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by

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Abstract

In this study we develop a tractable, yet general, framework to explain whether premium payment methods that impose no-surcharge rules are beneficial. This question is fundamentally related to policy and we provide a robust answer by considering how a variety of market structures are impacted by multiple payment methods. We find that the no-surcharge rule, which suggests uniform pricing to consumers, results in consumers paying different effective prices depending on their payment method. Instead, surcharging, which gives the impression of price discrimination, actually results in consumers paying the same effective price across payment methods. Most importantly, we also show that all consumers and all merchants earn greater surplus when surcharging is allowed. Furthermore, our results are robust across market structures suggesting that protected premium payment methods are generally harmful except for the credit card industry.

Keywords: Payment methods, credit cards, online shopping, merchant fees, consumer rewards, Ohio v.s. American Express, conduct parameter

JEL Classifications: L10, L20, L42

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1 Introduction

Over the last decade, merchants have engaged in an ongoing conflict surrounding the so called “anti-steering” or “no-surcharge rule” clauses that various payment method companies require. These clauses prevent merchants from asking or persuading their customers to use certain payment methods. These clauses are naturally binding since merchants are motivated to steer their customers away from premium reward payment methods that charge higher merchant fees. This debate is especially important for online and digital retailers that are unable to make implicit payment suggests “at the register” and often accept credit cards and online payment methods exclusively. Many of these online retailers, including Amazon, argue that these premium merchant fees are being passed on to consumers in the form of higher prices.¹

While this conflict between merchants and payment method companies continues, the recent Supreme Court ruling in June 2018 on the case of *Ohio v.s. American Express*, No. 16-1454, was a major blow to retailers. In their ruling, the Supreme Court sided with American Express and deemed these anti-steering clauses as acceptable. In particular, the Supreme Court argued that two-sided platforms should face more relaxed anti-trust scrutiny because while these premium cards and anti-steering clauses might harm merchants, the majority of the Supreme Court justices argue that the premium cards have benefited many consumers and expanded credit card usage.²

Since the Supreme Court ruling, the conflict between merchants and credit card companies has continued. Now, however, merchants are claiming that the justices focused entirely on the effects on credit card competition and failed to account for the impact that protected premium payment methods have on the underlying prices in retail markets. More specifi-

¹See “Are Other People’s Credit-Card Rewards Costing You Money? Amazon and other retailers believe so, and they’re going to war against high-end cards,” in the *New York Magazine*, October 16, 2018, for a detailed discussion.

²The Supreme Court’s ruling has spurred debates on the appropriateness and usefulness of platform economics in antitrust enforcement. Katz (2019) summarizes the important notions that should be carefully treated: including how to define a multi-sided platform in a meaningful way, how to define the “relevant market,” and how information on price and output should be used to judge a change in consumer welfare.

cally, the merchants argue that with more premium card holders, the higher fees incurred by merchants are passed onto consumers resulting in higher retail prices than would otherwise be the case if surcharging were allowed.³ And with higher prices, sales decrease, a dead-weight loss is generated, and consumers and merchants are harmed.

One caveat that is missing from the merchants' argument is how the *effective* retail price is impacted by the availability of a premium payment method. By effective price, we mean the rewards inclusive price that consumers pay. By considering the effective price with respect to the merchants' argument, it is possible that the pass-through from higher merchant fees is less than the improved consumer reward from a premium method so that premium users benefit from anti-steering. However, if the merchant fee pass-through is greater than the consumer benefit from a premium reward, then both premium and non-premium users are worse off in the retail market.⁴

To understand how the Supreme Court's ruling impacts effective prices, we depart from the two-sided market approach that considers consumer and merchant payment method acquisition.⁵ Instead, we take the acquisition of payment methods as given (to start) and consider the impact that multiple payment methods have on a retail market. Given the imperative connection between market structure and economic pass-through,⁶ we implement the conduct parameter approach in which the mode of competition is taken as an exogenous parameter in the retail market. This allows us to determine the extent to which merchant market power influences the welfare effects from the no-surcharge rule.

