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Effects of Automation on the Structure and Functioning of Banking

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The commercial banking system in the United States owes its existence to its ability to render for all sectors of the economy a unique and pervasive service, namely, the movement of money. This transfer of funds between debtor and creditor, buyer and seller, citizen and government, employer and employee--in fact from anyone with a balance in a bank to any identifiable payee is ever-ready, safe and convenient.

Banks consummate money settlements through an elaborate clearing system for transferring deposit balances from one account to another in the same bank or in different banks.^{1/} The principal tool used is the ordinary check. The mechanical and institutional channels by which 60 million checks daily find their way physically, and with appropriate accounting entries, from any one to any other among 70 million accounts is vastly more complicated than might be thought. It achieves a high degree of ultimate accuracy considering its predominant dependence on manual processing. The service is far from instantaneous, however, being no faster than present-day methods of transporting checks in considerable bulk about a city or throughout the country.

In the aggregate, the annual cost of operating the present check and settlement system for the entire country can be estimated at about 3.3 billion dollars. Some of this cost is borne by the Federal Reserve System, some is paid in the form of service charges assessed on the account of the payor, and some is "clipped" from the face of the check instrument itself and charged the payee when nonpar banks are involved. However, the bulk of the total cost is absorbed by the commercial banks themselves to attract balances that can be invested in interest-earning assets.

Given the cost and time pressures inherent in the present check settlement system, it is not surprising that the initial bank efforts to exploit the infant prodigy of electronic data processing have been aimed mainly at lowering the per-item handling cost and speeding up the performance of old-style check collection. This is constructive, so far as it goes, but it falls far short of the potential transformation of banking services rendered possible by automation. Laying aside all the undoubted strains and pains of the transition, it is practical to envision the advancement of the state of the art to a point that will permit--and perhaps almost force--radical change in banking structure and functions. This state will be reached within the discernible future, probably much sooner than most of us expect.

By that time, I expect, check usage as we know it will have largely disappeared, and the intricate process of settlement and deposit accounting will be carried on concurrently at and between 250 or so computer centers located throughout the country.^{2/} A modified giro system will be used, in which the payor will initiate the settlement process, but will do so by communicating, not with the payee, but with his bank--notifying it directly whom to pay, how much, and when.

Most of this information will be received at the bank in machine language; if not, it will be converted to that form, and the bank's computer will process the bookkeeping entries internally for amounts drawn on it. If one computer handles the accounts for several banks the operation is still almost entirely an internal one. If payment is to an account in another bank, the information will be automatically



routed into that bank's equipment. Bank positions will also be adjusted frequently throughout the day by debits and credits to member bank accounts with the Federal Reserve System. The computers will transmit printed-out confirmations to the payor and advices to the payee at appropriate intervals. The print-outs could be transmitted by mail or telephone wire, at the option of the customer. In the case of larger customers, the bank's computer will communicate directly with customer's equipment.

In this system there is no check sorting and re-sorting, no shipment of checks from bank-to-bank or bank-to-customer, no storage requirements for checks, no kited checks, no endorsement, no N.S.F. checks, no float, and a minimum of manual processing. Of course, different problems may later come to light. The machine must work; and the bank must make sure it is being instructed by the owner of the deposit. There is no reason, however, to fear that any such potential difficulties are beyond the technological capacities and probably the cost horizons now in view.

Furthermore, it seems logical and practical that at least some of the customer accounting antecedent and subsequent to settlement could be most economically done in a coordinated package with the settlement accounting. Every sales transaction, for example, by specifying a settlement date, might immediately be put into the bank's computer where it could accomplish immediate settlement or subsequent reminder and settlement. Similarly, a bank could handle payrolls and agree to bill and process many types of contractual payments for insurance, rent,

and mortgage payments. In short, by virtue of its central position in the payments process the bank is also able to perform ancillary and antecedent accounting and billing operations more economically than anyone else.

