

Notice: This Material
may be protected
by Copyright Law
(Title 17 U.S.C.)

Value Conflicts and Social Choice in
Electronic Funds Transfer System Developments

Rob Kling

Department of Information and Computer Science
and
Public Policy Research Organization
University of California, Irvine
Irvine, Ca 92717

February 1, 1978

(Rev. July 11, 1978)

ICS Technical Report #112

2F

ABSTRACT

During the last few years, computer-based systems which automate the transfer and recording of debits and credits have begun to be implemented on a large scale. These systems promise both financial benefits for the institutions that use them and potential conveniences to their customers. However they also raise significant social, legal, and technical questions that must be resolved if full-scale systems for Electronic Funds Transfer (EFT) are not to cause more problems for the larger public than they solve. This paper examines the incentives for EFT developments and the social problems they raise in the context of conflicts between five different value positions that are often implicit in analyses of proposed EFT arrangements. These conflicts reflect the relative importance of certain problems for specific groups. The value positions implicit in EFT proposals helps organize analyses of market arrangements, system reliability, and privacy of transactions. These topics are analyzed in this paper and related to the value positions held by concerned parties.

Last, the ways in which the public can learn about the social qualities of different arrangements and the pace of EFT developments are discussed in the context of social choice.

CR. Categories: 2.11, 2.12, 2.3, 3.52, 3.53, 3.55

Key Words: Electronic Fund Transfer Systems,
Social Impacts of Computing,
Privacy, Social Choice, Computer Networks,
Network Reliability, Security, Social Values

Acknowledgements:

Paul Armer, Russel Dewey, Bernard Galler, C.C. Gotlieb, Lance Hoffman, and Dan McCracken provided helpful comments on an earlier version of this manuscript [33].

Robert Ashenurst, Bruce Gilchrist, James Meehan, James Rule, and the referees provided helpful comments on this more extensive version.

1. What Issues Do Electronic Funds Transfer Systems Raise ?

During the last decade, an assortment of bankers, other members of the financial community, and computer specialists have been planning payment systems based on electronic impulses rather than cash, credit card chits, and paper checks and receipts. These Electronic Funds Transfer (EFT) systems* (promise to cut the cost of paper processing, reduce petty theft, and support convenient add-on services such as automatic payroll deposits [3,12,19,51].) EFT systems include networks for automatically clearing checks while debiting and crediting individual accounts, directly debiting and crediting individual bank accounts from point-of-sale (POS) terminals in retail stores, (and providing cash on demand 24 hours a day through automatic tellers.) While scenarios of less-cash and less-check societies encourages one to imagine integrated nationwide networks, different components now operate without large scale integration. BankAmericard, for example, has installed a nationwide network to transmit electronic credit receipts. Dozens of banks have installed automatic tellers [1]. Over two dozen savings and loan associations are experimenting with POS terminals linking supermarkets and department stores to individual bank accounts [45]. In addition, Fedwire and Bankwire transmit tens of billions of dollars in large interbank transactions each day [69]. At this time, however, there are

* EFT systems connote those technologies used to transmit credits, debits, or related business information computing and/or communications technologies. "EFT" is often used loosely to denote various computer-based technologies used by banks and businesses to process and store financial transactions and related information.

no networks which automate the processing of checks between personal accounts at different banks in the U.S.

Several dozen major financial institutions, government agencies, and computer vendors are developing specialized EFT technologies and their associated administrative frameworks. Since these organizations participate in a fast-moving social world in which events outpace rumors of events[38], some of the particulars cited in this paper may be dated by the time it is published.

EFT developments raise complex legal, social and technical issues and a fragmented literature devoted to EFT systems has grown at an enormous pace during the last few years. A few studies investigate a broad range of opportunities and problems that EFT systems may foster [3,51]. However, most of the published articles and proprietary reports address the special interests of financial, business, and technical groups that directly benefit from particular EFT arrangements. This pattern is due, in part, to the sheer complexity and variety of issues that EFT systems raise. In addition, most EFT experts owe their intimacy to working with an enterprise which has some stake in a particular form of EFT development. These commitments help create a literature in which analysis and advocacy are subtly intertwined.

Many analysts view EFT systems as "economic instruments" whose costs and benefits may be assessed adequately in dollars. This paper balances the literature on EFT systems by viewing them as both economic and political instruments. As political instruments, EFT systems may exacerbate fundamental conflicts of social values, which,

because they are relatively intangible, are difficult to assess.

The analytic framework developed in Section 2 utilizes idealized value positions to provide criteria for social choices. Some social activities that may be catalyzed by EFT systems, such as regulatory impediments to EFT developments, consumer indifference to EFT-related services, "credit blackouts," large-scale theft, or political surveillance, are substantially more troublesome for parties that hold one value position than for parties that hold another. In fact, certain patterns of EFT development exacerbate major value conflicts in American society.

Section 3 then indicates how some criteria for social choice lead many organizations to develop EFT systems. Section 4 analyzes several major unresolved social and technical problems in EFT developments -- maintaining consumer sovereignty in markets within which EFT-based services are provided, the development of reliable systems, and the protection of individual privacy*. Since the importance of these issues, and the sense one makes of them, depends upon one's values, these analyses are linked to major value positions that underlie discussions of EFT developments. Section 5 addresses two fundamental issues in shaping pro-social policies for EFT developments: how the public can learn about the ramifications of different EFT arrangements and what pace of development is most sensible. The article also points the reader to the rather dispersed literature on EFT systems.

* This article treats only a few major issues catalyzed by EFT developments. Many issues, such as the impacts of EFT systems on the U.S. Postal Service are outside its scope. See [39] for a list of 90 emerging research issues.

2. Value Positions for Assessing EFT Systems

EFT systems are a technical instrument; a means to some end. Proposals for preferred EFT arrangements often assume that certain social goods should be maximized. Five major value orientations are implicit in the published discussions of EFT systems.

1. Private Enterprise Model: The preeminent consideration is profitability of the EFT systems with the highest social good being the profitability of the firms providing or utilizing the systems. Other social goods such as users' privacy or the need of the government for data are secondary [63].
2. Statist Model: The strength and efficiency of government institutions is the highest goal. Government needs for access to personal data on citizens and needs for mechanisms to enforce obligations to the state would always prevail over other considerations [6!3].
3. Libertarian Model: The civil liberties as specified by the U.S. Bill of Rights are to be maximized in any social choice. Other social purposes such as profitability or welfare of the state would be sacrificed should they conflict with the prerogatives of the individual [6!3].
4. Neo-populist Model*: The practices of public agencies and private enterprises should be easily intelligible to ordinary citizens and be responsive to their needs. Societal institutions should emphasize serving the common man.
5. Systems Model: The main goal is that EFT systems be technically well organized, efficient, reliable, and esthetically pleasing.

In different instances, these positions may support, conflict with, or be independent of each other. Each of them, except the Systems model, has a large number of supporters and a long tradition of support within this country. Thus, EFT developments which are congruent with these positions might be argued to be in "the public interest."

* This position is also close to the spirit of Jeffersonian democracy and the sensibilities of Common Cause, the "citizen lobby."

Perceptions of benefits and problems depend upon one's values and commitments. For example, diminishing the cost of check processing is congruent with the Private Enterprise position articulated above, but is indifferent to Libertarian and Neo-populist positions. On the other hand, government regulations requiring financial institutions using EFT systems to keep detailed archival records of the transactions processed would be most congruent with a Statist position. These regulations compromise both Libertarian and Private Enterprise positions. This would especially be the case if the records kept at the expense of the businesses using EFT systems are occasionally searched by government agencies wishing to audit the activities of selected persons or groups.

While Neo-populist and Libertarian criteria are often compatible, they provide distinct criteria for social choices. Advocates of Libertarian criteria usually oppose universal identification numbers [75] and would be likely to oppose consolidated EFT service cards. Neo-populist analyses would judge consolidated record systems on their ease of use and would be more likely to favor the convenience provided by uniform record systems.

Parties with different interests often stress those criteria which advance their ends. Representatives of private firms argue in favor of Private Enterprise criteria; consumer activists argue for Neo-populist criteria. Some publics, such as large businesses and government agencies, are relatively well organized to influence EFT arrangements. These publics, which generally advocate Private Enterprise or Statist criteria, can afford extensive advertising and

lobbying. And some representative groups are so situated that they are likely to be routinely consulted by government agencies proposing legislation that impacts EFT arrangements. In contrast, the publics best served by the Neo-populist and Libertarian positions are poorly organized*.

Those publics whose interests are aligned with a common value position may be in conflict with each other. For example, while business interests are most closely aligned with the Private Enterprise position, particular businesses may compete within specific markets. In this article, the incentives and problems catalyzed by EFT systems are primarily analyzed in relation to the value positions developed here rather than in relation to the clash of interest groups.

Traditional political analyses focus upon groups and their interests. However, interest groups analyses can be clumsy and unbalanced in studies of EFT arrangements. Political theory provides little guidance in differentiating groups. Clusters of groups selected by an analyst (e.g., banks) may appear arbitrary to the members of these same groups when they perceive their interests to be different from those of competitive groups within the same category.

