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# CHANGES IN THE PROVISION OF CORRESPONDENT-BANKING SERVICES AND THE ROLE OF THE FEDERAL RESERVE BANKS UNDER THE DIDMC ACT

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## ABSTRACT

This paper focuses on microeconomic incentives set in motion by Federal Reserve decisions about how to implement the reserve-requirement and pricing-of-service provisions of the Depository Institutions Deregulation and Monetary Control Act of 1980 (the DIDMC Act). These incentives promise to reshape the production and character of correspondent-banking services, the margin of jurisdictional competition between state banking regulators and the Federal Reserve System, and ultimately the regional structure of the Federal Reserve itself.

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# CHANGES IN THE PROVISION OF CORRESPONDENT-BANKING SERVICES AND THE ROLE OF FEDERAL RESERVE BANKS UNDER THE DIDMC ACT

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Although it is convenient to think of the Federal Reserve System as a unified agency, it is in fact a decentralized bureau with 50 offices. The Fed's so-called head office is the Board of Governors in Washington, D.C. The System's partly autonomous regional divisions consist of 12 district Reserve Banks, which coordinate in turn the work of 25 branches, 11 regional check-processing centers and a communications center. The Fed's decentralized structure was conceived originally as the solution to a political problem: quieting populist fears that the U.S. central bank would come to be dominated either by Wall Street (i.e., financial interests) or by Washington, D.C. (i.e., elected federal politicians).

Fear of centralized government has long since been overtaken by concern for accountability and cost-effectiveness in government activities. With this shift in national priorities, the political rationale for the Fed's decentralized structure has become inoperative. Over the last 50 years, just as the federal government consolidated its authority over the individual states, the Board of

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Governors asserted practical sovereignty over the 12 Reserve Banks. In the process, the justification for the Fed's regional structure moved quietly from the political to the economic dimension. In practice, Reserve Banks emerged as convenient facilities for organizing, producing, and delivering central-banking payments services. Administratively, this division of labor had the further advantage of freeing the Board and its staff to concentrate on the more-glamorous tasks of making macroeconomic and regulatory policy.

This paper points out that Fed decisions about how to implement the reserve-requirement and pricing-of-service provisions of the DIDMC Act —the semi-pronounceable acronym for the Depository Institutions Deregulation and Monetary Control Act of 1980 — now threaten to undermine even the economic justification for System decentralization. These decisions set in motion incentives that will encourage paper instruments used in regionally based local and within-district transactions to shift into collection channels outside the aegis of the Federal Reserve System, while encouraging regionally footloose and inter-regional transactions into electronic forms. As telecommunications make on-line bank-to-bank connections increasingly economical, concern for economy in government will eventually require politicians to consolidate the regional structure of the Federal Reserve System.[1/]

## Changes in Fed Powers and Responsibilities Mandated by the DIDMC Act

This paper concerns itself with Title I of the DIDMC Act. Although this section of the Act is known as the "Monetary Control Act," we argue that its provisions have more to do with depository-institution control and Federal Reserve independence than with monetary control per se. By empowering the Fed to set reserve requirements for all depository institutions, the Act extends the sphere of Federal Reserve control to cover more than 35,000 nonmember

depository institutions. At the same time, it imposes a series of new obligations on Fed officials. First, it mandates that Fed-produced correspondent-banking services be made available to any depository institution that wishes to use them. Second, it requires that Fed officials set explicit prices for these services. Finally, among its other provisions, this section of the Act specifically directs the Fed to recover all direct and indirect costs attributable to Federal Reserve float.

While other titles of the Act set up mechanisms for easing longstanding government restrictions on the competitive behavior of U.S. depository institutions, on balance this title is restrictive. Although it promises to reduce reserve requirements for member banks, it sweeps thousands of nonmember deposit institutions for the first time into the Fed's regulatory net. Henceforth, every depository institution that offers interest-bearing third-party payment accounts or nonpersonal time deposits must meet reserve requirements determined by the Fed.

Congress did not expand the Fed's reserve-requirement powers arbitrarily, without Fed support and connivance. In agreeing to extend the System's jurisdictional reach, Congress answered a long series of Federal Reserve Chairmen's prayers. The Fed high command had long complained that it lacked the statutory powers to arrest an uncomfortable secular decline in the number of member banks and in the percentage of total commercial-bank assets lodged in these banks. To persuade Congress that the Fed needed to extend its regulatory dominion, Fed officials repeatedly claimed that, in times of high market interest rates, deposit institutions and fund-raising techniques outside the Fed's direct span of control were increasingly able to blunt the anti-inflationary thrust of traditional forms of monetary restraint.

