Competitive Aspects of EFTS: Impact of
the Development of Remote Electronic
Banking Facilities on Minnesota's
Financial Institutions

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There seems little doubt that EFTS is a technological force that will significantly affect the financial environment of the United States in the near future. Although the potential impact of many EFTS developments is only vaguely discernible at this time, several of these developments may affect the public's perception of present financial institutions as well as their need for financial services. It is these altered perceptions that may ultimately change the present relationship between financial institutions.

It is the intent of this paper to examine the change in the competitive relationship between financial institutions which may result from certain EFTS developments.

The methodology chosen for this analysis is conditional forecasting. This technique is useful, since it allows several forecast sets to be compared on a relative basis. The forecast sets developed will be derived from several contingent environments. These contingent environments will be determined by a number of factors; among them, the policy actions of specified federal and state regulatory authorities will be most important, since it seems evident that they will greatly affect development of EFTS. Moreover, the purpose of these forecasts is not to exactly predict a specific future environment but to provide estimates of the magnitude of impact that certain EFTS developments may have on the relationship between financial institutions.

General Model

The general conditional forecasting model is described by three sets of parameters:

$$\text{Set } 1 = \{L_1, L_2, L_3, L_4, \ldots, L_n\},$$

$$\text{Set } 2 = \{M_1, M_2, M_3, \ldots, M_n\}, \text{ and}$$

$$\text{Set } 3 = \{N_1, N_2, N_3, \ldots, N_n\}.$$

Set 1 is composed of parameters that represent such items as federal or state laws or regulatory policies which determine the available types of financial institutions and the activities in which these institutions may engage. Set 2 is composed of parameters that describe the competitive relationship between financial institutions. Set 3 is composed of parameters that represent various EFTS developments: for example, the development of consumer bank communication terminals, the development of remote service units by savings and loan associations, the introduction of telephone banking, and any number of other events related to the development of an electronic payments mechanism.

In the general model the parameters of Set 3 could interact with the parameters of Set 1 and affect a change in the financial structure of the environment. These changes may occur through any number of events. An EFTS parameter--the development of remote electronic banking facilities, for example--could provide certain financial institutions with a mechanism through which they could circumvent state-established branching restrictions. Or introduction of another EFTS parameter--such as automatic prepayment of certain bills--could provide an electronic substitute for certain financial services that presently only select financial institutions are allowed to offer.

Similarly, the EFTS parameters of Set 3 could alter the competitive relationship between financial institutions represented by the parameters in Set 2; for example, some EFTS developments may allow certain financial institutions to offer services that enable them to compete for customers previously considered within the exclusive domain of other financial institutions. EFTS parameters could also affect how the competitive relationship among financial institutions is measured. One measurement, banking offices, could be altered by adding to the number of offices offering traditional financial services the number of offices where perhaps only certain electronic financial services are offered. Another measurement of competition, demand deposit balances, could be expanded if, along with traditional checking account deposits, savings accounts reserved for automatic payments were included in the total.

Since a large number of environmental changes could be produced from introduction of even a small number of parameters in Set 3 alone, several simplifications had to be made; that is, the general conditional forecasting model had to be reduced. And it is on this simplified or reduced model that all conditional forecasts in this study are made.

Reduced Model

The reduced model is based on several restricted parameter sets. Set 1 will include as parameters only those federal and state laws and regulatory policies which relate to EFTS. Thus, numerous items previously included in this set as parameters will now be included only as constants. These items include state-instituted branching regulations, state wild card laws governing the behavior of state chartered financial institutions compared to that of federally chartered financial institutions, and federal laws regulating the financial services offered by various

financial institutions. Further, the financial institutions considered are restricted to include only three types: commercial banks, savings and loan associations (S&Ls), and other financial institutions. This "other" category only includes mutual savings banks and credit unions, since Minnesota has only one mutual savings bank, and credit unions in the state, although numerous, are not a significant factor in the financial market. Further, the reduced model assumes that only commercial banks and S&Ls engage in or derive any benefits from the EFTS developments considered in this analysis.

Similar simplifications are made with respect to Set 3. The number of EFTS developments is limited to the introduction of remote electronic banking facilities by commercial banks and S&Ls. As a result of this limitation other important electronic banking services are excluded: for example, telephone banking and automatic prepayment of bills. This limitation is made because the impact of other EFTS developments on the financial environment pose measurement problems that are beyond the scope of this initial study.

Finally, restricting the parameters of Set 3 to one type of EFTS development eliminates the possibility of various changes in the parameters of Set 2 as happens in the general model. Thus, the measure of the competitive relationship between financial institutions will be assumed to be unchanged irrespective of what EFTS parameters are introduced into the environment.

For the reduced model, the measure of the competitive relationship between specified financial institutions is the variable market share of consumer savings.[1] This measure is chosen because in all likelihood

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[1] All components of the competitive relationship are defined fully in Appendix 1.

the EFTS developments considered will have their largest impact in the consumer or retail banking market and because consumer savings can be used to measure that market with a significant amount of comparability between financial institutions.

In determining market share of consumer savings as a measure of competition, two variables are considered important: the interest rate differential between S&Ls and commercial banks on consumer savings accounts (currently 25 basis points) and the convenience of location of financial institutions (that is, the number of office locations). But since the interest rate differential is determined by one of the federal and state laws and regulatory policies in Set 1, which is now regarded only as a constant, this variable can be disregarded. So the only variable actually determining the market share of consumer savings is the number of financial institution office locations.

Analysis

The most general specification of the competitive relationship between financial institutions can be written as

$$(1) \qquad MSCS = F(MSTO, \tilde{L})$$

where
  $MSCS$ = market share of consumer savings held by specific financial institutions,

  $MSTO$ = market share of total offices held by the same financial institutions,

  $\tilde{L}$ = a subset of legal and regulatory parameters, and

  F = an unspecified function.

For simplicity $\tilde{L}$ can be divided into two parts: $\tilde{L}_1$ and $\tilde{L}_2$. $\tilde{L}_1$ will contain those legal and regulatory parameters relevant to

EFTS-related developments, and $\tilde{L}_2$ will contain only those legal parameters that define the banking structure of a particular state, namely, statewide banking structure, unit banking structure, etc. $\tilde{L}_1$ will be used subsequently to define the contingent legal and regulatory environment. Therefore, (1) can be rewritten as

(1a) $MSCS = F^i(MSTO)$

where $i = \{u,s\}$,

          u = unit banking structure, and

          s = statewide banking structure

and subject to the constraint that the contingent legal and regulatory environment relevant to EFTS developments is to be specified separately.

In order for this relationship to be used as a part of the reduced conditional forecasting model, a further relationship has to be developed which can transform the group of electronic banking facilities into equivalents of the traditional office facilities presently operated by financial institutions in Minnesota. This relationship is given as

(2) $REBF = G(TOF)$

where $REBF$ = remote electronic banking facilities,

          TOF = traditional office facilities, and

          G = an unspecified function.

These two equations will form the forecasting basis for the reduced model.

With respect to (1) it is assumed that an adequate representation of the functional relationship is a simple linear model of the form

(1b) $MSCS^u = b_0^u + b_1^u MSTO$

          $MSCS^s = b_0^s + b_1^s MSTO.$

In order to specify the coefficients of this equation, regression analysis is used based on two data sets. The first data set includes market share of consumer savings and market share of total office for S&Ls operating in unit banking states. The second set includes the same type of data for statewide banking states.[2/] The derived coefficients from this regression analysis are given as[3/]

(3) $MSCS^u = 22.9\% + .8MSTO$[4/] $R^2 = .54$
          (4.77)   (3.33)

(4) $MSCS^s = 7.9\%* + 1.5MSTO$ $R^2 = .66.$
          (1.72)   (5.56)

These results indicate a relative advantage for S&Ls operating in unit banking states over S&Ls operating in statewide banking states. This advantage is particularly evident in the b_0 coefficient, which is approximately 15 percentage points higher in unit banking states than statewide banking states. This advantage is at least partially explained

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[2/]A complete listing of all data points in each set is provided in Appendix 2.

[3/]Two questions should be addressed at this point. First, are the two regression equations generated from the segmented data sets structurally different or would a single regression equation generated from the combined data sets be more appropriate? (For a discussion of this topic refer to Appendix 3.) Second, since the regression equations were constructed from cross-sectional data for a single time period, is there reasonable comparability between these equations based on U.S. data and Minnesota's historical experience? (For a discussion of this question refer to Appendix 4.)

