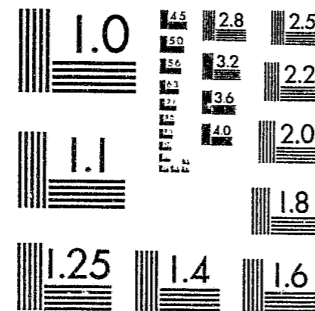


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Bureau of Justice Statistics Special Report

Electronic Fund Transfer Fraud

The rapid increase in the use of computer-based systems for financial transactions has heightened public and private concern over the potential for electronic fund transfer (EFT) crime or fraud. Two principal types of crime highlighted by this report are incidents associated with automatic teller machines (ATMs) and with wire transfer, that is, the transfer of funds by electronic means between banks.

Data from a survey of 16 American banks, all but one with deposits in excess of one billion dollars, and related industry data sources reveal the following estimates of level of activity in electronic transfers and the extent of crime:

- In 1983, there were 2.7 billion transactions involving \$262 billion processed through automatic teller machines (ATM).
- Of a sample of 2,707 ATM-related incidents (transactions resulting in accountholder complaints), 45% of all incidents were found to be potentially fraudulent, involving, for example, unauthorized use of lost or stolen cards, overdrafts, and "bad" deposits.
- Nationwide ATM bank loss from fraud during 1983 is estimated in the range between \$70 and \$100 million based on bank characteristics and a median bank loss of approximately \$84 million calculated on the basis of 2.7 billion transactions.
- In 1980, roughly 60 million wire transfers were completed involving 117 trillion dollars.
- The average exposure to loss (i.e., loss potential) in 139 problem wire transfer incidents reported by 12 of the 16 banks was \$833,279; actual losses occurred in 56% of these incidents.

The need to assess potential levels of fraud in electronic fund transfer systems has been apparent for some time. This report presents findings of the first pilot effort to develop such estimates on the basis of data obtained directly from a sample of banks.

It should be recognized that obtaining fraud data directly from banks represents a major breakthrough. Banks have traditionally been reluctant to share any information that might shake the consumer's confidence in the banking system. Similarly, bank record systems have not been organized to permit easy identification of EFT-related loss incidents. Despite these difficulties, a selected sample of banks agreed to participate and to provide BJS with data for this study. Total anonymity was assured to all participants.

Particular thanks should be expressed to the Association of

March 1985

Reserve City Bankers for their support in the effort.

In reviewing the report, it must be recognized that the pilot sample of 16 financial institutions cannot be considered as representative of the over 14,000 commercial banks in America. Subsequent contacts, however, indicate an interest by additional banks in participating in an expanded study. Data from such a survey would more clearly illustrate the nature of EFT fraud and more precisely define the scope of potential losses.

Data on EFT fraud is relevant for both planning and legislative consideration. This study has demonstrated that consistent data can be obtained from a panel of banks. A larger panel is now required to provide an ongoing source of information on EFT fraud and loss.

Steven R. Schlesinger
Director

- Anticipated losses from wire transfer fraud were estimated to increase approximately 70% over the next 5 years by a cross-section of bank managers and wire transfer experts.

BACKGROUND

The study described in this report represents the first pilot effort to obtain consistent incident-based data on EFT fraud from a small panel of financial institutions; prior to this effort, no valid data existed on the

nature or extent of computer fraud associated with electronic fund transfers.¹ The study focuses on incidents involving automatic teller machines (ATM) and wire transfer services.

At present, ATM represents the most established retail application of EFT technology. Other retail applications also include telephone bill paying, home banking and "point of sale" fund transfers. It is estimated that in 1983, 2.7 billion transactions (withdrawals

and deposits) worth \$262 billion were processed through 43,800 installed ATMs.²

At the corporate level, wire transfer, i.e., the transfer of funds by electronic means between financial institutions, represents the most established use of EFT technology. Approximately 60 million wire transfers were completed in 1980 involving 117 trillion dollars.³ This was 45 times the value of the nation's 1980 gross national product.

AUTOMATIC TELLER MACHINE FRAUD

Causes of ATM-related incidents

A sample of 2,707 ATM-related incidents were identified in the survey.⁴ Table 1 describes the basic causes of the 2,707 ATM-related incidents, classified according to whether the cause was related to a withdrawal or deposit.