We find that when the no-surcharge rule is implemented, the effective price that premium users pay is often higher than the effective price that would be charged if no consumer were premium. However, under certain demand structures, it is possible that premium consumers

³See "Are Other People's Credit-Card Rewards Costing You Money? Amazon and other retailers believe so, and they're going to war against high-end cards," in the *New York Magazine*, October 16, 2018, for a detailed discussion.

⁴Note, that non-premium users are always worse off because they incur the pass-through from the premium merchant fee but do not earn the premium benefit.

⁵In our discussion, we consider the implications of our model to the acquisition subgame.

⁶See Weyl and Fabinger (2013) for details.

pay a lower effective price when merchants have high levels of market power. At first glance, this suggests that the premium payment method might act as a redistribution mechanism that reduces the dead-weight loss generated by merchant market power.

Unfortunately, the potential benefits from the premium method disappear when comparing the effective prices between the surcharge and no-surcharge cases. More specifically, we find that all consumers pay the same effective price when surcharging is allowed and the premium method accounts for no sales. Furthermore, the effective prices with surcharging are less than the no-surcharge effective prices for all consumers. Altogether, our result imply that a premium payment method requires the no-surcharge rule to survive and is welfare destructive to consumers and merchants. It is important to note that these results are robust across all forms of merchant competition, suggesting that the no-surcharge rule is indeed protecting premium payment companies at the expense of higher prices.

Much of the literature on payment methods takes a two-sided market approach to analyze credit card acquisition, competition, and optimal fee structures. Rochet and Tirole (2002), Rochet and Tirole (2003), Wright (2003), and Wright (2004) pioneered this work by considering the connection between payment cards, card issuers, and merchants and consumers. These papers have been highly influential in terms of how different interchange fees impact credit card acquisition, how a no-surcharge rule is required to ensure acquisition, and how issuers and credit card companies set optimal fees.⁷ These papers, and the literature that follows, typically take a simplistic approach in how the final goods market is modeled and instead focus on optimal acquisition and interchange fees. This implies that these models are unable to determine the impact that different market structures have on consumers and merchants when multiple payment methods are present.

Following these seminal papers, others have considered important features of credit card markets that relate to no-surcharge rules or premium credit cards. In a similar effort to

⁷There has been very little empirical evidence that considers the issue of steering in credit card markets. One paper by Bringlevics and Shy (2014) find that the use of surcharge rules that provide discounts to cash and debit payment methods steer consumers towards those methods; however, the cost savings for merchants is small.

explain the Supreme Court’s ruling, Carlton and Winter (2018) compliment our work by focusing on the impact of the no-surcharge rule on the two-sided credit card market (instead of investigating the impact of these rules on the underlying retail markets). They highlight how the methods for evaluating vertical most-favored-nation (vMFN) clauses in traditional markets remain effective for evaluating the credit card no-surcharge rules in two-sided markets. By taking different approaches to consider a similar problem, our results collectively suggest that the Supreme Court’s ruling was misguided for two reasons: (i) they show that the no-surcharge rule ensures credit card fees that are higher than the monopoly credit card company case and (ii) we show that the no-surcharge rule results in higher effective prices for all consumers across all retail markets.⁸

One paper that is similar to ours is Shy and Wang (2011) who consider a model where credit cards are already saturated in the market and consumers purchase some items with cash and other items with a credit card. They focus on the impact of different types of credit card fees: fixed or proportional. However, merchants specialize in either goods purchased by credit cards or goods purchased with cash; thus, no goods are purchased with multiple payment methods in their model. This implies that one is unable to determine how multiple payment methods within a particular market impact pricing and efficiency in their model.⁹

Two other papers that relate to ours are Edelman and Wright (2015) and Liu et al. (2019). Edelman and Wright (2015) present a general framework for intermediaries using no-surcharge rules and they find that consumer surplus is harmed by no-surcharging but the effect on welfare is ambiguous. In their setting, the retail sector is modeled as an oligopoly market where the entire consumer demand is satisfied (implying no extensive margin). This

⁸Schwartz and Vincent (2019) consider the impact that asymmetric credit card fees have on credit card competition. They find that pure strategy equilibria in credit card fees cannot exist because credit cards compete by trying to outdo each other’s spread between the merchant fee and consumer reward. Unfortunately, Schwartz and Vincent (2019) model the retail market by considering a monopoly merchant and they only consider fixed fees and rewards (opposed to the proportional ones observed and modeled in this paper); these assumptions naturally generate specific results about merchant fee pass-through and so a richer model of retail is required. Similarly, Schwartz and Vincent (2006) also consider the no-surcharge rule but model merchants as monopolists and largely focus on optimal fee structures.

