given that under current proposed changes issuers get to choose among the various options and that consumers will probably remain largely unaware of how lender manipulation of where payments are applied can impact their account, it is likely that issuers will select the policy with the highest APR, resulting in only 37% of the benefit to consumers of an HRF policy.

The other policy options also result in less efficient risk-based pricing than HRF. Furthermore, the logic for allowing the issuer to treat the minimum payment as they wish is puzzling. The only possible reasoning appears to be that if there were separate accounts the customer would not be able to control how their minimum payments were applied. But this logic does not conform to the suggested policy if carefully reviewed. First, if the accounts are being treated as if they are separate, then the issuer should not treat the minimum payment anyway they choose but instead should be forced to allocate it proportionally (at worst). Second, if the accounts are being treated as if they are separate, then payments above the minimum should not be allocated equally or proportionally, but instead should all go to the highest interest account, as customers would typically opt to do with their payment above the minimum.

Economists often favor policy that maximizes market flexibility. Current policy recommendations follow this rule by giving issuers several options outside of LRF for allocating payments. However, the results clearly indicate that payment allocation is too opaque and shrouded for market forces to work at all in optimizing policy. Therefore, giving issuers policy options only reduces the opportunity for deception in their effort to maximize prices rather than eliminating the problem for their customers.

That credit card issuers manipulate the order in which payments are applied remains unknown to most consumers, and among those who are aware of it, the policy can easily be overlooked as a relatively minor, obscure rule of little consequence. The current prevailing policy of lowest rate balances being paid first greatly enhances income for credit card issuers through a largely unknown and seemingly unimportant rule that requires complex calculations to even approximate the consequences. Manipulating the order in which payments are applied also feeds into known biases in how future cash flows are valued and excessive optimism that make customers even less likely to be concerned.

The results of this study confirm that manipulation of the order in which payments are currently applied by lenders is powerful, deceptive, and inconsistent with risk-based pricing. Survey results demonstrate that the vast majority of borrowers are unaware of this policy and fail to understand its consequences. Using three different measures of risk as well as a combined measure, the LRF policy has been shown to make prices *less* correlated with risk. In fact, for two of these three measures and the aggregate measure, prices are actually inversely correlated with risk such that the least risky consumers pay the highest price. This is strong confirmation that credit card pricing (at least the payment allocation dimension) is not based on risk. Instead, pricing takes advantage of known behavioral biases and incomplete consumer information, seeking to maximize interest charged to consumers in ways that they are unlikely to react to or even perceive.

It is understandable that credit card issuers may sometimes need to raise prices. However, when they do so it should be done in a manner that is transparent and allows markets to remain efficient. Manipulating where payments go amounts to hidden pricing that prices inversely for risk and only exists because it is not understood by borrowers.

APPENDIX A: SURVEY METHODOLOGY AND ADDITIONAL RESULTS

A telephone survey commissioned by the Center for Responsible Lending was conducted among a national probability sample of 1,006 adults comprising 503 men and 503 women 18 years of age and older, living in private households in the continental United States. Interviewing for the survey was completed during the period September 12-15, 2008, a period when financial news was quite prominent in the headlines. Additionally, ongoing coverage of a "Credit Card Bill of Rights" that was under consideration in Congress and proposed credit card rule changes from regulators were in the news. Both of these proposed policy changes specifically discussed payment allocation in the rule changes under consideration. Therefore, if anything, the survey was conducted during a period of unusually high consumer awareness of this topic.

The survey was conducted by the Opinion Research Corporation as part of its regular CARAVAN® survey. All CARAVAN interviews are conducted using Opinion Research Corporation's computer assisted telephone interviewing (CATI) system. Opinion Research Corporation utilizes an unrestricted random sampling procedure that controls the amount of serial bias found in systematic sampling to generate its random-digit-dial sample. The sample is fully replicated and stratified by region. Only one interview is conducted per household. Unlike published directories, the probability telephone sample includes both unlisted numbers and numbers issued after publication of the directories. All sample numbers selected are subject to up to four attempts to complete an interview. Up to four attempts were used to reach respondents at selected sample numbers. To ensure reliable and accurate representation of the total population, completed interviews are weighted by four variables: age (18 years or older), sex, geographic region, and race.

The raw data are weighted by a custom designed program which automatically develops a weighting factor for each respondent.

All calculations shown in this report are for weighted results. Both respondents who did not have a credit card and who did not wish to respond to a particular question were excluded from the results shown.

The last question was more complicated than the prior questions and therefore is shown in its entirety below. It asked consumers to choose which of two options would save them more money:

As you may know, many people use their credit card to receive cash advances as well as make purchases. These cash advances typically are charged a higher interest rate and when you pay your bill, the payment is normally applied to the purchases first. Many credit cards also offer very low promotional interest rates, such as 0% for a specific period, or sometimes even for the life of the balance. [PAUSE]

> For the next question, please assume you have a credit card which has a $1,000 balance, split evenly between purchases and cash advances. Your purchase interest rate is 11% and your cash advance interest rate is 18%. You are trying to pay off the card, so you do not use the card anymore, but each month you make a $20 payment.
>
> You credit card company gives you one of two options – which one do you think is BETTER for you financially?
>
> -Move your purchase balance to a permanent interest rate of 0% (or)
>
> -Direct your payments to the cash advance balance first

The correct answer is "Direct your payments to the cash advance balance first". The difference in total payments is approximately $127, and the balance would be paid off approximately 6 months earlier than if the other option is taken. The $127 in lower payments is a savings of 21% in the total interest charges paid compared to the other scenario.

