

CREDIT CARD PRICING: THE CARD ACT AND BEYOND

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We take a fresh look at the concerns about credit card pricing and empirically investigate whether the Credit CARD Act of 2009 (the CARD Act) has been successful in addressing those concerns. The rational choice theory of credit card pricing, which posits that issuers use back-end fees to adjust the price of credit to reflect new information about borrowers' credit risk, predicts that issuers will respond to the CARD Act by using alternative ways to price risk. In contrast, the behavioral economics theory, which posits that issuers use back-end fees because they are not salient to consumers, predicts that issuers will respond by increasing unregulated nonsalient prices. If the market is competitive, we argue that the CARD Act should also result in increases in some salient, up-front prices. But we show that if issuers have market power, reductions in nonsalient fees may not result in concomitant increases in salient charges. We test these predictions using two datasets on credit card contract terms before and after the CARD Act rules went into effect. We find that the rules have substantially reduced the back-end fees directly regulated by the CARD Act, including late fees and over-the-limit fees. However, unregulated contract terms, such as annual fees and purchase interest rates, have changed little. Post-CARD Act, consumers continue to face high long-term prices and low short-term prices, and imperfectly rational consumers still have difficulty understanding the cost of credit card borrowing. We thus consider potential improvements to the regulatory framework. We argue that improved disclosures that provide consumers with the aggregate cost of credit under the contract, based on information about the borrower's likely use of credit, would improve consumer outcomes. Furthermore, we suggest that regulators should not focus only on prices that are "too high" but should also consider limiting the ability of issuers to charge introductory teaser interest rates that are, in a sense, "too low."

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INTRODUCTION

Credit card contracts have come under increased public and political scrutiny. This scrutiny culminated in the passage, by an overwhelming bipartisan majority, of the Credit Card Accountability, Responsibility, and Disclosure Act of 2009 (the CARD Act)¹ and in the creation, as part of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (the Dodd-Frank Act),² of the Consumer Financial Protection Bureau (CFPB).³ One of the main concerns motivating this landmark legal reform was the pricing structure used by many credit card issuers. Specifically, credit card contracts commonly lure consumers with low short-term prices (e.g., no annual fees and zero-percent introductory or teaser rates) and then impose high long-term prices (e.g., default interest rates and penalty fees).

The CARD Act specifically targets this pricing structure or, more accurately, one part of this pricing structure: it imposes limits on high long-term prices but does not meaningfully restrict issuers' ability to set low short-term prices. It significantly curtails interest rate increases: teaser rates must be in place for at least six months before the card account reverts to the higher "go-to" rate. Excluding the expiration of teaser rates and a few other narrow exceptions, issuers cannot increase interest rates in the first year after opening the credit card account. Rate increases, after the first year, apply only to new charges, not to existing balances. Long-term penalty fees have also been substantially restricted: late fees are restricted in magnitude and issuers may not charge over-the-limit fees unless the consumer explicitly requests that the issuer allow transactions that take the consumer over the credit limit. Finally, inactivity fees are banned.⁴

In this Article, we take a fresh look at the concerns about credit card pricing and empirically explore whether the CARD Act has been successful in addressing these concerns. Based on our findings, we offer tentative proposals for improving credit card regulation.

¹ Pub. L. No. 111-24, 123 Stat. 1734 (2009) (codified in scattered sections of 5, 11, 15, 20, and 31 U.S.C. (Supp. IV 2010)).

² Pub. L. No. 111-203, 124 Stat. 1376 (2010) (codified in scattered sections of 7, 12, 15, 18, 22, 31, and 41 U.S.C. (Supp. IV 2010)).

³ Consumer Financial Protection Act, 12 U.S.C. § 5301 (Supp. IV 2010).

⁴ See *What You Need to Know: New Credit Card Rules Effective Aug. 22*, BOARD GOVERNORS FED. RES. SYS., http://www.federalreserve.gov/consumerinfo/wyntk_creditcardrules2.htm (last updated June 15, 2010); *What You Need to Know: New Credit Card Rules Effective Feb. 22*, BOARD GOVERNORS FED. RES. SYS., http://www.federalreserve.gov/consumerinfo/wyntk_creditcardrules.htm (last updated Mar. 11, 2010). For a summary of the CARD Act rules, see *infra* Table 1. Restrictions on permissible payment allocation methods and balance calculation methods further reduce the amount that consumers pay in long-term interest and fees.

We begin, in Part I, by surveying existing explanations for the low short-term prices and high long-term prices common in credit card contracts and considering their implications for the effects of the CARD Act. There are two main theories for why issuers charge the high back-end fees regulated by the CARD Act—the rational choice theory and the behavioral economics theory. Each provides a framework for analyzing the consequences of the CARD Act.⁵

We first consider the rational-choice, efficiency theory. Under this theory, issuers use the fees and rates regulated by the CARD Act to price risk.⁶ Issuers set basic purchase annual percentage rates (APRs) for each consumer based on the issuer's initial assessment of the borrower's risk. Consumers who are subsequently revealed to be higher risk through their borrowing and repayment behavior under the contract are then charged increased rates and additional fees, such as default interest rates and late fees. The result of this *ex post* repricing is that borrowers with a higher risk of defaulting pay more for credit, resulting in a more efficient credit market.

The CARD Act restricts some of the back-end contractual instruments available to issuers to price risk.⁷ The rational choice theory thus predicts that the CARD Act will result in issuers using alternative ways to price risk. Issuers can be expected to find different means of *ex post* risk-based repricing like the cash-advance fee. They can also be expected to engage in more *ex ante* risk-based pricing. For example, in the pre-CARD Act world, some issuers, relying on their ability to match price to risk through back-end rates and fees, engaged in only limited risk-based pricing on the front-end—offering the same basic APR on all approved applications regardless of credit score or other risk characteristics. The rational choice theory predicts that more issuers will offer risk-based pricing

⁵ In a recent article, Adam Levitin explores rational-choice, risk-based accounts of rate-jacking—one important instance of high long-term prices, in our terminology. Levitin contrasts the risk-based pricing account with an “opportunistic pricing” account that has a behavioral economics flavor. See Adam J. Levitin, *Rate-Jacking: Risk-Based & Opportunistic Pricing in Credit Cards*, 2011 UTAH L. REV. 339, 342.

⁶ While focusing on the risk-based pricing theory of credit card pricing, we note another rational choice theory. According to this theory, the credit card product includes certain optional services such as obtaining a cash advance or using the card outside the United States. It is efficient to price these optional services separately through back-end fees (e.g., a cash-advance fee and a currency-conversion fee). Otherwise, issuers would be forced to cover the cost of these services by increasing the annual fee or the basic interest rate, and cardholders who do not utilize the optional services will cross-subsidize cardholders who do utilize these services. The cross-subsidy would also result in excessive use of the optional services and in inadequately low use of credit cards by cardholders who do not utilize the optional services. See OREN BAR-GILL, *SEDUCTION BY CONTRACT: LAW, ECONOMICS AND PSYCHOLOGY IN CONSUMER MARKETS* (forthcoming 2012) (manuscript at 18–20) (on file with authors).

⁷ See *supra* note 4 and accompanying text.

up front since they no longer can rely on back-end prices, such as default interest rates and late fees to effectively price risk. This means that the variance of the basic APR can be expected to increase.

With fewer ways to price risk, the optimal contract under the CARD Act will be less effective at pricing risk. Consequently, we expect the average initial basic APR charged to rise, spreading the cost of risk across all cardholders. This may also result in a reduction in the prevalence of teaser rates. Under the rational choice theory, the main effect of the CARD Act should be to raise the price for actually using credit, specifically the basic APR.

Importantly, if the rational choice theory fully explains issuers' use of high back-end fees, then the CARD Act may very well reduce social welfare. Since the cost of unpriced risk will be spread across all cardholders, low-risk cardholders ultimately cross-subsidize higher-risk cardholders. This implies that high-risk consumers will end up using credit cards excessively while low-risk consumers will not use enough. Also, because increased risk is not priced (or not fully priced), cardholders will undertake excessive risk-increasing actions. And, again, to the extent that issuers cannot anticipate these risk-increasing actions and price them *ex ante*, they will spread the cost of the unpriced risk across all cardholders.

The behavioral economics theory provides a very different explanation of the high back-end fees regulated by the CARD Act: issuers use these fees because they are not salient to consumers. According to the behavioral theory, imperfectly rational consumers place excessive weight on short-term, salient prices and insufficient weight on long-term, nonsalient prices. Faced with such biased demand, issuers offer low short-term prices and high long-term prices to minimize the perceived total price of their product. Losses on the low, below-cost, short-term prices are recouped through high, above-cost, long-term prices. Additionally, front-end benefits to borrowers are funded by back-end costs.⁸

Under the behavioral theory, with the CARD Act in place, issuers still have the same incentive to use nonsalient fees but may only do so in a restricted manner.⁹ The theory thus predicts that issuers will respond by increasing the remaining unregulated nonsalient prices on the contract, such as cash-advance fees and rates.

Furthermore, if the restrictions on nonsalient fees are sufficiently strong and the market remains sufficiently competitive, we also expect an increase in salient fees, such as annual fees and purchase APRs, and a reduction in the use of teaser rates. The

⁸ See BAR-GILL, *supra* note 6.

⁹ See *supra* note 4 and accompanying text.

intuition becomes clear under the assumption of perfect competition. In a perfectly competitive market, issuers merely break even prior to the CARD Act rules. When the rules restricting the use of nonsalient fees are applied, issuers have to raise other prices on the contract, including potentially salient prices, to compensate for the loss in revenue from the regulated contract terms. If issuers have market power, however, they may prefer to keep unregulated, salient prices low to maintain high consumer demand.

While the rational choice theory has trouble justifying many of the CARD Act rules, the rules make perfect sense under the behavioral economics theory. According to this theory, pre-CARD Act prices were distorted: long-term, nonsalient prices were too high and short-term, salient prices were too low. Further, though efficient incentives require cost-based pricing, we instead had salience-based pricing. Indeed, the CARD Act helps to correct this distortion.¹⁰

Importantly, we do not think of the rational choice theory and the behavioral economics theory as necessarily mutually exclusive. Issuers could use certain contract terms both to price risk and because they are nonsalient to consumers.

In Part II, we empirically evaluate the effects of the CARD Act on long-term and short-term prices and describe the current state of credit card pricing using the Federal Reserve's *Report of Terms of Credit Card Plans* and a hand-coded dataset of credit card agreements. We show that the CARD Act had its intended effect on over-the-limit fees and late payment fees, two items that the CARD Act directly regulates. However, credit card terms not directly regulated by the CARD Act exhibited little change. The basic pricing structure used in the market prior to the CARD Act, consisting of low up-front prices and high back-end rates and fees, still remains in place. Introductory APRs have not decreased in popularity since the CARD Act's passage. Consumers face the same prevalence of default APRs should they fail to keep up with their payments. The fact that contract terms not regulated by the CARD Act did not adjust sufficiently to compensate for the loss in revenue from the regulated terms provides evidence that issuers have some degree of market power, perhaps stemming from consumers' switching costs (psychological or otherwise).

Given the persistence of this pricing structure under current rules, we conclude in Part III by exploring alternative regulatory approaches. First, we consider the possibility of designing a total-cost

¹⁰ See BAR-GILL, *supra* note 6. When consumers behave in imperfectly rational ways, even prices that reflect the social cost of credit will not generally provide optimal incentives. See *id.* at 20. Consumer misperception distorts incentives, even when issuers do not deliberately distort prices. Skewed pricing exacerbates the incentive problem. See *id.* at 12. The CARD Act improves incentives by restricting skewed, salience-based pricing.

disclosure system that would aggregate both short-term and long-term price dimensions and thus help consumers choose optimally between competing credit card offers. Such disclosure, if effective, would also reduce issuers' incentives to decrease short-term prices and increase long-term prices. Second, we consider the possibility of directly regulating teaser rates. The CARD Act's prohibitions currently focus on back-end fees that are arguably *too high*. However, certain potential efficiency explanations do exist for these fees, described above, creating a real concern that there may be unintended consequences. In contrast, the CARD Act leaves untouched up-front prices that are *too low*, such as teaser interest rates. What's more, there is no convincing efficiency explanation for low (or zero) teaser interest rates. Therefore, we should be less concerned about the risk of unintended consequences posed by regulating teaser interest rates.

Since the CARD Act restrictions do not seem to substantially affect the use of teaser rates, we consider regulating them by increasing the minimum period that any teaser rate must remain in effect from the current six-month requirement under the CARD Act to eighteen months (or even longer). We expect such a change will increase offered teaser rates and lower their general prevalence. We also consider restricting the magnitude of the permitted increase from any teaser rate to the long-term, go-to rate. Such a restriction can be expected to increase teaser rates, decrease long-term, go-to rates, or both.

I

CREDIT CARD PRICING AND THE EFFECTS OF THE CARD ACT: THEORY

In this Part, we recount the rational choice, risk-based pricing theory for the structure of credit card pricing and the behavioral economics, salience-based pricing theory. We use these theories to explain common pricing patterns in the credit card market, specifically low short-term prices and high long-term prices, and to predict the effects of the CARD Act on these common pricing patterns. We then test these predictions empirically in Part II.

A. A Rational Choice Theory: Risk-Based Pricing

1. *Revealed Risk and Adjustable Prices*

Providing credit inevitably involves risk—the risk that the cardholder-borrower will default on repayment obligations. An optimal credit card contract prices risk and, moreover, adjusts prices to reflect new information about risk. When an issuer decides to supply a credit card to a specific consumer, the issuer has certain

information about this consumer—information provided in the credit card application, credit bureau information, etc. Based on this information, the issuer estimates the probability that the consumer will not repay the loan and sets the basic APR accordingly.

Over the course of the issuer–cardholder relationship, the issuer collects an increasing amount of information regarding the probability that the cardholder will not repay the loan. For example, when the cardholder makes a late payment or exceeds the credit limit, such events may indicate financial distress. A rational issuer would incorporate this new information into any risk assessments performed and adjust the price of credit to reflect the increased risk of nonpayment. Thus, late fees, over-the-limit fees, and default interest rates represent means for adjusting prices to reflect new risk information.

2. *The CARD Act*

The CARD Act restricts issuers' ability to raise interest rates and impose penalty fees.¹¹ In other words, it restricts issuers' ability to adjust the price of credit to new information about the risk of nonpayment. How would these restrictions affect the equilibrium pricing scheme? First, and obviously, to the extent that the CARD Act is effectively enforced, modes of repricing that the CARD Act bans will disappear: penalty fees exceeding limits set by the CARD Act or its implementing regulations will no longer be observed.¹² And the same goes for sharp increases in prescribed interest rates.

Second, given that such common repricing will effectively disappear, issuers can be expected to search for alternative modes of repricing.¹³ According to the rational choice theory, issuers employed late fees and over-the-limit fees because paying late and exceeding the credit limit are indications of an increased probability of nonpayment. Unable to use, or fully use, these indicators, issuers will likely turn to less informative indicators. For example, if using the card's cash-advance feature is indicative of financial distress, issuers may respond by increasing cash-advance fees. Because the CARD Act restricts the use of more informative indicators—such as paying late and exceeding the credit limit—we expect issuers to rely more heavily on less informative indicators like cardholders taking out cash advances.

¹¹ See *supra* note 4 and accompanying text.

¹² See Levitin, *supra* note 5, at 340 (“The CARD Act severely curtailed card issuers’ ability to rate-jack consumer credit cards.”).