[4/]The value of the t-statistic is shown in the parentheses beneath each coefficient in the equations. An asterisk next to a coefficient indicates that a coefficient is not significant at the 95 percent level of confidence.

by the ability of federally chartered S&Ls to place office locations without regard to state branch bank regulations.[5]

Prior to determining the functional relationship which can be used to measure the equivalence of remote electronic banking facilities relative to traditional banking offices, two simplifying assumptions are required because of the great lack of uniformity among remote electronic banking facilities. These are, first, that remote electronic banking facilities placed by commercial banks are approximated by detached automated tellers and, second, that the remote electronic banking devices placed by S&Ls are approximated by merchant-operated equipment like that placed by the First Federal Savings and Loan Association, Lincoln, Nebraska.[6]

A proxy variable is also substituted as a measure of the equivalence of these devices. This proxy variable measures the relative effectiveness of these specified electronic banking facilities to attract new deposits relative to traditional office facilities. This proxy variable is

(5) $$\frac{\text{Deposit Gain Remote Electronic Bank Facility}}{\text{Deposit Gain Traditional Banking Facility}} = \text{Equivalence Proxy}.$$

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[5] The Federal Home Loan Bank Board's statutes and regulations contain only one significant (although not inclusive) restriction to its policy regarding federal association branching. Section 556.5, subparagraph (2) of paragraph (b), specifies that a branch is to be in the same state as the home office and located within 100 miles of the association's home office. This 100-mile restriction may be waived given certain specified financial or legal conditions in a particular state.

[6] The electronic devices operated by First Federal Savings and Loan Association were chosen since they were some of the first operated by an S&L in the U.S. and data about their initial operation was readily available.

Using data gathered by the First Federal Savings and Loan Association, Lincoln, Nebraska, the relative effectiveness of remote electronic banking facilities is determined to be .45. Thus, a remote electronic banking facility is approximately one-half as effective as a traditional facility.[7]

Similar results are obtained using data collected by the National Association of Mutual Savings Banks.[8] From this data, remote electronic banking facilities--automated teller machines--have a relative effectiveness of .32 or are approximately one-third as effective as a traditional office facility.

So (2) can be rewritten as

(2a) $N = RE \times N'$

where N = equivalent number of traditional office facilities,

               N' = number of remote electronic banking facilities, and

               RE = relative effectiveness proxy.

The relative effectiveness, ranging from one-third to one-half, of these electronic facilities strongly suggests that these electronic

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[7]There were several shortcomings in using data collected by the First Federal Savings and Loan Association. First, the time period over which the data was collected was relatively short; thus the "novelty effect" of these devices on consumer banking patterns might tend to overstate the true, or long-run, average relative effectiveness. Further, concurrent with introduction of the devices were extensive promotional and premium campaigns. These effects, although they could not be isolated, may help to explain why the relative effectiveness of these remote electronic banking facilities was somewhat higher than predicted by the more general data collected by the National Association of Mutual Savings Banks.

[8]Linda Fenner Zimmer, "Cash Dispensers and Automatic Tellers," Savings Bank Journal, Vol. 56, No. 4 (June 1975).

banking facilities are effective substitutes for traditional facilities and are not merely replacements for tellers or other bank personnel.

Given this reduced model, two conditional forecast sets are developed. Conditional Forecast Set I examines the potential impact of the exclusive development of remote electronic banking facilities by S&Ls. Conditional Forecast Set II examines the potential impact from the combined development of these facilities by both commercial banks and S&Ls.

Conditional Forecast Set I

The Development of Remote Electronic Banking
Facilities by Savings and Loan Associations in Minnesota

The Federal Home Loan Bank Board (FHLBB) instituted a temporary regulation in January 1974[9/] permitting federally chartered S&Ls to establish a system for electronic funds transfer through remote service units (RSUs). Several important provisions of the regulation should be noted: RSUs are allowed to process deposits, withdrawals, and loan payments on established accounts. No new accounts may be opened at RSUs. Funds transfer must be effected through a card or equivalent identification device. Finally, the FHLBB may require sharing of an RSU among a number of institutions insured by the Federal Savings and Loan Insurance Corporation (FSLIC) subject to certain constraining provisions.

For this conditional forecast set, the legal aspects of RSU development by S&Ls in Minnesota are assumed to have the following structural parameters: The FHLBB regulation on RSU activity stands as issued. And Minnesota's state chartered S&Ls are also allowed to establish these facilities under existing or future enabling legislation (with similar service and locational restrictions as contained in federal regulations governing these facilities).

This set contains two conditional forecasts that describe the least and the greatest possible impacts of estimated RSU development on S&Ls' market share of consumer savings.

RSU developments are estimated by determining how many Minnesota institutions will develop these facilities as well as how many of these

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[9/] "Electronic Funds Transfer Through Remote Service Units,"
Title 12, Chapter V, subchapter C, Part 545--Federal Register, Vol. 39,
No. 126.

facilities will be developed by each institution. In analyzing the typical size of associations independently developing RSUs, it is determined that all associations which had developed or planned to develop RSUs have assets which rank them within the top 200 associations in the United States. Also, associations which are developing joint RSU projects have a combined asset size which ranks them in the top 200 institutions in the United States. Minnesota has five S&Ls in this top 200 ranking.[10/] Thus, five is our estimate of the greatest number of S&Ls in Minnesota likely to engage in independent RSU developments or serve as anchor associations in the development of a shared network of RSUs.

The likely number of RSUs developed by each of those five associations is also estimated from actual RSU development within the United States. From available information filed with the FHLBB, it is determined that on average each of the five S&Ls would develop approximately 40 RSUs. Therefore, the greatest number of RSUs likely to be developed and maintained would be 200.

To estimate the lowest possible number of RSU developments in Minnesota, the total of all RSUs in place or firmly committed for development as of June 1, 1976, is used. As of that date, Minnesota S&Ls had developed or had committed plans to develop approximately 100 RSUs.[11/] This number is used as the lowest possible number of RSUs to be developed in Minnesota. It should be noted that no attempt is made to adjust these estimates to allow for the sharing of facilities among S&Ls.

[10/] Total assets as of 12/31/74.

[11/] As of 12/31/76, approximately 125 were in place in Minnesota.

The model structure developed for Conditional Forecast Set I, presented in Chart 1, assumes that the development of RSUs by S&Ls will not have a significant effect on Minnesota's banking structure; that is, Minnesota will continue to closely resemble the structure exhibited by unit banking states. This assumption seems justified in that state and federally chartered S&Ls in Minnesota can already branch, subject to certain restrictions. Therefore, the development of RSUs will not provide S&Ls a means of substantial additional competitive advantage in overcoming any legislative office placement restrictions. Thus, changes in S&Ls' market share of consumer savings will be determined by movements along the unit banking regression line. This model structure is summarized as

$$(6) \qquad \Delta MSCS_R = MSCS_R - MSCS_i$$

where $\Delta MSCS_R$ = change in S&Ls' market share of consumer savings due to RSU development,

$MSCS_R$ = S&Ls' market share of consumer savings subsequent to RSU development,

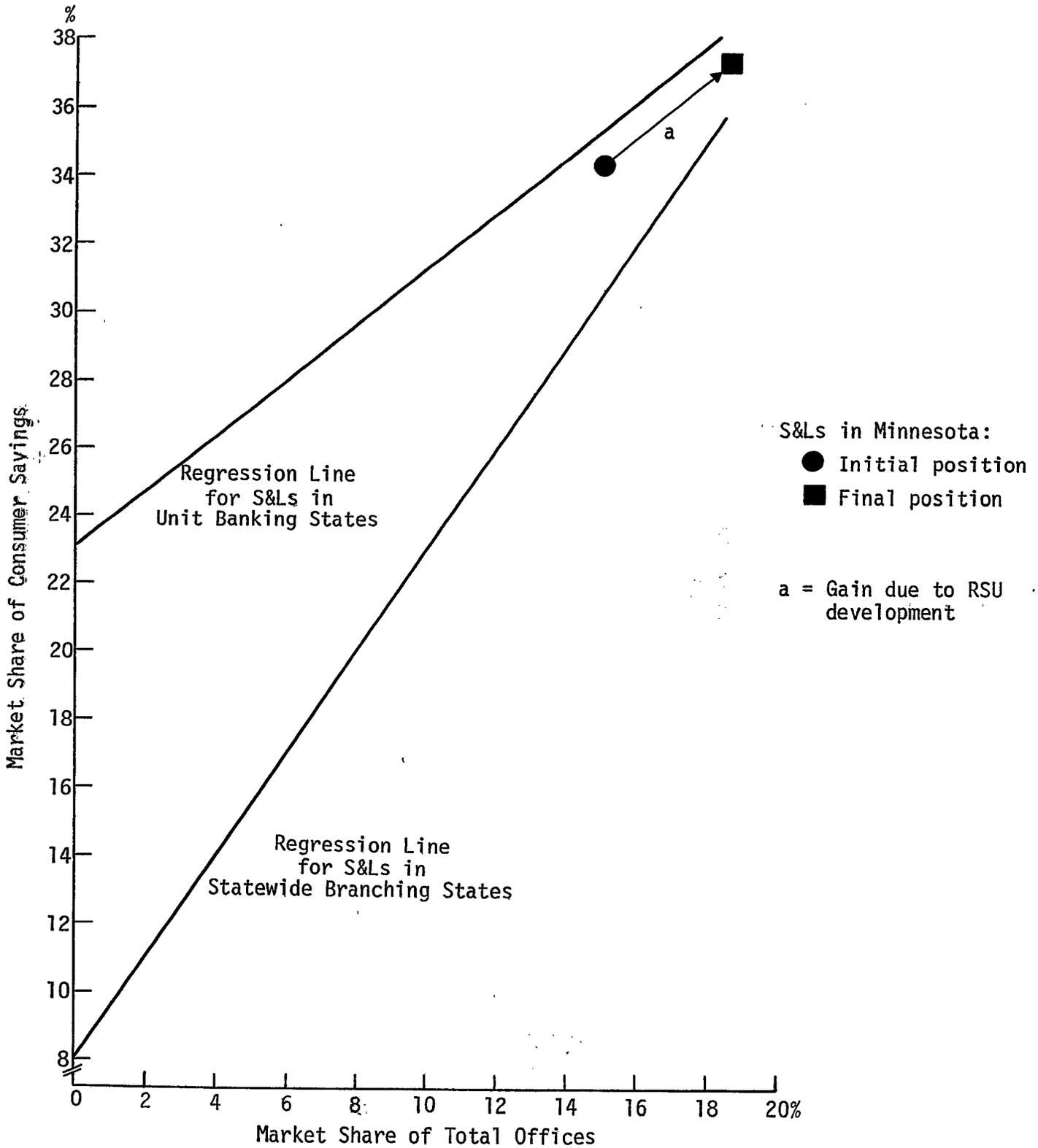$MSCS_i$ = initial S&Ls' market share of consumer savings,