In the modern theory of regulation (Stigler, Posner, Peltzman, Becker, Kane, 1977 and 1981) the statutory configuration of economic regulation is determined by incumbent politicians' self-interest, as conditioned by their perception of the balance of political pressures for wealth redistribution. The Fed's membership problem and its new authority to place reserve requirements on nonmember deposit institutions are best viewed as stages in a larger dialectical process driven by economic and political arbitrage. Before Congress could seriously consider answering the Federal Reserve's prayers, it had to think through the political effects of alternative responses. Many different interest groups had a stake in the solution and would be affected quite differently by alternative regulatory adjustments. The issues in the distributional conflict focused on effects of alternative reserve-requirement structures on implicit federal revenue, on different classes of deposit institutions, on deposit-institution customers, on the regulatory domain of state banking departments, and on the political clout of the Fed itself. To appreciate the solution adopted in the DIDMC Act, we must understand the problems from which the Fed sought relief and the balance the Act strikes between opposing interests on each of the principal issues of distributional conflict.

To provide analytic perspective on the desirability of pricing the Fed's correspondent services, we begin by identifying the various components of the opportunity cost of Fed membership. During the 1960s and 1970s, secularly rising interest rates associated with accelerating inflation raised this cost, intensifying two kinds of competition: (1) between the Fed and state banking departments for regulatory jurisdiction over state-chartered banks, and (2) between the Fed and correspondent banks for interbank deposit balances.

While recognizing that the Fed's membership problem has political, monetary-control, and tax dimensions, in the final analysis member-bank departures

from the System symptomized a spillover into the market for correspondent-banking services of competition between the Fed and state-banking departments for regulatory jurisdiction over state-chartered banks. This paper focuses on how the compromises embodied in the DIDMC Act promise to reshape the market for correspondent-banking services, the competition between state banking regulators and the Fed, and ultimately the regional structure of the Fed itself.

## The Fed's Membership Problem: The Ultimate Determinants of Reserve Requirements

During the 1960s and 1970s, the steady loss of members posed two kinds of political and monetary-control problems for Fed officials (Kane, 1980). On the policy-selection front, the decrease in membership eroded the Fed's political base, undermining its ability to resist pressure from incumbent politicians pushing for inflationary policy actions.[2/] On the policy-execution front, fear of speeding up the ongoing deterioration in Fed membership made System officials slow both to raise its discount rate or existing reserve requirements and to extend reserve requirements or deposit-rate ceilings to emerging deposit substitutes (such as offshore funding) developed by member banks to compete for funds effectively in the face of monetary restraint.

### Reserve Requirements As a Tax

Declining membership in the Federal Reserve System traced to the impact of accelerating inflation (and the increasing nominal rates of interest this implies) on the costs and benefits of membership to individual banks and on the intensity of industry competition for correspondent balances and other customer funds. A definitive analysis of this process is offered by Benston (1978). Although Federal Reserve pronouncements determinedly emphasize the macro-

economic role reserve requirements play as devices for influencing growth paths of monetary aggregates, microeconomically they function as selective excise taxes on deposits that may also be interpreted as a form of implicit taxation on deposit-institution profits. If restrictions on an institution's ability to pursue profitable opportunities are binding, they take potential income from the institution and/or its customers by force of law. Revenues from the reserve-requirement tax and from the Fed's monopoly on currency issue accrue to the Fed in the form of the interest it earns by investing reserve balances in government securities. After meeting its expenses, the Fed turns most of its remaining income over to the Treasury. In 1979, the so-called Fed "interest payment to the Treasury" was $9.3 billion.

In implicit as well as in explicit taxation, analysts must distinguish between effective and statutory tax rates and recognize the role that penalties play in securing compliance. Fed officials have tight control only over the statutory structure of differential reserve requirements and may resort only to a limited set of nonretroactive civil sanctions to enforce them. Because it is relatively easy to dream up low-requirement (and even nonreservable) deposit substitutes and because reserve requirements can not be imposed on a new instrument until after recognition and administrative lags, the costs to member banks of avoiding reserve requirements are in the long run both low and predictable. Exemption from reserve requirements was particularly secure in cases (e.g., bankers acceptances and federal funds) where the Federal Reserve had proclaimed its desire to develop broad markets in the instruments involved (Eisenbeis, 1980). Through the process of substituting low-requirement liabilities for high-requirement ones, the response of deposit institutions, their customers, and unregulated competing institutions ultimately determines the effective structure of reserve requirements.