¹³ See Robin Sidel, *Credit-Card Fees: The New Traps*, WALL ST. J., Feb. 20, 2010, <http://online.wsj.com/article/SB10001424052748704804204575069374130248754.html> (describing new types of credit card fees after the passage of the CARD Act).

Third, issuers can be expected to invest more in pricing risk *ex ante*.¹⁴ Usually, issuers price risk most efficiently when using *ex post* price adjustments. When repricing based on *ex post* information is restricted, issuers turn to investing more in repayment risk information at the application stage and to incorporating this risk in their *ex ante* pricing. Specifically, we can expect greater variance in the initial basic APR. Before the CARD Act, issuers could expend less effort in fine-tuning the basic APR to cardholder risk because they could count on *ex post* repricing. Now that the CARD Act has restricted *ex post* repricing, however, issuers must resort to expending more effort in fine-tuning the basic APR.

Finally, on a related note, issuers can be expected to increase the basic APR. The CARD Act restricts issuers' ability to reprice risk *ex post* using penalty fees and interest rate increases.¹⁵ As explained above, issuers will search for alternative means to price risk—alternative *ex post* repricing and more careful *ex ante* risk-based pricing. But these alternatives are second-best; it appears inevitable that the CARD Act will inhibit issuers' ability to price risk. Faced with a reduced ability to price risk—i.e., to make risky borrowers bear the cost of the higher risk they impose—we expect issuers to spread the cost of the unpriced risk across all cardholders. As a result, the average basic APR can be expected to increase.

B. A Behavioral Economics Theory: Salience-Based Pricing

Behavioral economics provides an alternative theory for credit card pricing that focuses on the salience of different dimensions of card contracts to consumers.

1. *Low Short-Term Prices and High Long-Term Prices*

Credit card issuers commonly set low short-term prices and high long-term prices.¹⁶ From the cardholder's perspective, this pricing structure defers the costs of the credit card product into the future. The behavioral economics explanation for deferred-cost contracts is

¹⁴ See Connie Prater, *Card Issuers Ready to Check Cardholder Income, Assets*, CREDITCARDS.COM (Jan. 22, 2010), <http://www.creditcards.com/credit-card-news/credit-card-application-income-check-1282.php> (describing the methods by which credit card issuers "will be peering more deeply into card applicants' financial affairs" after the CARD Act goes into effect).

¹⁵ See *supra* note 4 and accompanying text.

¹⁶ See Paul Heidhues & Botond Kőszegi, *Exploiting Naïvete About Self-Control in the Credit Market*, 100 AM. ECON. REV. 2279, 2279 (2010) ("[F]or most types of nonsophisticated borrowers the baseline repayment terms are cheap, but they are also inefficiently front loaded and delays require paying large penalties. Although credit is for future consumption, nonsophisticated consumers overborrow, pay the penalties, and back load repayment, suffering large welfare losses.").

based on evidence that future costs are often underestimated.¹⁷ When cardholders underestimate future costs, contracts with deferred-cost features become more attractive to cardholders and thus to issuers. Put differently, cardholders who suffer from the underestimation bias find long-term prices nonsalient. Issuers, then, increase these nonsalient price dimensions because they have limited effect on demand for the credit card product.¹⁸

Two underlying biases jointly contribute to the underestimation of many future costs: myopia and optimism. A myopic cardholder focuses on short-term benefits and excessively discounts long-term costs. An optimistic cardholder underestimates any self-control problems and the likelihood of contingencies bearing economic hardship, resulting in the underestimation of future borrowing. Since many long-term price dimensions in the credit card contract depend on borrowing levels, the underestimation of future borrowing leads to an underestimation of future costs.¹⁹

When cardholders underestimate future costs, issuers will offer deferred-cost credit card contracts. Consider a simplified credit card contract with two price dimensions: a short-term price, P_{ST} (e.g., an introductory interest rate), and a long-term price, P_{LT} (e.g., a long-term interest rate). Assume that the optimal credit card contract sets $P_{ST} = 0.1$ and $P_{LT} = 0.1$, as these prices provide optimal incentives and minimize total costs. Specifically, assume that these interest rates reflect the issuer's risk-adjusted cost of funds such that the rates induce borrowing only if the value of borrowing to the cardholder exceeds the cost of lending to the issuer. In this simplified example, if cardholders are rational, issuers will offer this optimal contract.

Now assume that cardholders underestimate future costs. For example, assume that cardholders underestimate the likelihood of borrowing on their credit card beyond the introductory period: while they will actually borrow an amount of \$100 both during and after the introductory period, they think they will borrow \$100 during the introductory period but only \$50 after the introductory period ends.

As a result of such misperception, issuers will no longer offer the optimal contract. To see this result, compare the optimal contract,

¹⁷ See Oren Bar-Gill, *The Law, Economics and Psychology of Subprime Mortgage Contracts*, 94 CORNELL L. REV. 1073, 1119 (2009) (discussing this underestimation phenomenon in a different context).

¹⁸ For a more detailed discussion, see BAR-GILL, *supra* note 6, at 3–10, 16–18; Oren Bar-Gill, *Seduction by Plastic*, 98 NW. U. L. REV. 1373, 1395–1400 (2004).

¹⁹ See Lawrence M. Ausubel, *Credit Card Defaults, Credit Card Profits, and Bankruptcy*, 71 AM. BANKR. L.J. 249, 263 (1997) (“[A] substantial portion of credit card borrowing still occurs at postintroductory interest rates . . .”).

the (0.1,0.1) contract, with an inefficient, deferred-cost contract setting $P_{ST} = 0.05$ and $P_{LT} = 0.16$, denominated as the (0.05,0.16) contract. Assume that under both contracts, the issuer, who operates in a competitive market, just covers the total cost of offering the credit card product. Under the optimal (0.1,0.1) contract, total interest payments are: $P(0.1,0.1) = 0.1 \cdot 100 + 0.1 \cdot 100 = 20$ (assuming, for clarity of exposition, that the introductory period and the postintroductory period are one year long each and that interest is assessed at the end of the period; time discounting is also ignored for simplicity). Under the inefficient (0.05,0.16) contract, total interest payments are: $P(0.05,0.16) = 0.05 \cdot 100 + 0.16 \cdot 100 = 21$. Total cost, and thus total interest payments, are higher under the inefficient, deferred-cost contract.

Now consider the cost of the credit card as perceived by the imperfectly rational cardholder. Perceived total interest payments under the optimal (0.1,0.1) contract are: $\hat{P}(0.1,0.1) = 0.1 \cdot 100 + 0.1 \cdot 50 = 15$. Perceived total interest payments under the inefficient (0.05,0.16) contract are: $\hat{P}(0.05,0.16) = 0.05 \cdot 100 + 0.16 \cdot 50 = 13$. Cardholders would prefer, and thus lenders will offer, the inefficient, deferred-cost contract.

Our results suggest that a similar outcome—low short-term prices and high long-term prices—also obtains in a monopoly setting. In the absence of consumer misperception, the monopolist faces the following dilemma: it wants to raise prices to increase its per-unit revenue and thus total profit, but higher prices decrease the number of units sold (i.e., decrease demand for the product, thus reducing total profit). Misperception solves the monopolist's dilemma, at least to a certain extent. When misperception causes consumers to underestimate one price dimension, the monopolist will increase the underestimated price and decrease the accurately perceived price. In doing so, the monopolist maximizes per-unit revenues while minimizing the accompanying reduction in demand.

2. *The CARD Act*

The CARD Act imposes restrictions on long-term rates and fees that are nonsalient to cardholders.²⁰ By doing so, the CARD Act restricts issuers' ability to defer costs. Thus, an effective CARD Act should successfully change credit card pricing. Three specific sets of changes can be expected. First, long-term rates and fees that fall under CARD Act restrictions, such as late fees and over-the-limit fees, should decrease.

Second, long-term rates and fees not restricted by the CARD Act

²⁰ See *supra* note 4 and accompanying text.

can be expected to increase. Faced with imperfectly rational cardholders who underestimate long-term, nonsalient prices, issuers have a strong incentive to defer costs. If the CARD Act restricts certain types of cost deferral, issuers will search for alternative types of cost deferral not targeted by the CARD Act. For example, cash-advance fees and rates and foreign-transaction fees, which are not restricted by the CARD Act, can be expected to increase.

Third, if the market is sufficiently competitive, we can expect short-term, salient prices to increase. In the absence of legal restrictions, issuers set high long-term prices and use revenues from these back-end prices to fund front-end perks and thus compensate for lower revenues, and even losses, incurred from low short-term prices. When back-end revenues dry up due to CARD Act restrictions, issuers may have to increase front-end, salient prices to continue covering their costs. As noted above, issuers will try to minimize this negative impact on back-end revenues by shifting to back-end prices not regulated by the CARD Act. But it is unlikely that they will entirely avoid a reduction in back-end revenues. As a result, short-term, salient prices can be expected to increase.²¹ Specifically, we can expect an increase in annual fees, introductory interest rates, and the basic APR, which, though a long-term price, has become increasingly salient to cardholders.

However, if credit card issuers have market power, they may not increase their front-end, salient prices in response to the CARD Act.²² With market power, the issuer may decide to maintain low salient prices to keep demand high. We analyze below the implications of the CARD Act for credit card pricing under the behavioral economics theory, focusing on the effects of market structure, using a simple model.

3. *A Simple Model*

We develop a simple model designed to demonstrate that, while legal restrictions on long-term, nonsalient prices necessarily result in concomitant increases in short-term, salient prices under perfect

²¹ Consider a profit-maximizing issuer choosing between two nonsalient back-end fees: F1 and F2. If the issuer chose to focus on F1, that means that F1 represents the more efficient means of extracting back-end revenues. If the CARD Act restricts the use of F1, the issuer will switch to F2. But F2 is less effective in extracting back-end revenues. Accordingly, the issuer will reduce the front-end perks, and front-end prices will increase. The issuer retains another option in the form of investing in designing a new nonsalient term, F3, which is as effective as F1 in extracting back-end revenues. It is unlikely, however, that the issuer will find a perfect substitute for F1. But, again, the cost K would need to be financed somehow—financing that will likely come from increased short-term prices.

²² See *infra* Part I.B.3.

competition, the same does not hold true when sellers have market power. In this latter scenario, legal restrictions on long-term, nonsalient prices will generally have a smaller effect, and in some cases no effect, on short-term, salient prices.

Assume a simple two-dimensional pricing scheme with a short-term, salient price p_1 , and a long-term, nonsalient price p_2 . The consumer accurately perceives p_1 . Namely, the perceived price, \hat{p}_1 , equals the actual price, p_1 . The consumer underestimates the long-term, nonsalient price. Specifically, the perceived price is $\hat{p}_2 = \delta \cdot p_2$, where $0 < \delta < 1$. We further assume that prices are nonnegative (i.e., $p_1 \geq 0$ and $p_2 \geq 0$).²³

Every consumer who chooses to purchase the product will pay a total price of $p_1 + p_2$ (for simplicity, assume no discounting). In other words, every consumer who purchases the product will pay p_1 exactly once and p_2 exactly once. The underlying, simplifying assumption is either: (1) that prices are applied regardless of how the consumer uses the credit card product; or (2) that every consumer who purchases the credit card product uses the product the same way, triggering the same prices, and that the prices themselves do not affect the usage intensity.

However, consumers *perceive* the total price *ex ante* to be only $p_1 + \hat{p}_2 = p_1 + \delta \cdot p_2$. Demand for the credit card product is a function of the total perceived price. The demand function can thus be written as follows: $q = q(p_1 + \hat{p}_2)$. For simplicity, we focus on the special case where demand is linear in the perceived total price: $q = q(p_1 + \hat{p}_2) = \bar{q} - a \cdot (p_1 + \hat{p}_2)$.

On the supply side, we assume that issuers face a constant marginal cost of c . Issuer profits are given by: $\pi(p_1, p_2) = q(p_1 + \hat{p}_2) \cdot (p_1 + p_2 - c) = [\bar{q} - a \cdot (p_1 + \delta \cdot p_2)] \cdot (p_1 + p_2 - c)$.

We begin by assuming a perfectly competitive market and consider the effects of a cap on the long-term price. In particular, suppose that issuers may not charge a long-term price p_2 greater than some \bar{p}_2 . The effects of such a cap in a competitive market are described in the following proposition. (The full analysis of the model and all proofs are relegated to Appendix 1.)

²³ In this simple framework, in the absence of the nonnegativity constraints, sellers will set p_1 at minus infinity and p_2 at positive infinity. A more general framework would replace the nonnegativity constraints with an assumption that setting a negative price entails a cost for the seller (beyond the cost of paying money to the consumer)—the cost from opportunistic behavior by consumers. In this more general framework, we could have negative (albeit not too negative) prices, as is sometimes observed in the market (e.g., loyalty programs can be viewed as creating a negative price for transacting). To view further justifications for these types of price-floor assumptions, see generally Paul Heidhues et al., *The Market for Deceptive Products* (Jan. 2012) (unpublished manuscript) (on file with author).

Proposition 1: *Effect of a cap on the long-term price in a competitive market.*

In a perfectly competitive market, when the law imposes a constraint \bar{p}_2 on the long-term price, the effects of the legal constraint, as compared to the outcome with no constraint, depend on the strictness of the constraint. In particular, there exists a set of thresholds for the constraint, $k_1 < k_2$, with $k_2 = c$, such that:

- (a) *Nonstrict Constraint.* If $\bar{p}_2 \geq k_2$, then the legal constraint has no effect and firms choose $p_1 = 0$ and $p_2 = c$.
- (b) *Strict Constraint.* If $k_1 \leq \bar{p}_2 \leq k_2$, then:
 - i. Sellers will reduce the regulated long-term price p_2 to the lowest level permitted by law.
 - ii. Sellers will increase the short-term price p_1 to compensate for the reduction in the long-term price p_2 .
 - iii. Demand will decrease.
- (c) *Very Strict Constraint.* If $\bar{p}_2 < k_1$, then the market will shut down.

The intuition for these results is straightforward. First, in the absence of any cap, firms prefer to make their money through the long-term price rather than through the short-term price because consumers are less sensitive to the long-term price.²⁴ However, once a binding cap constrains the long-term price, firms must raise the short-term price to cover their costs. In a perfectly competitive market, firms just barely break even, so a firm that fails to raise its short-term price in response to such a cap would go out of business. While the total price consumers pay does not change, the price *perceived* by consumers goes up (since more of it comes from the up-front price) and hence demand goes down.

If there is market power, however, a different cap effect emerges. To simplify, consider the polar case in which there is a single, monopolistic seller. The following proposition summarizes the effect of a cap on the long-term price on a monopolist.

Proposition 2: *Effect of a cap on the long-term price in a monopolistic market.*

In a monopolistic market, when the law imposes a constraint \bar{p}_2 on the long-term price, then, compared to the no-constraint benchmark:

- (a) If the long-term price is capped below the price the

²⁴ See *supra* Part I.B.1.

monopolist would otherwise choose, the monopolist will reduce the long-term price p_2 to the lowest level permitted by law.

- (b) The effect on the short-term price and on demand depends on how strict the legal constraint is. In particular, there exists a set of thresholds of the constraint $k_1 < k_2 < k_3$, with $k_2 = c$, such that:
- i. *Mild constraint.* If $\bar{p}_2 \geq k_3$, then the law has no effect on the short-term price and demand will increase.
 - ii. *Intermediate constraint.* If $k_2 \leq \bar{p}_2 \leq k_3$, then the short-term price will increase but demand will still increase.
 - iii. *Strict constraint.* If $k_1 \leq \bar{p}_2 \leq k_2$, then the short-term price will increase and demand will decrease.
 - iv. *Very Strict Constraint.* If $\bar{p}_2 < k_1$, then the market will shut down.

