
The Role of Technology in Serving the Unbanked

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1. Introduction

This paper extends our work on the unbanked, and the role that technology can play in helping to bring mainstream financial services to low-income populations and communities, while making it profitable to do so (Stegman 2001); Stegman and Lobenhofer 2002; Lobenhofer, Bredencamp, and Stegman 2003; Stegman and Faris 2004). While technology cannot overcome all of the barriers that have thus far prevented mainstream financial institutions from serving more of the poor, there is growing evidence that it can help overcome at least three of eight challenges identified in a Brookings Institution study by lowering costs, reducing access problems, and helping to create links to potential partners (Weissbourd 2002). With respect to cost, a recent report on electronic banking in Europe estimates that “electronic payments are between one-half to two-thirds cheaper than their paper-based counterparts” (Humphrey et al. 2003, 2). More to the point, a recent industry report forecasts that mainstream financial institutions may be able to capture as much as \$3.3 billion, or 22 percent, of the national unbanked market by 2010 using new self-service technology (Katkov 2002).

Since publication of my book *Savings for the Poor: The Hidden Benefits of Electronic Banking* (Stegman 1999) all fifty states have converted their federal Food Stamp Programs to electronic delivery through magnetic stripe cards that can be used at participating retailers, and more than forty states are using this same electronic platform to deliver cash benefits to welfare recipients who access their benefits at ATMs anywhere in the country. A lingering problem here is high transaction costs borne by welfare recipients because most banks and ATM network owners are unwilling to introduce surcharge-free benefit withdrawals (Nolan 1999). For example, in July 2004 alone, welfare clients in California “accessed cash benefits at 25,109 different ATM locations, a majority of which carried surcharges averaging \$1.80 per transaction (Electronic Benefit Transfer (EBT) Project 2004).

In addition to welfare payments, several states are also using stored value, or reloadable smart cards for delivering child support payments and unemployment benefits that can be accessed at ATMs. For example, in partnership with U.S. Bank, Oregon electronically delivers \$14.5 million a week to more than 70,000 unemployed citizens

through debit cards. With a paper check costing 50 cents to generate and 44.6 cents to handle and mail, vs. 7 cents to load benefits onto a smart card, taxpayer savings mount up very quickly (Associated Press 2004).

Also, through an arrangement with U.S. Bank, Iowa has become the first state to deliver all child support payments by direct deposit or debit cards, saving at least \$420,000 a year in postage alone (Associated Press 2003).

Beyond government benefits, over the past five years, a number of large employers have expanded their direct deposit operations for distributing wages, using stored value cards for paying unbanked employees, which further reduces payroll costs and, enables workers to avoid standing in line at local banks to cash their checks or paying high fees at local check-cashing outlets (Hawke 2004). In 2002, about 1 million families contained at least one worker who was paid through payroll cards, that, according to the consulting firm, Celent Communications, could rise to 25% by 2006 (Hildebrandt 2005, 1D). Another forecasting firm, Financial Insights, suggests that \$143 billion in wages and salaries will be delivered through payroll cards by 2007, while still another industry expert estimates that this delivery system has the long-term potential to serve 150 million consumers in the U.S. (Jacobs 2004, 6). National Companies like U-Haul International and Blockbuster, among others, offer payroll cards to their employees (Hildebrandt 2005, 1D).

With more than 40 percent of adult Hispanic immigrants in the U.S. regularly wiring money to relatives to Latin America totaling more than \$30 billion a year (PR Newswire 2004a; Hawke 2004) mainstream banks have also invented ways to use technology to capture a portion of the lucrative remittance market currently dominated by Western Union and MoneyGram, and other financial services business from a population., a large number of whom lack formal banking relationships (Hawke 2004). According to former Clinton administration Treasury official, Michael Barr, bank remittance products have the potential to attract immigrants into the banking system because by not having to set up each remittance transaction as a stand-alone proposition, financial institutions can pass through their lower cost structure to customers with an account. In turn, says Barr, “account ownership would let immigrants convert income into cash, save, and pay bills—not simply send remittances”(Barr 2004, 6)

Winston Salem, NC-based BB&T, for example, estimates that less than 27% of Hispanic consumers in its regional footprint have a bank account, and less than 18 percent own a credit card (Fort Lauderdale Sun-Sentinel 2004, 1E). “Bank of America, with 5,700 offices and 16,000 ATMs nationwide, launched its SafeSend transfer card program in 2002 to attract transfer business from Mexican immigrants who don’t have an account at the bank. A sender can phone, go online or visit a branch office to order a debit card that can be used at about 26,000 affiliated ATMs and 120,000 merchants throughout Mexico. The card is sent to the recipient by courier, and money can be added from the U.S. side at any time.” (Fort Lauderdale Sun-Sentinel 2004, 1E).

Finally, through partnerships with check cashing companies, several resource-constrained community development credit unions are partnering with check cashing companies to convert storefront outlets into virtual credit union branches using innovative point of banking technology (Stegman and Lobenhofer 2002; Hawke 2004). An outgrowth of these innovative partnerships is a new hybrid product which features an interest-bearing, federally insured deposit account linked to existing prepaid debit cards, which would make it possible for unbanked customers of check cashers to open a savings account at a partnering financial institution without ever having to step foot into a bank or credit union branch (Reosti 2004).

What all of these and other banking innovations share in common is the use of electronic funds networks (EFT) and automated teller machines (ATMs) as delivery systems for delivering financial services to unbanked and underbanked populations. In some cases, ATMs may be a more cost-effective means for delivering banking services at a branch location, which can improve the efficiency and/or profitability of that office, or replace it outright (Avery et al. 1997, 710). In other cases, these electronic products that utilize ATMs neither help unbanked individuals open a bank account, nor help them establish a credit history that would improve their access to cheaper sources of mainstream credit. But, some exciting developments are emerging along this front, as well.

A recent trade publication reported that NetSpend Corp, an Austin, Texas-based prepaid card marketer and processor whose cardholders tend to be unbanked, plans to introduce a program that would provide “individuals credit recognition when they use their prepaid cards to pay bills, rent and other recurring expenses.” (Debit Card News 2004, 1).

