

THE COST OF THE PAYMENTS MECHANISM TO THE NATION'S
COMMERCIAL BANKS

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INTRODUCTION

For research purposes, the cost of the present payments mechanism can be studied in five parts (1) the cost to commercial banks, (2) the cost to nonbanking businesses, (3) the cost to individual consumers, (4) the cost to the Federal Reserve System, and (5) the cost to the Federal Government. Research already completed on the cost of the present payments mechanism showed that the payments mechanism expenses for the Federal Reserve System were \$205.7 million and those relating to the Federal Government were in excess of \$179 million in 1970.^{1/}

The purpose of this study is to determine the cost of the present payments mechanism to all of our nation's commercial banks. The problem of cost analysis is divided into four sections. Section I briefly defines the present payments mechanism, Section II explains in more detail the various components of the payments mechanism, Section III describes some of the processing points of the check clearing mechanism, and Section IV determines the approximate cost of the present check clearing system to all of the nation's commercial banks.

This paper will concentrate mainly on the functions of the check clearing mechanism, as check payments account for most bank money transfers and because both descriptive and cost data on the other payments mechanism components relating to commercial banks are limited.

^{1/} Current Federal Reserve Payments Mechanism Expenses, John Thomas Whetstone, III and Jens Hugh Hutchens, Jr. (Board of Governors of the Federal Reserve System, September 1970) and A Study of the Cost of the Government Payments Mechanism, Eugene E. Snyder (Board of Governors of the Federal Reserve System, March 1971).

I. THE PAYMENTS MECHANISM

Commercial bank's payments mechanism refers to the transfer of monetary assets that begins when a buyer makes payment for the purchase of goods, services, or financial assets. This transfer of money from consumer to vendor may be accomplished in a number of ways, all of which generally fall under the concept of the payments mechanism.

Table 1
ESTIMATED DISTRIBUTION OF MONEY TRANSFERS WITHIN THE
BANKING SYSTEM AND DOLLAR AMOUNT^{1/}

<u>Type of Money Transfers</u>	<u>Average Daily Number of Money Transfers</u>	<u>Per cent</u>	<u>Average Daily Dollar Value of Money Transfers (in billions)</u>	<u>Per cent</u>
1. Checks	74,900,000	99.6	\$29.2	52.8
2. Wire Transfers	34,500	0.1	25.2	46.1
3. Miscellaneous	265,000	0.3	0.6	1.1

Source The Check Collection System, Bank Administration Institute, 1970, p. 1.

Table 1 shows the results of a study which intended to verify that checks are by far the major component of bank money flows, accounting for over 99 per cent of the average number of daily money transfers within the banking industry. Wire transfers comprised only 0.1 per cent of total bank transfers while 0.3 per cent are accounted for by miscellaneous methods. Those important components of the payments mechanism labeled as miscellaneous include currency and coin transfers, debit and credit advices from correspondent banks, bank credit card sales slips, and certain small volume transfers.

Table 1 also shows that while wire transfers are a small component of the total volume of money transfers, they comprise almost 50 per cent of the dollar value of these transfers. This situation arises because the large commercial banks and the Federal Reserve System both make extensive use of wire communication facilities to transfer very large sums of money. Wire

^{1/} Information in this table was taken from a 1967 survey and a series of interviews with officials of commercial banks, Federal Reserve Banks, and clearing-houses in various cities. Data here refer only to money transfers within the banking system.

transfers of money have important implications for future automation of the payments mechanism because they greatly accelerate the availability of funds. The miscellaneous methods of money transfer previously mentioned play a relatively small role, both in volume and dollar value, in the nation's payments mechanism.

II. METHODS OF MAKING PAYMENT

The following section will describe the various components of the payments mechanism, concentrating on the transfer of funds through demand deposits.

Demand Deposits

A check is a paper document which contains legal authorization to withdraw a specified amount of money from one's demand deposit account and to pay it to someone else. The check contains formatted information to identify who is to be paid, how much is to be paid, who is making payment, and where the check must be delivered in order that payment may be made.

