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## CONSUMER BIASES AND FIRM OWNERSHIP

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## CONSUMER BIASES AND FIRM OWNERSHIP\*

RYAN BUBB<sup>†</sup> AND ALEX KAUFMAN<sup>‡</sup>

**ABSTRACT.** Recent work has explored the implications of behavioral biases among consumers for firm behavior and has documented that profit-maximizing firms exploit consumer biases in the contracts they offer consumers. In this paper we show how ownership of the firm by its customers, as well as nonprofit ownership, can be used as commitment devices to avoid offering contracts that exploit consumer biases. In a model of a market in which for-profit investor-owned firms and mutual firms compete, sophisticated consumers who are biased but aware of their biases patronize mutual firms, while unbiased consumers and naive consumers who underestimate their biases patronize for-profit firms. Mutuals serving sophisticates offer high base prices but low “penalty” prices, while for-profits offer low base prices and high penalty prices, resulting in transfers from naive biased consumers to unbiased consumers. We present evidence from a range of markets that supports our theory.

**Keywords:** Firm Ownership, Consumer Biases, Credit Unions, Mutual Ownership, Nonprofits

**JEL Classifications:** D11, D14, D18, D21, D86, G21, G32, K22, L22, L31.

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## 1. INTRODUCTION

Recent work has explored the implications of behavioral biases among consumers for firm behavior and has documented that profit-maximizing firms exploit consumer biases in the contracts they offer consumers. For example, when consumers have time-inconsistent preferences and are (to some degree) naive, for-profit firms will price investment goods below marginal cost and charge back-loaded fees (Della Vigna and Malmendier, 2004). Similarly, in the presence of naive consumers, for-profit firms charge high surcharges and add-on prices, which result in naive consumers subsidizing the consumption of informed consumers (Gabaix and Laibson, 2006). When consumers are naive about their biases, such pricing behavior can result in losses to consumer welfare. Furthermore, Gabaix and Laibson (2006) argue that both regulatory remedies and competition are unlikely to cure these inefficiencies.

In this paper we show how ownership of the firm can be used as a commitment device to avoid using contracts that exploit consumer biases. In particular, if customers of the firm own the firm, as in a consumer cooperative, or if the firm has no owners, as in a nonprofit, then firm managers have less incentive to offer contracts that exploit consumer biases. We thus identify a “governance strategy” of shaping the incentives of firm management through assignment of ownership of the firm, rather than a regulatory strategy of dictating contractual terms or processes, as a way to reduce the social costs that result from consumer biases.<sup>1</sup> We formalize our argument in a simple model and offer evidence for our theory from a range of markets.

As a paradigmatic example, consider a bank that offers credit card services to consumers. Because of the complexity of the contractual relationship between banks and their customers, consumers have trouble understanding all of the charges, penalties, and other payments they are obliged to make to the bank under their credit card contract in various contingencies, such as the penalty interest rate that applies if they fail to make a minimum payment on time. Furthermore, many consumers have self-control problems that lead them to trigger commonly charged fees and penalties. Consequently, for-profit banks (we will use the term *for-profit* to denote investor-owned

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<sup>1</sup>The distinction between governance strategies and regulatory strategies for reducing agency costs is made by Hansmann and Kraakman (2004).

firms, as opposed to customer-owned and nonprofit firms) have a strong incentive to charge high fees and penalties. We will use the term *penalty* to denote contractual features that consumers have difficulty understanding and result in consumers paying more if they are subject to a behavioral bias. The use of penalties in credit card contracts can persist even in competitive markets, since banks simply compete on the salient, easily observable and understood features of accounts (e.g., the introductory interest rate and rewards programs), which we refer to as *base prices*, and then cover their costs through penalty income. In equilibrium, consumers who can avoid triggering these penalties are effectively subsidized through low base prices by consumers with biases that lead them to incur these charges.

Ownership of the bank by its customers is a potential mechanism by which firms can commit to not exploit consumer biases. We refer to firms that are owned by their customers as *mutuals*. Since a mutual bank is owned and (at least nominally) controlled by its customers, it lacks an outside residual claimant with control over the firm. It will set a price schedule that is preferred by, say, the median customer, modulo agency costs between customer-owners and bank management. If those agency costs are large, then mutuals will behave similarly to nonprofits, which are barred from distributing firm profits to those who control the firm. Nonprofit status can also attenuate the incentives of firm management to use pricing that exploits consumer biases. Managers of nonprofits are still able to enjoy some “perquisites” from firm revenues, but have weaker incentives than do owners of for-profit firms to extract consumer surplus by exploiting consumer biases. To simplify the exposition of our theory, we simply refer to mutuals in what follows, but our conclusions about mutuals also apply to nonprofits.

Mutuals thus charge lower penalties and, in a competitive market, must charge higher base prices than do for-profits to break even. Sophisticated biased consumers, who are aware of their risk of incurring penalties on their account, prefer to pay the higher base prices to bank at mutuals in order to avoid subsidizing unbiased consumers and thereby to receive credit card services at lower total cost. In contrast, naive biased consumers who are unaware of their self-control problem are less fortunate as they are unable to recognize the good deal offered to them by mutuals. In the long-run equilibrium in a market in which for-profits and mutuals compete, sophisticated biased consumers

patronize mutual firms, while naive biased consumers and unbiased consumers patronize for-profit firms.

Our analysis also suggests that mutuals have a greater incentive than do for-profit firms to educate consumers about their biases as a way of attracting customers. If consumers underestimate their biases more often than they overestimate their biases, then mutuals would on net gain more customers through education, while for-profits would lose them.

Firm ownership is used in many different markets to mitigate incentives of firms to exploit consumer biases. Consumer financial services markets are perhaps the best application, as credit unions, mutual savings and loans, mutual savings banks, and mutual insurance companies have substantial market share, and consumer biases play a large role in household financial decision-making.<sup>2</sup> Other markets in which mutuals and nonprofits play major roles and in which consumer biases may be important include education and health care.

Factors beyond the scope of our analysis, of course, also influence the prevalence of ownership types in different markets. For example, consider the cell phone service market. Grubb (2008) argues that the pricing structure commonly used by cell phone companies, in which a particular quantity is included for a flat fee, followed by high prices for additional minutes, results from consumer overconfidence in their estimation of their demand. However, mutual cell phone companies do not exist in the United States, presumably because such a firm would have trouble raising the substantial capital necessary to build a cell network.

Our analysis suggests that policies that expand the share of mutual firms in markets in which consumer biases cause social costs or undesirable redistribution may be normatively attractive, even if, as some scholars believe, mutual firms tend to operate less efficiently than do for-profits. For example, policies that expand the role of credit unions in mortgage origination may reduce the opportunistic behavior of lenders vis-à-vis unsophisticated borrowers, which Bar-Gill (2008) argues has plagued the subprime mortgage market. Our analysis also provides a potential justification for

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<sup>2</sup>Della Vigna and Malmendier (2004) document features of credit card contracts that exploit consumer naivete about their time inconsistent preferences. Consumer biases are also thought to explain the distinctive features of subprime mortgage contracts, which typically defer many of the payments by the borrower into the future and include a host of obscured fees (Bar-Gill, 2008). Campbell (2006) reviews evidence of the ways that actual household financial decisionmaking falls short of the rational model.

regulators to disallow conversions of mutually-owned thrifts and credit unions to investor-owned banks. Our theory is also relevant to the debate over the entry of for-profit banks into microfinance markets in the developing world. The financial contracts offered by for-profit microfinance institutions may result in more transfers away from biased consumers toward less biased (who may be on average more affluent) consumers than do the contracts used by nonprofits, resulting in less benefit for the poorest borrowers.

In support of our theory, we present evidence that consumer contracts offered by for-profit firms differ from those offered by mutually owned firms in the markets for credit cards, deposit accounts, and mutual funds. We find the robust result that for-profit firms charge higher penalties than mutually owned firms and that their base prices are typically lower than mutuals. Furthermore, we provide evidence that for-profit banks shroud important information about their products more often than do mutuals.

We also investigate whether consumers sort into for-profit, nonprofit and mutually-owned firms based on their perceptions of their own biases, as our theory predicts. Using proxies for bias and proxies for perceptions of bias, we find that perceptions are a more important determinant of credit union membership than is bias itself. Relatedly, our theory provides a new perspective on the debate over whether credit unions are meeting their statutory obligation to serve those of “modest means”<sup>3</sup>: if low-income consumers are more likely than others to be naive about their biases, then credit unions may have trouble winning them from for-profits, which attract them with low base prices but then charge high penalties.

Our work brings together two different literatures: (1) work on the role of firm ownership in mitigating incentives for opportunism vis-à-vis some class of firm patrons (i.e., providers of some input to the firm, or purchasers of the firm’s output); and (2) work on the implications of consumer biases for market contracts. Hansmann (1980, 1996)’s seminal work on non-investor-owned firms

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<sup>3</sup>The Government Accountability Office found that credit unions serve a lower proportion of low- and moderate-income customers than do commercial banks. GAO, *Credit Unions: Financial Condition Has Improved but Opportunities Exist to Enhance Oversight and Share Insurance Management*, (Report, GAO-04-91, Oct. 2003). Representatives of the banking industry have used this finding to argue that credit unions should no longer receive an exemption from corporate income taxation. *See Review of Credit Union Tax Exemption: Hearing Before the Committee on Ways and Means*, 109th Congress (Nov. 3, 2005).

puts particular emphasis on the role of information asymmetries between the firm and some class of patrons of the firm as a rationale for ownership of the firm by that class of patrons. We argue that the inability of firms to commit to not exploit consumer biases is another important motivation for ownership of the firm by customers.

Our model is also related to Glaeser and Shleifer (2001), who analyze an entrepreneur's decision to start a nonprofit business rather than a for-profit business. They model nonprofit status as a means of committing to deliver higher values of non-contractible product quality ex post, by lowering the payoff from shading on those dimensions of quality. We model mutual ownership in a similar way, but focus on its ability to ameliorate commitment problems posed by consumer biases rather than non-contractibility. An important difference between our analysis and the model of Glaeser and Shleifer (2001) is that we show how mutual status affects the form of *contracts themselves*, not just the non-contractible aspects (e.g., quality of service rendered) of the relationship between firm and consumer.

The plan of the paper is as follows. In Section 2 we present a model of mutual and for-profit firms in a market in which consumers are subject to a bias and derive predictions on the structure of market contracts and the sorting of consumers between firms. In Section 3 we offer evidence on the differences between the contracts used by mutuals and those used by for-profits in the credit card, deposit account and mutual fund markets. In Section 4 we investigate whether consumers sort into mutuals and for-profits according to their perceptions of their risk of incurring penalties. In Section 5 we briefly describe evidence that suggests that for-profit firms shroud contract terms more often than do mutual firms. Section 6 concludes.

## 2. THE MODEL

Though our model may apply to a variety of consumer biases and markets, for ease of exposition we have written the model using the example of consumers in the market for some type of financial service account (e.g., a deposit account, credit card, mortgage, etc.) who are vulnerable to penalties due to a self-control problem.

2.1. **Setup.** Suppose that each of an infinite number of potential banks can provide the account at the same cost. Banks' marginal cost of providing an account is normalized to 0. Each bank can choose contract offers composed of a *base price*,  $p$ , which is observed by potential customers, as well as a non-negative *penalty*  $\hat{p}$ , which is not observed by potential customers. By base price, we refer to account features that are highly salient to customers, such as the annual or monthly fees, credit card reward programs, deposit account interest rates, and credit card introductory interest rates. The base price could be negative, in which case the bank is paying customers for opening and using accounts.

By penalty, we refer to account charges that are (1) hard for consumers to observe and understand, because the services being contracted for and the contracts themselves are complex (there could be many penalties buried in the fine print, the importance of which is difficult to evaluate); and (2) that may or may not be incurred, and are more likely to be incurred if the customer is subject to some bias such as a self-control problem. Examples of penalties include late fees for missing a minimum payment and the penalty interest rate for credit cards, and fees for falling below a minimum balance in a deposit account. For concreteness, we will focus on late fees.

We will refer to a vector  $(p, \hat{p})$  as a *contract*. The set of feasible contracts for each bank is denoted  $\mathbb{P} \equiv \mathbb{R} \times \mathbb{R}^+$ , a generic element of which will be denoted  $\mathbf{p} = (p, \hat{p})$ .

2.1.1. *Consumer behavior.* We assume that all of a continuum of consumers value account services at more than banks' production costs, so that it is in fact efficient for all consumers to open an account. Consumers' valuations  $v$  of account services are distributed in the population according to the pdf  $g(\cdot)$ , with corresponding cdf  $G(\cdot)$ , independently of other characteristics of consumers. We normalize the size of the population of consumers to 1.

Each consumer faces a cost to paying on time and avoiding a penalty of  $c \in \mathbb{R}^+$ , which is distributed in the population according to the pdf  $f(\cdot)$ , with corresponding cdf  $F(\cdot)$ , which is strictly increasing on  $\mathbb{R}^+$ .  $c$  is a reduced form way of modeling the self-control problem that leads consumers to incur penalties. A consumer with cost  $c$  facing a penalty  $\hat{p}$  will pay on time if and only



if  $c < \hat{p}$ . Consumers with a high  $c$  are subject to a greater self-control problem than are consumers with a low  $c$ .

Each consumer's  $c$  is initially unknown to the consumer. Instead, each consumer initially has a (potentially inaccurate) belief about his  $c$ , which is denoted by  $\tilde{c}$ . All consumers make decisions about whether to accept an offered contract as if  $\tilde{c}$  is their true cost of paying on time. For simplicity, we assume that  $\tilde{c}$  is distributed identically to and *independently* of  $c$ .<sup>4</sup> Consumers for whom  $\tilde{c} = c$  thus have correct beliefs about their  $c$ . We refer to consumers with beliefs  $\tilde{c} \approx c \approx 0$  as *unbiased*. Unbiased consumers are not subject to a bias, and they know it. We refer to biased consumers with beliefs  $\tilde{c} \approx c > 0$  as *sophisticated*. Sophisticated consumers are subject to a self-control problem (high  $c$ ) and are aware of the extent of their problem. In contrast, biased consumers with  $\tilde{c} < c > 0$  are *naive* and underestimate the degree to which they are vulnerable to incurring penalties. Finally, consumers with  $\tilde{c} > c$ , whom we refer to as *paranoids*, overestimate the degree to which they are vulnerable to incurring penalties. We assume that firms do not know consumers' types (either  $c$  or  $\tilde{c}$ ) and therefore cannot discriminate among consumers directly on the basis of their type.

We model consumers' difficulty in observing and understanding penalties simply as all consumers not knowing the  $\hat{p}$  offered by different banks. However, in equilibrium consumers have rational expectations about each bank's  $\hat{p}$ .<sup>5</sup>

2.1.2. *Firm behavior.* Bank managers choose what contracts to offer and face incentives that differ by ownership type of the firm. We consider two types of banks: investor-owned for-profit banks (*for-profits*) and customer-owned banks (*mutuals*). We model for-profit banks as perfectly controlled by their (risk neutral) residual claimants so that they simply maximize expected profits net of the costs of charging penalties (described below). Since  $\hat{p}$  is not observed by consumers,

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<sup>4</sup>Independence of beliefs about the cost of paying on time and the true cost of paying on time is an unrealistic assumption — consumers' beliefs about their difficulty in paying on time surely are somewhat correlated with their actual self-control problem — but it substantially simplifies the analysis of the model. We consider below how relaxing this assumption would change our results.