In the monopolist case, the results are more complicated. In the absence of a legal constraint, the monopolist also prefers to make all of its revenue from the long-term price since consumer demand is less sensitive to the long-term price than to the short-term price.²⁵ However, unlike in the case of perfect competition, if the cap is binding, the monopolist may not raise the short-term price. The reason is that with a mild constraint, the increase in per-customer revenue that an increase in the short-term price would produce is less than the loss in revenue from the resulting reduction in demand. Thus, a mild legal constraint on the long-term price will *increase* demand for the monopolist's product. However, as the constraint becomes progressively stricter, the monopolist will ultimately begin to raise its short-term price.

Even over the range of legal constraints in which the monopolist responds by increasing the short-term price, the monopolist will adjust short-term price less than will firms in a perfectly competitive market. We formalize this point by comparing the effect of the legal constraint across the two market structures in the following proposition.

Proposition 3: When the legally imposed cap rests in the $k_1 \leq \bar{p}_2 \leq k_2$ range, the cap will cause firms in a perfectly competitive market to increase their short-term prices by more than a monopolist will.

²⁵ See *id.*

The intuition for this result is straightforward: In a competitive market, for every dollar decrease in p_2 caused by the legal constraint, sellers must raise p_1 by a dollar (to cover their costs). In a monopolistic market, such a large increase in p_1 is not necessary since the monopolist is making a positive profit. The legal constraint clearly reduces the monopolist's profit. When recalibrating its pricing strategy in response to the legal constraint, the monopolist trades off the benefits of an increase in p_1 —a larger per-unit revenue (or a smaller decrease in per-unit revenue)—against the costs of such an increase in terms of reduced demand. Accordingly, the monopolist will increase p_1 by a smaller amount as compared to sellers in a competitive market.²⁶

Perfect competition and monopoly represent only the two polar cases. Real-world markets, including the credit card market, fall somewhere in between. Despite housing a large number of competing firms, the credit card market has exhibited some degree of supracompetitive pricing, a point made in an influential paper by Laurence M. Ausubel in 1991.²⁷ According to Ausubel, one source of market power in the credit card market stems from the cost to consumers of searching for a better credit card and switching between cards.²⁸ As costs of switching away from an issuer (to a competing issuer) rise, so does the issuer's market power.

Whatever the source of market power in the credit card market, we conjecture that the results derived from the comparison of the two polar cases of monopoly and perfect competition apply more generally. Namely, the legal constraint on p_2 has a smaller effect on p_1 and on demand when the issuer has more market power.

From a welfare perspective, the fact that the increase in p_1 is smaller in magnitude than the reduction in p_2 implies that consumers enjoy part of the surplus that the monopolist (or issuer with lesser market power) lost. Moreover, as pricing shifts from misperceived price dimensions to accurately perceived price dimensions, the total

²⁶ Our assumption of linear demand plays a role in this result. Under perfect competition, the reduction in the nonsalient price always passes through dollar for dollar to the salient price, no matter what the shape of the demand function. With linear demand, a monopolist passes through less than 100% of the change in the nonsalient price. But if the demand function is sufficiently concave in the relevant region, a monopolist can possibly pass through more than 100% of the change in the nonsalient price. The argument is that market power represents one reason why incomplete, or even zero, pass through may occur.

²⁷ Laurence M. Ausubel, *The Failure of Competition in the Credit Card Market*, 81 AM. ECON. REV. 50, 75–76 (1991).

²⁸ See *id.* at 68–70; see also Paul S. Calem & Loretta J. Mester, *Consumer Behavior and the Stickiness of Credit-Card Interest Rates*, 85 AM. ECON. REV. 1327, 1328–29 (1995) (discussing Ausubel's theory in greater detail); Victor Stango, *Pricing with Consumer Switching Costs: Evidence from the Credit Card Market*, [50] J. INDUS. ECON. 475, 475–92 (2002).

effect of consumer bias on consumer decision making is reduced—to the benefit of consumers.²⁹ This effect is present in both competitive and monopolistic markets.

II

CREDIT CARD PRICING AND THE EFFECTS OF THE CARD ACT: EVIDENCE

In this Part, we first seek to provide some suggestive evidence on the causal effect of the CARD Act, an ambitious goal given the other macroeconomic events that occurred during the period in which the CARD Act's rules took effect. In pursuing this goal, we mainly rely on a simple before–after comparison to provide evidence on the effect of the CARD Act. Households' borrowing behavior and financial institutions' lending behavior were of course affected by the financial crisis over this period, so the before–after comparisons must be interpreted with caution. Still, we think the data discussed below showing sharp changes upon the passage of the CARD Act provide convincing evidence that the Act had the intended effect on the contract terms directly regulated under it. Less clear, however, is whether the before–after comparisons on terms *not* directly regulated by the CARD Act, which reflect much smaller changes, are properly attributable to the CARD Act.

Our second goal is more straightforward: we seek simply to describe the current state of credit card pricing. The behavior of credit card issuers under current rules sheds light on the scope for further improvements to credit card regulation.

The new rules imposed on credit card issuers under the CARD Act were phased in at the beginning of 2009. Starting on the effective date of the CARD Act, August 22, 2009, issuers were required to give forty-five days' notice for certain rate and fee increases.³⁰ On February 22, 2010, a set of additional rules went into effect including restrictions on interest rate increases in the first year of new credit card accounts and an opt-in requirement for over-the-limit transactions and fees.³¹ On August 22, 2010, another set of rules went into effect including restrictions on late payment fees and a ban on inactivity fees.³² In Table 1 of Appendix 2, we provide the key provisions that went into effect on each date.

²⁹ The difference between the actual total price and the perceived total price is $(p_1 + p_2) - (p_1 + \delta \cdot p_2) = (1 - \delta) \cdot p_2$. This difference is decreasing in p_2 .

³⁰ See Prater, *supra* note 14.

³¹ See *What You Need to Know: New Credit Card Rules Effective Feb. 22*, *supra* note 4.

³² See *What You Need to Know: New Credit Card Rules Effective Aug. 22*, *supra* note 4.

A. Data

We use two sources of data on the terms of credit card contracts. The first is the Federal Reserve's *Report of Terms of Credit Card Plans* (TCCP).³³ The TCCP data have been collected semiannually since 1990 from the twenty-five largest bank issuers of credit cards and an additional 125 issuers. Respondents include commercial banks, savings and loans, and savings banks but do not include credit unions or finance companies that do not issue credit cards through a bank or thrift.³⁴ The survey asks issuers to report the primary pricing terms for the largest consumer credit card plan offered by the issuer available to new customers.³⁵ Terms collected include the purchase APR, late-payment fee, over-the-limit fee, whether the issuer offers an introductory interest rate, and whether the issuer uses double-cycle billing.

An advantage of the TCCP data is that they provide a long time series, giving us rich information about the historical evolution of the terms of credit cards. We focus on the period beginning with the July 31, 2001, survey and ending January 31, 2011, the most recent survey available. The survey suffers from the disadvantage of only providing information about a limited set of terms with only limited information about each term. For example, issuers that offer a range of APRs based on the riskiness of the cardholder are instructed to report only the midpoint of the range of APRs, and issuers only indicate whether an introductory rate is available and not what the introductory APR and the length of the introductory period are. Moreover, in working with the data, it became apparent that issuers' responses to the TCCP survey are sometimes incomplete and inaccurate. For example, magnitudes of certain fees are sometimes missing for issuers that, we suspect, do charge these fees.³⁶

Accordingly, we coded a new dataset on the terms of credit card contracts available just prior to the February 22, 2010, phase-in of CARD Act rules as well as after the August 22, 2010, phase-in of the final set of CARD Act rules. Our source of credit card contracts stems from the CARD Act itself. The CARD Act requires credit card issuers

³³ See FED. RESERVE SYS., SUPPORTING STATEMENT FOR THE REPORT OF TERMS OF CREDIT CARD PLANS 1 (Apr. 9, 2010), available at <http://www.federalreserve.gov/BoardDocs/ReportForms/formsreview/FR2572.20051005.omb.pdf>. To access data from the semiannual survey of credit card plans, including in Microsoft Excel format, see *Credit Cards: Survey of Credit Card Plans*, BOARD GOVERNORS FED. RES. SYS., <http://www.federalreserve.gov/creditcard/survey.html> (last updated Mar. 2, 2012).

³⁴ FED. RESERVE SYS., *supra* note 33, at 3 n.5.

³⁵ See FED. RESERVE SYS., REPORT OF TERMS OF CREDIT CARD PLANS—INSTRUCTIONS 2 (2010), available at http://www.federalreserve.gov/reportforms/forms/FR_257220100630_i.pdf.

³⁶ See *id.*

to provide the full text of their credit card agreements to the Board of Governors of the Federal Reserve (the Board).³⁷ The Board has made available on its website the most recent set of agreements provided to it.³⁸ The first batch of agreements was provided on December 31, 2009, but is no longer available on the website. However, the Board provided the earlier set of contracts to us in response to a Freedom of Information Act request.

This credit card agreements database is advantageous for us in two ways: first, it includes all types of credit card issuers, including credit unions; second, we can code a large set of terms by reading the agreements directly. We randomly selected twenty-four credit union issuers and twenty-five investor-owned issuers (e.g., commercial banks, savings and loans, etc.) from the 389 issuers for which we have agreements. Table 2 of Appendix 2 contains the list of issuers in our data. For each issuer, we coded the corresponding agreement provided for December 31, 2009, as our pre-CARD Act observation and the earliest agreement provided *after* the August 22, 2010, effective date of the final set of CARD Act rules as our post-CARD Act observation. Thus, our “pre-CARD Act” observations are in fact contracts offered after the CARD Act’s August 22, 2009, effective date but prior to the bulk of the rules under the CARD Act taking effect. The limited rules that took effect immediately in August 2009 will generally bias our estimates toward not observing an effect of the CARD Act. Thirty-six selected issuers had to be discarded and replaced with a new randomly selected issuer because either a pre- or post-CARD Act agreement was not provided or was provided but was incomplete.

A weakness of both datasets is that they do not provide information on the number of customers that use each contract. Thus, we cannot detect a shift in the number of customers at each issuer governed by the contract that we coded. One possibility is that issuers responded to the CARD Act not by changing the overall menu of contract terms available but by shifting more customers into particular credit card contracts. However, we can detect only menu changes, not changes in the fraction of customers that use each card within the menu. This is a substantial limitation of our empirical analysis. A more definitive evaluation of the CARD Act would require data on the number of active accounts for each set of contract terms offered by each issuer. Still, we think our inquiry into the menu of contract terms offered by firms is informative.

³⁷ See 15 U.S.C. § 1632(d)(2) (Supp. IV 2010).

³⁸ See *Credit Cards: Interactive Tools and Features*, BOARD GOVERNORS FED. RES. SYS., <http://www.federalreserve.gov/creditcard> (last updated Nov. 10, 2010).

In comparing the results between the two datasets, it is important to keep in mind that credit unions are present in the agreements dataset but not in the TCCP data. Credit unions use very different pricing structures than do investor-owned credit card issuers, with far lower back-end fees and penalties.³⁹ This makes both the average level of fees and the change in fees before and after the CARD Act lower in the agreements database than in the TCCP data. We provide a subgroup analysis breaking out the results for investor-owned issuers and credit unions separately.

B. Contract Terms Directly Regulated by the CARD Act

We begin with contract terms that are directly regulated by the CARD Act.

1. *Over-the-Limit Fees*

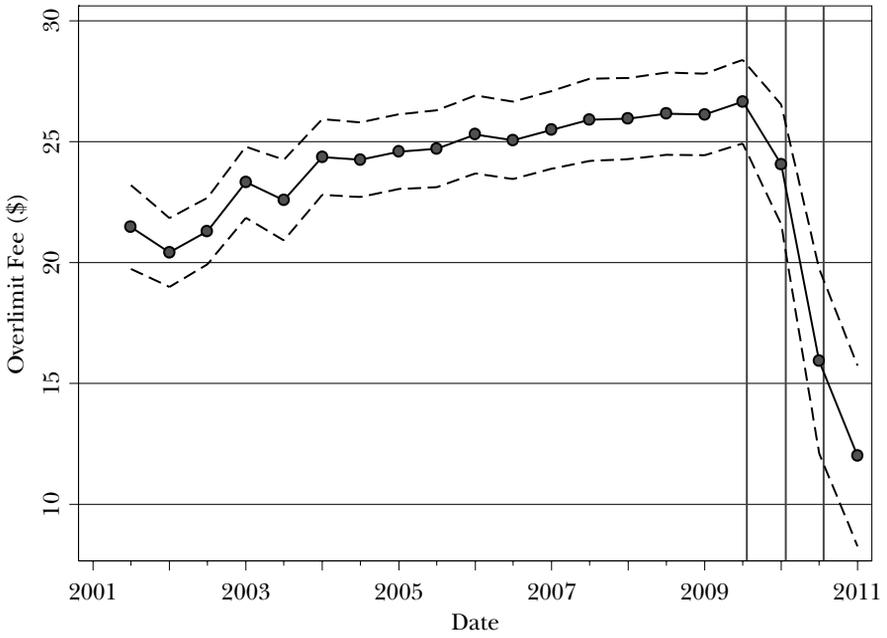
Beginning February 22, 2010, credit card issuers may not charge fees to a consumer for exceeding the credit limit unless the consumer has explicitly opted in to the issuer's over-the-limit service.⁴⁰ Moreover, credit card issuers may now charge only one over-the-limit fee per billing cycle.⁴¹ Figure 1 shows that issuers have dramatically lowered their over-the-limit charges in response. The figure plots the average of credit card issuers' over-the-limit fees for each date in the TCCP data starting from the beginning of our sample period in July 2001. The steady increase in the use of over-the-limit fees over the previous decade is evidenced by the upward slope of the plot until 2009. The average over-the-limit fee thereafter sharply drops from \$26 in July 2009 down to \$12 by January 2011. The three vertical lines in the figure are drawn at the three key effective dates for rules under the CARD Act: August 22, 2009, February 22, 2010, and August 22, 2010.

³⁹ See Ryan Bubb & Alex Kaufman, *Consumer Biases and Firm Ownership* 30 (NYU Ctr. for Law, Econ. & Org. Working Paper No. 11-35, 2011), available at <http://ssrn.com/abstract=1945852>.

⁴⁰ See *What You Need to Know: New Credit Card Rules Effective Feb. 22*, *supra* note 4.

⁴¹ See *id.*

FIGURE 1: AVERAGE OVER-THE-LIMIT FEES OVER TIME



Notes: Dashed lines represent 95% confidence interval. Source: TCCP data.

Table 3 provides the sample means for selected contract terms pre- and post-CARD Act from the agreements data as well as the difference in means. For each variable, we restrict the sample to issuers for which we have over-the-limit fee data in both the pre- and post-CARD Act observations.