In a free society, a degree of voluntariness is inherent in every system of differential taxation. But before the DIDMC Act, member banks' option to withdraw from the Federal Reserve System added a second dimension to the voluntariness in the reserve-requirement tax system. Fed officials had to concern themselves with tracking and controlling the components of what we may call the "net disincentive to membership."

Components of the Membership Disincentive

Whether an individual bank should alter its membership status depends both on the balance of continuing costs and benefits that membership offers to it and on the transition cost of effecting a change in status. For national banks, the transition cost of becoming a nonmember includes the expense and trouble of switching to a state charter and the public-relations effects of removing "national" from the bank's name. No bank should become a member unless the balance of continuing benefits and costs is positive. Similarly, no bank should remain a member if the present value of continuing membership costs exceeds the sum of the transition cost and the present value of its continuing membership benefits.

Abstracting from transition costs, the net disincentive to membership may be described as a function of three sets of determinants:

1. Elements that determine the gross burdens of membership.
2. Service offsets to this burden that are offered by the Fed;
3. Opportunity costs of alternative forms of holding reserves.

The gross burdens of membership consist of two opportunity costs: the cost of holding Federal Reserve stock and the cost of conforming to the Fed's schedule of reserve requirements. In the short run, both costs vary directly with market rates of interest. The cost of reserve requirements also varies with the

distance between (1) Fed requirements and enforcement practices and (2) the reserve-requirement structure and penalties enforced by the banking commission in the bank's home state. Whether governed by Fed or state requirements, a bank systematically endeavors to lighten its reserve burden by exploiting opportunities to make advantageous adjustments in the composition of its liabilities and in the form in which it holds its reserves.

Offsetting the gross burdens of membership is the net value of the formerly "free" Fed correspondent services used by the bank. This value depends on the level and mix of the bank's particular service needs. Compared to fees charged for correspondent services by commercial banks, membership benefits have traditionally been thought to be of minor value to small banks.[3/] The value of the Fed's service offset is increased by improvements in the availability of transit items and reduced by explicit or implicit service charges set by the Fed. Before the DIDMC Act, the Fed's explicit service charges were zero. Implicit charges refer to the costs of complying with access-to-service provisions such as deadlines for depositing collection items and requirements that items be fine-sorted by destination. It includes the value to the bank of the option to borrow from the Fed's discount window and of any leverage that membership may confer with respect to the outcome of Fed regulatory decisions, particularly on holding-company and merger applications. Managers of large member banks believed that leaving the System would adversely affect the Board's future willingness to allow their banks to expand operations under the provisions of the Edge Act and the Bank Holding Company Act. Also, it is hard for nonmember banks to solicit much correspondent business from national-bank respondents (because national banks may place only a small percentage of their deposits in nonmember correspondent banks) and a few state-chartered banks may have believed that

membership helped them to garner favorable actions from the Board under the Bank Merger Act.

Finally, exogenous movements in the marginal opportunity cost of different forms of holding reserves affect both the optimal composition of a bank's reserve balances and its optimal liability structure. Increases in interest rates tend to raise the gross burden of membership for given reserve composition and liability structure and, by increasing the volatility of a bank's liabilities, to increase the level of implicit interest that can be earned on balances due from correspondent banks. Increases in implicit interest consist either of expansions in the quantity of services offered in exchange for a given level of deposits or of reductions in the level of supporting-balance requirements necessary to purchase a given level of correspondent services.

Why Fed Reserve Requirements Are Not A Redundant Policy Instrument

Fed officials have repeatedly testified about their concern for countering unfavorable trends in membership. This suggests that the agency's goal function includes, in addition to traditional indices of the state of the national economy, some index of membership penetration of the banking industry. Considered as an opportunity cost, the membership disincentive has a number of components, only two of which (service benefits and requirement structure) are directly controlled by the Fed. To counter unfavorable movements in membership penetration occasioned by increased interest rates, reductions in effective reserve requirements in individual states, or increased offers of implicit interest by correspondent banks, Fed officials must be prepared to adjust its offer of service offsets and its structure of reserve requirements.