⁹Bourguignon et al. (2019) also provide a rich set of predictions for merchant payment policy as well as the fee structure designed by assuming that card acceptance and surcharging are “shrouded” for consumers.

is an important assumption since the extensive margin is crucial for determining dead-weight loss and any double marginalization effect that may arise from premium fees. Instead, Liu et al. (2019) include an extensive margin on demand by considering a market with log-concave demand that is served by a monopoly merchant. They find that the no-surcharge rule can increase consumer surplus much like third-degree price discrimination can improve consumer surplus under the right demand specifications.

There are a few notable differences that drive the differences in results between these two papers and our own. First and foremost, both Edelman and Wright (2015) and Liu et al. (2019) use fixed, not ad valorem, consumer rewards and merchant fees which naturally have pass-through rules that differ from the ad valorem structure used in our model and that are actually observed in payment method markets. Second, like Liu et al. (2019), we include an extensive margin on demand; however, we also allow for a variety of competition structures in the retail market. As a result we find that the no-surcharge rule unambiguously harms all consumers and all merchants across all competition structures suggesting that surcharging would improve welfare in retail markets.

2 The Model

There are a plethora of markets where multiple payment methods are used to make purchases (e.g., cash, debit cards, standard credit cards, premium credit cards, cryptocurrencies, etc.). For simplicity, suppose that there are two payment methods: a premium payment method and a regular payment method which could simply be cash. We normalize the regular payment method fees and rewards to zero but assume that the premium method includes a consumer reward and a merchant fee.

Suppose that the market for some product has a unit mass of consumers that each have unit demand. Consumer values, v , are drawn from the distribution $F(\cdot)$, and if all consumers use the regular payment method for a product sold at posted price p , then the standard

demand curve follows: $q = 1 - F(p)$. However, with multiple payment methods, consumers pay different effective prices because consumers that use the premium method earn rewards. Premium rewards are proportional to the posted price so that an item purchased at posted price p generates $f_1 \cdot p$ cash back, where $f_1 > 0$ denotes the reward to consumers. This implies that the effective price paid by a premium consumer is $(1 - f_1)p$ while consumers using the regular method face an effective price of p .

Let $\lambda \in [0, 1]$ capture the mass of premium consumers so that there is a mass of $(1 - \lambda)$ regular consumers. Given the distribution of payment methods, an item sold at posted price p_i , $i = p, r$, has premium and regular demands given by:

$$Q_p = \lambda \cdot [1 - F((1 - f_1)p_p)],$$

$$Q_r = (1 - \lambda) \cdot [1 - F(p_r)].$$

We allow for two types of pricing regimes. The no-surcharge rule is the first. In this case the merchants must charge the same price across all payment methods so that $p_p = p_r \equiv p$. This no-surcharge rule is currently implemented by premium credit card companies and provided the controversy that led to the Supreme Court ruling. To determine the impact of the no-surcharge rule, we also consider the case where merchants surcharge across payment methods.

For merchants, sales made to premium consumers generate $(1 - f_2) \cdot p_p$ in revenues, where f_2 is the merchant fee taken by the premium payment method. We assume that $1 > f_2 \geq f_1 > 0$ so that profit for credit card companies is non-negative.¹⁰ Depending on the nature of competition within the market, the number of merchants may vary. However,

¹⁰Typically a premium credit card offers between 0.5-1.5% cash back to consumers and charges merchants a 1.5-3.5% fee which corresponds to $f_1 \in [0.005, 0.015]$ and $f_2 \in [0.015, 0.035]$.

the total profit across all merchants is given by:¹¹

$$\begin{aligned}\Pi(p_p, p_r) &= [(1 - f_2)p_p - c]Q_p + (p_r - c)Q_r \\ &= \lambda[(1 - f_2)p_p - c] \cdot [1 - F((1 - f_1)p_p)] + (1 - \lambda)(p_r - c) \cdot [1 - F(p_r)],\end{aligned}$$

where c denotes a merchant's marginal cost and for simplicity we assume that marginal costs are equal across merchants.