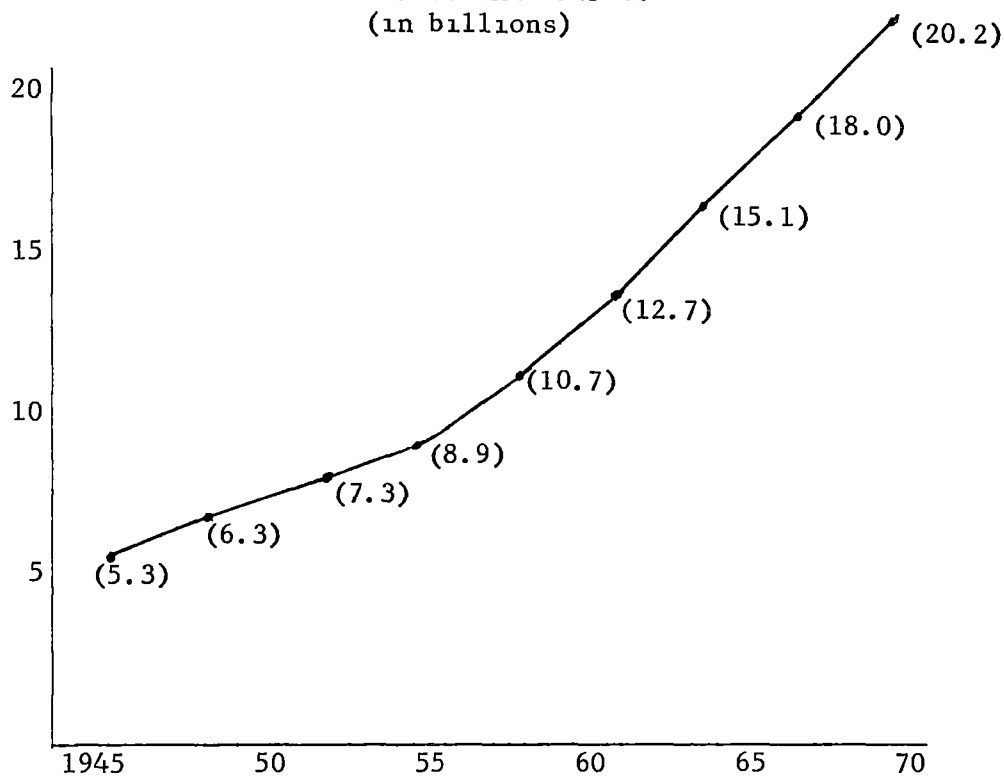
No precise count of check volumes is made due to the many checks issued and the many routes of collection, but it has been estimated that over 62 million checks are written each day, and that the same number are deposited or cashed at the nation's commercial banks.^{1/} With approximately 21.5 billion checks written in 1970, and with a projected annual growth rate of approximately 7 per cent, 33 billion checks can be expected to be written in 1975. In addition, it has been estimated that a check is handled more than 10 times by clerks and machines in more than 2.5 commercial banks before it reaches its final destination. Thus, 21.5 billion checks written in 1970 turns into 230 billion check-handlings during that year.^{2/} Figure 1 shows the Annual Check Volume from 1945 to 1968.

According to research done by the Bank Administration Institute, individuals are the major check writers, accounting for about 52 per cent of all checks written, while businesses are the prime receivers of checks,

^{1/} The Story of Checks, Federal Reserve Bank of New York, 1970, p. 13.

^{2/} The Check Collection System, p. 17.

Figure 1
ANNUAL CHECK VOLUME 1945-68
(in billions)



Source: The Check Collection System, p. 3.

accounting for 55 per cent of all checks received.^{1/} Table 2 gives a further breakdown of check writer/receiver interrelationships.

Table 2
CHECK WRITER/RECEIVER INTERRELATIONSHIPS
 (Per cent of Total Checks Written)

W r i t e r s		Receivers			Totals
		Individuals	Businesses	Government	
	Individuals	14.7	35.9	1.1	51.7
	Businesses	27.0	18.7	0.9	46.6
	Government	<u>1.1</u>	<u>0.4</u>	<u>0.2</u>	<u>1.7</u>
	Totals	42.8	55.0	2.2	100.0

Source: The Check Collection System, Bank Administration Institute, p. 7.

These funds are transferred into different accounts, whether within the same bank or across the country, by means of a diverse and complex check clearing mechanism. This clearing mechanism consists of a network of processing points tied together by a transportation and communication system. The processing points consist of the approximately 14,000 commercial banks and all their branches, 248 city clearing houses, and the 12 Federal Reserve Banks and their 24 Branches. Most of the checks are processed through about 400 large commercial banks and the Federal Reserve Banks.

Check Collection

The primary function of the check collection mechanism is to clear a check through the bank of first deposit and carry it ultimately to the bank on which it was originally drawn. About 30 per cent of all checks deposited for collection are payable at the bank of first deposit.^{2/} These checks are known as home debits or "on us" items and have a relatively short journey through the

^{1/} The Check Collection System, p. 7.

^{2/} The Payments System: Problems, Fantasies, & Realities, Federal Reserve Bank of New York, Monthly Review, May, 1971, p. 109.

commercial bank mechanism as they are already at their final destination. Home debits need only travel through the internal department of the bank of first deposit to complete the collection cycle. The remaining 70 per cent of all checks deposited are not drawn on the bank of first deposit and must be sent to the drawee bank, wherever it may be located, through either a local clearinghouse, a correspondent bank, the Federal Reserve System, or the drawee bank itself. Consequently, these transit or "on others" checks are the items that present the most problems of time to the check clearing mechanism.

A clearinghouse is an organization established by banks in the same locality through which checks and other instruments are exchanged and net balances settled. Messengers from each bank bring bundles of checks, one bundle for each of the other banks in the clearinghouse, and a list of the amounts due their banks from each other bank.