* For example, only four people represented civil liberties groups and five people represented consumer groups out of 203 witnesses heard at public hearings sponsored by the National Commission on Electronic Funds Transfers. In contrast, other groups and their witnesses included the banking industry (85), service providers and equipment manufacturers (40), retail merchants and commercial interests(18), bank regulatory agencies(19) [51, pp.359-369]. While only 2.5% of the witnesses represented consumer groups, consumer concerns may have had greater voice with the Commission since it held consumer group meetings at each of its three "public interchange meetings [51, pp.372-376]. But other interests clearly dominate the testimony presented.

On the other hand, relying on the perceptions of participants leads the analyst to create the largest number of groups for those interests which are highly active, for which an issue is most salient, and which have finely differentiated ways of carrying out their activities. In the case of EFT developments, several different classes of banks (e.g., savings and loan associations, commercial banks) and businesses have different stakes in and preferences for EFT arrangements. An interest group analysis would distinguish these groups and count at least a dozen distinct participants in the finance, retail, and computing industries. In contrast, consumers would count as but one group*. Such an analysis would be unwieldy given the large number of groups to be considered and the way in which some groups which advocate similar values, nevertheless prefer slightly different EFT arrangements. The value analysis developed here avoids these difficulties by utilizing fewer categories since only a few criteria for social choice underlay the debates over preferred EFT arrangements.

Both interest group analyses and value analyses help identify salient social issues and the ways in which different resolutions of an issue best serve a particular group or value position. However, neither interest group nor value analyses can provide sufficient analytical insight into the dynamics of the issues identified. Understanding the social and technical dynamics of particular issues

* "Consumers" might be differentiated into four groups based upon their socio-economic status and degree of urbanicity. Knowing a person's socio-economic status helps predict his receptiveness to EFT technologies and his participation in banking/credit relationships [3, 25]. But such differentiation adds to the number of groups and further complicates analysis.

(e.g. market structure) requires additional theoretical (e.g., economic) concepts. However, both interest group and value analyses play an essential role in identifying and ordering the issues worthy of attention.

Section 3 highlights some of the major incentives that invite different groups to develop particular EFT systems, and section 4 analyzes some of the social and technical problems that these developments raise. Since most of these problems hinge on value conflicts that are exacerbated by EFT developments, it is unlikely that they will be solved. Rather, different EFT arrangements - technologies, organizational practices, and laws - will simply tend to favor one value position more strongly than another. Thus, EFT systems can be viewed as new sources of social tensions. The magnitude of these tensions will depend upon the extent to which these different value positions are held by members of the larger society and the extent to which various EFT developments admit compromises acceptable to major parties.

3. Incentives for EFT Developments

Some analysts identify emerging EFT systems with social progress. For example, Long claims that[43, p.2]:

EFTS is happening because it is a better way. All arguments about the sufficiency of the present paper system are meaningless. Television did not come about because the radio system was overloaded or breaking down, nor did radio or the telephone develop because the mail was about to collapse. Neither were these systems built because the public was crying for their development. They came about simply because they represented a "better way" of communication.

Even if EFT systems can foster some form of social progress, they are costly [1, 7, 51] and will be developed by organizations with specific incentives. While many EFT systems are to be used by the larger public, they are selected, financed, and developed by financial institutions, retail firms, and public agencies which embed them in their own operations. It should not surprise anyone that EFT systems have been designed to provide attractive benefits to those organizations that utilize them directly. Thus, EFT systems have been most forcefully advocated and developed by groups which employ predominantly Private Enterprise or Statist criteria for social choice*[4, 11, 12, 19, 43, 44, 59]. The following examples include three that illustrate predominately Private Enterprise criteria and two that illustrate Statist criteria:

1. In general, savings and loan associations are prohibited by law from providing checking accounts. Direct linkages between point of sale terminals and banks might afford customers the convenience of checking accounts without violating current laws. Such innovations might enable savings and loan banks to draw customers (and thus deposits) away from commercial banks*.
2. Supermarkets and small business suffer large losses from bad checks. Computer-based credit authorization services enable a merchant to diminish his losses.
3. Firms that advertise by mail often define potential customers by certain demographic characteristics[51, pp. 128-130]. Knowledge that a person recently purchased a similar service is a better predictor of the likelihood that he will purchase a given service than is his membership in some demographically defined group. As financial transactions become automated the pool of potential market data either for internal use by large retail firms or for sale by credit card firms could increase substantially and provide merchants with finer mailing lists.

* EFT systems have also captured the imaginations of people who judge computer systems by their technical merits [4, 47, 76].

* Savings and Loan associations have also tried other means to provide a demand deposit service competitive with commercial banks. In New England some have initiated NOW accounts. In other localities, Savings and Loan banks offer free checking accounts through a participating commercial bank[72].

4. In 1970, the Federal Reserve Board (Fed) processed 7.7 billion checks [29] for member banks, and the volume has been growing at 7% each year. But is barred from passing its costs back to the banks. In addition, banks have been steadily leaving the Federal Reserve System since World War II[9]. The Fed provides special loans and market information in exchange for member banks maintaining relatively high reserve funds on account without interest in the reserve system. If the Fed administered a national EFT system, it could increase the accuracy and timeliness of its data about transactions in the economy. If automated check processing systems could lower the cost of check handling*, the Fed could diminish its overhead. Improved information and reduced reserve requirements might entice banks to re-enter the Federal Reserve System and thereby help increase the Fed's effective control over monetary policy[29].
5. By the end of 1975, more than 32 million people were receiving Social Security benefits. Automating the transfer of credit to social security recipients could save a large fraction of the costs of preparing and mailing monthly checks. In addition, theft of checks from post boxes would be eliminated.

Analyses of EFT developments are sharpened by distinguishing benefits from incentives. An incentive is an expected good that induces a party to take action, while a benefit is any good derived from the action taken. It may benefit individuals to receive fewer unwanted advertisements, but the incentives for developing special-interest mailing lists would be the decreased costs of advertising borne by retailers. Some incentives, particularly those that emphasize competition for new customers, also promise benefits to consumers through convenient new services and faster credit through pre-authorized payments. However, cost-savings to EFT using institutions is more problematic. The little publicly available data on which to assess the claims for cost savings indicate that most EFT systems become cost effective only with very high transaction volumes[3, 7, 51]. Benton estimates that a typical check verification

* Checks alone were estimated to cost \$5 billion to process in 1973 [17].

system requires 600,000 verifications per month to be economically viable [7]. (While over 6,000 automated teller machines are reported in use[1], recent surveys of their operating costs indicate that, on the average, they cost between \$1.50 and \$2.50 per transaction given current levels of use[7].) Ernst estimates that a nationwide automated clearing house network would need between 180 million and one billion transactions per year to be economically viable[28]. The high capital costs of EFT systems and the high volumes of business which they require makes consumer acceptance vital*.

Some incentives are more important than others to EFT-using organizations. It is unlikely that individual banks would save a substantial portion of the cost of paperhandling with EFT systems[3, 7]. Rather, fear and hope drives many private organizations into developing EFT systems. (A firm that develops EFT-related services may gain new customers; one that delays much longer than its competitors may lose out[43].)

While Private Enterprise and Statist criteria encourage many organizations to develop specific EFT arrangements, some consumer convenience (a Neo-populist value) may accrue from them. However, no one argues that enhancing Libertarian values are either a major incentive or likely consequence of large-scale EFT developments.

* While many organizations publicly announce new EFT developments, withdrawals are more quiet. One exception is the decision of Glendale Federal Savings and Loan to remove a network of 137 POS terminals from 20 supermarkets after 2 years of development and trial. Apparently, consumers routinely cashed their payroll checks through the terminals, but did not increase their bank deposits sufficiently to allow the bank to turn a profit[1].

Lastly, Systems criteria and consumer convenience, a Neo-populist criterion, may favor more integrated services (e.g., fewer cards and terminals).

The relatively few incentives offered by EFT developments for advocates of Libertarian or Neo-populist criteria for EFT developments may be underscored by reversing our analysis. EFT technologies may help solve some of the problems faced by profit-making firms or public agencies in carrying out their activities. But advocates of Neo-populist criteria, who stress institutional and legislative reforms to render large organizations more accountable to the public, are unlikely to view EFT systems as an important strategic instrument. Similarly, Libertarian analysts, who are concerned about minimizing the intrusiveness of organizations into people's private lives, are unlikely to consider EFT technologies to be important means for protecting individual liberties. As we shall see in the next section, some EFT technologies do not threaten these value positions if they are embedded in particular market arrangements or are accompanied by special legal safeguards. But that is far different from saying that EFT technologies provide new means for Libertarian or Neo-populist social reform.

4. EFT Developments and Social Values

During the last decade, the intellectual climate surrounding EFT developments has altered dramatically. Until the mid-1970's, Private Enterprise, Statist, and Systems criteria dominated the analyses of EFT operations. However, during the last few years, policy analyses

of EFT developments have been addressed from a wider variety of perspectives including Neo-populist and Libertarian positions [33, 34, 51, 56, 67, 73, 79]. Public policies are developed by political actors in a context of competing values (and interests) [37]. Policy analyses may be informed by "objective" studies, such as empirical studies of EFT operating costs or studies of the state of the art in computer security. But anticipating the likely effects of future technologies relies upon analogies with similar situations and hypothetical cases. One's values help decide which analyses are most attractive and which features of the technology and social setting should be included in the hypothetical cases. More generally, personal values play a central role in helping a policymaker when there is little empirical data to inform decisions [37], a situation characteristic of emerging technologies. Of course, some analyses may be particularly biased by ignoring or heavily discounting competing value concerns.