$MSCS_R = b_0^{u'} + b_1^u [MSTO_i + \Delta MSTO_R]$,

$MSCS_i = b_0^{u'} + b_i^u MSTO_i$,

and b_1^u = slope of the regression line of unit banking states,

Chart 1

RSU CONDITIONAL FORECAST MODEL STRUCTURE (SET I)

Impact on S&Ls' Market Share of Consumer Savings and Total Offices

$b_0^{u'}$ = adjusted intercept for the regression line of

unit banking states,[12]

$MSTO_i$ = initial S&Ls' market share of total offices,

and

$\Delta MSTO_R$ = change in S&Ls' market share as a result of RSU

development.

Both conditional forecasts in Set I, the greatest-impact conditional forecast and the least-impact conditional forecast, are based on the same structural model. The least-impact conditional forecast measures the development of the smallest probable number of RSUs by S&Ls under the assumed structure. The greatest-impact conditional forecast measures the effects of the development of the largest number of RSUs by S&Ls under the same assumed structure.

Although the model structure and EFTS facility estimates totally determine the impact of these developments on a statewide basis, one other factor must also be considered before determining the impact of these facilities in specified geographic areas in Minnesota. This factor is the strategy used by a financial institution in the distribution of these devices throughout the state. For this analysis two placement strategies for remote electronic banking facilities are considered. First, these devices could be placed in accordance with the distribution of the total assets of commercial banks throughout the state. The motivation for this competitive strategy depends on which group of

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[12]For convenience (and given that the present relationship between Minnesota's S&Ls' market share of consumer savings and their market share of total offices is known with certainty), the structure models use a translated unit banking regression line; Minnesota is thus positioned exactly on the line.

Chart 2

CHANGES IN S&Ls' SHARE OF THE CONSUMER SAVINGS MARKET
AS A RESULT OF RSU DEVELOPMENT

Least ⬚ and Greatest ⬚ forecasts *

MINNESOTA   MINNEAPOLIS-ST. PAUL   OUTSTATE

*Least and greatest forecasts depend on the likely least and greatest number of electronic devices and institutions developing them and on Minnesota's financial structure.

The ranges possible within these forecasts depend on how well these devices attract deposits and by what strategy they are placed within the state (to compete with banks or S&Ls).

Table 1

HOW S&L DEVELOPMENT OF RSUs WILL AFFECT MINNESOTA'S CONSUMER SAVINGS MARKET

(Thousands of $ and % Share)

GEOG. DIV. / FIN. INST.	MINNESOTA COMMERCIAL BANKS	SAVINGS & LOANS	OTHER	MINNEAPOLIS-ST. PAUL COMMERCIAL BANKS	SAVINGS & LOANS	OTHER	OUTSTATE COMMERCIAL BANKS	SAVINGS & LOANS	OTHER	TOTAL STATE	MINNEAPOLIS-ST. PAUL	OUTSTATE
INITIAL ENVIRONMENT	7,707 / 56.8	4,647 / 34.2	1,227 / 9.0	3,415 / 44.2	3,284 / 42.5	1,027 / 13.3	4,292 / 73.3	1,363 / 23.3	200 / 3.4	13,581 / 100.0	7,726 / 56.9	5,855 / 43.1
GREATEST IMPACT — 1/3 — Assumption 1	7,482 / 55.1	4,872 / 35.9	1,227 / 9.0	3,289 / 42.6	3,410 / 44.1	1,027 / 13.3	4,193 / 71.6	1,462 / 25.0	200 / 3.4	same as above		
GREATEST IMPACT — 1/3 — Assumption 2	7,482 / 55.1	4,872 / 35.9	1,227 / 9.0	3,251 / 42.1	3,448 / 44.6	1,027 / 13.3	4,231 / 72.3	1,424 / 24.3	200 / 3.4			
GREATEST IMPACT — 1/2 — Assumption 1	7,372 / 54.3	4,982 / 36.7	1,227 / 9.0	3,227 / 41.8	3,472 / 44.9	1,027 / 13.3	4,145 / 70.8	1,510 / 25.8	200 / 3.4			
GREATEST IMPACT — 1/2 — Assumption 2	7,372 / 54.3	4,982 / 36.7	1,227 / 9.0	3,170 / 41.0	3,529 / 45.7	1,027 / 13.3	4,202 / 71.8	1,453 / 24.8	200 / 3.4			
LEAST IMPACT — 1/3 — Assumption 1	7,264 / 53.5	5,089 / 37.5	1,227 / 9.0	3,167 / 41.0	3,532 / 45.7	1,027 / 13.3	4,097 / 70.0	1,558 / 26.6	200 / 3.4	same as above		
LEAST IMPACT — 1/3 — Assumption 2	7,264 / 53.5	5,090 / 37.5	1,227 / 9.0	3,092 / 40.0	3,607 / 46.7	1,027 / 13.3	4,172 / 71.3	1,483 / 25.3	200 / 3.4			
LEAST IMPACT — 1/2 — Assumption 1	7,058 / 52.0	5,296 / 39.0	1,227 / 9.0	3,052 / 39.5	3,647 / 47.2	1,027 / 13.3	4,006 / 68.4	1,649 / 28.2	200 / 3.4			
LEAST IMPACT — 1/2 — Assumption 2	7,058 / 52.0	5,296 / 39.0	1,227 / 9.0	2,942 / 38.1	3,757 / 48.6	1,027 / 13.3	4,116 / 70.3	1,539 / 26.3	200 / 3.4			

Left-margin labels: ENVIRONMENT — INITIAL ENVIRONMENT — Relative Effectiveness of RSUs — Assumption — RSU CONDITIONAL FORECAST — GREATEST IMPACT — LEAST IMPACT

Chart 3

HOW S&L DEVELOPMENT OF RSUs
WILL AFFECT MINNESOTA'S CONSUMER SAVINGS MARKET

Least [::] and Greatest [▒] Impact on S&Ls' Market Share

financial institutions are placing the devices. S&Ls would be motivated

to engage in such a strategy to increase their industry's share of

financial assets at the expense of commercial banks; in this case, it

could be classified as a penetrative strategy.[13/] Commercial banks

would engage in such a strategy to maintain their industry's share of

financial assets from encroachment by other classes of financial insti-

tutions; in this case, the strategy could be classified as defensive.

Second, these devices could be placed in accordance with the distribution

of assets of S&Ls. This second strategy would be classified as a penetrative

strategy for commercial banks and a defensive strategy for S&Ls.

The results of this Conditional Forecast Set I are presented

in Table 1 for three geographic divisions: the state of Minnesota, the

Minneapolis-St. Paul area, and the outstate region of Minnesota.[14/]

Chart 2, a consolidation of these results, presents a range of values

that covers all likely outcomes of both forecasts for each geographic

division. The range is primarily determined by the assumptions concerning

the relative effectiveness of remote electronic banking facilities and

by the competitive strategy chosen to distribute these devices throughout

the state. For simplicity, this range is bounded below by the outcome

most favorable to commercial banks and bounded above by the outcome most

favorable to S&Ls. Chart 3 presents the results of Conditional Forecast

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[13/] In conjunction with a shift in financial assets from commercial
banks to S&Ls would be a shift of assets between institutions placing
these devices and those not placing these devices. This secondary
effect is not considered in this analysis.