When the drawee bank is not in the same locality as the bank of first deposit, a correspondent bank or the Federal Reserve System is used to clear the check. A correspondent bank serves as a depository and performs banking functions for other banks, usually out-of-town banks. Transactions are settled at the Reserve and correspondent banks by crediting the sending and debiting the receiving bank's deposit accounts. Federal Reserve Banks in turn use the Interdistrict Settlement Fund to settle their net balances through the Board of Governors of the Federal Reserve System in Washington, D. C. Federal Reserve Banks do not charge for check clearing services, while correspondent banks usually require deposit balances of their bank customers in payment for their services. The decision by bank officials as to which clearing technique to use is an important one, for any delays to the clearing mechanism cause a loss in opportunity to use those funds represented.

Exception Items

Besides those check items already mentioned, commercial banks also handle checks that are labeled exception items. Basically these include all items that cannot be handled in a routine way such as nonpar checks, envelope drafts, noncash items, and return checks. Nonpar checks are those that are paid by the drawee bank at some amount below face value. Recent years have seen a rapid decline in nonpar banking, resulting in fewer handlings, easier processing, and fewer routing problems. It has been estimated that within a few years there will be fewer than 200 nonpar banks in the United States.^{1/} Envelope drafts are those items in the check clearing mechanism that have irregularities, usually in the form of attachments, and therefore cannot be processed through regular channels. Noncash items such as maturing notes and bonds do not call for immediate payment and thus, cannot be collected through the regular check clearing mechanism.

Return checks, while only accounting for a small portion of exception items, are the portion which affect handlings and float, and which in turn increase the expenses of the check clearing mechanism. Return items are checks returned unpaid because of insufficient funds, improper or wrong endorsement, being sent to the wrong bank, being misdated, or having a signature problem. In addition, some are checks written on nonexistent accounts and payment has been stopped on others. These items obviously require much time and effort which increases the processing costs for most commercial banks.

^{1/} The Check Collection System, 1970, p. 25.

In 1967, approximately .75 per cent of all items presented for payment were returned unpaid. Thus, on the average 562,000 checks were returned unpaid each day amounting to 140 million items during the whole year.^{1/} Approximately one-half of all returned checks are eventually made good for payment but the extraordinary processing costs are still incurred. Table 3 below shows some of the reasons for check returns and the percentages they account for.

Table 3
TRANSIT ITEMS RETURNED UNPAID
(average daily 1952)

<u>Reason for Return</u>	<u>Per cent</u>
Insufficient Funds	54
Endorsement	19
Mis-routing	11
Signature	3
Uncollected Funds	3
Other	<u>10</u>
Total	100

Source The Check Collection System, p. 24.

Most States permit direct return of unpaid items caused by insufficient funds, the greatest cause of returned checks. Thus, unpaid checks would be sent directly to the bank of first deposit rather than being routed back through the Federal Reserve System and all other endorsing banks.

Other Related Expenses

Two other results of the check payments system may also be looked upon as an expense to our nation's commercial banks. These are commercial bank float and check kiting. Both are a result of the time involved in the check clearing mechanism. Commercial bank float is the dollar volume of items

^{1/} The Check Collection System, 1970, p. 24.

credited to customer accounts but not yet collected from the bank on which they were drawn. From the standpoint of the individual banks, this commercial bank float lowers their earning assets for, although the checks have been credited to the individual customer accounts, these new deposits cannot be invested until the funds are actually received. With check kiting, a drawer writes a check which he has insufficient funds to cover but the bank has no knowledge of his "insufficient funds" position due to the time involved in the check clearing mechanism. The law makes check kiting a criminal offense, but the law is difficult to enforce. Commercial banks must undergo a considerable amount of work in keeping accurate records of float in order to prevent check kiting operations.

Economies of Scale

Some research has indicated that larger banks enjoy an inherent cost advantage over smaller banks with respect to the demand deposit function. Frederick Bell and Neil Murphy, in a 1967 study^{1/} of banks in the Boston, New York and Philadelphia Federal Reserve Districts, found that the average direct demand deposit cost curve was in fact downward sloping and thus unit costs were decreasing with an increase in deposit volume. The results of the study revealed that a 10 percent increase in total number of accounts resulted in a 9.1 percent increase in total cost when all other cost related factors were held constant.

Economies of scale result from a more efficient use of input to achieve a greater output per unit of input. These economies may arise

^{1/} Economies of Scale in Commercial Banking, Frederick W. Bell and Neil B. Murphy, Federal Reserve Bank of Boston, 1967.

in the demand deposit function in two ways. First, increased size permits greater specialization of tasks and thus a more efficient organization of resources. Large banks have the opportunity to assign labor and capital to a certain facet of work while smaller banks must use the same input factors for various jobs. Second, certain types of computerized equipment that permit increased efficiency in the demand deposit function are economically feasible only for large scale operations.