Ideally, we prefer results that are consistent across market structures so that unambiguous policy recommendations can be made. However, the presence of premium payment methods or the implementation of a no-surcharge rule might impact a monopoly market differently than an oligopoly one. Thus, to comprehensively investigate the impact that payment methods have on effective prices we must consider the role of market structure. To do so, we implement the conduct parameter approach as proposed by Weyl and Fabinger (2013). The conduct parameter, $\theta \in [0, 1]$, captures the level of competition between symmetric merchants where greater θ corresponds to less competition. At the extremes, $\theta \rightarrow 0$ captures competition approaching perfect, and $\theta \rightarrow 1$ corresponds to competition approaching the case of a monopoly merchant. In this way, we are able to capture the degree of competition in a continuous manner with a single parameter without specifying the specific type of competition.¹²

To illustrate the conduct parameter approach in our setting, first consider the simple case with a single (cash) payment method. In this case, an industry's optimal retail price is characterized by

$$\frac{(p - c)}{p} \cdot |\epsilon| = \theta \quad \text{or} \quad \underbrace{\theta \cdot Q}_{\text{Marg. Benefit}} = \underbrace{(p - c) \left| \frac{dQ}{dp} \right|}_{\text{Marg. Loss}}. \quad (1)$$

This relationship shows that if the conduct parameter decreases (corresponding to an increase

¹¹At this point, we assume that all merchants accept the two payment methods (as is the case in most markets where merchants accept cash, debt, and credit).

¹²Note that $\theta = \frac{1}{n}$ corresponds to Cournot competition with n symmetric merchants.

in competition), then the marginal benefit from increasing ones price goes down. As a result, the equilibrium price decreases with greater competition.

Applying the conduct parameter approach to our setting implies that the surcharge prices ($p_p \neq p_r$) and the no-surcharge price ($p = p_p = p_r$) are given by (the derivations are shown in the appendix):

$$\theta \cdot Q_r = (p_r - c) \cdot \left| \frac{\partial Q_r}{\partial p_r} \right|, \quad (2)$$

$$\theta \cdot (1 - f_2) \cdot Q_p = [(1 - f_2)p_p - c] \cdot \left| \frac{\partial Q_p}{\partial p_p} \right|, \quad (3)$$

$$\lambda \cdot \theta(1 - f_2)Q_p + (1 - \lambda) \cdot \theta Q_r = \lambda \cdot [(1 - f_2)p - c] \cdot \left| \frac{\partial Q_p}{\partial p} \right| + (1 - \lambda) \cdot (p - c) \cdot \left| \frac{\partial Q_r}{\partial p} \right|. \quad (4)$$

The timing of the game is as follows. First, merchants observe premium fees and rewards ($f_2 > f_1 > 0$), the nature of competition (θ), the distribution of payment methods (λ), the distribution of consumer values ($F(\cdot)$), and the surcharge rule (surcharge or no-surcharge). Then the equilibrium price(s) are determined. Lastly, consumers observe their value and make purchasing decisions.

3 Equilibrium

We solve the game backwards and we start with the subgame where the no-surcharge rule is implemented. To simplify our analysis, suppose that consumer values are distributed uniformly, $v \sim U(0, 1)$, and that $c \in (0, 1)$. This implies that demand is linear: $Q_p = \lambda[1 - (1 - f_1)p]$ and $Q_r = (1 - \lambda)(1 - p)$.