TABLE 3. POOLED SAMPLE

	(1) Pre-CARD Act	(2) Post-CARD Act	(3) Difference
Over-the-Limit Fee (\$) (N=49)	16.72	5.98	-10.74*** (2.21)
Maximum First Late Fee (\$) (N=44)	30.54	25.57	-4.98*** (0.96)
Maximum Subsequent Late Fee (\$) (N=44)	31.09	29.26	-1.83** (0.72)
Intro APR Offered? (N= 49)	0.20	0.22	0.02 (0.02)
Intro APR (%) (N=9)	3.96	3.46	-0.50 (0.52)
Purchase APR (%) (N= 48)	14.30	14.75	0.45 (0.27)
APR Range (%) (N= 48)	9.73	9.51	-0.22 (0.60)
Balance Transfer APR (%) (N= 24)	14.57	14.41	-0.16 (0.41)
Balance Transfer Fee (%) (N=49)	1.18	1.31	0.12 (0.11)
Cash Advance APR (%) (N=38)	17.08	18.11	1.03*** (0.38)
Cash Advance Fee (%) (N=49)	1.86	1.98	0.12 (0.16)
Default APR (%) (N=14)	22.51	22.80	0.29 (0.29)
Foreign Transaction Fee (%) (N=49)	1.25	1.35	0.10 (0.11)
Annual Fee (\$) (N=49)	17.63	13.01	-4.62 (5.10)
Returned Payment Fee (\$) (N= 49)	26.94	24.44	-1.49 (1.25)
<i>Notes:</i> Sample sizes denote the number of issuers. For each variable, we only include issuers for which the variable is nonmissing in both the pre-CARD Act and post-CARD Act observations. Standard errors clustered at the issuer level in parentheses in column (3). Source: Agreements database. (***) significant at 1%, (**) significant at 5%, (*) significant at 10%.			

In the agreements data, we see a similar drop in over-the-limit fees, from \$16.72 to \$5.98. Tables 4 and 5 break out these results for the credit union and investor-owned issuer subgroups, respectively. Both types of issuers exhibited a similar drop in over-the-limit fees charged.

TABLE 4. CREDIT UNION SUBGROUP

	(1) Pre-CARD Act	(2) Post-CARD Act	(3) Difference
Over-the-limit Fee (\$) (N=24)	13.69	3.33	-10.35*** (2.45)
Maximum First Late Fee (\$) (N=19)	24.89	23.68	-1.21 (0.90)
Maximum Subsequent Late Fee (\$) (N=19)	24.89	24.87	-0.03 (1.02)
Intro APR Offered? (N=24)	0.21	0.25	.04 (0.21)
Intro APR (%) (N=4)	7.05	7.05	0.00 (2.42)
Purchase APR (%) (N=24)	13.83	14.22	0.39** (0.15)
APR Range (%) (N=24)	7.35	7.66	0.30 (0.42)
Balance Transfer APR (%) (N=13)	14.50	14.09	-0.40 (0.58)
Balance Transfer Fee (%) (N=24)	0.08	0.17	0.08 (0.08)
Cash Advance APR (%) (N=20)	14.31	14.58	0.27* (0.14)
Cash Advance Fee (%) (N=24)	0.71	0.83	0.13 (0.09)
Default APR (%) (N=5)	19.38	19.40	0.02 (0.02)
Foreign Transaction Fee (%) (N=24)	0.88	1.04	0.17 (0.12)
Annual Fee (\$) (N=24)	1.54	1.54	0.00 (1.61)
Returned Payment Fee (\$) (N=24)	20.96	20.27	-0.69 (1.88)
<i>Notes:</i> Sample sizes denote the number of issuers. For each variable, we only include issuers for which the variable is nonmissing in both the pre-CARD Act and post-CARD Act observations. Standard errors clustered at the issuer level in parentheses in column (3). Source: Agreements database. (***) significant at 1%, (**) significant at 5%, (*) significant at 10%.			

TABLE 5. INVESTOR-OWNED ISSUER SUBGROUP

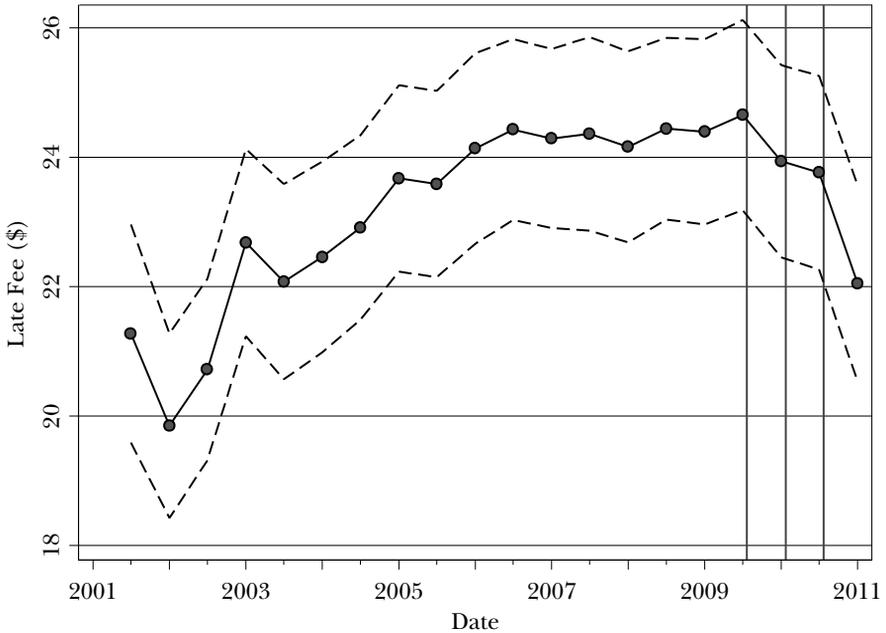
	(1) Pre-CARD Act	(2) Post-CARD Act	(3) Difference
Over-the-limit Fee (\$) (N=25)	19.64	8.52	-11.12*** (3.71)
Maximum First Late Fee (\$) (N=25)	34.84	27.00	-7.84*** (1.29)
Maximum Subsequent Late Fee (\$) (N=25)	35.80	32.60	-3.20*** (0.93)
Intro APR Offered? (N= 25)	0.20	0.20	0.00 (0.12)
Intro APR (%) (N=5)	1.49	0.59	-0.90 (0.95)
Purchase APR (%) (N=24)	14.77	15.29	0.51 (0.53)
APR Range (%) (N=24)	12.12	11.37	-0.74 (1.13)
Balance Transfer APR (%) (N=11)	14.66	14.79	0.14 (0.60)
Balance Transfer Fee (%) (N=25)	2.24	2.40	0.16 (0.21)
Cash Advance APR (%) (N=18)	20.16	22.03	1.88** (0.76)
Cash Advance Fee (%) (N=25)	2.96	3.08	0.12 (0.32)
Default APR (%) (N=9)	24.25	24.69	0.44 (0.46)
Foreign Transaction Fee (%) (N=25)	1.61	1.65	0.04 (0.18)
Annual Fee (\$) (N=25)	33.08	24.02	-9.06 (10.06)
Returned Payment Fee (\$) (N=25)	32.67	30.40	-2.28 (1.69)

Notes: Sample sizes denote the number of issuers. For each variable, we only include issuers for which the variable is nonmissing in both the pre-CARD Act and post-CARD Act observations. Standard errors clustered at the issuer level in parentheses in column (3). Source: Agreements database. (***) significant at 1%, (**) significant at 5%, (*) significant at 10%.

2. Late Payment Fees

Beginning August 22, 2010, issuers cannot charge a late payment of more than \$25 unless one of the borrower's previous six payments had also been late, in which case the fee can be up to \$35.⁴² Figure 2 shows that issuers had steadily increased their late payment fees over the previous decade but, upon passage of the CARD Act, started decreasing late payment fees, from \$27 in July 2009 down to \$12 in January 2011.

FIGURE 2: AVERAGE LATE FEE OVER TIME



Notes: Dashed lines represent 95% confidence interval. Source: TCCP data.

In the contracts provided in the agreements dataset, issuers commonly structure late fees based on the size of the borrower's outstanding balance and, since the CARD Act, commonly charge less for the first late payment than for subsequent late payments within six months. We thus coded the maximum fee charged under the contract for the borrower's *first* late payment as well as the maximum fee charged for subsequent late payments within six months of the first late payment.

Table 3 shows that issuers' first late payment fee decreased by

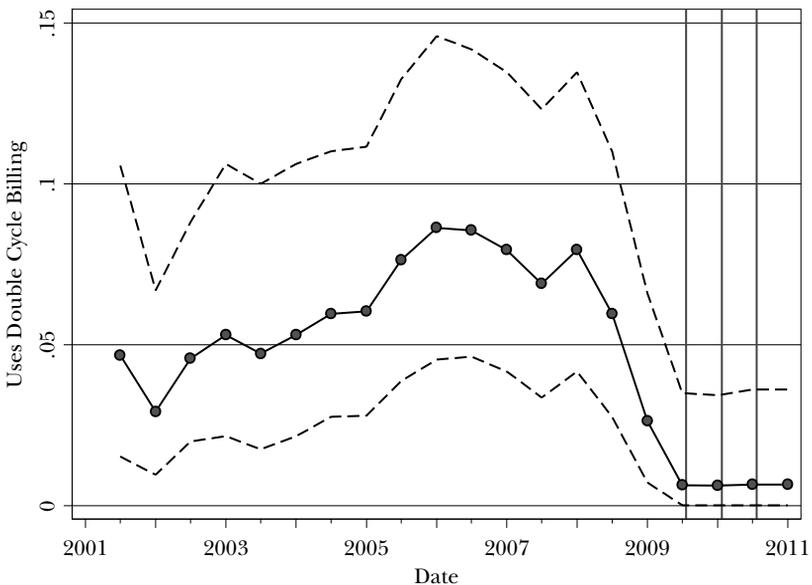
⁴² See *What You Need to Know: New Credit Card Rules Effective Aug. 22*, *supra* note 4. Issuers can also charge a higher late payment fee if they can show that the costs it incurs justify the size of the fee.

about \$5 after the CARD Act’s restrictions went into effect, from \$30.54 to \$25.57. But the late fee charged for subsequent late payments fell by only \$1.83. Tables 4 and 5 show that these declines are largely due to investor-owned issuers who, on average, lowered their maximum first late payment fee by \$7.84 and their subsequent late payment fee by \$3.20.

3. Double-Cycle Billing

As of February 22, 2010, issuers can only impose finance charges on balances in the current billing cycle and may not use “double-cycle billing,” which entails calculating the balance by looking back two billing cycles.⁴³ Figure 3 shows a growing minority of issuers used double-cycle billing over the previous decade, but the practice sharply dropped from 8% of issuers as of January 2008 to less than 1% of issuers by July 2009. This drop actually preceded the effective date of the ban on double-cycle billing.

FIGURE 3: PERCENTAGE OF ISSUERS USING DOUBLE-CYCLE BILLING OVER TIME



Notes: Dashed lines represent 95% confidence interval. Source: TCCP data.

C. Unregulated Up-Front Prices

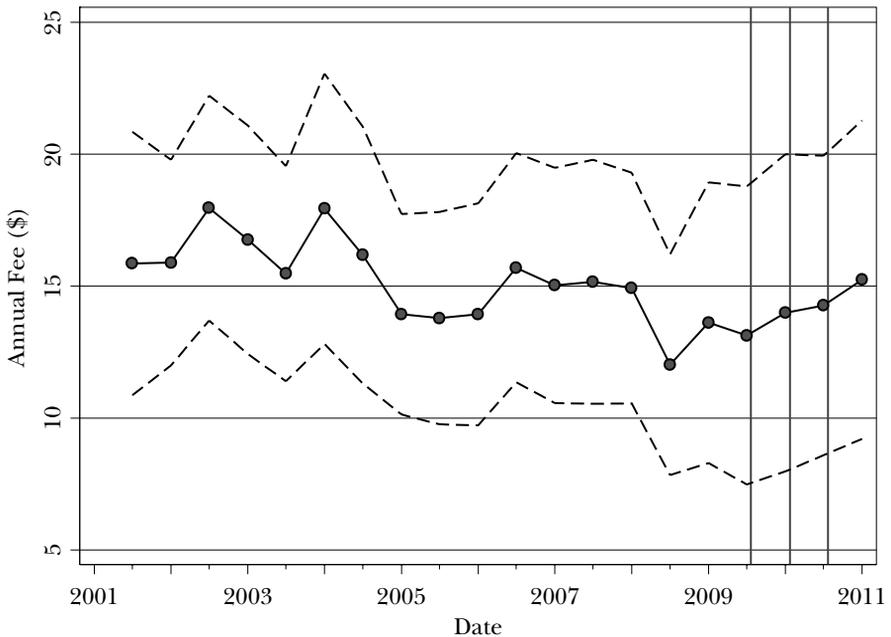
We now turn to prices that we expect are salient to consumers at the time of contract choice but are not directly regulated by the CARD Act.

⁴³ See *What You Need to Know: New Credit Card Rules Effective Feb. 22*, *supra* note 4.

1. Annual Fees

Figure 4 shows that annual fees had generally been in decline over the previous decade, from a high of \$18 on average in July 2002 to a low of \$12 in January 2008. But since the passage of the CARD Act, annual fees have risen somewhat, reaching \$15 in January 2011. The agreements dataset, however, shows no statistically significant change in annual fees. On the whole, then, these two datasets suggest that annual fees have not substantially increased following the phase-in of the CARD Act rules.

FIGURE 4: AVERAGE ANNUAL FEES OVER TIME



Notes: Dashed lines represent 95% confidence interval. Source: TCCP data.

Our findings are largely consistent with other research. For example, a report by the Pew Charitable Trusts on the effect of the CARD Act found that the prevalence of annual fees declined slightly from 2009 to 2010, from 15% of all surveyed cards down to 14%.⁴⁴ However, they did find that, for cards that charged an annual fee, the median annual fee rose from \$50 to \$59 for banks cards.⁴⁵

Focusing on a narrow subset of card accounts that had been

⁴⁴ See PEW HEALTH GRP., TWO STEPS FORWARD: AFTER THE CREDIT CARD ACT, CREDIT CARDS ARE SAFER AND MORE TRANSPARENT—BUT CHALLENGES REMAIN 15 (2010), http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Credit_Cards/PEW-CreditCard%20FINAL.PDF?n=1231.

⁴⁵ See *id.*

opened less than twelve months prior, a report by Argus Information and Advisory Services found that 25.5% of all new accounts in the third quarter of 2010 charged an annual fee compared to only 11.1% in the third quarter of 2009.⁴⁶ And an analysis by the Office of the Comptroller of the Currency (OCC) found a large rise in the fraction of subprime credit cards that charge an annual fee, from 4% in January 2009 to 21% by the end of 2010.⁴⁷

The data as a whole, however, paint a picture of no substantial change in annual fees during and after the CARD Act phase-in. In particular, the OCC found no significant change in issuers' annual fee revenue from July 2009 to November 2010.⁴⁸

2. *Purchase APRs*

Figure 5 shows the average purchase APR spread (the APR charged under the contract minus the *Wall Street Journal* prime rate used as the index for most variable rate cards) reported by issuers in the TCCP data. Purchase APR spreads began to increase as the financial crisis ensued in 2008, rising from 6% in July 2007 to 10% in January 2011. The figure vividly illustrates why a simple before–after comparison for purchase APRs is not a credible approach to estimating the precise causal effect of the CARD Act; other factors affecting APRs, first and foremost the riskiness of credit card lending, were changing over the period as well and need to be accounted for. So, while the TCCP data show that APRs increased by about one percentage point—from 9% in July 2009 just prior to the CARD Act to 10% in January 2011⁴⁹—other macroeconomic market changes confounded the effect of the CARD Act. The agreements data show a 0.45-percentage-point increase in the purchase APR after the CARD Act rules took effect,⁵⁰ but this difference is not statistically significant.