<sup>5</sup>Note that the expectations of consumers with very low  $\tilde{c}$ , naive or sophisticated, about penalty levels are irrelevant, since they believe that they will not incur any penalties. However, it is important for our results that sophisticated consumers with high  $c$  have rational expectations about penalties.

each bank chooses  $\hat{p}$  to maximize penalty income minus the costs of penalties from its customer base.<sup>6</sup> In contrast, mutual banks are (at least nominally) controlled by their customers. As a simple stylized model of mutual ownership, we follow Glaeser and Shleifer (2001)’s approach to modeling nonprofits and assume that, due to agency costs between customers and bank management, the hired managers of mutuals can extract some “perquisites” from their firm that are a fraction  $d \ll 1$  of the firm’s revenues, and therefore have muted incentives to maximize penalty revenue compared to for-profit bank owners.<sup>7</sup> We would model nonprofits in the same way, and all of our conclusions regarding mutuals also apply to nonprofits.<sup>8</sup> We use the term mutuals in our exposition only because customer ownership is more common than nonprofit status in banking.

While managers can reap benefits from charging penalties, they face costs from extracting penalty revenue. For each customer of the bank, bank management incurs a non-cash (e.g., effort) cost  $\psi(\hat{p})$  from choosing a penalty  $\hat{p}$ , with  $\psi'(\cdot) \geq 0$ ,  $\psi'(0) = 0$ , and  $\psi''(\cdot) > 0$ .  $\psi(\cdot)$  is a reduced form way to represent costs due to regulatory constraints and to the managerial effort and psychic costs (e.g., it is unpleasant for the manager because of social preferences) required to charge and extract large penalties from customers. To simplify, we assume  $\psi(\hat{p})$  is incurred per customer (whether or not the customer triggers the penalty) so that a firm’s optimal choice of  $\hat{p}$  is not a function of the scale of the firm. We assume the same cost function  $\psi(\cdot)$  applies regardless of the ownership structure of the firm.

2.1.3. *Timing of the model.* The timing of the model is illustrated in Figure 1. Banks first choose their contract offers  $(p, \hat{p})$ . Consumers then learn their beliefs about their cost of paying on time,  $\tilde{c}$ , and observe the base price,  $p$ , of the contract offers, and then choose a contract (or not to open

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<sup>6</sup>Since customers don’t observe  $\hat{p}$ , banks do not consider the effect of their penalty choice on the number of customers they serve.

<sup>7</sup>In an earlier version of the paper we instead assumed that mutuals are subject to no agency costs between customer-owners and managers and offer the budget balancing contract preferred by their median customer, which yielded qualitatively similar results. The only significant difference that results from this alternative approach is that a budget-balancing mutual monopolist avoids the deadweight loss associated with monopoly pricing by for-profits.

<sup>8</sup>Nonprofits are formally different than mutuals — nonprofits do not have owners in the sense that they are legally prohibited from distributing earnings to those who control the firm, while customers enjoy both control of and residual financial claims in mutuals. However, collective action problems likely result in substantial agency costs in mutuals, which lack a market for firm control and other institutions that mitigate agency costs between managers and owners of for-profit firms.

an account). After contracts are formed, consumers then learn their true cost of paying on time,  $c$ , and the penalty charged under their contract,  $\hat{p}$ , and choose whether to pay on time or to incur the penalty.

**2.2. Monopoly.** Suppose that a single monopolist bank offers account services to consumers. An equilibrium for the monopolist case of the model is simply a set of contracts offered by the firm that maximize the objective function of the firm's managers, given that consumers choose optimally with rational expectations about the (initially unobserved) penalties associated with the contracts. In what follows we ignore contract offers that would attract no customers. We first derive the bank's equilibrium penalties. Since the penalty  $\hat{p}$  charged under a contract is unobserved by the bank's customers, the bank chooses  $\hat{p}$  to maximize penalty revenue net of penalty costs per customer (with penalty revenue deflated by  $d$  if the bank is a mutual). More formally, the bank's contracts must satisfy the following *penalty optimality* condition.

**Definition 1.** A bank offering contract  $(p, \hat{p}) \in \mathbb{P}$  satisfies penalty optimality if  $\hat{p}$  is a solution to the following program:

$$(1) \quad \max_{\hat{p}' > 0} [1 - F(\hat{p}')] \delta \hat{p}' - \psi(\hat{p}')$$

where  $\delta = 1$  for for-profit banks and  $\delta = d < 1$  for mutuals.

The first order condition for the problem in (1) is

$$(2) \quad \delta [1 - F(\hat{p}^*) - f(\hat{p}^*) \hat{p}^*] = \psi'(\hat{p}^*)$$

(2) implicitly defines the solution to (1) as a function of  $\delta$ ; denote that function  $\hat{p}^*(\delta)$ . Furthermore, to simplify notation define  $\hat{p}_{fp} \equiv \hat{p}^*(1)$  and  $\hat{p}_m \equiv \hat{p}^*(d)$ .

We now have the intuitive result that a for-profit monopolist charges a higher penalty than does a mutual monopolist.

**Lemma 1.**  $\hat{p}_{fp} > \hat{p}_m$

*All proofs are in the Appendix.*

For-profit banks charge higher penalties than mutuals because their owner-managers receive the full amount of revenues from penalties while managers of mutuals retain only a small fraction  $d$  of penalty revenues but face the same non-cash cost function for penalties,  $\psi(\cdot)$ , as for-profits.

Consider now whether a monopolist bank can sustain multiple contracts in equilibrium. Since the penalties of all contracts must all be the same to satisfy penalty optimality, and customers only observe the base price of contracts, in equilibrium the bank can offer only a single contract, as we now state.<sup>9</sup>

**Lemma 2.** *A monopolist bank offers only a single contract in equilibrium.*

Now consider the monopolist's choice of  $p$ . In a long run equilibrium in which the monopolist offers  $(p, \hat{p})$ , each consumer will have rational expectations about  $\hat{p}$  and will open an account if and only if  $v > p + \min(\hat{p}, \tilde{c})$ . Consumers consider  $\tilde{c}$  rather than  $c$  when deciding whether to accept a contract because they do not know  $c$  and instead believe that their cost of avoiding the penalty is  $\tilde{c}$  at the time they make contracting decisions (as described above). For consumers with  $\tilde{c} \leq \hat{p}$ , the condition for accepting the contract is  $v > p + \tilde{c}$ . For consumers with  $\tilde{c} \geq \hat{p}$ , the condition for accepting the contract is  $v > p + \hat{p}$ . The joint density function of  $v$  and  $\tilde{c}$  is (by independence):  $h(v, \tilde{c}) = g(v)f(\tilde{c})$ . The long run demand function for the monopolist is thus:

$$(3) \quad \begin{aligned} D(p, \hat{p}) &= \int_{-\infty}^{\hat{p}} \int_{p+\tilde{c}}^{\infty} f(\tilde{c})g(v)dv d\tilde{c} + \int_{\hat{p}}^{\infty} \int_{p+\hat{p}}^{\infty} f(\tilde{c})g(v)dv d\tilde{c} \\ &= \int_{-\infty}^{\hat{p}} [1 - G(p + \tilde{c})]f(\tilde{c})d\tilde{c} + [1 - G(p + \hat{p})][1 - F(\hat{p})] \end{aligned}$$

For the monopolist's problem to be well-behaved, we need the following assumption to hold.

**Assumption 1.**  $\frac{\partial^2 D(p, \hat{p})}{\partial p^2} \leq 0$

Concavity of the demand function is a standard assumption to ensure that the second order condition of the monopolist's problem is satisfied.

To ensure that the monopolist's optimal choice of  $p$  is decreasing in  $\delta$ , we assume the following.

<sup>9</sup>We restrict consumption of the financial service to the discrete amounts of either opening an account or not, and allow only deterministic contracts, to simplify the model. These assumptions eliminate the possibility of a monopolist using the quantity of (or probability of receiving) the service to price discriminate.

**Assumption 2.** For all  $\delta \in [d, 1]$ ,  $\left. \frac{\partial^2 D(p, \hat{p})}{\partial p \partial \hat{p}} \right|_{\hat{p}=\hat{p}^*(\delta)} \leq 0$

Assumption 2 is a weaker assumption than the standard single-crossing property that ensures monotone comparative statics. It says that the sensitivity of demand to the bank's base price is weakly increasing in the bank's penalty price. We can calculate expressions for the derivatives of  $D(p, \hat{p})$  relevant for these assumptions as follows:

$$(4) \quad \frac{\partial^2 D(p, \hat{p})}{\partial p^2} = - \int_{-\infty}^{\hat{p}} g'(p + \tilde{c}) f(\tilde{c}) d\tilde{c} - g'(p + \hat{p}) [1 - F(\hat{p})]$$

$$(5) \quad \frac{\partial^2 D(p, \hat{p})}{\partial p \partial \hat{p}} = -g'(p + \hat{p}) [1 - F(\hat{p})]$$

Examining (4) and (5) above, you can see that adding Assumption 2 to Assumption 1 results in an only slightly stronger set of assumptions. If  $v$  is distributed uniformly, these assumptions are satisfied.

Since the monopolist's choice of  $\hat{p}$  is determined by the penalty optimality condition above, the monopolist's choice of  $p$  is the solution to the following problem:

$$(6) \quad \max_p D(p, \hat{p}^*(\delta)) [\delta p + [1 - F(\hat{p}^*(\delta))] \delta \hat{p}^*(\delta) - \psi(\hat{p}^*(\delta))]$$

We now have the following result.

**Proposition 1.** *Under Assumptions 1 and 2, a monopolist for-profit bank charges a higher penalty, and a lower base price, than does a monopolist mutual bank.*

The intuition for the result that a for-profit monopolist charges a lower base price than a mutual monopolist is as follows. When setting the base price, a monopolist trades off the benefit from the higher payments per customer as it increases the base price against the cost from the loss of customers. We have shown that for-profit banks charge higher penalties than mutuals, and they therefore derive greater benefits from penalties than do mutuals. Thus the cost of losing customers from raising its base price is more acute for a for-profit monopolist than for a mutual. Furthermore,

at a given level of the base price, there are fewer customers at a for-profit than at a mutual (since customers know it has a higher penalty). Thus the marginal benefit of raising the base price from higher base price payments for customers that remain is smaller for the for-profit (since there are fewer customers). Both of these effects go in the same direction, resulting in a lower base price for a for-profit monopolist than for a mutual monopolist.

To further build intuition for these results, consider a simple example in which all customers are sophisticated and have the same  $c = \tilde{c}$ , and in which consumers' valuations of the service  $v$  are distributed uniformly on an interval  $[0, \bar{v}]$ . Consider first the monopolist's choice of  $\hat{p}$ . If the monopolist chooses  $\hat{p} > c$  then no customer will pay the penalty but the monopolist will still bear  $\psi(\hat{p})$ , which is obviously not optimal. So the monopolist chooses some  $\hat{p} < c$  to solve the following problem.

$$(7) \quad \max_{\hat{p}' > 0} \delta \hat{p}' - \psi(\hat{p}')$$

The first order condition for this problem is:

$$(8) \quad \delta = \psi'(\hat{p}^*)$$

Clearly, then, we have  $\hat{p}^*(1) > \hat{p}^*(d)$ , given  $\psi''(\cdot) > 0$ , so for-profits charge higher penalties than do mutuals.

Now consider the monopolist's choice of base price. The monopolist solves the following problem.

$$(9) \quad \max_p \left[ 1 - \frac{p + \hat{p}^*(\delta)}{\bar{v}} \right] \delta [p + \hat{p}^*(\delta)] - \psi(\hat{p}^*(\delta))$$

The first order condition for this problem, which implicitly defines  $p^*(\delta)$ , is:

$$(10) \quad -\frac{1}{\bar{v}} \delta [p + \hat{p}^*(\delta)] + \left[ 1 - \frac{p + \hat{p}^*(\delta)}{\bar{v}} \right] \delta = 0$$

Applying the implicit function theorem, we have that the sign of  $p^*(\delta)$  is the same as the sign of:

$$(11) \quad -\frac{1}{\bar{v}}[p + \hat{p}^*(\delta) + \delta \hat{p}'^*(\delta)] + 1 - \frac{p + \hat{p}^*(\delta)}{\bar{v}} - \delta \frac{1}{\bar{v}} = -\frac{1}{\bar{v}}[\delta \hat{p}'^*(\delta)] - \delta \frac{1}{\bar{v}}$$

where the equality follows from substituting in the first order condition and which is unambiguously negative. Since  $p^*(\delta) < 0$ , we have the result that the base price charged by a for-profit monopolist is less than the base price charged by a mutual monopolist.

**2.3. Competition.** Now consider the case with free entry of firms into banking.

**2.3.1. Equilibrium concept.** Following Rothschild and Stiglitz (1976), a long-run competitive equilibrium will be a set of contracts for each firm type (i.e., for-profits and mutuals) such that, when consumers choose the contract that maximizes their expected utility with rational (i.e., correct) expectations about each contract's penalties, (1) each equilibrium contract satisfies penalty optimality for the firm type that offers it; (2) all equilibrium contracts make nonnegative expected profits; and (3) there is no contract outside the equilibrium set such that, if it were offered, it would attract customers, make a nonnegative profit, and satisfy penalty optimality for some firm type. As usual, each equilibrium contract will make zero expected profits given free entry and perfect competition. In what follows, we ignore any contracts that if offered would attract no customers. Below we consider first competitive equilibria in which only for-profit banks can enter and compete in the market, and then consider competitive equilibria in which mutual banks can enter and compete with for-profits.

It will be useful in what follows to define a long-run per-customer profit function  $\pi(\mathbf{p})$ . This function is

$$(12) \quad \pi(\mathbf{p}) = p + [1 - F(\hat{p})]\hat{p} - \psi(\hat{p})$$

Formally, our equilibrium concept is as follows.

**Definition 2.** A competitive equilibrium is a set of for-profit contracts  $P_{fp}^* \subset \mathbb{P}$  and, if mutuals are allowed to enter, a set of mutual contracts  $P_m^* \subset \mathbb{P}$  (with the set of all equilibrium contracts denoted  $P^* \equiv P_{fp}^* \cup P_m^*$ ), such that

- (1) For all  $\mathbf{p}^* \in P^*$ ,  $\mathbf{p}^*$  satisfies penalty optimality
- (2) Nonnegative profits: for all  $\mathbf{p}^* \in P^*$ ,  $\pi(\mathbf{p}^*) \geq 0$
- (3) Free entry: There does not exist a  $\mathbf{p}' \in \mathbb{P}$  such that
  - (a) There exists a customer type  $\tilde{c}$  that strictly prefers  $\mathbf{p}'$  to all contracts in  $P^*$
  - (b)  $\mathbf{p}'$  satisfies penalty optimality either for a for-profit bank or, if mutuals are allowed to enter, for a mutual bank
  - (c) Nonnegative profits:  $\pi(\mathbf{p}') \geq 0$

2.3.2. *Equilibrium with only for-profit banks.* Suppose that only for-profit banks can enter. We now have the following result.