Many policy analyses, regardless of quality, are also political documents which reflect workable compromises among parties who represent conflicting interests and values. This is the best way to view the recent detailed reports of the (National Commission on Electronic Funds Transfer) (NCEFT) [50, 51] or the Privacy Protection Study Commission (PPSC) [56]*. Both reports address relevant competing

* The NCEFT was established in 1974 to serve the U.S. Congress by studying EFT developments and "to recommend appropriate administrative action and legislation to permit the orderly development of public and private EFT systems [51, p.iii]." It first met early in 1976, published a final report late in 1977 [51], and is now inactive. The PPSC was authorized by the Federal Privacy Act of 1974 (Public Law 93-579), completed a final report in mid-1977 [56], and is also inactive.

values. There are, in addition, explicit conflicts regarding market arrangements and consumer protection in the majority and minority reports of the NCEFT.

Resolution of market arrangements is central to EFT development, and privacy issues have been of particular concern to computer scientists [48]. These will be examined and linked to the value positions introduced in the preceding section. In addition, developing reliable EFT systems, which should normally be a technical concern and consistent with all the value positions analyzed here, has also been treated as a value-dependent issue in many recent analyses. The debates in these three policy arenas illustrate the way value conflicts underlie other debates about EFT developments.

4.1 Market Arrangements

According to neo-classical economic theory, the class interests of consumers are best served when goods and services are bought and sold under conditions of a free market: (a) there are many buyers and sellers, none dominant, who may easily enter and exit the market and alter their business associates; (b) each party has complete information about a product or service through its price (all costs are internalized) [46]. The interests of particular parties may conflict in particular transactions: sellers compete with each other and consumers seek the best bargains. In addition, individual agents may be specially advantaged by departures from free market conditions (e.g., by having special information about the quality or expected supply of a product). In neo-classical theory, however, these

departures are viewed as either random perturbations from an ideal situation or as systematic "market failures" to be remedied by special regulations such as prohibitions against price-fixing. According to the theory, the long-term interests of all parties are best served in free-markets: the largest number of goods will be produced at the lowest overall price [46]. Both Neo-populist and Private Enterprise values would be jointly served by these arrangements.

As conditions in a particular market depart from this theoretical ideal, Private Enterprise and Neo-populist values may increasingly conflict. If the market is dominated by few consumers, then prices may be set too low and suppliers may not receive a fair profit for their efforts. If a market is dominated by few suppliers, prices may be too high and the market will "inefficiently" produce too little. If all costs are not internalized in the price of a good, the market will price it too low, too much will be produced, and the real costs to consumers will be excessive[68]; Private Enterprise criteria will dominate Neo-populist values. The actual balance between Private Enterprise criteria and Neo-populist values in practice depends upon the actual structure of particular markets. Thus claims about the utility of free-markets as arenas for public choice about EFT arrangements (e.g., "let the market decide"), must rest upon careful analyses of the relevant market structures. In the rest of Section 4.1 we shall shift our attention from explicit concern with value positions to an analysis of EFT developments and market structures.

4.1.1 Competition within the Financial Industry

Neo-populist critiques of American enterprise often equate size and market power [49]. (However, in the American banking industry with 19,000 banks of different kinds, size and market influence are more subtly related to competition.) Since banks are authorized to operate in a given city or state, competition is currently focussed on local rather than national markets. Within many local markets, both urban and rural, banking is relatively concentrated. (In the seven largest cities, the three largest banks held over between 43% and 78% of the total deposits in 1973[80].) In reviewing the empirical economic studies of banking performance, Reid [58] finds consistent evidence of positive relationships between the level of concentration in specific markets and increasing prices for various services.

(Advocates of EFT services suggest that allowing banks to extend their services via terminal networks into new markets by eliminating "archaic" branching and single-state banking laws would increase local competition with resultant gains both for consumers and more efficient service providers.) Thus, the definition of a bank branch and the deployment of terminals is one central focus of debates over market structure.

However, banking is also concentrated nationally. In 1973, the 100 largest banks held 70% of the funds on deposit [58]. Through bank mergers and acquisitions of bank-holding companies, this industry has become more concentrated during the last two decades[58]. Advocates of large banks contend that they provide greater safety for deposits and cost-savings through economies of scale, even though there is

scanty empirical evidence to support the latter claim [29, 58].
(Representatives of smaller banks and consumer groups note that the expensive EFT costs can be more easily afforded by the larger banks: they therefore fear that EFT developments will further accelerate the concentration of the banking industry. This part of the debate focuses upon different proposals for (mandatory or permissive) sharing EFT facilities which would alter the competitive advantage of larger institutions to underwrite expensive capital investments.)

(In these debates, consumer groups utilize Neo-populist criteria and bankers utilize both those criteria and Private-Enterprise criteria in asserting their preferences.) Of course, customer service or consumer preference are honorific values which any party can benefit by claiming. However, empirical studies can shed some light on the relationship between market arrangements advocated and their actual efficacy.

4.1.1.1 Branching

Competitive balances between banks may be altered by the way in which regulatory agencies or legislative bodies (re)define branch banking. (Proponents of widespread terminal deployment argue that banks would provide more convenient services and be more competitive if they could place a terminal in any geographical area, regardless of the home state of the bank.) (In addition, rural and suburban communities might gain new services by having larger urban banks install terminals throughout a region.)

(Critics, on the other hand, fear that nationally chartered banks which can afford large scale systems, will slowly displace either smaller banks or state chartered banks which will not be able to compete [19]*.) The nationwide networks may act like chain restaurants in driving out local, more diverse businesses.

(These issues, which in part hinge on whether an automated teller machine will be considered a bank branch, have not been resolved). In 1974, the Comptroller of Currency ruled that branch applications are not required by National banks for terminals placed within 50 miles of the bank office to which they were linked. This ruling was struck down in a subsequent Supreme Court decision. However, the NCEFT has recommended that state and federal legislation be enacted to enable the unfettered placement of "branch/terminals" for intrastate banking, or in "natural market areas that cross contiguous state lines [51, p.87]."

4.1.1.2 Shared Facilities

The competitive balance between banks is changing through mergers, new services, and altered statutory provisions. Advocates of Private Enterprise criteria are particularly concerned that there be sufficient competition in a market, that it operate efficiently, and yet that competition not be so severe that many firms fail.

* Ceteris paribus, state banks now have a slight competitive advantage in states which allow branching and which do not treat terminals as branches.

Representatives of smaller banks and consumer groups fear that the investment required for EFT facilities will differentially advantage larger banks [19]. If only larger banks can afford to implement EFT services, smaller banks may be encouraged to merge with them. (Large bank representatives argue that innovators should receive fair rewards for their risks and that market forces should determine the public's banking services[19].)

Public policies that legislate the extent to which EFT equipment can or must be shared is one issue in which these concerns are being addressed. Under "mandatory sharing," EFT providers must share their facilities - communication networks and terminals - at a fair fee with any institution that seeks access. Under "pro-competitive sharing," parties may agree to share, but if challenged, such sharing arrangements will be permitted, required, or prohibited on a case by case basis" depending upon the competitive effects [51]. A majority of NCEFT commissioners have recommended that laws and regulations be adopted to support pro-competitive sharing. However, several state laws mandate the sharing of EFT facilities[57], and mandatory sharing has been advocated by a minority of the commission[51].

Deciding on policies for sharing is a complex issue. It entails arguments about economies of scale and the kinds of business arrangements which are permissible under anti-trust regulations*. It

* It can also entail privacy considerations in deciding who should operate shared facilities. For example, the PPSC explicitly recommended that no Federal agency, such as the Federal Reserve Board which currently administers several automated clearing houses, be an EFT operator[56, p.173]. In contrast, the NCEFT did not recommend restricting the Federal role in administering EFT operations[51].

can be partly illuminated with empirical studies of the effects of current EFT systems upon market shares. However, EFT market data is sparse [51, p. 108], and market arrangements may change after EFT technologies become widespread. Thus many decision makers rely upon a priori value positions in case of doubt. Some people place more trust in current market structure and regulatory arrangements [51, pp. 97-101]. Others prefer legislative mandates, such as those for mandatory sharing, to insure some parity between banks [51, pp. 267-271].

4.1.2 Consumer Convenience and Protection


(Firms that offer EFT services, such as automated tellers and POS terminals linked to banks, provide new services that enhance the convenience of consumers and thereby attract new business. Thus viewed, these EFT systems illustrate the pro-social action of free markets. Consumers will vote with their dollars for the better quality services.)

