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Bank ATMs and ATM Surcharges

The automated teller machine (ATM) has become a part of everyday life. According to Dove Consulting (2004), there are approximately 371,000 ATMs in the United States that process 30 million transactions per day. Concurrent with the growing deployment of ATMs has been significant variation in the price of ATM services. In particular, the surcharge fee paid by consumers using an ATM that does not belong to their bank increased from zero in 1996 to an average of roughly $1.50 in 2003. These price increases have been met with opposition from community groups who argue that the price increases fall heaviest on disadvantaged segments of the population. Over the past several years, many municipalities have considered either capping surcharges or banning them altogether.

The proliferation of ATMs and the pricing schemes that accompany them also have attracted a great deal of attention from research economists, because they shed light on how banks compete against each other in the current environment. By studying the pattern of entry of ATMs in certain markets we can gain insight into the potential welfare consequences of the lifting of artificial price controls. This *Economic Letter* reports on recent research on bank ATMs and ATM surcharges.

Industry structure

The ATM industry infrastructure consists of card-issuing banks, ATM machines, and a telecommunications network to process transactions (see Hayashi, Sullivan, and Weiner 2003). In the early stages of their deployment, ATM machines generally were owned and operated by banks, and the machines were physically located on the bank premises. By the 1990s, much of the growth in ATM deployment shifted to non-bank locations, such as convenience stores and grocery stores. Today, the majority of ATMs are located at sites other than banks. Moreover, many of these ATMs are operated or owned by independent, nonbank operators. In terms of how customers use ATMs, more than 75% of all ATM transactions are cash withdrawals, and the remainder are deposits and balance inquiries.

ATM cardholding customers, ATMs, and card-issuing banks are all linked by shared networks. These networks were typically formed (originally) as joint partnerships among participating banks. In 2002, there were about 40 networks, the largest being the national networks of Cirrus and Plus, which are owned by MasterCard and Visa, respectively.

A transaction involving a customer from Bank A using an ATM owned by Bank B generates a number of fees. Bank A must pay the network a *switch fee* for routing the transaction; these fees range from 3 cents to 8 cents per transaction. Bank A, the card-issuing bank, must pay the ATM owner, Bank B, an *interchange fee*. These fees range from 30 cents to 40 cents for a withdrawal and are determined by the ATM network. When an ATM and a customer's bank both are linked via multiple networks, the actual interchange fee will vary based upon the agreements between the ATM owner and the different networks. Bank A may charge its cardholding customer a *foreign fee* for using Bank B's machine, and Bank B may charge the customer from Bank A a *surcharge fee* for using its ATM machine. As of 2002, 87% of all ATM deployers levied such surcharges, which accounted for about one-third of all transactions; the average amount of the surcharge across all operators was about $1.50. According to Dove Consulting (2004), the average monthly operating costs for an ATM in 2003 was $1,314, consisting mostly of fixed items such as depreciation, maintenance, telecommunications, and cash replenishment.

The economics of ATM deployment

Like many other goods and services, the reasons for deploying ATMs have changed over time. The first ATMs in the United States were deployed primarily to enhance customer service and reduce costs. ATMs were "open" 24 hours a day and tended to have shorter lines than bank tellers did. From the banks' point of view, ATMs promised significant cost advantages over tellers for providing routine services like cash withdrawals and account balance statements.

Of course, deployment decisions can hinge on motives other than customer service and cost. In this *Letter* we consider two such motives. First, banks have considerable scope to use ATM surcharges to compete against each other not only for consumers of ATM services, but also for the larger set of banking services

(see Hannan et al. 2003). In particular, the surcharges banks impose on users who are from other banks not only generate extra revenue, but also drive up the costs of the bank's competitors by injecting a degree of incompatibility into the ATM network.

Ishii (2004), and Knittel and Stango (2004) examine this issue and find that the size of the ATM network has a significant impact on the demand for bank deposits. That is, potential bank customers take the size of a bank's ATM network into account when deciding where to bank. Ultimately, this tendency is likely to favor larger banks over smaller banks, as the larger banks typically have more ATMs with which to lure customers. Indeed, one of the messages of these papers is that banks overinvest in machines relative to the social optimum in their attempt to win deposits.