**Proposition 2.** *There is a unique competitive equilibrium with for-profits with a single equilibrium contract given by  $P_{fp}^* = \{(-[1 - F(\hat{p}_{fp})]\hat{p}_{fp} + \psi(\hat{p}_{fp}), \hat{p}_{fp})\}$ .*

With only for-profit banks competing, the equilibrium involves pooling on a single contract involving a high penalty and low base price. Consumers who are subject to self-control problems (i.e., who have high  $c$ ) thus subsidize banking services for the unbiased (i.e, those with low  $c$ ), who receive services at below cost.

The intuition behind the result that for-profit banks do not separate customer types into different contracts is as follows. Suppose a bank offered a higher base price and an implicit promise of lower penalties to attract sophisticated and paranoid consumers. Only sophisticated and paranoid consumers would be interested in such a contract, since both naive and unbiased consumers care only about the base price. But penalty optimality implies that this alternative contract would have the *same* penalty as for the equilibrium contract, and thus would make all consumers worse off.

The inability of for-profit banks to sort customers into different contracts is thus due to a commitment problem. If instead there were some sort of commitment device for for-profit banks (say via reputation) then a sorting equilibrium could potentially exist with only for-profit banks.



2.3.3. *Equilibrium with for-profit and mutual banks.* Suppose now mutual banks can enter and compete with for-profit banks. We now have the following result:

**Proposition 3.** *There is a unique competitive equilibrium with for-profits and mutuals in which:*

- (1) *There is a single contract offered by for-profits,  $(-[1 - F(\hat{p}_{fp})]\hat{p}_{fp} + \psi(\hat{p}_{fp}), \hat{p}_{fp})$  and a single contract offered by mutuals,  $(-[1 - F(\hat{p}_m)]\hat{p}_m + \psi(\hat{p}_m), \hat{p}_m)$ .*
- (2) *For-profits charge a higher penalty  $\hat{p}_{fp} > \hat{p}_m$ , and a lower base price  $p_{fp} < p_m$ , than do mutuals.*
- (3) *There exists a  $\tilde{c}^* \in (\hat{p}_m, \hat{p}_{fp})$  such that consumers with  $\tilde{c} < \tilde{c}^*$  prefer to use for-profit banks and consumers with  $\tilde{c} > \tilde{c}^*$  prefer to use mutuals.*

In an equilibrium with mutuals and for-profits competing, consumers with relatively low  $\tilde{c}$  prefer to obtain an account at for-profits rather than mutuals. These consumers do not expect to be hit with penalties, since they believe their cost of avoiding penalties is low, and so find for-profits' low base prices and high penalties attractive. Some of these consumers, however, are naive and have high true cost of avoiding penalties, and as a result incur the penalty. Thus, naive consumers with self-control problems subsidize unbiased consumers at for-profits.

In contrast, consumers with high  $\tilde{c}$  avoid for-profits, since they fear being hit with large penalties (or incurring large costs to avoid getting hit with penalties). Those who also have high  $c$  are subject to a self-control problem but are sophisticated about it and use mutuals to avoid paying the high penalties at for-profits. Paranoid consumers with high  $\tilde{c}$  but low  $c$  mistakenly fear the high penalties at for-profits, but would be better off if they switched to for-profits and enjoyed the subsidy from naive consumers.

2.4. **The effect of mutuals.** The equilibrium with mutuals competing with for-profits results in different outcomes for consumers than the competitive equilibrium with just for-profits. In particular, mutuals can result in an efficient expansion of utilization of financial services, less cross-subsidization of unbiased consumers by consumers with self control problems, and more efficient late payment behavior. We also consider in this section the situation in which, contrary to our

assumptions in the model, consumer biases result in consumption of services by consumers who value them at less than their cost and whether mutuals offer a potential solution to this problem.

2.4.1. *Underutilization of financial services.* Recall that we assumed that all consumers value account services at greater than their cost of production. While stylized, this assumption seems plausible as an approximation to the first best for many financial services, including credit cards and deposit accounts. However, with only for-profit banks competing, a consumer will obtain an account if and only if

$$(13) \quad v > p_{fp} + \min(\hat{p}_{fp}, \tilde{c})$$

For some consumers with high  $\tilde{c}$  and relatively low  $v$ , this condition fails. These consumers have a modest valuation of account services, and perceive a high cost of penalties, and consequently stay out of the financial services market despite the negative base price.

In contrast, with mutual banks competing with for-profits, a consumer will obtain an account if and only if

$$(14) \quad v > \min[p_{fp} + \min(\hat{p}_{fp}, \tilde{c}), p_m + \min(\hat{p}_m, \tilde{c})]$$

The right hand side of (14) is weakly lower than the right hand side of (13), and strictly lower for consumers with sufficiently high  $\tilde{c}$ . The result is that more consumers obtain an account when mutuals compete with for-profits than when only for-profits offer financial services.

2.4.2. *Overutilization of financial services.* Suppose instead that there are some consumers who value the service at less than their social costs. For example, consider a consumer who should not take out a mortgage because she will likely default, which results in high social and private costs. Consumer naivete about their biases can result in *overconsumption* of the service in such a situation. In terms of the model, we can have  $v > p + \tilde{c}$  so that the consumer values the service at greater than her perceived cost but  $v < p + \tilde{p}$ ,  $c > \hat{p}$ , and  $v < c$  so that the consumer underestimates her cost of avoiding the high penalty and is inefficiently utilizing the service. In the consumer loan market, such behavior by firms is often referred to as “predatory lending”.

In our model, the introduction of mutuals cannot address overutilization. While such consumers would face higher perceived prices at mutuals, for-profits continue to offer low base prices and attract such consumers. Predatory lending can thus persist in a market with mutuals competing with for-profits. Our model illustrates the limitations of mutuals in curing inefficiencies that arise from consumer biases.

However, if we change some assumptions of the model, mutuals can ameliorate this problem of overutilization through three channels. First, while the introduction of mutuals does not change the pricing decisions of for-profits in the model due to the assumption that  $c$  and  $\tilde{c}$  are distributed independently, if  $c$  and  $\tilde{c}$  are positively correlated, then competition from mutuals can result in lower penalties at for-profits. Consumers sort between mutuals and for-profits based on their beliefs about their cost of avoiding penalties,  $\tilde{c}$ . If  $c$  and  $\tilde{c}$  are positively correlated, then the introduction of mutuals would result in lower average  $c$  at for-profits, which would reduce their equilibrium penalties, since fewer of their customers would pay them. This reduction in penalties would be accompanied by a rise in base prices in order for for-profits to break even. Through this effect on the contracts offered by for-profits, mutuals could in theory reduce the number of consumers who inefficiently consume financial services. Such an effect seems likely to be relatively modest, however.

Second, as we discuss in Section 2.5, mutuals have an incentive to educate consumers about their biases. The introduction of mutuals can thus result in the “sophisticating” of some consumers who otherwise would fall victim to predatory lending.

Third, while in the model consumers sort between mutuals and for-profits solely on  $\tilde{c}$ , in reality there are substantial search costs and other factors that determine where consumers bank. Thus, a consumer who, if she went to a for-profit, would inefficiently utilize the financial service may instead bank at a mutual and, faced with a higher base price, be dissuaded from using the service.<sup>10</sup>

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<sup>10</sup>“Stickiness” in where consumers bank would also have an effect on other types of consumers. For example, sophisticates may fail to take advantage of mutuals when they should if there are large search costs.

2.4.3. *Cross-subsidization.* When only for-profits offer accounts, consumers with  $c > \hat{p}_{fp}$  subsidize consumers with  $c < \hat{p}_{fp}$ . When mutuals compete with for-profits, the degree of cross-subsidization is reduced. Consumers with relatively high  $\tilde{c}$  obtain accounts at mutuals and pay lower penalties, resulting in less redistribution between consumers. At mutuals, consumers with high  $c$  do better, and consumers with low  $c$  do worse, than they do at for-profits.

2.4.4. *Penalty-incurring behavior.* In the first-best, all consumers with  $c$  greater than 0 pay late. With only for-profits offering accounts, however, only consumers with  $c > \hat{p}_{fp} > 0$  will pay late, resulting in inefficiency. In contrast, with mutuals competing with for-profits, consumers who bank at mutuals will pay late if  $c > \hat{p}_m < \hat{p}_{fp}$ , reducing this distortion.

2.5. **Education of consumers by firms.** A natural question is whether firms can win customers through debiasing their competitors' customers by educating them about the hidden prices charged by firms. Gabaix and Laibson (2006) consider this possibility by allowing firms to costlessly convert some fraction of naive consumers into unbiased consumers. However, they show that firms are subject to a "curse of debiasing": debiased customers prefer to continue to patronize firms with high penalties since debiased consumers can now avoid those penalties and enjoy a subsidy from the remaining naive customers at firms with high penalties. Consequently, competition may not provide an incentive for firms to educate consumers about (easily avoidable) hidden penalties and the like.

A similar "curse of sophisticating" occurs for for-profits in our model, but does not occur for mutuals and nonprofits. While the self-control problem that results in consumers paying late in our model seems unlikely to be easily cured,<sup>11</sup> consumers' knowledge of their self-control problem seems plausibly changeable. Thus, we consider whether firms would choose to educate consumers about their self-control problem and offer an informal treatment here. Suppose firms could educate consumers, changing their  $\tilde{c}$  so that their  $\tilde{c} = c$  but cannot target consumers with particular  $\tilde{c}$  or  $c$ , since they do not observe consumers' types (as in the model above). Furthermore, suppose

<sup>11</sup>Agarwal, Driscoll, Gabaix, and Laibson (2008) show that in the month following being charged a fee on their credit card account, consumers are 40% less likely to incur another fee than their baseline probability. However, their likelihood of incurring a fee increases as the period since they last incurred a fee increases. This serves as evidence that it is difficult for many consumers to correct the biases that lead them to incur penalties.

that firm managers of all types of firms *ceteris paribus* would like to serve more customers (for example, suppose the market is not perfectly competitive).

For-profit firms would prefer not to educate naive consumers with high  $c$  but low  $\tilde{c}$  about their bias, since then they may switch to banking at a mutual. However, for-profit firms may want to educate paranoid consumers with a low  $c$  and high  $\tilde{c}$  as they may then switch to for-profits. In contrast, mutuals have an incentive to educate naive consumers with high  $c$  and low  $\tilde{c}$  in order to win over customers from for-profits. But mutuals and nonprofits would not want to educate their paranoid customers with low  $c$  and high  $\tilde{c}$ , as they may then defect to for-profits. Since firms cannot target particular types of consumers, whether a firm has an incentive to educate consumers depends on the distribution of types in the population. As the fraction of paranoid consumers gets larger, the incentive of for-profits to educate consumers increases while the incentive of mutuals to educate consumers decreases. Similarly, as the fraction of naive consumers gets larger, the incentive of for-profits to educate consumers decreases while the incentive of mutuals to educate consumers increases.

In our model above,  $c$  and  $\tilde{c}$  are independent and identically distributed, resulting in equal fractions of paranoid and naive consumers in the population. However, a more realistic assumption might be that  $c$  and  $\tilde{c}$  are positively correlated, and the distribution of  $c$  first order stochastically dominates the distribution of  $\tilde{c}$  so that on average consumers underestimate the extent of their self-control problems. We think it is likely that naive consumers are much more common than paranoid consumers. This analysis would then suggest that mutuals and non-profits have greater incentive than for-profits to educate consumers about their likelihood of incurring fees.

This reasoning depends crucially on our definition of consumer education as an action that sets  $\tilde{c} = c$ . If we defined education differently (for instance, as an action that reveals  $\hat{p}$ ) then this reasoning would not hold. It is a central assumption of this paper that contracts are inherently difficult to understand and that disclosure, though it might alert consumers to particular prices and contract features, cannot convincingly inform consumers that *no other* important prices or features lie buried in fine print. For this reason, even with disclosure  $\hat{p}$  cannot be fully known *ex ante*.

### 3. EVIDENCE: CONTRACT TERMS

We present three distinct types of evidence for our theory. First, we show that the contract terms offered by mutuals and for-profits follow the patterns predicted by our model. Second, in Section 4, we present evidence that consumers sort into firms with different ownership types according to their expectations about the likelihood of triggering penalties, as predicted by our model. Third, in Section 5 we present evidence that for-profits shroud fees more commonly than mutuals do.

Across a variety of markets, mutuals offer very different contracts than for-profits. In particular, mutuals offer higher introductory and base prices but lower penalty prices than for-profits.

**3.1. Empirical framework.** Every time a firm’s manager chooses a new contract offer, that manager’s optimal choice is affected by the ownership structure of the firm. To identify the effect of ownership we estimate the following equation:

$$Y_{cf} = \beta_0 + \beta_1 \mathbf{X}_{cf} + \beta_2 MUT_f + \lambda_f + \epsilon_{cf}$$

where  $Y_{cf}$  is a given term of the contract  $c$  offered by firm  $f$ ,  $\mathbf{X}_{cf}$  is a vector of controls,  $MUT_f$  is an indicator for whether the firm is a mutual,  $\lambda_f$  is a firm-specific error term, and  $\epsilon_{cf}$  is a contract-specific error term. Because of correlation in the error induced by  $\lambda_f$ , we perform all contract-level regressions with errors clustered at the firm level.

**3.2. Credit cards.** Examining a sample of credit cards issued by credit unions and for-profit banks, we find that contracts offered by credit unions differ greatly from contracts offered by for-profits. In particular, for-profit credit cards follow the pattern of low introductory prices and high back-loaded prices documented by Della Vigna and Malmendier (2006), while credit union credit cards have a much flatter profile of prices. As a preview of our results, the difference can be seen visually in Figure 2, which compares means of Introductory APRs, Purchase APRs, and Penalty APRs for the cards in our sample.

In the market for credit cards, contracts are take-it-or-leave-it offers designed by the card issuer.<sup>12</sup> Credit card issuers include for-profits, such as commercial banks, and mutuals, such as credit unions.<sup>13</sup> Though for-profits make up the bulk of credit card lending by volume in the United States, credit unions constitute a large fraction of lenders in the market. According to *The Card Industry Directory* (2006), 58 of the top 100 credit card lenders in the country by lending volume were credit unions.

3.2.1. *Data.* Our credit card contract data come from Bankrate.com, a company that compiles rate and fee information for the banking industry. Bankrate performs a weekly survey of several hundred credit cards, including all of the largest issuers. We obtained the Bankrate credit card survey for the first week of July, 2008.

We eliminated duplicate observations, as well as observations with missing contract terms.<sup>14</sup> In addition, we eliminated a small number of cards that appeared to be payment cards rather than credit cards.<sup>15</sup> We were left with 310 distinct cards, issued by 65 distinct lenders. Of those cards, 76 were issued by credit unions, and of the 65 lenders 19 were credit unions. Table 1 contains information on the size and nature of the dataset after each round of elimination. Table 2 contains the name of every credit card issuer in the final dataset.