Figure 15 gives some additional interesting survey results regarding account usage. Among all credit card users, 17.4% reported using cash advances. The usage was significantly higher among lower income respondents. Promotional rates were used by 55.7% of respondents. Higher income credit card users utilized promotional rates significantly more often. This suggests that poorer households are paying more for credit cards by both using a higher cash advance rate and by less frequently using a low promotional rate. African American and Latino credit card users tended to use both promotional rates and cash advances more than other groups. However, only the increased promotional rate use by African Americans was statistically significant at the 5% level.[42]

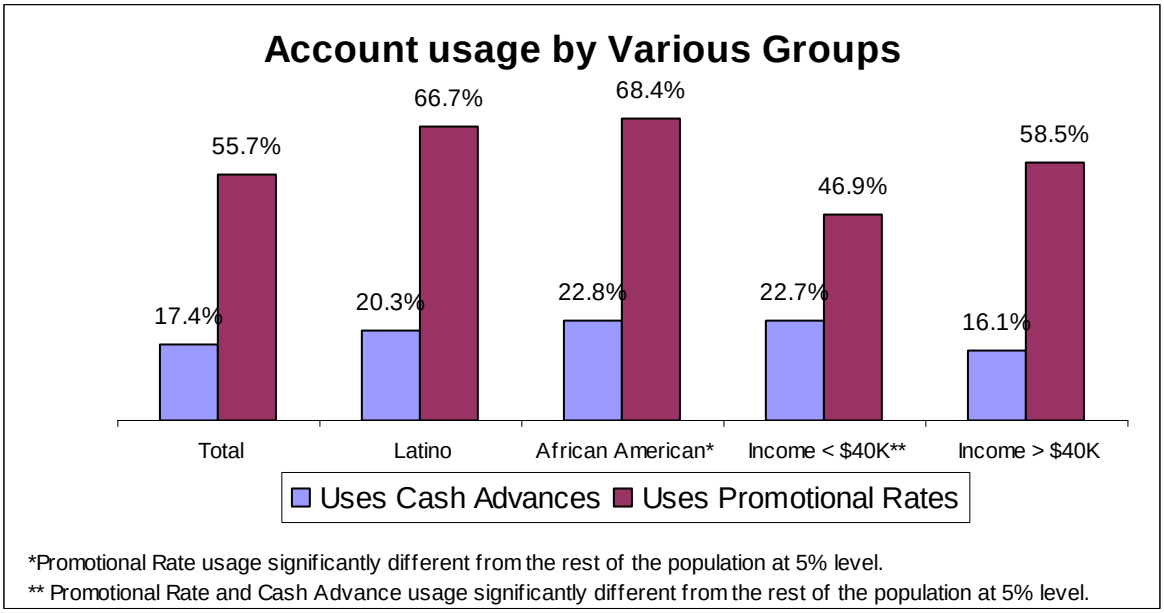


Figure 15

APPENDIX B: SIMULATION METHODOLOGY

Since some of the examples presented depend on specific assumptions regarding the nature of payments and account activity for an individual, a Monte Carlo method simulation was used to estimate the impact of payment allocation policies on a broad range of consumers. The simulation takes pre-defined probability distributions for the key parameters and randomly assigns value for each. Therefore, it can allow us to see what happens for consumers as a whole or trends across consumers when payments, cash advances, purchases, and balance transfers change from month to month in a variety of patterns. Different payment allocation rules were simulated for the sample of accounts given the levels of activity and payments made for each account. Statistics were run on the computer-generated sample of accounts.

Results are reported for 3,240 random accounts simulated for five years each which resulted in 194,400 total simulated random months of data. Most of the analysis has been conducted based on data summed into account years, with year-to-year change and averages within the year being examined. In terms of yearly data points for statistical analysis, there are a total of 16,200 observations for each policy option considered (or 12,960 for year-to-year change statistics, which exclude the first year). The same random parameters were used for each of the payment allocation policy options analyzed (LRF, HRF, EP, PP and other options discussed in the conclusion). Therefore, none of the variation between policy options can be attributed to random variation in input parameters between these scenarios since the exact same set of random parameters was used for each.

