



"Exploring Electronic Commerce with Jerry Dwyer"

By Gerald P. Dwyer

E-mail: dwyerg@clemson.edu

Gerald P. Dwyer, Jr. is a Vice President at the Federal Reserve Bank of Atlanta, where he heads up the finance group in the Research Department, and a Professor of Economics at Clemson University. Since receiving his Ph.D. at the University of Chicago, he has been a faculty member at Texas A&M University, Emory University and the University of Houston. Mr. Dwyer also has been associated with the Federal Reserve Bank of St. Louis and the Federal Reserve Bank of Chicago. His research has been published in economics and finance journals, the Federal Reserve Banks of Atlanta and St. Louis Reviews, books, conference volumes and C/C++ Users Journal. His current research interests include banking, electronic money and financial markets.

*The views expressed here are those of the author and not necessarily those of the Federal Reserve Bank of Atlanta or the Federal Reserve System.

Is There a Future for Electronic Cash in the United States?

Abstract:

The results of the trial of smart cards in the Upper West Side of Manhattan suggest that smart cards have a long way to go before their use in the United States. Citibank, Chase Manhattan Bank, MasterCard and Visa participated in the trial. About 96,000 people acquired the cards, 600 merchants signed up, but consumers used the cards to spend only about one or two million dollars from October 1997 through October 1998. Average spending per card was about \$10 or \$20 per card, and the cards provided by Citibank gave consumers \$5 to sign up for its card. Evidently merchants also were paid to participate. These are not auspicious results. Other evidence suggests that the inability to use the cards over a wider area was part of the reason for the lack of use. How can smart cards be made generally acceptable without banks taking an enormous risk by providing cards and card readers to everyone in the United States at once? One solution is to focus on uses in which the cards are likely to have the highest value, for example eateries in a metropolitan area and provide the cards to people who frequent those establishments.

To put it mildly, the first week of November 1998 seemed to bring grim news for anyone who thinks that smart cards are likely to be important in the near future. A trial of smart cards in New York's Upper West Side ends in December 1998 with disappointing results. Two headlines on November 4 are "Banks, Credit Card Companies Withdraw Support for Money Cards" and "Firms to End Smart-Card Test As America Shuns Plastic Cash" by Amy Feldman of the New York Daily News and Paul Beckett in the Wall Street Journal Europe respectively. These are not exactly encouraging thoughts. A day later, Digicash announced that it is filing for bankruptcy and attempting to reorganize under Chapter 11, which does not suggest that electronic cash on the Internet is just around the corner. Of these two events, the smart-card trial in New York is the event with deeper significance. I will discuss the future of digital cash on the Internet in later articles.

The publicly-available results of the trial of smart cards in New York generally are consistent with the headlines even

if the headlines are overdrawn. The trial was a substantial one with Citibank, Chase Manhattan Bank, MasterCard and Visa participating. About 96,000 people acquired the cards and 600 merchants signed up, but consumers used the cards to spend only about one or two million dollars from October 1997 through October 1998. Average spending was about \$10 or \$20 per card, and the cards provided by Citibank gave consumers \$5 to sign up for its card. Most people loaded no funds onto their card after they tried them. Evidently merchants also were paid to participate. These are not auspicious results by any standard.

Saul Hansel of the New York Times reports that consumers mainly were interested in using the cards at grocery stores, although he also says that laundry machines in some apartment buildings accounted for 30 percent of the cards' use (The New York Times, November 4, 1998). The cards could not be used in pay phones and vending machines. These are curious and pertinent observations. Why curious?

When I first read about smart cards, I thought that they were likely to be adopted about as fast as ATM cards. ATM cards were adopted at a glacial pace. Why should smart cards be any different? By 2020, they may be important. Then again, maybe not.

I changed my mind about the likely rate of adoption of smart cards when I began working in downtown Atlanta three years ago. Each day, I go to Starbucks in the morning and I go out to lunch. At the start of each week, I get currency from an ATM machine to cover my spending for the week. I pay amounts that are odd pennies for both the coffee and for lunch. I generally pay with bills and receive change to avoid holding up the lines. Sometimes I am carrying so much change that I can be heard coming from 30 feet away. I have quite a pile of pennies at home. It would be convenient to avoid the change and just use a card to pay for the coffee and lunch. I doubt that I'm much different than many other people, at least in these respects. A smart card could save me time and bother.

Furthermore, single-use cards for traveling on transit systems and making long-distance phone calls are common in the United States and around the world. A smart card would have advantages over these single-purpose cards for people who have a bank account.

If it would be convenient for me to use a card, why can't I pay for my coffee and lunch with one of the cards already in my wallet? An online system for credit or debit cards apparently is too slow, too expensive or both to make it worthwhile for consumers and retailers. Over the years, some fast food restaurants have tried online cards and have dropped them. The costs of using online credit and debit cards are too high for transactions between \$1 and \$10. Smart cards loaded with a cash value and usable without a connection to determine the cards' validity or the balance can be faster and cheaper to use.

What do the results of the trial imply? When will smart cards come into widespread use? General economic principles provide some guidance. Consumers will use smart cards if they have higher value, lower cost or both to them than currency and coin. Merchants will accept the cards if they lower the merchants' costs, increase their sales or both. Ultimately, merchants' use depends on whether customers find smart cards convenient. Banks will provide the cards if they earn a profit from doing so, which ultimately depends on whether consumers and merchants find smart cards worthwhile.

Instead of focusing solely on one trial, it is valuable to take a wider perspective. The University of Exeter also tried smart cards and now is rolling out a new version of its Mondex smart card. Like many universities (including universities in the United States which supposedly shuns smart cards), Exeter has found cards are a useful way to collect payments from students for books and everyday purchases such as lunch or a soda. Students also find such cards useful. The University of Exeter also has published the results of surveys of students and staff, available at <http://www.ex.ac.uk/mondex/ProjHist.html>. One obvious result of the survey is that, while the sample of students has

had a good overall impression of the cards in each of three surveys, faculty and staff did not even in the third survey after a year of use. Every question reveals that faculty and staff use the cards less. Why not? One possibility: Students' activities are more narrowly circumscribed than those of faculty and staff. Students are more likely to find the cards useful over a large part of their transactions, whereas faculty and staff have relatively more transactions off campus where the cards are useless.

The survey results at Exeter suggest that general lack of acceptability of smart cards in New York may have been their over-riding disadvantage. The exceptions were for repetitive transactions in the same location, as in a laundromat or large transactions in grocery stores. In grocery stores, though, debit and credit cards are likely to be at least as useful as electronic money stored on smart cards.

How can smart cards be made generally acceptable without banks taking an enormous risk by providing cards and card readers to everyone in the United States at once? One way to avoid problems of general acceptability would be to make smart cards usable with the old technology as well as the new one. This strategy is similar to Intel's solution for making its hardware compatible with old software. This is not obviously desirable from the standpoint of consumers, who want to know what funds are being used to pay for goods and services.

Another solution is to focus on uses in which the cards are likely to have the highest value: for example, provide cards to people who frequent eateries in a particular area. To some degree, this sounds like the New York trial that did not result in much usage, but it is not. The New York trial apparently targeted all establishments in a narrow geographic area. This alternative solution targets all establishments of certain types in a wider area, such as a metropolitan area. Given advertising costs, an area smaller than a metropolitan area is likely to make little sense anyway. Fast food restaurants, which actually have tried to use online credit cards, may be locations where the offline cards are highest value for consumers and merchants alike.

Electronic cash on smart cards will not completely replace currency and coin issued by the United States federal government. Even so, such money is quite likely to be in widespread use in the foreseeable future.