

# The Economics of Electronic Benefit Transfer Payments

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Currently, federal and state agencies transfer almost \$500 billion in benefits to recipients each year. This includes cash benefits, food stamps, Social Security, student loans, unemployment, retirement, and other benefit payments. Almost 70 percent of these payments are paper-based. Paper is used for 60 percent of the more than \$400 billion in federal benefits. And it constitutes close to 100 percent of the \$95 billion in state benefits.

Most benefit recipients have checking or savings accounts at depository institutions and increasingly receive their payments electronically as a direct deposit to their account. Indeed, 58 percent of Social Security recipients now receive their payments electronically. However, many of the recipients participating in other benefit programs—including food stamps and Aid to Families with Dependent Children (AFDC)—do not have an account at a depository institution. These recipients rely on paper-based delivery of their estimated \$112 billion in benefit payments.

Overall, 10 percent of all U.S. households do not have a deposit account. These households are the so-called “un-banked” and are unable to receive an electronic direct deposit. For low income households, this figure is even higher. For households in the lowest income quintile (lowest one-fifth of income), 26 percent do not have a deposit account. And for families receiving AFDC, general assistance, or food stamps, the figure is higher still: almost 75 percent do not have a deposit account (Wood and Smith 1991, Tables 1 and 2).

Targeted at families without a deposit account, electronic benefits transfer (EBT) will allow these families to draw their benefits electronically through

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automated teller machines (ATMs) and retail point-of-sale (POS) terminals instead. As envisioned by federal and state benefit-issuing agencies, benefit recipients will have the convenience of an integrated electronic delivery system that they can access with a single card. EBT is estimated to also cost less than the current paper-based benefit delivery system. The annual savings from EBT are estimated to be \$195 million per year. Additional advantages will include a reduction in fraud and increased assurance that benefits are used for their intended purpose. Overall, surveys from pilot programs indicate that the majority of benefit recipients, banks, and retailers all prefer EBT over the existing paper-based system.

This article focuses on economic issues related to EBT. Its primary purpose is to (1) outline who would be affected by EBT and how it would work; (2) illustrate its likely impact on U.S. payment structure; (3) report cost/benefit results based on EBT pilot programs; (4) assess how EBT costs may be affected by scale economies; and (5) note the replacement of checks by EBT and other electronic payments.

## **1. EBT: WHO IT WOULD AFFECT AND HOW IT WOULD WORK**

Table 1 lists the major federal and state benefit programs and the percent that beneficiaries and their families are of the total U.S. population. Because some recipients receive benefits from more than one program, adding up the percentages shown in column 1 (totaling 47 percent) will overstate the percent of the population receiving benefits.<sup>1</sup> A more accurate and conservative estimate would be that around one-third of all U.S. families receives one or more benefit payments, ranging from food stamps to Social Security to military, state, and federal retirement payments.

### **Benefit Recipients without a Deposit Account**

EBT focuses on those benefit recipients that do not have a deposit account.<sup>2</sup> As seen in column 2, the percent of recipients without an account ranges from 8 percent for recipients of military, state, and federal retirement pensions to 75 percent for recipients of AFDC. These are the recipients targeted for EBT. Recent estimates of the EBT caseload (with some double counting) are

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<sup>1</sup> Food stamps and AFDC, for example, have an especially large overlap since 80 percent of AFDC households also receive food stamps while 43 percent of food stamp households also receive AFDC.

<sup>2</sup> Even those with deposit accounts are being encouraged to switch away from government-issued checks, at both the federal and the state level, to electronic direct deposit of payroll, Social Security, retirement, and other benefits. Indeed, recent federal legislation requires most federal government payments to be made electronically by 1999 (Marjanovic 1996).

**Table 1 Benefit Recipients in U.S. Population and Recipients Without Deposit Accounts (1985)**

<b>Government Benefit Program</b>	<b>Percent of Families in U.S. Population*</b>	<b>Percent of Families without Accounts</b>
Food Stamps	6	73
Aid to Families with Dependent Children	3	75
Food Programs for Women, Infants, and Children	1	56
General Assistance	1	74
Social Security	26	14
Supplemental Security Income	2	50
Pensions	8	8
Unemployment and Student Loans	n.a.	n.a.

\*Percent of families receiving benefits approximates percent of population.