⁴⁶ See Michael Heller, Argus Info. & Advisory Servs., *The CARD Act—One Year Later: Recent Trends in the Credit Card Industry*, CFPB 5 (Feb. 22, 2011), <http://files.consumerfinance.gov/f/2011/03/Argus-Presentation.pdf>.

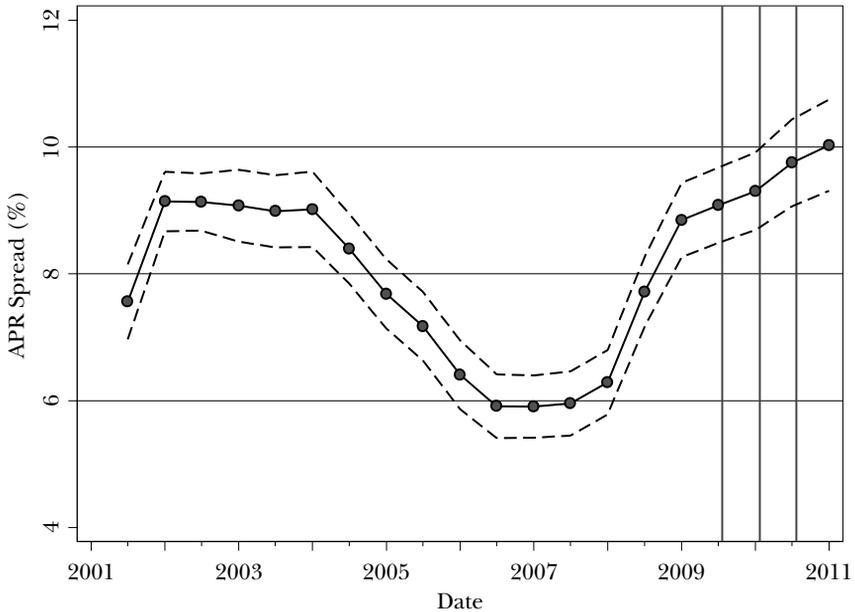
⁴⁷ Jennifer Faulkner, Office of the Comptroller of the Currency, *The CARD Act—One Year Later: Impact on Pricing and Fees*, CFPB 6 (Feb. 22, 2011), <http://files.consumerfinance.gov/f/2011/03/OCC-Presentation.pdf>.

⁴⁸ See *id.* at 9.

⁴⁹ See *infra* Figure 5.

⁵⁰ See *infra* Figure 5.

FIGURE 5: AVERAGE REPORTED PURCHASE APR SPREAD OVER TIME



Notes: Dashed lines represent 95% confidence interval. Source: TCCP data.

Our findings are consistent with the findings from other studies. The OCC report, for example, provides the distribution of APRs on accounts and shows only a very slight, rightward shift of the distribution after the CARD Act was phased in,⁵¹ consistent with the small changes we see in our agreements data.

We also coded the *range* of APRs charged by each issuer. Many contracts state that the purchase APR is based on the creditworthiness of the borrower and quote the range of APRs available. We calculated the APR range as simply the difference between the highest and lowest purchase APR available across all credit card contracts provided by the issuer at each date. This is a simple measure of the extent to which issuers price credit risk *ex ante*. Table 3 shows no statistically significant difference in APR range after the CARD Act rules went into effect for the entire sample.

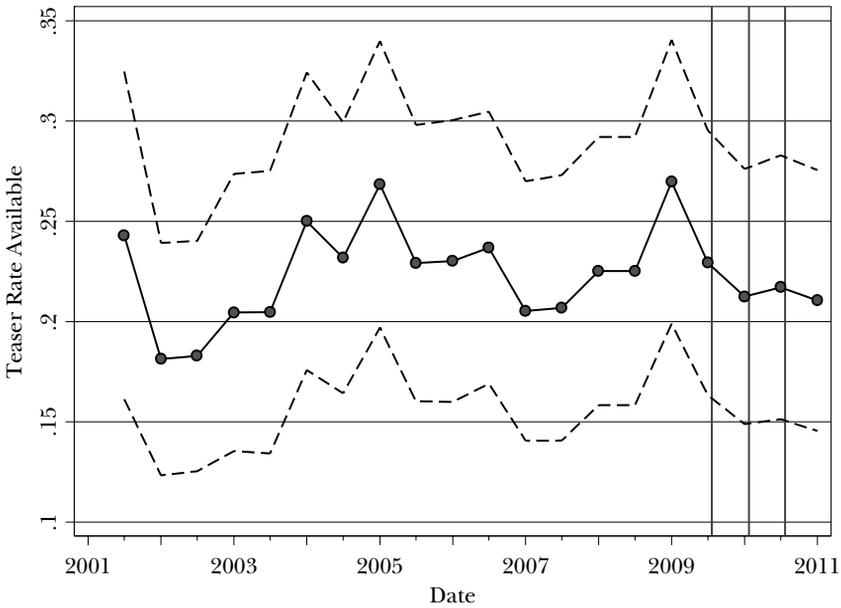
3. Introductory APRs

Figure 6 shows that there has been little change in the fraction of issuers that offer an introductory APR. This fraction has varied between 18% and about 26% over the past ten years. Of the issuers who responded to the TCCP survey in January 2011, 21% offered

⁵¹ See Faulkner, *supra* note 47, at 3–5.

introductory APRs. The post-CARD Act observations in the agreements dataset show that 22% of issuers in the sample offer introductory APRs, with no statistically significant change as the CARD Act was phased in. For contracts that offered introductory APRs, the APR offered was, on average, 3.46% in the post-CARD Act agreements data. Tables 4 and 5 show that investor-owned issuers offer much lower introductory rates than do credit unions. With the important caveat that our sample is very small, the five investor-owned issuers that offered introductory APRs post-CARD Act offered a rate of 0.59% on average as compared to 7.05% for the four credit unions that offered an introductory APR.

FIGURE 6: PERCENTAGE OF ISSUERS USING INTRODUCTORY APRS OVER TIME



Notes: Dashed lines represent 95% confidence interval. Source: TCCP data.

Another caveat regarding our agreements-database result is that some issuers who offer introductory APRs do so through a separate offering document that was not included in the contracts they filed with the Federal Reserve. We thus observed contracts that referenced the possibility of “promotional APRs” but did not explicitly offer such an APR in the contract. Ultimately, we coded such contracts as not offering an introductory APR. The true prevalence of introductory APRs is thus greater than reflected in our agreements data.

Other studies similarly find no decrease in the use of introductory APRs. For example, the Argus report shows a substantial *increase* in the use of introductory purchase APRs to attract

new customers, with 17.8% of new accounts having an introductory purchase APR in the third quarter of 2009 compared to 33.4% in the third quarter of 2010.⁵² A report by Andrew Davidson of Mintel Comperemedia on the CARD Act shows that introductory balance-transfer APR terms are becoming more generous due to longer introductory periods.⁵³

4. *Balance-Transfer APRs and Fees*

The TCCP data do not include information about balance-transfer APRs and fees. The agreements data show that there has been little change in the terms for balance transfers as the CARD Act rules were phased in.⁵⁴ Table 3 shows that post-CARD Act, issuers in the sample, on average, charged balance-transfer APRs of 14.43% and balance-transfer fees of 1.28%.

D. Unregulated Back-End Prices

We now turn to contract terms not regulated by the CARD Act that consumers likely do not view as salient when choosing among different credit card products.

1. *Cash-Advance APRs and Fees*

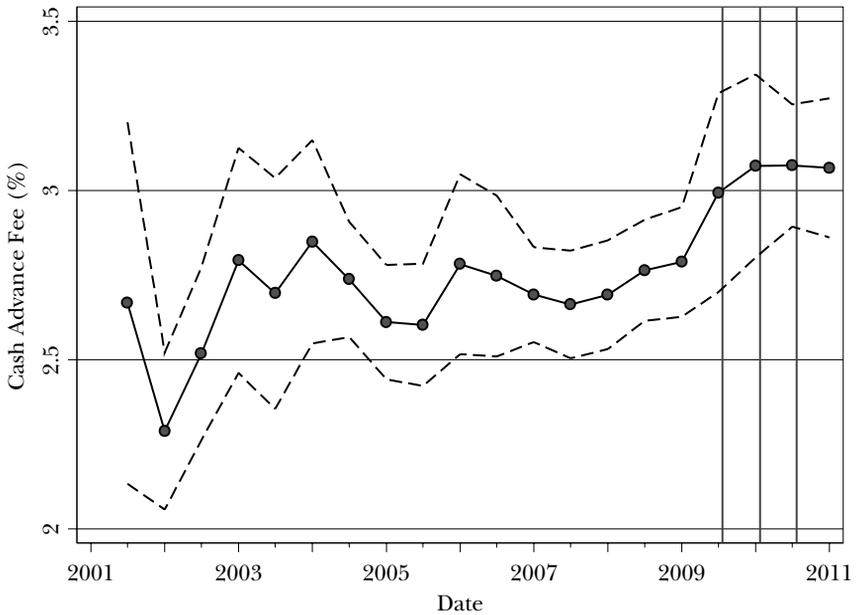
Though the TCCP survey does not collect data on cash-advance APRs, issuers are asked about cash-advance fees. Figure 7 shows that cash-advance fees have trended upward from about 2.5% in the early 2000s to over 3% by 2011. The upward trend appears to have leveled off since the passage of the CARD Act in 2009.

⁵² See Heller, *supra* note 46, at 6.

⁵³ See Andrew Davidson, *The Supply of Credit in the Card Market*, MINTEL COMPEREMEDIA 13 (Feb. 22, 2011), <http://files.consumerfinance.gov/f/2011/03/Comperemedia-presentation.pdf>.

⁵⁴ See *supra* Table 3.

FIGURE 7: AVERAGE CASH ADVANCE FEE OVER TIME



Notes: Dashed lines represent 95% confidence interval. Source: TCCP data.

The agreements data show that cash-advance APRs have increased as the CARD Act was phased in by about one percentage point, from 17% to 18%, as reflected in Table 3. While this change is statistically significant, it is possible that other events that occurred over this period, not the CARD Act, induced the change. One way to increase our confidence that this increase in cash-advance APRs is due to the effect of the CARD Act is to use a difference-in-difference analysis using credit unions as a control group. Credit unions charge much lower back-end fees and prices⁵⁵ and hence are likely to be less affected by the CARD Act rules. They are, however, affected by general macroeconomic and market changes. We thus estimate the amount by which investor-owned issuers increased their cash-advance APRs over and above the amount by which credit unions changed their cash-advance APRs. Tables 4 and 5 show only a small 0.27-percentage-point increase in credit unions' average cash-advance APR compared to a 1.88-percentage-point increase among investor-owned issuers. The difference-in-difference estimate of 1.61 percentage points is statistically significant (p -value of 0.04). In contrast, cash-advance fees did not change significantly over the period.⁵⁶

⁵⁵ See Bubb & Kaufman, *supra* note 39.

⁵⁶ See *supra* Tables 4–5.

2. *Default APRs*

The TCCP survey does not collect information on default APRs, which are used to calculate finance charges when the borrower has been delinquent on payments for a specified period of time. The agreements data show no change in default APRs over the period, with the average default APR (among issuers who charge a default APR) at 22.8% post-CARD Act.⁵⁷

3. *Foreign-Transaction Fees*

The TCCP survey also does not collect information on foreign transaction fees. We coded these for the agreements data and found no significant change over the period. Such fees averaged 1.35% post-CARD Act.⁵⁸

4. *Returned-Payment Fees*

Returned-payment fees are also not provided in the TCCP data. In the agreements data, we found no significant change in such fees over the period. They averaged \$24.44 for our post-CARD Act contracts.⁵⁹

E. Credit Card Issuers' Revenues and Profits

Overall, through our data, we saw significant reductions in two types of fees directly regulated by the CARD Act that provide a substantial source of revenue for credit card issuers—over-the-limit fees and late fees—but no substantial increases in other credit card rates and fees to compensate for the consequent loss in fee revenue. Our findings are corroborated by the fall in interest and fee revenues reported by credit card issuers over the period.

The dramatic fall in overall fee revenue is shown in the OCC's report on the CARD Act.⁶⁰ While the nine largest issuers in the OCC's data earned a total of about \$1.8 billion in fee revenue in the month of July 2009, this number fell to under \$1 billion by November 2010.⁶¹ Similarly, the Argus report shows a reduction in gross effective asset yield from 18.6% in the third quarter of 2009 to 17.8% in the third quarter of 2010.⁶² The gross effective finance charge yield also fell over the same period from 12.8% to 12.3%.⁶³ A report

⁵⁷ See *supra* Table 3.

⁵⁸ See *id.*

⁵⁹ See *id.*

⁶⁰ See Faulkner, *supra* note 47, at 9.

⁶¹ *Id.*

⁶² See Heller, *supra* note 46, at 10. This includes finance charges, interchange fees, and other fees.

⁶³ *Id.*

by Credit Suisse on credit card issuer profitability shows a similar fall in profit margins of large credit card issuers from 10% in the third quarter of 2009 to 8.8% in the third quarter of 2010.⁶⁴

In their public filings, large credit card issuers attribute the fall in revenues and profits over this period to the CARD Act. For example, Capital One reported a decline in noninterest income from \$3.7 billion in 2009 to \$2.7 billion in 2010 that it said was “primarily attributable to a reduction in penalty fees resulting from the . . . CARD Act and a reduction in customer accounts.”⁶⁵ Another large issuer, JPMorgan Chase & Co., estimated that its net income would be reduced by \$750 million annually due to the CARD Act’s restrictions.⁶⁶

The fact that credit card issuers did not increase their other charges to fully compensate for the loss in fee revenue stemming from the restrictions of the CARD Act suggests that issuers enjoy market power. As explained in Part I, in a competitive market, restrictions on nonsalient, back-end prices lead to concomitant increases in unregulated, salient prices. In contrast, when issuers

⁶⁴ Moshe Orenbuch, Credit Suisse Sec. (USA) LLC, *Credit Card Profitability Under Pressure*, CFPB 2 (Feb. 22, 2011), <http://files.consumerfinance.gov/f/2011/03/Moshe-Orenbuch-Credit-Suisse-presentation.pdf>.

⁶⁵ Capital One Fin. Corp., Annual Report (Form 10-K) 40–41 (Dec. 31, 2010).

⁶⁶ See JPMORGAN CHASE & CO., 2010 ANNUAL REPORT: THE WAY FORWARD 79 (2011), available at <http://investor.shareholder.com/jpmorganchase/annual.cfm> (follow “2010 Complete Annual Report” hyperlink). JPMorgan Chase further explained that

[t]he most significant effects of the CARD Act include: (a) the inability to change the pricing of existing balances; (b) the allocation of customer payments above the minimum payment to the existing balance with the highest annual percentage rate (“APR”); (c) the requirement that customers opt-in in order to receive, for a fee, overlimit protection that permits an authorized transaction over their credit limit; (d) the requirement that statements must be mailed or delivered not later than 21 days before the payment due date; (e) the limiting of the amount of penalty fees that can be assessed; and (f) the requirement to review customer accounts for potential interest rate reductions in certain circumstances.

Id. Bank of America reported a similar effect in its 2010 Annual Report, reporting that

[t]he CARD Act legislation contains comprehensive credit card reform related to credit card industry practices including significantly restricting banks’ ability to change interest rates and assess fees to reflect individual consumer risk, changing the way payments are applied and requiring changes to consumer credit card disclosures. The provisions of the CARD Act negatively impacted net interest income and card income during 2010, and are expected to negatively impact future net interest income due to the restrictions on our ability to reprice credit cards based on risk, and card income due to restrictions imposed on certain fees. The 2010 full-year decrease in revenue was approximately \$1.5 billion.