In spite of the fact that larger banks may realize certain cost advantages within the demand deposit function, it was nevertheless found that their per unit processing costs were actually higher than those of smaller banks. This can be explained by two factors. First, branching, more apparent in larger banks, tends to increase costs mostly due to a greater labor requirement. Second, and more recently discovered, larger banks usually hold those accounts having a greater amount of activity thus further increasing processing costs.

More recent research in the area of commercial bank economies of scale has suggested that previous economies may no longer exist with respect to the demand deposit function.

Wire Transfers

The individual member banks, upon request, may transfer funds through the Federal Reserve's wire transfer system to member banks and non-member clearing banks in the same area and in other territories. Wire transfers, as mentioned earlier, account for a small percentage of total volume of money transferred, but account for a substantial portion of total dollar amount transferred. This results from extensive use of the wire system by large banks for transferring large sums of money.

The computerized switching center for wire transfers between Districts at Culpeper, Virginia, is run by the Federal Reserve Bank of Richmond. Wire transfers increase the availability of funds and are a step in the direction of a changing payments system.

Other Payment Methods

Currency and Coin

Today's money supply consists of nearly \$57 billion in currency and coin in circulation and about \$190 billion in demand deposits in the nation's commercial banks. Although most of the total dollar volume of payments today are made by check, it has been estimated that approximately 40 per cent of the American people deal almost exclusively in cash.^{1/} Currency and coin deposits received by commercial banks are either sent to their respective Federal Reserve Banks for deposit or kept on hand for customer withdrawals.

In contrast to the demand deposit function, there is very limited descriptive and cost data on commercial bank handlings of currency and coin. One study, however, on certain types of currency and coin operations and their approximate costs is reprinted in Table 4. Cost figures for currency and coin operations are not included in the final section of this paper.

Money Orders

Approximately 90 per cent of all postal money orders are cashed at commercial banks, and the remainder eventually end up there via postmasters' deposits. After the correct accounts have been debited and/or credited, all postal money orders are then sent through the Federal Reserve System where they are processed. Commercial banks also issue money orders and other special

^{1/} Electronic Money and the Payments Mechanism, Federal Reserve Bank of Boston, 1968, p. 4.

Table 4
COSTS OF MONEY ROOM PRODUCTS

<u>Products</u>	<u>Approximate Standard Time</u> (in minutes)	<u>Approximate Unit Cost</u> (in dollars)
1. Payroll order	3- 4	1.00
2. Coin order	6- 8	3.00
3. Money		
a. activity cost/hour		10.00
b. cost per \$1,000	.02-.08	.01
4. Customer Deposit	3- 5	1.00 - 2.00
5. Prepacking	1- 3	.50
6. Proving Coin (\$1,000)	10-28	3.00
7. Currency order	4- 6	2.00
8. Envelope deposits	1- 3	.50
9. Rolled Coin	6- 8	1.00

Source: Unpublished Federal Reserve System staff study.

purpose payment orders such as drafts, cashier's checks, and special signature checks (on which the bank fills in the date and amount and the purchaser fills in the payee's name and his own signature).

Preauthorization

Preauthorization is a method of money transfer by which the account holder, with one signature, authorizes the bank to transfer funds from his account whenever certain conditions exist. Thus, the debtor's bank will pay his bills, whether fixed or variable in amount, without recurring action by him. Preauthorization can reduce the number of checks in the system, however, any cost benefits from preauthorization seem to accrue from accounts that engage in a large volume value of transactions, such as insurance firms and corporate payrolls. This concept has been struggling to gain a general acceptance for some time now, but present factors suggest that preauthorization plans may receive increasing use and attention in the near future.^{1/}

In addition, response authorization and direct authorization may be relied upon when the requirements for preauthorizations do not exist. Response authorization may occur when the bank receives a request to transfer funds in a situation when it is unauthorized to do so. The bank may then go to the account holder for the needed authorization. Direct authorization is a single order given from the account holder to the bank naming a specific party to which funds are to be transferred. This procedure occurs mostly in payroll disbursing, bill paying and wire transfer services.

Such plans, by reducing the check volume, may eventually have important cost saving implications with respect to the demand deposit function.

1/ The Payments System Problems, Fantasies, & Realities, Federal Reserve Bank of New York, Monthly Review, May, 1969, p. 112.

Bank Credit Card Plans

While checks are very convenient as a way of making remote payments, bank credit cards have been developed for customers to make "on site" payments. The widespread adoption of bank credit cards may have served to slow the growth of check volume slightly, and consequently might have some cost saving implications for the commercial bank demand deposit function. Increased paper work and processing from the credit card plans, however, has most likely cancelled any saving from fewer checks being in the system. In addition, bank credit cards may be deferring payments for goods or services that would have otherwise been made in cash, thus increasing the number of checks written and the resulting processing costs.