3.2.2. *Analysis.* A simple comparison of mean contract terms, presented in Table 3, shows that for-profit and mutual pricing behavior is quite different. The top panel of the table compares introductory rates. For-profit issuers are far more likely than credit unions to offer introductory

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<sup>12</sup>Although the card network (e.g. Visa, MasterCard) influences contract terms such as the interchange fee, for the purposes of this paper, all relevant contract terms are set by the issuer. The interchange fee is the percentage of the sale that goes from the merchant directly to the issuer and acquirer. This fee affects the merchant-issuer relationship and has no direct effect on the borrower-issuer relationship.

<sup>13</sup>Credit unions clearly fit our definition of mutuals. They are owned by their member-depositors, who exert control over their managers. Managers are supposed to distribute any residual profits back to member-depositors via favorable rates. However, due to agency costs, control may be imperfect and managers may act partially in their own self-interest.

<sup>14</sup>The Bankrate dataset had many duplicated observations: multiple re-listings of an identical credit card. For this reason, we eliminated all contracts that did not differ from any other contract by the name of the issuer or any features of the card. The Bankrate data also included several cards with missing contract terms. We excluded a card if it was missing any contract terms.

<sup>15</sup>Our criterion for identifying payment cards was a listed non-introductory purchase APR of 0%. Payment cards fill a very different niche than credit cards (for instance, it is impossible to borrow beyond the one-month billing cycle with a payment card) and so we eliminated them from the sample.

rates that are lower than their standard rates, and the mean difference in rates<sup>16</sup> is significant. In the terminology of our model, these introductory, highly-advertised rates would be components of  $p$ .

In contrast, the bottom panel compares penalty contract terms. These terms are only relevant in the case of a late payment or other misbehavior by the borrower, and in the terminology of our model would be components of  $\hat{p}$ . Credit union credit cards have far lower penalty APRs<sup>17</sup> than do for-profit cards, as well as lower late fees and over-the-limit fees. In addition, they have longer grace periods.<sup>18</sup> If a consumer has a significant chance of making a late payment or going over the credit limit, that consumer will pay less with a credit union credit card.

The middle panel is a residual category of contract terms. These are “standard” contract terms in the sense that they apply in non-introductory, non-penalty situations. However, they are of varying levels of salience, and some only apply when a customer takes a specific action (e.g. takes a cash advance). It is not *a priori* clear whether they should be considered components of  $p$  or  $\hat{p}$ . We discuss each in turn.

Rewards programs, such as air miles or cash-back programs, make a strong claim to inclusion in  $p$ . They are very salient to customers choosing between cards, and they are often highly advertised. They are also one of the major sources of value for card users. Consistent with our model, we find that 49% of all for-profit cards have rewards programs, while only 17% of credit union cards do. Unfortunately we have no data on the relative generosity of the programs.

Annual fees and purchase APRs are also relatively salient to consumers, and are perhaps more easily considered part of  $p$  than  $\hat{p}$ . The evidence here contradicts our model, with credit union unions offering significantly lower rates for both. The annual fee result, however, is driven by a few outliers (the median annual fee for both credit union cards and for-profit cards is \$0) and is small in

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<sup>16</sup>All rates are calculated for the entire sample, unconditional on offering an introductory or penalty APR distinct from the standard purchase APR. Differences are also significant and in the same direction for rates calculated conditional on offering distinct introductory and penalty APRs, as in Figure 3.

<sup>17</sup>Penalty APRs are APRs that are triggered following a late payment on the current card or, in the case of “universal default” provisions, on any other card owned by the borrower.

<sup>18</sup>The grace period is the amount of time a credit card user can wait without paying a balance before it is considered late.



dollar terms when compared with other contract features.<sup>19</sup> The fees and rates associated with cash advances and non-introductory balance transfers are generally less salient and seem more properly considered components of  $\hat{p}$ . These follow the expected pattern and are significantly lower for credit unions.

Next we perform the same analysis using a set of controls. One potential concern with a simple comparison of means is that credit unions and for-profits may systematically differ on dimensions that affect contract terms but are not direct consequences of ownership type, inducing omitted variables bias. The best candidate for such a dimension is firm size: credit unions have on average much lower lending volume than for-profits. Though it is not clear how size would affect optimal contract terms,<sup>20</sup> we nonetheless perform regressions controlling for the log of lending volume, taken from *The Card Industry Directory* (2006).<sup>21 22</sup>

A slightly different concern is that ownership type may affect contract terms via channels other than the one envisioned in our model. In the model, firm ownership has a direct effect on contract terms through the incentives it creates for firm management. The difference in contract terms then induces sorting among customers according to bias type.<sup>23</sup> Hence the model predicts that for-profit and mutual patrons may look somewhat different on observables, but this sorting is the consequence, not the cause, of the difference in contracts.

An alternative story is that firm ownership type is directly associated with customer composition, and that composition-based differences in demand drive differences in contracts. Credit unions and for-profit issuers have different customer selection processes. For instance, credit unions have

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<sup>19</sup>Figures from Agarwal, Driscoll, Gabaix, and Laibson (2008) suggest that the average credit card holder pays approximately \$121 per year in fees (late fees, over the limit fees, and cash advance fees) not including interest later accrued on such fees. This amount alone swamps annual fees, and it does not include what is perhaps the largest source of credit card penalty income: Penalty APR rates.

<sup>20</sup>Unlike production choices that involve fixed capital investments, contract terms seem relatively unconstrained by size. Since most accounting is done electronically, more complex contracts are not appreciably more difficult to administer than simpler ones.

<sup>21</sup>This source has data for the 250 largest lenders in the United States. Lenders in the Bankrate sample but not in the top 250 were given a rank of 251 and a lending volume equal to that of the 250th lender.

<sup>22</sup>Alternative specifications, such as raw volume or volume quintiles, produced very similar results to log volume.

<sup>23</sup>Note that in the model, there is no feedback from bias sorting to contract type. Customers sort according to  $\tilde{c}$ , while firms design contracts in response to the distribution of  $c$  they face. Due to the independence of  $\tilde{c}$  and  $c$ , sorting does not alter firms' optimal contract. However, in a modified version of the model with  $\tilde{c}$  and  $c$  correlated, feedback from sorting to contract terms is possible.

membership criteria that for-profit issuers do not. If for-profit customers happen to demand very different contracts than credit union customers do, and if we don't fully control for differences in customer characteristics in our regressions, then we may erroneously ascribe differences to the incentives created by ownership type which are actually due to differences in consumer demand.

We do not believe that the contract differences we observe could plausibly be driven by demand differences alone. The first reason is that our results are unaffected by the inclusion of all available controls for customer type. Though the Bankrate data do not contain rich controls, and contain no direct information on borrowers, we do have data on card type (Gold, Platinum, Student, Business, and Secured) which is effectively a proxy for borrower characteristics such as creditworthiness.<sup>24</sup> Table 4 summarizes the differences between for-profit banks and credit unions along the above dimensions. The two types of firm do indeed offer a different mix of card types. In addition, for-profits have much larger mean lending volume than credit unions because all of the very largest lenders in the country are for-profit; however, they have lower average rank by volume because the Bankrate sample also contains a number of very small for-profit lenders.

Tables 5-7 perform regressions controlling for card type dummies and log lending volume. We find that the overall pattern of coefficients is unchanged by the controls. For instance, adding the controls changes the coefficient on credit union from 2.64\*\*\* to 2.67\*\*\* with Introductory APR as the dependent variable, from -1.52\*\*\* to -1.03\* with Purchase APR, and from -11.16\*\*\* to -9.29\*\*\* with Penalty APR. In sum, controlling for all observables available to us does not change our results.

In order to further investigate the possibility that our contract differences may be demand-based, we use alternative data sources to directly investigate whether people who use for-profit credit cards are observably different from those who use credit union credit cards. In order for sorting to be the driving force for the large differences in contracts we observe we would expect to see substantial differences in credit union and for-profit customers.

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<sup>24</sup>Though the credit card industry has no fixed definition of Gold and Platinum cards, the terms are generally used to denote cards aimed at high-FICO borrowers. Conversely, Secured cards are marketed towards credit-compromised individuals looking to rebuild their credit scores. The definitions of Student and Business cards are self-explanatory.

Table 8 presents data from the Survey of Consumer Finances merged from 1989 to 2004. We do find some small but statistically significant demographic differences between credit union and for-profit credit cards. Credit union card users are on average slightly younger, more likely to be male, and more likely to have graduated from high school. There is no significant differences between groups in their proportion white, black, or college graduate. The only demographic category in which there is an appreciable difference between the groups is income: households served by credit unions make, on average, \$11,134, or 16% less per year than do households with for-profit credit cards. The lower panel examines two observable characteristics that we expect do drive selection into credit unions. We find that people who use credit union cards are more likely to be employed than users of for-profit cards, and are specifically more likely to be employed in the public sector. This is consistent with the fact that many credit union membership criteria are employer-based, which may explain the income differential. Employment-based selection is only a concern if we believe selection between, say, public and private sector employment is correlated with demand for up-front fees versus back-loaded fees. We believe that most such employment- and criteria-based selection is largely orthogonal to consumers' demand for particular contract terms.

On the whole, we think it is implausible that these modest differences in customer composition explain even a small part of the large differences between for-profit and credit union credit card contracts. Without a compelling mechanism by which criteria-based sorting would be correlated with demand for different contract types, and without evidence that strong sorting on observables actually does take place, it is unlikely that the stark contract differences we find in the data are caused by sorting. They are far more plausibly caused by differences in managerial incentives due to firm ownership.

Another way to test whether the observed contract differences stem from factors consistent with our theory is to examine whether managers of for-profit and credit union issuers do indeed face different incentive schemes. Examining the 2005 America's Community Bankers Compensation Survey, Mazur (2005) finds the highest-paid employee of stock-owned savings banks was paid on average \$237,102, 45% of which was in bonus and profit-sharing payments. In contrast, among mutual banks, the highest-paid employee was paid on average \$178,726, only 24% of which was in

bonus and profit-sharing payments. Similarly, the Credit Union National Association 2004-2005 CEO Total Compensation Survey found that the average credit union CEO cash compensation was \$189,432 of which 14.5% was in bonus and incentive payments (Molvig, 2005). It thus appears that investor-owned banks do indeed use higher-power incentive contracts to compensate their top executives than do mutuals, as our theory predicts. We think these differences are the best explanation for the observed differences in contracts between for-profit issuers and credit unions.

*3.2.3. Additional robustness checks.* So far in the analysis we have treated each card as a separate observation. The philosophy behind this is that each set of contract terms is the result of decisions made by a manager. The ownership structure of the firm has an opportunity to influence those decisions each time a new contract is created. However, we do find in the Bankrate data that cards issued by the same firm are more likely to resemble each other than cards issued by other firms. In order to ensure that our results were not driven by the few issuers with the most cards, we reduced our dataset from a card-level dataset of 310 observations to an issuer-level dataset of only 65 observations.<sup>25</sup> To do this we calculated issuer averages for each contract dimension. Table 9 reproduces Table 3 with this issuer-level dataset. Tables 10-12 perform issuer-level analysis with the same controls. Though a few coefficients become insignificant, the results are similar to the card-level analysis. Importantly, the coefficient on *CU* remains positive and significant in all Introductory APR regressions, and negative and significant in all Penalty APR regressions.

One alternate explanation for our APR results is that there is a fixed cost to introducing complex contract features such as introductory and penalty APRs, and credit unions, which are smaller on average than commercial banks, do not find it cost-effective to do so. First, we note that differences between credit unions and for-profits persisted even in regressions that controlled for firm lending volume. Second, Figure 3 shows that even when we restrict the sample to only banks with introductory and penalty APRs distinct from their purchase APRs, it is still the case that credit unions offer a flatter rate profile. Hence, the results cannot be driven solely by contract term fixed

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<sup>25</sup>This is essentially a reweighting using all the original data but weighting issuers equally no matter how many different contracts they offer.

costs. Additionally, it seems unlikely that such fixed costs would be large enough to account for the differences.

As a final robustness check, we use an alternative sample of contract terms collected by the Woodstock Institute, a consumer advocacy group, in 2004. Though their dataset contains only 20 cards, we used their data to construct Table 13, which is analogous to our Table 3. The results are remarkably similar to our own. The main difference is that their data show an even greater difference between for-profit introductory APRs (mean 2.9%), and credit union introductory APRs (mean 11.8%) than our own do. Though the dataset is small and was collected by an advocacy group, we find some validation in the fact that a second independently collected dataset, from a different year, strongly confirms our findings.

**3.3. Deposit accounts.** We next consider deposit account contracts. In our sample, for-profit banks have higher penalties associated with their deposit accounts (checking and savings) than do credit unions. However, on net, the results provide only mixed evidence for our theory. Unlike in the case of credit cards, we are not able to clearly identify which contract components constitute the “base price” of a deposit account, and our best candidate (interest rate) appears to be more favorable at credit unions than at for-profits, contrary to our theory.

**3.3.1. Data.** Using figures provided to us by the Government Accountability Office (GAO), constructed from data collected by Moebs Services and Informa Research Services, we compared the average charges levied for a variety of deposit account transactions by credit unions and by for-profit banks. The Moebs tables are constructed from 37,080 observations of banks and credit unions collected via telephone surveys over the years 2000 to 2007. The sample of institutions is statistically representative of the nation as a whole. Informa tables are constructed from 5,925 observations collected over the years 2001 to 2006. Informa focused on larger banks and credit unions only, and the sample was not designed to be statistically representative.

The GAO was contractually obligated not to share the underlying data with us, but it did provide tables with means for the relevant subgroups. Because we do not have access to the underlying

datasets we cannot provide standard errors. However, the very large sample sizes suggest that the differences we present are statistically significant.

3.3.2. *Analysis.* Table 14 shows that for-profit bank fees exceed credit union bank fees across a wide variety of transactions.<sup>26</sup> The only fee for which credit unions consistently charge more is the “Return of Deposited Item” fee, which is charged when a customer attempts to deposit a bad check written by someone else. Such fees are charged relatively rarely (in comparison to, say, a Non-Sufficient Funds Fee), and they are triggered by the malfeasance of someone other than the customer—still, it is unclear why this particular fee should fail to follow the pattern.

Likely candidates for  $\hat{p}$  components, such as Non-Sufficient Funds Fees and Overdraft Fees, show a clear pattern of being higher at for-profits than credit unions. Monthly maintenance fees, which are only triggered when the balance falls below a pre-set threshold, are also properly part of  $\hat{p}$  and show the expected pattern. However, it is not clear what the components of  $p$  are for deposit accounts. None of the prices tracked in the GAO data appear to be a good fit for  $p$ . Additionally, it appears that credit unions pay slightly higher interest rates than for-profits on interest-bearing accounts. Interest rates were not tracked in the GAO survey, but a 2008 study conducted by Data-trac on behalf of the National Credit Union Association found that credit unions paid an average of 0.52% on interest checking accounts, while for-profits paid 0.42%. Credit unions paid 0.74% on regular savings accounts, while for-profits paid 0.51%.<sup>27</sup>

It is difficult to know, however, what other components of  $p$  might be missing from our tables. Customers often cite the convenience of finding in-network ATMs as an important factor in deciding where to bank, and for-profit banks tend to be larger and have more extensive ATM networks. We are also not able to capture possible differences in the inducements (such as free tote bags, clock radios, etc.) offered by the two types of firm as rewards for opening an account. Given that for-profit banks successfully compete with credit unions to attract customers, it is likely that they

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<sup>26</sup>The Moebs and Informa data had slightly different sampling strategies (Moebs was designed to be nationally representative, while Informa was not) which may explain the differences in the point estimates.