BANK OF AMERICA CORP., OPPORTUNITIES ARE EVERYWHERE: 2010 ANNUAL REPORT 62 (2011), available at http://media.corporate-ir.net/media_files/irol/71/71595/reports/2010_AR.pdf.

have market power, the indirect effect on unregulated, salient prices is weaker and, in some cases, there will be no such effect at all. Our empirical analysis—finding only limited effects on unregulated, salient prices—suggests that at least some issuers have market power. Given this market structure, the CARD Act likely redistributed surplus from issuers to consumers.⁶⁷

F. Summary and Implications

Since the passage of the CARD Act, consumers now face much lower over-the-limit fees and modestly lower late fees. However, the basic structure of credit card pricing remains much as it was prior to the CARD Act. Column (2) of Tables 3, 4, and 5 provides a snapshot of credit card pricing after the CARD Act rules went into effect for our entire sample, for credit unions, and for investor-owned issuers, respectively. Issuers continue to use introductory rates to attract new borrowers, and issuers continue to charge high default APRs when consumers cannot keep up with the minimum payments due on their cards. Our findings are broadly consistent with other studies that have attempted to empirically assess the effects of the CARD Act on credit card pricing.⁶⁸

While we view the CARD Act as a definite improvement, high long-term prices and low short-term prices remain prevalent, and imperfectly rational consumers still find it difficult to understand the cost of credit card borrowing.

III

BEYOND THE CARD ACT: PROPOSALS FOR IMPROVED CREDIT CARD REGULATION

Part II has shown that low upfront prices and high back-end prices persist post-CARD Act. Under the rational choice theory, high back-end prices are welfare increasing since they are used to

⁶⁷ See *supra* Part I.B.3.

⁶⁸ See JOSHUA M. FRANK, CTR. FOR RESPONSIBLE LENDING, CREDIT CARD CLARITY: CARD ACT REFORM WORKS 2 (2011), <http://www.responsiblelending.org/credit-cards/research-analysis/FinalCRL-CARD-Clarity-Report2-16-11.pdf> (finding an increase in price transparency for credit card consumers); JOSHUA M. FRANK, CTR. FOR RESPONSIBLE LENDING, DODGING REFORM: AS SOME CREDIT CARD ABUSES ARE OUTLAWED, NEW ONES PROLIFERATE 2 (2009), <http://www.responsiblelending.org/credit-cards/research-analysis/CRL-Dodging-Reform-Report-12-10-09.pdf> (noting several ways credit companies have tried to make up losses from the CARD Act through alternative fees); PEW HEALTH GRP., A NEW EQUILIBRIUM: AFTER PASSAGE OF LANDMARK CREDIT CARD REFORM, INTEREST RATES AND FEES HAVE STABILIZED (2011), http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Credit_Cards/Report_Equilibrium_web.pdf; PEW HEALTH GRP., *supra* note 44, at 1–2 (finding that, while credit card companies have eliminated “unfair” practices, problems with the disclosure of penalty pricing remain).

implement efficient risk-based pricing.⁶⁹ Under the behavioral economics theory, high back-end prices are part of a welfare-reducing pattern of salience-based pricing.⁷⁰ Low front-end prices are another part of this welfare-reducing pricing scheme.⁷¹ And, unlike with high back-end prices, the rational choice explanation for low front-end prices seems weak, as we elaborate below. These conclusions suggest that it is useful to consider potential improvements to the regulatory framework for credit cards.

The potential improvements that we consider can increase welfare regardless of whether one believes the rational choice story or the behavioral economics story. We begin by proposing to rethink the mandatory disclosure regime governing credit card issuance. Our proposed disclosure mandates are designed with the imperfectly rational cardholder in mind, but they can also reduce the cost of collecting information for the perfectly rational cardholder and, in any event, should not substantially harm the perfectly rational cardholder.⁷² Moreover, enhanced disclosure does not stand in the way of efficient risk-based pricing. Our second policy proposal targets the low upfront prices. According to the behavioral economics theory, these prices are part of a welfare-reducing pricing scheme, and they lack a convincing rational choice explanation.

A. Disclosure

Traditionally, disclosure mandates were the regulatory technique that dominated credit card regulation. The CARD Act stays the course in this regard, retaining the historical focus on disclosure.⁷³ But it also moves beyond disclosure, restricting—even banning—certain practices.⁷⁴ The concern about distorted pricing—high long-term, nonsalient prices and low short-term, salient prices—can be addressed by well-designed disclosure mandates. This, however, requires a new disclosure paradigm. We begin by briefly describing the traditional approach to disclosure and why it failed. We then highlight recent disclosure regulations that mark the beginning of a shift to the new disclosure paradigm. We conclude this subpart with some tentative suggestions for continuing and enhancing this

⁶⁹ See *supra* Part I.A.

⁷⁰ See *supra* Part I.B.

⁷¹ See *id.*

⁷² See RICHARD H. THALER & CASS R. SUNSTEIN, *NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS* 145–46 (rev. & expanded ed. 2009); Colin Camerer et al., *Regulation for Conservatives: Behavioral Economics and the Case for “Asymmetric Paternalism,”* 151 U. PA. L. REV. 1211, 1219–21 (2003); Cass R. Sunstein & Richard H. Thaler, *Libertarian Paternalism Is Not an Oxymoron,* 70 U. CHI. L. REV. 1159, 1161–63 (2003).

⁷³ See 15 U.S.C. § 1637(i) (Supp. IV 2010).

⁷⁴ See *id.* § 1637(j)–(l).

important trend.

1. *Traditional Disclosures*

Traditional credit card disclosures provide disaggregate product-attribute information. Different rates and fees are disclosed, most prominently in the famous Schumer Box.⁷⁵ The imperfectly rational consumer finds it difficult to aggregate this information into a single measure that would effectively guide credit card choice⁷⁶: Is a card with a high interest rate and a low annual fee better than a card with a low interest rate and a high annual fee? Is a card with an attractive teaser rate for purchases and a high interest rate for cash advances better than a card with no teaser rate and a lower interest rate for cash advances?

Moreover, product-attribute information—information on rates and fees—is insufficient; consumers need information on how often these rates and fees will be triggered (i.e., product-use information). The relative importance of the interest rate and the annual fee depends on how much the consumer will borrow. And the relative importance of the teaser rate for purchases and the interest rate for cash advances depends on how many dollars' worth of purchases the consumer is going to finance during the introductory period and how many dollars will be needed from cash advances.

The shortcomings of the traditional disclosure paradigm suggest the contours of a new disclosure paradigm. This new paradigm should be based on two principles: (1) aggregate disclosures that (2) incorporate product-use information.⁷⁷

2. *Steps in the Right Direction*

Recent developments in credit card regulation and beyond are moving credit card disclosure in the right direction. The importance of disclosing product-use information is beginning to be recognized. The Dodd-Frank Act imposes a general duty, subject to rules prescribed by the new CFPB, to disclose information, including usage data, in markets for consumer financial products.⁷⁸

⁷⁵ See U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-06-929, CREDIT CARDS: INCREASED COMPLEXITY IN RATES AND FEES HEIGHTENS NEED FOR MORE EFFECTIVE DISCLOSURES TO CONSUMERS 17 (2006).

⁷⁶ See *id.* at 54.

⁷⁷ This new approach, at least with respect to aggregation, is not really new. The traditional justification for the APR disclosure is to provide a total cost of credit measure to help consumers who cannot aggregate the different price dimensions on their own. This view of the APR as an aggregate, total cost of credit disclosure has been more prominent in the mortgage context than in the credit card context. See Camerer et al., *supra* note 72, at 1233–34.

⁷⁸ See 12 U.S.C. § 5533 (Supp. IV 2010).

The minimum payment disclosure mandated by the CARD Act similarly recognizes the importance of product-use information. The CARD Act requires that issuers disclose a minimum payment warning on a consumer's monthly bill, including the time it would take to pay off the balance and the aggregate total payment if the consumer were to pay only the minimum amount each month.⁷⁹ The CARD Act also requires that issuers calculate and disclose the monthly payment required to pay off the cardholder's balance in three years and the savings, in total payments, from this faster repayment schedule.⁸⁰ The minimum payment disclosures combine product-attribute information with certain use patterns specified by the CARD Act and implementing regulations—slower repayment (making only the minimum payment) and faster repayment (paying off the balance in three years).

Recent regulations also recognize the importance of disclosing aggregate information. Federal Reserve Board regulations, which took effect along with the CARD Act-implementing rules, require that issuers disclose, on the monthly statement, monthly and year-to-date totals of interest charges and fees separately.⁸¹ This provides an example of an aggregate disclosure regime that combines individual-use information and product-attribute information.

3. *Continuing in Stride*

These recent developments, while promising, can be improved. Consider the disclosure of monthly and year-to-date totals of interest charges and fees. First, disclosing a single total-cost figure can be more effective than disclosing two separate figures—one for interest and one for fees. Second, though year-to-date figures make sense for monthly statement disclosures, they contain limited use information. Issuers could be required to provide a year-end summary with total annual cost figures based on a longer history of use patterns, perhaps for the trailing three years.

Finally, to facilitate competition, these aggregate disclosures that combine product-attribute information with product-use information need to be provided by new issuers, as well. Of course, a new issuer does not have the same product-use information as the consumer's current issuer. To level the playing field, regulators could require that the current issuer provide, in electronic form, detailed use information that could then be transferred to new issuers or to

⁷⁹ See *What You Need to Know: New Credit Card Rules Effective Feb. 22*, *supra* note 4.

⁸⁰ See *id.*

⁸¹ *CARD Act Factsheet*, CFPB (Feb. 2011), <http://www.consumerfinance.gov/credit-cards/credit-card-act/feb2011-factsheet>.

intermediaries. Alternatively, new issuers could be required to disclose expected aggregate costs based on statistical, average-use information of other consumers who hold the same card.

A well-designed aggregate disclosure that combines product-attribute and product-use information can address the concern about distorted credit card pricing. Consider a total-cost disclosure that aggregates both short-term and long-term price dimensions, properly weighted using information on the consumer's specific use patterns. Such a disclosure helps consumers to optimally choose between competing credit card offers and would also reduce the incentive of issuers to decrease short-term prices and increase long-term prices. If consumer choice is guided by a disclosure that aggregates short-term and long-term costs, a pricing scheme that shifts costs to back-end, long-term price dimensions will no longer cause consumers to underestimate the total cost of the credit card product. The proposed disclosure will bypass the temporal bias in consumer decision making and thus mitigate the temporal bias in credit card pricing.

B. Targeting Teasers

Another potential step regulators should consider is to impose restrictions on teaser rates. As explained above, in theory, restricting back-end prices—the approach adopted by the CARD Act—can also lead to higher front-end prices (i.e., less generous teaser rates).⁸² Our empirical analysis suggests that this theoretical prediction did not materialize or at least that the effect on front-end prices was relatively weak.⁸³ Direct regulation of teaser rates may thus be worth considering.

1. *The Trouble with Teasers*

For the most part, the new restrictions on credit card contracts imposed by the CARD Act target fees and rates that are in some sense “too high.” For example, the CARD Act imposes limits on how high late fees can be and restricts the number of over-the-limit fees issuers can charge to one fee per billing cycle.⁸⁴ Indeed, restricting fees that are too high represents an intuitive approach to credit card contract regulation.

But from a behavioral economics perspective, there is actually a stronger case to be made for regulating interest rates that are in some sense “too low,” specifically introductory, or teaser, interest rates.

⁸² See *supra* note 8 and accompanying text.

⁸³ See *supra* Table 3.

⁸⁴ See 15 U.S.C. § 1666i-2 (Supp. IV 2010).

The behavioral theory posits that issuers offer teaser interest rates to lower the perceived price of a given contract.⁸⁵ Teaser rates lower the perceived price to consumers because many of them are optimistic about their ability to pay off an accumulated balance at the expiration of the introductory period and consequently underestimate the probability that they will continue to carry a positive balance after the introductory period expires.⁸⁶

A consequence of low teaser rates is that consumers have an incentive to borrow too much during the introductory period.⁸⁷ To see this, consider a consumer who is offered a credit card with a 0% introductory interest rate for twelve months with a go-to rate of 18% at the end of the introductory period. The 0% teaser rate looks like free money. A rational consumer would exploit this offer by shifting spending on to the card and investing the borrowed funds in an interest-bearing savings account. At the end of the introductory period, this rational consumer could simply pay off the balance on the card, close the account, and pocket the accumulated interest in the savings account.

Consider what happens if the consumer instead is optimistic and underestimates the probability of carrying a balance after the end of the introductory period. In exploiting the offer, the consumer hopes to take advantage of the interest-free loan for a year. But, in fact, the consumer will ultimately not have the cash on hand to pay off the balance at the end of the introductory period. Because the consumer thinks borrowing is free, the consumer will run up an excessively high balance. The overborrowing produced by teaser rates lowers consumer welfare.⁸⁸ Such overborrowing also reduces social welfare: when the price of credit is set below the cost of credit to the issuer, consumers will borrow even when the benefit of borrowing is lower than the cost of credit.⁸⁹ Discouraging teaser rates, then, is a sensible regulatory goal.

The best evidence, arguably, that teaser interest rates result in consumer mistakes comes from a randomized experiment conducted by Laurence M. Ausubel and Haiyan Shui.⁹⁰ They use data from a

⁸⁵ See *supra* note 8 and accompanying text.

⁸⁶ See *supra* Part I.B.1.

⁸⁷ See Heidhues & Kőszegi, *supra* note 16, at 2288 (noting that during the introductory period, a borrower excessively borrows due to unrealistic repayment assumptions and short-term bias).

⁸⁸ See *id.* at 2280–81.

⁸⁹ See *id.* at 2288–89 (noting that, because the borrower “underestimates [the] cost” of a loan relative to consumption benefits, overall welfare decreases drastically due to misprediction and thus costly repayment).

⁹⁰ Haiyan Shui & Lawrence M. Ausubel, Time Inconsistency in the Credit Card Market 4–5 (Jan. 30, 2005) (unpublished manuscript), *available at*

large credit card issuer that randomly assigned a set of preapproved potential new customers to receive different credit card offers.⁹¹ The key comparison is between the group that received an offer of a 4.9% interest rate for six months with a go-to rate of 16% and the group that received an offer of a 7.9% interest rate for twelve months, also followed by a go-to rate of 16%.⁹² Substantially more consumers offered the lower 4.9% teaser for a shorter period accepted the offer than did consumers offered the higher 7.9% teaser for a longer period. Moreover, Ausubel and Shui track consumers' actual borrowing and payment behavior under the cards and find that the group with the lower but shorter-term teaser rate pays on average about \$50 more in interest than they would have paid with the higher but longer-term teaser rate card. Furthermore, most customers in their data do not switch out of the contract after the expiration of the teaser rate even when they are carrying a balance. These data are consistent with consumers underestimating the probability of continuing to carry a balance after the introductory period expires as well as with the existence of substantial switching costs.

Importantly, our proposed regulation pertains only to teaser interest rates, not other forms of discounts found in credit card contracts, such as waivers of annual fees for the first year. Teaser interest rates both distort incentives and exploit the specific difficulty consumers have in estimating the probability that they will continue to borrow under the card after the teaser rate period expires, leading to overborrowing.⁹³ Other forms of discounts, such as no annual fees, are less problematic and, given consumer switching costs, may represent healthy price competition, as discussed below.