3.1 The No-Surcharge Subgame

For the no-surcharge rule case (which is observed in reality), we have the following no-surcharge subgame equilibrium price:

Lemma 1. *If merchants cannot surcharge across payment types, then the equilibrium retail*

price is

$$p^*(\lambda, \theta) = \frac{(1 - \lambda f_1)c + \theta \cdot (1 - \lambda f_2)}{(1 + \theta)[1 - \lambda(f_1 + f_2 - f_1 f_2)]}. \quad (5)$$

Not surprisingly, greater premium usage or less competition increase prices: $\frac{\partial p^*(\lambda, \theta)}{\partial \lambda} > 0$ for all θ and $\frac{\partial p^*(\lambda, \theta)}{\partial \theta} > 0$ for all λ . However, an arguably more important consideration is the comparison between the effective prices that consumers pay with and without the existence of the premium payment method. In particular, if $(1 - f_1)p^*(\lambda, \theta) > p^*(0, \theta)$, then all consumers (both premium and regular) pay a higher effective price when the premium payment method exists. And if this is in fact the case, then the premium payment method generates a double marginalization effect that is harmful to all consumers. We find that this is the case when the mass of premium consumers is sufficiently large:

Proposition 1. *All consumers pay a higher effective price when the premium method exists, $(1 - f_1)p^*(\lambda, \theta) > p^*(0, \theta)$, if and only if $\lambda > \frac{f_1(c+\theta)}{c[f_2-f_1(f_2-f_1)]} \equiv \bar{\lambda}$.*

In other words, Proposition 1 implies that premium consumers pay a lower effective price when the premium method exists, $(1 - f_1)p^*(\lambda, \theta) < p^*(0, \theta)$, only if $\lambda < \bar{\lambda}$. Furthermore, notice that an increase in market power amongst merchants (i.e., an increase in θ) implies that $\bar{\lambda}$ increases. This implies that the premium payment method might combat market power markups by maintaining a lower effective price for the premium consumers. This result is especially important in the context of double marginalization. For example, if f_1, f_2 , and c are such that $\bar{\lambda} > 1$ for high values of θ , then the premium payment method acts as a redistribution between merchants with market power and their consumers so that premium consumers pay a lower effective price than if the premium method did not exist. This implies that if all consumer were premium, then the premium payment method serves as a redistribution mechanism that takes surplus from merchants with market power and offers it to consumers so that total sales expand.

There are several additional results from Proposition 1 that are worth mentioning. First note that if the credit card company charges a higher markup so that f_2 increases, then $\bar{\lambda}$

decreases so that there is a greater number of λ where all consumers are made worse off from the existence of premium payment methods. Second, if we consider the case of perfect competition, then Proposition 1 implies that all consumers are worse off when $\lambda > \frac{f_1}{f_2}$ (since $f_1 \cdot f_2 \approx 0$ in practice). If we consider the case where premium merchant fees are 3% while rewards are 1%, then premium consumers are better off when at most a third of consumers are premium, $\lambda < \frac{0.01}{0.03} = \frac{1}{3}$. Unfortunately, data on the percent of credit card transactions is limited; especially at disaggregated levels (like a single market that is clearly served by perfectly competition merchants). Luckily the Federal Reserve provides some information on payment method usage. Using survey data, Greene and Stavins (2018) find that 27% of payments are made with credit cards (relative to cash and debit options). At the same time, Greene and Stavins (2018) also point out that credit card purchases are more common for more expensive purchases and for purchases made online. These numbers suggest that credit card users are better off in markets that are perfectly competitive since $0.27 < 0.33$.

3.2 The Surcharge Subgame

Allowing merchants to charge different prices across consumers that use different payment methods is currently not allowed. Merchants have attempted to challenge the no-surcharge rule that has been implemented by premium credit card companies. However, at this time, the courts have ruled against the merchants so that surcharging does not currently occur in practice. To better understand how surcharging might impact effective prices across market structures, we consider the surcharge subgame.

Note that when surcharging is allowed, a premium consumer is enticed to use the regular payment method when their effective premium price is greater than the effective regular price; that is, when $(1 - f_1)p_p \geq p_r$. Naturally, this allows merchants to discourage premium usage and increase profits which is detrimental to the premium payment companies. Solving the surcharge subgame, we have the following result:

Lemma 2. *If merchants surcharge, then all consumers pay the same effective price for all*

$\theta \in [0, 1]$ and for all $f_2 \geq f_1$, and equilibrium prices are given by:

$$p_r^* = (1 - f_1)p_p^* = \frac{(1 - \lambda f_1)c + (1 - \lambda f_2)\theta}{(1 - \lambda f_1) + (1 - \lambda f_2)} \equiv p_{SR}^*. \quad (6)$$

The fact that all consumers pay the same effective price in equilibrium implies that surcharging eliminates premium sales and the premium payment companies earn no revenue. Furthermore, this result is robust across all market structures, highlighting how the premium companies require the no-surcharge rule in order to survive.