A successful effort to link payment histories of the unbanked to mainstream credit bureaus could pay enormous dividends to both affected consumers and mainstream financial institutions. The former would gain access to cheaper sources of credit, while banks would find ready demand for mortgage loans by tens of thousands of Latino and other immigrants, large numbers of whom remain outside of the banking system (Sichelman 2004, 1)

With the number of installed ATMs having more than tripled in the last decade, electronic payments now exceeding cash and checks as the preferred payment medium, and between 11-14 billion transactions and transactions now conducted at these portals, the Center for Community Capitalism at the University of North Carolina at Chapel Hill set out to measure the accessibility of ATMs to low-income populations and minority communities (All 2004, Kitten 2004). Among other things, this paper presents preliminary findings and some tentative policy implications that flows from what to our knowledge is the first national study of the availability and access of ATMs to low-income and minority communities.

The remainder of this chapter is in five parts. First we review the characteristics of the unbanked population using national data, and then we focus in on North Carolina, one of the few states that have actually surveyed the financial services behavior and preferences of low-income banked and unbanked households. The latter focus not only allows us to compare at least one local dataset with the national picture, but the NC survey also collected data on the interests of unbanked households in becoming banked, an issue that no national dataset addresses.

In Section two, we discuss the ATM industry and industry experts' competing claims that it is a mature sector in decline, or an increasingly smart and technologically sophisticated financial services delivery system with enormous growth potential. Regardless of which future represents reality, knowing something about the locational patterns of these portals is critical to the banking industry, policymakers, and regulators, an issue we address in Section 3.

Section four discusses our painstaking efforts to compile and validate a national ATM database, methodological issues, and various metrics for measuring access. Next we present our empirical analysis, and conclude with policy recommendations regarding technology and the unbanked.

2. The Significance and Size of the Problem

In today's economy, it is increasingly important to have access to a basic bank account and mainstream financial services. Without bank accounts, families often pay high fees—as much as \$15,000 over a lifetime—to check cashers and other fringe bankers to conduct basic daily financial transactions (Hawke 2000). More importantly, banking status has profound implications for families' long-term self-sufficiency. People with bank accounts are more than twice as likely to hold savings as are people who are unbanked and are more likely to add to their savings on at least a monthly basis (Dunham 2001). In fact, controlling for income and other factors, lower-income individuals with bank accounts are 43% more likely than those who are unbanked to have positive net financial assets of any kind. Indeed, for more than half the unbanked (54%), their only asset is their car (Federal Reserve Board 1998). Underscoring the relationship between being banked and savings, federal data for 2001, indicate that more than three times as many unbanked households had no financial savings (69 percent) compared to those with bank accounts (22 percent) (Caskey, Durán and Solos 2004, 11). It is precisely this tie that leads many advocates and policymakers to “focus on helping lower-income households to build savings as a way to bring them into the banking system.”(p. 5)

Any way you slice it, a large segment of U.S. households lack a banking relationship. National estimates of the unbanked range from 11 percent of all households

in 2001 (Azicorbe, Kennickell, and Moore 2003) to 20 percent of all households (in 1999) (General Accounting Office 2002). In absolute numbers, the Chicago-based Center for Financial Services Innovation numbers unbanked households at at least 10 million, describing them as disproportionately poor, minority, lower income and young (Jacobs 2004, 2) Celent Communications, a company that tracks the financial services industry, places the number of unbanked and underbanked households, the latter having inactive bank accounts with small balances, at nearly 33 million (Katkov 2002).

Studies also confirm that a large percentage of Latino households—up to one-half, according to the National Council of La Raza—are unbanked, with foreign-born Latinos even less likely to have a banking relationship (National Council of La Raza 2004). More generally, researchers at the Chicago Federal Reserve Bank peg the percent of foreign-born unbanked households at 32 percent, compared to about 18% of U.S. born households (Newberger, Rhine, and Chiu 2004, 2). Using data from the U.S. Census Survey of Income and Program Participants, these researchers broke down the unbanked foreign-born this way: Mexican immigrants, 54%; European households, 17%; and Asian immigrants, 19%. Like their native-born counterparts, “unbanked foreign-born share many of the same characteristics as the unbanked in the general population: lower incomes, lower net worth, fewer years of education, and single marital status” (Newberger, Rhine, and Chiu 2004, 2)

With some estimates that upward of a quarter of a million undocumented Latinos have the financial resources to buy a home if they could get a mortgage, a growing business case is being made in mainstream bank boardrooms across the country for taking a fresh look at the untapped market segment consisting of unbanked and underbanked immigrants (Weissbourd 2002).

Focusing on individuals rather than households, the U.S. General Accounting Office pegs the unbanked at up to 56 million American adults (General Accounting Office 2002). Studies conducted of big box retailers peg the number of K-Mart and Wal-Mart unbanked customers at 30 percent and 20 percent, respectively (Fisher 2004, D1; Mitchell 2004, 3) which explains why the nation’s largest retailer has entered the financial services business in a big way (Zelner 2005) Today, Wal-Mart has SunTrust

bank branches in nearly 1000 of its Supercenters and, according to a company spokesman, through its new discount check cashing, money order, and money transfer services, Wal-Mart is saving its customers \$2 million a week, while earning significant profits (Zelner 2005, 29; PR Newswire 2005).

Local Estimates of the Unbanked. One consequence of the fact that most empirical surveys of the unbanked are national in scope, is that we do not know whether financial services behavior among similar populations differ in important ways across states and localities. By comparing opportunistic and more purposive studies, industry experts and policy makers can better understand the importance of local factors in serving the unbanked.

According to trade reports, for example, about 28,000 Cleveland households--one out of every seven—is unbanked, while up to 40 percent of all low- and moderate-income households in the 12 states where KeyBank has a retail presence do not have a checking account (Russell 2004, D1). The KeyBank estimates are similar to the results of an important study of financial services behavior of lower income adults in Los Angeles and New York City by the Office of the Comptroller of the Currency, which found about 37 percent of all lower income adults in these two cities combined lack bank accounts. However, there were significant differences, with unbanked rates of 42 percent and 32 percent in New York City and Los Angeles, respectively (Dunham 2001).

Another local survey, this one in metropolitan Chicago focusing on racial and ethnic differences in banking behavior, found less than 3 percent of whites to be unbanked, and 29 percent of Blacks and 24 percent of Hispanics to be unbanked (Greene, Rhine, and Toussaint-Comeau 2003, 5). Unbanked Whites were quite dispersed, with just a third residing in low-and-moderate-income neighborhoods, compared to more than 75 percent of unbanked Hispanics and 41 percent of unbanked Blacks (Greene, Rhine, and Toussaint-Comeau 2003, 5).