[14/] The compositions of Minneapolis-St. Paul and the outstate
region of Minnesota are defined in Appendix 1.

Set I combined with the extrapolated historical trend.[15/] The trends

presented in Chart 3 should not be construed as a forecast of the future

environment, rather they should be viewed as a reasonable benchmark from

which to gauge the impact of EFTS developments.[16/]

[15/]Regression equations for all historical trends are given in
Appendix 6.

[16/]It is not intended that these historical extrapolations can
provide a timetable for EFTS developments, nor is it likely that these
past historical trends would continue unperturbed in the presence of any
EFTS developments in this area.

Conditional Forecast Set II

The Development of Remote Electronic Banking Facilities by Commercial Banks and Savings and Loan Associations in Minnesota

In December 1974 the Comptroller of the Currency issued an interpretive ruling which allowed national banks to establish remote electronic banking facilities, specifically, customer-bank communication terminals (CBCTs).[17/] CBCTs enable national bank customers to request the withdrawal of funds from the customer's deposit account or from a previously authorized line of credit and to instruct their banks to receive or transfer funds for the customer's benefit. The original interpretive ruling allowed banks to place CBCTs in unlimited numbers and without geographic limitations. But in May 1975 the original ruling was amended by the Comptroller.[18/] The most important revision was that a CBCT could no longer be located more than 50 miles from the nearest office of the bank installing the facility unless the CBCT was shared with a local financial institution.

The Comptroller's original ruling disregarded the restrictions contained in federal laws regulating branch banks and on this ground has been successfully challenged in the courts. For example, in June 1975 a U.S. District Court in Denver, Colorado, ruled that since a CBCT accepts deposits, it violates the National Bank Act and those Colorado laws which prohibit branch banking.[19/]

[17/] "Customer Banking Communication Terminals," *Federal Register*, Title 12, Chapter 1, Part 7, Vol. 39, No. 248.

[18/] "Customer Banking Communication Terminals," *Federal Register*, Title 12, Chapter 1, Part 7, Vol. 40, No. 97.

[19/] Other district courts have ruled in a similar manner. In October 1976 the U.S. Supreme Court refused to hear any appeals of these lower court decisions.

In Minnesota only one national bank, the Zapp National Bank, St. Cloud, installed a CBCT. This CBCT was opened in June 1976, but in July 1976 the Minnesota commissioner of banks requested the Zapp National Bank to close its off-premise CBCT. In October 1976, subsequent to the Supreme Court decision not to review the lower court decisions concerning CBCT development, the Zapp National Bank closed this facility.

In Conditional Forecast Set II the legal aspects of RSU and CBCT development by Minnesota financial institutions are assumed to have the following structural parameters: Both the FHLBB's regulation on RSU development and the Comptroller's revised interpretative ruling of May 1975 will be enforced without adjustment. Further, both state chartered banks and S&Ls, through existing or future Minnesota legislation, may establish remote electronic banking facilities that can offer substantially the same services and are subject to the same locational restrictions as CBCTs and RSUs.

This set contains two conditional forecasts. These forecasts will describe the least and the greatest possible impacts of the combined development of remote electronic banking facilities by commercial banks and S&Ls. The least-impact forecast assumes that both commercial banks and S&Ls develop a limited number of these devices and promote them in a cautious manner. The greatest-impact forecast assumes more aggressive development and more intense promotion of these devices by both commercial banks and S&Ls.

Estimates of the number of RSUs and CBCTs to be developed in Minnesota are derived independently; for example, the number of CBCTs is estimated without reference to actual or potential numbers of RSUs. The estimates for least and greatest RSU developments in this "combined"

Forecast Set II are the same as those derived in Forecast Set I. Since no significant CBCT development is presently underway in any unit banking state and no reliable surveys of planned CBCT developments are available, an estimate of the potential number of CBCTs has to be developed.

As noted previously, S&Ls operating in unit banking states seem to have an inherent advantage over those operating in statewide banking states. And this inherent advantage may be partially explained by the inability of commercial banks to branch or place offices in unit banking states without major locational restrictions, while S&Ls have only limited locational restrictions with respect to branching. S&Ls' mean market share of consumer savings and total offices is larger in unit banking states than in statewide banking states: 37.1 vs. 31.0 percent of consumer savings and 17.0 vs. 14.9 percent of total offices.

This difference in S&Ls' mean market share of total offices between unit banking states and statewide banking states is used as a first approximation to the potential loss of S&Ls' market share of total offices in Minnesota which might be the result of CBCT development by commercial banks in unit banking states. This relationship is summarized by

(7) $$MSTO_i - MSTO_c = \mu_u - \mu_s$$

where

$MSTO_i$ = Minnesota S&Ls' market share of total offices prior to CBCT development,

$MSTO_c$ = Minnesota S&Ls' market share of total offices subsequent to CBCT development,

μ_u = S&Ls' mean market share of total offices in unit banking states, and

μ_s = S&Ls' mean market share of total offices in statewide banking states.

Using (7) and the difference between the mean market share of total offices and the number of offices of financial institutions in Minnesota, the potential number of CBCTs to be developed by Minnesota banks can be determined.[20] The estimation is that between 440 and 660 CBCTs would be operated by commercial banks in Minnesota. It should be emphasized that this is only a first approximation, since the analysis assumes all banks in Minnesota to act as independent entities and makes no adjustments for the state's extensive multibank holding company structure. Also, sharing of CBCTs among commercial banks is not explicitly

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[20]

Given

N' = estimated number of CBCTs developed in Minnesota,

N = the increase in equivalent traditional offices in Minnesota caused by the development of CBCTs by commercial banks,

RE = relative effectiveness of remote electronic banking facilities with respect to traditional banking offices,

TO_i^A = total traditional offices for all Minnesota financial institutions prior to CBCT development,

$TO_i^{S\&L}$ = total traditional offices for Minnesota S&Ls prior to CBCT development,

$MSTO_i$ = Minnesota S&Ls' market share of total offices prior to CBCT development,

μ_s = S&Ls' mean market share of total offices statewide banking states, and

μ_u = S&Ls' mean market share of total offices unit banking states,

then

$$\frac{TO_i^{S\&L}}{TO_i^A + N} = MSTO_i - (\mu_s - \mu_u)$$

or

$$N' = \left[\frac{TO_i^{S\&L}}{MSTO_i - (\mu_s - \mu_u)} - TO_i^A\right] \times RE^{-1}.$$

considered. The distribution of the estimated CBCTs throughout Minnesota
as a result of various placement strategies is summarized in Table 2.

The model structure for the combined least-impact conditional
forecast of Set II, presented in Chart 4, assumes that development of
remote electronic banking facilities will not have a significant impact
on Minnesota's banking structure; that is, Minnesota will continue to
closely resemble the structure exhibited by unit banking states. Therefore,
changes in S&Ls' market share of consumer savings resulting from changes
in their market share of total offices are estimated from movement along
the regression line for unit banking states. This model is justified on
the grounds that both commercial banks and S&Ls place only a minimal
number of these devices and that their promotion of them is limited.
The least-impact conditional forecast model can be summarized as

$$(8) \qquad \Delta MSCS_{RC_L} = \Delta MSCS_{C_L} + \Delta MSCS_{R_L}$$

where

$\Delta MSCS_{RC_L}$ = change in S&Ls' market share of consumer savings due to RSU and CBCT development,

$\Delta MSCS_{C_L}$ = change in S&Ls' market share of consumer savings due to CBCT development,

$\Delta MSCS_{R_L}$ = change in S&Ls' market share of consumer savings due to RSU development,

$\Delta MSCS_{C_L} = b_0^{u'} + b_1^0 [MSTO_i + \Delta MSTO_C] - MSCS_i$,

$\Delta MSCS_R = b_0^{u'} + b_1^u [MSTO_i + \Delta MSTO_{R_L}] - MSCS_i$,

$MSCS_i = b_0^{u'} + b_1^u MSTO_i$,

b_1^0 = slope of the regression line for unit banking states,

$\Delta MSTO_C$ = S&Ls' market share total offices subsequent to CBCT development,

$b_0^{u'}$ = adjusted intercept of the regression line for unit banking states,

$\Delta MSTO_{R_L}$ = change in S&Ls' market share total offices as a result of RSU development,

$MSTO_i$ = S&Ls' market share total offices prior to RSU or CBCT development, and

L = least-impact forecast.

