

Visa states that the purpose of interchange fees “is to ensure an economically efficient balance between promotion to cardholders on the one hand and promotion to merchants on the other.”⁴⁷

56. The interchange fee may affect card holding, card use, and merchant acceptance, and thus it might serve to balance the costs and benefits of the merchant and cardholder sides of a card transaction. There are three fundamental questions:

- Does the level of an interchange fee affect the equilibrium outcome in ways that matter for economic efficiency and consumer welfare?
- In those cases in which the interchange fee does matter, what is the optimal interchange rate?
- In those cases in which the interchange fee does matter, do market forces lead to setting an optimal interchange rate?

The answers to all three questions depend on the market structure and business institutions that constitute the economic environment in which the interchange fee is levied.

57. No-surcharge rules are one of the most important elements of the institutional structure in which interchange fees operate. Moreover, surcharges may themselves serve as a mechanism for internalizing network effects so that they are not network externalities. Hence, the analysis below proceeds by examining the effects of interchange rates on market equilibrium first in a market where surcharges are feasible and second in a market where surcharges are banned. The two situations are then compared.

V. EQUILIBRIUM WITH FRICTIONLESS MERCHANT SURCHARGING

58. The present section assumes that merchants can costlessly surcharge in the absence of formal prohibitions. In practice, frictions may prevent a merchant from engaging in surcharging even in the absence of formal restrictions. For example, there may be transactions costs associated with charging multiple prices, or merchants may fear some form of consumer backlash. Thus, the analysis of the present section may overstate the extent to which removal of formal no-surcharge rules affects the market outcome.

A. A NEUTRALITY RESULT

59. As several authors have pointed out, when merchants are free to charge retail prices that are contingent on the method of payment used by the purchaser, these retail price differentials may undo any effects of interchange fees.⁴⁸

⁴⁷ *Visa Response* at 21.

⁴⁸ Jean-Charles Rochet and Jean Tirole (“Cooperation among Competitors: The Economics of Payment Card Associations,” 16 May 2000 (hereafter *Rochet and Tirole*)) establish an interchange fee neutrality result in the context of a specific model of issuer, acquirer,

60. The issue can be represented algebraically as follows. Let p denote the price charged by merchants for card-based purchases. Let m denote the merchant service fee. Let r denote the rebate paid by issuers to cardholders. For users of cards with loyalty programs offering rebates or rewards, $r > 0$. For users of other credit and charge cards, the typical value of r is zero.⁴⁹ Finally, let a denote the interchange fee paid by acquirers to issuers.

61. Rational consumers base their purchase and payment mechanism decisions on $p - r$, the net cost to a consumer from making a card-based purchase. Suppose a change in the interchange fee of da leads to changes in p and r equal to dp and dr , respectively. Then the change in a consumer's net costs of a card-based transaction is $dp - dr$. Hence, if the rates of change are equal (*i.e.*, $dp/da = dr/da$), then changes in the interchange fee have no effect on the net prices paid by consumers to make card-based purchases.

62. How likely are the rates of change in p and r to be equal when the interchange fee rises? Consider what happens when each party—issuer, acquirer, and merchant—expects every other party simply to pass through the increase. The merchant sees its merchant service fee rise by da . But the merchant also sees consumers' willingness to purchase goods and services using cards rise by da because issuers pass on the benefits they receive from the higher interchange fee by increasing the rebate by da . Moreover, the merchant expects all other merchants to raise their prices for card-based transactions accordingly. Hence, the merchant faces a pricing problem that is identical to the earlier one, except that everything happens at a price da higher; equilibrium quantities would be unaffected.⁵⁰ Similar arguments can be made for acquirers and issuers. If there is a unique equilibrium in each of the merchant, acquiring, and issuing markets for a given interchange fee, then there is a unique set of equilibrium consumption and output levels and it is invariant with respect to the level of the interchange fee.

and merchant behavior. Joshua S. Gans and Stephen P. King ("The Neutrality of Interchange Fees in Payment Systems," draft version 28 May 2001) provide very general conditions for neutrality to hold.

⁴⁹ A negative value of r would correspond to per-transaction fee charged by the issuer to the card user.