<sup>27</sup>Complicating matters, interest rates on deposit accounts are also a major channel by which credit unions pay dividends to their member-shareholders (see Emmons and Schmid (2001)). High interest rates on deposits for credit unions may be partially due to these payments.

offer superior terms on at least some component of their deposit account contracts. We have data to compare the magnitude of some fees, but not to fully capture all possible  $p$  components.

3.4. **Mutual funds.** There are very few major cooperatively-owned mutual fund managers in the U.S. today, so analysis of this market by ownership type is necessarily anecdotal. Still, we feel that the evidence that exists is highly suggestive.

Mullainathan, Shleifer, and Schwartzstein (2008) argue that firms manage to charge high fees for mutual fund management because investors are coarse thinkers, and co-categorize mutual fund investment with other types of professional services, for which high fees may be a signal of high quality. However, low-fee index funds consistently outperform their high-fee intensively managed counterparts, once fees themselves are taken into account. Use of a high-fee managed fund business model can be seen as a way in which financial companies profit from the coarse thinking of their customers, to those customers' disadvantage.

Using data from the Center for Research on Security Prices on mutual fund expense ratios, we find that among the largest mutual fund management companies (defined as managing  $> 50$  funds), the one with the lowest expense ratio is Vanguard (0.0018), a mutual. The mean expense ratio for this group of the 82 largest management companies is 0.0126, seven times higher. Similarly, Vanguard has the lowest 12b-1 fees of the group.<sup>28</sup>

#### 4. EVIDENCE: CUSTOMER SORTING

In the previous section we argued against customer sorting as the driving force behind the differences between contracts offered by for-profits and mutuals. However, our model implies that differences in contracts should themselves induce a particular type of sorting. Low  $\tilde{c}$  consumers (naives and the unbiased) should be attracted by for-profit contracts since they are not concerned about being subject to penalties, while high  $\tilde{c}$  consumers (sophisticates and paranoids) should be attracted by mutuals. Furthermore, it is consumer *perceptions* of their vulnerability to penalties ( $\tilde{c}$  in the model), not their true vulnerability ( $c$  in the model), that determines consumer's choices between for-profits and mutuals.

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<sup>28</sup>The 12b-1 fee is often criticized as a covert way to raise prices on investors.

It is difficult to test for such sorting because it is difficult to measure consumer biases and consumer perceptions of their biases. However, we offer several pieces of evidence suggesting that such perception-based sorting does indeed take place.

**4.1. Customer behavior and attitudes.** One approach to testing our sorting theory is to use survey-based measures of consumers' concern about penalties to proxy for  $\tilde{c}$ , and survey-based measures of their actual behavior to proxy for  $c$ . We do this using merged data from the Survey of Consumer Finances 1989-2004 and test whether  $\tilde{c}$ , and not  $c$ , determines credit union use.

We proxy for  $c$ , the cost of avoiding penalties, using outstanding credit card balances, collapsed to a binary variable. If the respondent ran a non-zero balance in the month prior to survey,  $CarryBal_i$  is 1.  $CarryBal_i$  is 0 if the balance was zero, and missing if the respondent does not hold a credit card. Credit card balances are a noisy measure of  $c$ , since many factors contribute to whether an individual runs a balance in a given month. Still, we believe  $CarryBal_i$  carries meaningful information. It is negatively correlated with both income and education, as would be expected of  $c$ , and is a form of direct evidence that penalty rates are indeed relevant for the cardholder. 54.3% of cardholders in the data carry a non-zero balance.

We proxy for  $\tilde{c}$ , the consumer's expectation of the cost of avoiding penalties, using the response to the following question: "What is the most important reason your family living here chose the institution that you did for your main checking account?" The respondent is provided with, depending on the year of the survey, up to 31 choices.  $WantLowFee_i$  is coded as a 1 if the respondent chose "Low fees or service charges" as the most important reason for choosing their checking account, and 0 if the respondent chose any other response as the most important. We consider this a proxy for  $\tilde{c}$  because fees are unimportant unless the account holder believes there is a positive probability of incurring them. A person who considers low fees the most important reason to choose a checking account must put substantial weight on the likelihood of paying those fees. 15.4% of checking account holders in the data chose low fees and service charges as their most important reason.



We first estimate a probit model of the form

$$(15) \quad CUCheck_i = \alpha_0 + \alpha_1 WantLowFee_i + \alpha_3 \mathbf{X}_i + \epsilon_i$$

where  $CUCheck_i$  is an indicator for whether the household has its primary checking account at a credit union, and  $\mathbf{X}_i$  is a vector of controls including sex, age, age<sup>2</sup>, race, education, income, industry, occupation, and year of survey. The results, reported in column (1) of Table 16, confirm that people concerned about fees are indeed more likely to hold a checking account at a credit union than those who do not.

One possible concern about this result is that the variable  $WantLowFee_i$  might be subject to reverse causality. The question asks specifically about reasons for opening checking accounts. We know from Section 3.3 that credit unions have lower fees than for-profits on their checking accounts. It seems possible that banking at an institution with low fees, which might be advertised in the bank's branches, might cause one to cite low fees as the most important reason for choosing the account.

We can investigate this by turning to credit card usage. We estimate probit models of the form

$$(16) \quad CUCC_i = \alpha_0 + \alpha_1 WantLowFee_i + \alpha_2 CarryBal_i + \alpha_3 \mathbf{X}_i + \epsilon_i$$

where  $CUCC_i$  is an indicator for whether the household has its primary credit card at a credit union. Note that while  $WantLowFee_i$  is based on a question about checking accounts, it seems likely that consumer concern about fees in checking accounts is a decent proxy for consumer concern about fees in other types of financial service accounts. Moreover, reverse causality from  $WantLowFee_i$  to  $CUCC_i$  is less of a concern since the two variables concern different types of financial service accounts. The prediction from our model is that  $\alpha_1$  will be positive, while  $\alpha_2$  will be zero (assuming we have fully captured  $\tilde{c}$  in  $WantLowFee_i$ ).

Column (2) of Table 16 first reports estimates of (16) without  $WantLowFee_i$  and shows that actually carrying a credit card balance has no effect on holding a credit union credit card.<sup>29</sup>

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<sup>29</sup>Without controls it does have a small, positive effect.

Column (3) reports estimates of the full model and shows that  $WantLowFee_i$  is predictive of credit card use while  $CarryBal_i$  remains insignificant. We take this as confirmation that our proxy for  $\tilde{c}$  is an important determinant of selection into credit unions, while our proxy for  $c$  has no effect.

One possible concern is that  $WantLowFee_i$  might be affecting the choice of credit union credit cards indirectly:  $WantLowFee_i$  could cause people to choose credit union checking accounts, and then having a credit union checking account could have a direct effect on choosing a credit union credit card, because it is easy to get a credit card from an institution you already do business with. Thus, in column (4) we add a control for whether the individual also has a credit union checking account. The disadvantage of adding credit union checking as a control is that it is also an outcome, highly correlated with credit union credit cards, and may soak up much of the useful variation in  $WantLowFee_i$ . As expected, the control is highly significant ( $z = 33.55$ ), leaving  $WantLowFee_i$  smaller but still statistically significant.

Columns (5) and (6) perform the same regression as column (3) for the subgroups with and without credit union checking accounts. We find that for those without credit union checking,  $WantLowFee_i$  still has a significant (though smaller) effect on the probability of getting a credit union credit card, while  $CarryBal_i$  still has no effect. For those with credit union checking accounts,  $WantLowFee_i$  is insignificant and  $CarryBal_i$  has, if anything a slightly negative effect.  $WantLowFee_i$  thus has an effect only on the subgroup that does not have their primary checking account at a credit union. One potential explanation for this is that having a credit union checking account determines the choices of most of those households who could be influenced by their  $\tilde{c}$  to use a credit union credit card.

Taken together, the above evidence suggests that proxies for  $\tilde{c}$ , such as perceptions of the importance of fee size, have a larger effect on the probability of choosing a mutual than do proxies for  $c$ , such as whether or not the individual is actually running a debt. We interpret this evidence as supporting the predictions of our theory concerning customer sorting based on their perceived vulnerability to penalties.

4.2. **Customer income.** We next examine the relationship between credit union use and income. Despite their mandate to meet the savings and credit needs of “persons of modest means,”<sup>30</sup> credit union customers are on average somewhat more affluent than for-profit bank customers. Jacob, Bush, and Immergluck (2002) found that in Chicago in 2000, credit unions were more likely to be used by people in the second-highest income bracket (\$60,000-\$70,000) than by those in any other bracket. Similarly, Table 15 presents merged data from the Survey of Consumer Finances 1989-2004 that shows that people in the second-highest income decile (\$86,001-\$125,000 in the 2004 survey) are more likely than others to have their main checking account at a credit union, both conditional on having a checking account at either a for-profit or credit union, and unconditionally.<sup>3132</sup>

Why are credit unions being used most often by the affluent, despite their mandate to target the poor? Although income is at best a rough proxy for the types presented in our model, this evidence is consistent with our model in a world in which the poor are more likely to be naively biased and thus use for-profits, the middle and upper-middle classes are more likely to be aware of their biases and bank at mutuals, and the very rich more likely to be unbiased or, equivalently, to have sufficient wealth cushions to avoid all fees and thus bank at for-profits. This points toward a potential explanation for why credit unions have traditionally failed to meet their mandate to serve persons of “modest means”: if low-income consumers are more likely than others to be naive about their biases, credit unions will have trouble winning them from for-profits.

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<sup>30</sup>In the Credit Union Membership Access Act, Congress found that credit unions “ have the specified mission of meeting the credit and savings needs of consumers, especially persons of modest means.” Pub. L. 105-219, §2, 112 Stat. 913 (1998).

<sup>31</sup>Similar tables can be constructed from the SCF for credit cards issued by credit unions, and for mortgages. The results consistently show peak use in the upper middle income brackets, despite explicit targeting of credit unions to the poor.

<sup>32</sup>Note that the fact that the affluent are more likely than the poor to use credit unions does not contradict the result, presented in Table 8, that credit union users have lower income than for-profit bank users. People in the upper tail of the income distribution use for-profits much more than credit unions, and this raises the mean income of for-profit patrons.

## 5. EVIDENCE: SHROUDING

An additional prediction of our modeling framework is that mutuals will wish to “educate” consumers about their biases, and for-profits will not, so long as naives outnumber paranoids in the population in order to gain market share from for-profits. One possible way to make customers understand their potential for paying penalties is to disclose fees whenever possible.

Consistent with our theory, commercial banks shroud their deposit account fees more often than credit unions do. By federal law both commercial banks and credit unions must provide lists of applicable fees in a form easily accessible by current or potential customers. Formally, institutions must be in compliance with Regulation DD of the Truth in Savings Act (TILA) which requires that depository institutions disclose the fees associated with accounts.<sup>33</sup> According to GAO statistics, between the years of 2002 and 2006 for-profit institutions were cited an average of 0.258 times for violations of disclosure, while their credit unions counterparts were cited an average of only 0.013 times. Though the monitoring body is different for each group (the FDIC monitors for-profits; the NCUA monitors credit unions) the criteria for evaluation are identical and there is no evidence of important differences in monitoring protocol. Furthermore, the NCUA actually conducted more examinations per institution than did the FDIC over this time period according to the GAO report. We see this as evidence that commercial banks are less likely to than credit unions to educate consumers about the possibility of paying penalties.

## 6. CONCLUSION

Firm ownership can be a socially useful device for shaping incentives in domains in which alternative modes of social control, such as regulation and market competition, are ineffective. These domains include markets in which consumer biases result in losses to social welfare. While the evidence we have presented for our theory is confined to financial services markets, we think it is likely that firm ownership plays a similar role in attenuating the incentives of firms to exploit consumer biases in other markets, such as education and health care.

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<sup>33</sup>12 C.F.R. §230.4(b)(4).

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APPENDIX A

**Proof of Lemma 1.** A simple revealed preference argument gets the weak inequality,  $\hat{p}_{fp} \geq \hat{p}_m$ . Dividing through the firm's objective function in (1) by  $\delta$ , we know by definition of an optimum,

$$(17) \quad [1 - F(\hat{p}_{fp})]\hat{p}_{fp} - \psi(\hat{p}_{fp}) \geq [1 - F(\hat{p}_m)]\hat{p}_m - \psi(\hat{p}_m)$$

and

$$(18) \quad [1 - F(\hat{p}_m)]\hat{p}_m - \frac{1}{d}\psi(\hat{p}_m) \geq [1 - F(\hat{p}_{fp})]\hat{p}_{fp} - \frac{1}{d}\psi(\hat{p}_{fp})$$

Rearranging these, we get:

$$(19) \quad [1 - F(\hat{p}_{fp})]\hat{p}_{fp} - [1 - F(\hat{p}_m)]\hat{p}_m \geq \psi(\hat{p}_{fp}) - \psi(\hat{p}_m)$$

and

$$(20) \quad [1 - F(\hat{p}_m)]\hat{p}_m - [1 - F(\hat{p}_{fp})]\hat{p}_{fp} \geq \frac{1}{d}[\psi(\hat{p}_m) - \psi(\hat{p}_{fp})]$$

These in turn imply:

$$(21) \quad \psi(\hat{p}_{fp}) - \psi(\hat{p}_m) \leq \frac{1}{d}[\psi(\hat{p}_m) - \psi(\hat{p}_{fp})]$$

or

$$(22) \quad [1 - \frac{1}{d}][\psi(\hat{p}_{fp}) - \psi(\hat{p}_m)] \leq 0$$

Since  $d < 1$ , the first factor on the right hand side of this inequality is negative, so that the second factor must be positive. With  $\psi'(\cdot) > 0$  we thus must have  $\hat{p}_{fp} \geq \hat{p}_m$ .

To get a strict inequality, we resort to calculus. Using the implicit function theorem and the second order condition for the problem in (1),  $\hat{p}^*(\delta) > 0$  if and only if  $f(\hat{p}^*(\delta))(\hat{p}^*(\delta)) < 1 - F(\hat{p}^*(\delta))$ . Furthermore, the first order condition (2) implies that  $f(\hat{p}^*(\delta))(\hat{p}^*(\delta)) < 1 - F(\hat{p}^*(\delta))$  for all  $\delta \in [d, 1]$ . Since  $\hat{p}^*(\delta) > 0$  for all  $\delta \in [d, 1]$ , we must have  $\hat{p}(1) > \hat{p}(d)$ , or  $\hat{p}_{fp} > \hat{p}_m$ .  $\square$

**Proof of Lemma 2.** Suppose there existed an equilibrium with more than one contract. All equilibrium contracts must offer  $\hat{p} = \hat{p}^*(\delta)$ . Thus, each equilibrium contract must offer a different  $p$  to be distinct. Furthermore, consumers have rational expectations about  $\hat{p}$ . All consumers prefer the equilibrium contract with the lowest  $p$ . But this is a contradiction with the supposition that more than one contract attracts customers in equilibrium.