2. *The Risk of Unintended Consequences*

In contrast to regulating high back-end fees, regulating teaser rates creates little risk of unintended consequences. As discussed above, a theoretically plausible efficiency rationale exists for high back-end fees on credit cards: they may be used to efficiently price risk.⁹⁴ Consequently, there is a real concern that restrictions on high back-end fees, like those in the CARD Act, may result in the unintended consequence of a less efficient credit card market. Because issuers cannot price risk as effectively, they must spread the

<http://www.ausubel.com/creditcard-papers/time-inconsistency-credit-card-market.pdf>.

⁹¹ See *id.* at 7.

⁹² See *id.* at 3, 8–9.

⁹³ *Id.* at 3, 9; see Heidhues & Kőszegi, *supra* note 16, at 2288–89 (noting that the borrower with a teaser rate in the introductory period both mispredicts repayment and size of switching fees after the introductory period).

⁹⁴ See *supra* note 6 and accompanying text.

cost of risk across more borrowers. In consequence, less risky borrowers will face inefficiently high interest rates, distorting their use of credit cards. Moreover, credit card issuers may simply stop lending to certain high-risk borrowers.

In contrast, we are aware of no plausible efficiency rationale for teaser rates. We know of only two potential theories for how credit card teaser rates might serve a social function but do not think either theory provides a plausible mechanism by which regulating teasers could have negative unintended consequences. The first such theory considers teaser rates to be the natural form price competition takes when consumers face switching costs.⁹⁵ The second posits that initial discounts to new customers might serve as a way for firms to overcome asymmetric information about the quality of their product.⁹⁶ We consider each in turn.

a. *Paying Customers to Switch*

One explanation for credit card issuers' use of teaser rates is that they are the result of switching costs among consumers. There is a well-developed literature in industrial organization examining the implications of switching costs for market pricing.⁹⁷ An important result in this literature is that the presence of switching costs provides an incentive for firms to charge new customers a lower price than existing customers. In effect, firms are paying customers to switch. Banning differential pricing for new and existing customers can thus increase firm profits but lower consumer welfare.⁹⁸

Applying these insights to the credit card market, some scholars have argued that teaser rates are how credit card issuers pay customers to switch.⁹⁹ This raises the concern that regulating teaser rates would result in less price competition in the credit market and ultimately harm consumers.

⁹⁵ See, e.g., Joseph Farrell & Paul Klemperer, *Coordination and Lock-In: Competition with Switching Costs and Network Effects*, in 3 HANDBOOK OF INDUSTRIAL ORGANIZATION 1967, 1970 (Mark Armstrong & Robert Porter eds., 2007) ("Lock-in hinders customers from changing suppliers in response to (predictable or unpredictable) changes in efficiency [Therefore, firms compete *ex ante* for this *ex post* power, using penetration pricing, introductory offers, and price wars.").

⁹⁶ See Ausubel, *supra* note 19, at 262–63.

⁹⁷ See, e.g., Farrell & Klemperer, *supra* note 95, at 1989.

⁹⁸ See *id.* at 2053.

⁹⁹ See, e.g., Stango, *supra* note 28, at 477–79 (explaining, with the use of an empirical model, how credit market firms set prices and teaser rates together to capture consumer-switching-cost idiosyncrasies and thus gain market share); see also Victor Stango, *Competition and Pricing in the Credit Card Market*, 82 REV. ECON. & STAT. 499, 503 (2000) (noting that "variable-rate" firms, which comprise roughly sixty percent of the credit card market, aggressively employ teaser rates to capture market share—a crucial determinant of profit margin).

Banning teaser rates, however, would not in fact prevent credit card issuers from paying customers to switch. There are many alternative ways for issuers to pay customers to switch in order to overcome consumers' switching costs. For example, they could simply give new customers cash or a cash equivalent. This is, indeed, a common practice. JPMorgan Chase & Co. currently offers a waiver of its \$95 annual fee for new customers for its Chase Sapphire Card.¹⁰⁰ There is no reason why issuers can only pay customers to switch through a temporary interest-free loan (i.e., by offering a teaser rate). In fact, as argued above, luring new customers by offering interest-free loans reduces welfare: it distorts use decisions, resulting in excessive borrowing and leads imperfectly rational consumers to underestimate the total cost of the card.¹⁰¹ Paying customers to switch with cash or cash equivalents avoids such distortions. Consequently, the potential explanation for teaser rates based on the benefits of paying customers to switch does not pose a serious concern of unintended consequences from regulating teasers.

b. *Asymmetric Information About Product Quality*

Another functional explanation sometimes offered for discounts to new customers is that consumers do not know the quality of firms' products and hence firms use initial discounts to induce consumers to try their product and discover its high quality.¹⁰² The story goes as follows: Consider a market for a product in which there is variation in the quality of different firms' products but consumers lack reliable indicators of quality. The only way to learn about a firm's product is to try it. Hence, firms offer a "trial period discount" of some sort as an inducement for consumers to give the product a try. Firms then set the go-to price of the product high enough to recoup the costs of these initial discounts.¹⁰³

This seems like a perfectly plausible explanation for initial discounts in many markets. Most of us have indulged in free trial samples of products and the like, from soap to Chinese food at the airport food court. It may also explain initial discounts on subscription services such as cable television and magazines where consumers are uncertain about the service's quality or value.

We find this theory implausible, however, as an explanation for teaser rates on credit cards for the simple reason that there is little

¹⁰⁰ *Chase Sapphire Preferred Rewards Credit Card*, CHASE SAPPHIRE, <https://creditcards.chase.com/sapphire/credit-cards/sapphire-preferred-card> (last visited Mar. 19, 2012).

¹⁰¹ See *supra* notes 84–93 and accompanying text.

¹⁰² See Ausubel, *supra* note 19, at 262–63.

¹⁰³ See *id.* at 263.

uncertainty about the “quality” of a credit card. Credit card issuers lend consumers money. And, after all, money is money. There surely is some variation among credit card issuers in customer service, but this dimension of a credit card is relatively inconsequential. Most of us experience the customer service of a credit card issuer only rarely. Indeed, we posit that consumers call their credit card issuers so infrequently that they are unlikely to learn much about their customer service during the teaser rate period.

There is thus no plausible theoretical account for how regulating credit card teaser interest rates could lead to undesirable outcomes. Given the inefficient incentives and consumer mistakes produced by credit card teaser rates, we think serious consideration of teaser regulation is warranted.

3. *Taming Teasers*

How might we go about regulating teaser interest rates? Prohibiting issuers from offering attractive introductory interest rates poses a potential political problem: rational consumers, as well as naïve consumers who think they are rational but in fact are harmed by teaser rates, undoubtedly *like* getting 0% interest rate offers.¹⁰⁴ Fashioning a palatable regulation of teasers requires finessing this political problem through appropriate framing of the restriction.

The best approach may be to require issuers not to raise interest rates from any initial teaser rate for a sufficiently long period so that offering 0% APRs is no longer attractive to issuers. The CARD Act imposes a limited restriction along these lines. The CARD Act currently requires that any promotional rate on a credit card remain in place for at least six months.¹⁰⁵ We propose that the minimum term for teaser rates be increased to eighteen months, or even longer. This would make teaser rates much more costly to issuers. In particular, the cost to issuers of rational consumers taking advantage of teaser rates and then closing the account when the rate expires will be much higher if the teaser must remain in place for three times as long or more. An advantage of this approach in terms of political feasibility is that it is framed as a restriction on increases in interest rates rather than as a ban on low introductory interest rates.

Another approach would be to restrict the magnitude of any

¹⁰⁴ Patrick L. Warren & Daniel H. Wood, <Will Governments Fix What Markets Cannot? *The Positive Political Economy of Regulation in Markets with Overconfident Consumers*> 18 (Nov. 2010) (unpublished manuscript), available at <http://ssrn.com/abstract=1605146> (arguing that consumers will not generally support regulation that prevents exploitation of consumer biases because they perceive the costs of such regulation to outweigh the benefits).

¹⁰⁵ 15 U.S.C. § 1666i-2(b) (Supp. IV 2010).

increase from a promotional rate to a go-to rate. For example, issuers could be prohibited from increasing the APR by more than, say, five percentage points upon expiration of a promotional rate. This would ban issuers from offering, for example, a 0% introductory APR combined with a go-to APR of 15%.

Either of these approaches would help eliminate the distortive effects of teaser rates and promote social welfare.

APPENDIX 1

Appendix 1 contains the full analysis of the model outlined in Part I.B.3. We start with the perfect competition case, then proceed to the monopoly case, and finally compare the two cases.

a. Perfect Competition

A seller operating in a perfectly competitive market seeks to maximize demand by minimizing the perceived total price while satisfying its participation constraint.¹⁰⁶ Formally, the seller minimizes $p_1 + \hat{p}_2$, subject to $\pi(p_1, p_2) = [\bar{q} - a \cdot (p_1 + \delta \cdot p_2)] \cdot (p_1 + p_2 - c) \geq 0$. We further assume that prices are nonnegative, i.e., $p_1 \geq 0$ and $p_2 \geq 0$.¹⁰⁷ The seller's problem reduces to: $Min (p_1 + \delta \cdot p_2)$ s.t. $p_1 + p_2 \geq c$ and the nonnegativity constraints. Solving this problem, we find that the seller will set $p_1^{NLC} = 0$ and $p_2^{NLC} = c$ (the superscript "NLC" denotes the benchmark case, in which the monopolist faces "No Legal Constraint" in its pricing strategy). With these prices, demand for the product will be: $q^{NLC} = \bar{q} - a \cdot \delta \cdot c$.

Now assume that the law limits the permissible level of p_2 to $\bar{p}_2 < c$. Faced with such a legal constraint, the seller will set $p_1^{LC} = c - \bar{p}_2$ and $p_2^{LC} = \bar{p}_2$ (the superscript "LC" denotes the "Legal Constraint"). With these prices, demand for the product will be: $q^{LC} = \bar{q} - a \cdot \delta \cdot c - a \cdot (1 - \delta) \cdot (c - \bar{p}_2) < q^{NLC}$. Note that when $\bar{p}_2 < \frac{a \cdot c - \bar{q}}{a \cdot (1 - \delta)}$, demand is zero (or negative), and the market shuts down.

These results are summarized in the following proposition.

Proposition A1: In a perfectly competitive market—

- (a) Without a legal constraint, sellers will set $p_1^{NLC} = 0$ and $p_2^{NLC} = c$, and demand will be $q^{NLC} = \bar{q} - a \cdot \delta \cdot c$.
- (b) With a legal constraint $p_2 \leq \bar{p}_2$ (where $\bar{p}_2 < c$), sellers will set $p_1^{LC} = c - \bar{p}_2$ and $p_2^{LC} = \bar{p}_2 < c$, and demand will be $q^{LC} = \bar{q} - a \cdot \delta \cdot c - a \cdot (1 - \delta) \cdot (c - \bar{p}_2)$.
- (c) With a very strict legal constraint, $\bar{p}_2 < \frac{a \cdot c - \bar{q}}{a \cdot (1 - \delta)}$, the market shuts down.

Corollary A1 summarizes the effects of the legal constraint on pricing and demand.

Corollary A1: In a perfectly competitive market, when the law imposes a legal constraint $p_2 \leq \bar{p}_2$ (where $\bar{p}_2 < c$)—

¹⁰⁶ See ROBERT S. PINDYCK & DANIEL L. RUBINFELD, MICROECONOMICS 271–72 (7th ed. 2009).

¹⁰⁷ See *supra* note 23 for comments on an alternative to this simplified framework.

- (a) The Regulated Price, p_2 : sellers will reduce p_2 , as compared to the no-constraint benchmark, to the maximum level permitted by law.
- (b) The Unregulated Price, p_1 : sellers will increase p_1 , as compared to the no-constraint benchmark, to compensate for the reduction in p_2 .
- (c) Demand, q : demand will decrease, as compared to the no-constraint benchmark.

b. Monopoly

The monopolist seller maximizes $\pi(p_1, p_2) = [\bar{q} - a \cdot (p_1 + \delta \cdot p_2)] \cdot (p_1 + p_2 - c)$, subject to $p_1 \geq 0$ and $p_2 \geq 0$. The first order conditions (ignoring, for the moment, the nonnegativity constraints) are:

$$\frac{\partial \pi(p_1, p_2)}{\partial p_1} = -a \cdot (p_1 + p_2 - c) + [\bar{q} - a \cdot (p_1 + \delta \cdot p_2)]$$

$$\frac{\partial \pi(p_1, p_2)}{\partial p_2} = -a \cdot \delta \cdot (p_1 + p_2 - c) + [\bar{q} - a \cdot (p_1 + \delta \cdot p_2)]$$

The first thing to note is that for all p_1 and p_2 ,

$$\frac{\partial \pi(p_1, p_2)}{\partial p_2} > \frac{\partial \pi(p_1, p_2)}{\partial p_1}.$$

This means that the monopolist always prefers raising p_2 (if it can) to raising p_1 . By increasing p_2 , the monopolist gets the same per-unit increase in revenue as it would get from increasing p_1 with a smaller reduction in demand. Accordingly, without any legal constraint on the ability to raise p_2 , the monopolist will set $p_1^{NLC} = 0$ and a p_2 that solves $\frac{\partial \pi(p_1=0, p_2)}{\partial p_2} = 0$, or:

$$-a \cdot \delta \cdot (p_2 - c) + [\bar{q} - a \cdot \delta \cdot p_2] = 0$$

Solving for p_2 , we obtain $p_2^{NLC} = \frac{\bar{q} + a \cdot \delta \cdot c}{2 \cdot a \cdot \delta}$. (We assume that $\frac{\bar{q} + a \cdot \delta \cdot c}{2 \cdot a \cdot \delta} \geq c$, which reduces to $\bar{q} \geq a \cdot \delta \cdot c$; otherwise, there would be no market for the product.) With these prices, demand for the product will be $q^{NLC} = \bar{q} - a \cdot \delta \cdot \frac{\bar{q} + a \cdot \delta \cdot c}{2 \cdot a \cdot \delta}$.

Now assume that the law limits the permissible level of p_2 to $\bar{p}_2 < p_2^{NLC} = \frac{\bar{q} + a \cdot \delta \cdot c}{2 \cdot a \cdot \delta}$, adding another constraint, $p_2 \leq \bar{p}_2$, to the monopolist's maximization problem.

As explained above, the monopolist always prefers to raise p_2 . Therefore, the legal constraint is binding, and the monopolist will set $p_2^C = \bar{p}_2$. But now it is possible that the monopolist will also want to set a positive p_1 . To explore this possibility, we calculate the derivate of profits with respect to p_1 at $p_1 = 0$, given $p_2 = \bar{p}_2$:

$$\left. \frac{\partial \pi(p_1, \bar{p}_2)}{\partial p_1} \right|_{p_1=0} = -a \cdot (\bar{p}_2 - c) + [\bar{q} - a \cdot \delta \cdot \bar{p}_2] = \bar{q} - a \cdot (1 + \delta) \cdot \bar{p}_2 + a \cdot c$$

This derivative is positive if and only if $\bar{p}_2 < \frac{\bar{q} + a \cdot c}{a \cdot (1 + \delta)}$. Note that $\frac{\bar{q} + a \cdot c}{a \cdot (1 + \delta)} \leq \frac{\bar{q} + a \cdot \delta \cdot c}{2 \cdot a \cdot \delta}$ (given our assumption that $\bar{q} \geq a \cdot \delta \cdot c$). We thus have

two cases:

(1) Mild Legal Constraint: $\frac{\bar{q}+a \cdot c}{a \cdot (1+\delta)} \leq \bar{p}_2 < \frac{\bar{q}+a \cdot \delta \cdot c}{2 \cdot a \cdot \delta}$. When the legal constraint is mild,

$$\left. \frac{\partial \pi(p_1, \bar{p}_2)}{\partial p_1} \right|_{p_1=0} \leq 0,$$

and the monopolist will set: $p_1^{LC} = 0$ and $p_2^{LC} = \bar{p}_2$. With these prices, demand for the product will be $q^{LC} = \bar{q} - a \cdot \delta \cdot \bar{p}_2 > q^{NLC}$.

