

most likely to have proprietary cards in the absence of general purpose cards. Thus, claims of any such benefits must be regarded as highly speculative.

38. This discussion indicates that credit allows the smoothing of consumption in the face of uneven income streams, may reduce the need to hold unproductive inventories, and might reduce transactions costs. But one must be careful not to overstate the benefits. Moreover, one must recognize that these are beneficial effects of *credit in general*, not specifically benefits of *card* use. Thus, one must also examine the extent to which credit and charge card transactions generate these benefits. The Australian economy has other forms of credit available that can be used to engage in lifetime income smoothing (*e.g.*, home mortgages). The existence of other forms of credit does not remove the benefits of credit cards for many consumers as a means of short-term or small-scale smoothing, but it reduces the importance of credit cards for overall macroeconomic performance. A closely related question concerns the extent to which particular uses of credit cards give rise to these benefits. For example, so-called transactors may not use credit cards to smooth consumption flows, and thus their use of the cards may not generate many of these benefits.

39. The fact that credit and charge card use may not increase aggregate consumption, or may do so by significantly less than some parties imply, does not mean that credit cards have no beneficial effects. But, as will be shown below, the considerations identified here have significant consequences for efficient pricing and whether markets succeed or fail to attain efficient outcomes.

IV. THE POSSIBILITY OF EXTERNALITIES

40. A notable feature of consumer and merchant benefits is that a single card-based transaction can generate benefits for both sides of the transaction simultaneously. Moreover, each side needs to take actions in order for a transaction to take place. This fact raises the possibility each side will make privately optimal, but socially inefficient, decisions because it will fail to take into account effects on the other side of the transaction. This section explores these implications further and poses questions answered in the following sections.

A. NETWORK EFFECTS

41. A general purpose credit and charge card is valuable to consumers because it can be used to pay for purchases at a variety of merchants. All else equal, an actual or potential cardholder places greater value on a card issued on a network with more extensive merchant acceptance. Thus, the greater the number of merchants who accept a given system's cards, the greater the number of consumers who wish to carry and use the card. This positive relationship between network size (as measured by the number and variety of merchants) and consumer valuation is an example of a more general phenomenon that economists refer to as *network*

effects.³⁸ Network effects arise when, the greater the number of users on a system, the more valuable the system is to an individual user.

42. Economists distinguish *direct* network effects from *indirect* network effects. Direct network effects arise when an increase in the size of a network increases the value of the network to its users. Telephone networks entail direct network effects—different users value increased network size because they can communicate with one another, which gives rise to benefits of variety. Indirect effects arise when actions by one party increase the supply of complementary services, which increases the economic welfare of other users of those services. Personal computer operating systems and applications programs provide a very well known example: The greater the number of people using a given operating system, the larger the potential market for applications running on that operating system, the larger the number of applications that are likely to be written for that operating system, and thus the greater the benefits to users of that operating system.

43. The credit and charge card industry can exhibit both types of network effects. There is a direct network effect associated with merchant acceptance of cards. An increase in the number of merchants accepting a card raises expected consumer benefits because a cardholder is more likely to be able to use the card on occasions when he or she finds it valuable to do so.

44. The credit card industry may also exhibit indirect network effects. If one cardholder takes actions that make it more desirable for merchants to accept cards, those actions may lead to an increase in merchant acceptance, which can help other cardholders. For example, there can be a positive-feedback relationship between the number of consumers carrying and using cards on the one hand and the number of merchants accepting the cards on the other. When acceptance of a credit card stimulates profitable sales, an increase in the number of consumers carrying a given system's brand of cards raises the value to a merchant of accepting that brand of card because the greater the number of such customers, the more acceptance of the card is likely to stimulate sales for the merchant. Thus, the greater the number of consumers who carry and use a given system's credit and charge cards, the greater the number of merchants that find that the benefits of card acceptance outweigh the costs.³⁹ This increase in the number of merchants would then benefit other holders of cards on that network.