(Since 1971, the American Bankers Association has commissioned several market studies of people's acceptance of EFT technologies [3]. Most people appear satisfied with their current payments media (e.g., cash, credit cards, checks) and have shown little interest in shifting to real-time payments.) Most consumers seem particularly interested in maintaining their float and controlling the size and timing of their payments. Thus, they will occasionally opt for pre-authorized deposits into their accounts (e.g., payroll) and show little interest in pre-authorized debits (e.g., telephone or utility bills). Generally, consumers manifest the same kind of economic rationality as

do business enterprises: they want to increase the speed with which they receive income, control the speed at which they pay for goods and services, and are unwilling to accept convenience for its own sake without asking what it will cost. Of course, individual levels of control may vary with different EFT technologies. For example, one maintains control over payments with automated tellers and relinquishes control with pre-authorized debits which exclude stop-payment mechanisms.

Approximately 20% of American households do not utilize checking accounts[3]. While many of these people tend to be poorer than account users, some of them simply prefer to transact business on a cash basis. However, certain government initiatives may force many of these people to utilize checking accounts or related banking arrangements. If the major federal agencies that provide monetary payments such as the Veterans Administration, Social Security Administration, and selected welfare agencies rely upon automated check processing systems to reduce their overhead costs, then they can force their clients into holding bank accounts. Such actions would compromise Libertarian values for Statist values.

Difficulties also arise when business conditions do not meet free market assumptions. For example, if the public depends upon a particular set of arrangements which originally offered convenience, consumer exit becomes difficult, and suppliers may raise their prices or lower the quality of service [14].



Recent credit card practices illustrate the point. During the late sixties, many banks provided charge cards easily. Since the cards offered a convenient service, many people enthusiastically adopted them and there are now over 75 million bank cards in circulation[56,p.57]. For certain transactions, such as renting a car, possession of a bank card (or a similar quality card) has become essential. In 1976, the bank card companies began to alter the arrangements for card services by (a) charging a minimum monthly fee, even if the card is unused, and (b) by replacing the carbon copy card receipts enclosed with the monthly bill with a simplified listing of transactions. Service charges to the customer have increased. Consumer ease, a Neo-populist value, has been diminished since card customers must expend additional energy to verify their transactions or provide receipts for other purposes.

In consumer protection, as in other market issues, the positions taken by various parties seem to hinge in large part on a priori value commitments. People who trust current market structures or who view the recent history of regulation as inimical to their interest or to a broader public interest advocate reliance upon current market forces to select the best services. In their view, Neo-populist and Private Enterprise values can be jointly served[19]. Other analysts view the American economy as becoming increasingly controlled by several hundred large corporations [8] which are usually protected by the regulatory agencies that were charged to balance their institutional interests against legislative mandates and broader public interests[49, 58]. According to these analysts, reliance upon current market and regulatory arrangements would not further serve the broad

public, and they point to the vigor with which specific industries have fought consumer reforms such as truth-in-advertising laws and the Fair Credit Reporting Act. These Neo-populist critiques emphasize the ways in which particular markets differ from the neo-classical model of perfect competition, and they seek various forms of corrective action to recreate those special settings where there is a relative harmony between Neo-populist and Private Enterprise criteria.

4.2 Reliability

In theory, unreliable EFT systems serve no legitimate interest. Individuals and organizations could lose valuable capital and credibility. In addition, the theft of sensitive data could threaten Libertarian values by invading the privacy of data subjects. The Systems position also supports computer systems which can easily be rendered secure from theft and be dependable[70]. However, security measures may compromise the Neo-populist position if increased security requires more complex procedures for ordinary people to verify their identities.

(During the last decades we have learned that increasing the scale of a computer system leads to a more than linear increase in the difficulty of maintaining it reliably.) While most of the existing EFT prototypes seem relatively reliable, it is hard to extrapolate from their behavior to systems that are considerably more complex without careful study. (Unfortunately, many EFT advocates minimize the problems of large scale theft or system failure when addressing lay audiences (including public officials) who are satisfied with the

current payments systems[11, 12, 19, 43, 69]. (Reliable systems would be more costly; advertising potential problems would discourage people from adopting EFT services casually; both would impede the acceptance of EFT systems.)

4.2.1 Theft and Sabotage (Security)

Lucrative thefts and embezzlements carried out on computer-based systems[2, 53, 81]. (Many EFT advocates portray the existing paper-based payments system as inefficient[43]. It is also relatively secure. The maximum theft is limited by the amounts of cash or securities that are stored in any one place.) In the paper-based system, the money is physically distributed over thousands of banks. Some security is built into the current system of decentralized and weakly coupled banks since theft requires physical presence. Perhaps an occasional Brinks robbery will net a million dollars every few years. However, in automated check processing (ACP) systems*, the maximum theft is only limited by all the funds on account in a particular bank. If an intruder is sufficiently clever to "enter" via a remote terminal, he could gain access to all the funds in the system!)

For a theft to be successful with ACP systems, credits need not exit from the system. A successful thief might simply transfer funds into his account and transform them into services by transacting legitimate business and allowing other businesses to legitimately

* ACP systems denote fully automated transfers between individual checking accounts. Our analysis of ACP systems does not cover regional check clearinghouses which do not link individual accounts with real-time funds transfers. Nor do we cover intra-bank networks such as Bankwire or Swift [69].

debit his account in exchange for goods and services. Alternately, if he wished to leave the country with substantial cash, he might extract it by normal means after surreptitiously siphoning funds into several medium-sized accounts. (He might also extract funds through automated tellers.)

While strategies for enhancing system security are receiving substantial attention, the task of developing thoroughly secure software systems is immense. In a recent review of system security, Linde noted 26 different generic functional flaws in software systems[41]. These range from strategies for authenticating users to the strategies for checking the appropriateness of various parameters that are passed between system modules. In addition, he noted 18 distinct strategies that an interloper could use in attempting to gain illegitimate access to privileged system commands and password files and then to "free" access to a system. The current situation may be summarized as follows:

1. Most contemporary computer systems are insecure and it is currently impossible to prove that a given computer system is technically secure*.

* Attempts to prove the correctness of programs are receiving some attention, but the current schemes can deal only with comparatively simple programs. Production operating systems written in languages whose properties are easy to formalize seem well out of reach. Some attempts have been made to prove the correctness of particular protection schemes for particular machines, but these proofs do not insure that the implemented scheme is free of error. Recently, it was demonstrated that one cannot prove the correctness of an arbitrary configuration of a rather general protection scheme[24].

2. The body of techniques for developing technically secure systems is growing rapidly [26, 41, 54, 64, 74]. These schemes vary in cost and influence the design of dozens of system features.
3. Any computer system is as secure as its weakest component. Most of the larger computer systems have several features that enhance security, but these may be bypassed by clever intruders who exploit other design weaknesses[41].
4. The strategies for insuring a high level of protection require dozens of features in each system to be appropriately designed. These special features may only coexist on a few experimental systems and a few systems used within the intelligence community.
5. A heavily protected system is relatively costly and each additional security feature adds to the system overhead[26]. The former adds to the cost of frequent checking while the latter limits the ease with which certain resources such as data files may be shared.
6. Most security flaws in computer systems are detected after the system is implemented. They are usually found:
 - (a) after a penetration has been discovered;
 - (b) through a systematic and costly security check;
 - (c) by accident.
7. The preceding remarks apply primarily to computer systems with a centralized processor. The state of knowledge about strategies for developing secure networks, such as those required for EFT systems, is even more primitive.

Computer-based systems can be rendered relatively secure through deft design and extensive testing[41]. Most security flaws in computer systems are currently found by accident, one bug at a time. However, systems can be shaken down through "war games" to help understand their flaws and develop counter-measures for successful penetration. In the case of EFT systems, various components may have to be installed in operational settings for some period of time before they are shaken down for technical flaws. During periods of installation or alteration they remain relatively vulnerable.

Secure systems also depend upon complete, well-specified, and carefully enforced administrative procedures. Passwords, for example, must not only be restricted to people with a "need to know," but also altered when people change jobs. Physical security of a site must exclude unauthorized persons whose identification (badges) is inappropriate when they walk through sensitive areas. Procedures such as these, even when sufficient in principle, are often not enforced with thorough and uniform efficiency. Most organizational life continues "effectively" with some slippage in the efficacy of internal surveillance and control. However, levels of surveillance and control that are sufficient for manual record systems or decoupled and simple computer-based services may not be sufficient to offer adequate protect for larger scale, or highly coupled EFT systems.

Theft by insiders or by people with inside connections remains a constant problem in the most technically secure system[53, 79]. Given the potential gains, thieves may attempt to extort as well as bribe or co-opt employees of financial institutions who know sensitive details of EFT operations. Since there are over 14,000 commercial banks and 5,000 savings and loan associations (excluding branches) in this country, there would be tens of thousands of potential points of entry and people who might assist such entry. Maintaining the integrity of people who have sensitive knowledge of EFT systems operations, and insuring the thorough enforcement of administrative controls, may far exceed the technical problems of system security both in magnitude and difficulty.

4.2.2 System Availability

To the public, computing represents a reliable technology. They are concerned with the problems of inaccurate data or organizational procedures (such as billing errors) rather than with system crashes[71]. The closer one gets to the terminals of an on-line system, the more one lives in the "up" and "down" world of computing. (The more complex the architecture of a computer system and its associated software, the more likely it is to fail.) Small dedicated machines often run without crashing for months, while many large computer centers expect at least a few crashes every week*. (While many crashes require only minutes to recover from, occasional crashes can keep a system down for hours or days. All this is tolerable when anyone who depends upon the system can let a transaction slip for an hour or two without major cost or inconvenience.)