Source: Adapted from U.S. General Accounting Office (1988), p. 44 (as reported in Wood and Smith [1991]).

shown in Table 2. There are potentially some 31 million users of EBT out of perhaps a total of 86 million benefit recipients (estimated to be one-third of the U.S. population of 258 million). In sum, EBT would directly affect about 12 percent of the U.S. population and involve \$112 billion in payment transfers.<sup>3</sup>

### **How Benefits are Delivered**

An illustration of how EBT works is provided in Figure 1. The flow of the payment instrument or payment information is shown with a solid line; the actual movement of funds is represented by a dotted line. Under paper-based delivery of benefits, checks or food stamps (the current payment instruments) are distributed by mail or picked up by recipients at local benefit offices. Recipients then cash their benefit check at a bank, check-cashing outlet, or store

<sup>3</sup>The push for EBT has come from the executive branch of the federal government; primarily, Vice President Gore, officials in the Treasury Department and the Office of Management and Budget (to improve efficiency), the Department of Agriculture (to improve the food stamp program), and the Department of Health and Human Services (to improve federal and state welfare programs).

**Table 2 EBT Caseload and Value of Benefits**

(Pooled Federal and State Benefits, 1993)

<b>Government Benefit Program</b>	<b>EBT Caseload<sup>1</sup> (millions)</b>	<b>Value of Benefits (\$ billions)</b>
Food Stamps	10.8	22.0
Aid to Families with Dependent Children	3.7	16.9
Food Programs for Women, Infants, and Children	1.4	2.1
General Assistance	1.3	5.5
Social Security	5.9	41.1
Supplemental Security Income	3.0	12.2
Pensions <sup>2</sup>	0.6	4.7
Unemployment and Student Loans	4.4	7.2
	31.1	111.7

<sup>1</sup>EBT caseload refers to families, not number of individuals covered.<sup>2</sup>Federal, military, railroad, and veterans' pensions.

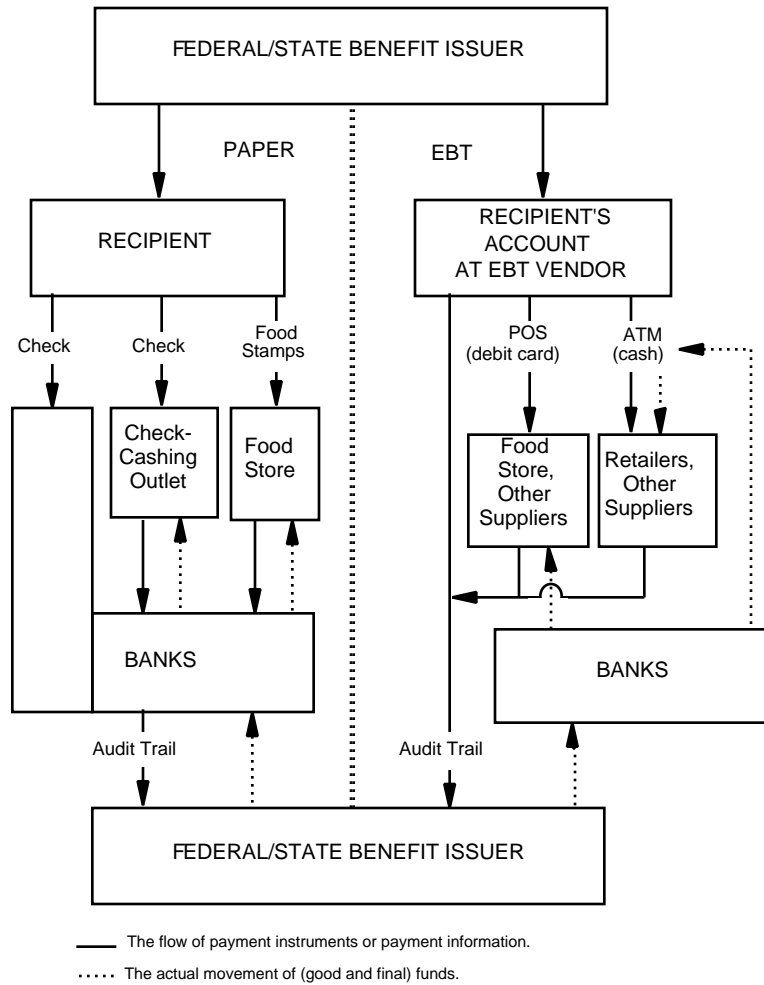
Source: Federal EBT Task Force (1994), p. 8.

and trade food stamps for permitted food items at participating supermarkets. The cashed benefit checks and redeemed food stamps are processed within the banking system and then physically presented to the issuing agency or paying agent, often a Federal Reserve Bank. As few programs are funded before transactions occur, it is at this point that the actual transfer of funds takes place—from government agency to the banks and finally to the food stores and other entities that accepted the payment instrument.