In research reported on elsewhere, Stegman and Faris estimate that 17 percent of all low-income households (with incomes under \$30,000) in North Carolina were unbanked in 2001, which mirrors the national rate. (Stegman and Faris 2001).

Consistent with national surveys, their statewide survey found racial differences in unbanked rates to persist even after controlling for other factors such as age, education, marital and employment status.

Equally problematic is the fact that nearly forty percent of TANF households in North Carolina are unbanked. Leavers—ostensibly, those who are on the path to greater economic security—are even worse off. Forty-two percent of the families who left welfare in the 18 months prior to the survey are unbanked. This means the already difficult transition from cash assistance to the work force poses additional challenges: Paying monthly bills is more time-consuming and costly, saving money is made more difficult, and investing in long-term financial security is all but impossible.

Less education also increases the likelihood of being unbanked. Families with no high school graduates are just 40 percent as likely as those with at least one college graduate to own an account. Families with at least one high school graduate, but no adult who went to college, are 45 percent as likely as those with at least one college graduate to be banked.

Families whose parents were banked were more likely themselves to own an account. This implies that there may be important cultural factors associated with people's relationships with banks, and that families without historical ties to banks may require significant effort on the part of the financial institutions to capture their business.

While more than three quarters (77%) of low income banked households in North Carolina have some savings, this is true of just one third (32%) of all unbanked respondents. Other things equal, families who do not save are just 25% as likely to be banked as families who do save. Similarly, families who have a way to borrow \$500 in an emergency are 1.5 times more likely to be banked than those who do not. Having savings is also related to timely bill payment. Compared to irregular savers, monthly savers are 25% less likely—but non-savers 44% more likely—to have been called by a bill collector.

Regardless of their sponsorship or geography, studies of the unbanked generally identify a similar set of reasons why people do not have bank accounts, “not having enough money, not trusting banks, the potentially high costs of maintaining a bank account, and the concurrent decision to patronize check cashers.” (Newberger, Rhine, and Chiu 2004, 2). This is consistent with the North Carolina research, which found that the two primary reasons for not owning accounts among lower income unbanked households are high costs, and perceived lack of need. Nearly half of all unbanked families find bank accounts to be too expensive, including almost half of all current welfare recipients, and two-thirds of all unbanked recent leavers. The most commonly cited cost feature is the minimum initial deposit required to open the account: 79 percent of respondents who mentioned a cost-related reason for not owning an account cited the opening deposit specifically.

Ace Cash Express, one of the nation’s largest non-bank financial services provider elaborates on the reasons why approximately 3 million customers visit their more than 1,200 stores each month to purchase a variety of financial services rather than conducting their business at traditional banks:

“For many of these Americans, the business model of the traditional bank does not work. For them, the painful reality of poor or no credit history makes them undesirable to banks, while for others, minimum balance requirements and high overdraft and other fees make maintaining a checking account unrealistic. Even for those who do not establish an account, many simply keep a minimum balance and are unable to build savings, access lines of credit or utilize other basic bank services. The lack of a nearby branch or, multi-lingual tellers and limited hours of operation further contribute to the disenfranchisement of these Americans. Some simply do not feel welcome or comfortable inside a bank” (Ace Cash Express, Inc. 2004, 3)

3. The Impacts of Bank Location on the Unbanked

Campaigns to reduce the number of unbanked come at a time when access to financial services for low-income families has become increasingly problematic. The interplay of many factors—among them the deregulation of interest rate ceilings in the 1980s, new technology, bank mergers, and growing competition from nondepository institutions—has led to a significant decline in the number of financial institutions in the

United States—dropping by almost 29 percent between 1994 and 2003—while the number of bank branches has grown by 15 percent (FDIC 2004).

FDIC research suggests that statewide expansion of branch networks is a function of overall employment, population, and per capita income growth, and changes in the total number of bank offices and per capita population per office; the lower the latter, the less excess capacity, and the greater the potential for growth (Spieker 2004). At the community level, the principal drivers are population and employment growth (FDIC 2004).

Negative demographic trends and excess capacity contribute to branch closures, a problem of particular relevance to low-income communities. Between 1975 and 1995, according to a Federal Reserve study, low-income neighborhoods saw a 21 percent decline in branch facilities (Avery et al. 1997, 719). However, because many of these communities have been losing population, the researchers suggest that, on a per capita basis, low-income communities were as well served by mainstream financial institutions at the end of the study period, as were residents of more affluent neighborhoods (Avery et al. 1997, 720).

Though not addressed by Avery et al, in addition to demographics, Stegman and Faris found that race also plays a role in the spatial patterns of banks and check-cashers in North Carolina. To begin with, low income African Americans and Latinos in North Carolina are just two thirds as likely as whites to own an account. Race matters not just for individual families but for communities as well. For each one percent increase in the Black population of the county of residence, regardless of the householder's race, Stegman and Faris found the likelihood of being banked decreased by one percentage point.

Controlling for demographic and economic factors, they found that for every 12-percentage point increase in the Black population of an average North Carolina county, a bank branch is lost and a check-cashing outlet is gained. For every two-percentage point increase in the county's Latino population, a bank branch is lost. Using similar data for North Carolina, Burkey and Simkins found that “a one percentage point increase in the

black population reduces the number of banks by one percent and increases the number of payday lenders by one percent” (Burkey and Simkins 2004, 8).

While in North Carolina, at least, banks and check cashers are often found in the same communities, suggesting that in economic terms, there is a strong complementarity between mainstream and fringe providers of financial services (Burkey and Simkins 2004, 9, 10), other case study research suggests that mainstream and fringe banking offices are substitutes, rather than complements. According a Chicago Federal Reserve Bank study, 40% of low-to-moderate-income (LMI) Chicago neighborhoods had only check cashers and no banks, 32% had check cashers and banks in about equal proportions, and 28% had only banks (Rhine et al. 2001, 15). Consistent with Stegman and Faris, Rhine et al also found that race plays a role in the location of mainstream banking offices: the LMI Chicago neighborhoods with no banks, and just check cashers have a greater percentage of minority households than other LMI areas (Rhine et al. 2001, 15).