The Fed's interest in stabilizing membership precludes it from treating reserve requirements as part of its permanent kit of macroeconomic instru-

ments. Except in the very short run, Fed reserve requirements are set in response to competition, i.e., by political and microeconomic forces largely beyond its control. Whenever the financial environment changes, self-interested actions by respondent banks, correspondent banks, and state banking commissions change the statutory structure of reserve requirements and offsets that is optimal from the Fed's own point of view. In long-run general equilibrium, the effective level of reserve requirements is market-determined.

Member banks' exit option restricted the Fed's ability to make statutory reserve requirements stick and put it inescapably into the correspondent-banking business. Before the DIDMC Act, in regulatory rule-making and in pursuing stabilization objectives, Fed officials dared not view member banks as a subservi-ent clientele. Because they had to compete for regulatory jurisdiction against state banking authorities and the FDIC, Fed officials have had to consider more closely than central bankers in other countries even the short-run benefits and costs their actions visit on individual commercial banks. This concern explains a number of distinctive elements in the framework of U.S. central-banking policy as schemes for paying implicit interest on bank reserves. I have in mind such regulatory details as the System's movement to a progressive structure of reserve requirements (including adjustments in the definition of what constitutes a "deposit"), its adoption and continued use of a macroeconomically counterproductive system of lagged reserve accounting, its adherence to a maximal two-day delay in the availability of uncollected items which forces the Federal Reserve to make interest-free loans to member banks, its creation of seasonal borrowing privileges, its discriminatory "surveillance" of individual-bank use of what in most phases of the interest-rate cycle have been subsidized opportunities for borrowing at the Fed discount window, and the substantial

recent expansion in the quantity and quality of the subsidized services it offers to member banks.

Notwithstanding textbook claims to the contrary, the Fed's statutory authority to set reserve requirements cannot, except at brief and infrequent intervals, be exercised arbitrarily. Decisions about the level and structure of reserve requirements are shaped by an interplay of economic and political forces that I call the "regulatory dialectic" (Kane, 1977 and 1981).

The Regulatory Dialectic

Accelerating inflation raises the opportunity-cost burdens imposed by statu tory banking regulation. When nominal interest rates rise, differential elements in pre-existing regulation inevitably open up opportunities for arbitrage. Incentives exist for financial institutions of all types to reconsider regulatory affiliation and to expand the production of nonreservable deposit substitutes. Whatever set of statutory requirements the Fed sets, deposit institutions, customers, and unregulated competitors must be expected to rearrange their accounts to optimize with respect to effective changes in their opportunity set. Avoidance activity includes actions taken by regulated institutions and their customers to minimize the effective burden of statutory requirements. The concept also covers induced invasions of regulated markets by nontraditional competitors.

The displacement of traditional banking business into new institutions and new contractual forms determines the structure of effective requirements and is subject itself to a subsequent round of statutory review and political counteraction. Regulatory avoidance typically makes some form of re-regulation politically optimal. Deposit institutions and customers that feel the net burden on them is too heavy would bring political pressure for statutory relief directly

and indirectly on Fed officials. This pressure would take the form of public-relations and lobbying activity aimed at building a coalition among Fed officials and incumbent politicians for an alternative regulatory strategy. On the other hand, political forces favoring a strategy of high effective reserve requirements would push for extending the reserve-requirement tax to nondeposit bank liabilities or to previously unregulated institutions. The statutory outcome of such lobbying activity inevitably kicks off fresh rounds of avoidance and re-regulation.

## Competition for Bankers Balances

Besides directly raising the opportunity costs of reserves, rising interest rates stimulate correspondent-bank competition for interbank balances. In recent years, to counter the effects of rising interest rates, Fed officials generally lowered statutory reserve requirements and expanded the supply of subsidized services for member banks. At the same time, they lobbied Congress for new powers, particularly for a system of universal reserves. Frustrated by legislative inaction, in 1978 FRB Chairman Miller went so far as to threaten that the Fed would on its own authority pay interest on member-bank reserve balances.