Food Stamps

The U. S. Department of Agriculture issues food stamp coupons in denominations of 25 cents, 50 cents, and \$2.00. They are traded at grocery stores which turn over the stamps to commercial banks for credit to their accounts. Member banks obtain payment through their Federal Reserve Bank while nonmember banks forward the coupons to their correspondent banks who in turn present them to their Federal Reserve Banks for payment. Figures are not available on the cost to the commercial banking system of food stamp processing.

III. CHECK PROCESSING WITHIN A BANK

This section describes the various processing points of the check clearing mechanism within an individual commercial bank.

Checks come into a commercial bank via customer transactions and from other parts of the banking system. Customer transactions take place over the counter, in the form of checks cashed and deposited, and through mail and night deposits. These checks are taken by the receiving teller who may sort the checks into home debits and transit items. Items in transit may arrive at the bank either directly from other banks (including correspondents), a local clearinghouse, or a Federal Reserve Bank. Return items, now on their way back to the original drawer, are included with those items in transit but are kept separate from the other checks.

All checks received by the bank must undergo various input control functions. Input control is a general concept describing those control techniques that take place in teller operations or in the proof department. The more labor intensive operations, such as examination of checks for proper signature, are usually performed by the teller while the more capital intensive functions are performed in the proof and transit department.

Proof and transit operations are the nucleus of the check processing system within a commercial bank. Most checks are processed in these departments before they can be sent to their final destination. All exception items, including return checks, must be processed separately with exact processing procedures varying from bank to bank.

The three main proof and transit operations are proof of deposit, check encoding, and document sorting. The first two are categorized as proof operations and are performed on proof machines in most commercial banks. In contrast, document sorting is considered to be a transit operation and may be performed either on a multipocket proof machine or a reader-sorter linked to a computer. Proof machine sorting is referred to as low-speed processing while sorting by computer is referred to as high-speed processing. Most larger banks process checks through a high-speed system.^{1/} A high-speed process distinctly separates the proof and transit departments while a low-speed process, because all three operations are performed on a proof machine, does not.

These proof and transit operations are described below

Proof of Deposit The total amount of a batch of checks entering the proof department must be verified by adding up the values of the individual checks and comparing them to the total. This process is done mechanically on most proof machines. First, the individual check amounts are punched into the adding machine keyboard and listed on a control tape. These amounts are totaled and the total on the control tape is compared to the total of the batch. The machine then compares the two figures and if they do not match up, the machine locks.

Encoding All checks and deposits are encoded in the proof department. If checks are not qualified (i.e., encoded as to bank identification number), they are corrected at this point. Encoding is accomplished when the dollar amount is entered in the lower right-hand corner of the check. The value of the check must be typed into the adding machine keyboard of the proof machine. The imprinter is activated simultaneously when the check is dropped into the chute.

^{1/} A recent study made by Arthur D. Little, Inc. reports that banks with deposits of over \$25 million usually sort checks under a high-speed processing system.

All encoding, both bank identification number and dollar amount, is done by magnetic ink for magnetic ink character recognition (MICR) equipment. MICR, developed around 1956, is simply a method of putting this vital information on the check in a form which the computer can read. Thus, MICR encoding is only necessary when the individual bank uses a high-speed sorting process.

Low-Speed Document Sorting The individual checks entering the proof and transit departments must be separated according to destination. Some checks will be home debits, and others will be clearing and transit items. Clearing items may be collected locally while transit items may not. Proof machines with a sorting capacity may have anywhere from 8 to 40 different pockets. Each pocket is designated to receive a particular type of check by depressing that specific key on the machine.

The sort is accomplished after the checks have been encoded. After a check is dropped into the machine, it is fed mechanically to the selected pocket. Simultaneously, the amount of that check is printed on an individual pocket tape which eventually lists the total amount for all the items in each pocket.

There are basically three types of proof machines and they differ according to function. They are listed by function in Table 5.

High-Speed Document Sorting Document sorting under high speed processing produces the same results as if a proof machine were used except for an obvious difference in processing speed. Under this system, the reader sorter may read, sort, and tabulate the MICR information at speeds of 1,500 checks per minute.^{1/}

1/ An Electronic Network for Interbank Payment Communications, Bank Administration Institute, Park Ridge, Illinois, 1969, p. 6.

Once the transit (and clearing) items are sorted, they are grouped into batches of checks by destination. Attached to each batch is a cash letter which lists the total amount of all the checks. These batches are then forwarded to an output control center before being shipped. The function of the output control center is to make certain that the dollar amounts of the individual batches of checks add up to the total amount originally entering the proof department. These batches are then sent by the transportation department either directly to the drawee bank, a local clearinghouse, a correspondent bank, or a Federal Reserve Bank.