For willing business customers, the bank's service could include a large part of the accounting, analysis, and financing of receivables and even extend to provision of much current cash flow accounting, a basis of analysis that has become of increasing importance in both business and financial planning.

Tied into the possibility of, if not a prerequisite to, expanded service for most depositors is the introduction of a depositor combination cash/credit card. This device could be used for immediate payment, partially replacing the use of coin and currency, or it could be used for the processing of convenience credit or the scheduling and liquidation of instalment or revolving credit.^{3/}

All of these ancillary operations enhance profitable business prospects of a computerized settlement system outlined above. Obviously they and similar extensions of service have an important bearing upon the alacrity and enthusiasm with which banks will convert to or adopt EDP systems.

If the foregoing projections are realistic, they seem to promise, in the aggregate, a substantially more efficient settlement mechanism. And they imply additional profit opportunities for banks that can combine settlement with receivables accounting, payroll accounting, credit card operation, and a consumer credit system for depositors.

Today, no one really knows how much cost reduction, private and social, a fully computerized system might achieve. Some of those with the earliest and most extensive experience in partial EDP applications are taking a hard, if not skeptical, look at "hardware" costs of a full-scale operation. One of the difficulties of bringing the relevant evidence together is the problem of totaling up actual private costs in our present settlement system which could be eliminated or reduced in the "checkless-cashless" society. Another is the allocation of the new system's public and private costs among various public and private beneficiaries. If public costs presently involved in the distribution of currency and processing of checks, for example, are substantially reduced how can the entrepreneur banker who brings this about collect a quid pro quo?

The question then of whether and how commercial banks will regard EDP as an opportunity for profitable service is not easily answered. The banking system is not distinguished for its innovative achievements--despite evidence of improvement in recent years. Its adaptability to change is hampered by regulatory constraints on structure and function. Entry, branching, and merger are closely regulated as are prices paid for deposits and many of the conditions under which credit can be extended. Thus, there is a tradition of conservatism in management reinforced by competitive sheltering and regulatory constraints that act as inhibitions to innovative steps with any evident structural or functional consequences.

This opens the way for nonbank enterprises to become well established in the EDP record-keeping applications antecedent or related to settlement before banks even enter the field. If they do, their customers are likely to be relatively indifferent to tardily offered adjuncts to a banking settlement system.

The deferred entry of banks into the consumer credit business is a case in point. Today, credit for consumers is relatively independent of the banking system though it is also available there, and generally for less. However, even today, seldom does a bank's consumer credit system exploit the natural advantages of a continuing depositor relationship in the way that vendors, for example, have exploited the continuing patronage of their customers. Moreover, consumer credit is a natural extension of other banking operations. A bank's individual depositors use credit extended by its retail firm depositors with the proceeds of trade-credit bank lines. Vendors have established practical standards of creditworthiness for their customers and profitably priced the credit extended. At the most, very few banks have offered an aggressively competitive alternative to vendor credit by carrying the credit financing from producer or wholesaler through to the ultimate consumer.

As an industry, banks have moved into consumer credit far more slowly than vendors; they have not been innovative and, by and large, have made almost no use of their key position in settlement accounting to provide services more broadly and economically than anyone else.

Past experience suggests, therefore, that the banking system may well be reluctant or inhibited from exploiting the opportunities

inherent in automation, particularly if more aggressively-minded EDP machine sellers or users can carve out large sectors of potential service in which, through lower costs and innovative flexibility, they can establish customer loyalties.

But if skepticism borne of experience leads me to expect opportunities to be missed in this area, logic compels me to insist that such a fate is not inevitable. A clear enough vision of future possibilities exists in some banks today. Hammered home hard enough by both intra-industry communication and private advice, it might serve to erode much of the inertia and inhibition now forestalling a full-fledged revolution in the settlements mechanism.

If this should happen--and assuming public policies are accommodative--not only banking services but also banking structure could be literally transformed. Profound structural changes seem almost a certainty. Automation can and will burst the locational constraints that are implicit in Federal conformity to the provisions of 50 State banking laws pertaining to branching. Not only will metropolitan area-wide banking operations become commonplace everywhere at the option of bank managements but remote control banking State-wide, and even across State lines, will also be feasible, limited by little more than the telephone toll costs of servicing more distant customers.