### Dimensions of Competition from Private Correspondents

In principle, respondent banks can purchase services from correspondent banks either by contracting to pay explicit service charges or by holding a deposit balance large enough to compensate the correspondent implicitly. In almost every state, reserve-requirement statutes count balances due from other banks the same as "cash." Some states count cash items in the process of collection (CIPC) and even marketable securities as well.

Balances due from correspondents have a dual productivity for nonmember banks. Paying for correspondent services with due-from balances allows a nonmember bank to earn implicit interest at the market rate on reserve balances required by its home state. On the supply side of the market, neither the Fed nor private banks could pay explicit interest on demand balances due to domestic banks. They had to compete by offers of implicit interest instead. In competitive markets, implicit interest payments would take the form of lowering fees and/or expanding the range of available correspondent services when and as the value to the correspondent of the customer bank's balances increase. The key point is that competition among correspondents for nonmember banks' due-from balances must assure that, in equilibrium, reserve balances would be as productive in risk-adjusted after-tax yield as vault cash or any earning asset. Supplier competition in the market for correspondent services must make due-from balances earn, at the margin, the going implicit rate of return. Moreover, responding to customer demands for transactions services and the structure of fees for robbery and burglary insurance, nonmember banks must adjust their holdings of vault cash until they earn the same implicit yield.

In markets where the Fed and private suppliers compete equally, the supply price of correspondent services — i.e., implicit or explicit supporting-balance requirements—should have been the same at the margin for each type of producer. To recognize that a wider array of services is available from private correspondents and available as well on more flexible terms,[4/] competitive pricing would require that supporting balances set by private suppliers slightly exceed reserve requirements established by the Fed. Types of deposits on which Fed reserve requirements exceed supporting requirements at private banks would be burdened by an implicit tax. On the other hand, deposits on which

correspondent supporting requirements greatly exceed Fed requirements would be receiving a net subsidy.

While the development of a longstanding membership problem guarantees us that the Fed was imposing a net tax on at least one type of deposit, it is not at all clear that its reserve requirements were burdensome across the board. Using the model and data set described in the next section, two colleagues and I estimated that in 1974-1975 Fed reserve requirements were uniformly burdensome only for time and savings accounts (Kane, Castner, and Peterson). As this account category loomed larger and larger on bank balance sheets, so did the size of the membership problem facing the Fed. In accord with our criterion for Fed reserve requirements to be competitive, correspondent requirements for due-from balances to support ordinary demand-deposit accounts at different sizes of banks prove to be slightly in excess of the statutory ratios set by the Fed. Finally, supporting-balance requirements on balances owed to other banks and to the U.S. Treasury greatly exceeded Fed reserve requirements. Our analysis indicates that these accounts were being subsidized.

As a sensitivity test, this quantitative pattern of supporting-balance requirements at private correspondents was confirmed for a parallel sample of member banks in unpublished regressions run for me by Federal Reserve Board personnel. Presumably, when acting as correspondents for other banks, member banks would channel much of their activity through their Fed accounts. Consistent with this presumption, supporting balances imposed on member-bank due-to balances (though slightly higher) proved much the same as those imposed on other demand deposits. In turn, estimates of supporting balances on other demand deposits and on time accounts were comparable to those found for nonmember banks. This supports the notion that the high working-balance

requirements observed for volatile deposits at nonmember banks reflects the rich menu of services that these accounts generate. It is also consistent with the view that, for banks located in states where CIPC is not counted as legal reserves, a high percentage of due-from balances may represent uncollected funds. Taken together, these hypotheses serve to reconcile our results with Benston's finding that Fed service subsidies to correspondent banks are shifted forward, so that the burden of membership falls "rather evenly" on banks of different deposit size (Benston, p. 55).

## Econometric Analysis of Implicit Pricing in the Market for Correspondent Services

Model of Working-Balance Requirements. Our analysis defines the ith nonmember bank's holdings of vault cash and due-from balances, $R_i$, as the working-balance equivalent of reserve balances recognized by the Fed (cf. Gambs). We hypothesize that nonmember banks vary their holdings of the reserve-eligible assets defined in their state's banking law to minimize the potential net burden of state reserve requirements. Our analysis focuses on respondent banks' individual response to exogenous demands for transactions services from depositors and exogenous prices for wholesale transactions services set in the correspondent-banking market. We assume that the volume of correspondent services that a nonmember bank demands varies inversely with the price of correspondent services and directly with market interest rates and its customers' aggregate deposit activity. Since neither customer service demand nor correspondent prices are directly observable, we resort to proxy variables.