⁵⁰ Formally, let $p(x, X) + r$ denote the per-unit price consumers are willing to pay to purchase x units of a merchant's output, where X is a vector denoting the output levels of all rival merchants. Suppose the merchant's costs are $c(x) + mx$. Then the merchant's profits are $\{p(x, X) + r\}x - \{c(x) + mx\} = p(x, X)x - c(x) + \{r - m\}x$. If r and m change by the same amount, there is no effect on the optimal choice of x given what other merchants are doing. But if every merchant reasons this way, X will be unaffected. Hence, the original set of equilibrium quantities will remain equilibrium quantities after the change in the interchange fee. Similar notation can be introduced for acquirers and issuers to show that their quantity choices would be unaffected as well. For a formal derivation, see Joshua S. Gans and Stephen P. King, "The Neutrality of Interchange Fees in Payment Systems," draft version 28 May 2001.

B. WELFARE ANALYSIS

63. When the conditions of the neutrality result hold, the interchange fee cannot be used as a tool to balance the costs and benefits potentially enjoyed by the two sides of a card-based transaction. This raises the question of whether the resulting equilibrium will be inefficient and whether there will be uninternalized external effects. As it turns out, merchant pricing may still provide an important means of internalizing external effects.

64. Frontier Economics and Visa argue that, absent a mechanism for internalization, externalities will arise from card usage because merchants earn positive margins on sales made using credit and charge cards.⁵¹ The argument goes as follows. Some people are willing to purchase a particular product from a given merchant only if that merchant accepts a particular brand of credit or charge card. Thus, because the merchant typically sells goods and services at prices that exceed its marginal costs, a consumer's decision to use his or her credit card generates a benefit for the merchant. This benefit will be an externality if there is no mechanism to ensure that merchants compensate card users.

65. There are several problems with using this argument to conclude that interchange fees are needed to ensure efficiency. Some of these problems have already been identified in the earlier discussion of merchant benefits. First, an individual merchant's benefits of card acceptance arise only from sales transactions that would not have been made if the merchant did not accept cards. Second, the merchants' *collective* benefits may be zero because one merchant's increased sales can come at the expense of other merchants' sales. Both of these points raise doubts about the magnitude of these effects, even if they are externalities. Third, there may be other mechanisms for internalization, specifically, merchant pricing. All of these problems point to the need for careful analysis.

66. Several authors have conducted formal economic analyses that examine the welfare properties of equilibrium when surcharging is practiced. Professors Rochet and Tirole carefully model market equilibrium under the assumption that there is a single card network and a single alternative payment mechanism, "cash."⁵² They also assume that merchants are so-called Hotelling competitors: two firms that offer differentiated products and each choose prices taking the other merchant's prices as given. Absent a no-surcharge rule, a merchant in their model sets one price for card-based transactions and another for cash transactions.

67. In this model, an individual merchant can increase its sales by accepting credit cards. Moreover, Rochet and Tirole assume that merchants enjoy positive transactions benefits from card use. Thus, both types of potential merchant benefits identified in Part III.B above are present in their model. One of Rochet and Tirole's key findings is that neither of these benefits is a source of externality. The reasons why are worth exploring.

⁵¹ Frontier Economics, "Joint Bank Review of Credit Card Membership and Interchange Fees," *Report on Credit Interchange Fees to Review Banks*, January 2001, at 73, and *Visa Response* at 21.

⁵² *Rochet and Tirole*.

68. First, the increased sales are not a source of externality because—although an individual merchant gains sales by accepting cards—the collective effect on merchant sales is zero. In the Rochet and Tirole model, the total quantity of purchases is fixed over the relevant range of prices. Hence, with respect to unit sales, the merchants play a zero-sum game.

69. Second, merchant transactions benefits are not a source of externality because there is an internalization mechanism. Competition between the two merchants leads them to pass their transactions benefits through to consumers in the merchants' retail prices.⁵³ If credit card transactions are 1 percent cheaper because of reduced cash handling costs, the merchants set prices lower for credit transactions than for cash transactions by a corresponding amount. In general, the retail pricing differential associated with card use may be positive or negative, reflecting the merchant's net incremental benefits and costs of card use. In this way, consumers face prices that guide their card holding and usage decisions based on the costs and benefits realized by both sides of a card-based transaction.

70. The intuition behind this result can be seen by taking the interchange fee to be negative (*i.e.*, issuers pay acquirers) and equal to the acquirer's marginal costs.⁵⁴ With this interchange fee, issuers bear all of the issuing and acquiring costs and pass these on to their cardholders. So why wouldn't there be a problem when merchants get benefits but all of the costs fall on the cardholder side of the transaction? The answer is the use of retail price differentials by merchants. Consumers would face all of the costs of card holding and usage, but given the prices set by merchants, consumers would also enjoy all of the benefits.