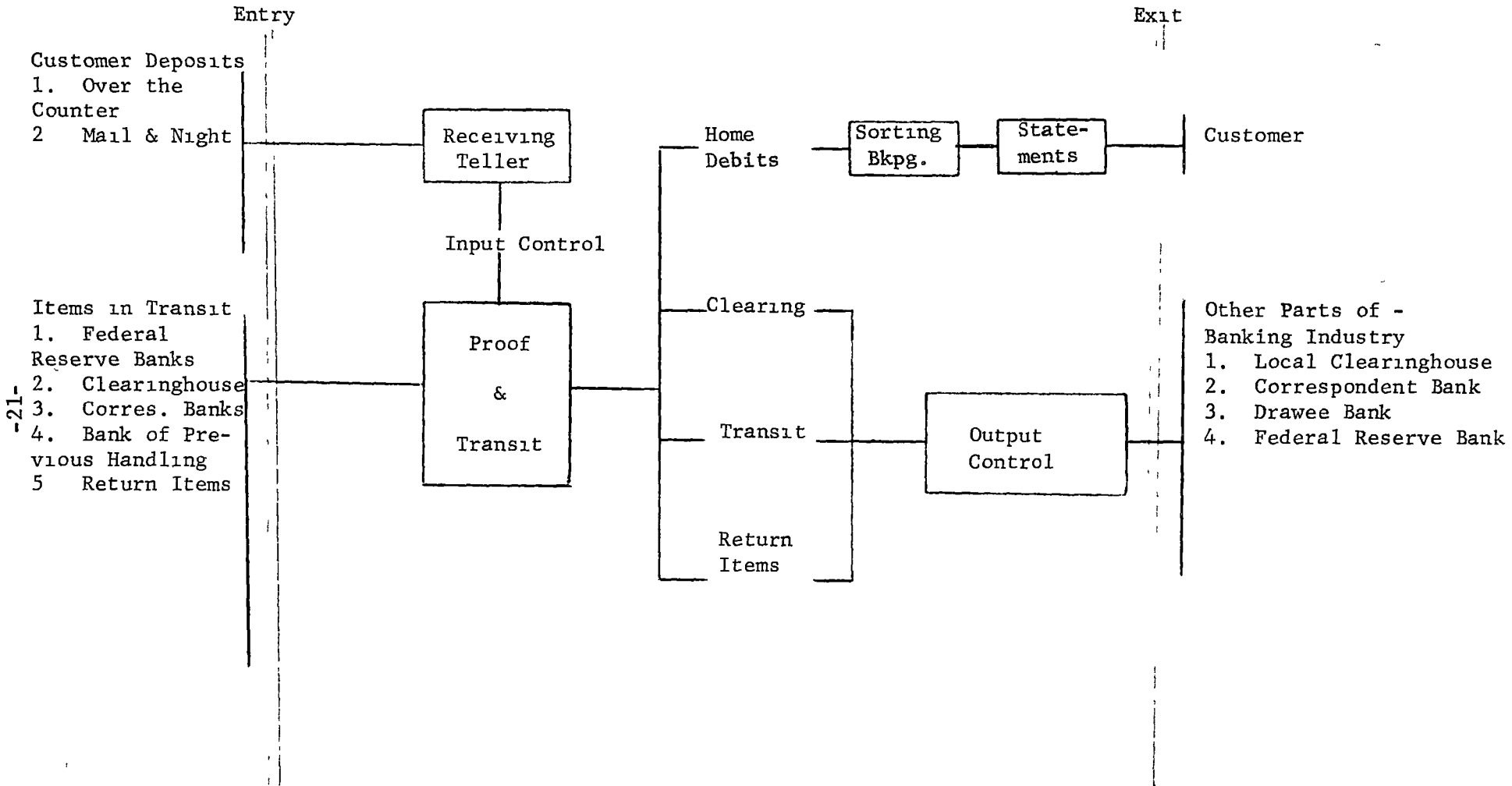
The bank gives less immediate concern to its own checks for they only have to travel through the internal network of that bank. These items are sorted again by computer into debits and credits and the respective entries are mechanically posted to the individual customer accounts. With the individual accounts now updated, the checks are hand filed, according to account number, for purposes of statement preparation and mailing. Some large banks have recently installed automated statement preparation equipment. Thus, the cycle within an individual commercial bank is completed with all home debits winding up in the customer's hands and all transit items on their way to the drawee bank.

Table 5
DIFFERENT TYPES OF PROOF MACHINES
USED BY COMMERCIAL BANKS

<u>FUNCTIONS</u>		<u>MACHINES</u>
Proof, Encode, Sort	IBM 1201	24 or 32 pockets
	NCR 482	8-16 or 24 pockets
	NCR 450	32 or 40 pockets
Proof, Encode	IBM 1203	1 pocket
	NCR 481	2 pockets
	Burroughs P703	1 pocket (in limited use)
Proof, Partial Sort	IBM 1260	8 pockets

Figure 2

CHECK PROCESSING WITHIN A COMMERCIAL BANK



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IV. DETERMINATION OF THE COMMERCIAL BANK
CHECK CLEARING EXPENSE

This final section will consider the cost of the check clearing mechanism to the nation's commercial banks. Because the amount of cost data on individual bank demand deposit functions is limited, an exact cost figure cannot easily be determined, however, some light may be shed on the subject through data approximation.