As shown, almost three-fourths of all incidents were caused by withdrawal-related events. Almost a third of these involved unauthorized transactions with a stolen or lost card. Another 15% involved unauthorized transactions completed while the card was held by the accountholder. Almost a third of the incidents resulted from mechanical problems that caused inaccurate dispensing of funds or posting of withdrawals.

ATM-related incidents resulting in apparent loss to an accountholder or bank may result from technical failure, human error or fraud. For purposes of this study, individual incidents were classified as "fraudulent" on the basis of the facts involved as indicated in bank records, including in some cases existence of actual fiscal loss to the bank.⁵ Law enforcement investigation and judicial review might result in a reclassification of some of these incidents.

As table 1 shows, 45% of all identified incidents were found to be fraudulent. Almost all of these fraudulent incidents involved unauthorized use of lost or stolen cards or cards still held by the accountholder, overdrafts, and "bad" deposits (for example, deposits of stolen or uncollectible checks and "empty envelope" deposits).

Incidents involving lost or stolen cards

Reports of the 644 incidents involving lost or stolen cards (table 1) were further analyzed.

Cause of incident	Incidents in sample		Classified as fraudulent
	Number ^a	Percent	
Withdrawal-related	2,069	73.4%	
Unauthorized withdrawal ^a			
ATM card lost or stolen	644	22.9	644
ATM card in possession of accountholder	313	11.1	313
Overdraft ^a			
Against insufficient/bad deposit	51	1.8	51
Bank computer suspected to be off line	171	6.1	171
Bank posting procedures known to be delayed	10	.3	10
No fraud ^b			
Accountholder confused	235	8.3	0
Inaccurate posting by bank due to mechanical failure	579	20.6	0
Other ^c	66	2.3	12
Deposit-related	412	16.8%	
Bad deposit by accountholder ^c			
Empty envelope deposited	29	1.0	17
Stolen/fraudulent check deposited	10	.3	10
Uncollectible (not stolen/fraudulent) check deposited	25	.9	14
Bad deposit by person other than accountholder ^a	76	2.7	76
No fraud ^b			
Accountholder confused	137	4.9	0
Accountholder made deposit to wrong account	50	1.8	0
Amount deposited different from amount in envelope or keyed in	43	1.5	0
Inaccuracy in posting of deposit by bank	66	2.4	0
Other ^c	36	1.3	2
Unreported and other ^c	276	9.8%	19

- ^a All incidents classified as fraudulent.
^b All incidents classified as not fraudulent.
^c Incidents classified as fraudulent only where bank sustained loss.
^d Total incidents involving identified causes exceeds total number of incidents because individual incident may have more than one cause.

● **Location of loss or theft.** Cards were lost or stolen in the home (25%), retail establishments (20%), cars (18%), places of employment (12%), streets (8%) or schools (7%); these proportions are based on 395 incident reports on location of loss.

● **Nature of theft.** Where cards were stolen, approximately two-thirds (66%) were taken as the result of a theft of a purse or wallet (purse snatching). Cards were also the specific object of a theft (26%) and were taken as part of a more general theft of personal belongings (8%). These proportions are based on 379 incident reports describing the nature of the theft.

● **Number of unauthorized transactions per incident.** The number of unauthorized transactions is relevant since maximum daily ATM withdrawal limits (generally \$200-300) are established by banks. Based on 535 incident reports, cards were generally used once (27%), twice (24%), or between 3 and 5 times (28%). In 13% of reported incidents, however, cards were used between 6 and 10 times. In 8% of incidents, cards were used more than 10 times in connection with unauthorized transactions.

● **Date of last transaction.** Once notified of a loss or theft, ATM cards are "hot-carded" to prevent further trans-

actions with the card. Of 440 incident reports, the last unauthorized transaction was made 1 or more days before notification in 48% of incidents, on the day of notification in 38% of incidents, and after the day of notification in 13% of incidents, suggesting some failure by banks to "hot-card" the card immediately.