The dynamics of real-time EFT networks deserve special attention. Real-time debiting schemes will probably change the time constant of the current payments system by several orders of magnitude*. Tremendous differences can therefore be expected in the characteristic behavior of the system to inputs or disturbances. It would help to have concrete studies of EFT dynamics to draw strong

* One may also buy reliability with backup equipment such as extra processors, core, and secondary storage; the costs increase accordingly.

* Currently, paper-based transactions take between one and ten days to pass through the payments system. In an automated system, transactions might be processed between one second and ten minutes depending upon the assumptions one makes about file search and data entry times. At the extremes, the ratios of time to process transactions is between 400 to 800000 times faster in the automated system. If one assumes that a paper based system will process a transaction in three days and an electronic system will clear in two minutes, the ratio is about 2000.)

conclusions. However, hypothetical examples can help illustrate the dynamics that merit attention in simulations or in real systems**.

Consider the following examples:

1. A major urban bank developed a small network of automated teller machines in a downtown area. Some people became accustomed to relying upon the system for spare cash when they were entertaining themselves downtown. One night the network crashed, but no notices were posted at the automated tellers. When some people found one machine inoperable, they hailed cabs and began an unsuccessful tour of the automated tellers seeking cash. The next morning the bank received irate calls from several cabbies who had trouble collecting their fares.
2. Under current arrangements, if a bank makes a clerical error, and a customer's account is not properly credited, the person can still conduct his normal business affairs while he and the bank investigate the problem. It might come to his attention via an overdraft notice by mail, and checks he has just written are probably still passing through the chain of payee and banks that normally take several days. While this system is slow, it is relatively tolerant of certain errors. A real-time system is likely to be less tolerant. If a person relies upon real-time POS network as the medium for doing his business and a data processing or clerical error occurs while he is on a weekend trip, he may suddenly find himself unable to buy gas, food, or pay for his hotel**.
3. A large firm with several hundred thousand employees deposits its payroll in employee accounts late on a Friday afternoon. Suppose that due to either a clerical error or program malfunction, these payroll transfers are not properly made and each employee receives only several dollars. During the evening, other institutions may attempt to debit these employee accounts for pre-authorized payments such as insurance premiums. In addition, employees may be transacting their regular business and expect their payroll to be available as a credit base. If some of these transactions bounce, and then transactions upon which they are based begin to bounce, we may see "poor credit" propagate through EFT systems. Such a stream of poor credits may propagate through thousands of accounts before it is noticed. Could such an event,

** Before disasters occur, emphasis upon errors seems misplaced. However, studies of computer error indicate that often there are no organizational procedures for correcting errors because the errors in question were never considered possible[71, 79, pp. 97-108].

** He may escape some of these problems by resorting to a device that would be an anachronism in a society dependent on real-time EFT systems-- travelers' checks. Even overdraft privileges in an automated system may not be sufficient, since a large erroneous debit could cancel them.

however unlikely, lead to a "credit blackout" somewhat analogous to the North East power blackout of 1965 and the New York City blackout of 1977?

The first is a real example illustrating equipment failures which are relatively well understood. The other two are hypothetical examples which illustrate special problems with record-keeping procedures. The effects of equipment failure or recording procedures may be similar - losses of service; but their causes differ. Individual errors and system failures may be rare, but they can be very disruptive. While these particular conditions may not occur, are there other conditions that could precipitate system failures in nationwide real-time EFT systems?

4.3 Privacy of Personal Transactions

Privacy connotes a complex array of issues: what information shall be collected about a person; how shall a person know about, complete, or correct a record (due process); to whom and under what conditions shall personal records be made available (confidentiality)? A common view treats privacy as an elementary social exchange[78]. People that wish a service relinquish certain information so that the provider may make a sound decision.

In a society where most individuals conduct their business with small-scale local institutions, few formal records are needed. An individual may have some knowledge of and control over those records that are kept. During the last century, American society has become one in which people transact a large fraction of their business with

regional or national organizations. The emergence of new government agencies (e.g., Social Security Administration, state motor vehicle agencies) and large regional and nationwide firms has increased the number of occasions that people need relinquish written information about their personal histories and practices.

Many organizations routinely share information about their clients to help improve their own decisions[56, 51]. Credit histories, medical records, and personnel information exemplify the records that circulate, often with the tacit consent or encouragement of the data-subject. People applying for a service with one organization often want the provider to know of successful similar transactions completed elsewhere. Since records are costly to routinely collect, store, and transfer, little information is collected frivolously[78].

While people have been asked to provide more information [56, pp. 6-13] about their personal activities to organizations less subject to local control, they have not gained commensurate legal protection. Regulations restricting the kind of data collected and occasions over which information provided for one purpose may be used for another have not evolved as rapidly as have new record keeping practices [56, pp.10-11, 75]. In fact, most people do not know all the occasions on which their records are shared or the uses to which they are put[56, pp.12-13].

Libertarian criteria emphasize system designs, organization practices, and laws which minimize intrusiveness, maximize fairness, and maximize the control individuals have over the content and

confidentiality of their records unless there are major, competing concerns[56, pp.13-28]. Advocates of Statist and Private Enterprise positions emphasize the needs that large organizations have for information, the costs of implementing due process procedures, and of the infrequency of abuse [61]. Record keeping practices, surveillance, and control over access will be addressed in the next three sections.

4.3.1 Record Keeping Practices

While there are many EFT technologies which could be used by many kinds of organizations, automated check processing (ACP) systems and bank records illustrate the way in which privacy issues generally arise. Any ACP system would record to whom each person writes each check. This information, along with the date of the transaction, a check identifier, and the amount of transaction would appear in one's local bank record. Record of each payee is necessary as a possible receipt and for the check writer to audit his account. All this information is available now, since each bank microfilms every check cashed against one of its account holders. However, the cost of finding out whether a particular individual wrote a check to a particular party or group is prohibitively expensive. The checks are filmed as they are processed and each person's checks are randomly distributed through the thousands of other checks processed by his bank each month. Privacy of transactions is now insured under all but the most unusual circumstances by the sheer cost and inconvenience of manual search. (Some surveillance is possible: a bank can easily keep track of the checks written by particular individuals as they

clear. However, it is extremely expensive to search for records of those checks after they have been returned to the checkwriter.) In the current system, the microfilm records are kept on file for 6 years*. With ACP systems, they would be neatly filed in machine-readable form for 6 years.

In EFT systems, disclosure of information is the primary privacy issue. This situation contrasts with credit-reporting systems in which the accuracy of information about a person and his right to audit his own file, contest its contents, and control its access are all salient issues[75]. In most financial transactions, the first three are the normal rights of any creditor or debtor. A critical issue is designating the owner of the set of data describing an individual's transactions with financial institutions. Recent court rulings have tended to place ownership of records in the hand of the record keeper and to hold that the data subject has no legal interest in them[56, pp.6-8].

4.3.2 Surveillance and Organizational Effectiveness

Some of the organizations that would use large scale EFT systems transact business with tens of thousands or even millions of clients. In order to manage their large volume of transactions and clients, they need personally specific information. Also, clients will need

* The Bank Secrecy Act of 1970 requires banks to keep records of each check in excess of \$100 that is debited against any of the accounts it provides for 6 years[56, p.104, 62]. In practice, banks microfilm all checks written by their account holders[56, p.105]. The act was unsuccessfully challenged in 1970 in a joint suit brought to the U.S. Supreme Court by the California Bankers Association and the American Civil Liberties Union [15].

detailed accounting of their transactions (e.g., for what, with whom, when, for how much) to audit their own records. Different kinds of data will be carefully collected by organizations to help carry out socially sanctioned activities. However, the range of information available through integrated large-scale EFT systems creates a tremendous social resource.

Rule [62, pp.269-277, 63] defines the "surveillance capacity" of an information system by "the sheer amount of meaningful personal data available on those with whom the system must deal.... the effective centralization of data resources...., the speed of information flow and decision-making within the system...., and the points of contact between system and clientele." Any of the major EFT systems increase at least the last three characteristics of surveillance capacity. Institutions which utilize EFT systems may increase their effectiveness by exerting more control over their clients who deviate from their preferred practices. For example, most businesses that use POS terminals linked to a banking network could insure that each customer is able to pay his bill when services are rendered. Currently, credit card verification and check verification cards only attest that a customer is a good credit risk in general, but not that he is creditworthy at the time of of a particular transaction. Thus, increases in the speed of information flow may help businesses decrease their losses through poor credit decisions.

As the geographic mobility of people increases, surveillance technologies that help track the location or activities of people also become important for investigative agencies. Law enforcement agencies

which track suspects in criminal investigations, and social service agencies* would become more effective as the surveillance capacity of the accessible information systems increases. However, the EFT systems that enhance the surveillance capacity of government agencies may be built and operated by private firms to enhance their own operations. Under current arrangements in which individuals do not have legally assertable interests in data about them, credit authorization services could legally "track" people for public agencies without informing the data subjects. While Private Enterprise criteria lead some analysts to oppose vigorous privacy legislation [23, 61], weak privacy laws may also increase the efficiency of public agencies with investigative roles. This fosters a latent coalition between groups using Private Enterprise and Statist criteria[61].