The cost figures relied on here are taken from the Federal Reserve's 1970 Functional Cost-Analysis. This analysis is compiled annually and was based in 1970 on data furnished by 951 participating banks in the 12 Federal Reserve Districts. The banks are arranged according to deposit size--up to \$50 million, \$50 million - \$200 million, and over \$200 million--and expenses relating to the demand deposit function are listed for each deposit size range. In addition, unit costs for processing home debits, transit checks, and other items are derived based on the total expenses of the demand deposit function adjusted by a measure of activity defined as total weight units. The different weights--transit items and home debits are assigned values of 1 and 2.73, respectively--reflect the differences in processing costs associated with these different types of transactions.^{1/} These unit costs can be used to derive an approximate overall cost to commercial banks for dealing with these items.

The cost of the check clearing mechanism to commercial banks for 1970 can be estimated by summarizing the total cost of processing both home debits and transit items. The cost of processing deposits (credits to customer

^{1/} The difference in processing costs are based on standard time studies conducted by the Bank Administration Institute.

accounts) is not included because this function is less dependent on the method of making payments. For 1970, the per unit costs of processing a home debit in each of the three bank deposit sizes--up to \$50 million, \$50 million to \$200 million, and over \$200 million--were 7.20 cents, 8.38 cents, and 10.60 cents, respectively. The per unit costs of processing a transit item in each category were 2.64 cents, 3.07 cents, and 3.88 cents, respectively. These unit costs are based on those commercial bank expenses--both direct and indirect--related to the demand deposit function. In the 1970 Functional Cost Analysis, demand deposit expenses are separated into two sections, processing wages and expenses, and administrative and overhead expenses. Listed in the first section are tellers' salaries and wages, transit and bookkeeping wages, fringe benefits, furniture and equipment, computer service expense and/or computer expense, printing, stationery, and supplies, postage, freight, and delivery, telephone and telegraph, and fees (legal and other). The second section includes officers' salaries and fringe benefits, publicity and advertising, FDIC insurance, share of occupancy costs, and all miscellaneous expenses. The distinction between direct and indirect expenses relating to the demand deposit function is rather hard to make, but based on the breakdown given in the 1970 Functional Cost Analysis, the indirect expense (administrative and overhead) for participating banks in each deposit range amounted to approximately 25 - 30 per cent of the direct expense (processing, wages, and expenses) for 1970.

In order to determine a total cost figure from those unit costs previously mentioned, the amounts of checks--both transit and home debits--processed by all banks in each deposit size range must be known. During 1970, an estimated 21.5 billion checks were written and deposited or cashed at all the nation's commercial banks.^{1/} Of these, about 70 per cent (15.1 billion)

^{1/} The Outlook for the Nation's Check Payments System 1970 - 1980, Arthur D. Little, Inc., December 1970, p. 4.

were transit items that had to be sent to one of the approximately 14,000 drawee banks directly or indirectly through clearinghouses, correspondent banks, or Federal Reserve Banks. All 21.5 billion were home debit items to the bank on which they were originally drawn. However, data on the portion of these 21.5 billion home debits and 15.1 billion transit items processed by all commercial banks in each of the three deposit size ranges previously mentioned are not available. However, data are available from a Bank Administration Institute study on the percentage of home debits and transit checks processed for banks in the deposit size ranges of up to \$50 million, \$50 million to \$100 million, \$100 million to \$500 million, and over \$500 million. Using these data, two cost figures, a high and low estimate, can be determined.

Table 6
BANK STATISTICS BY BANK SIZE

<u>Bank Size</u> <u>(millions of dollars)</u>	<u>Number of Banks</u>	<u>Per cent of total</u> <u>checks processed</u>
\$0 - 50	12,948	33.4
50 - 100	335	2.4
100 - 500	320	21.5
over 500	90	39.4

Source An Electronic Network for Interbank Payment Communications, p. 5.

According to the above table, banks in the \$0-50 million deposit size range process 33.4 per cent of the total volume of checks or 7.181 billion home debits and 5.027 billion transit items.

From here an approximation of the percentage of checks processed by those banks in both the \$50 million to \$200 million and over \$200 million deposit size ranges must be made. This can be accomplished by using the figure

for the percentage of checks processed by banks in the \$100 million to \$500 million deposit size range first as a part of the large deposit size range (over \$200 million) and again as a part of the middle deposit size range (\$50 million to \$200 million). Due to higher per unit processing costs in the large banks, the first estimate will contain an upward bias while the second estimate will contain a lower one.^{1/} The two different estimates of the expense of check processing to commercial banks appear in Table 7.

The total costs to all commercial banks of the check clearing mechanism in 1970--i.e., processing of home debits and transit items--is somewhere between \$2,393 million and \$2,502 million.