● **Location of personal identification number (PIN).** PINs were recorded and kept near the ATM card (typically in the purse or wallet) in 72% of 437 incidents. PINs were actually written on the card in 6% of the incidents and were written and kept separate from card or purse in 7%. In 15% of incidents, the accountholder claimed that PINs were not written down.

Use of cameras

A photograph of the alleged offender was available in only 24% of the fraudulent incidents. Even when one was available, however, the alleged offender was identified in only 38% of the cases. Equipping all ATM's with cameras may not be a solution to ATM fraud because there appear to be many ways to "fool" the camera. Equipping some ATM's with cameras, on the other hand, may be cost-effective, because uncertainty regarding use of photographic equipment may encourage carelessness by potential offenders.

Extent of ATM loss

Potentially fraudulent ATM incidents may result in loss to the ● accountholder only (where claimed losses are denied in full by the bank);⁶ ● bank only (where bank claims are not recovered in full or bank waives accountholder partial liability);⁷ ● both accountholder and bank (where accountholder liability is limited or where bank claims against an accountholder are only partially recovered); ● neither bank nor accountholder (where, for example, recovery is made from a third party or stolen checks are deposited but no withdrawals are made).

Table 2 describes the average loss to the bank, accountholder, or both, resulting from potentially fraudulent ATM incidents. Losses exceeded \$2,500 per incident in about 1% of the sample.

Table 2 also describes the average number of transactions involved in each type of incident. The data show that multiple unauthorized transactions (3.6 on average) often occur in an incident, resulting in losses in excess of the daily ATM withdrawal limit.

Federal Regulation E

The vast majority of the 202 incidents in which both the accountholder and the bank sustained a loss involved Federal Regulation E. Federal Regulation E provides that accountholder liability is limited to \$50 (if card is reported missing within 2 days of discovery) or \$500 (if card is reported missing more than 2 days after discovery). In such cases the remaining part of the claimed loss must be covered by the bank. The average accountholder loss in this sample of 202 incidents was \$74, suggesting that missing cards were generally reported within 2 days of discovery. The data also indicate that in several instances banks did not press Regulation E liability in order to maintain good customer relations.

The 202 incidents of joint bank and accountholder loss include 182 incidents of lost or stolen cards. In 65% of these incidents, the report indicated that the personal identification number (PIN) had been kept on or near the card. Thus, accountholders might have sustained greater losses if liability had been assessed to reflect a negligent failure to conceal adequately the PIN.

Estimated nationwide ATM fraud loss

To estimate nationwide bank losses attributable to ATM fraud, the ratio of 1983 ATM fraud losses to the volume of ATM transactions (withdrawals and deposits) and the dollar value of ATM transactions were calculated for each

Loss incurred by:	Fraudulent incidents		Average loss to		Average number of transactions
	Number	Percent	Bank	Accountholder	
Neither bank nor accountholder	46	3.8	\$ 0	\$ 0	2.2
Accountholder only	369	30.3	0	255	3.5
Bank only	446	36.7	330	0	3.3
Both accountholder and bank	202	16.6	365	74	4.8
Unreported	153	12.6	—	—	—

panel bank.⁸ Nationwide ATM fraud loss estimates were then derived by applying these ratios to 1983 national estimates of the total number of ATM transactions and the total dollar volume of ATM transactions.

Table 3 shows the high, low, and median loss ratios in each category. (Average values for all panel banks combined are not shown since they obscure the wide variation between banks and may be misleading.)

Table 3 also describes the high, median and low estimates of total 1983 bank losses from ATM fraud calculated on the basis of the high, median, and low loss ratios. By way of explanation, the "high" ratio estimation represents the estimated loss that might be expected if all banks shared the characteristics and anticipated losses of the panel bank with the highest ratio of ATM fraud losses to the number or value of ATM transactions.

As banks vary widely in these characteristics, it is likely that total estimated fraud losses would be in a range close to median value estimates shown in table 3, or approximately \$70-\$100 million.

