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Strategic incompatibility in ATM markets

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ABSTRACT

We test whether firms use incompatibility strategically, using data from ATM markets. High ATM fees degrade the value of competitors' deposit accounts, and can in principle serve as a mechanism for siphoning depositors away from competitors or for creating deposit account differentiation. Our empirical framework can empirically distinguish surcharging motivated by this strategic concern from surcharging that simply maximizes ATM profit considered as a stand-alone operation. The results are consistent with such behavior by large banks, but not by small banks. For large banks, the effect of incompatibility seems to operate through higher deposit account fees rather than increased deposit account base.

> 'ATM surcharges may put small banks—or, more accurately, banks that do not own many ATMs—at a disadvantage... [Surcharges] may induce small-bank customers to move their deposit accounts to the larger banks, resulting in increased concentration in local banking markets.'
>
> — from 'Competition in ATM Markets,' Congressional Budget Office (1998).

1. Introduction

In recent years the economics of incompatibility have moved to the forefront of policy debates. The generic issue is something like this: A firm produces two products, which may be more valuable when consumed together. The firm faces competition in one or both markets. In principle, consumers can "mix and match" the firm's products with those of its competitors, but the firm decides to restrict consumers' ability to do so, effectively forcing them to buy both of its products together. Antitrust concerns over this behavior are common. In computers, Microsoft is held to have used a variety of technical and contractual restriction to link products in this way.[1] In media and telecommunications markets, the prospect that owners of "bottleneck" facilities might use that advantage to acquire market power in other markets is an ongoing concern.[2] Kodak allegedly used contractual restrictions to deny users of its copiers the ability to use independent service and parts for repairs.[3] Printer manufacturer Lexmark was sued for restricting consumers' ability to use third-party toner cartridges in its printers. Terminology in these cases varies—some refer to incompatibility, others refer to access or interconnection pricing, and others term this behavior tying—but the economic question is the same in each case: when will a firm attempt to restrict access across related markets, and when will that strategic behavior be successful?[4]

In this paper we provide an empirical framework for examining this question, using data from ATM markets. Banks offer both ATM cards and ATM services as a bundle to their depositors. They also offer other banks' customers access to their ATMs, but impose a per-use *surcharge* for each such transaction. Surcharges are closest to the telecommunication example; they are an access fee for off-network transactions. The allegation (highlighted by the quote above) is that large banks use surcharges to create incompatibility between their ATMs and other banks' cards, degrading the value of

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[1] See Genakos et al. (2004) for an empirical examination of the OS/server issue, in which Microsoft allegedly degraded the interoperability of its OS with rivals' server software. The antitrust suit against Microsoft alleged that Microsoft tied both Internet Explorer and its Java platform to Windows in order to maintain its Windows monopoly. See, e.g., Gilbert and Katz (2001) for a discussion.

[2] The government's case against the AOL/Time Warner merger alleged that the merged entity could harm Internet Service Provider competition by denying competitors access to Time Warner's cable lines, and this issue dictated the terms of merger approval (which mandated that Time Warner provide open access to competing ISPs). In the Telecommunications Act of 1996, the concern that local exchange carriers could leverage their monopoly from switches to related markets drove the imposition of regulated access pricing.

[3] See Mackie-Mason and Metzler (2004) for a discussion.

[4] See Whinston (1990) for a clear exposition of the intuitive link between tying, interconnection degradation, and incompatibility.

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their competitors' deposit accounts and creating competitive advantage in that market.[5]

The particular difficulty in ATM markets is that banks might impose surcharges simply to maximize profits in their ATM business, considered as a stand-alone entity. This makes it hard to distinguish behavior intended to maximize profits *within* a market from behavior intended to maximize profits *across* markets. Do high ATM surcharges reflect an intent to create competitive advantage in the deposit account market? Or, do they merely reflect a profit-maximizing response to ATM demand? This is of particular concern in our setting; while there has been some empirical work establishing that surcharges are correlated with changes in deposit market outcomes, that work has not attempted to disentangle strategic behavior from other explanations (such as omitted variables affecting both markets).[6] More generally, while there is a substantial theoretical literature identifying the conditions under which incompatibility reflects a strategic motive, there has been little work attempting to empirically identify strategic incompatibility.[7]

To distinguish surcharging that maximizes ATM profits from strategic incompatibility, we first estimate the firm-level surcharge that would maximize ATM profits without any regard to the deposit market. Our identification strategy benefits from a natural experiment. Prior to 1996 banks were largely barred from imposing surcharges; after the restriction was lifted, surcharging became widespread.[8] This regime change in surcharging allows us to estimate the elasticity of residual demand for foreign ATM transactions. With the elasticity in hand and information on marginal cost, we can estimate the optimal stand-alone surcharge for each firm.

We then measure differences at the bank-level between actual surcharges and our estimated optimal stand-alone surcharges: we call this difference the *incompatibility premium*. We find that banks with a large share of ATMs in their local markets have much higher incompatibility premia than small banks (those with low ATM shares in their local markets); in fact, for small banks the average incompatibility premium is quite close to zero. This is consistent with the view that small firms have little motive or ability to restrict access for competitive advantage, but that large banks do have such a motive. We also estimate a model that can in principle reveal the parameters of interest to a bank: the partial derivatives of deposit account prices and quantities with respect to surcharging. In the models where we impose the most structure on the data, the parameters suggest that in our sample the strategic incompatibility motive stems from higher deposit fees, rather than increased quantity in the deposit account market.