45. The presence of multiple competing payment networks complicates the analysis of network effects.⁴⁰ To the extent a user of a card on one network confers positive effects on

³⁸ For a survey of the economics of network effects, see Michael L. Katz and Carl Shapiro "Systems Competition and Network Effects," *Journal of Economic Perspectives*, **8**, No. 2 (Spring 1994):93-115.

³⁹ There can be fixed costs of card acceptance. These include the expense of having terminals installed at the point of sale, the costs of training personnel, and any fixed costs charged by third-party processors or acquirers.

⁴⁰ The degree to which various payment mechanisms compete with one another has been subject to disagreement. In its analysis of a recent bank merger, the Australian Competition and Consumer Commission concluded that credit cards are in a relevant

other users of that network, he or she may also confer negative effects on users of other payment networks. These negative effects arise for the same reason that positive ones do—usage of other payment mechanisms falls, and to the extent that there are economies of scale in acceptance, the acceptance networks may shrink, reducing consumer benefits from use of that payment mechanism.

46. One question raised by the *Joint Study* is whether network effects diminish as a network matures.⁴¹ Maturity can refer to several different concepts. In network markets, actual and potential users typically care about future network sizes. For example, if a consumer is going to pay an annual fee for a card, he or she would like to know how many merchants are likely to accept the card over the coming year. Consequently, consumer expectations can be an important driver of the market outcome. Consumers may form expectations by looking at current installed bases and projecting forward, which can lead to the so-called “chicken and egg problem.” The chicken-and-egg problem arises when no consumer wants to join a network because too few merchants accept the card, but additional merchants don’t want to join the network because too few consumers carry the card. Credit and charge card networks can share a self-fulfilling expectations property with other networks: If everyone expects a network to succeed it will succeed, and if everyone expects a network to fail it will fail. Once a network has become established, the expectations process may get past the chicken-and-egg problem. The network’s viability may then be less sensitive to small changes in the size of the network, and the network may need to do less to promote membership (*e.g.*, subsidize membership) than would a fledgling network.

47. There is another sense in which a credit and charge card network may mature. It is possible that, at a sufficiently high level of membership on either the merchant side or the cardholder side, marginal changes in membership generate smaller or no benefits to other parties. For instance, to the extent that the incremental merchants on a network are substitutes for merchants already on the network, the value to a cardholder from having additional merchants accept cards very likely diminishes as the number of merchants increases.⁴² An

product market distinct from cash, cheques, and debit cards (Australian Competition and Consumer Commission, “ACCC Not to Oppose Commonwealth Bank/Colonial Merger,” Press Release, June 8, 2001, at 4.) The credit card associations and their members often assert the existence of vigorous competition among all payment mechanisms and therefore would include debit and cheques in the relevant market. (For example, *MasterCard Submission* at 4.) Notwithstanding this disagreement, all parties agree that there are multiple general purpose credit card networks supporting payment mechanisms that are substitutes for one another.

⁴¹ *Joint Study* at ii.

⁴² In theory, the last merchants to join a network might turn out to be the ones most valued by consumers, but intuitively this is very unlikely to happen in practice. For example, there might be some sort of community-of-interest effects, where a set of consumers and merchants have particular interest in transacting with one another, and thus only want to belong to the network if other members of this community belong, but cannot coordinate to join the network in a timely fashion. I am unaware of evidence that these effects are

established network again might thus need to do less to promote membership than would a fledgling network.

48. These considerations bring up the broader issue of internalizing network benefits, to which the analysis now turns.

B. NETWORK EFFECTS OR NETWORK EXTERNALITIES ?

49. In thinking through the business and public policy implications of network effects, it is important to understand whether the network *effects* are network *externalities*. Among economists, there have been decades of controversy over the definition of externalities. The various definitions proposed by economists include the following:⁴³

- Any situation in which actions by one economic agent affect the welfare of another economic agent not directly involved in the transaction.
- Missing markets.
- Situations in which taxes or subsidies could lead to Pareto improvements.