Set II's least-impact forecast is then constructed by combining estimates of the smallest probable development of remote electronic banking facilities with the above model structure. (For the convenience of the reader the impact of the development of CBCTs by commercial banks on the market share of S&Ls is isolated and presented in Table 3.)

The results, presented in Table 4, cover a range of values depending on what one assumes about the relative effectiveness of these devices and on which strategies commercial banks and S&Ls choose for distributing the devices throughout the state.

A consolidation of Table 4 is presented in Chart 5. The ranges of values for the forecast in Table 3 are bounded above by the outcome most favorable to S&Ls and bounded below by the outcome most favorable to commercial banks.

Chart 6 presents the results of the combined least-impact forecast in Set II together with the extrapolated historical trend. The interpretation of this chart is subject to the same restrictions indicated in Forecast Set I.

The model structure for the combined greatest-impact forecast in Set II is also presented in Chart 4. For the greatest-impact conditional forecast it is assumed that the banking structure in Minnesota will more

Chart 4

COMBINED RSU & CBCT CONDITIONAL FORECAST MODEL STRUCTURE (SET II)
Impact on S&Ls' Market Share of Consumer Savings and Total Offices

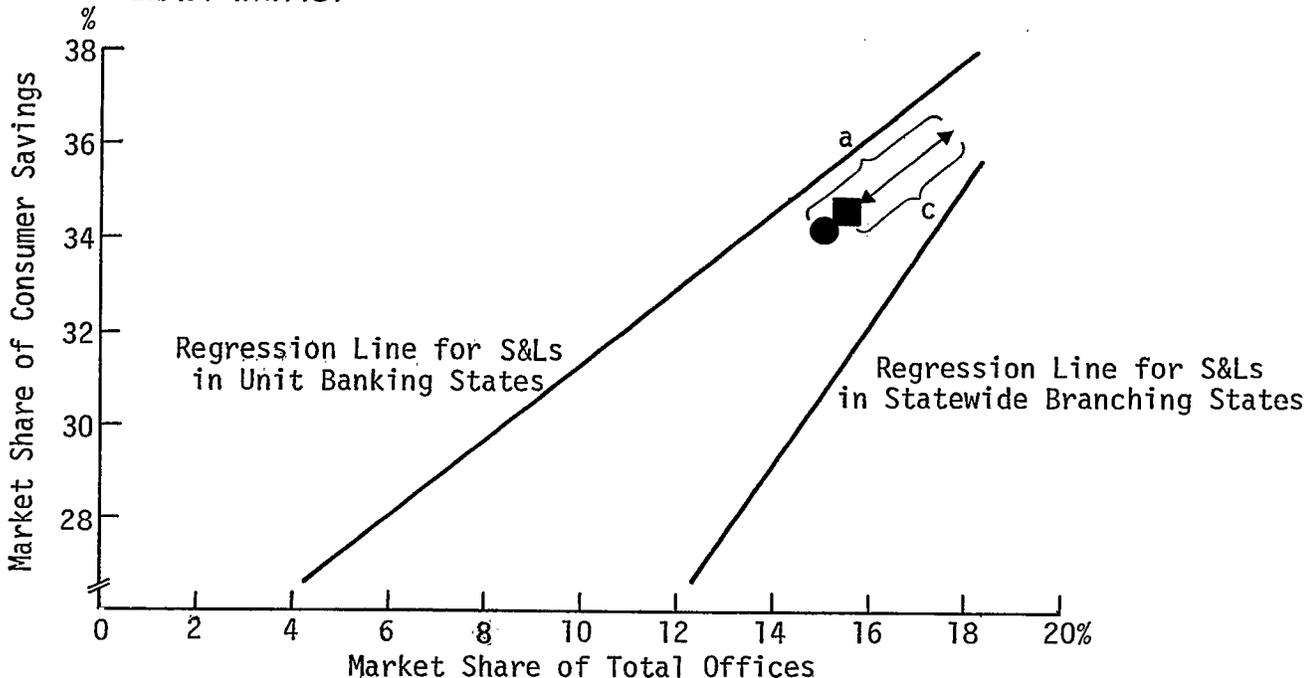S&Ls in Minnesota:

● Initial position

■ Final position

a = Gain due to RSU development

b = Loss due to change in state banking structure

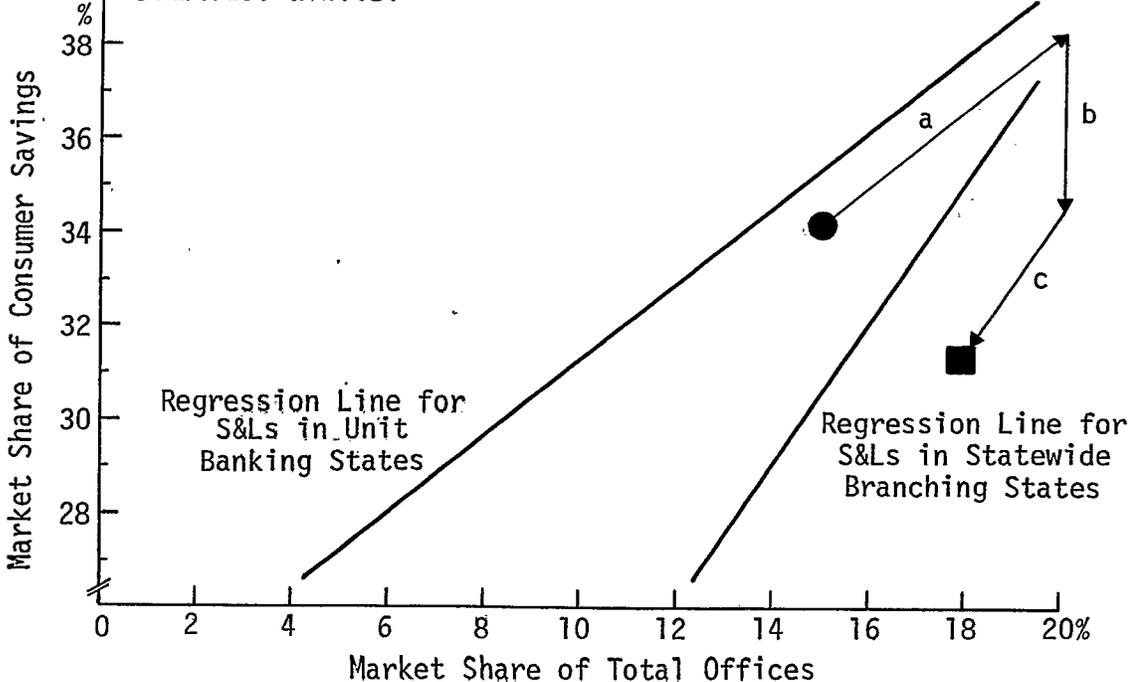c = Loss due to CBCT development

LEAST IMPACT

GREATEST IMPACT

Table 3

HOW COMMERCIAL BANK DEVELOPMENT OF CBCTs WILL AFFECT
S&Ls' SHARE OF MINNESOTA'S CONSUMER SAVINGS MARKET

(Thousands of $ and % Share)

CBCT CONDITIONAL FORECAST		GEOG. DIV. / ENVIRON.	MINNESOTA	MINNEAPOLIS-ST. PAUL	OUTSTATE
		INITIAL ENVIRONMENT	4,647 / 34.2	3,284 / 42.5	1,363 / 23.3
LEAST IMPACT	Assumption 1		4,413 / 32.5	3,153 / 40.8	1,260 / 21.5
	Assumption 2		4,413 / 32.5	3,113 / 40.3	1,300 / 22.2
GREATEST IMPACT	Assumption 1		3,694 / 27.2	2,750 / 35.6	944 / 16.1
	Assumption 2		3,694 / 27.2	2,589 / 33.5	1,106 / 18.9