Comparison with credit card fraud loss

Current data indicate that the level of credit card fraud loss per transaction and per dollar volume exceeds comparable ATM losses. In 1983, for example, VISA reported a loss per transaction of \$0.081 and a loss per \$1,000 transaction volume of \$1.59. One possible explanation for these differences is that organized fraud, especially card counterfeiting operations, does not appear to be a problem in the ATM industry at this time. Additionally, more lenient withdrawal limits and a greater inability

to control "hot-carded" transactions may result in higher credit card losses. Overall, estimated nationwide losses for ATM fraud are considerably less than estimated losses for credit card fraud.⁹

WIRE TRANSFER FRAUD

Public concern over potential major EFT fraud loss is focused in the area of wire transfer. At this time, however, no formal recording mechanisms exist for the ongoing documentation of wire transfer incidents.¹⁰ Findings in this section are based, therefore, on data submitted by the 16 panel banks in response to a data collection instrument requiring description of all incidents occurring within the preceding 5 years. A total of 139 incidents were described by 12 of the 16 banks; 4 panel banks indicated that no incidents had occurred.

In light of data collection difficulties and of the potential for underreporting of undetected or embarrassing incidents, the data collected must be viewed as only a sample of total wire transfer incidents and cannot be used to estimate total wire transfer losses. The sample does represent, however, the largest single and systematic collection of data describing wire transfer incidents and should serve as a base-level resource for analysis of wire transfer incidents.

Type of incident

Table 4 describes the nature of the potentially fraudulent incidents reported. Reported incidents included cases where losses were actually sustained (columns A and C) or where similar acts resulted in exposure without actual loss (columns B and D)—where, for example, the bank success-

	Low	Median	High
Fraud loss ratios:			
Loss per transaction (withdrawal or deposit)	\$0.013	\$0.031	\$0.073
Loss per \$1000 of transaction volume	0.128	0.321	1.122
Nationwide fraud loss estimates:			
Based on estimate of 2.7 billion transactions in 1983 ^a	\$35.1 million	\$83.7 million	\$197.1 million
Based on estimate of \$262 billion in transaction volume in 1983 ^a	33.5	84.1	294.0

^a Source: See footnote 2.

fully recovered an erroneously credited payment prior to its withdrawal.

As shown, unintentional errors leading to loss or exposure occurred in 94% of the incidents, which far exceeded intentional fraudulent acts (6%). This confirms the hypothesis that intentionally fraudulent acts, although potentially costly, are quite rare. The nine intentionally fraudulent incidents clearly do not provide an adequate basis for meaningful analyses.

As table 4 shows, errors leading to potential fraud are generally clerical, committed by bank employees and related to the duplication or misrouting of messages and payments. Such inadvertent errors (which may involve a "typo," a misplaced digit or an erroneous currency conversion) may result in major loss (or, at the least, exposure to fraudulent loss) if recipients of erroneously credited payments abscond with the funds, claim that funds were legitimately "owed," or otherwise spend windfall receipts in alleged ignorance of the fund source. Recovery of such losses may be legally complex and costly.

Extent of exposure to loss

As shown in table 5, the average loss to which banks were exposed, per reported incident, was \$883,279. The maximum reported exposure level was over \$37 million. Although actual losses occurred in only about 56% of these incidents, the data confirm the high dollar value of potential wire transfer loss.

Table 5 also shows that the average loss to which banks were exposed was more than 50 times higher in those incidents in which no loss resulted. This is consistent with the view that, where exposure is large, all efforts are made by banks to recover funds and to thus eliminate the possibility of actual losses. This factor may also explain the seemingly low average level of net loss (\$18,861), which the data indicate occurred in incidents resulting in actual loss.

The magnitude of the difference in exposure levels among banks having a loss and those not having a loss, however, may also indicate that some incidents in which exposure resulted in large actual losses may not have been reported in the study.