3.3 Comparing Effective Prices

Comparing prices between the two subgames shows that surcharging is preferred from an effective price perspective:

Proposition 2. *If $f_1 > f_2^2$, then effective prices with surcharging are less than effective prices with the no-surcharge rule: $p_{SR}^* < p^*$ for all $\theta \in [0, 1]$.*

Anecdotally, premium and non-premium payment methods have f_1 considerably larger than f_2^2 . This suggests that all consumers pay a lower effective price when surcharging is allowed, regardless of the market structure that exists between merchants. In other words, the no-surcharge clauses set by premium companies result in higher effective prices for all consumers in every market throughout the business-to-consumer economy. While we do not model welfare explicitly, the welfare implications are crystal clear: (i) merchant profit increases with surcharging since merchants face fewer pricing constraints, and (ii) consumer surplus increases since all consumers pay lower effective prices. These results highlight how the implementation of the no-surcharge rule by premium card companies creates a double marginalization effect that harms all consumers and merchants. Thus, the potential benefits from the premium method that were discussed following Proposition 1 disappear when surcharging is allowed.

Altogether, our results conclude that the having a premium payment method that is protected by a no-surcharge rule harms consumers and merchants across all markets. In terms of the current policy debate, this suggests that the merchants' point is a valid one: protected higher premium fees are passed on to consumers creating a double marginalization effect that increases effective prices and reduces sales. Furthermore, by showing that premium usage disappears in the surcharge subgame equilibrium, we highlight how the no-surcharge rule is necessary for premium credit card companies to earn any revenues.

4 Discussion

In this section, we briefly discuss the implications of our findings to the context of existing policy debates. In particular, we apply our results to the ongoing debate of premium card acquisition, premium v.s. standard credit cards, merchant steering and “accept all cards” clauses, and retailer credit card offerings.

4.1 Payment Method Acquisition: A Prisoner's Dilemma Game?

While we do not model acquisition explicitly, our findings do have implications towards payment method acquisition. For the case where surcharging is allowed, Lemma 2 implies that effective prices will be equalized across payment methods; as a result, consumers have no incentive to acquire the premium payment method and this is consistent with the previous literature (Rochet and Tirole (2002), Wright (2003), and Wright (2004)). When the no-surcharge rule is implemented, a consumer that does not use the premium payment loses out on the premium rewards that effectively lower their price. At the same time, a merchant might lose sales by not accepting a premium method. This implies that both consumers and merchants have an incentive to acquire the premium payment method. However, by all agents acquiring the premium payment method, Proposition 1 implies that all consumers might still pay a higher effective price than if no consumer used the premium method. In

this case, the payment method acquisition game between consumers and merchants is akin to the prisoner’s dilemma game where every agent has an incentive to acquire the premium method but all agents would be better off if they collectively avoid the premium option. This suggests that the use of policy or side payments (in the form of surcharges) is necessary to obtain the welfare improving outcome.

4.2 Premium v.s. Standard Credit Cards

In many ways, our results suggest that credit card usage is harmful. However, it is important to note that there are many potential benefits from credit cards that we abstracts from in our model. As a result, one must be very considerate when interpreting our results to certain credit card issues. If we use our model to consider the comparison of cash and standard credit cards, then our results imply that standard credit cards increase the effective prices that consumers pay. But we also know that standard credit cards also provide many benefits to consumers that are not accounted for in our model (e.g., theft protection and easier online shopping). Thus, the benefits from standard credit cards clearly outweigh the inefficiency that they generate in the form of higher effective prices.

Instead, if we use our model to consider the comparison between standard and premium credit cards, then our model is no longer abstracting from these benefits since the standard credit cards already provide theft protection and easier online shopping. In this case where the main benefits from credit cards are already obtained through standard cards, our results suggest that premium credit cards that are protected by no-surcharging are harmful to consumers and merchants.