Table 2

ESTIMATED NUMBER OF CBCTs IN MINNESOTA AND POSSIBLE LOCATIONS

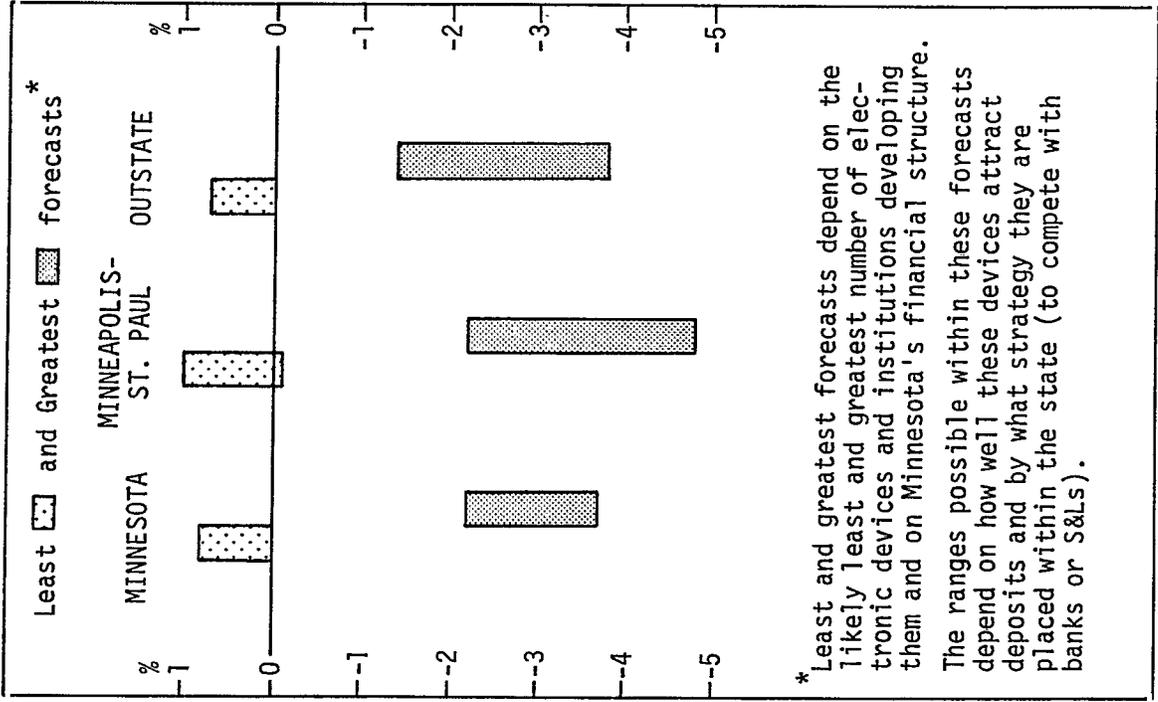| ESTIMATION PROCESS	DIVISION / VARIABLE DISTRIBUTION	MINNESOTA		MINNEAPOLIS-ST. PAUL		OUTSTATE	
		CBCTs	CBCTs PER BANK OFFICE	CBCTs	CBCTs PER BANK OFFICE	CBCTs	CBCTs PER BANK OFFICE
RELATIVE EFFECTIVENESS OF CBCTs = 1/3	TOTAL ASSETS OF COMMERCIAL BANKS	660	.8	367	2.7	293	.4
	TOTAL ASSETS OF SAVINGS & LOANS	660	.8	478	3.5	182	.2
RELATIVE EFFECTIVENESS OF CBCTs = 1/2	TOTAL ASSETS OF COMMERCIAL BANKS	440	.6	245	1.9	195	.3
	TOTAL ASSETS OF SAVINGS & LOANS	440	.6	319	2.3	121	.2

Table 4

HOW RSU & CBCT DEVELOPMENT WILL AFFECT
S&Ls' SHARE OF MINNESOTA'S CONSUMER SAVINGS MARKET

(Thousands of $ and % Share)

				MINNESOTA	MINNEAPOLIS-ST. PAUL	OUTSTATE
	INITIAL ENVIRONMENT			4,647 / 34.2	3,284 / 42.5	1,363 / 23.3
COMBINED CONDITIONAL FORECAST — LEAST IMPACT	Relative Effectiveness of RSUs 1/3	Assumption	1	4,638 / 34.2	3,279 / 42.5	1,359 / 23.3
			2	4,638 / 34.2	3,277 / 42.4	1,361 / 23.3
	1/2	Assumption	1	4,748 / 35.0	3,341 / 43.3	1,467 / 24.0
			2	4,748 / 35.0	3,358 / 43.5	1,393 / 23.8
GREATEST IMPACT	1/3	Assumption	1	4,137 / 30.5	2,998 / 38.8	1,139 / 19.5
			2	4,137 / 30.5	2,911 / 37.7	1,226 / 21.0
	1/2	Assumption	1	4,343 / 32.0	3,113 / 40.3	1,224 / 20.9
			2	4,343 / 32.0	3,061 / 39.6	1,282 / 21.9

Chart 5

CHANGES IN S&Ls' SHARE OF THE CONSUMER SAVINGS MARKET
AS A RESULT OF RSU & CBCT DEVELOPMENT

Legend: Least [▫] and Greatest [▨] forecasts*

MINNESOTA   MINNEAPOLIS-ST. PAUL   OUTSTATE

*Least and greatest forecasts depend on the likely least and greatest number of electronic devices and institutions developing them and on Minnesota's financial structure.

The ranges possible within these forecasts depend on how well these devices attract deposits and by what strategy they are placed within the state (to compete with banks or S&Ls).

closely approximate the structure of statewide banking states than of unit banking states after financial institutions are allowed to develop remote electronic banking facilities. Thus, the impact of S&Ls' loss of market share of total offices due to CBCT development by commercial banks will have a relatively larger effect on S&Ls' market share than would be the case if the unit banking structure were maintained. This change in market share of consumer savings caused by CBCT development will be measured by a movement along the regression line for statewide banking states.

This assumption is justified on the following basis: Remote electronic banking facilities have certain similarities to branches, although their impact on a given area or organization is not as great as that of a traditional office. Minnesota's banks operate under the additional constraint that they cannot branch; the state's S&Ls, however, may operate branches within limits. Thus, CBCT activity in Minnesota has a potential inherent advantage to commercial banks which may not accrue to S&Ls. Further, the 50-mile geographic limit imposed by the Comptroller's ruling is not a serious impediment to CBCT development given Minnesota's population distribution and the state's multibank holding company activity.

The model for the combined greatest-impact forecast of Set II can be summarized as

(9) $\quad \Delta MSCS_{RC_g} = \Delta MSCS_{R_g} + \Delta MSCS_{C_g} + \Delta MSCS_s$

where $\quad \Delta MSCS_{RC_g}$ = change in S&Ls' market share of consumer savings due to RSU and CBCT development,

$\Delta MSCS_{R_g}$ = change in S&Ls' market share of consumer savings due to RSU development,

$\Delta MSCS_{C_g}$ = change in S&Ls' market share of consumer savings due to CBCT development,

$\Delta MSCS_s$ = change in S&Ls' market share of consumer savings given a change in Minnesota's financial structure, i.e., from a structure similar to other unit banking states to a structure similar to other statewide banking states,

$$\Delta MSCS_{R_g} = b_0^{u'} + b_1^u[MSTO_i + \Delta MSTO_R] - MSCS_i,$$

$$\Delta MSCS_{C_g} = b_0^s + b_1^s[MSTO_i + \Delta MSTO_C] - MSCS_i,$$

$$\Delta MSCS_s = MSCS_i - MSCS_i^s,$$

$$MSCS_i^s = b_0^s + b_1^s MSTO_i,$$

$\Delta MSTO_{R_g}$ = change in S&Ls' market share of total offices due to RSU development,

$\Delta MSTO_{C_g}$ = change in S&Ls' market share of total offices due to CBCT development,

$MSCS_i$ = initial S&Ls' market share of consumer savings,

$MSCS_i^s$ = initial S&Ls' market share of consumer savings, assuming Minnesota had a banking structure similar to statewide banking states,

$MSTO_i$ = initial S&Ls' market share of total offices,

$b_0^{u'}$ = adjusted intercept for the regression line for unit banking states,

b_1^u = slope of the regression line for unit banking states,

b_0^s = intercept of the regression line for statewide banking states,

b_1^s = slope of the regression line for statewide

banking states, and

g = greatest-impact forecast.

The combined greatest-impact forecast is then constructed by putting together the estimates of the largest probable development of remote electronic banking facilities with the greatest-impact model structure above.

The results for Forecast Set II, presented in Table 4, are consolidated in Chart 5 and combined with the historical trends in Chart 6.