To be sure, banks have detoured branching restrictions for some time, as large banks in various parts of the country have solicited and made loans all over the United States--or over the world, for that matter--and have accepted deposits by mail or wire from customers

wherever located. But this sort of substitute for branching is a reality only for large accounts. The dynamic change that will come into being is that computerizing the demand depositor-bank relationship will make it practicable and in all probability economically profitable for banks spectacularly to extend their present service areas for small and medium-sized accounts. This they can do, by using the U.S. mails or by hooking their computer onto a local telephone in any community they wish to serve.

The same features of automation that will enable banks to achieve many of the advantages of a far-flung branching system will also introduce a large element of obsolescence into many existing branch facilities. Branches that have been established to achieve proximity to depositors and are essential from the bank's standpoint only because they facilitate the sweeping up of loanable funds or minimize deposit fluctuations by more nearly encompassing the local payments cycle will become superfluous.

Depositors will have no need to visit their banking office any more often than they now visit their telephone or electric utility company office. They will not be making deposits of checks; rather their bank will notify them of credits to their accounts. They will rarely find it necessary to go to their bank to obtain cash, even for transactions that are now typically made with cash. Their credit line will be activated automatically. Their cash/credit card will be the equivalent of cash at a supermarket, the cleaners, or a department store. The coin and currency required for transactions that will



continue to be most conveniently handled in that fashion will be supplied from commercial establishments that are regularly serviced by money truck pickup and delivery.

Perhaps there will be a place for "baby branches"--small field offices which might serve as headquarters for account salesmen and loan officers, and for performing custodial, certification and routine financial advisory services, but it is hard to visualize the typical branch office in existence today as fitting into a computerized banking institution of the future.

Automation in banking will likely have lesser effects on such traditional types of bank credit extension as farm lending, mortgage lending, and loans to large businesses and to financial enterprises. But it should have a major impact upon consumer credit and trade credit between firms, particularly of small and medium size. These types of credit involve substantial investigative and bookkeeping costs relative to interest earned on a typical loan or line of credit. They also involve more surveillance and more losses, though of a readily insurable type, thus adding further to overhead costs.

With automation banks can offer a credit system which ties settlement accounting into quasi-automatic credit extension; this combination has great operating advantages over other arrangements available to vendors or independent consumer finance companies. A bank depositor credit card is of superlative convenience for the purchaser when he can use it anywhere and in doing so express his preference for cash payment, convenience credit, instalment credit or any combination of the three.

The bank, in offering this service, can extend credit to seller or buyer, or both, on the basis of prearranged lines, lines that have been fixed with access to unparalleled sources of information on the customer's financial activity and responsibility. Moreover, the computer continuously updates this information and can alert the bank's credit department on a timely basis to the emergence of credit abuses by whatever standard the bank may choose to employ. Imagine the convenience of a continuing scrutiny of the customer's cash inflow and outflow in relation to use of bank credit, and all monitored by a sentry who reports instantaneously!

Such a system would not be without losses to be sure, but they could be controlled by fixing maximum credit lines for various types of accounts. And loan limits could serve another purpose--that of fostering larger demand deposit balances. If a line of credit, for example, were some multiple of average daily balance it is quite likely that most depositors would gladly pay the "commitment fee" for the convenience and prestige of bank credit. And still another advantage so far as banks are concerned is the conventional preference of many bankers for self-liquidating short-term credit, met in this instance by the rapid turnover of consumer and sales credit of the type envisioned.

Particular beneficiaries of this more flexible and better disciplined credit use should be the many self-employed in the economy, ranging from part-time salesmen to proprietors. While their aggregate credit use is a small factor in bank lending, a significant public interest is served by uncovering any method of economically and

conveniently making more bank resources available to them. Under current operating procedures, the overhead costs associated with such credit, when added to a regular interest charge, entail effective interest rates that are prohibitive or appear highly discriminatory. Automation offers a method of minimizing overhead costs and probably reducing risk, thereby making bank credit more accessible to a sector of the economy that has found all sources of credit "high priced."