Assigning distributions to account parameters is particularly challenging for this scenario. Little public information on the distribution of account activity is available. What little data that is available tends to focus on total account activity, without breaking down the various types of activity. One study that does give means and standard deviations for a large sample of credit card account data broken down by type of activity is Agarwal et al (2007)[43]. Means and standard deviations for payments, purchases, and cash advances from this source were used as a basis for creating probability distributions. Creating probability distributions for the simulation is further complicated by the fact that the most commonly used distribution, the "normal distribution" is inappropriate for this scenario. First, the correct distributions are truncated at zero. In some situations a truncated normal distribution can be used, but in this case, the means are less than a single standard deviation from zero, implying that a very large portion of the data would have to be truncated. Furthermore, data is unlikely to peak at the mean. In fact, the most common value (mode) is zero for purchases and cash advances and around the minimum for payments, with no particular peaks at higher values. Therefore, for purchases and cash advances, a continuous uniform distribution was used with probability *p* with a *1-p* probability of the value being equal to zero. The range of the uniform distribution and the value of *p* were created to approximate the mean and standard deviation from a study by Agarwal et al.[44] For payments, the distribution selected was:

Payment= (2% x balance) + a random variable with a gamma distribution

The (2% x balance) is intended to represent the minimum payment. The gamma distribution (with the parameters used) generally has a very high likelihood of a value close to zero, with a long tail going in the positive direction only (i.e. no values below zero). Once again, the parameter selected approximated the distribution from Agarwal et al.[45]

It is important to include balance transfers at a promotional rate in the simulation since they can have a large impact on payment allocation results. The mean and standard deviation for this distribution are not available. They were assumed to have a similar distribution to cash advances, with a very high probability of a 0 value in a given month, and then otherwise a uniform distribution with a large range. Table 7 gives the values selected for all key simulation variables.

Table 7

Simulation Parameters				
	p	uniform distribution	APR	Introductory APR period
Purchases	38%	$0 to $1,650	12.11%	n/a
Cash Advances	8%	$0 to $4,000	19.10%	n/a
Balance Transfers	8%	$0 to $4,000	0.00%	8 months
	Gamma Distribution Parameters			
	kappa(alpha)	theta(beta)		
Payments	0.1111	3,138		

The APR's and introductory APR period were kept fixed throughout the simulation and are based on data from two surveys.[46] Based on these same surveys, balance transfers

were assumed to receive the introductory rate for 8 months and after that the remaining balance shifted to the purchase rate.

While the above parameters were used for one set of simulations (194,400 simulated months of data), a second set of simulations was used with adjusted parameters. This is because the parameters used resulted in an imbalance between activity and payments. This created a rising balance for most accounts (i.e. the average of purchases, cash advances, and balance transfers plus interest charges was higher than the average of payments). Since one of the important issues is to examine what happens under various policies when account balances change in various ways, it was important to get a large sample of accounts with declining balances as well as rising balances. Therefore, a second set of simulations adjusted activity downward and payments upward so that account balances on average stayed stable, or put another way, there were as many declining balances as rising balances. This occurred when activity levels for purchases, cash advances, and balance transfers were raised by 30%, while payments above the minimum were reduced by 30%. New random variables were generated for all parameters in this second set of simulations (although again, each policy option used the same set of random numbers).

The general conclusions were found to be the same using both sets of simulations. However, the results using the second set of parameters were less confounded by rapidly rising average balances. Therefore the results shown are generally for the second set of simulations with parameters after lowering activity levels and raising payments. Unless otherwise stated, regression results are weighted by balance to more accurately reflect the patterns of price change relevant to issuers. As with shifting simulation parameters, the general conclusions of the study are the same regardless of whether weighted statistics are used.

In addition to the above variations, a number of additional alternative simulations were attempted to see how sensitive the results are to the input parameters. In addition to simply changing the distributions, an attempt was made to account for the fact that there may be correlation between real parameters. Both autocorrelation in time (e.g. people who made a high payment or took a cash advance are likely to do so again) and correlation between variables (specifically with payments being correlated with recent activity levels) were included as alternative specifications. Table 8 includes summarizes some of the specifications attempted. In all of these alternative scenarios the LRF method resulted in significant inverse risk-based pricing, and it was less efficient as risk-based pricing than alternative payment allocation methods.[47]

Table 8
Summary of APR and Risk Relation for Alternative Scenarios

Scenario	Risk Score Regression Coefficent HRF	Risk Score Regression Coefficent LRF	Risk Score Regression R-square HRF	Risk Score Regression R-square LRF
Autoregressive Parameters-Heavy	-0.89	1.05	0.038	0.022
Autoregressive Parameters-Moderate	-0.91	1.08	0.038	0.023
Cash down 50%	0.17	1.84	0.001	0.048
Purchase down 50%	-1.70	0.76	0.021	0.006
Balance Transfers down 50%	-1.53	0.61	0.049	0.008
Payments down 50%	-0.80	1.06	0.033	0.020
Cash up 100%	-1.30	0.21	0.151	0.003
Purchase up 100%	-0.24	0.79	0.011	0.030
Balance Transfers up 100%	0.36	1.70	0.005	0.061
Payments up 100%	-1.07	0.61	0.037	0.007
Payments correlated with month's activity	-0.80	0.57	0.038	0.008
Payments correlated with 6 mos. activity	-1.12	0.83	0.061	0.013
Truncated normal distributions	-1.47	1.21	0.059	0.019

Pseudo-Credit Score

To test the combined impact of the three risk factors identified, a pseudo-credit score was constructed for the simulation data. Since it is unknown how important each of the three factors are in contributing to total risk, the credit score gives an equal weight to each of the three variables. In order to truly give each factor equal weight, the three variables in question (cash advances taken per year, payments made per year, and yearly average balance change) were each normalized. This was done by subtracting the mean and dividing by the standard deviation for each variable to create a new variable with a mean of 0 and a standard deviation of 1. The combined pseudo-credit score (RS) was then calculated as:

RS=[(payments – balance change –cash advance) * 19.3757] + 676.3938

where all input variables are the normalized versions. Like standard credit scores (such as a FICO score), the scale was defined such that a higher score implies lower risk. Therefore, payments are left positive, while the other two variables have their negative values added to the total. The two constants were chosen to approximate the mean and range of a FICO score. After conversion, the average score was 678 and the maximum value was 850. Although the original inputs to the simulation were not normally distributed, the resulting RS variable was very close to normal in distribution (see Figure 16).