Chart 6

HOW S&L & COMMERCIAL BANK DEVELOPMENT OF RSUs & CBCTs
WILL AFFECT MINNESOTA'S CONSUMER SAVINGS MARKET

Least [ ] and Greatest [ ] Impact on S&Ls' Market Share
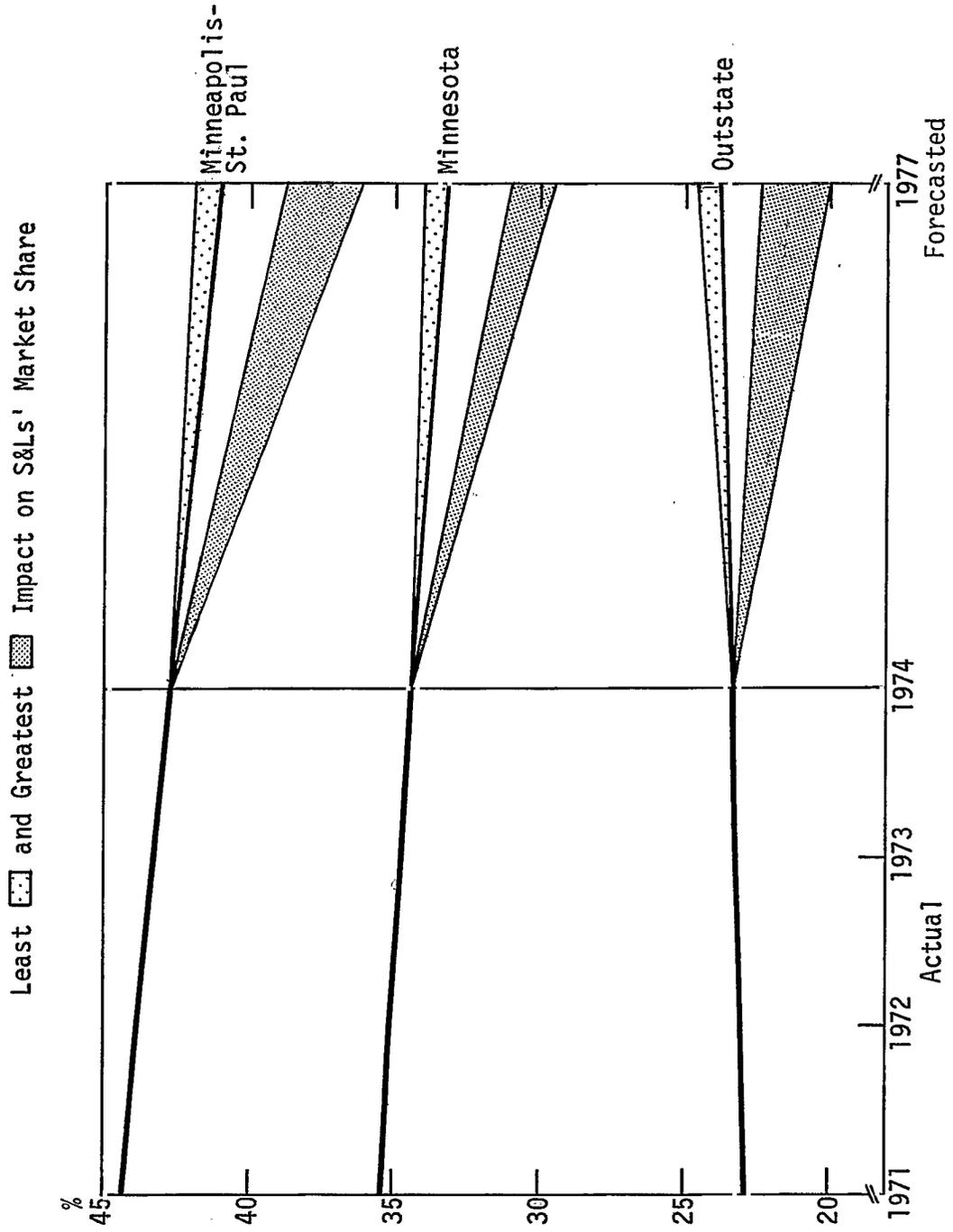
Conclusions

Two classes of conclusions can be drawn from this analysis: First, these remote electronic banking facilities are effective substitutes for traditional banking facilities (with respect to their relative abilities to attract deposits) and do not merely provide a new mechanism for the accomplishment of financial transactions previously performed by traditional bank or S&L personnel. Second, the impact that these devices will have on the financial structure of the state (summarized in Chart 7) is sensitive to the legal and regulatory environment which governs their development.

Thus, substantial competitive advantage may accrue to those classes of financial institutions which can develop remote electronic banking facilities on an exclusive basis. Further, changes in S&Ls' market share of consumer savings resulting from exclusive development may be significant, especially in comparison to the historical movements of the market shares of consumer savings held by various other financial institutions.

An environment that allows both commercial banks and S&Ls to develop remote electronic banking facilities will likely result in the most favorable outcome going to commercial banks. Thus, although S&Ls may gain a minimal increase in their market share of consumer savings, their limited potential gain is at risk in that other forecast assumptions within this environment imply an outcome where S&Ls may suffer a substantial reduction in their market share of consumer savings.

Appendix 1

DEFINITION OF VARIABLES

CONSUMER SAVINGS

Commercial Banks--Savings deposits and other time deposits, including

individual, partnership, and corporation (IPC) deposits,

for insured institutions.

Savings & Loan Associations--Savings capital for insured and noninsured

institutions.

Credit Unions--Savings deposits and savings shares.

Mutual Savings Bank--Savings and time deposits.

TOTAL OFFICES

Includes home offices, branches, and facilities.

Branch--Any branch bank, branch office, branch agency, additional

office, or any branch place of business at which deposits are

received, checks paid, or money lent.

Facility--Any office maintained by a bank acting as a depository

and financial agent of the federal government at military

bases or other government institutions for the purpose of

providing paying and receiving facilities for the personnel
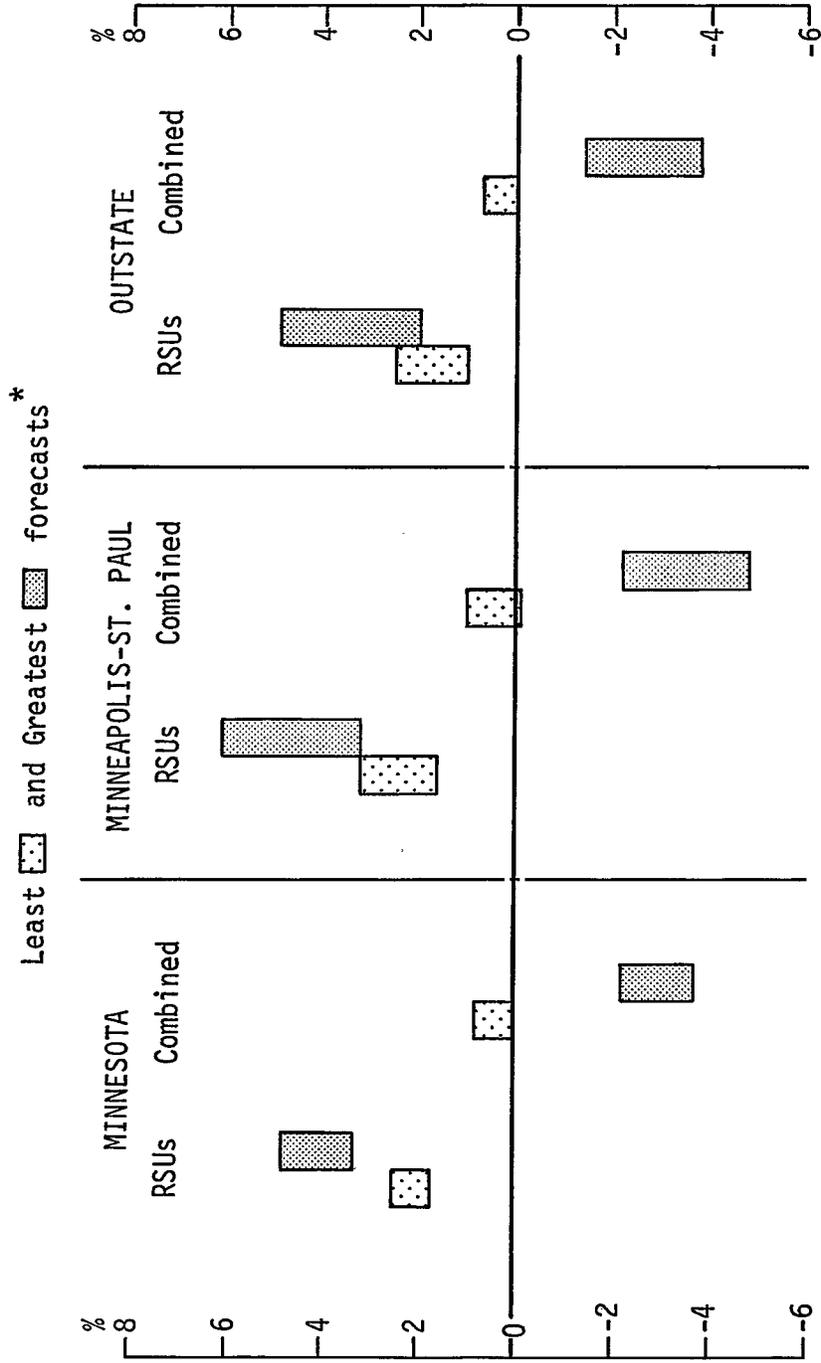
thereof.

STATE DIVISIONS

Minneapolis-St. Paul--Includes Anoka, Dakota, Hennepin, Ramsey, and

Washington counties.

Outstate Minnesota--Includes all counties in Minnesota not included

in the Minneapolis-St. Paul definition.