Cost of the Demand Deposit Function

The preceding estimates of the cost of the check clearing mechanism to commercial banks consider only those demand deposit functions that are directly related to the method of making payment. There are, however, other demand deposit functions that are indirectly related to the payments mechanism and consequently could be affected if a change were to occur in the payments system. The costs of processing deposits, for example, were excluded from the previous cost illustrations, but are indirectly incurred as a result of making payment.

Therefore, in order to add a degree of perspective to this cost analysis, it is appropriate to consider the costs incurred by commercial banks as a result of the total demand deposit function. The 1970 Functional Cost Analysis, using the expenses of the demand deposit function listed earlier in this section, derives the cost per \$1,000 of demand deposits for the commercial

^{1/} Although some studies have shown the presence of economies of scale with respect to the demand deposit function, both increased branching and higher account activity in larger banks more than compensate for any cost advantage they might have over smaller banks. In addition, more recent studies have suggested these economies do not exist.

Table 7
EXPENSE OF CHECK PROCESSING TO COMMERCIAL BANKS

<u>High Estimate</u>				
Home debits				
<u>by deposit size range</u>	<u>checks processed</u>		<u>cost per unit</u>	
\$0 - 50 million	7.1810	x	7.20	\$ 517,032,000
50 - 200 million	1.2255	x	8.38	102,696,900
over 200 million	13.0935	x	10.60	<u>1,387,911,000</u>
Total home debit cost				2,009,639,900
Transit items				
\$0 - 50 million	5.07670	x	2.64	132,704,880
50 - 200 million	.85785	x	3.07	26,335,995
over 200 million	9.10545	x	3.88	<u>355,619,460</u>
Total transit cost				494,660,335
Total Cost (high estimate)				<u>2,502,300,235</u>

<u>Low Estimate</u>				
Home debits				
<u>by deposit size range</u>	<u>checks processed</u>		<u>cost per unit</u>	
\$0 - 50 million	7.1810	x	7.20	\$ 517,032,000
50 - 200 million	5.8480	x	8.38	490,062,400
over 200 million	8.4700	x	10.60	<u>897,820,000</u>
Total home debit cost				1,904,914,400
Transit items				
\$0 - 50 million	5.0267	x	2.64	132,704,880
50 - 200 million	4.0936	x	3.07	125,673,520
over 200 million	5.9397	x	3.88	<u>230,072,360</u>
Total transit cost				488,450,760
Total Cost (low estimate)				2,393,365,160

banks in each of the three deposit size ranges. If these costs are multiplied by the dollar amount of the nation's demand deposits (in thousands), a cost for the total demand deposit function can be determined. As an approximation, however, only the cost for the larger banks--\$25.40 per \$1,000 of demand deposits--will be used as these banks hold most of the dollar volume of the nation's demand deposits. The amount of demand deposits held by commercial banks during 1970 was \$181.5 billion.^{1/} Consequently, the total cost of the demand deposit function to the nation's commercial banks for 1970 was slightly over \$4.6 billion. Again, however, remember that this estimate includes those expenses of the demand deposit function that are indirectly related to the method of making payment as well as those expenses measured in the previous section.

^{1/} This figure is taken as of July 1970, for purposes of approximating the Year's average and excludes Government and interbank demand deposits.

SUMMARY AND CONCLUSIONS

The purpose of this paper was to find and expound the components of the payments mechanism with respect to all commercial banks. It has concentrated mainly on the commercial bank check collection system, because checks account for by far the greatest number of banking system money transfers, and they consequently, explain the greatest part of the cost of the payments mechanism to commercial banks. In addition, both descriptive and cost data on the other components of the commercial bank payments mechanism are very limited.

Table 7 shows the costs of the payments mechanism components of the commercial bank demand deposit function to be somewhere between \$2.39 and \$2.50 billion. This figure includes only the expenses of processing home debits and transit items and excludes those demand deposit costs--such as the processing of a deposit--which are less dependent on the means of making payment. Both the direct expenses of processing checks and the indirect administrative and overhead expenses related to the demand deposit function are included in this aggregate cost figure.

The \$109 million difference between the high and low cost estimates derived in the last section, while absolutely large, is a small amount relative to the more than \$2 billion represented here. Such an aggregate cost figure may prove useful when compared to the approximate costs of changing to and operating a new system of payments in our nation's commercial banks.

Again, however, one should remember that these final figures represent only the expense of check processing and ignore other relevant payments mechanism expenses incurred by commercial banks. These figures therefore can

be regarded as very conservative estimates, with the total no doubt exceeding \$2.5 billion. In addition, a cost analysis which adds those demand deposit functions which are only indirectly related to the method of making payment produced a figure in excess of \$4.6 billion for 1970. Continued study of the costs of the payments mechanism to commercial banks may lead to more exact results and better understanding of the need for possible changes in the payments system in the near future.