In their continuous search for loanable resources banks will find automation a far keener tool than they are accustomed to using. On the one hand, it will enable them to attract demand deposit customers with assurance of a simpler, safer, and more convenient means of payment than has ever been offered. Not only will the computer reduce the risk in paying bills, it will also take over the chores in banking-- such as a trip to the bank and the standing in line to make a deposit, the writing of checks and mailing them to creditors, and similar routine tasks. Moreover, it will give the depositor "instant bookkeeping" as he will be able to find out as often as he likes the exact status of his account, and with that knowledge give the bank instruction as to whom to pay, and when. Thus he is enabled to manage his money position as closely as he likes.

From the standpoint of profitable operations, banks that offer a service making possible the close management of customers' bank accounts are almost certain to find their demand deposit totals wasting away as a manifestation of the automation program. Moreover, given the capabilities of a computerized economy, more frequent

settlement periods are likely, if not certain, to come into widespread use and this development will diminish still further the size of a comfortable operating balance for the typical depositor. Just as weekly wage and salary payments go with a lower operating bank balance than is needed when payments are monthly, the shorter interval made possible by automation will call for even smaller cash balances.

Given declining need for demand deposit balance for these "technological" reasons, banks have the alternative of establishing fees to cover at least a portion of the costs incurred for processing flows through demand deposit accounts or of establishing minimum balances commensurate to the scope and cost of services rendered. If they rely heavily on fees, then in order to maintain their aggregate of loans and investments banks will need to attract time deposits (or to borrow) in one form or another in competition with other banks, other financial intermediaries, and the capital markets. The compensating balance alternative, on the other hand, if enhanced in appeal by linking it to a packaged credit line, would enable banks to minimize losses in demand deposit balances.

Other changes consequent to the automation of money flows-- such as operating space and labor requirements of banking institutions-- involve formidable housekeeping and management adjustments, but they are of a different order of concern.

Nor has any mention been made of the possibility of the settlement system being nationalized, along the lines of European experience, in the Post Office or the Federal Reserve System. While

such a step is technically feasible, if not advantageously suited to a monopolistic operation, our preferences run strongly against extending Government operations into service areas that can be satisfactorily performed privately.

If the views and speculations advanced here are at all persuasive, it will probably be with the assenter's proviso that "it won't happen in my time." To this skepticism I can only reply that most of the innovations I have alluded to are now in being, or about to be placed in operation. Individual banks in all sections of the country are adopting, piecemeal, elements of a system such as has been described. Before very long these experimental operations will provide a solid foundation for the new banking system of the future.

Footnotes

1/ Commercial banks also have an important function to perform in the only alternative procedure for settling the economy's accounts, i.e., by the use of coin and currency. They maintain at significant cost local reservoirs of cash for the use of their businesses and individual customers who can withdraw amounts and denominations when required and return to the pool unfit or excess holdings.

2/ The number of computer centers given is conjectural but comprises an optimum operational size and a convenient geographical area. The very rapid growth of computer centers recently seems to presage the automation of all demand deposit accounting in the near future--using checks or any other settlement media. Banks will have a choice of their own equipment, a correspondent's facilities, a cooperative processing organization or a commercial service bureau.

3/ The cash card involves some exposure to theft or counterfeiting but various identification devices such as voice "fingerprinting," or other technological developments now under study appear adequate to control losses. Security may be more importantly achieved, however, by the positive identification of all payees inherent in the system. To be a payee one must have an account with a bank and have met whatever identification and responsibility standards are found to be necessary for the protection of payors. There are no intermediate signatories in the system--once the payor has directed his bank to make a given

Footnotes (Continued)

payment and the bank is satisfied with its identification of the payor, then there is no opportunity of intercepting and misappropriating the "document" used for this purpose.