**Proof of Proposition 1.** The first order condition for this problem is:

$$(23) \quad \frac{\partial D(p^*, \hat{p}^*(\delta))}{\partial p} [\delta p^* + [1 - F(\hat{p}^*(\delta))]\delta \hat{p}^*(\delta) - \psi(\hat{p}^*(\delta))] + \delta D(p^*, \hat{p}^*(\delta)) = 0$$

Denote the solution to (23) as a function of  $\delta$  as  $p^*(\delta)$ . It will be sufficient to show that  $p^*(\delta) < 0$  for all  $\delta \in [d, 1]$ .

It is helpful to rewrite the equation that implicitly defines  $p^*(\delta)$  by dividing the first order condition in (23) by  $\delta$ :

$$(24) \quad H(p^*, \delta) \equiv \frac{\partial D(p^*, \hat{p}^*(\delta))}{\partial p} [p^* + [1 - F(\hat{p}^*(\delta))]\hat{p}^*(\delta) - (1/\delta)\psi(\hat{p}^*(\delta))] + D(p^*, \hat{p}^*(\delta)) = 0$$

By the implicit function theorem, we know that

$$(25) \quad p^*(\delta) = -\frac{\frac{\partial H(\delta, p^*)}{\partial \delta}}{\frac{\partial H(\delta, p^*)}{\partial p^*}}$$

The second order condition for the problem in (6),  $\frac{\partial H(\delta, p^*)}{\partial p^*} < 0$ , is satisfied since we have assumed that  $\frac{\partial^2 D(p, \hat{p}^*)}{\partial p^2} \leq 0$ . Thus  $p^*(\delta) < 0$  if and only if  $\frac{\partial H(\delta, p^*)}{\partial \delta} < 0$ ,

We can now calculate:

$$(26) \quad \begin{aligned} \frac{\partial H(\delta, p^*)}{\partial \delta} = & \hat{p}^*(\delta) \frac{\partial^2 D(p^*, \hat{p}^*(\delta))}{\partial p^* \partial \hat{p}^*} \left[ p^* + [1 - F(\hat{p}^*(\delta))] \hat{p}^*(\delta) - (1/\delta) \psi(\hat{p}^*(\delta)) \right] \\ & + \frac{\partial D(p^*, \hat{p}^*(\delta))}{\partial p^*} \left[ \hat{p}^*(\delta) [1 - F(\hat{p}^*(\delta)) - f(\hat{p}^*(\delta)) \hat{p}^*(\delta) - \psi'(\hat{p}^*(\delta))/\delta] + \psi(\hat{p}^*(\delta))/\delta^2 \right] \\ & + \frac{\partial D(p^*, \hat{p}^*(\delta))}{\partial \hat{p}^*} \left[ \hat{p}^*(\delta) \right] \end{aligned}$$

Now substitute for  $\psi'(\hat{p}^*)/\delta$  using (2), and we get:

$$(27) \quad \begin{aligned} \frac{\partial H(\delta, p^*)}{\partial \delta} = & \hat{p}^*(\delta) \frac{\partial^2 D(p^*, \hat{p}^*(\delta))}{\partial p^* \partial \hat{p}^*} \left[ p^* + [1 - F(\hat{p}^*(\delta))] \hat{p}^*(\delta) - (1/\delta) \psi(\hat{p}^*(\delta)) \right] \\ & + \frac{\partial D(p^*, \hat{p}^*(\delta))}{\partial p^*} \left[ \psi(\hat{p}^*(\delta))/\delta^2 \right] \\ & + \frac{\partial D(p^*, \hat{p}^*(\delta))}{\partial \hat{p}^*} \left[ \hat{p}^*(\delta) \right] \end{aligned}$$

We can calculate the following partial derivatives of  $D(p, \hat{p})$  to show that they are both negative:

$$(28) \quad \frac{\partial D(p, \hat{p})}{\partial p} = - \int_{-\infty}^{\hat{p}} g(p + \tilde{c}) f(\tilde{c}) d\tilde{c} - g(p + \hat{p}) [1 - F(\hat{p})] < 0$$

$$(29) \quad \frac{\partial D(p, \hat{p})}{\partial \hat{p}} = -g(p + \hat{p}) [1 - F(\hat{p})] < 0$$

Examining the right-hand side of (27) we can thus see that the second and third terms are unambiguously negative, and since both  $\hat{p}^*(\delta)$  and the term in square brackets are positive, under Assumption 1 the first term is also weakly negative. Hence,  $\hat{p}^*(\delta) < 0$ .  $\square$

**Proof of Proposition 2.** First, note that penalty optimality requires all equilibrium contracts to use  $\hat{p} = \hat{p}_{fp}$ .

Second, the singleton set of contracts  $P_{fp}^* = \{(-[1 - F(\hat{p}_{fp})] \hat{p}_{fp} + \psi(\hat{p}_{fp}), \hat{p}_{fp})\}$  is an equilibrium. The equilibrium contract uses  $\hat{p}_{fp}$  and so satisfies penalty optimality. To see that it makes nonnegative profits, note that consumers pay a penalty  $\hat{p}$  if and only if  $c > \hat{p}$ . Hence, a total of  $1 - F(\hat{p}_{fp})$  pay a penalty in the equilibrium, and total profits are thus:

$$(30) \quad \pi(-[1 - F(\hat{p}_{fp})] \hat{p}_{fp} + \psi(\hat{p}_{fp}), \hat{p}_{fp}) = -[1 - F(\hat{p}_{fp})] \hat{p}_{fp} + \psi(\hat{p}_{fp}) + [1 - F(\hat{p}_{fp})] \hat{p}_{fp} - \psi(\hat{p}_{fp}) = 0$$



Furthermore, it satisfies free entry since any alternative contract that also satisfies penalty optimality and makes some consumer type strictly better off must offer a  $p < -[1 - F(\hat{p}_{fp})]\hat{p}_{fp} + \psi(\hat{p}_{fp})$  and would therefore make negative profits.

Third, this equilibrium is unique. To see this, note that all equilibrium contracts in any alternative equilibrium must have  $\hat{p} = \hat{p}_{fp}$ . Now note that all consumer types will buy the equilibrium contract with the lowest  $p$ , so any equilibrium must have a single contract. Now note that any equilibrium contract with  $p < -[1 - F(\hat{p}_{fp})]\hat{p}_{fp} + \psi(\hat{p}_{fp})$  would make negative profits, while any with  $p > -[1 - F(\hat{p}_{fp})]\hat{p}_{fp} + \psi(\hat{p}_{fp})$  would violate free entry.  $\square$

**Proof of Proposition 3.** Denote the equilibrium base prices charged by for-profits and mutuals as  $p_{fp}$  and  $p_m$ , respectively. We first prove that the proposed equilibrium is indeed an equilibrium.

penalty optimality requires all equilibrium contracts offered by for-profit banks to use  $\hat{p} = \hat{p}_{fp}$ , and those offered by mutual banks to use  $\hat{p} = \hat{p}_m$ , which the proposed equilibrium contracts indeed satisfy.

Consider now the profits banks earn under each contract. Each consumer that accepts the contract  $(p, \hat{p})$  pays the penalty if and only if  $c > \hat{p}$ . The per-customer profit generated by each equilibrium contract is thus:

$$(31) \quad \pi(p_{fp}, \hat{p}_{fp}) = -[1 - F(\hat{p}_{fp})]\hat{p}_{fp} + \psi(\hat{p}_{fp}) + [1 - F(\hat{p}_{fp})]\hat{p}_{fp} - \psi(\hat{p}_{fp}) = 0$$

$$(32) \quad \pi(p_m, \hat{p}_m) = -[1 - F(\hat{p}_m)]\hat{p}_m + \psi(\hat{p}_m) + [1 - F(\hat{p}_m)]\hat{p}_m - \psi(\hat{p}_m) = 0$$

The contracts thus satisfy the nonnegative profits condition.

Furthermore, the proposed equilibrium contract set satisfies free entry since any alternative contract that also satisfies penalty optimality and makes some consumer type strictly better off must offer a lower base price than the equilibrium contract offered by its ownership type (for-profit or mutual) and would therefore make negative profits.

Finally, we now show that each of the two equilibrium contracts would indeed attract customers. Consider a consumer with  $\tilde{c} > \hat{p}_{fp} > \hat{p}_m$ . (That such a consumer exists can be seen by examining the optimization problem (1) which determines  $\hat{p}_{fp}$  and  $\hat{p}_m$ , the solutions to which clearly have  $1 - F(\hat{p}_{fp}) > 0$  and  $1 - F(\hat{p}_m) > 0$  since if not then no customer would pay a penalty, yet the bank would incur the costs  $\psi(\hat{p})$ , which cannot be optimal.) We want to show that such a consumer prefers the contract  $(p_m, \hat{p}_m)$  to the contract  $(p_{fp}, \hat{p}_{fp})$ . The consumer will expect to pay the penalty under either contract, so it suffices to show that  $-p_{fp} - \hat{p}_{fp} < -p_m - \hat{p}_m$ .

It will be useful to derive expressions for  $-p_{fp} - \hat{p}_{fp}$  and  $-p_m - \hat{p}_m$ :

$$(33) \quad \begin{aligned} 0 &= [1 - F(\hat{p}_{fp})]\hat{p}_{fp} - \psi(\hat{p}_{fp}) + [1 - F(\hat{p}_{fp})](-\hat{p}_{fp}) + \psi(\hat{p}_{fp}) \\ &= -p_{fp} + [1 - F(\hat{p}_{fp})](-\hat{p}_{fp}) + \psi(\hat{p}_{fp}) \\ &= F(\hat{p}_{fp})(-p_{fp}) + [1 - F(\hat{p}_{fp})](-p_{fp} - \hat{p}_{fp}) + \psi(\hat{p}_{fp}) \end{aligned}$$

And we thus have:

$$(34) \quad -p_{fp} - \hat{p}_{fp} = \frac{F(\hat{p}_{fp})p_{fp} - \psi(\hat{p}_{fp})}{1 - F(\hat{p}_{fp})}$$

And similarly we can show that:

$$(35) \quad -p_m - \hat{p}_m = \frac{F(\hat{p}_m)p_m - \psi(\hat{p}_m)}{1 - F(\hat{p}_m)}$$

The following chain of inequalities yields our desired result.

$$\begin{aligned}
(36) \quad -p_{fp} - \hat{p}_{fp} &= \frac{F(\hat{p}_{fp})p_{fp} - \psi(\hat{p}_{fp})}{1 - F(\hat{p}_{fp})} \\
&< \frac{F(\hat{p}_{fp})p_{fp} - \psi(\hat{p}_m)}{1 - F(\hat{p}_{fp})} < \frac{F(\hat{p}_m)p_{fp} - \psi(\hat{p}_m)}{1 - F(\hat{p}_m)} < \frac{F(\hat{p}_m)p_m - \psi(\hat{p}_m)}{1 - F(\hat{p}_m)} \\
&= -p_m - \hat{p}_m
\end{aligned}$$

It can easily be shown that the first inequality holds by  $\psi(\hat{p}_{fp}) > \psi(\hat{p}_m)$ , the second inequality holds by  $F(\hat{p}_{fp}) > F(\hat{p}_m)$ , and the third inequality holds by  $p_{fp} < p_m$  (which we show in the proof of part (2) below).

To see that there exist customers who prefer the for-profit contract, consider customers with  $\tilde{c} < \hat{p}_m$  who expect to pay no penalty under either contract. (That such a consumer exists can be seen by examining the optimization problem (1) which determines  $\hat{p}_{fp}$  and  $\hat{p}_m$ , the solutions to which clearly have  $1 - F(\hat{p}_{fp}) < 1$  and  $1 - F(\hat{p}_m) < 1$  since  $\psi'(0) = 0$ .) These customers prefer the for profit contract since it has a lower base price.

We now prove part (2) of the Proposition. By Lemma 1,  $\hat{p}_{fp} > \hat{p}_m$ . Furthermore, we must have  $[1 - F(\hat{p}_{fp})]\hat{p}_{fp} - \psi(\hat{p}_{fp}) > [1 - F(\hat{p}_m)]\hat{p}_m - \psi(\hat{p}_m)$ . (Proof: Suppose not. Then this violates the optimality of  $\hat{p}_{fp}$  for for-profits in the problem (1).) Consequently, we have  $p_{fp} < p_m$ .

We now show that this equilibrium is unique. First, in any equilibrium, the only for-profit contract possible is  $(p_{fp}, \hat{p}_{fp})$ . To see this, first note that all for-profits must use  $\hat{p}_{fp}$  by penalty optimality. Then, suppose a contract is offered by a for-profit with  $p < p_{fp}$ . Such a contract would make negative profits, so this is not an equilibrium. Suppose instead a contract is offered by a for-profit with  $p > p_{fp}$ . If  $(p_{fp}, \hat{p}_{fp})$  is also offered in the equilibrium, then the contract  $(p, \hat{p}_{fp})$  would attract no customers. And if  $(p_{fp}, \hat{p}_{fp})$  is not also offered in the equilibrium, then the set of contracts violates free entry since customers choosing  $(p, \hat{p}_{fp})$  would be made better off by  $(p_{fp}, \hat{p}_{fp})$ . Analogous arguments establish that in any equilibrium, the only mutual contract possible is  $(p_m, \hat{p}_m)$ .

Consider now an alternative equilibrium in which only  $(p_{fp}, \hat{p}_{fp})$  is offered. Such a contract set would violate free entry since the contract  $(p_m, \hat{p}_m)$  if offered would satisfy penalty optimality for mutuals and nonnegative profits (as shown above) and would make some types of customers better off (as also shown above).

Similarly, consider an alternative equilibrium in which only  $(p_m, \hat{p}_m)$  is offered. Such a contract set would violate free entry since the contract  $(p_{fp}, \hat{p}_{fp})$  if offered would satisfy penalty optimality for for-profits and nonnegative profits (as shown above) and would make some types customers of better off (namely, those with  $\tilde{c} < \hat{p}_m$  who expect to pay no penalty under either contract and thus prefer the lower base price  $p_{fp}$ ).

We have thus established uniqueness of the equilibrium.