With EBT, the arrangement is somewhat different. First, the government agency (or its paying agent) provisionally credits the benefit recipient's account at the EBT vendor. The provisional credit equals the value of the benefits to be received (the payment information).<sup>4</sup> Using a personal identification number, or PIN, the recipient withdraws cash through an ATM and/or debits his EBT

<sup>4</sup> The EBT vendor may or may not be a bank: it all depends on who submitted the winning bid for the EBT contract.

**Figure 1 Paper and EBT Flow**



account using a debit card. The initial crediting process enables the benefit recipient to buy groceries at stores that accept debit cards through their POS network and, in some cases, pay rent at housing offices using the same debit card. At the end of the day, EBT vendors determine the total cash withdrawn and the sum of POS debits made to all EBT accounts. This audit information is provided to the benefit-issuing government agency, who then transfers the necessary covering funds to the banks. The banks in turn reimburse the ATM

owners and credit the accounts of businesses where the POS transactions occurred. Thus the essential difference between the two benefit transfer sequences shown in Figure 1 is the substitution of electronic payment information via EBT for paper-based check and food stamp payment instruments.

## 2. THE EFFECT OF EBT ON THE STRUCTURE OF U.S. PAYMENTS

### Current Payment Structure

Cash transactions are by far the most numerous. They have been estimated to account for perhaps 83 percent of all U.S. payments, with similarly high percentages in other countries as well.<sup>5</sup> Since the average value per transaction is quite low (estimated to be less than \$10 in the United States), cash payments account for only a small percent of the value of all payments.<sup>6</sup>

With EBT, the main focus is on the substitution of electronic for paper-based payment methods. Excluding large-value wire transfers, the current structure of noncash transactions is shown in Table 3.<sup>7</sup> Checks account for 78 percent of noncash transaction volume and 89 percent of their value. Checks are now, and always have been, the dominant noncash payment method in the United States. Electronic payments include credit card, debit card (POS), and automated clearing house (ACH) payments. ACH payments include direct debits (preauthorized bill payments), direct deposits (direct deposit of payroll, Social Security, and retirement income), and corporate cash management debits. As seen in Table 3, credit cards are currently the most important class of electronic payments in terms of transaction volume (17 percent) while ACH is the most important in terms of value (10 percent, due to large-value corporate cash management debits).

While EBT will expand consumers' use of ATMs as a way to obtain cash (instead of cashing a benefit check), the net effect of EBT will be to shift a significant portion of "cash-like" paper transactions to electronic payments. Food purchases made with food stamps—which are like cash—will shift to

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<sup>5</sup> Cash accounts for 86 percent of all transactions in Germany, 78 percent in the Netherlands, 90 percent in the U.K. (Boeschoten 1992, pp. 73–74), and is probably higher still in Japan, where cash is used heavily.

<sup>6</sup> One important area for cash transactions concerns the 2.7 million vending machines where cold drinks, candy, and other products are dispensed. Vending machine transactions totaled 26 billion in 1994 with an average value of just over \$0.60 each (*Vending Times* 1995).

<sup>7</sup> Wire transfers average \$4.3 million per transaction and clearly are not representative of normal consumer or even standard business payments. These payments represent less than 1 percent of noncash transactions but, due to their large average amount per transaction, account for 86 percent of payment value.

**Table 3 The Structure of U.S. Noncash Payments**

(1994 percent composition and average dollar amounts)

	Transaction Volume:		Transaction Value:		Average Value
	Billions	%	\$ Billions	%	
Check	61.7	78.3	71,500	89	\$1,159
Credit Card	13.7	17.3	731	1	53
Debit Card (POS)	1.1	1.4	45	0	41
Direct Debit & ACH	2.3	3.0	8,370	10	3,639
Total	78.8		80,646		

Source: Annual data computed from Bank of International Settlements (1995).

noncash electronic debit card transactions at grocery stores. In addition, the number of government checks issued, mailed, received (and possibly mishandled), will be reduced. Benefits now provided by check will shift to ATMs (for cash withdrawal) and to POS as a portion of food, housing, clothing, and other transactions previously handled with cash, food stamps, payment vouchers, or money orders moves to an EBT (debit) card.