The questions posed in these papers, and a host of others, would have been difficult to address were it not for a regime change in the ATM industry. Up to 1996 the major networks prohibited the levying of surcharges. Once the ban was lifted, deployment increased substantially, tripling between 1996 and 2001. Of course, it is possible that other developments during this time period may have altered the demand for ATM services. But the regime change provided a kind of "before and after" experiment commonly used to examine the predictions of economic models.

Gowrisankaran and Krainer (2005) take a different approach to identifying the effects of ATM surcharging. Rather than using variation over time in the surcharge regime, the authors look at a cross-section of ATM market structures in two states with very different regimes. In Minnesota, as in most of the country, ATM operators raised surcharge prices once the networks permitted it. In nearby Iowa, however, the state legislature upheld the surcharge ban until 2003. Since the counties on either side of the Iowa-Minnesota border are quite similar in terms of population density, industry mix, and income per capita, the authors argued that the relationship between entry and surcharging could be inferred from the entry patterns on either side of the Iowa-Minnesota border in 2002, just before Iowa lifted the ban. This approach is attractive because it sidesteps the question of whether some other factor or factors might have contributed to the surge in ATM deployment since 1996. Whatever such factors may be and whatever their quantitative importance, they should have had the same effect on both the Iowa and the Minnesota markets.

The Gowrisankaran and Krainer study is well-suited to exploring a second motive for ATM deployment: the straightforward profitability of a stand-alone ATM. The study builds on the observation that much of the new ATM deployment has occurred in nonbank locations, such as highway convenience stores, grocery stores, casinos, and bars. Many of these sites tend to be remote from banks, residential areas, or downtown shopping districts, which renders them unattractive for an ATM if the sole source of revenue comes from the interchange fee. However, entry into these locations becomes possible once banks (or more generally, ATM operators) are permitted to charge sufficiently high surcharges to offset the relatively low amount of transaction volume. Not surprisingly, the authors found that Minnesota, which permitted surcharging, had more ATMs per person than neighboring Iowa, where surcharging was banned. Given a set of potential entry points, such as a convenience store or grocery store, the probability of entry was significantly higher in Minnesota than in Iowa.

Gowrisankaran and Krainer went on to estimate a formal entry model where consumer demand functions were allowed to depend on proximity to an ATM and on its price, and where the owners of potential ATM entry points make profit-maximizing decisions about whether to deploy an ATM on a site. With estimates of consumer demands and ATM entry probabilities in hand, the authors conduct experiments to assess the welfare implications of different surcharging regimes. For example, do consumers attach greater value to a market structure with more proximate ATMs that are also more expensive to use? Or would consumers prefer fewer ATMs that are free? If regulators vary the surcharge price, how are the effects of these price changes shared by consumers and ATM operators?

In answer to these questions, Gowrisankaran and Krainer found that consumers are sensitive to the distance they must travel to use an ATM; they are willing to pay an estimated 8 cents to 10 cents to reduce the distance to an ATM by one kilometer. Consumers were found to be surprisingly sensitive to surcharge fees. If the probability of a consumer using a given ATM is 50%, then raising the surcharge by just 10 cents would result in the same consumer using the ATM with 46% probability. The deployment of ATMs was also found to be sensitive to the pricing regime. The Iowa surcharge ban is estimated to have reduced ATM entry by about 12% on average in the counties along the Minnesota border. Correspondingly,

experiments that varied the surcharge regime did not reveal big differences in aggregate welfare across regimes. However, different surcharge regimes did imply differences in the sharing of costs across the economy. At one extreme, an outright surcharge ban raises consumer welfare by about 35%, while ATM operator welfare declines by about 20%.

Conclusions

There has been a large amount of research interest on the connection between the recent proliferation of ATMs and the pricing of ATM services. Gowrisankaran and Krainer found that an outright surcharge ban did not deter the deployment of ATMs in a major way in a sample of rural markets. This evidence suggests that the huge increase in deployment in the last several years may be due to factors other than the simple lifting of the surcharge ban. Finally, all of the studies cited corroborated a high degree of consumer sensitivity to ATM fees. It seems likely, then, that ATM deployment and pricing strategy will continue to be an important component of how banks compete against each other in local markets.

Gautam Gowrisankaran
Visiting Scholar
Washington University
in St. Louis and NBER

John Krainer
Economist

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