50. A common feature of all of these definitions is the notion that there are certain effects that one economic agent's actions have on another economic agent that are not fully captured in market prices. The failure of prices to reflect these effects means that self-interested economic decision makers may not take into account the effects of their actions on other economic agents. Thus, there may be a divergence between social and private incentives. Air pollution provides a classic example of potential externalities. Consider the decision of a firm whether to operate a factory that would earn X dollars annually. Suppose that the pollution created by the factory's operating is harmful to people living around the plant, and the monetary equivalent of this harm is two million dollars. It is economically efficient to shut down the plant if X is less than two million. But, in the absence of legal restrictions on polluting, the firm will operate the plant if its private benefits exceed its private costs. Thus, the firm will operate the plant unless local residents are able to organize to offer payments of X dollars or more to the firm to shut it down. If the plant's neighbors are unable to organize, the firm may operate the plant even if its benefits are only one million dollars and the harm to others is two million dollars. In this case, the firm's decision to operate gives rise to the negative externality of air pollution.

51. Although the air pollution in this example is an external effect, it need not be an externality. Suppose that the firm has to purchase a permit to pollute the air and this permit costs two million dollars. In this case, there is a market for air pollution rights, and the firm chooses to operate the plant if and only if the benefits of operation exceed two million dollars,

currently significant in Australian credit and charge card networks.

⁴³ Andreu Mas-Colell, Michael D. Whinston, and Jerry R. Green, *Microeconomic Theory*, Oxford University Press, 1995, at Chapter 11.

which is the socially efficient decision rule. Hence, the market for air pollution rights internalizes the effects.

52. This example thus illustrates a central point about externalities: Whether the effects of an activity constitute externalities depends, *inter alia*, on the set of market institutions in which the activity takes place. In part for this reason, there has been controversy over whether network effects constitute externalities, or whether market mechanisms develop to ensure that prices reflect the effects that one agent's actions have on others.⁴⁴

C. THE POTENTIAL ROLE OF INTERCHANGE FEES

53. The interchange fee has been identified as one potential mechanism to promote internalization of external effects by transferring funds from one side of card-based transactions to the other. At first glance, the interchange fee is a payment that goes from the merchant acquiring institution to the card issuing one. However, economists distinguish between the *statutory incidence* and the *economic incidence* of a fee. The statutory incidence refers to the party that initially pays the fee under the formal rules and institutions of the market. The economic incidence refers to who actually pays the fee once the market adjusts to a new equilibrium reflecting the fee. It is a well-established principle of economics that the statutory and economic incidences of a fee may be very different from one another.⁴⁵

54. The statutory incidence of the interchange fee for a given transaction is that the associated merchant acquirer pays. However, the presence of such fees affects the merchant service fees and thus may affect what merchants charge their customers. Moreover, receiving the fee affects an issuer's incentives for card issuance, including both pricing and promotion strategies. Hence, the economic incidence of interchange fees may fall on the associated merchant and its customers, both credit and charge card users and non-card users.

55. The effects of interchange fees on merchant service fees and the prices of card services charged to cardholders are recognized by both MasterCard and Visa in their rationales for interchange fees. MasterCard states that interchange

is fundamentally a balancing device for increasing the value and safeguarding the efficiency of the open systems by shifting costs between issuers and acquirers, and thereby the charges between cardholders and merchants.⁴⁶

⁴⁴ For a negative view on the importance of network externalities generally, see S. J. Liebowitz and Stephen E. Margolis, "Network Externality: An Uncommon Tragedy," *Journal of Economic Perspectives*, **8**, No. 2, Spring 1994:133-150.

⁴⁵ See, for example, Michael L. Katz and Harvey S. Rosen, *Microeconomics*, 3rd Edition, Irwin McGraw-Hill, 1998, at Chapter 11.2, and Robert S. Pindyck and Daniel L. Rubinfeld, *Microeconomics*, 5th Edition, Prentice Hall, 2001, at Chapter 9.6.

⁴⁶ *MasterCard Submission* at 9.

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,