Despite the growing number and sophistication of this kind of research, few studies have tied the lack of proximity to bank offices to the size or composition of the unbanked population. However, Stegman and Faris have found, at least among lower income North Carolinians, that the density of local banking opportunities does seem to influence account ownership. Controlling for other factors, for every additional bank branch in a household’s zip code of residence, the likelihood of the household being banked increases by 6 percent. Moreover, controlling for family-specific factors, for every additional check-cashing outlet in a household’s zip code of residence, the likelihood of the household being banked decreases by 4 percent.

Given the negative demographics that drive branch presence in many low-income communities, and the heightened role that technology plays in reducing both brick and mortar and labor costs, it is important to learn more about the role of automated teller machines (ATMs) in the provision of financial services in LMI communities. While these increasingly sophisticated portals have the potential to substitute for more costly brick and mortar branches, thereby maintaining or extending access to financial services,

whether or not they serve this purpose is an unsettled empirical question. Indeed, one small Treasury Department-sponsored study suggests that ATM locations might mirror branch patterns. “In New York and Los Angeles, according to former Treasury official Michael Barr, in 2000, there were nearly twice as many ATMS per resident in middle-income zip codes as there were in low-income zip codes (Barr 2004, 182). It is findings like these that led to the Center for Community Capitalism’s national study of ATM locations, which we discuss below.

4. The Role of ATMs in Serving the Unbanked

Industry Trends. Many factors have influenced the shift to electronic payments and ATMs--bank mergers, deregulation, heightened competition and price pressures that encourage the substitution of technology for labor—but no development is more important than the introduction of surcharging in 1996. Almost overnight, surcharging turned bank-owned ATM networks into profit centers, and spurred the growth of independent service organizations (ISOs) that placed their machines in highly accessible retail and other locations, sharing revenues with merchants (Dove Consulting 2002). “From an estimated installed base of 123,000 machines in 1995, the growth spurt led to 352,000 installed machines by the end of 2002.” (Whitehead 2003) With further growth since then, there is now one ATM for every 296 households (Dove Consulting 2004).

In 2004, 6.1 billion ATM withdrawals totaling \$520 billion were made in the U.S., with 2.5 billion surcharge-eligible transactions taking place at foreign machines (i.e., those owned by other than the customer’s bank) (Federal Reserve System 2004, 39, 40). Despite these striking numbers, a review of the ATM literature is of two minds: the ATM sector is a mature industry characterized by declining deployment rates, saturated markets, declining average transaction volumes, falling profits, and a bleak outlook, but poised for a strong rebound driven by a new generation of technology that improves serviceability, functionality, and convenience (Dove Consulting 1999; Whitehead 2003).

Despite 11 billion transactions in 2003, ATM volume was up just 2 percent over the previous year (Dove Consulting 2004), a far cry from the 4.5 percent compound annual growth rate (CAGR) from 1997-2002, and way below the 8.7 percent CAGR from

1992 to 1997 (Celent Communications 2004, 59). A flatline trend would not be as challenging were it not for the stratospheric growth in ATMs during the initial five years or so after removal of the surcharge ban. As a result, average transaction volume per month per machine is down—to 3,484 for on-premise bank ATMs, 1,500 for off-premise, and 355 for ISO-owned machines (Dove Consulting 2004). While deployers have “had some success in reducing ATM costs, revenues are declining at a faster rate” (Dove Consulting 2004).

Complicating the problem is the fact that most older ATMs continue to run on software that is built into the machine and is difficult to reprogram (requiring separate changes on each machine), which makes them uneconomic to upgrade, especially where average volumes are low, like in many low-income and low-traffic locations. With location being the best predictor of an ATM’s success, and high-tech smart machines costing as much as \$40,000 compared to less than \$5,000 for a simple machine (Schrock 2004, 16), the economics may not support deployment of the former in low-income communities.

The good news is that since about 78 percent of all ATM transactions are withdrawals a percentage which has varied little in the past several years, (Dove Consulting, 2004), old machines remain quite functional for many low-income individuals who depend upon conveniently located machines to access their government benefits or wages. Thus, rather than lack of functionality driving them from the market, enhanced security standards imposed by EFT network owners, and federal government requirements to make machines ADA-compliant by adding voice guidance technology will force their replacement or closure in the next few years (Hayes 2004, 23).

Not all the trade literature is bearish, however, with many industry observers believing that the ATM industry is once again on the verge of a renaissance, as institutions replace obsolete machines with smarter, multifunctional, high-tech self-service kiosks that once again become “a central channel in banks’ distribution strategies” (Katkov and Fonseca 2002). Despite the continuing use of ATMs for mainly cash withdrawals, these smart machines are capable of issuing money orders, accepting

bill payments, topping-up mobile phone and other smart cards, selling postage stamps, settling parking fines, as well as taking deposits (Grossi 2004, 34).

ATM Availability and Density. Since there is no single source of automated teller machine (ATM) locations, we had to build a national database from disparate sources, and undertake a lengthy and painstaking process to clean the data and remove, to the best of our abilities, duplicate records. This challenging exercise is described in detail elsewhere (Stegman, Rocha and Davis, 2004). For our analysis, because the Community Reinvestment Act (CRA) pays special attention to the provision of services to low-income and minority communities, we pay particular attention to service levels in these places.

We take advantage of a unique database created by the Brookings Institution's Metropolitan Studies Program that aggregates census data for the nation's largest 100 central cities, which tags each census tract as being located in its respective city's inner ring, middle ring, or outer ring (Berube and Forman 2002).¹ By linking our ATM database to the Brookings database, for all 100 cities taken together, we can examine the spatial distribution of ATMs by race and income within each ring location. This exploratory analysis focuses on measured differences in ATM availability and density to low-income and minority communities.

In this initial highly aggregated analysis we find, especially with respect to the inner ring, sizable differences in the per capita number of unique ATM locations in low minority census tracts compared to high minority census tracts (Graph 1). Within the inner rings of all 100 cities combined, we find an average of 29.3 ATM addresses per 10,000 population for low-minority census tracts (<15% black) compared to just 13.4 ATM addresses for census tracts that are at least 50 percent black. This difference, though not as extreme, also holds for middle and outer ring tracts.