4.3.3 Control Over Access to Personal Information

In 1965 the U.S. Supreme Court recognized that an individual has a constitutional right to privacy, based on the Bill of Rights and selected Constitutional Amendments*. The right to privacy is not absolute, however, particularly when it conflicts with other constitutional rights. These conflicts center on the kinds of "fair information practices" that best protect an individual's rights without rendering the legally sanctioned activities of public and private organizations costly or ineffective. Actions, however

* HEW, for example, operates the Parent Locator Service [56, pp.482-485] to find parents who default on their child-support payments.

* [Griswold vs. Connecticut, 381 U.S. 479(1965)].

infrequent, which violate individual rights, or different forms of actual or potential abuse, become a focus of Libertarian concern. In contrast, analysts of Private Enterprise or Statist persuasion emphasize the actual infrequency of real abuse relative to the large volume of similar records that are processed without noticeable problems.

Public agencies often have legitimate needs for such information. Traditionally, law enforcement agencies and investigative bodies (e.g., grand juries, legislative committees) have had access to individual financial records through secret subpoena and informal working arrangements with financial institutions[56]. Federal law enforcement agencies remained exempt from recent privacy legislation[56, pp.517-518]. Public agencies occasionally abuse politically and personally sensitive information. For example, during the early 1970's, the IRS maintained a special division to investigate politically unconventional people and groups[84]. Such abuses are not wholesale; they are selectively aimed at groups which advocate unpopular ideas[84]. The very existence of an instrument that can easily be abused does not guarantee that abuses will occur. Rather, according to Libertarian analyses, abuse is tempting and, on occasion, likely unless discouraged through strong, incentives[56, 75, 83].

Attempts to strengthen individual rights in a period of expanded record keeping have taken the form of explicit laws such as the Fair Credit Reporting Act (FCRA) [56, 75] and the Federal Privacy Act of 1974. Omnibus laws which cover broad classes of record systems are attractive because of their simplicity. However, they have been

criticized as being difficult to administer because they are overbroad and insensitive to variations in record keeping practices that occur in different kinds of relationships between individuals and complex organizations.

An alternative to omnibus laws such as the Privacy Act are record-specific acts such as the FCRA. Such restricted laws are more sensitive to the delicate balance between organizations and their clients, and can also be more explicit in prescribing legal actions. Specific acts, however sensitive, can leave large classes of record systems untouched. For example, the FCRA excludes check guarantee services from its provisions of allowing data subjects to audit their records since these services do not influence credit, insurance, or employment decisions. Complete sets of record-specific laws can be numerous and complex. For example, the PPSC proposed 155 regulations covering different kinds of relationships (e.g., depository, tax records, statistical research) [56]. They aim to balance current practices by consistently providing individuals with legally assertable interests in their own records. Most of the recommendations focus upon procedures for insuring due process and maximizing feasible confidentiality.

In the case depository relationships and EFT systems, the PPSC [56, pp. 119-124] (and the NCEFT which recommended most of the same policies [51]) propose that: (a) individually identifiable account or transaction information be retained in the account records of financial institutions for limited periods of time; (b) that individuals should expect very confidential relationships with

depository institutions (e.g., they will be notified of disclosures of information to third parties which they must authorize); (c) that account information only be available from the primary parties to a transaction; and (d) that individuals be considered to have a continuing interest in the use and disclosure of their financial records[51, 56]. In addition, the PPSC has proposed that Federal agencies seeking data regarding individuals from private sector record keepers (a) use legal means such as administrative summons or judicial subpoena and, (b) that the individual be informed of the search and have the legal capacity to contest it, except in such cases as notifying the data subject would seriously impair the integrity of an investigation [56, pp. 336-379].

These recommendations have yet to be enacted into law and may face severe compromises along the way. Even if enacted, they may not stand up to appeal through the courts, since they contravene those recent court rulings which deny a data subject assertable rights over his own records. Furthermore, laws, however well intentioned, may be difficult to enforce. Experience with the Privacy Act, for example, suggests that while some agencies have voluntarily complied with its provisions, others have attempted to subvert its intent [6, 56]. The Privacy Act has been bypassed through generous interpretations of a "routine use" clause when agencies wish to share information. The Act has also been used to justify officials' concealing information which would clearly serve a public interest and are of a kind (e.g., agency procedures) which are not covered by the act[6]. Even in cases of apparent noncompliance, enforcement has been weak [6, 56].

4.4 Value Positions and Public Interests

This account has introduced only a few of the rich array of technologies*, opportunities, problems, and issues catalyzed by EFT developments. The role of public agencies as EFT providers and limits to consumer liability [55, 66] were not addressed under market arrangements; the security of individual transactions was ignored in the discussion of system security; data encryption was ignored in the discussion of system reliability [26]; the privacy of business records were neglected in the analyses of privacy. Other classes of issues, such as the impact of different EFT developments on postal operations or monetary policy [59] have been omitted entirely. In fact, EFT developments may viewed as troublesome, in part, because they raise so many complex issues.

The issues addressed here reflect some of the fundamental value conflicts in the debates over preferred EFT arrangements. It may appear simplistic to emphasize the conflicts between Libertarian analysts with Private Enterprise and Statist analysts; one may wonder about the issues and conditions under which Neo-populists would concur with people using Private Enterprise arguments. However these cleavages consistently recur in debates over preferred EFT arrangements [13, 51, 56, 61]. One does not find consumer advocates insisting that EFT systems be rapidly developed with the same vigor that they sought truth-in-advertising laws or the Freedom of

* This account has neglected systems for transferring large sums between banks such as Fedwire, Bankwire, and Swift [69]. Also it has neglected the European GIRO systems which usually transfer funds through the postal system.

Information Act [67]. Nor do civil libertarians suggest that EFT technologies provide important new means for protecting personal freedom[56].

These conflicts do not mean that Neo-populist and Libertarian values, necessarily suffer under all EFT arrangements. Both Libertarian and Neo-populist values are best served when EFT developments meet special criteria and are covered by protective covenants. (However, even Libertarian and Neo-populist criteria suggest different policies for sharing EFT facilities.) Parties using Systems criteria also prefer special EFT technologies --those that are particularly elegant, efficient, and reliable [4, 47]. Laissez-faire EFT developments are only consistent with certain Private Enterprise and Statist analyses.

Even though the NCEFT has published a rich set of policy recommendations to help foster benign EFT developments, one should not expect a single bundle of policies to provide a complete, coherent, and consistent framework for pro-social EFT developments. Even the NCEFT has hedged in some of its proposals; for example, it has recommended a policy of "pro-competitive" sharing in which individual cases are to be resolved in the courts.

It is unlikely that a complex, fragmented, and diffuse technology, like EFT systems, will develop through any more coherent decisions than have more focussed technologies such as communications satellites[31] or television[10]*. It is commonly assumed that some combination of market discipline, regulatory oversight, and professional self-control will insure technical and social

arrangements that best serve a broad public [35]. However, technologies that are developed in complex and fragmented markets [36], support services which are mediated by large organizations, and which serve unorganized publics do not fit these models of accountability very well [35]. Traditionally, policies for technology development have emphasized multiple goals (e.g., employment and technological advance) and reflect major concessions to established interests which support conflicting means, if not ends [10, 31]. The net effect is that EFT developments will serve some value positions more strongly than others. That makes computer specialists who develop particular EFT systems tacit partisans of the value positions their developments best support[32].

5. EFT Developments and Social Choice

Many new technologies exacerbate conflicts of interests and conflict alone should not discourage innovation. Groups that can exploit technical innovations often fare better than competitive groups which do not. In retrospect, the replacement of blacksmiths by auto-mechanics is simply a "cost" of switching from horses to cars. Only romantic sentiment would lead us to yearn for the vanishing blacksmith. However, value conflicts are more subtle. It may be easy to say that groups which develop market-supported innovations best serve the public interest. But it is harder to assert that public life is improved, say, if legitimate opportunities for freedom of individual expression are sacrificed for administrative efficiency.

Value conflicts may be the unintended long term byproducts of conflicts fought more tangible interests. For example, the development of large scale highly integrated EFT systems by private enterprises may threaten Libertarian values. However, the organizations that advocate large scale EFT systems seem to be more concerned with short term competition with each other than with weakening Libertarian values. It is fairer to say that their technical strategists are indifferent to competitive values than that they are opposed to competitive values*.

The analyses in Section 4 indicated how certain EFT developments can easily lead to fundamental conflicts between the five value positions introduced earlier. These conflicts cannot easily be resolved by some simple cost/benefit calculus. While a single organization might use a cost analysis to decide how best to exploit the potentials of different EFT systems, public policies to balance competing interests, encourage competitive markets, protect consumers, insure reliable systems, and protect individual rights to privacy are not easily accommodated by simple quantitative analyses. Some calculations, such as the expected costs of different policies, or the number of people or transactions to be influenced, may inform policy decisions. However there is simply no overall calculus into which such values can be substituted that would mechanically choose

* However, in this example, groups advocating Private Enterprise criteria may fight with groups advocating Libertarian criteria if the latter groups may impede their potential competitive advantage with other business interests [61]. Ironically, people who are called upon to criticize a particular value position in the course of their work, may value that position in their private lives[22].