### Changes in Payment Structure from EBT

Debit card payments have been growing quite rapidly (Caskey and Sellon 1994) and currently are over a billion transactions a year. If EBT were fully implemented today, the number of debit card transactions could double or triple.<sup>8</sup> As seen in Table 3, such an increase in debit card transactions would expand their role to 3 to 4 percent of noncash payments, thus equaling or exceeding the level of direct debits and other ACH payments (at 3 percent).<sup>9</sup> A rise in debit card payments from the current level of 1.4 percent of noncash payments up to a level of 3 to 4 percent may not sound important. However, it is

<sup>8</sup> Based on experience with EBT pilot programs, Abt Associates has estimated that two benefit programs—food stamps and AFDC—could add 0.8 billion new POS transactions (Kirlin et al. 1990, p. 230). These two programs account for 47 percent of the estimated EBT caseload in Table 2. If the other benefit programs generate similar POS use, then EBT by itself may lead to an additional 1.7 billion POS transactions. Another source suggested an additional 3 billion in POS transactions from EBT (Piskora 1995, p. 14).

<sup>9</sup> While EBT would also increase ATM transactions from their current base of around 8 billion, ATM transactions primarily involve the withdrawal of cash (not electronic payments). ATM transactions are composed of cash withdrawal (86 percent), cash or check deposit (10 percent), and account transfer (3 percent), with only 1 percent involving an electronic bill payment (Board of Governors 1991).

significant when compared to the past growth of ACH transactions, which were specifically designed to be a direct substitute for the paper check.<sup>10</sup> The ACH was established in 1972 and it has taken over twenty years for this electronic payment method to reach its current level of 3 percent of noncash payments. Viewed in this light, it is clear that EBT will have an important impact on the composition of retail payments over a relatively short time period.

### **3. EBT VERSUS PAPER: A COST/BENEFIT COMPARISON**

Experience with a number of EBT pilot programs permits a cost/benefit comparison of electronic versus paper benefits transfer. During the planned seven-year EBT implementation period from 1994 to 2000, an ongoing government investment is needed to purchase, install, and operate new POS terminals. Reflecting the multiyear lifetime of these terminals, this fixed cost is amortized over a period of years. As benefit delivery is increasingly shifted from paper to EBT during this period, the reduction in paper costs is expected to be sufficient not only to pay back this terminal investment but also to provide net savings to U.S. taxpayers of over \$250 million overall. Once the program is fully established, as shown in Table 4, the net savings are estimated to be \$195 million annually.

The virtue and value of EBT is that it is predicted to deliver benefits at a lower cost as checks and food stamps are replaced by debit cards and ATM use. The largest ongoing expense of a mature EBT program is the electronic payment processing cost incurred by the benefit issuer and the EBT processor. As noted below, the few studies that exist have shown that electronic payments are cheaper than paper-based payments, both in the United States and in other countries.

Additional benefits from EBT are obtained from enhancing security and reducing fraud associated with counterfeit food stamps. And, although difficult to quantify, there will be greater assurance that benefits will go toward their intended purpose. For example, EBT will eliminate “cash change” in food stamp transactions. It will also reduce the opportunity for diversion of benefits to secondary markets—where some recipients sell their stamps, at a discount, in order to purchase nonbenefit items. Finally, the electronic cash registers now in place in most supermarkets can be programmed to control the purchase of items not covered through benefit programs (e.g., alcoholic beverages, rather than food items).

The EBT cost estimate in Table 4 includes \$116 million a year to account for the possible expense from theft or misuse of EBT cards. However, some experts think this estimate is too low. The Federal Reserve Board has waived

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<sup>10</sup> Unlike ACH, credit card transactions started out as paper transactions. Only recently have almost all portions of the credit card transaction been switched over to electronics.