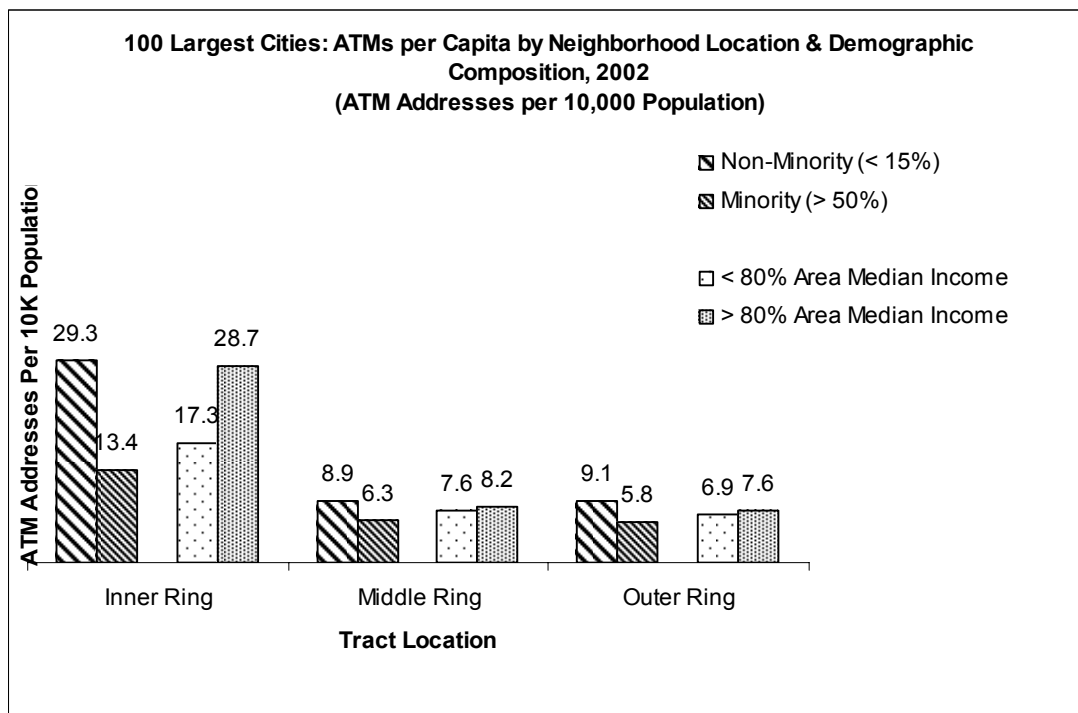
High minority tracts are also much more likely than low-minority tracts to have no ATMs within their boundaries (Graph 2). Twice the percentage of very low-minority

¹See Berube and Forman (2002) for discussion of how city rings are defined and measured.

inner ring tracts as very high minority tracts have no ATMs. Again, somewhat smaller differences hold in the middle and outer rings.²

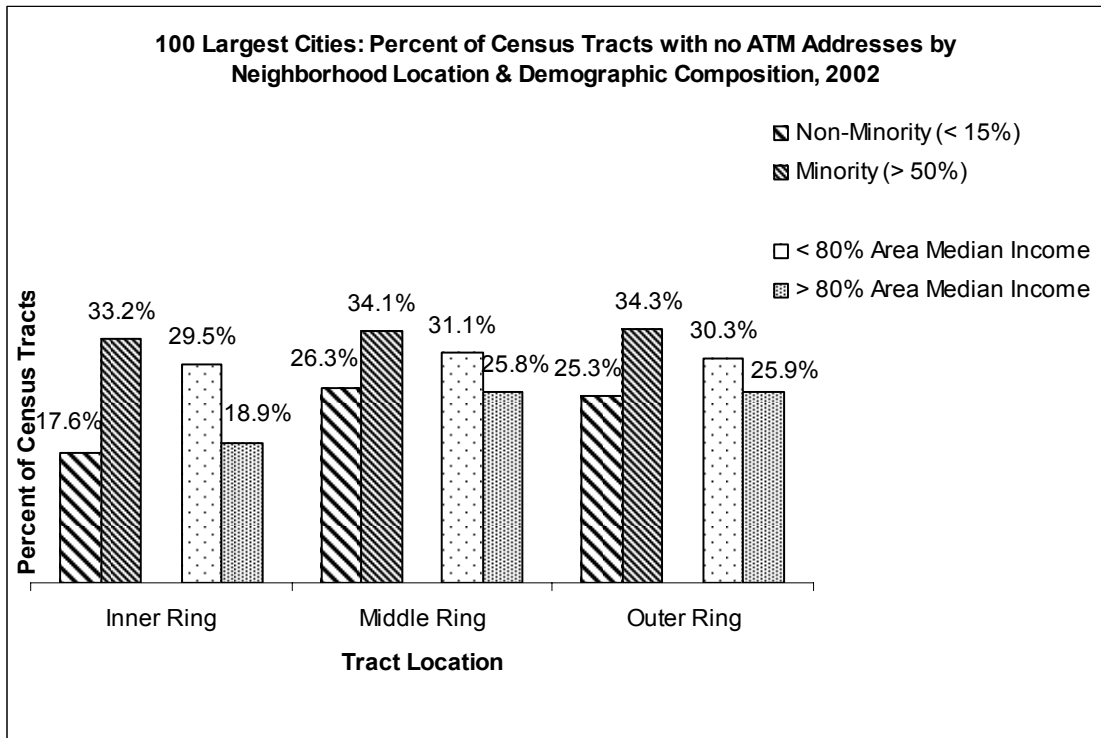
We also find a much greater relative number of ATM addresses in higher income census tracts in the inner ring, than in lower income tracts, which we define as being below 80 percent of the area median income. Contrary to our race analysis, these differences in service levels by income dramatically decline as one proceeds outward to the periphery. However, about fifty percent more low income than high income inner ring census tracts have no ATMs (30 percent vs. 19 percent).

Graph 1



² Census tracts are small, relatively permanent statistical subdivisions of a county delineated by local participants as part of the U.S. Census Bureau's Participant Statistical Areas Program. Census tracts generally have between 1,500 and 8,000 people, with an optimum size of 4,000 people. (Counties with fewer people have a single census tract.) <http://www.census.gov/geo/www/tiger/glossry2.html#CensusTract>

Graph 2



The Cases of Boston and Detroit. Next, we illustrate the capabilities of our database to examine the availability and accessibility of low income and minority populations to ATM locations within individual central cities. We chose Boston and Detroit as our case study cities because the inner city economies of these two places have been the subject of intensive analysis by the Initiative for Competitive Inner Cities (ICIC), a nonprofit organization directed by Harvard Business School Professor Michael Porter (ICIC 2004).³ For this analysis, we use the smaller Census Block Group rather than the Census Tract as our spatial unit of analysis, and not only use per capita ATM addresses as a measure of service availability, but a more sophisticated measure of

³ We should also note that our database seems to have achieved good coverage for both Boston (9.9 addresses per 10,000 people) and Detroit (8.2).

accessibility as well.⁴ Accessibility is measured as the distance from the centroid of a block group to the nearest ATM, where distance is measured on the actual street network system.