"optimal" policies. When calculi, such as cost/benefit analyses, are proposed, they are often based upon tacit social and philosophical assumptions which render them ethically "incomplete"[22].

Nevertheless, public policies to shape EFT developments are likely to be more sensible if the public learns to understand the social dynamics EFT arrangements. Public policies are more likely to be effective if EFT developments move at such a pace that they do not rapidly antiquate new administrative or legal arrangements. We now turn to these two issues, learning and the pace of development.

5.1 Learning

Many of the policy questions raised by EFT might be better answered with greater information about the opportunities provided by and problems raised by alternative EFT technologies and arrangements. But it is not clear how the public will learn about preferential EFT arrangements before some systems are developed on a sufficiently large scale that they are too costly to revise [33, 34]. It is tempting to propose experimental systems to be studied. In fact, there are now many several dozen small-scale "experiments" such as to those initiated by the savings and loans associations which have placed terminals in supermarkets [44]. While these efforts might produce helpful data about system reliability and consumer-business relations, their results are now treated as proprietary.

It may also be difficult to extrapolate from small scale EFT prototypes to larger scale operations. After all, if one "experimented" with private automobiles in 1910 by placing 2500 cars

in Los Angeles, would they have helped us understand the long-range problems of roadway congestion and pollution in the city several decades later? Simply building relatively small scale prototype systems and extrapolating their behavior in some near linear fashion may provide little insight into the dynamics of a society which depends on digital debits and credits.

An alternative to experimentation is to turn to the imperfect methods utilized by "futures" researchers [42]. One strategy, that of speculative scenarios, has been explored in some EFT studies[3]. Another promising, but difficult approach, uses explicit social theory and an explicit "design space" for predicting the likely impacts of alternative (EFT) technologies [38]. There is compelling evidence from the BART development that when technical choices are made to alter social behavior without good social theory, poor and irrevocable choices may result [77]. Unfortunately, theories to help understand and predict the kinds of social behavior influenced by EFT developments is poorly developed [38]. And tragically, the value of such theory is often disparaged within the technical and business communities.

While these approaches, scenarios and theory, are influenced by the sensitivity, imagination, and biases of the investigator they provide some understanding of the potential impacts of larger scale EFT arrangements. In addition, future researchers readily acknowledge that complex technical forecasts and technology assessments are value laden [42]. Thus, the value positions identified here should also appear in "futures" studies of EFT arrangements[3, 38].

5.2 Pace of EFT Developments

(Despite these normative considerations, EFT developments are emerging in an industrial system and under existing legal and regulatory arrangements which encourage large enterprises to expand their operations. Growth is a dominant feature of large enterprises[14] and both the computer and financial industries are highly concentrated. For expansion-seeking suppliers of computing equipment, EFT systems offer a lucrative new market.)

EFT systems offer financial institutions strong potential for increasing their market share*. Firms in both industries may gain from large scale EFT systems which provide many services. Such EFT designs need not evolve through long-term planning. Rather, on the margin, most EFT suppliers, providers, users, and consumers reduce their costs and increase their convenience by incremental integration of the EFT services.

Many American industries [22, 40] use a twenty year period for planning and amortizing major investments. While twenty or thirty year intervals are sensible planning periods for financial analysts, they may be too short for serious social analysis. In addition, both private enterprises and legislative bodies utilize much shorter time frames in analyzing policy alternatives [40]. But many major

* Currently, computer equipment suppliers are primarily selling financial institutions on the virtues of EFT systems rather than responding to existing demands from those institutions for equipment to build large-scale EFT systems. The "cascaded" structure of the market for computer-based systems places consumers at the far end of a long series of technical and institutional developments. New products presumably benefit consumers, but they exert little control over the shape of the technology [34].

(technologies are woven into the fabric of social life over a period of several decades.) When the period of foresight is much smaller than the period over which serious social repercussions are felt, the "tyranny of small decisions" easily leads to an overall arrangement which no one would have sought had the long run designs been initially made explicit. For example, twenty years ago the Los Angeles freeway system promised freedom and convenience. At each choice point, it was "rational" for developers to create bedroom enclaves and regional shopping centers that paralleled the freeways. Today, Southern Californians are locked into a pattern of transportation and land use which does not meet their needs very well and which is hard to drastically alter. Similarly, current market arrangements and dispersed regulatory responsibilities encourage EFT providers, users, and regulators to continue making attractive incremental choices. As EFT services spread, failing to integrate several related services that are manually linked by different users or consumers may appear oddly "inefficient." Thus, highly integrated and pervasive of EFT systems may be less the product of a grand design than the by-product of many small "locally rational" decisions.

EFT systems are being developed at a rapid pace. As Long notes, "The fear of being out of the marketplace is one of the stongest in our present day environment[43]." Sometimes, this fear is turned into the claim that EFT systems are "essential" and "inevitable," and thus there is little reason to consider, let alone regulate, the pace of development. However, as we have indicated in Section 3, there is little evidence to indicate that EFT technologies are "essential" aside from the competitive pressures felt by businesses in sectors

where EFT developments may alter market shares. EFT technologies may provide interesting and convenient services; but interest and convenience are less persuasive criteria*.

If EFT technologies are "inevitable," the public certainly can afford to wait a few more years for them to be developed. More importantly, arguments about inevitability obscure both the mad scramble of financial institutions for preferential market positions behind the scenes and our ability to choose which EFT technologies best serve a broad range of public interests. The fact that many large-scale technical developments seem to emerge without explicit public choice leads some analysts to reify technology and argue that complex technical developments are out-of-control [16]. Our ability to select and even to reverse large scale technical developments may provide the most serious refutation of this vision of technological imperialism[83].

In the short run, active EFT development in 1978 undermines the proposals of the NCEFT and PPSC to help resolve some of the value conflicts which are easily exacerbated by EFT developments[51, 56]. Traditionally, legal and regulatory protections lag new technological developments, even when potential problems could have been averted easily with early action [40, p.521]. (Active development and implementation of major EFT components today simply places our society

* It was once believed that railroads were "essential" for the development of the American economy in the 19th century. However, careful economic analysis provides ~~no provides~~ no support for this belief[20].

again in a position of having greater faith in new technologies.) We need to enhance our abilities to purposefully shape EFT systems in a way that deals with long-term problems that may be faced by many, in addition to the short-term gains accrued by the few.

6. Conclusions

This paper has introduced many complex issues that the public will face as EFT systems become widespread. While they have been addressed in greater detail elsewhere, few have been satisfactorily resolved. This paper has, in fact, underlined the problematic character of certain "solutions." Because large scale EFT developments raise many complex legal, technical, and social issues, neat answers to the dilemmas examined here are unlikely. And no small list of solutions (e.g., technically secure networks, encrypted data, "correct programming," laws which provide individuals with legally assertable interests in financial data about them, EFT regulatory agencies) would be sufficient to insure benign EFT developments. Such "solutions" might improve the ease, convenience, and quality of certain EFT arrangements. But reliance upon them ignores the profound social character of EFT technologies and their institutional settings.

The major thrust of this paper has been to indicate how analyses of alternative EFT arrangements are rooted in assumptions about social values which cannot be simply eliminated through small-scale experiments or cost/benefit calculi. It has also indicated how certain value positions (e.g., Libertarian and Neo-populist) are best served when EFT arrangements meet certain constraints which may not

"naturally" arise under current market conditions. The analyses presented in this article raise difficult issues which merit careful public scrutiny and debate before irrevocable EFT commitments are made on a large-scale.

Bibliography

1. A retreat from the cashless society. Business Week (April 18, 1977): 80-90
2. Allen, Brandt. The embezzler's guide to computer systems. Harvard Business Review, vol #53 (July-August 1975): 79-89.
3. Arthur D. Little, Inc. The consequences of electronic funds transfer--A technology assessment of movement towards a less cash/less check society. Report C-76397, Cambridge, Ma. January 30, 1975.
4. Backman, F. Are computers ready for the checkless society? Proc. National Computer Conference 1976, vol. #45 Montvale, N.J.: AFIPS Press, 147-156.
5. Balderston, F. E., Carman, J., and Hoggatt, A. Computers in banking and marketing. Science: vol. 195 (Mar. 18, 1977): 1115-1118
6. Belair, Robert. "Less government secrecy and more personal privacy? Experience with the federal freedom of information and privacy acts. The Civil Liberties Review 4(1)(May/June 19.77): 10-19.
7. Benton, John. Electronic funds transfer: pitfalls and payoffs. Harvard Business Review 55(July/August 1977): 16-19, 28-29, 164-173
8. Blair, John M. Economic concentration: structure, behaviour, and public policy. Harcourt, Brace nad Javanovich, New York, 1972
9. Boehne, E. The fed's job is getting harder. Financial Section, New York Times, July 21, 1974.
10. Bunce, Richard. Television in the corporate interest. Praeger Publishers, New York, 1976
11. Clayton, R. E. Electronic funds transfer is coming. Banking, September 1972, 65, 42-46.
12. Cox, E. B., and Giese, P. Now it's the "less-check society." Harvard Business Review, 50 (November-December 1972)6-18.
13. Dowling, R. Congress urged to enact access curbs before EFT development. American Banker CXXLI, #209 (Oct. 27, 1976): 1, 24
14. Eichner, Alfred. The megacorp and oligopoloy: micro foundations of macro dynamics. Cambridge University Press, New York, 1976