4.3 Steering and Accept All Cards Clauses

The majority of credit card companies like Visa, Mastercard, and American Express have an “accept all cards” requirement that forces retailers to accept all of their standard and premium cards. To circumvent the accept all cards requirement, retailers hoped to steer their

consumers either by asking for particular payment methods (cash or standard cards) or by penalizing certain payment methods (premium cards) with a surcharge. If such steering practices are effective (as we show in the for the surcharge case), then premium usage is prevented and efficiency restored.

Unfortunately, the recent Supreme Court ruling sided with the credit card companies and prevents steering. The main consideration throughout this debate was over competition between credit cards. However, such a focus failed to consider the repercussions of premium credit cards on effective retail prices. Moving forward, one way for merchants to bypass steering is to target these accept all cards requirements. In fact, this is what several major retailers are currently pursuing under the argument that such clauses are anticompetitive at the bank level (with respect to interchange fees). While this lawsuit is currently ongoing, a federal court ruling in favor of the retailers would allow retailers to directly steer their consumers by declining premium credit cards while accepting standard ones, and we find that such a policy would lower effective prices for all consumers and improve efficiency within retail markets.

4.4 Retailers Offering Credit Cards

In several ways, our findings resemble the issue of double marginalization in the vertical supply chain. Naturally, the vertical integration solution to double marginalization might apply to the premium payment method problem that exists in retail. In particular, merchants can vertically integrate by offering their own credit card. This is common for major retailers like Macy's, Amazon, and Target. Another potential solution is for merchants to negotiate rates with credit card companies as a kind of vertical integration. Following the Supreme Court's ruling on surcharging, many major retailers began negotiating alternative rates on premium cards.¹³ The retailers claim that the intention of these negotiations is to keep retail prices low, and our model suggests that this objective is legitimate and will improve market

¹³See "Are Other People's Credit-Card Rewards Costing You Money? Amazon and other retailers believe so, and they're going to war against high-end cards," in the *New York Magazine*, October 2018, for details.

efficiency. Thus, policy makers should not necessarily consider such negotiations between retailers and credit card companies as collusive or anti-competitive.

5 Concluding Remarks

In this paper, we aim to determine how the effective prices, defined as prices inclusive of payment method rewards, are impacted by the use of multiple payment methods and how this impact depends on the surcharge rule that is in place. When the no-surcharge rule is implemented, we find that the premium merchant fee pass-through is often greater than the premium reward to consumers so that all consumers, premium and non-premium, pay a higher effective price when premium payment methods are available in the market. If merchants can surcharge across payment methods, then all consumers pay the same effective price so that premium payment methods account for no sales. Furthermore, by comparing prices across the two rules we find that effective prices are always lower with surcharging.

Our results are consistent across all market structures, suggesting that the presence of premium payment methods that are protected by no-surcharge rules harms consumers and merchants in all retail markets. This suggests that the Supreme Court ruling to prevent steering (i.e., surcharging) benefited premium credit card companies at the expense of consumers and merchants. However, our findings also imply that policy makers can rectify this mistake by banning credit card company “accept all cards” clauses. Such a ruling would enable merchants to lower effective prices by limiting premium card purchases without losing sales to consumers using standard credit cards.

Appendix of Proofs

Deriving Equations (2), (3), and (4): Taking the classic conduct formula from Equation (1) we have that $\frac{p-c}{p} = -\epsilon \cdot \theta = \frac{-\theta Q(p)}{p \cdot Q'(p)}$ and this implies that $0 = \theta Q(p) + Q'(p) \cdot (p - c)$. Notice that this is the first-order condition from the Cournot model after symmetry is imposed with $\theta = \frac{1}{n}$.