Finally, we turn to part (3) of the Proposition. We have already established that consumers with  $\tilde{c} < \hat{p}_m$  prefer for-profits and consumers with  $\tilde{c} > \hat{p}_{fp}$  prefer mutuals. Now consider consumers with  $\hat{p}_m < \tilde{c} < \hat{p}_{fp}$ . They receive the payoff  $-p_m - \hat{p}_m$  from choosing a mutual and the payoff  $-p_{fp} - \tilde{c}$  from choosing a for-profit. If  $\tilde{c} = \tilde{c}^* \equiv p_m - p_{fp} + \hat{p}_m$  then the consumer is indifferent. To see that  $\tilde{c}^* \in (\hat{p}_m, \hat{p}_{fp})$ , note that  $p_m - p_{fp} + \hat{p}_m > \hat{p}_m$  since  $p_m > p_{fp}$  and that  $p_m - p_{fp} + \hat{p}_m < \hat{p}_{fp}$  since  $-p_{fp} - \hat{p}_{fp} < -p_m - \hat{p}_m$  (as shown above). Finally, looking at the payoffs to consumers with  $\tilde{c} \in (\hat{p}_m, \hat{p}_{fp})$ , clearly for  $\tilde{c} < \tilde{c}^*$  consumers prefer for-profits, and for  $\tilde{c} > \tilde{c}^*$  consumers prefer mutuals.  $\square$

APPENDIX B

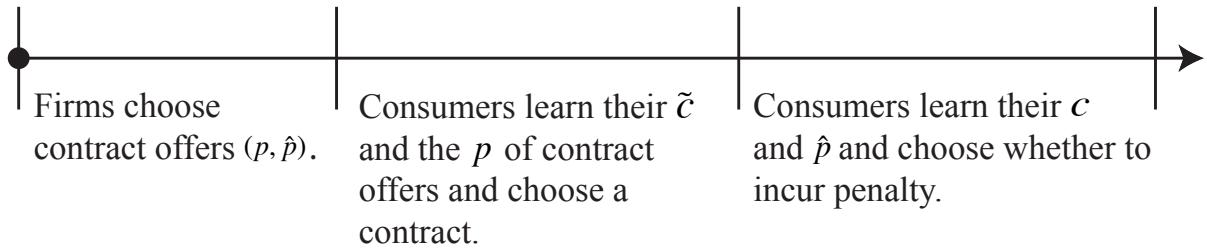


FIGURE 1. Timing of the model.

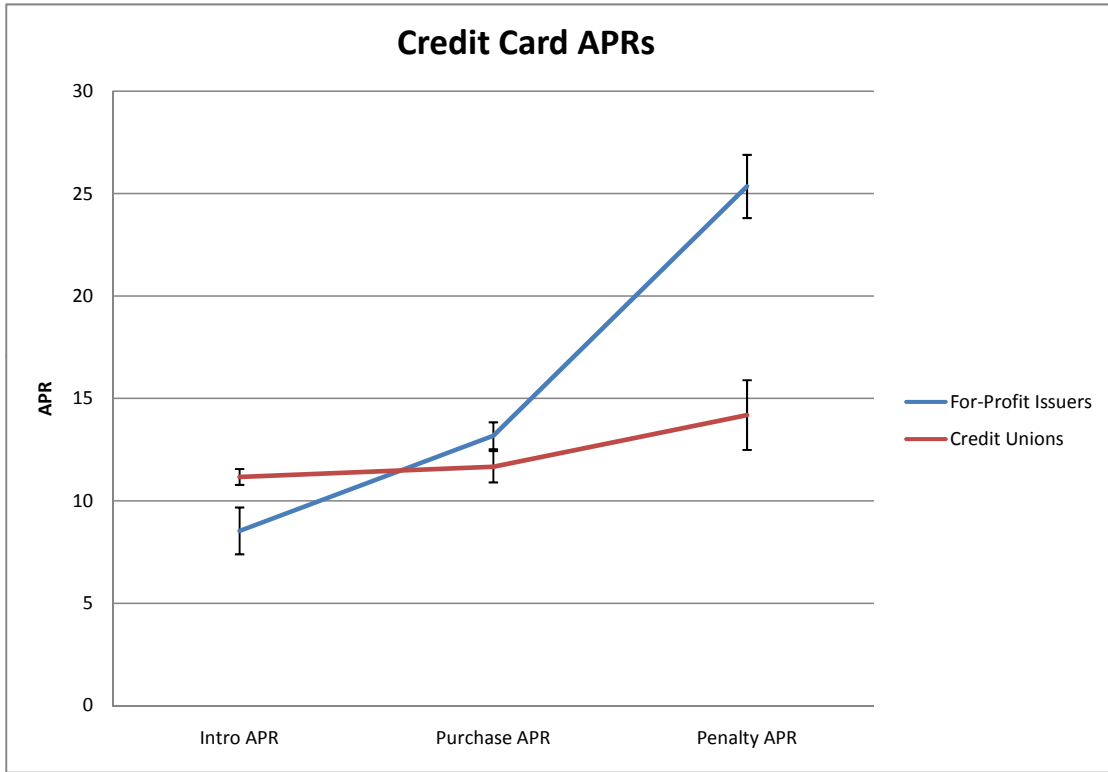


FIGURE 2. Time profile of APRs (95% confidence intervals)

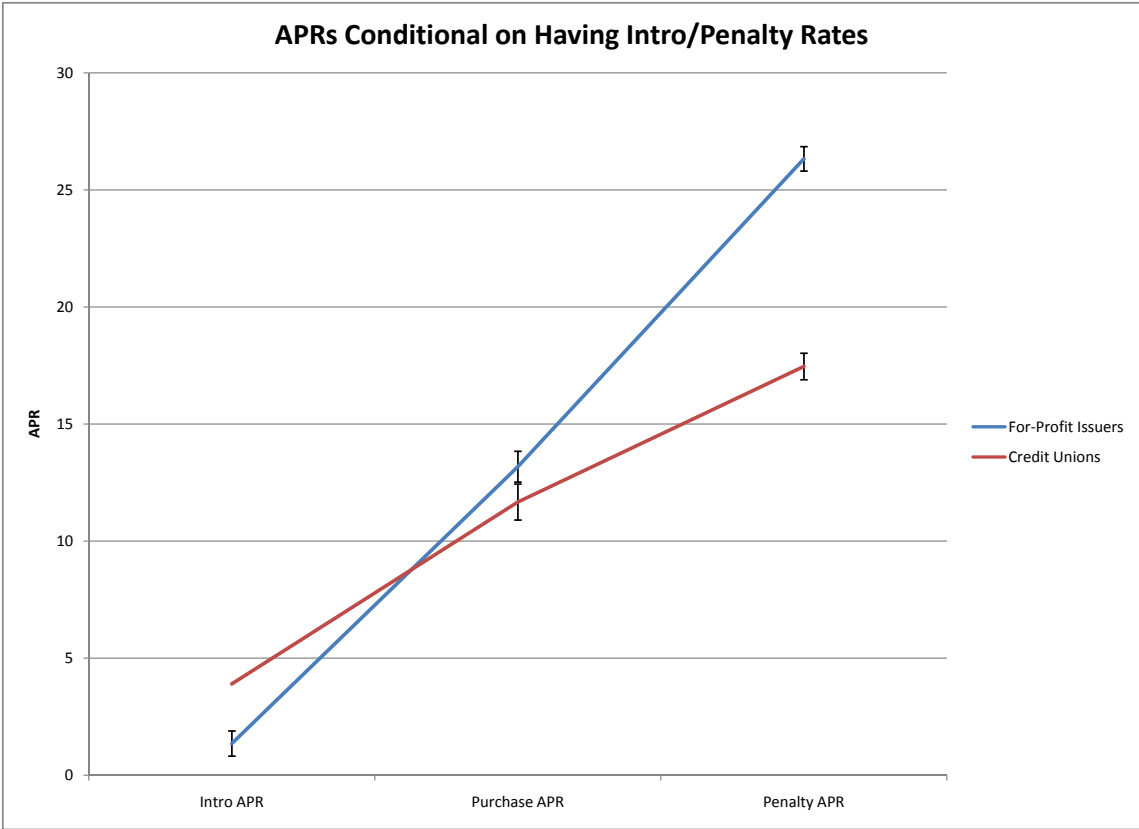


FIGURE 3. Time profile of APRs, conditional on having special introductory and penalty APR rates (95% confidence intervals)

TABLE 1. The Bankrate Sample

	Cards	Issuers
Full Sample	438	74
Dropped Due to Missing Data	111	8
Dropped Because Was a Payment Card	17	1
Analysis Sample	310	65
	For-Profit Issuers	Credit Unions
Analysis Sample Cards	234	76
Analysis Sample Issuers	46	19

TABLE 2. For-Profit Issuers and Credit Unions in the Bankrate Sample

For-Profit Issuers		Credit Unions
1st Hawaiian Bank	First-Citizens Bank & Trust	America First CU
5 Star Bank	FirstMerit Corp.	Digital FCU
American Express	HSBC	GTE FCU
Amalgamated Bank of Chicago	InfiBank	Golden One CU
BB&T BankCard Corp.	Intrust	Michigan State University FCU
BancorpSouth	National City Corp.	Municipal CU
Bank Card Center	Plains Community Bank	Navy Federal CU
Bank of America	Pulaski Bank	Orange County Teachers FCU
Barclays Bank	RBC Centura	Patelco CU
CMC	Royal Bank of Scotland	Penn. State Employees FCU
Capital One	Simmons Bank	Pentagon FCU
Certegy	State Farm	Randolph Brooks FCU
Chase	Synovus Bank	Redstone FCU
Citibank	TD Banknorth	SEFCU
Commerce Bank	Target Financial Services	San Diego CU
Compass Bank	U.S. Bancorp	Suncoast FCU
Delaware National Bank	UMB Bank	United First FCU
Discover	Wachovia	VyStar CU
Elan	Wells Fargo	Wescom CU
First National Bank of Omaha	Wilmington Trust	
Fifth Third Bank	Zions First National Bank	
First Bankcard		
First Internet Bank of Indiana		
First Premier Bank		
First Tennessee Bank		

TABLE 3. Card-Level Raw Differences in Contract Terms

	For-Profit Issuers	Credit Unions	difference
Has Special Intro APR (fraction)	0.397	0.0526	-0.345*** (0.0719)
Intro APR (%)	8.535	11.17	2.638*** (0.797)
Has Special Balance Transfer Intro APR (fraction)	0.543	0.197	-0.345*** (0.115)
Balance Transfer Intro APR (%)	6.920	10.21	3.294*** (1.093)
Purchase APR (%)	13.18	11.67	-1.519*** (0.531)
Has Rewards Program (fraction)	0.491	0.171	-0.320*** (0.0819)
Annual Fee (\$)	13.20	1.882	-11.32*** (2.299)
Balance Transfer APR (%)	13.37	11.64	-1.732*** (0.543)
Balance Transfer Fee (%)	1.959	0.257	-1.703*** (0.278)
Cash Advance APR (%)	19.20	12.10	-7.102*** (0.786)
Cash Advance Fee (%)	2.970	0.849	-2.121*** (0.266)
Has Special Penalty APR (fraction)	0.932	0.434	-0.497*** (0.121)
Penalty APR (%)	25.35	14.19	-11.16*** (1.160)
Late Fee (\$)	35.85	18.54	-17.31*** (2.195)
Over-the-limit Fee (\$)	32.05	15.50	-16.55*** (2.346)
Grace Period (days)	22.33	25.07	2.732*** (0.714)
Observations	234	76	310

Note: Standard errors in parentheses, clustered at the issuer level. All figures are calculated for the entire sample (i.e. unconditional on having an introductory APR or a penalty APR distinct from the standard purchase APR). Significantly different from zero at 99 (\*\*\*), 95 (\*\*), and 90 (\*) percent confidence. By “Special Intro APR” we refer to an introductory APR that is unequal to the standard purchase APR. The “Intro APR (%)” figure is not conditional on having a special intro APR, and includes cards with introductory rates equal to the purchase rate. The same pattern is followed for the figures on balance transfer introductory rates and penalty rates. Source: Bankrate.com.

TABLE 4. Bankrate Summary Statistics

	Card-Level			Issuer-Level		
	FPs	CUs	diff	FPs	CUs	diff
Gold	0.0769	0.224	0.147*** (0.0353)	0.0894	0.189	0.100** (0.0411)
Platinum	0.654	0.382	-0.272*** (0.0654)	0.577	0.382	-0.195** (0.0811)
Student	0.0855	0.0263	-0.0592** (0.0243)	0.0809	0.0211	-0.0599* (0.0331)
Business	0.103	0.118	0.0159 (0.0375)	0.127	0.116	-0.0117 (0.0434)
Secured	0.0470	0.105	0.0583 (0.0350)	0.0600	0.0833	0.0233 (0.0428)
Volume (\$mil)	50764	309.1	-50455*** (18599)	13813	363.6	-13449 (8538)
Rank by volume	63.98	47.11	-16.88 (16.62)	111.6	54.16	-57.45** (26.36)
Observations	234	76	310	46	19	65

Note: Standard errors in parentheses. Standard errors for card-level means are clustered at the issuer level. Significantly different from zero at 99 (\*\*\*), 95 (\*\*), and 90 (\*) percent confidence. Source: Bankrate.com.



TABLE 5. Card-Level Differences, with Controls

	Has Intro APR (fraction)	Intro APR (%)	Has Balance Transfer Intro APR (fraction)	Balance Transfer Intro APR (%)
CU	-0.338*** (0.0761)	2.673*** (0.810)	-0.249** (0.117)	2.339** (1.067)
Gold	0.0143 (0.0861)	-1.227 (1.013)	-0.0932 (0.0824)	0.399 (0.939)
Platinum	0.0867 (0.0746)	-1.942* (1.057)	0.0584 (0.0680)	-1.501* (0.871)
Student	0.0766 (0.138)	1.146 (2.178)	-0.178 (0.126)	4.538*** (1.677)
Business	0.127 (0.101)	-2.210** (1.037)	-0.104 (0.107)	1.127 (1.122)
Secured	-0.170* (0.0898)	5.196*** (1.632)	-0.279*** (0.0875)	6.470*** (1.626)
Log(Volume)	-0.0110 (0.0127)	0.233 (0.146)	0.0238 (0.0145)	-0.144 (0.199)
Constant	0.567** (0.268)	4.735 (2.959)	0.0357 (0.314)	10.19** (4.365)
Observations	310	310	310	310
R-squared	0.135	0.148	0.164	0.179

Note: Standard errors in parentheses. Standard errors for card-level means are clustered at the issuer level. Significantly different from zero at 99 (\*\*\*), 95 (\*\*), and 90 (\*) percent confidence. Source: Bankrate.com.

TABLE 6. Card-Level Differences, with Controls (con't)

	Purchase APR (%)	Has Rewards Program (fraction)	Annual Fee (\$)	Balance Transfer APR (%)
CU	-1.027*	-0.125**	-12.36***	-1.457**
	(0.517)	(0.0502)	(3.003)	(0.628)
Gold	-1.527***	-0.0736	8.831**	-1.393**
	(0.493)	(0.0515)	(3.903)	(0.598)
Platinum	-1.158**	0.109**	-1.439	-1.098
	(0.550)	(0.0497)	(2.942)	(0.685)
Student	2.107***	-0.228**	-5.757	2.101***
	(0.587)	(0.110)	(3.641)	(0.639)
Business	-0.765	0.0669	-0.0927	-1.012*
	(0.537)	(0.0879)	(2.994)	(0.571)
Secured	3.397***	-0.192***	15.32***	3.159***
	(0.984)	(0.0530)	(3.528)	(1.004)
Log(Volume)	0.257***	0.0633***	0.752*	0.165
	(0.0967)	(0.00946)	(0.390)	(0.114)
Observations	310	310	310	310
R-squared	0.284	0.347	0.097	0.206
	Balance Transfer Fee (%)	Cash Advance APR (%)	Cash Advance Fee (%)	
CU	-1.440***	-5.544***	-2.087***	
	(0.270)	(0.894)	(0.272)	
Gold	0.000595	-1.091	0.127	
	(0.181)	(0.744)	(0.128)	
Platinum	0.593**	0.654	0.147	
	(0.237)	(0.539)	(0.113)	
Student	0.604**	2.039***	0.289*	
	(0.301)	(0.760)	(0.171)	
Business	-0.244	-1.013*	-0.105	
	(0.247)	(0.573)	(0.172)	
Secured	0.388	1.807**	0.492**	
	(0.325)	(0.856)	(0.195)	
Log(Volume)	0.0336	0.475***	0.00908	
	(0.0516)	(0.133)	(0.0198)	
Observations	310	310	310	
R-squared	0.288	0.507	0.564	

Note: Standard errors in parentheses. Standard errors for card-level means are clustered at the issuer level. Significantly different from zero at 99 (\*\*\*), 95 (\*\*), and 90 (\*) percent confidence. Source: Bankrate.com.