**Table 4 Federal EBT Costs and Benefits**

	<b>Annual Values in Year 2000 and After (\$ millions)</b>
Federal EBT Cost:	
Infrastructure	5.0
Administration, Design and Development	1.3
Operations	234.8
Total	241.1
Federal EBT Benefit:	
Reduction in Paper-Based Benefit Delivery Cost	
Total	435.8
Annual EBT Savings over Paper Delivery of Benefits:	194.7

Source: Federal EBT Task Force (1994), p. 38.

until 1997 any extension to EBT of protections currently available to consumers from Regulation E. Regulation E sets an upper limit on losses cardholders can face (currently \$50) if they promptly report the theft or loss of their ATM, credit, or debit card to the card issuer. This permits the issuer to stop further transactions and thereby limit losses. Some estimates of the possible additional expense of extending Regulation E consumer protections to EBT are as high as \$500 million to \$800 million a year (Stix 1994, p. 86). If this level of extra expense for EBT from Regulation E were incurred, it would more than offset the forecasted net benefits of the program shown in Table 4.

At present, procedures are being investigated that would minimize losses in the event that some or all of the consumer protections offered by Regulation E are extended to EBT. Pilot tests are underway in two states (New Jersey and New Mexico) to provide accurate estimates of the potential expense involved. Under Regulation E, issuers of benefits could not limit their losses—as banks now can—by refusing to serve high-risk recipients who make repeated claims of lost or stolen cards and benefits.

A reasonable compromise may be to provide beneficiaries with the same sort of (limited) protections from loss and theft that they currently receive under the existing paper-based system. Although less comprehensive than Regulation E, such an arrangement would not disadvantage beneficiaries relative to their current position. It is important to note that loss of an EBT card by itself would

not lead to recipient or card issuer losses. This is because *both* the card and the recipient's PIN number have to be used to obtain cash from an ATM or authorize a POS transaction. The same is not now the case for fraudulent use of consumer credit cards (where only a signature is required) but does apply to use of consumer ATM and debit cards.

### **The Ratio of EBT to Paper Payment Costs**

In Table 4, the ratio of estimated annual EBT costs (\$241 million) to the documented cost of paper-benefit delivery (\$436 million) is 0.55. For the level of benefits to be delivered, the cost of EBT card use in store POS debit card terminals and ATM cash withdrawals is thus apparently a little more than half of the current cost of issuing checks and food stamps. This overall cost comparison is supported, in part, by some results from a recent EBT pilot program. Although all costs were not tallied, those associated with smart card off-line EBT and food stamp coupons were compared: the resulting EBT card/food stamp cost ratio was 0.57 (Food and Nutrition Service 1994).<sup>11</sup>

A more comprehensive cost comparison, although on a per-transaction basis, is to contrast the estimated social cost of an electronic payment with that for a check. Social cost includes payer, retailer, bank, and payee expenses while the costs in Table 4 concern government (and bank and some retailer) costs. The ratio of the estimated social cost of a debit card POS payment (approximately equivalent to an EBT POS transaction) with that for a check is 0.59 (Humphrey and Berger 1990, p. 50). A more recent study compares the social cost of an electronic ACH payment with that for a check and obtains an (average) ratio of 0.45 (Wells 1994, p. 40). Finally, a study of Norwegian payer and payee bank costs of processing an electronic POS debit (including terminal costs) versus that of a check yielded a ratio of 0.32 while the cost ratio for an ATM transaction to that of a check was 0.25 (Robinson and Flatraaker 1995, p. 211). What this demonstrates is that whether one compares the government per-transaction cost of EBT versus food stamps, or the social cost of debit card or ACH payments versus that of a check, or the bank costs of a POS debit or an ATM transaction versus checks, in every case electronic payments are less costly than those relying on paper (checks or food stamps). This result gives indirect support for the EBT/paper cost comparison results of Table 4.

### **EBT Card Technology: Magnetic Stripe Versus Smart Card**

The cost estimates for EBT assume the use of a card with a standard magnetic stripe and dial-up (telephone) access to EBT account information for

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<sup>11</sup> Exhibit 1 in this source was used after converting the retailer and financial institution costs shown there to a per-case-month basis (dividing these costs by 1,000/190).

verification of transactions, either through ATMs or POS.<sup>12</sup> A 1993 congressional Office of Technology Assessment study, however, suggested that new “smart-card” technology applied to EBT may yield even lower longer-run costs.