Applying this approach to the regular consumer market, we have that $0 = \theta Q_r + (p_r - c) \cdot \frac{\partial Q_r}{\partial p_r}$ which implies that $\theta \cdot Q_r = (p_r - c) \cdot \left| \frac{\partial Q_r}{\partial p_r} \right|$. Now consider the premium consumer market where profit from the premium consumers is given by: $\Pi_p = [(1 - f_2)p_p - c]Q_p$. With the $(1 - f_2)$ distortion in the markup term, applying the conduct formula implies that $0 = \theta \cdot (1 - f_2)Q_p + [(1 - f_2)p_p - c] \cdot \frac{\partial Q_p}{\partial p_p}$ so that $\theta \cdot (1 - f_2)Q_p = [(1 - f_2)p_p - c] \cdot \left| \frac{\partial Q_p}{\partial p_p} \right|$. Lastly, by weighing the two equations across the λ premium consumers and the $(1 - \lambda)$ regular consumers we have that $\lambda \cdot \theta(1 - f_2)Q_p + (1 - \lambda) \cdot \theta Q_r = \lambda \cdot [(1 - f_2)p_p - c] \cdot \left| \frac{\partial Q_p}{\partial p_p} \right| + (1 - \lambda) \cdot (p_r - c) \cdot \left| \frac{\partial Q_r}{\partial p_r} \right|$. \square

Proof of Lemma 1: The equilibrium price for the no-surcharge subgame is given by Equation (4). Solving for p with $Q_p = \lambda[1 - (1 - f_1)p]$ and $Q_r = (1 - \lambda)(1 - p)$ implies that $p^*(\lambda, \theta) = \frac{(1 - \lambda f_1)c + \theta \cdot (1 - \lambda f_2)}{(1 + \theta)[1 - \lambda(f_1 + f_2 - f_1 f_2)]}$. \square

Proof of Proposition 1: Equation (5) implies that $(1 - f_1) \cdot p^*(\lambda, \theta) > p^*(0, \theta)$ if and only if $(1 - f_1)[(1 - \lambda f_1)c + (1 - \lambda f_2)\theta] > (c + \theta)[1 - \lambda(f_1 + f_2 - f_1 f_2)]$ which holds if and only if $\lambda > \frac{f_1(c + \theta)}{c[f_2 - f_1(f_2 - f_1)]} \equiv \bar{\lambda}$. \square

Proof of Lemma 2: Solving for p_r and p_p independently using Equations (2) and (3) implies that $\theta(1 - p_r)(1 - \lambda) = (p_r - c)(1 - \lambda) \left| \frac{\partial Q_r}{\partial p_r} \right|$ so that $p_r = \frac{c + \theta}{1 + \theta}$ and that $\theta(1 - f_2)\lambda[1 - (1 - f_1)p_p] = [(1 - f_2)p_p - c]\lambda(1 - f_1)$ so that $p_p = \frac{\theta}{(1 + \theta)(1 - f_1)} + \frac{c}{(1 + \theta)(1 - f_2)}$. However, with these prices we have that $(1 - f_1)p_p \geq p_r$ if and only if $f_2 \geq f_1$. Thus, a corner solution occurs where the two consumers pay the same effective price which we denote by $p_{SR} \equiv p_r = (1 - f_1)p_p$. Using Equation (4) and substituting p_{SR} for p_r and $(1 - f_1)p_p$ implies that $\lambda\theta(1 - f_2)(1 - p_{SR}^*) + (1 - \lambda)\theta(1 - p_{SR}^*) = \lambda(p_{SR}^* - c)(1 - f_1) + (1 - \lambda)(p_{SR}^*c)$ so that $p_{SR}^* = \frac{(1 - \lambda f_1)c + \theta \cdot (1 - \lambda f_2)}{(1 - \lambda f_1) + (1 - \lambda f_2)}$. \square

Proof of Proposition 2: Equations (5) and (6) imply that $p_{SR}^* < p^*$ if and only if $(1 + \theta)\lambda f_1 f_2 < 1 - \theta + \theta\lambda(f_1 + f_2)$. Notice that the left-hand side is increasing in θ while the right-hand side is decreasing in θ . Thus, if the inequality holds for $\theta = 1$, then the inequality holds for all $\theta < 1$. Thus, $p_{SR}^* < p^*$ if and only if $2f_1 f_2 < f_1 + f_2$. Note that if $f_2^2 < f_1$, then $2f_1 f_2 < 2f_2^2 < 2f_1 \leq f_1 + f_2$ so that $f_2^2 < f_1$ implies that $p_{SR}^* < p^*$. \square

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