We assume that the volume of correspondent and currency services purchased for deposit customers depends on the level and mix of customer deposit balances. To simplify the analysis, we distinguish just three categories of deposits:

1. "volatile" deposits, $D_V$, defined as the sum of interbank and Treasury accounts;
2. other demand deposits, $D_O$;
3. time and savings accounts, $D_T$.

Making use of Hicks' composite-good theorem, our choice of proxy for the price of correspondent and currency services can be justified by imposing the following identifying assumptions on wholesale and retail payments technology:

1. every class of accountholder is offered a specific mix of account services;
2. the volume of correspondent and vault-cash services offered to account holders is proportionate to the amount of deposits in each class.

Our analysis conceives of working-balance requirements on each type of deposit — $b_V$, $b_O$, $b_T$ — as a set of implicit prices appropriate for the mix of services demanded. These prices are determined exogenously by payments technology and by competition in the market for correspondent-banking services.

In our model, a nonmember bank adjusts its working balances, $R_i$, both to comply with state reserve requirements and to deliver a target level of transactions services to accountholders of each type. The bank's goal is assumed to be to maintain an exogenously targeted time path for deposits, given supporting-balance and currency requirements, and subject to exogenous changes in its reserve position and in the level of interest rates. Because of differences in state reserve requirements and variation in opportunity costs, the level of transactions services offered could vary systematically across banks and across time.

Respondent banks <u>supply</u> working balances, customers and correspondent banks <u>demand</u> them. Customers demand them indirectly by valuing the services

performed by these balances and correspondent banks directly demand due-to balances as an implicit price for performing correspondent services. We explained previously that correspondent-bank competition for nonmember-bank reserve balances makes them as productive at the margin as any other bank asset. To convert this intuitive argument into a partial-equilibrium model of respondent-bank portfolio equilibrium, we assume that $R_i^S$ shifts exogenously with a bank's current funding needs. We present the following conditional model of the $i^{th}$ bank's instantaneous supply of working balances, $R_i^S$:

$$R_i^S = \max ( \Sigma\, s_{ji} D_{ji},\ R_i^D | R_i^S ), \tag{1}$$

where $s_{ji}$ represents effective liquid-reserve requirements in the bank's home state on the $j^{th}$ class of deposits at the $i^{th}$ bank and $R_i^D | R_i^S$ represents customer and correspondent demand for working balances when $R_i^S$ is made exogenously available by bank i. As we have explained, working balances required by the bank's home state can only momentarily exceed working-balance demand. This is because the marginal return earned on the differential amount of working balances would be zero. Any level of working balances that takes its place as part of a respondent bank's equilibrium portfolio must lie simultaneously on the demand function for the bank's working balances, $R_i^D$.

If a random portfolio disturbance were suddenly to lift $R_i^S$ above the conditional demand for it, the bank would act immediately to raise its marginal return on working balances to the anticipated risk-adjusted, after-tax rate of return on other assets. To accomplish this, bank i would undertake two types of balance-sheet adjustments:

1. It would adjust its mix of liabilities (shifting its funding from high-$s_{ji}$ into low-$s_{ji}$ categories) and it would lower the effective $s_{ji}$ by expanding its holdings of reserve-eligible earning-asset substitutes for working balances;

2. It would transfer working balances from vault cash to due-from balances. Because of due-from balances' value to correspondent banks, competition among these banks forces due-from balances to earn the market yield.

Full portfolio equilibrium is possible only when $R_i^S = R_i^D | R_i^S$. Econometrically, this condition serves as an identifying restriction. If we assume that financial transactions costs are negligible for banks, the working-balance demand curve can be estimated by ordinary least squares.

Our most parsimonious model of working-balance demand neglects interest-rate effects. It expresses R as a linear reduced form in the exogenous variables $D_V$, $D_O$, and $D_T$:

$$R_i = a + b_V D_{Vi} + b_O D_{Oi} + b_T D_{Ti} + u_i. \qquad (2)$$

This model may be given an accounting interpretation. Within the sample of data from which its parameters are estimated, the slope estimates tell us the average level of supporting currency and due-from balances on each class of deposits. The intercept $\underline{a}$ represents the average amount of working balances explained by omitted variables, i.e., by nondeposit sources of bank demands for correspondent and currency services. $R_i$ is defined as the sum of the bank's balances due from other banks, $R_D$, and vault cash, $R_C$; $u_i$ represents a stochastic error term.