Exposure time

As in the case of ATM loss, the longer the elapsed time between the incident leading to loss and the bank notification or discovery of the loss (exposure time), the greater the actual expected loss. As shown in table 5,

Table 4. Cause of wire transfer incidents

Incident	(A) Successful fraudulent transfer (N=4)	(B) Attempted fraudulent transfer (N=5)	(C) Error leading to fraudulent loss (N=71)	(D) Error leading to exposure without loss (N=59)
Cause of incident	100.0%	100.0%	100.0%	100.0%
Message duplicated	0.0	0.0	54.9	23.8
Message misrouted	0.0	0.0	5.7	30.4
Wrong amount	25.0	0.0	12.7	5.1
Entry to wrong account	0.0	0.0	8.4	13.6
Wrong currency	0.0	0.0	5.6	6.7
External collusion	25.0	60.0	0.0	0.0
Insufficient funds	0.0	20.0	0.0	3.4
Test word not validated	0.0	0.0	1.4	1.7
Misuse of ID/password	0.0	20.0	0.0	0.0
Data line compromise	0.0	0.0	0.0	1.7
Unreported	50.0	0.0	11.3	13.6
Incident caused by	100.0%	100.0%	100.0%	100.0%
Bank employee(s)	100.0	20.0	94.3	79.6
Corporate customer	0.0	0.0	0.0	8.5
Fund transfer network	0.0	0.0	1.5	3.4
Bank computer system	0.0	0.0	0.0	3.4
Individual customer	0.0	20.0	0.0	0.0
Unreported	0.0	60.0	4.2	5.1

Table 5. Exposure to loss in wire transfer incident

Incidents	Wire transfer incidents		Bank exposure			Average number of days of exposure
	Number	Percent	Minimum	Average	Maximum	
All incidents	134 ^a	100.0%	\$30	\$ 883,279	\$37,357,000	101
Incidents resulting in:						
Some bank loss	75	56.0	30	34,729	315,000	158
No bank loss	59	44.0	30	1,961,945	37,357,000	30

^aData unavailable on 5 reported incidents.

exposure time for incidents with some loss (158 days) was 5 times longer than that for incidents with no loss. This basically reflects the increased difficulty of recovering (or preventing withdrawal of) funds after longer periods of time.

Survey of attitudes toward wire-transfer fraud loss

Although available data do not permit estimates of actual wire transfer fraud levels, data obtained in a 1983 survey of bank officials describe current attitudes regarding the extent, cause and future likelihood of such wire transfer losses.¹¹

Estimates of the extent of current annual losses and the anticipated level of loss in 5 years are shown in table 6. As in the case of incidents reported by panel banks, it is reasonable to assume that incidents are infrequent and that major losses may not be fully reported. It is relevant, however, that average anticipated losses (\$39,548) exceed current net loss estimates (\$23,327) by 70%, reflecting a high level of concern among bank officials.

Table 7 describes survey respondents' views regarding the current and anticipated causes of wire transfer frauds. As shown, respondents indicate

that identified causes, and particularly those involving sophisticated technology, will have an increasing impact on wire transfer fraud.

The distinction between respondents whose institutions have and have not suffered prior wire transfer loss is shown in table 8. The data indicate that those institutions with no loss experience are more than twice as concerned about the contributions that the stated causes would make to wire transfer fraud than those with loss experience, most probably because those with loss experience know that certain steps could be taken to mitigate these causes.

Table 6. Wire transfer survey findings: Estimated current and anticipated annual wire transfer fraud loss

Loss	Low	Average	High
Loss estimates:			
Current annual net loss per bank ^a	\$100	\$23,327	\$215,000
Anticipated loss per bank in 5 years ^b	100	39,548	500,000

^aBased on 35 banks that sustained a loss.

^bBased on 28 banks that responded to this question and assuming that no new fraud prevention measures are adopted.

Methodology: A panel approach

In collaboration with the Association of Reserve City Bankers (ARCB), data in this study were collected from a panel of 16 ARCB member banks. Because few small financial institutions can justify extensive EFT systems, the study panel banks were intentionally selected from among the ARCB member banks, as they include some 200 of the largest commercial banks in the United States. Thus, whereas only 1% to 2% of all commercial banks have deposits exceeding \$1 billion, all but one of the panel banks have deposits greater than \$1 billion. Geographically, all regions of the country are included in the panel: the Northeast, Southeast, Midwest, Southwest, Rocky Mountain States, and Far West.

The panel banks themselves are not representative of all commercial banks, but their EFT operations can be considered to be somewhat representative of established EFT systems. In the ATM area, panel banks have had ATM systems for an average of 9 years. Additionally and on the average, each panel bank owns 146 ATM terminals and processes 4,300 transactions (i.e., withdrawals and deposits) a month, a figure close to the industry average. Twelve of the panel banks belong to a regional or nationwide ATM network; four do not. In the wire transfer area, the panel banks process from 400 to 28,000 transactions a day.