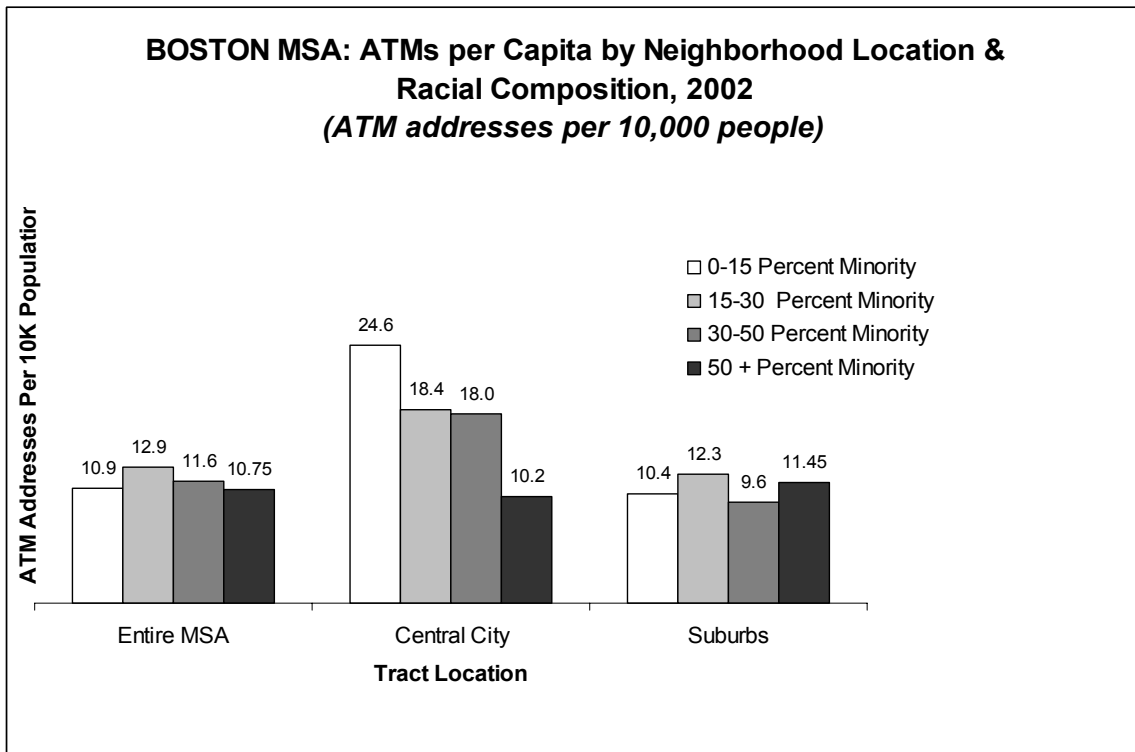
The two cities differ significantly by race and income. Boston's median household income is about twenty percent higher than Detroit's, though both cities have approximately the same percentage of low-income block groups: 42 percent (1,307) of Detroit's census block groups have a median income below 80 percent of the Area Median Income compared to about 37 percent (634) in Boston (Table 1). However, 38 percent (1,197) of Detroit's census block groups are at least 30 percent African-American compared to just 11 percent (192) in Boston.

When access to ATM services is measured by network distance, we find either no statistical differences by race (Detroit), or a moderately significant difference (Boston) where high minority areas tend to be a couple blocks *closer* to the nearest ATM location. Due partly to their proximity to the central business district, low-income block groups in both cities are statistically significantly closer to the nearest ATM than are high-income block groups. However, based on a straightforward per capita count of ATM addresses, high minority block groups in both cities are statistically significantly less well served by ATMs than are low-minority places. These results suggest that high minority block groups in both cities tend to have ATMs nearby but fewer choices in ATM locations (Graphs 3 and 4).

With respect to income, however, we have different results by city: in Boston, low income communities are statistically significantly better served than high-income block groups, but are worse off in Detroit. For the latter, the mean count of ATM addresses is 0.66 for low-income block groups and 0.96 for higher income places (Table 1).

⁴ Census Block Groups generally contain between 600 and 3,000 people, with an optimum size of 1,500 people. Most BGs were delineated by local participants as part of the U.S. Census Bureau's Participant Statistical Areas Program. <http://www.census.gov/geo/www/tiger/glossry2.html#BlockGroup>.