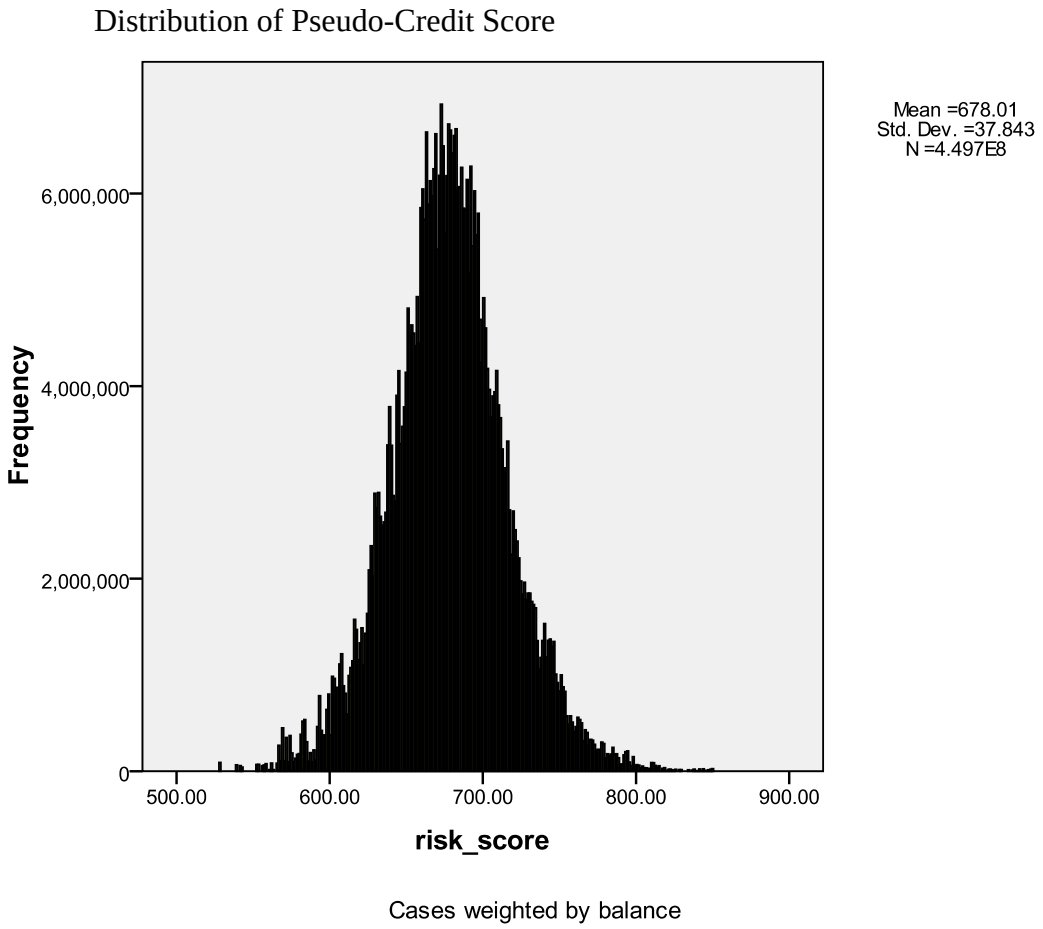


Figure 16

Distribution of account impact

Figure 17 shows the distribution of the impact on account finance charges of using the LRF policy instead of the HRF policy. The distribution peaks at zero, showing that more accounts have a zero or near-zero impact than implied by a normal distribution, but a broad range of accounts are affected. The top 5% of accounts (i.e. 95th percentile) in terms of impact, have about 14% of the aggregate impact, while the top 10% of accounts (i.e. 90th percentile) have 23% of the aggregate impact.

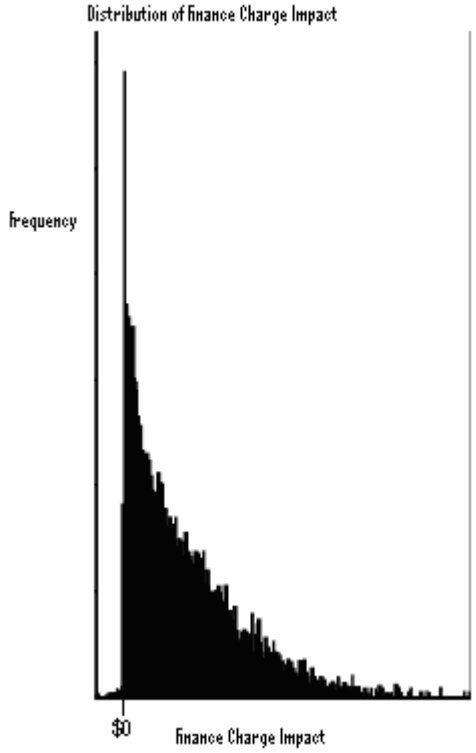


Figure 17

APPENDIX C: SAMPLE TERMS

Attached are sample terms and conditions statements from August 2008 Chase Bank and Capital One solicitations that include payment allocation terms (the relevant language is in #3 under "Authorization" for the first sample and under the question "How do you Apply My Payment?" for the second sample). Images are from Mintel Comperemedia and come from the 4th and 2nd pages of respectively of the solicitation packages.