TABLE 7. Card-Level Differences, with Controls (con't)

	Has Penalty APR (fraction)	Penalty APR (%)	Late Fee (\$)	Over-the-limit Fee (\$)	Grace Period (days)
CU	-0.476*** (0.124)	-9.291*** (1.185)	-15.19*** (2.250)	-15.57*** (2.366)	1.716*** (0.611)
Gold	0.107** (0.0531)	-1.005 (0.766)	0.511 (1.051)	0.0267 (1.570)	0.302 (0.354)
Platinum	0.0412 (0.0363)	0.474 (0.590)	2.122** (0.961)	2.097* (1.230)	-0.819** (0.379)
Student	0.0975** (0.0442)	2.737*** (1.011)	2.887** (1.325)	5.109*** (1.746)	-1.406** (0.689)
Business	-0.0274 (0.0666)	-1.413 (0.894)	-0.0163 (1.572)	1.795 (1.760)	0.282 (0.459)
Secured	0.0557 (0.102)	1.573 (1.160)	0.739 (1.642)	2.395 (1.756)	-2.095 (1.418)
Log(Volume)	0.00925 (0.00642)	0.598*** (0.144)	0.598*** (0.190)	0.111 (0.303)	-0.313*** (0.0926)
Constant	0.688*** (0.162)	11.99*** (3.342)	21.18*** (4.577)	27.55*** (6.128)	29.82*** (1.975)
Observations	310	310	310	310	310
R-squared	0.312	0.596	0.568	0.335	0.300

Note: Standard errors in parentheses. Standard errors for card-level means are clustered at the issuer level. Significantly different from zero at 99 (\*\*\*) , 95 (\*\*), and 90 (\*) percent confidence. Source: Bankrate.com.

TABLE 8. Comparison of Users of For-Profit and Credit Union Credit Cards

	Credit Unions	For-Profits	difference
Female (fraction)	0.200	0.223	-0.023* (.0125)
Age (years)	46.25	49.35	-3.10*** (0.477)
White (fraction)	0.849	0.832	0.017 (0.011)
Black (fraction)	0.082	0.080	0.002 (0.008)
HS Grad (fraction)	0.933	0.894	0.039*** (0.008)
College Grad (fraction)	0.371	0.378	-0.007 (0.015)
Income (\$)	57635	68769	-11134*** (1651)
Employed (fraction)	0.844	0.702	0.142*** (0.009)
Public Sector (fraction)	0.113	0.038	0.075*** (0.007)
Observations	1432	16899	18331

Note: Weighted with SCF population weights. Standard errors in parentheses. Standard errors for card-level means are clustered at the issuer level. Significantly different from zero at 99 (\*\*\*), 95 (\*\*), and 90 (\*) percent confidence. Definition of “Public Sector” includes public administrators and military personnel, but excludes teachers and police officers. This narrow definition was used because of coarse occupational grouping in the public-use version of the SCF. Source: 1989 - 2004 Survey of Consumer Finances.

TABLE 9. Issuer-Level Raw Differences

	For-Profit Issuers	Credit Unions	difference
Has Intro APR (fraction)	0.426	0.0526	-0.373*** (0.0788)
Intro APR (%)	8.060	11.17	3.106*** (0.906)
Has Balance Transfer Intro APR (fraction)	0.467	0.179	-0.288*** (0.104)
Balance Transfer Intro APR (%)	7.542	10.32	2.781*** (1.021)
Purchase APR (%)	12.69	11.66	-1.030** (0.515)
Has Rewards Program (fraction)	0.316	0.167	-0.149** (0.0625)
Annual Fee (\$)	11.32	2.070	-9.252*** (3.056)
Balance Transfer APR (%)	13.05	11.64	-1.411** (0.569)
Balance Transfer Fee (%)	1.883	0.289	-1.594*** (0.272)
Cash Advance APR (%)	18.09	12.12	-5.978*** (0.820)
Cash Advance Fee (%)	2.884	0.681	-2.203*** (0.258)
Has Penalty APR (fraction)	0.891	0.461	-0.431*** (0.114)
Penalty APR (%)	23.94	14.30	-9.636*** (1.047)
Late Fee (\$)	33.83	18.64	-15.18*** (2.157)
Over-the-limit Fee (\$)	30.96	15.03	-15.94*** (2.367)
Grace Period (days)	23.20	24.93	1.734*** (0.596)
Observations	46	19	65

Note: Standard errors in parentheses. Significantly different from zero at 99 (\*\*\*), 95 (\*\*), and 90 (\*) percent confidence. Source: Bankrate.com.

TABLE 10. Issuer-Level Differences, with Controls

	Has Intro APR (fraction)	Intro APR (%)	Has Balance Transfer Intro APR (fraction)	Balance Transfer Intro APR (%)
CU	-0.275*** (0.0984)	2.355** (1.114)	-0.202* (0.115)	1.952 (1.314)
% Gold	0.303 (0.327)	-4.429 (3.697)	-0.0438 (0.380)	-0.114 (4.358)
% Platinum	0.521*** (0.181)	-5.313** (2.048)	0.362* (0.211)	-4.647* (2.414)
% Student	0.391 (0.371)	0.123 (4.200)	0.0793 (0.432)	4.266 (4.952)
% Business	0.197 (0.283)	-3.453 (3.208)	0.0517 (0.330)	-1.937 (3.782)
% Secured	-0.215 (0.294)	8.279** (3.327)	-0.202 (0.342)	7.672* (3.923)
Log(Volume)	-0.0235 (0.0156)	0.356** (0.177)	0.00393 (0.0182)	0.0708 (0.209)
Constant	0.508 (0.306)	4.575 (3.468)	0.186 (0.357)	8.309** (4.089)
Observations	65	65	65	65
R-squared	0.365	0.390	0.206	0.276

Note: Standard errors in parentheses. Significantly different from zero at 99 (\*\*\*) 95 (\*\*), and 90 (\*) percent confidence. Source: Bankrate.com.

TABLE 11. Issuer-Level Differences, with Controls (con't)

	Purchase APR (%)	Has Rewards Program (fraction)	Annual Fee (\$)	Balance Transfer APR (%)
CU	-0.526 (0.495)	-0.0832 (0.0732)	-12.70*** (4.343)	-1.055 (0.723)
% Gold	-3.813** (1.641)	-0.175 (0.243)	13.14 (14.41)	-2.583 (2.398)
% Platinum	0.428 (0.909)	0.299** (0.134)	-7.655 (7.981)	0.144 (1.328)
% Student	2.850 (1.864)	-0.308 (0.276)	2.841 (16.37)	3.229 (2.725)
% Business	-1.559 (1.424)	-0.262 (0.211)	7.033 (12.50)	-1.844 (2.081)
% Secured	7.059*** (1.477)	-0.157 (0.218)	48.74*** (12.97)	5.836*** (2.158)
Log(Volume)	0.258*** (0.0786)	0.0390*** (0.0116)	1.275* (0.690)	0.175 (0.115)
Observations	65	65	65	65
R-squared	0.525	0.393	0.333	0.285
	Balance Transfer Fee (%)	Cash Advance APR (%)	Cash Advance Fee (%)	
CU	-1.155*** (0.361)	-4.728*** (1.002)	-2.091*** (0.245)	
% Gold	-0.280 (1.198)	-3.527 (3.323)	0.366 (0.813)	
% Platinum	1.681** (0.664)	4.498** (1.841)	0.686 (0.450)	
% Student	1.377 (1.361)	1.905 (3.775)	0.745 (0.924)	
% Business	-0.586 (1.040)	-2.585 (2.884)	0.00635 (0.706)	
% Secured	-0.325 (1.078)	6.447** (2.991)	1.548** (0.732)	
Log(Volume)	-0.00518 (0.0574)	0.431*** (0.159)	0.0315 (0.0389)	
Observations	65	65	65	
R-squared	0.384	0.556	0.642	

Note: Standard errors in parentheses. Significantly different from zero at 99 (\*\*\*) 95 (\*\*), and 90 (\*) percent confidence. Source: Bankrate.com.

TABLE 12. Issuer-Level Differences, with Controls (con't)

	Has Penalty APR (fraction)	Penalty APR (%)	Late Fee (\$)	Over-the-limit Fee (\$)	Grace Period (days)
CU	-0.415*** (0.102)	-7.928*** (1.281)	-13.15*** (2.166)	-13.44*** (2.423)	0.724 (0.655)
% Gold	0.461 (0.339)	-1.740 (4.248)	7.523 (7.186)	7.566 (8.037)	-0.159 (2.173)
% Platinum	0.0595 (0.188)	5.070** (2.353)	8.933** (3.981)	11.93*** (4.452)	-3.987*** (1.204)
% Student	0.632 (0.386)	9.208* (4.827)	15.31* (8.164)	16.59* (9.131)	-5.163** (2.468)
% Business	0.130 (0.295)	-1.414 (3.686)	-1.032 (6.236)	6.871 (6.974)	3.607* (1.885)
% Secured	-0.378 (0.305)	2.339 (3.823)	-1.891 (6.468)	4.502 (7.233)	-1.921 (1.955)
Log(Volume)	0.00866 (0.0163)	0.323 (0.203)	0.494 (0.344)	-0.226 (0.385)	-0.129 (0.104)
Constant	0.603* (0.318)	14.22*** (3.985)	17.48** (6.742)	25.27*** (7.540)	28.07*** (2.038)
Observations	65	65	65	65	65
R-squared	0.323	0.603	0.563	0.533	0.386

Note: Standard errors in parentheses. Significantly different from zero at 99 (\*\*\*), 95 (\*\*), and 90 (\*) percent confidence. Source: Bankrate.com.



TABLE 13. Differences in Contract Terms in Woodstock Data

	Credit Unions	For-Profit Issuers	difference
Has Intro APR (fraction)	0.0	0.8	-0.8*** (.1333)
Intro APR (%)	11.80	2.87	8.93*** (1.550)
Purchase APR (%)	11.80	12.06	-0.263 (0.9268)
Annual Fee (\$)	0.0	0.0	0.0 (0.0)
Balance Transfer APR (%)	11.00	11.20	-0.203 (0.9853)
Balance Transfer Fee (%)	0.40	2.10	-1.70*** (0.530)
Cash Advance APR (%)	11.70	19.10	-7.40*** (1.052)
Cash Advance Fee (%)	0.55	3.20	-2.65*** (0.313)
Has Penalty APR (fraction)	0.4	0.9	-0.5** (.191)
Penalty APR (%)	14.91	23.96	-9.05*** (2.393)
Late Fee (\$)	17.00	28.95	-11.95*** (2.862)
Over-the-limit Fee (\$)	17.90	33.60	-15.70*** (2.090)
Grace Period (days)	25.0	21.5	3.5*** (0.764)
Observations	10	10	20

Note: Standard errors in parentheses. Significantly different from zero at 99 (\*\*\*), 95 (\*\*), and 90 (\*) percent confidence. Source: Westrich and Bush (2005), Woodstock Institute.

TABLE 14. Fees for Checking and Savings Accounts

	Moebs \$ervices		Informa Research Services	
	For-Profit	Credit Union difference	For-Profit	Credit Union difference
Monthly Fee (for Interest Checking) (\$)			8.74	3.85
Non-Sufficient Funds Fee (\$)	23.19	20.51	25.96	21.61
Overdraft Fee(\$)	\$22.93	19.75	26.70	21.82
OD Trans from Deposit (\$)	2.84	2.61		
OD Trans from Credit (\$)	1.59	1.13		
Stop Payment (\$)	19.93	14.49	24.81	16.35
ATM (\$)	1.33	0.93	1.57	1.04
Foreign ATM (\$)	0.82	0.65	1.21	0.90
Return of Deposited Item (\$)	6.59	12.11	5.89	8.58

Note: No standard errors provided because we do not have access to the original data. Sources: Moebs \$ervices (2000-2007) and Informa Research Services (2001-2006), provided by the Government Accountability Office. The Moebs sample had 37,080 observations, and the Informa sample had 5,925 observations, though not all observations were non-missing for every variable.

TABLE 15. Main Checking Account at Credit Union, by Household Income Decile

	Checking Accounts (conditional on having any checking account)	Checking Accounts (unconditional)
1st Decile	8.5%	7.6%
2nd Decile	9.1%	8.6%
3rd Decile	12.7%	12.2%
4th Decile	12.4%	12.0%
5th Decile	15.6%	15.3%
6th Decile	17.3%	17.1%
7th Decile	17.3%	17.2%
8th Decile	17.1%	17.1%
9th Decile	17.8%	17.8%
10th Decile	10.5%	10.5%
Observations	21932	22318

Note: Weighted with SCF population weights. Deciles are calculated relative to the income distribution of the source year. 1st decile denotes lowest income; 10th decile denotes highest income. Source: Survey of Consumer Finances 1989-2004.

TABLE 16. Effect of Customer Attitudes on Credit Union Use

	(1)	(2)	(3)	(4)	(5)	(6)
Outcome	<i>CUcheck</i>	<i>CUCC</i>	<i>CUCC</i>	<i>CUCC</i>	<i>CUCC</i>	<i>CUCC</i>
<i>WantLowFee</i>	0.111*** (0.009)		0.054*** (0.009)	0.012* (0.009)	0.017** (0.007)	-0.014 (0.027)
<i>CarryBal</i>		-0.001 (0.006)	-0.000 (0.007)	-0.003 (0.006)	0.004 (0.005)	-0.049* (0.028)
<i>CUcheck</i>				0.344*** (0.013)		
Controls	Y	Y	Y	Y	Y	Y
Subgroup	All	All	All	All	CU check=0	CU check=1
Observations	21930	18277	17879	17878	15913	1965

Note: Weighted with SCF population weights. Regressions are probits with marginal effects reported. *CUcheck* is an indicator for whether the household has its primary checking account at a credit union. *CUCC* is an indicator for whether the household has its primary credit card at a credit union. *WantLowFee* is an indicator for whether the household chose “low fees and service charges” as the most important reason for choosing where to open a checking account. *CarryBal* is an indicator for whether the household ran a non-zero credit card balance in the month prior to the survey. Standard errors in parentheses. Significantly different from zero at 99 (\*\*\*), 95 (\*\*), and 90 (\*) percent confidence. Controls include sex, age, age<sup>2</sup>, race dummies, education dummies, income dummies, industry dummies, occupation dummies, and year of survey dummies. Source: Survey of Consumer Finances 1989-2004.