71. The Hotelling model is one representation of merchant behavior. There are others. For instance, the perfectly competitive model of merchant behavior also gives rise to equilibrium retail price differentials equal to the differences in merchants' net costs of different payment mechanisms. Hence, with perfectly competitive merchants, consumers would face retail prices that reflected net merchant benefits and costs. Other models of merchant behavior can give rise to different equilibrium retail price differentials. Part IX.F of the Technical Appendix contains an illustrative model of a monopoly merchant. Depending on demand conditions, the differentials may be larger or smaller than the differences in net transactions costs and benefits.⁵⁵

72. Dr. Wright modifies the Rochet and Tirole model and reaches different conclusions. His most striking result is that, when merchants have monopoly power, frictionless surcharging destroys the market for credit and charge cards and eliminates their use entirely.⁵⁶ Dr. Wright finds that, when surcharging is feasible, the merchant sets prices that extract all of the consumer

⁵³ *Rochet and Tirole* at 18.

⁵⁴ Recall that, because of neutrality, the choice of interchange fee does not affect the resulting equilibrium quantities or net retail prices.

⁵⁵ In addition, as discussed later in the present section, Professors Gans and King examine a model in which a monopoly merchant sets the differential inefficiently high.

⁵⁶ Julian Wright, "An Economic Analysis of a Card Payment Network," December 2000 (hereafter *An Economic Analysis*) at 13.

surplus derived from purchase of the good by the marginal cardholder (*i.e.*, the cardholder with the lowest benefits from card use). Knowing this would happen, the marginal cardholder would not have paid to obtain a card in the first place. Hence, there can be no marginal cardholder, and allowing surcharges leads to the complete collapse of the credit card industry. As discussed in the Technical Appendix, this result is an artifact of an extreme assumption made in the model.⁵⁷ Under more realistic assumptions, cards are used, or even overused, in equilibrium when merchants have monopoly power and surcharging is feasible.

73. Even with Hotelling merchants, Dr. Wright finds that the equilibrium outcome with surcharging can lead to inefficiently low levels of cardholding. The reason is that he, unlike Rochet and Tirole, assumes that consumers make greater purchases when credit cards are accepted. Hence, there are economywide increased-sales benefits which are not internalized even when retail price differentials reflect transactions benefits.⁵⁸ As discussed in Part III.B above, however, the assumption of significant economywide increased-sales benefits is problematical.

74. Collectively, these models illustrate an important general point. Depending on the model of merchant pass through, some or all of the transactions benefits will be passed through to consumers through retail price differentials. Surcharges can thus be a mechanism for ensuring a balance of cost and benefits between the two sides of a card-based transaction. In other words, *surcharging can allow the market to internalize what might otherwise be an externality.*

75. American Express claims to the contrary that
permitting surcharging amounts to an arbitrary decision by regulators that
merchants should have to pay none of the costs of the credit card system and
that cardholders should pay all of those costs.⁵⁹

As the analyses above demonstrate, this claim is false. For some market structures, surcharges fully internalize the effects on the two sides of a transaction. In other cases, although the surcharges do not perfectly reflect merchants' net costs and benefits of different payment mechanisms, surcharges still partially internalize these effects.

76. A similar assertion is sometimes made that 'because merchants benefit from card use they should have to bear the costs.' When the transactions benefits minus the merchant service fee are positive, merchants will have incentives to promote card use through discounts, rather than surcharges. Similarly, if the transactions benefits were equal to the merchant service fee, merchants would be neutral in terms of promoting one payment mechanism or another. It is in

⁵⁷ See Part IX.C below.

⁵⁸ More precisely, there are economywide gains in the surplus associated with equilibrium sales. (See *An Economic Analysis*, §4.3.)

⁵⁹ *American Express Submission* at 10.

merchants' interests to use surcharges to reduce credit and charge card use relative to other payment mechanisms only when the merchant service fee exceeds the transactions benefits.

77. Even if surcharges exactly reflect differences in the net transaction benefits and costs of different payment mechanisms, there may be other distortions in the market outcome. For instance, if issuers and acquirers in the Rochet and Tirole model were perfectly competitive, the market outcome with frictionless surcharges would be fully efficient. However, Rochet and Tirole find that, when issuers are less than perfectly competitive, equilibrium in their model entails the under use of credit cards as the result of issuer market power.⁶⁰ The fact that issuer market power is the source of the problem indicates the social value of removing obstacles to issuer competition.