(2) Stricter Legal Constraint: $\bar{p}_2 < \frac{\bar{q}+a \cdot c}{a \cdot (1+\delta)}$. When the legal constraint is stricter,

$$\left. \frac{\partial \pi(p_1, \bar{p}_2)}{\partial p_1} \right|_{p_1=0} > 0,$$

the monopolist will set a positive p_1 . Specifically, solving the first order condition:

$$\frac{\partial \pi(p_1, \bar{p}_2)}{\partial p_1} = -a \cdot (p_1 + \bar{p}_2 - c) + [\bar{q} - a \cdot (p_1 + \delta \cdot \bar{p}_2)] = 0$$

we obtain:

$$p_1^{LC} = \frac{\bar{q} - a \cdot (1 + \delta) \cdot \bar{p}_2 + a \cdot c}{2 \cdot a} > 0$$

Case 2 needs to be further divided into the following subcases:

(2a) Intermediate Legal Constraint: $c < \bar{p}_2 < \frac{\bar{q}+a \cdot c}{a \cdot (1+\delta)}$. Note that $c \leq \frac{\bar{q}+a \cdot c}{a \cdot (1+\delta)}$ (given our assumption that $\bar{q} \geq a \cdot \delta \cdot c$). With an intermediate legal constraint, the monopolist will set $p_1^{LC} = \frac{\bar{q}-a \cdot (1+\delta) \cdot \bar{p}_2+a \cdot c}{2 \cdot a} > 0$ and $p_2^{LC} = \bar{p}_2$. With these prices, demand for the product will be $q^{LC} = \bar{q} - a \cdot (p_1^{LC} + \delta \cdot \bar{p}_2) > q^{NLC}$.

(2b) Strict Legal Constraint: $\frac{a \cdot c - \bar{q}}{a \cdot (1-\delta)} \leq \bar{p}_2 \leq c$. Note that $\frac{a \cdot c - \bar{q}}{a \cdot (1-\delta)} \leq c$ (given our assumption that $\bar{q} \geq a \cdot \delta \cdot c$). With a strict legal constraint, the monopolist will set $p_1^{LC} = \frac{\bar{q}-a \cdot (1+\delta) \cdot \bar{p}_2+a \cdot c}{2 \cdot a} > 0$ and $p_2^{LC} = \bar{p}_2$. With these prices, demand for the product will be $q^{LC} = \bar{q} - a \cdot (p_1^{LC} + \delta \cdot \bar{p}_2) \leq q^{NLC}$. The expressions for the two prices and for the demand (i.e., the quantity sold) are the same as with an intermediate legal constraint. The difference is that with a strict legal constraint, demand for the product decreases, as compared to the no-constraint benchmark.

(2c) Very Strict Legal Constraint: $\bar{p}_2 < \frac{a \cdot c - \bar{q}}{a \cdot (1-\delta)}$. The preceding analysis and the resulting prices,

$$p_1^{LC} = \frac{\bar{q}-a \cdot (1+\delta) \cdot \bar{p}_2+a \cdot c}{2 \cdot a} > 0$$

and $p_2^{LC} = \bar{p}_2$, apply only as long as we don't hit the monopolist's participation constraint, $\pi(p_1, p_2) \geq 0$, which boils down to $p_1 + p_2 \geq c$. When $\bar{p}_2 < \frac{a \cdot c - \bar{q}}{a \cdot (1-\delta)}$, the participation constraint is binding, and the monopoly case converges with the perfect competition case. The monopolist will set

$$p_1^{LC} = c - \bar{p}_2 > \frac{\bar{q}-a \cdot (1+\delta) \cdot \bar{p}_2+a \cdot c}{2 \cdot a}$$

and $p_2^{LC} = \bar{p}_2$, and demand will be $q^{LC} = \bar{q} - a \cdot \delta \cdot c - a \cdot (1 - \delta) \cdot (c - \bar{p}_2) < q^{NLC}$. But, as in the perfect competition case, nonnegative demand cannot be sustained when $\bar{p}_2 < \frac{a \cdot c - \bar{q}}{a \cdot (1-\delta)}$, and the market shuts down.

The results are summarized in the following proposition.

Proposition A2: In a monopolistic market—

- (a) Without a legal constraint, the monopolist will set $p_1^{NLC} = 0$ and $p_2^{NLC} = \frac{\bar{q}+a\cdot\delta\cdot c}{2\cdot a\cdot\delta}$, and demand will be $q^{NLC} = \bar{q} - a \cdot \delta \cdot \frac{\bar{q}+a\cdot\delta\cdot c}{2\cdot a\cdot\delta}$.
- (b) With a legal constraint, $p_2 \leq \bar{p}_2$ (where $\bar{p}_2 < \frac{\bar{q}+a\cdot\delta\cdot c}{2\cdot a\cdot\delta}$)—
- With a Mild Legal Constraint, $\frac{\bar{q}+a\cdot c}{a\cdot(1+\delta)} \leq \bar{p}_2 < \frac{\bar{q}+a\cdot\delta\cdot c}{2\cdot a\cdot\delta}$, the monopolist will set $p_1^{LC} = 0$ and $p_2^{LC} = \bar{p}_2$, and demand will be $q^{LC} = \bar{q} - a \cdot \delta \cdot \bar{p}_2 > q^{NLC}$.
 - With an Intermediate Legal Constraint, $c < \bar{p}_2 < \frac{\bar{q}+a\cdot c}{a\cdot(1+\delta)}$, the monopolist will set $p_1^{LC} = \frac{\bar{q}-a\cdot(1+\delta)\cdot\bar{p}_2+a\cdot c}{2\cdot a} > 0$ and $p_2^{LC} = \bar{p}_2$, and demand will be $q^{LC} = \bar{q} - a \cdot (p_1^{LC} + \delta \cdot \bar{p}_2) > q^{NLC}$.
 - With a Strict Legal Constraint, $\frac{a\cdot c - \bar{q}}{a\cdot(1-\delta)} \leq \bar{p}_2 \leq c$, the monopolist will set

$$p_1^{LC} = \frac{\bar{q}-a\cdot(1+\delta)\cdot\bar{p}_2+a\cdot c}{2\cdot a} > 0$$
 and $p_2^{LC} = \bar{p}_2$, and demand will be $q^{LC} = \bar{q} - a \cdot (p_1^{LC} + \delta \cdot \bar{p}_2) \leq q^{NLC}$.
 - With a Very Strict Legal Constraint, $\bar{p}_2 \leq \frac{a\cdot c - \bar{q}}{a\cdot(1-\delta)}$, the market shuts down.

Corollary A2 summarizes the effects of the legal constraint on pricing and demand.

Corollary A2: In a monopolistic market, when the law imposes a legal constraint $p_2 \leq \bar{p}_2$ (where $\bar{p}_2 < \frac{\bar{q}+a\cdot\delta\cdot c}{2\cdot a\cdot\delta}$)—

- (a) The Regulated Price, p_2 : sellers will reduce p_2 , as compared to the no-constraint benchmark, to the maximum level permitted by law.
- (b) The Unregulated Price, p_1 :
- When the legal constraint is mild, $\frac{\bar{q}+a\cdot c}{a\cdot(1+\delta)} \leq \bar{p}_2 < \frac{\bar{q}+a\cdot\delta\cdot c}{2\cdot a\cdot\delta}$, the law will not affect p_1 . The monopolist will set $p_1 = 0$ with and without the legal constraint.
 - When the legal constraint is stricter (intermediate or strict), $\frac{a\cdot c - \bar{q}}{a\cdot(1-\delta)} \leq \bar{p}_2 < \frac{\bar{q}+a\cdot c}{a\cdot(1+\delta)}$, the law will induce the monopolist to increase p_1 , as compared to the no-constraint benchmark.
- (c) Demand, q :
- When the legal constraint is mild or intermediate, $c < \bar{p}_2 < \frac{\bar{q}+a\cdot\delta\cdot c}{2\cdot a\cdot\delta}$, demand will increase, as compared to the no-constraint benchmark.
 - When the legal constraint is strict or very strict, $\bar{p}_2 \leq c$, demand will decrease, as compared to the no-constraint benchmark.

c. Perfect Competition vs. Monopoly

The results derived above can be used to compare the perfect competition case and the monopoly case. The comparison is summarized in Corollary A3.

Corollary A3:

- (a) When $c \leq \bar{p}_2 < \frac{\bar{q}+a\cdot\delta\cdot c}{2\cdot a\cdot\delta}$,
 - i. In the perfect competition case, the legal constraint has no effect (since sellers in a perfectly competitive market do not price above c).
 - ii. In the monopoly case, the legal constraint will result in a lower p_2 ; p_1 will remain at zero if the legal constraint is mild, $\frac{\bar{q}+a\cdot c}{a\cdot(1+\delta)} \leq \bar{p}_2 \leq \frac{\bar{q}+a\cdot\delta\cdot c}{2\cdot a\cdot\delta}$, and will increase if the legal constraint is intermediate, $c \leq \bar{p}_2 \frac{\bar{q}+a\cdot c}{a\cdot(1+\delta)} \leq \frac{\bar{q}+a\cdot\delta\cdot c}{2\cdot a\cdot\delta}$; and demand will increase.
- (b) When $\frac{a\cdot c-\bar{q}}{a\cdot(1-\delta)} < \bar{p}_2 < c$,
 - i. In the perfect competition case, the legal constraint will result in a lower p_2 , a higher p_1 , and reduced demand.
 - ii. In the monopoly case, the legal constraint will result in a lower p_2 , a higher p_1 , and reduced demand.
 - iii. The increase in p_1 and the decrease in the demand will be larger in the perfect competition case.
- (c) When $\bar{p}_2 \leq \frac{a\cdot c-\bar{q}}{a\cdot(1-\delta)}$, the market shuts down in both the perfect competition and monopoly cases.

Most of the results summarized in Corollary A3 follow immediately from Corollary A1 and Corollary A2. The results in part (b)(iii) of the Corollary require further proof. Starting with the effect of the legal constraint on p_1 : In the perfect competition case $p_1^{LC} = c - \bar{p}_2$, and

$$\frac{dp_1^{LC}}{d\bar{p}_2} = -1.$$

In the monopoly case,

$$p_1^{LC} = \frac{\bar{q}-a\cdot(1+\delta)\cdot\bar{p}_2+a\cdot c}{2\cdot a}$$

and

$$\frac{dp_1^{LC}}{d\bar{p}_2} = -\frac{1+\delta}{2}.$$

The effect is larger in the competition case since $\frac{1+\delta}{2} < 1$. The relative effect on demand follows from the relative effect on p_1 since p_2 is the same in both the perfect competition and monopoly cases.

APPENDIX 2

TABLE 1. EFFECTIVE DATES OF SIGNIFICANT CARD ACT RULES

<i>Effective Date</i>	<i>Provisions</i>	<i>Source</i>
May 22, 2009	CARD Act signed into law	Credit CARD Act of 2009, Pub. L. No. 111-24, 123 Stat. 1734 (2009).
Aug. 20, 2009	45-day notice requirement for certain rate and fee increases; requirement to notify consumers of their right to cancel the card without penalty before the increases become effective. 21-day notice requirement for periodic payment statements.	Sec. 101, § 123. Sec. 106, § 163.
Feb. 22, 2010	Rate increases on outstanding balances forbidden with exceptions for teaser rates, variable APR cards, and the conclusion of temporary hardship periods. Changing the available methods of obligor's repayment forbidden with exceptions for five year amortization and periodic payment plans. Rate increases for fixed-rate cards generally forbidden for the first year; "promotional" (teaser) rates must stay in place for at least six months. Opt-in requirement for over-the-limit transactions and fees; double-cycle billing prohibited. Payments in excess of the minimum must be applied first to the balance with the highest interest rate. Creditors required to consider obligor's ability to pay before opening credit card account or increasing the credit limit. New minimum payment warning/disclosure. Internet posting of standard credit card contracts. Total fees during the first year of the account must not exceed 25% of the total credit line (excluding late fees, over-limit fees, and returned-payment fees).	Sec. 101, § 171. Sec. 101, § 171. Sec. 101, § 172. Sec. 102, § 127. Sec. 104, § 164. Sec. 109, § 150. Sec. 201, § 127. Sec. 204, § 122 Sec. 105, § 127.
Aug. 22, 2010	Rate increases must be re-evaluated every six months. Magnitude of penalty fees restricted; Federal Reserve Board rules implementing this are: Fees based on violation of account terms may not exceed a reasonable proportion of the total costs incurred by card issuer as a result of those types of violations. Card issuers must reevaluate and adjust these fees every twelve months. Safe Harbors (fees presumed to be reasonable): \$25 for a violation of account terms, \$35 for a second violation of the same type within six billing cycles, 3% of delinquent balance on accounts that require the payment of outstanding balances in full at the end of each billing cycle. Fees that exceed the dollar cost associated with the violation are prohibited. Fees that do not have a dollar cost to card issuer are prohibited, including: fees on transactions the issuer refuses to authorize, inactivity fees, and account termination fees. Multiple fees based on a single event or transaction are prohibited.	Sec. 101, § 148. Sec. 102, § 149. 12 C.F.R. § 226.52(b)(1)(i) (2010). <i>Id.</i> § 226.52(b)(1)(ii). <i>Id.</i> § 226.52(b)(2)(i)(A). <i>Id.</i> § 226.52(b)(2)(i)(B). <i>Id.</i> § 226.52(b)(2)(ii).

TABLE 2. LIST OF ISSUERS IN THE AGREEMENTS DATASET

<i>Credit Unions</i>	<i>Investor-owned Issuers</i>
Altra Federal Credit Union	1st Financial Bank USA
America's First Federal Credit Union	American Express Bank, FSB
City County Credit Union of Fort Lauderdale	Applied Bank
DuPage Credit Union	Bank of the West
Educational Community Credit Union	Barclays Bank Delaware
Educational Employees Credit Union	Capital One Bank (USA), National Association
FirstLight Federal Credit Union	Citibank (South Dakota) N.A.
Grow Financial Federal Credit Union	Credit One Bank N.A.
HAPO Community Credit Union	Discover Bank
Langley Federal Credit Union	Dollar Bank, Federal Savings Bank
Navy Federal Credit Union	FIA Card Services
Notre Dame FCU	First Hawaiian Bank
Pen Air Federal Credit Union	FPC Financial, F.S.B.
SEFCU	GE Money Bank
Seven Seventeen Credit Union, Inc.	HSBC Bank Nevada, N.A.
Sharonview Federal Credit Union	Iberia Bank FSB
South Carolina Federal Credit Union	INTRUST Bank, N.A.
Spokane Teachers Credit Union	Lexus Financial Savings Bank
SRP Federal Credit Union	Marathon Petroleum Company LP
Talbots Classics National Bank	Nordstrom FSB
United Nations FCU	Target National Bank
University of Iowa Community Credit Union	TCM Bank N.A.
Watermark Credit Union	USAA Savings Bank
WSECU	Wells Fargo Bank NA
	Zions Bank