Confidentiality of all data associated with the survey is specifically protected under Department of Justice legislation and regulations.

Data collection focused on ATM and wire transfer activity. In the ATM area, a relatively large sample of potentially fraudulent incidents was identified, thus allowing for a detailed understanding of the nature and extent of ATM fraud. (The sample included every fifth reported incident.) In the area of wire transfer, the sample included all potentially fraudulent incidents identified by panel banks. Additionally, a questionnaire was used to survey wire transfer managers.

Although these data permit a general review of the nature of wire transfer fraud, no consistent data are available to estimate the extent of such fraud. The overwhelming reason for the disparity in available fraud-related data in these two technologies is compliance with Federal Regulation E—which, in addition to specifying limits on accountholder liability, requires that all ATM-related consumer complaints be formally processed.

Table 7. Wire transfer survey findings: Current and anticipated causes of fraud

Cause	Number of respondents	Percent respondents indicating that the stated cause:	
		Currently contributes to fraud and loss	Will in 5 years contribute to fraud and loss ^a
All causes	—	38.9%	50.8%
Call-back failure	45	53.3	71.1
Collusion (internal)	38	28.9	55.3
Collusion (external)	37	37.8	59.5
Data line compromise	39	25.6	43.6
Entry posted to wrong account	50	84.0	86.0
Insufficient funds	45	53.3	53.3
Message altered	42	26.2	40.5
Message duplicated	46	80.4	71.7
Misuse of password	44	29.5	38.6
Payment without proper I.D.	41	41.5	48.8
PIN compromised	36	25.0	36.1
Test key compromised	41	17.1	39.0
Unauthorized access to operation area	46	19.6	26.1
Unauthorized alteration of data base	36	22.2	41.7

^aAssuming no new fraud prevention measures are adopted in the interim.

Table 8. Wire transfer survey findings: Perceived causes relative to prior loss experience

Cause	Banks reporting prior loss		Banks reporting no prior loss	
	Number of respondents	Percent of respondents indicating that stated cause currently contributes to fraud and loss	Number of respondents	Percent of respondents indicating that stated cause currently contributes to fraud and loss
All causes	—	24.6%	—	51.8%
Call-back failure	30	33.3	22	72.7
Collusion (internal)	28	7.1	20	50.0
Collusion (external)	29	31.0	17	58.8
Data line compromise	28	0.0	21	47.6
Entry passed to wrong account	32	87.5	22	72.7
Insufficient funds	29	51.7	22	50.0
Message altered	30	6.7	21	47.6
Message duplicated	32	71.9	22	68.2
Misuse of password	30	16.7	22	50.0
Payment without proper I.D.	29	20.7	21	57.1
PIN compromised	27	3.7	20	45.0
Test key compromised	30	6.7	18	33.3
Unauthorized access to operations area	30	3.3	22	36.4
Unauthorized alteration of data base	28	3.6	22	36.4

Conclusion

Although loss from an individual wire transfer fraud is considerably greater than that from an ATM fraud, it should be recognized that there are many more fraudulent acts in ATM than in wire transfer. Consequently, the banking industry should have substantial concern with ATM fraud, especially as such acts affect a larger portion of the general public.

The rapid growth of EFT systems—fueled by advances in computer and communications technology and by competition resulting from a continuing deregulation of the banking industry—makes it critical to assess their risk-to-fraud on an ongoing basis. This is especially important, as EFT systems tend to complement each other's growth.

References

¹See K. W. Colton, J. M. Tien, S. Tvedt, A. L. Barnett (Public Systems Evaluation, Cambridge, MA), *Computer Crime: Electronic Fund Transfer*

Systems and Crime, Washington, D.C.: Bureau of Justice Statistics, NCJ-83736, September 1982. More recently, a general study of computer crime was completed by the American Bar Association's (ABA's) Task Force on Computer Crime—*Report on Computer Crime*, Washington, D.C.: June 1984. The ABA study, based on 283 responses to a survey mailing to approximately 1,000 private organizations and public agencies, revealed that high levels of loss were estimated for overall computer crime. Since only 16 of the ABA respondents represented the banking community however, the findings do not directly address the issue of EFT fraud.