78. Distortions in issuers' pricing to their cardholders raise a second issue. Credit card issuers generate two revenue streams from their operations. One stream comprises annual fees and interchange fees, which are collected even if a card is never used as a source of credit beyond the grace period. The other stream comprises finance charges paid by cardholders who maintain balances past the grace periods on their cards. Although this point is not addressed by the formal models cited by respondents, the profitability of credit card lending may create incentives for issuers with market power to set annual fees or transactions charges below cost (e.g., no-annual-fee cards) in order to encourage consumers to hold cards, use them to make purchases, and increase their borrowing levels. The presence of these incentives may offset or even outweigh the incentives for issuers with market power to set annual fees or the transactions charges levied on consumers above costs. To the extent that issuers set annual fees and transactions charges below costs, the overuse of cards would be encouraged in the setting examined by Rochet and Tirole.

79. Professors Gans and King consider a model in which there is a monopoly merchant and similarly find that there is insufficient card use.⁶¹ Unlike Rochet and Tirole, Gans and King find that the market outcome results in credit card sales that are strictly less than socially optimal even when issuers are perfectly competitive. Like Rochet and Tirole however, Gans and King find that the restriction of credit card use is *not* due to network externalities. Instead, the distortion in card use is the result of the exercise of merchant market power, specifically retail price discrimination against card use.⁶² As discussed in the Technical Appendix, the possibility of this type of price discrimination follows from the special structure of demand that they have

⁶⁰ Rochet and Tirole at 20.

⁶¹ Joshua S. Gans and Stephen P. King, "Regulating Interchange Fees in Payment Systems," draft version 14 June 2001 (hereafter *Regulating Interchange Fees*) Proposition 1 at 7. This proposition relies on the unstated assumption that the sum of the transaction fees charged by issuers to cardholders and by acquirers to merchants are greater than or equal to social marginal costs.

In contrast to Dr. Wright's finding in *An Economic Analysis*, the use of credit cards is not eliminated entirely when the merchant is a monopolist in the Gans and King model.

⁶² *Regulating Interchange Fees* at 8.

assumed—where a consumer uses credit cards for those transactions for which he or she has a relatively high willingness to pay—and it need not arise in other models of demand, even when there is a monopoly merchant.⁶³

80. The models discussed so far demonstrate that the nature of competition among merchants and among issuers can affect the efficiency of the market outcome. A final point to note is that increased competition among acquirers might simultaneously promote increased merchant acceptance and efficient card holding and use. The logic underlying this conclusion is that increased competition among acquirers could be expected to reduce the markup of merchant service fees over the interchange fee and acquisition costs, all else equal. The lower merchant service fees would make card acceptance more attractive to merchants and could lead to lower surcharges (or bigger discounts) for the use of credit and charge cards.

81. In summary, economic theory provides reasons to believe that surcharges can serve as an important means of internalizing external effects but that the market outcome may not be fully optimal in the presence of frictionless surcharging. The lesson of these models is that both the structure of consumer demands and the nature of retailer market structure can affect the degree to which retail price differentials reflect underlying differentials in a merchant's costs and benefits of various payment mechanisms. Under some conditions, these differentials will exactly reflect the underlying cost and benefit differentials, thus perfectly internalizing the external effects. In other cases, the differentials may be smaller or larger than ideal. There is no general finding that merchants with market power will set retail price differentials that are biased against credit and charge cards. Moreover, in some cases the problem is not network effects, it is issuer market power.

VI. EQUILIBRIUM IN THE PRESENCE OF NO-SURCHARGE RULES

82. When merchants are forbidden to surcharge, the neutrality result discussed in the previous section may no longer hold, which raises questions of the welfare effects of interchange fees and the determination of optimal interchange fee levels.

A. EQUILIBRIUM FOR A GIVEN INTERCHANGE RATE

83. The presence of a no-surcharge rule breaks the logic of the interchange neutrality argument presented in the previous section. But even with a no-surcharge rule, neutrality still holds when merchants are perfectly competitive. To see this fact, suppose that card-based transactions are more costly to merchants than are other transactions. Then under a no-surcharge rule, individual merchants will specialize. Some merchants will accept credit and charge cards and will charge relatively high prices. Other merchants will accept only cash and will charge relatively low prices. Any merchant that tried to set a common price for both card

⁶³ See Part IX.E below and cross-references therein.