TERMS & CONDITIONS LGC21534

Authorization: When you respond to this credit card offer from Chase Bank USA, N.A. ("Chase", "we", or "us"), you agree to the following:

1. You authorize us to obtain credit bureau reports in connection with your request for an account. If an account is opened, we may obtain credit bureau reports in connection with extensions of credit or the review or collection of your account. If you ask, we will tell you the name and address of each credit bureau from which we obtained a report about you.
2. If an account is opened, you will receive a Cardmember Agreement with your card(s). By using the account or any card, or authorizing their use, you agree to the terms of the Cardmember Agreement.
3. You authorize us to allocate your payments and credits in a way that is most favorable to or convenient for us. For example, you authorize us to apply your payments and credits to balances with lower APRs (such as promotional APRs) before balances with higher APRs.
4. Claims and disputes are subject to arbitration.
5. **As described in the Cardmember Agreement, we reserve the right to change the terms of your account (including the APRs) at any time, for any reason, in addition to APR increases that may occur for failure to comply with the terms of your account.**

Notice About this Pre-Approved Offer:

PRESCREEN & OPT-OUT NOTICE: This "prescreened" offer of credit is based on information in your credit report indicating that you meet certain criteria. This offer is not guaranteed if you do not meet our criteria. If you do not want to receive prescreened offers of credit from this and other companies, call the consumer reporting agencies toll-free, 1-888-567-8688; or write:

Equifax Options, P.O. Box 740123, Atlanta, GA 30374-0123,

Experian Target Marketing, P.O. Box 919, Allen, TX 75013,

TransUnion Opt Out Request, P.O. Box 505, Woodlyn, PA 19094-0505.

Before we approve you for a credit card, we will review your credit report and the information you provide with your response to confirm that you continue to meet the predetermined criteria for this offer. Based on this review, you may not receive a card. If approved for an account, your credit line will be at least $500. It is possible that certain applicants directly applying for a credit card from us, now or in the future, could obtain cards on the same terms or on more favorable terms than the terms available through this offer.

You must be at least 18 years old to qualify (19 in AL and NE).

We reserve the right to change the benefit features associated with your card at any time.

Ohio Residents: The Ohio laws against discrimination require that all creditors make credit equally available to all customers, and that credit reporting agencies maintain separate histories on each individual upon request. The Ohio Civil Rights Commission administers compliance with the law.

Notice to Married Wisconsin Residents: No provision of any marital property agreement, unilateral statement or court decree adversely affects our rights, unless you give us a copy of such agreement, statement or court order before we grant you credit, or we have actual knowledge of the adverse obligation. All obligations on this account will be incurred in the interest of your marriage or family. You understand that we may be required to give notice of this account to your spouse. **Married Wisconsin residents must furnish their (the applicant's) name and social security number as well as the name and address of their spouse to Cardmember Service at P.O. Box 15218, Wilmington, DE 19850-5218.**

Affiliate Information Sharing: Chase Bank USA, N.A. is part of JPMorgan Chase & Co. We and our JPMorgan Chase & Co. affiliates may share information about you among affiliates in order to offer products and services of interest to you. If you would prefer that we do not share information from your application, credit bureaus or third parties, please call us at 1-888-868-8618. For more information about our information handling policies, visit us on the web at: http://www.chase.com/privacypolicy.

Replying to this offer: If we receive your response after the expiration date, or the name and address on this offer differ from the information you provide to us, we will treat your response as an application for an account that was not prescreened. If you omit any information on the form, we may deny your request for an account. You must have a valid permanent home address within the 50 United States or the District of Columbia. We cannot process the form if the mailing address has been changed to an address outside that market area.

USA Patriot Act: To help the government fight the funding of terrorism and money laundering activities, Federal law requires all financial institutions to obtain, verify, and record information that identifies each person who opens an account. What this means to you: When you open an account, we will ask for your name, address, date of birth, and other information that will allow us to identify you. We may also ask to see your driver's license or other identifying documents.

Return your offer in the envelope provided or mail to: Cardmember Service, P.O. Box 15201, Wilmington, DE 19850-5201.