Graph 3



Graph 4

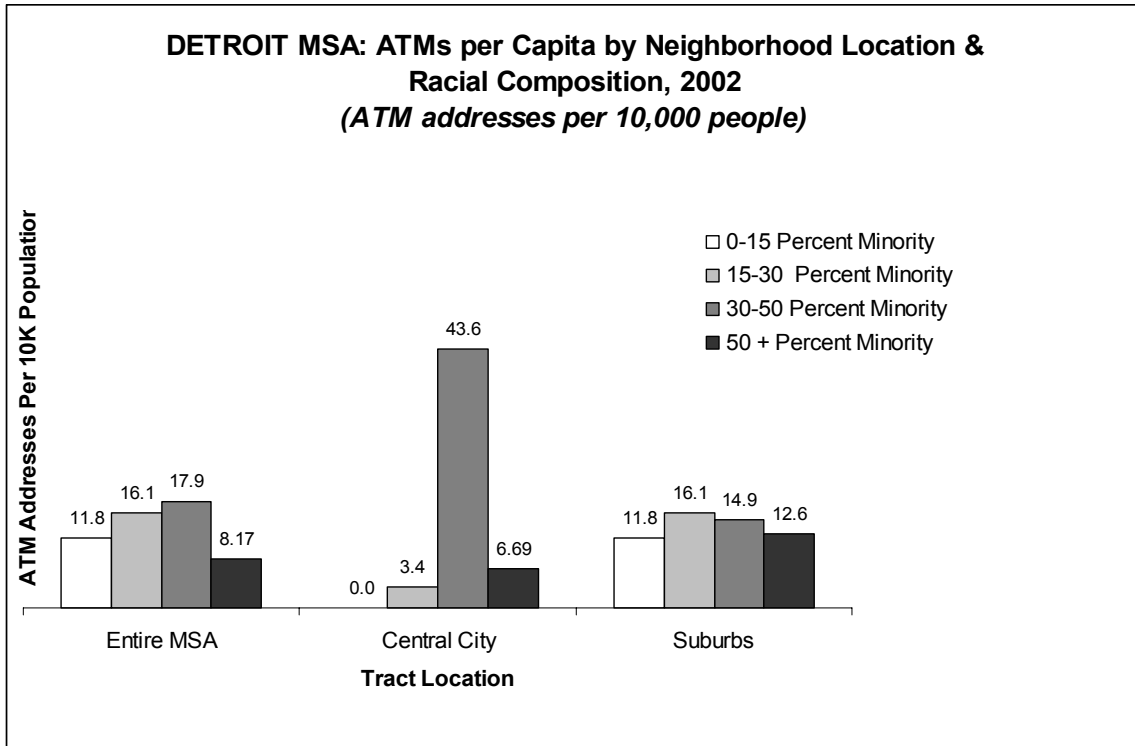


Table 1
Comparison of Accessibility Measures Between Detroit and Boston

		Detroit				Boston			
		Min	Max	Mean	SD	Min	Max	Mean	SD
Percentage Black (%)		0	100	34.49	41.60	0	97	10.86	20.35
Median Income (\$)		0	200,001	46,683.41	24,864.12	0	200,001	54,041.36	24,773.32
Network Distance (miles)		0	3.0691	0.55	0.33	0	3.39	0.37	0.30
Number of ATMs Addresses		0	33	0.83	1.92	0	55	1.26	2.91
		Number of Block Groups		Mean Network Distance (Miles)	Mean Count of ATMs	Number of Block Groups		Mean Network Distance (Miles)	Mean Count of ATMs
Percentage Black (%)	< 30%	1,914		0.54	1.02	1,507		0.38	1.3
	> 30%	1,197		0.52	0.53	192		0.33	0.7
	ANOVA			2.23	47.53			5.024	9.23
	Sig.			1.4	0.00			0.03	0.00
Median Income (\$)	< 80% MSAMI	1,307		0.50	0.66	634		0.27	1.54
	> 80% MSAMI	1,804		0.56	0.96	1,066		0.44	1.10
	ANOVA			29.54	18.38			133.01	9.43
	Sig.			0.00	0.00			0.00	0.00

Source: Center for Community Capitalism

ATM Deployment by Individual Banks. We obtained complete counts from 8 banks which collectively own 20,100 ATMs, whose individual locational patterns we examine in this final part of our empirical analysis. Because we received bank-specific ATM directories under the condition that we would not identify which deployment pattern was associated with which institution, Tables 2 and 3 refer only to banks A-H. Our bank-specific analysis is limited to estimates of ATM availability (ATMs per capita) across their service areas because it was impractical in the time available to us to estimate accessibility levels across actual street networks that span vast regional service areas. For each bank, we use two measures of availability: ATMs per 10,000 population in metropolitan areas within which a given bank has at least one ATM; and the percent of Census Block Groups in those metropolitan areas in which that same bank has no ATM. The former metric in Table 2 is on the left side of the / mark, and the latter is on the right side.

The first comparison of note in our bank-level analysis is that the per capita availability of ATM service in any given cluster of block groups is far smaller than the per capita values presented earlier. Thus, for example, while in all census block groups whose black population is under 30 percent, there are 7.28 ATM addresses per 10,000 population aggregating all ATMs across owning institutions, while 60 percent of all such block groups contain no ATMs at all; for no *single* bank do comparable measures exceed 1.0 for the former or fall below 90 percent for the latter (Table 2). These very large differences are due to the fact that the higher values pertain to all bank- and credit union-owned as well as all non-bank owned machines in a given location, while the lower number represents the machines owned by single institutions.

While our analysis is still in a very early stage, and we plan to continue exploring various methodologies to assess ATM deployment strategies of individual banks, the results are nevertheless suggestive and should be of interest to regulators and policy makers alike. For all eight banks, the per capita availability of unique ATM locations in block groups that are less than 30 percent black exceeds availability in block groups that are more than 50 percent black. In six of eight cases, the former places higher level of service does not exceed 2:1. However, for two of the banks (B and E), the level of service in low-minority block groups is five times

greater than in block groups that are 50 percent or more black. For all eight banks, availability of service in low-income block groups is as good or better than in higher income places.

To test the proposition that lower levels of availability in high minority block groups was a reflection of income differences rather than due to differences in race, we estimated per capita ATM locations within each minority concentration for low- and high-income places, and still found lower levels of availability for some banks in high-minority block groups (Table 3). While availability is generally greater in low-income places than high-income places within each racial category, for each of the eight banks, controlling for income, there are fewer ATMs per capita in high-black block groups than in low-black block groups. In 6 out of eight cases, the differences in availability levels are not very large. However, for two banks (E, and F), the differences are significant: 5:1 and 20:1.

Table 2
 ATM Addresses of Banks and Credit Unions per 10,000 People
 and % of Block Groups with no ATMs
 by Demographic Characteristics of Census Block Group
 for Selected Lenders
 MSAs in which Lender is active only

	Total ATMs	Black Population			Median Income*	
		< 30%	30% - 50%	> 50%	< 80% AMI	> 80% AMI
All ATMs	201,613 [†]	7.28/ 59.5%	7.66/ 58.6%	5.21/ 70.7%	8.58/ 58.8%	6.53/ 61.6%
Selected Banks	20,100	0.94/ 89.6%	1.18/ 89.0%	0.61/ 94.7%	1.11/ 89.8%	0.85/ 90.3%
A		0.47/ 93.7%	0.50/ 93.9%	0.28/ 97.0%	0.56/ 93.9%	0.43/ 94.2%
B		0.11/ 98.2%	0.05/ 99.4%	0.02/ 99.8%	0.13/ 98.0%	0.10/ 98.5%
C		0.23/ 97.1%	0.23/ 97.1%	0.11/ 98.7%	0.22/ 97.5%	0.22/ 97.2%
D		0.06/ 99.1%	0.05/ 99.3%	0.04/ 99.6%	0.06/ 99.2%	0.06/ 99.1%
E		0.10/ 98.6%	0.07/ 99.2%	0.02/ 99.8%	0.12/ 98.5%	0.08/ 98.8%
F		0.45/ 93.4%	0.59/ 92.8%	0.32/ 96.6%	0.51/ 94.7%	0.41/ 93.7%
G		0.37/ 95.5%	0.33/ 96.6%	0.19/ 98.2%	0.48/ 95.6%	0.30/ 96.2%
H		0.39/ 95.1%	0.60/ 93.1%	0.26/ 97.3%	0.41/ 95.6%	0.37/ 95.2%
All Credit Unions	17,853	0.82/ 91.0%	0.92/ 90.7%	0.58/ 95.0%	0.97/ 91.3%	0.73/ 91.6%

*Area Median Income is the median income of the MSA

[†]This number is smaller than our earlier reported total because some addresses could not be definitively assigned to a block group.