²To the extent possible, 1983 estimates are based on trend analyses. These figures are lower than those estimated by one industry expert, L. F. Zimmer—"ATM 1983: A Critical Assessment," Bank Administration, May 1984. However, the estimates are probably higher than those estimated by another industry expert, H. S. Nilson—as documented by R. M. Garsson in "Two Consultants' Totals Vary for Nation's Teller Machine," *American Banker*, August 10, 1983.

³See Association of Reserve City Bankers (ARCB), *Risks in the Electronic Payment Systems: Report of the Risk Task Force*, Washington, D.C.: December 1983.

⁴For purposes of the survey, an "incident" is defined as an event resulting in a complaint by the accountholder. Accountholder complaints may be prompted by discovery of an apparent bank error or may arise in response to bank notification that some apparently improper transaction has occurred (e.g., bad deposit, overdraft check). For purposes of loss

estimation, a single "incident" includes all unauthorized transactions arising out of the initial event (e.g., multiple uses of a stolen ATM card).

⁵Incidents where potentially irregular transactions (e.g., mechanical failures, empty envelope deposits) were corrected by the accountholder or bank to avert loss were classified as nonfraudulent; this may underestimate the level of fraudulent incidents.

⁶Actual accountholder losses (if any) are difficult to ascertain where claims are denied (generally in cases of allegedly unauthorized transactions made while the card is held by the accountholder). For purposes of the study, accountholder losses (as shown in table 2) are based on the amount of unrecovered claims.

⁷Losses refer to direct payments to cover account-holder claims and do not include administrative, legal, or interest costs associated with processing or pressing ATM claims.

⁸Calculation of loss ratios was complicated by the fact that bank records frequently do not distinguish between ATM and other losses, between ATM fraud and other incidents, or between deposits/withdrawals and other nonfraud-related ATM transactions. Where panel banks were members of bank networks, efforts were also required to segregate transactions. Despite these difficulties, 12 of 16 panel banks provided relevant loss and transaction data with sufficient completeness to use for calculation of fraud loss ratios. ATM fraud loss tables could not be derived from a total of reported incidents because they constituted just a sample.

⁹In 1983, VISA reported \$113 million fraud loss (VISA Turning the Cards on Fraud, VISA San Francisco, California, Feb. 1984); Master Card reported \$65 million fraud loss (conversation with a spokesperson for Master Card, N.Y., N.Y., Feb. 13, 1985); fraud loss data from other credit cards (e.g., American Express, Diners, etc.) was not available to the study. However, the Nilson Report (Report No. 347, Los Angeles, Calif., Jan. 1985) estimates total credit card fraud loss at \$561 million.

¹⁰Errors or inquiries concerning wire transfer are usually kept on a log, while incidents requiring further investigation or legal action are described in note form and kept in folders that may be maintained by the bank's wire transfer manager, security office or audit and control office.

¹¹Questionnaires were distributed to 155 wire transfer managers and bank officials (one per bank) attending the 1983 Bank Administration Institute's Money Transfer Developments Conference. The overall response rate was 47%, although all respondents did not reply to all questions; about three-fourths of the respondents were wire transfer managers. In general, respondents represent major financial institutions (the volume of wire transfers per day was 2,072 on average and ranged up to 30,000; the average value of transfers was \$7.6 billion and ranged to \$110 billion). Almost half of respondents indicated a willingness to provide additional incident-based data in the future.

Bureau of Justice Statistics Special Reports are prepared principally by BJS staff under the direction of Joseph M. Bessette, deputy director for data analysis. This report was written by James M. Tien, Thomas F. Rich, and Michael F. Cahn, Public Systems Evaluation, Inc., Cambridge, Mass., and Carol G. Kaplan, chief, Federal statistics and information policy branch. The report was edited by Benjamin H. Renshaw, deputy director for management. Marilyn Marbrook, publications unit chief, administered report production, assisted by Millie Baldea, June I. Maynard, and Joyce M. Stanford.

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