Smart cards have an apparent operating cost advantage over magnetic stripe cards. Use of a smart card would allow EBT authorization and transaction information to be handled at the terminal itself. The chip in the card would periodically be credited with “value” due a beneficiary. A program in the chip would identify the beneficiary, authenticate each transaction, and debit the stored value each time the card was used. Once a day, smart card (off-line) terminals would be accessed to determine the value of funds the benefit-issuing agencies would need to provide to pay for the beneficiary transactions made that day.<sup>13</sup> In contrast, magnetic stripe cards require, at a minimum, the use of dial-up authorization for each transaction and, with standard on-line ATM and POS systems, the even more costly capability to debit or place a hold on the cardholder’s account for the amount of the transaction at the time the transaction occurs.

While the smart card may have a lower operating cost once an EBT system is in place, the cost of the cards themselves and the need to deploy a new type of terminal would cause the government’s initial investment to be higher than with magnetic stripe cards. This is because some 109,000 ATMs and 376,000 POS terminals that read magnetic stripe cards already are in the marketplace and most of them already have the on-line communication capability needed for EBT applications (Caskey and Sellon 1994). Therefore, the higher government investment required for smart cards at a time when budgets are being cut, coupled with the sunk cost in existing magnetic stripe cards and terminal equipment, along with the uncertainty regarding use of an unfamiliar technology, will all probably mean that magnetic stripe cards will be the instrument of choice for EBT in the foreseeable future.

### **The Experience of EBT Pilot Programs**

Since 1984, there have been pilot programs in eight counties and cities which have tested various aspects of EBT. These results, including relative costs and implementation procedures, have been extensively documented by Abt

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<sup>12</sup> Access to account information for transaction verification involves comparing a user’s card and PIN number against a data file containing valid card and PIN numbers for transaction authorization. It need not also involve the immediate debiting (or placing a hold on) the cardholder’s account and the transfer of funds to the payee. When these additional steps are taken at the end of the day, the terminal network is classified as being “off-line”; if these steps are taken at the same time the transaction is authorized, the terminal network is “on-line.”

<sup>13</sup> In pilot programs, however, these costs have been higher than expected. This has resulted from a need to (1) update off-line terminals each day with a list of unauthorized (lost/stolen) cards, raising communication costs; (2) replace lost cards and issue new ones as beneficiaries move into and out of benefit programs; and (3) reconcile card and account balances due to terminal errors.

Associates and others. Recipients, retailers, and banks participating in the pilot programs have consistently shown a preference for EBT compared to current paper-based benefit transfer methods. At present, ten states have operational EBT programs. Three states (Maryland, New Mexico, and South Carolina) are operating statewide and others are expanding in that direction. Over thirty-three states have active plans to implement EBT in the near future (Food and Consumer Service 1995). Some of these programs will involve multistate arrangements.

#### **4. SCALE ECONOMIES AND FUTURE EBT COSTS**

Previous studies have shown that large scale economies exist for ATM terminal use and ACH electronic payment processing. Economies associated with POS terminals also likely exist and would probably be similar to those reported for ATMs. In contrast, empirical analyses indicate that scale economies in check processing are much lower than for electronic payments and have already been largely realized (Humphrey 1985; Bauer and Hancock 1992). Given scale economies in ATM, ACH, and (by implication) POS, it is expected that future EBT costs may fall substantially as volume rises. As shown below, there are important limits to this expected result.

##### **ATM and Other Payment Scale Economies**

Payment scale economies exist when the percent increase in total costs from a rise in transaction volume is less than the percent increase in transactions, so the average cost of a payment transaction falls. Holding other cost influences constant, check processing expenses rise by an average of 8.8 percent for each 10 percent increase in transaction volume (Bauer 1993) while ATM costs only rise by 3 to 5 percent for each 10 percent increase in volume (Walker 1978; Humphrey 1994). Although check processing scale economies are less than those for ATMs, there is an upper limit to the ATM economies. Busy or actively used ATMs have queuing problems. Customers who have chosen to use an ATM because it is more convenient than waiting in a teller line when a branch office is open have a similar problem at an ATM when the volume of transactions per machine exceeds 7,000 to 8,000 per month.<sup>14</sup> At this point, banks typically supply an additional terminal to address the peak-time queuing problem. The additional terminal expense raises the average cost per ATM transaction so that scale economies are realized only up to a certain volume level per ATM.

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<sup>14</sup> If an ATM transaction occurred every three minutes, there would be 300 transactions for a day that began at 8:00 a.m. and ended at 11:00 p.m. Over a month, there could be 9,000 transactions per terminal. However, peak load problems would create queues at substantially lower levels of monthly use.