Source: Mintel Comperemedia

CAPITAL ONE® IMPORTANT DISCLOSURES

Card Center, P.O. Box 30284, Salt Lake City, UT 84130-9842

ANNUAL PERCENTAGE RATE (APR) for purchases*	0% (0.00000% daily periodic rate) through your 02/2009 billing period. After that, a variable rate, currently equal to **18.9%** (0.05178% daily periodic rate).
Other **APRs**	Balance transfer APR: Same as for purchases. Cash advance APR: A variable rate, currently equal to 22.9% (0.06274% daily periodic rate). Default APR: A variable rate, currently equal to 24.9% (0.06822% daily periodic rate). See explanation below.*
Variable rate information	Your purchase APR may vary quarterly. The rate will be determined by adding 13.9% to the Prime rate.* Rate in effect 07/01/2008. Your balance transfer APR may vary quarterly. The rate will be determined by adding 13.9% to the Prime rate.* Rate in effect 07/01/2008. Your cash APR may vary quarterly. The rate will be determined by adding 17.9% to the Prime rate.* Rate in effect 07/01/2008. Your default APR may vary monthly. The rate will be determined by adding 19.9% to the Prime rate.** Rate in effect 07/01/2008.
Grace period for repayment of the balance for purchases	25 days from the date of the periodic statement on new purchases (provided you have paid your previous balance in full by the due date).
Method of computing the balance for purchases	Average daily balance (including new purchases).
Minimum finance charge	For each Billing Period that your Account is subject to a finance charge, a minimum total **FINANCE CHARGE** of $0.50 will be imposed.
Membership fee	$39 annually.
Miscellaneous fees	Cash advance fee: 3% of amount of the cash advance, but not less than $10. Balance transfer fee: None. Late payment fee: Your late payment fee will be based on the amount of your account balance at the time the fee is applied. Balance of $0 - $99.99 = $15 fee; balance of $100 - $249.99 = $29 fee; balance of $250 or more = $39 fee. Over-the-credit-limit fee: Your over-the-credit-limit fee will be based on the amount of your credit limit at the time the fee is applied. Credit limit of $0 - $499.99 = $19 fee; credit limit of $500 - $999.99 = $29 fee; credit limits of $1,000 or more = $39 fee.

Returned payment fee: $39.

* **Can You Increase My APRs?** Your variable APRs can go up or down as the Prime rate goes up or down. Your introductory APRs may expire and increase to your non-introductory APRs if your payment is received late (3 or more days after your payment due date). We may increase your APRs to the Default APR disclosed above if your payment is received late twice within any 12 billing periods. If we increase your APRs to the Default APR, we will return you to your non-introductory APRs if you make at least the minimum payment on time for 12 consecutive billing periods. In the future, we may increase your APRs if market conditions change. If we increase your APRs for any reason other than an increase in the Prime rate or if you paid late as disclosed above, we will notify you in writing of your options in advance, including the right to opt out.

What About Any Other Terms Of My Account? We may change any other terms of your account, other than APRs, at any time. If we change any of these terms, we will notify you in writing of your options in advance, including the right to opt out of certain changes.

Do You Engage In Universal Default? We do not engage in a practice known as "universal default." Universal default permits a credit card company to increase your APRs simply because you fail to make a payment on a loan with another lender or your credit history contains other negative information.

How Do You Calculate My Variable Rate?

* We calculate your variable rates by adding a percentage to the Prime rate published in the "Money Rates" section of *The Wall Street Journal* on the 25th day of December, March, June and September. If the *Journal* is not published on that day, then see the immediately preceding edition. If Prime changes, your new rate will take effect on the first day of your January, April, July and October billing period.

** We calculate your variable rate by adding a percentage to the Prime rate published in the "Money Rates" section of *The Wall Street Journal* on the 25th day of each month. If the *Journal* is not published on that day, then see the immediately preceding edition. If Prime changes, your new rate will take effect on your next billing period.

What About Future Offers? At any time in the future, we may extend new offers in connection with this account, including opportunities to transfer additional balances. These new products and services may have different APRs, fees and other terms. We will provide any different terms when we make you the new offer, and you may accept or decline any such offer.

How Do You Determine My Credit Line? We determine your credit line based on your credit history and information you provide on your application. If your application is approved, you will receive a minimum credit line of $300.

How Do You Apply My Payment? We will apply your payment to pay off lower-rate balances before paying off higher-rate balances.

How Do You Calculate My Minimum Payment? Your minimum payment will be the greater of 3% of your outstanding balance or $15. If your balance is less than $15, your minimum payment will equal your balance.

How Can I Get My Credit Line Increased? In order to receive your credit line increase, you must activate your card and use it at least once in the first 90 days, don't go over your credit limit, and make your first three minimum monthly payments on time. The credit line increase will be applied to your account the following billing period after your third on-time payment is received.

Refer to the "Additional Disclosures & Terms and Conditions" enclosed for additional important disclosures.