15. Ege, S. M. Electronics funds transfer: A survey of problems and prospects in 1975. Md. Law Review, 35 (1), 3-56.
16. Ellul, Jacques. The technological society. New York: Alfred A. Knopf 1964
17. Ernst, M. An assessment of the less cash/less check technology. Report C-76397 Arthur D. Little, Inc. April 1974.
18. Federal Reserve Board. Evolution of the payments mechanism Federal Reserve Bulletin, December 1972, 58(3), 1009-1012.
19. Federal Reserve Bank of Boston. The economics of a national electronic funds transfer system. Conference Series NO. 13, October 1974, Boston, MA.
20. Fogel, Robert W. Railroads and American Economic Growth. Johns Hopkins Press, Baltimore, 1964
21. Freeman, D. Technology and society: issues in assessment, conflict and choice. Rand McNally, Chicago, 1974
22. Goodpaster, K. and Sayre, K. An ethical analysis of power-company decision-making. in [61]
23. Gregory, Francis. The privacy issue--a reply. Records Management Quarterly 11(1) (Jan. 1977):7-9
24. Harrison, M.A., Ruzzo, W.L. and Ullman, J.D. Protection in operating systems. C. ACM 19(8) (August 1976):461-470.
25. Hiltz, S.R. and Turoff, M. EFT and social stratification in the USA: more inequality? Telecommunications Policy 2(1) (March 1978):22-31
26. Hoffman, Lance. Modern methods for computer security and privacy. Prentice Hall, Englewood Cliffs, N.J., 1977
27. Holmes, Edith. Privacy backers hit HEW project: work, welfare rolls matched. Computerworld XI(47) (Nov. 21, 1977): 1,8
28. Jurgen, Donald and Ernst, Martin. Electronic funds transfer: too much, too soon? IEEE Spectrum 14(5) (May, 1977): 51-57
29. Kaufman, George. Money, the financial system, and the economy. Rand McNally, Chicago, 1973
30. King, J. and Kraemer, K. Electronic funds transfer as a subject of study in technology, society and public policy. Telecommunications Policy 2(1) (March 1978):13-21

31. Kinsley, Michael. Outer space and inner sanctums: government, business, and satellite communication. John Wiley and Sons, New York, 1976
32. Kling, Rob. Computers and social power. Computers and Society 5(3) (Fall 1974): 6-11
33. Kling, Rob. Passing the digital buck: unresolved social and technical issues in electronics funds transfer systems. TR#87 Information and Computer Science Department University of California, Irvine June 1976.
34. Kling, Rob. EFTS: social and technical issues. Computers and Society 7(3) (Fall 1976):3-10
35. Kling, Rob. Six models for the social accountability of computing. Computes and Society 9(1) (Summer 1978) (in press)
36. Kling, R., and Gerson, E. The social dynamics of technical innovation in the computing world. Symbolic Interaction 1(1) (December 1977):132-146
37. Kling, Rob. Information systems and policymaking: computer technology and organizational arrangements. Telecommunications Policy 2(6) (March 1978):22-32
38. Kling, Rob. EFT and the quality of life. Proc. National Computer Conference 1978, Montvale, N.J.: AFIPS Press, vol. #47, pp. 191-197.
39. Kraemer, K., King, J. and Colton, C. Towards an agenda for EFT research. Computers and Society 8(2) (Summer 1977):3-11
40. Lawless, E. Technology and social shock. Rutgers University Press, New Brunswick, N.J., 1977
41. Linde, R.R. Operating system penetration. Proc. National Computer Conference 1975, Montvale, N.J.: AFIPS Press, 1975, 361-368.
42. Linstone, H.A. and Simmonds, W.C. Futures research: new directions. Addison-Wesley, Reading, Mass., Pub. Co. 1977
43. Long, R.H. Discussion paper. in [19], pp.31-38.
44. Long R.H. EFT systems, banking, and regulation J: A report by the ACT Division of BAI. Bank Administration Institute, Park Ridge, Il., 1974.
45. Lovati, J.M. The changing competition between commercial banks and thrift institutions for deposits. Bulletin, Federal Reserve Bank of St. Louis, July 1975, 2-8.

46. Mansfield, Edwin. Microeconomics. 2nd. ed. Norton and Co., New York, 1975
47. Mazzetti, J.P. Design considerations for electronic funds transfer switch development. Proc. National Computer Conference 1976, Montvale, N.J.: AFIPS Press, 139-146
48. McCracken, D. et. al. A problem list of issues concerning computers and public policy. Communications of the ACM 17(9) (Sept. 1974):495-503
49. Mintz, M. and Cohen, J. Power, Inc. Viking Press, New York, 1976
50. National Commission on Electronic Fund Transfers. EFT and the public interest. U.S. Government Printing Office Washington, D.C. February, 1977
51. National Commission on Electronic Fund Transfers. EFT in the United States: policy recommendations and the public interest. U.S. Government Printing Office Washington, D.C. October, 1977
52. Noll, Roger. Reforming regulation. Washington, D.C. The Brookings Institution 1971
53. Parker, Donn B. Crime by computer. Charles Scribners and Sons, New York 1976
54. Peterson, H.E., and Turn, R. System implications of information privacy. AFIPS Conference Proceedings, 30, 1967 Spring Joint Computer Conference, New York: Thompson Book Co., 291-300.
55. Portway, Patrick S. EFT systems? no thanks, not yet. Computerworld 12(2) (Jan 9, 1978):14-16, 21, 23-25
56. Privacy Protection Study Commission. Personal privacy in an information society. U.S. Government Printing Office Washington, D.C. July, 1977
57. Prives, D. The explosion of state laws on electronic fund transfer systems. P-76-1 Program on Information Technologies and Public Policy Harvard University Cambridge, Mass.: 1976
58. Reid, Samuel. The new industrial order: concentration regulation and public policy. Mc Graw Hill, New York, 1976
59. Richardson, D. W. Electric money: evolution of an electronic funds-transfer system. MIT Press, Cambridge, Mass. 1970
60. Rose, Sanford. More bang for the buck: the magic of electronic banking. Fortune 95(5) (1977), 202-226

61. Rossman, Laura W. Financial industry sees EFT privacy laws adequate. American Banker CXLI, #210 (Oct. 28, 1976): 1,11
62. Rule, J. Private lives and public surveillance. Schocken Books, New York, 1974.
63. Rule, J. Value choices in electronic funds transfer policy. Office of Telecommunications Policy, Executive Office of the President, Washington, D.C., October 1975.
64. Saltzer, Jerome and Schroeder, Michael. The protection of information in computer systems. Proc. IEEE 65 #9 Sept. 1975, 1278-1308
65. Sayre, K. (ed.) Values in the electric power industry. University of Notre Dame Press, Notre Dame, Ind. 1977
66. Schick, Blair. Some impacts of electronic funds transfer on consumer transactions. in [19]pp. 165-179.
67. Schuck, P.H. Electronic funds transfer: A technology in search of a market. Md. Law Review, 35(1) (1975), 74-87.
68. Schultze, L. The public use of the private interest. Harper's 254(1524) (May, 1977) 43-62.
69. Simpson, R. Clay. Money transfer services. Computers and Society 7(4) (winter 1976):3-9
70. Steifel, R.C. A checkless society or an unchecked society? Computers and Automation, 19(October 1970): 32-35.
71. Sterling, T. and Laudon, L. The human (and inhuman) side of management information systems. Datamation (December 1976):53-59
72. The time is NOW. Forbes Magazine 120(1)(July 1, 1977):61-62
73. Turoff, Murray and Mitroff, Ian. A case study of technology assessment applied to the "cashless society" concept. Technol. Forecasting and Soc. Change 7(1975):317-325
74. Weissman, C. Secure computer operation with virtual machine partitioning. Proc. National Computer Conference 1975, vol. #44, Montvale, N.J.: AFIPS Press, 929-934.
75. U.S. Dept. of HEW, Secretary's Advisory Committee on Automated Personal Data Systems. Records computers, and the rights of citizens. Washington, D.C.: 1973
76. Walker, Gerald M. Electronic funds transfer systems. Electronics (July 24, 1975):79-85

77. Webber, M. "The BART experience- what have we learned?" The Public Interest #45 (Fall 1976): 79-108.
78. Weizenbaum, J. Computer power and human reason. Freeman and Co., San Fransisco, 1976
79. Wessel, Milton Freedom's edge: The computer threat to society Addison-Wesley, Reading, Mass. 1974.
80. Westin, Alan and Baker, Michael. Databanks in a free society. New York: Quadrangle Books 1972
81. Whiteside, Thomas. Computer Capers Thomas Y. Crowell, New York, 1978.
82. Wilcox, Clair and Shepard, William. Public policies towards business. Fifth ed. Richard D. Irwin, Inc., Homewood, 1975
83. Winner, Langdon. Autonomous technology: technology out-of-control as a theme in political thought. MIT Press, Cambridge, Mass. 1977
84. Wise, David. The American police state. Random House, New York, 1976