There is another limitation to ATM scale economies. As banks have discovered, the increased convenience for consumers of using an ATM for cash withdrawal, as opposed to withdrawing cash at a branch office or writing a check for cash at a retail outlet, has led bank customers to expand their use of ATMs. Banks expected to reduce operating costs by shifting customer transactions—primarily cash withdrawal—to ATMs since an ATM transaction costs about half as much as the same transaction at a bank branch office (Berger 1985). However, ATMs are extraordinarily convenient. Customers now choose to “stop at the ATM” for cash twice (or even three times) as frequently as they used to visit their banks to cash a check. As a result, the gains banks were planning on from lower costs and scale economies at ATMs have been largely offset by an unexpected rise in frequency of use. While the cost per transaction of a customer cash withdrawal fell by around one-half when an ATM was used instead of a teller, the frequency of use effectively doubled, leaving total costs relatively unchanged overall (Humphrey 1994).

The same convenience benefits that have led to greater-than-expected use of ATMs by bank customers will also exist for EBT recipients.<sup>15</sup> To deal with this, after a certain number of free transactions each month, EBT recipients may incur a fee that covers the average cost of additional ATM transactions until the next benefit month rolls around. Such a pricing arrangement will help control EBT costs. It may also lead banks to adopt a more cost-based pricing arrangement for ATM services provided to depositors. Currently, only around 25 percent of banks charge their customers for using the bank’s own ATMs. Fees almost always apply for customer use of a “foreign” ATM—an ATM owned by another bank.<sup>16</sup>

Like ATMs, POS terminals would face an upper limit for scale economies due to queuing problems associated with very intensive use. In addition, a number of POS terminals would have to be placed in relatively low volume locations to provide the same degree of access with EBT as now occurs with food stamps. Thus, while POS terminals could potentially see the same degree of scale economies that have been measured for ATMs, the realization of these economies will be limited. Over time, however, EBT could “pull” more non-EBT consumers into using point-of-sale EBT and debit card terminals, due merely to their increased availability. If this occurs, POS scale economies will

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<sup>15</sup> In pilot tests, the frequency of shopping trips rose with EBT compared to when food stamps were used. This would increase the frequency of POS transactions and add to EBT costs.

<sup>16</sup> The average fee for customer use of its own bank’s ATM is around \$0.40 while the fee for use of a foreign ATM is around \$1.00 (Barthel 1993). Even so, use of foreign ATMs has grown from 15 percent of all ATM transactions in the mid-1980s to around 50 percent today (McAndrews 1991). Compared to a traveler’s check, a \$1.00 fee for use of a foreign ATM is cost-effective if more than \$100 is withdrawn (since the fee for a traveler’s check is typically 1 percent of the dollar value purchased). More recently, some ATM owners (including some owned by banks) have imposed an additional surcharge (often around \$1.00) for use of a foreign ATM.

be more fully realized by jointly serving these two groups at locations where EBT volume per terminal may be low.

### **ACH Scale Economies**

When magnetic stripe cards are used, EBT will require dial-up access to beneficiary account information for authorization of each ATM or POS transaction. It will usually also require the on-line debiting of (or placing a hold on) the cardholder's EBT account, which is typical today with ATM or debit card use. The flow of funds and final settlement for these transactions (involving government to bank to retailer funds transfers for each day's EBT transactions) will usually be through overnight ACH interbank transfers. ACH costs increase by 6 to 7 percent for each 10 percent rise in transaction volume so scale economies exist here too (Humphrey 1985; Bauer and Hancock 1995). While ACH average costs fall as volume increases, the cost reduction is not as fast as one might have expected. ACH costs are composed of computer processing expenses (which experience strong scale economies) along with interbank communication costs (which face few such economies). In setting up the ACH, the Federal Reserve connected all banks, rather than only those with sufficiently high volume. Thus scale economies from computer transaction processing were partially offset by the high cost of communicating with banks with low ACH volume. In addition, since ACH applications tended to be concentrated at certain times of the month for bill payments and payroll disbursements, rather than spread more evenly on a day-to-day basis, peak-load processing problems occurred. Thus the potential for scale economies associated with a relatively constant ACH volume flow were eroded because of substantial excess (and unused) ACH capacity during most of the month.