Source: Mintel Comperemedia

[1] David K Stein, *Wrong problem, wrong solution: how congress failed the American consumer*, 2 Emory Bankruptcy Developments Journal (Spring 2007).
[2] Sha Yang, Livia Markoczy, Min Qi, *Unrealistic optimism in consumer credit card adoption*, 170-185 Journal of Economic Psychology (2007).
[3] Xavier Gabaix, David Laibson, *Shrouded attributes, consumer myopia, and information suppression in competitive markets*, MIT Department of Economics Working Paper 05-18 (April 11, 2005).
[4] Wendy Edelberg, *Risk-based Pricing of Interest Rates in Household Loan Markets*,Federal Reserve (December 5, 2003); Nadia Massoud, Anthony Saunders, Barry Scholnick. *The Cost of Being Late: The Case of Credit Card Penalty Fees*, (March 2006) at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=890826.
[5] Survey results presented later are consistent with this point.
[6] Ronald J. Mann, *Bankruptcy reform and the "sweat box" of credit card debt*, University of Illinois Law Review (2007).
[7] A GAO study found that 23 of 28 issuers in the survey explicitly had this policy. However, the other 5 issuers applied payments "subject to their discretion", suggesting it is highly likely that all of these remaining issuers used the same methodology without explicitly stating the policy. *CREDIT CARDS: Increased Complexity in Rates and Fees Heightens Need for More Effective Disclosures to Consumers*, GAO-06-929, (September 2006).
[8] Unlike the simplified description of the first month, the graph includes the impact of finance charges.
[9] *Good Luck Complaining About Your Bank*, Consumer Reports, (March 2008) at http://www.consumerreports.org/cro/aboutus/mission/viewpoint/bank-complaints-3-08/overview/bank-complaints-ov.htm
[10] For example, Discover Card in August 2008 was sending out a solicitation that advertised "0% APR* on balance transfers FOR LIFE of the balance". Interestingly, to get the rate for life, one had to make at least two new purchases or cash advances a month. Since Discover uses the LRF payment allocation method, this activity guarantees that balances will move from the promotional rate to the cash or purchase rate.
[11] The reason it does not convert *all* of the balance to the highest rate is that if there is always some new activity, this activity takes a little time to convert. In the example used for Figure 1, the proportion of balance at the cash rate stabilizes around 91% because new purchase activity ($100 a month) represents roughly 9% of the total balance.
[12] Bank rate average of survey: *Blindfolded Into Debt: A Comparison of Credit Card Costs and Conditions at Banks and Credit Unions*, Woodstock Institute, (2005) at www.woodstockinst.org.
[13] Based on an average balance of $10,678 per household from CardWeb.com.
[14] To get a feel for why individual account information matters rather than merely working with aggregate averages, consider two situations. In one situation, there are two account holders, each of whom has a $2,500 purchase balance and a $2,500 cash advance balance. As they make payments, the portion of their balance at purchase vs. cash advance rates can shift dramatically based on the payment allocation rules. Under the LRF policy if the consumer pays down half of their balance, they will have all of their remaining balance at the higher cash advance rate. On the other hand, if the highest rate is paid first, all the remaining balance would be at the lower purchase rate. Using the average difference found in one survey this would result in a change in the interest rate of 6.99% just from changing the payment allocation. However, now consider if the same issuer had $10,000 in balances, but this time rather than both customers having both a purchase and cash advance balance, one customer has a $5,000 cash advance balance and the other customer has a $5,000 purchase balance. In this case, payment allocation method makes no difference in interest earned since each customer has only one relevant interest rate. Note that the aggregate cash advance and purchase balances are the same in both scenarios, but the diversity of balances in individual accounts can make a very big difference in the outcome.
[15] While simulation parameters are meant to replicate actual account data, differences in patterns of activity and payments could effect the magnitude of the APR difference. Appendix B discusses the results of alternative specifications. While the APR difference may be off by as much as 50%, the general conclusions of this study remain very robust to large changes in the size and nature of the simulation parameters.
[16] Technically, some LRF interest rate variation is related to risk, but *inversely* (i.e. lower risk accounts pay higher rates) as the findings later will show.