Chart 7

COMPARING THE CHANGES IN S&Ls' SHARE OF THE CONSUMER SAVINGS MARKET
UNDER THE TWO CONDITIONAL FORECAST SETS

Least [ ] and Greatest [ ] forecasts*

*Least and greatest forecasts depend on the likely least and greatest number of electronic devices and institutions developing them and on Minnesota's financial structure.

The ranges possible within these forecasts depend on how well these devices attract deposits and by what strategy they are placed within the state (to compete with banks or S&Ls).

Appendix 2

S&LS' MARKET SHARES IN UNIT BANKING & STATEWIDE BANKING STATES

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UNIT BANKING STATES

State	S&Ls' Market Share of Total Offices	Total Consumer Savings
Arkansas*	7.2%	36.2%
Colorado	32.9	48.0
Florida	36.2	60.4
Illinois	18.2	36.3
Iowa*	11.0	32.3
Kansas	7.1	43.3
Minnesota	15.0	34.1
Missouri	21.6	45.8
Montana	7.6	21.2
Nebraska	15.4	40.0
North Dakota	9.9	39.0
Oklahoma	14.3	33.4
Texas	30.0	37.8
West Virginia	8.9	13.0
Wyoming	3.9	27.8
AVERAGE	17.0%	37.1%

STATEWIDE BANKING STATES

State	S&Ls' Market Share of Total Offices	Total Consumer Savings
Alaska	10.1%	20.7%
Arizona	26.5	40.1
California	30.8	53.1
Connecticut	8.0	15.8
Delaware	7.9	7.5
Hawaii	26.2	39.0
Idaho	11.1	24.2
Maine	6.1	11.0
Maryland	26.0	40.7
Nevada	17.6	43.8
North Carolina	18.1	41.3
Oregon	20.0	44.2
Rhode Island	6.9	11.6
South Carolina	19.5	61.6
South Dakota	4.5	20.6
Utah	9.9	40.7
Vermont	3.4	8.7
Virginia	14.4	30.0
Washington	16.4	34.0
AVERAGE	14.9%	31.0%

*Excluded from analysis

Sources: Credit Union National Association, Inc., Federal Home Loan Bank Board, United States League of Savings Institutions, Federal Deposit Insurance Corporation, and National Association of Mutual Savings Banks

Appendix 3

ALTERNATIVE REGRESSION MODELS

The original regression model considered based on the combined data set was

(A:3:1) $MSCS = b_0 + b_1 MSTO + b_2 D$

where D is a dummy variable representing the banking structure of a given state, i.e., D=1—statewide banking states and D=0—unit banking states. This particular model was chosen, since it represents the most general case where the effects of the dependent variable market share of total offices and the banking structures are simultaneously considered when generating the regression coefficients. Using data from both unit banking states and statewide branching states, the following equation was determined

(A:3:1a) $MSCS = 16.9 + 1.18 - 3.51*D$ $R^2 = 58.$
　　　　　　　 (4.0)　 (6.1)　 (1.0)

Since the correlation coefficient for this model was only marginally higher than the correlation coefficient associated with the regression model in (3) and significantly smaller than the correlation coefficient associated with the regression model in (4) and since the structure variable of this model had a nonsignificant coefficient, this regression model based on the combined data sets was considered inappropriate.

Finally, the two independent regression models generated from the segmented data were tested for similarity in structure. In order to determine the similarity or dissimilarity of the regression models, the residual variances of the respective regression models $(\sigma^2_{y \cdot x})$ were tested for homogeneity by means of the two-tailed F-statistic. Using this statistic it was determined that the hypothesis, which assumed the residual variances were homogeneous, could be rejected at the 95 percent level of confidence. Given that the residual variances of the regression models were heterogeneous, future testing of the regression models with the Chow statistic was deemed unnecessary, and it was concluded that the regression models given in (3) and (4) were structurally different.

HISTORICAL REGRESSION MODEL--MINNESOTA

The following regression model was developed to explain historical trends for S&Ls' market share of consumer savings in Minnesota and to be used for comparison purposes with the cross-sectional model.

(A:3:1) $MSCS_M = b_0 + b_1 MSTO + b_2 T + b_3 [I_s^{S\&L} - I_s^{Com'l\ Banks}]$

$+ b_4 [I_t^{S\&L} - I_t^{Com'l\ Banks}]$

where   MSCS = S&Ls' market share of consumer savings,

MSTO = S&Ls' market share of total offices,

T = time period,

I_s = interest rate paid on savings deposits,

I_t = interest rate paid on time deposits, and

M   = Minnesota.

A correlation analysis was made on the variables in order to eliminate any multicollinearity between model variables. From the correlation analysis it was determined that the time and market share of total offices variables were highly correlated as were the variables representing interest rate differentials of time and savings deposits. As a result, one variable from each of the above sets was eliminated: the time variable and the interest differential of time deposits variable. Consequently,

(A:3:2) $MSCS_M = b_0^1 + b_1^1 MSTO + b_2^1 [I_s^{S\&L} - I_s^{Com'l\ Banks}]$.

The coefficients for this model were then derived by regression analysis from Minnesota data for the period 1967 to 1974. The results from this analysis are

(A:3:3) $MSCS_M = 26.9\% + 0.4 MSTO* + 6.87*[I_s^{S\&L} - I_s^{Com'l\ Banks}]$ $R^2 = .52$.
$\qquad\qquad\quad$ (6.11)   (1.67)   (1.72)

This regression model was then compared to the cross-section regression model for all unit banking states to determine if any significant differences existed for the two models for the relevant coefficients: b_0 and b_1. It was determined through use of the t-statistic that neither the constant coefficients 'b_0' or the coefficients of the market share total offices variable 'b_1' were significantly different between regression models at the 95 percent level of confidence.[†] Thus, it can be concluded that there exists reasonable comparability between the regression models based on cross-sectional data and the model constructed for Minnesota from time series data.

[†] $t = \dfrac{b_0 - b_0^1}{s(b_0 - b_0^1)} = .85$, where t(critical) = 2.1,

and $t = \dfrac{b_1 - b_1^1}{s(b_1 - b_1^1)} = 1.66$, where t(critical) = 2.1.

Appendix 5

DEVIANCE TEST—MINNESOTA

The deviance test was used to determine whether or not Minnesota should be considered atypical with respect to other unit banking states.

Two regression models were required for this test. The first model was the model derived from the full data set containing all unit banking states

$$MSCS_u = 22.9 + 0.8MSTO \qquad R^2 = .54.$$
$$\qquad (4.7) \qquad (3.3)$$

The second regression model is the model derived from the data set of unit banking states which excludes Minnesota

$$(A:4:1) \qquad MSCS_u' = 23.1 + 0.8MSTO \qquad R^2 = .51.$$
$$\qquad\qquad (4.50) \qquad (3.21)$$

The following hypothesis is then tested

$$H_0: \quad MSCS_{u'}(MN) - MSCS(MN) = 0$$

where $MSCS_{u'}(MN)$ = the true value of S&Ls' market share

at consumer savings based on the second

regression model, and

MSCS(MN) = the actual value of S&Ls' market share

of consumer savings.

Using the t-statistic, H_0 cannot be rejected.[*]

Thus, assuming Minnesota was drawn randomly from the sample (that is, the basis of choice was not Minnesota's deviance from the regression line), it could be concluded that the state head not be considered atypical with respect to all other unit banking states.

---

[*] $t = \left(\dfrac{MSCS_{u'}(MN) - MSCS(MN)}{S[MSCS_{u'}(MN) - MSCS(MN)]} \right) = .1$, where t(critical) = 2.1.

Appendix 6

HISTORICAL TRENDS---S&LS IN MINNESOTA 1971-1974

State of Minnesota

$$MSTO = 9.50\% + 1.31T \qquad R^2 = .97$$
$$\quad (19.79) \quad (7.41)$$

$$MSCS = 35.7\% - .32T* \qquad R^2 = .62$$
$$\quad (45.77) \quad (1.1)$$

Minneapolis-St. Paul

$$MSTO = 13.25\% + 2.52T \qquad R^2 = .96$$
$$\quad (13.90) \quad (7.2)$$

$$MSCS = 44.9\% - .56T* \qquad R^2 = .99$$
$$\quad (47.20) \quad (1.6)$$

Outstate Minnesota

$$MSTO = 7.95 + .71T \qquad R^2 = .56$$
$$\quad (36.14) \quad (8.88)$$

$$MSCS = 22.75 + .14T \qquad R^2 = .70$$
$$\quad (.18) \quad (.06)$$
$$\quad 12.6 \quad 2.33$$

MSTO = Minnesota S&Ls' market share of total offices.

MSCS = Minnesota S&Ls' market share of consumer savings.

T   = Time variable; T=1, 1971; T=2, 1972; T=3, 1973; T=4, 1974.