Because the partial equilibrium incentives for incompatibility need not correlate with equilibrium outcomes in any systematic way, we also estimate the relationship between the incompatibility premium and changes in deposit account prices, card account base and ATM deployment after surcharging.[9] In these empirical models, we condition on actual surcharges and measure the correlation between outcomes and the incompatibility premium. We find little evidence that incompatibility is associated with increases in either deposit account fees or card base; there is some evidence that banks engaging in strategic incompatibility increase their ATM deployment.[10]

To our knowledge, ours is the first empirical study to estimate the degree to which firm behavior is distorted by incentives for incompatibility. It is closely related to work by Genakos et al. (2004), which estimates the incentive for incompatibility, but does not measure the equilibrium behavior generated by such an incentive. More generally, our work adds to the empirical literature on compatibility and competitive strategy.[11]

2. ATM markets

Banks offer a variety of financial products, but we focus on two: ATMs and ATM cards. Together, the two allow electronic withdrawals from deposit accounts.[12] Banks bundle cards and access to their ATMs together in the standard set of service offerings to depositors. Banks price those bundles using monthly fees, service charges and implicit income on deposits. Survey evidence and previous empirical work suggests that access to ATMs is an important deposit account characteristic, differentiating banks both horizontally and vertically.[13]

Because banks operate on shared networks, customers can use their ATM cards at other banks' ATMs: these are called *foreign* transactions. Each foreign transaction generates two fees: a switch fee paid by the cardholder's bank to the network, and an interchange fee paid by the cardholder's bank to the ATM owner.[14] A foreign transaction may also generate a *foreign fee* paid by the cardholder to the cardholder's bank. Foreign transactions are common during our sample period, comprising roughly 35% of all ATM transactions in 1996.[15]

Prior to 1996, the major ATM shared networks (PLUS and Cirrus) prohibited ATM owners from imposing *surcharges* when non-customers used their machines. While some states had overridden this prohibition before 1996, most had not. In 1996, the networks rescinded the ban and surcharges became widespread. From

[5] Throughout the paper, our definition of 'large' matches that in the quote above: we measure bank size based on share of ATMs in local (county) markets rather than the national market.

[6] Massoud et al. (2006) discuss this endogeneity issue, but do not estimate by how much strategic behavior distorts surcharges. Hannan et al. (2003) focus on the reduced form link between bank characteristics and surcharges without attempting to test whether surcharging is a form of strategic incompatibility.

[7] Early theoretical work developing the economics of such markets includes that of Matutes and Regibeau (1988), Matutes and Regibeau (1992), Economides (1989) and Chou and Shy (1990). Later work focusing on incompatibility includes Church and Gandal (1992, 1996, 2000) and Economides and Salop (1992). Economides et al. (1996) discuss the strategic use of access fees, and Economides (1998) relates the access issue to telecommunications markets and the Microsoft case.

[8] Some states permitted surcharging before 1996; we account for this in the empirical work below.

[9] Massoud et al. (2006) conduct a similar test that correlates surcharges with changes in deposit market outcomes; we condition on surcharges and estimate the correlation between changes and our estimated incompatibility premium.

[10] Massoud et al. (2006) find a positive correlation between surcharges and gains in deposit share for large banks. Hannan et al. (2003) establish that large banks charge higher surcharges, using data from 1998, and also find that large banks are more likely to impose surcharges in markets with a high inflow of new customers—a result that they argue is consistent with the leveraging motive. But, they find little support for the notion that large banks are motivated by an attempt to steal existing customers from small banks. Prager (2001) finds no evidence that surcharges are correlated with deposit share losses by small banks, although her definition of "small" is based on national size and includes many banks with high local market share. Hannan (2007) does find evidence that large banks gain share in states with surcharges relative to a state that banned them, but is unable to undertake any cross-sectional analysis related to surcharging and the incompatibility motive because he does not observe actual surcharges. The more structural work in Ishii (2006) and Knittel and Stango (2008) both find, using different data, that the data fit a model where consumers value ATMs and ATM access, and consider both when making their deposit account decisions. The estimated parameters in Ishii (2006) also suggest an economically significant role for strategic incompatibility.

[11] Early work in this literature (e.g. Brynjolfsson and Kemerer, 1996; Gandal, 1994; Gandal, 1995; Greenstein, 1993) seeks to identify a first-order effect of compatibility on pricing and firm behavior. Later work has focused on a much richer set of questions, such as the welfare effects of competition between incompatible networks (Rysman, 2004; Shankar and Bayus, 2003; Ohashi, 2003), and firm strategies such as preannouncements (Dranove and Gandal, 2003).

[12] Dove Consulting Inc. (1999, 2002) finds that in both 1999 and 2002, roughly eighty percent of ATM transactions were cash withdrawals. Deposits and inquiries comprise roughly ten percent each.

[13] Knittel and Stango (2009) find that deposit account prices are correlated with banks' ATM fleet size, after the advent of surcharging.

[14] See McAndrews (2003) for a discussion of these fees. The *Bank Network News* periodically reports fees for the largest ATM/debit networks.

[15] We take this figure from data in the Bank Network News, various years. It matches quite well with the 38% average figure in Massoud et al. (2006).