The overall implication for EBT from scale economies in ATM and POS terminals and ACH processing is that major future reductions in EBT costs from this source should not be expected. While EBT costs may fall somewhat over time, this will likely be due as much to standard learning curve effects as it is to realizing scale economies in electronic payments. In repetitive tasks, learning curve effects often lead to reductions in initial unit cost of from 10 percent to 20 percent (sometimes more) as cumulative output expands over time (Mansfield 1996).

## **5. ELECTRONIC PAYMENT AND EBT REPLACEMENT OF CHECKS**

Electronic payments have long been touted as a potentially lower-cost payment method that could replace many check and some cash transactions. The first electronic substitute specifically designed to replace checks was the ACH, the prototype of which was launched in California in 1972. Only recently has

the ACH made much headway in this replacement effort. Substitution has occurred chiefly through programs that replaced checks with direct deposit of Social Security, retirement, and government and private payrolls, along with pre-authorized direct debits for recurring bill payments. Even so, it has taken over twenty years for the ACH to account for 3 percent of noncash transaction volume (Table 3). The 2.3 billion in ACH transactions during 1994 are presumed to have replaced this many checks.

Introduced in 1971, ATMs have likely been more successful than the ACH in terms of check replacement. Before ATM use became common, approximately 8 percent of all checks were written to obtain cash (Bank Administration Institute 1979). In 1994, there were 8.3 billion ATM transactions. Approximately 86 percent or 7.1 billion of these transactions represented cash withdrawal. Since customers use the ATM to withdraw cash over twice as often as they cashed checks for the same purpose, the 7.1 billion ATM cash withdrawal transactions likely displaced over 3.5 billion checks. Thus ATMs are estimated to have replaced 3.5 billion check transactions while the ACH has only replaced around 2.3 billion.

In terms of overall transaction volume, the most important electronic substitute for a check has been the credit card. Credit card transactions were initially paper-based but now are almost wholly electronic. Credit cards account for over 13 billion transactions. While some credit card transactions have probably replaced cash, the vast majority represent check replacement (since the average value of a credit card transaction is \$53 while that for cash is less than \$10).

As noted above, EBT will shift check and food stamp transactions to cash withdrawals at ATMs and POS electronic debit card payments. This increase in POS use may expand debit card transactions from their current level of 1.4 percent of noncash payments to 3 to 4 percent. This translates into a possible check replacement of from 1.7 billion to 3 billion from EBT alone.<sup>17</sup> Thus, overall, EBT by itself may replace as many checks over a short period of time as have been replaced by ACH over the past twenty years. While this result is not a "revolution" in payment practices, it will reduce further the already slow growth in per-person use of checks. Preliminary forecasts are that per-person use of checks in the United States will turn negative in the next few years, a result that should be accelerated by the expansion of EBT.

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<sup>17</sup> Additional check replacement may follow the increase in availability of POS terminals associated with EBT. About 600,000 POS terminals may be needed in a mature, nationwide EBT system (Kirlin et al. 1990, p. 202). Many food stores participating in the food stamp program would have to be supplied with new terminals even though there are almost 500,000 POS terminals in place today.

## 6. SUMMARY AND CONCLUSION

Federal and state benefits total almost \$500 billion a year and range from food stamps to Social Security to Aid to Families with Dependent Children to military retirement. Many benefit recipients have accounts at depository institutions and increasingly receive benefits through an electronic direct deposit. However, one-third of recipients do not have a deposit account and are the focus of electronic benefits transfer. EBT delivers benefits electronically through ATMs (for cash withdrawal) and retail POS debit card terminals. An EBT transaction is expected to cost only about half of what a paper-based benefit transaction (check, food stamp) costs. Overall, EBT is projected to disburse \$112 billion in benefits each year, cover 31 million families (12 percent of the population), and may save \$195 million annually by the year 2000.

Currently, 78 percent of all U.S. noncash transactions are made by check, while 22 percent are made electronically (mostly credit cards). As EBT expands, POS use may double or triple from its current level of 1.4 percent of noncash transactions up to 3 to 4 percent of these payments. Thus EBT could by itself expand electronic payments by perhaps 2 percentage points, lowering check use to 76 percent of noncash transactions. Overall, EBT will contribute to check replacement, improve the efficiency of delivering benefit payments at the federal and state level, and should also provide greater availability of POS debit card terminals (and thereby promote further the ongoing shift to electronic payments).

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