Source: Center for Community Capitalism

Table 3
 ATM Addresses of Banks and Credit Unions per 10,000 People
 by Demographic Characteristics of Census Block Group
 for Selected Lenders
 MSAs in which Lender is active only

	Total ATMs	Black Population					
		< 30%		30% - 50%		> 50%	
		< 80% AMI*	> 80% AMI	< 80% AMI	> 80% AMI	< 80% AMI	> 80% AMI
All ATMs	201,613 [†]	9.32	6.58	8.49	6.63	5.30	4.96
Selected Banks	20,100	1.21	0.86	1.31	1.01	0.64	0.54
A		0.64	0.44	0.53	0.46	0.31	0.22
B		0.15	0.10	0.03	0.13	0.00	0.05
C		0.24	0.23	0.22	0.24	0.14	0.06
D		0.07	0.06	0.05	0.05	0.03	0.04
E		0.15	0.09	0.09	0.03	0.03	0.00
F		0.60	0.42	0.75	0.45	0.03	0.00
G		0.54	0.31	0.40	0.21	0.22	0.11
H		0.43	0.38	0.70	0.48	0.27	0.22
All Credit Unions	17,853	1.10	0.74	0.98	0.84	0.59	0.55

*Area Median Income is the median income of the MSA.

[†]This number is smaller than our earlier reported total because some addresses could not be definitively assigned to a block group.

Source: Center for Community Capitalism

5. Conclusions and Recommendations

With the capital cost of a new ATM machine about one-fiftieth that of a typical bank branch (Spieker 2004, 7), and the average transaction conducted with a bank teller is estimated to cost more than three times that of an ATM transaction (Avery et al. 1997, 711), there is little doubt of self-service technology's enduring role in the financial services industry. What remains unsettled is the extent to which this technology will help bring unbanked individuals into the mainstream banking system, or continue to serve primarily as an access point to non-bank financial services. Because of technology's potential to bring full-fledged banking services to underserved people and communities, the empirical core of this paper presents preliminary findings from an ambitious attempt to determine whether low-income and minority communities are fairly served by ATMs.

In reflecting on the daunting challenge we faced in compiling a national database of ATMs and their importance to regulated financial institutions, we can think of no reason why owners of EFT networks or the institutions themselves should be permitted by law or regulation to treat the location of their ATMs as proprietary information. Their critical role in the delivery of financial services generally, and the reliance by low-income populations on ATMs to access a growing array of means-tested and other government benefits, demands that federal regulators and policy makers consider ways of improving the collection, coverage, standardization, and public dissemination of ATM locations, and the services they provide. In the absence of federal requirements, States should consider adopting licensing or registration regulations that would require owners to report the location and features of all their ATMs.

Although we find that low-income and minority populations have good access to ATM locations, generally, there may be some problems with respect to the density of services as defined by ATM locations per capita. Whether lower density of service availability may be justified on business grounds, we cannot say for sure, although our analysis that controlled for income, suggests that this may not be the case. Density of service is important because it affects location-specific competitive market environments that, in turn, may affect surcharge fees and policies. According to Hannan et al, "the probability of surcharging decreases with the number of ATMs per square mile (Hannan et al 2001, 24)

Research also suggests that financial institutions are more likely to impose surcharges in high-minority markets (Hannan et al 2001, 20). Although this research leaves unanswered the question of whether the higher incidence of surcharges in minority communities reflects “a greater willingness to pay for convenient access to cash... perhaps due to higher costs of traveling to avoid surcharges or differences in overall cash usage,” these findings have important policy implications (Hannan et al. 2001, 20).

These findings are important because surcharges are neither trivial nor stable. For the industry as a whole, the average surcharge for an off-premise cash withdrawal rose from \$1.48 in 2001 to \$1.65 in 2003, or about 11%, while the on-premise ATM surcharge was \$1.57, and higher still, \$1.80 for large ISO-owned machines (Dove Consulting 2004).

While our analysis of individual bank deployment patterns is admittedly crude and preliminary, the large variation in per capita availability we found in high-minority communities, relative to low-minority places, within individual institutions as well as across banks, even when controlling for household income, suggests that the CRA service test should explicitly require examiners to analyze the spatial location, services provided and other relevant features of ATM services. This is why we are very disappointed by the recent decision by federal regulators to modify the CRA regulations by raising the threshold definition of small banks from less than \$250 million in assets to under \$1 billion, which had the unfortunate effect of exempting 88 percent of all thrifts (828 institutions) from the service test requirement that only applies to large banks (National Community Reinvestment Coalition 2004). With the FDIC following OTS’s lead, has the effect of reducing community reinvestment requirements, including exemption from the CRA service test, for 96 percent (5,115 institutions) of all the banks it regulates (National Community Reinvestment Coalition 2004).

In the absence of responsible federal regulation, we can encourage states as they negotiate second generation EBT contracts to do so in such a way as to encourage their financial institution partner to provide bank accounts that would receive the government benefits which would be accessible to the recipient by debit card (Center for Financial Services Innovation 2004). We can also hope that competitive market forces and the growing recognition of the relationship between having an account and the future demand for high-margin remittance and

other products will encourage mainstream financial institutions to introduce into the marketplace cost-effective technology-driven products for the unbanked and underbanked market such as those suggested by Barr and others featuring online debit access, no checking, with the account divided into transaction and savings purses that would provide a low-cost, low-risk opportunity for low-income households to safely store money, pay bills save, and establish a credit history (Barr 2004).

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