[17] Nadia Massoud, Anthony Saunders, Barry Scholnick, *Who Makes Credit Card Mistakes?* Philadelphia Federal Reserve (August 2007) at http://www.philadelphiafed.org/econ/conf/consumercreditandpayments2007/papers/Scholnick_Who_Makes_Credit_Card_Mistakes.pdf.
[18] These results are also consistent with tests of disclosures conducted by the Federal Reserve. The Federal Reserve found that despite testing a variety of disclosure statements, many consumers still did not understand the implications of the payment allocation disclosure. *Unfair or Deceptive Acts or Practices; Proposed Rule*, 28914-28915 Federal Register (Monday, May 19, 2008).
[19] Difference is statistically significant at 1% level.
[20] Mark Furletti, C*redit Card Pricing Developments and Their Disclosure*, Discussion Paper, Payment Card Center, Federal Reserve (January 2003).
[21] Difference between Good/Excellent combined and Fair/Poor combined is significant at the 5% level.
[22] The question was designed to be as simple as possible given the complexity of the issue, rather than focusing on scenarios where payment allocation policy is the most deceptive. A more complex version of the question was given to a non-random group of respondent who all worked in the finance sector. The majority of these professionals also chose the incorrect answer.
[23] People with good or excellent knowledge were significantly more likely (at the 1% level of significance) to choose the correct response.
[24] The difference between those with "excellent" or "good" knowledge and other groups was statistically significant at the 5% level.
[25] As noted previously, the dynamics of payment allocation policy are complex, and this scenario is presented simply to demonstrate how a higher payment can cause a higher APR for some people. There are a few unusual patterns of activity when the APR will decline as a result of making large payments. However, these situations realistically impact fewer consumers than those for whom large payments cause APR to rise. In fact, the Monte Carlo simulation discussed later verifies this conclusion.
[26] Other FICO score inputs, such as the percent of credit limit used, are also related to rising debt levels.
[27] Of course, once again, this is merely one indicator of risk in a statistical sense. Some consumers increase debt for a variety of reasons that may have nothing to do with their risk of default.
[28] This is a bit of a simplification since balances will grow slightly faster for cash advances due to a higher APR.
[29] While it was expected that there might be a very high degree of correlation between payment level and balance change (which can cause a multicollinearity problem), the actual correlation was -0.195. While this is high enough to be statistically significant, this is not nearly high enough to suggest a serious multicollinearity problem, which occurs when two variables basically convey the same information (for example, Kahane suggests that an absolute value of the correlation coefficient of 0.8 signals a multicollinearity problem--Leo H. Kahane, *Regression Basics*, Sage Publishing (2001).)
[30] Payments are assumed to be 10% of balances and the purchase balance is assumed to start at $1,000.
[31] Payments are assumed to be 10% of balances, there is no other initial balance, and $100 in purchases are made every month.
[32] While drastically changing the weighting of the components of the credit score might change the coefficient found or even its sign, it will always be the case that LRF shows the worst relationship with risk-based pricing, regardless of the weights used. Since the standard deviation of the pseudo-credit score was 37.8, another way of looking at the score is that an increase of one standard deviation in score (in other words a decrease of one standard deviation in risk) led to an increase of 12 basis points in APR. Or perhaps more importantly the difference in the APR between LRF and HRF from a change of one standard deviation in the credit score was 60 basis points (0.6 percentage points), with LRF pricing low-risk accounts higher, and HRF pricing low-risk accounts lower.
[33] For example, adding the years since opening to the regression, eliminating the weighting, or using the original simulation parameters as described in Appendix B.
[34] The only possible exception to this would be unlikely scenarios where a low temporary rate is being paid off and then expires to become the highest rate. However, promotional rates usually stay at the lower purchase rate when they expire, so this is unlikely to occur.
[35] Since there is evidence of nonlinearity in the time variable, regressions were also estimated that used dummy variables for each year rather than a single linear variable. Other than greater clarity in the year-to-

year regression pattern (which shows a slight decline in APR for EP and HRF in the last year), the substantive results are the same and lead to the same general conclusions.

[36] Stefano Della Vigna & Ulrike Malmendier. *Contract design and self-control: Theory and evidence*, 353-402 The Quarterly Journal of Economics (2004).

[37] Ron Harris, Einat Albin , *Bankruptcy Policy in Light of Manipulation in Credit Advertising*, Theoretical Inquiries in Law, (July 2006).

[38] Jonathan M. Orszag & Susan H. Manning., *An Economic Assessment of Regulating Credit Card Fees and Interest Rates*, Compass (October 2007).

[39] Nationwide is a member-owned organization like a credit union in the United States and claims to be the only "major credit card provider" in the UK to have this policy. Some other large credit unions in the United States do not have any explicit allocation policy because they charge only one rate (while still offering cash advances), making payment allocation policy irrelevant.

[40] For simulation results where the minimum payment is treated differently, a 2% average minimum payment is used based on the Consumer Action Network's 2008 Credit Card Survey.

[41] This is a comparison of the APR reduction of each alternative policy compared to LRF with and without the minimum payment exclusion.

[42] This was using a 2-tail t-test. With a one-tail t-test some other results are also slightly significant.

[43] Specifically, the distributions used are from Appendix/Table A2 of: Sumit Agarwal, John C. Driscoll, Xavier Gabaix, and David Laibson, *The Age of Reasons: Financial Decisions Over the Life Cycle*, National Bureau of Economic Research (June 2007) at http://www.nber.org/papers/w13191 . The data from this paper may not perfectly represent the entire market because they are from one large U.S. bank. However, the averages are generally consistent with available industry statistics.

[44] Sumit Agarwal, John C. Driscoll, Xavier Gabaix,& David Laibson, *Stimulus and Response: The Path from Naïveté to Sophistication in the Credit Card Market* (August 20, 2006) at http://www.stanford.edu/group/SITE/archive/SITE_2006/Web%20Session%207/Gabaix_mistakes_aging.pdf.

[45] See footnote 46

[46] Purchase rate, cash advance rate, and introductory period are the average of bank rates from: *Blindfolded Into Debt: A Comparison of Credit Card Costs and Conditions at Banks and Credit Unions*, Woodstock Institute (2005) at www.woodstockinst.org . The median introductory rate is from *2008 Credit Card Survey*, Consumer Action Network at www.consumer-action.org.

[47] In almost all scenarios, HRF resulted in proper risk based pricing. But there were two specifications where HRF had inverse risk-based pricing. However, the amount of APR driven by risk for HRF in these two scenarios was extremely small, and in any case they were still significantly better in risk-based pricing than the LRF method. It is also interesting that both of these scenarios increase the relative importance of 0% promotional rates, which causes an increase risk-based pricing distortion regardless of the payment allocation method.