Richer models of the working-balance demand equation allow correspondent banks to vary working-balance requirements inversely with two other variables which are also assumed to be exogenous: (i) the individual bank's flow of funds in the process of collection (which serves as an additional source of liquid funds to suppliers of correspondent services), $CIPC_i$, and (ii) the opportunity cost of interbank balances as represented by the federal-funds rate, FFR. The expanded model is:

$$R_i = a + b_V D_{Vi} + b_O D_{Oi} + b_T D_{Ti} + cFFR + dCIPC_i + u_i. \quad (3)$$

In models where either c or d are nonzero, the supporting-balance requirements (the b's) themselves may be interpreted as functions of FFR or CIPC. Unlike possible simultaneity among $D_V$, $D_O$, $D_T$ and R (which would play havoc with identifiability), this issue can be examined by looking at ordinary-least-squares estimates of (3). Because estimates of equation (2) and (3) are subject to substantially richer types of simultaneous-equation and omitted-variable bias, it is pleasant to report that the only noteworthy effect of relaxing restrictions on c and d is to lower somewhat the estimate of $b_V$.

Interpreting the Slope Coefficients of (3).

1. The slope coefficients $b_V$, $b_O$, and $b_T$ represent the estimated values of the working-balance requirements imposed against the respective deposits. On the basis of the volatility of the underlying accounts and supposing marginal-cost pricing by correspondent banks, we expect each b to be positive, with $b_V > b_O > b_T > 0$.[5/]
2. The sign of the interest-rate coefficient c is ambiguous. On the one hand, it should reflect reductions in correspondent-bank requirements associated with increases in the opportunity cost of reserves. On this interpretation, c should be negative. On the other hand, as an indirect effect, high interest rates should also make customer deposits turn over faster, which would increase the amount of currency and clearing services to be performed for a respondent bank with a given deposit structure.
3. Many correspondents give depositing banks immediate credit for uncollected items (Knight, Melton). This practice would bias the b estimates upward (especially $b_V$) as compared to Fed requirements. Includ-

ing CIPC in our regressions may be interpreted as overcorrecting for this bias, letting d estimate the percentage of uncollected items customarily included in R. According to Gibert (1978), CIPC counts as part of a bank's primary reserves in 16 states. If R and CIPC were perfect substitutes in meeting balance requirements, d would equal minus unity.

This treatment constitutes an overcorrection because, where correspondents do not grant immediate credit, respondents' uncollected items generate funds for correspondents in advance of the time that they credit them to the depositing bank. Hence, suppliers of correspondent services should be willing to tie supporting-balance relief to a bank's CIPC volume. Giving a bank credit for its CIPC is a way that private correspondents can price their services advantageously vis-a-vis the Fed. This analysis leads to the restriction, $-1 < d < 0$.

The Data Set. As part of a joint Federal Reserve-FDIC study of the possibility of improving monetary statistics, the FDIC collected daily data on individual-bank reserve and deposit holdings between June 20, 1974 and May 7, 1975 for a sample of 181 large nonmember banks and between August 22, 1974 and May 7, 1975 for a supplementary sample of 396 small nonmember banks. The sampling frame defined a large bank as one that at yearend 1973 had total deposits of at least $100 million. The form that reporting banks employed is reproduced as Figure 1. The variables we have previously defined align with these reporting categories as follows:

R = sum of $R_D$ as entered in column (5) and $R_C$ in column (8).

$D_V$ = sum of entries in columns (1) and (2).

$D_O$ = entry in column (3).

FIGURE 1

FEDERAL DEPOSIT INSURANCE CORPORATION
550 17th Street, NW, Room 3004-C
Washington, D. C. 20429

# REPORT OF DEPOSITS AND VAULT CASH

NAME OF BANK AND LOCATION *(City and State)*

REPORT FOR PERIOD ENDING *(Complete date)*

*Wednesday,*

## DAILY CLOSING BALANCES *(IN NEAREST THOUSANDS)*

| | DATE *(Month and Day)* | DEMAND DEPOSITS | | | | | | CASH ITEMS IN PROCESS OF COLLECTION (4) | | DEMAND BALANCE DUE FROM BANKS (5) | | SAVINGS DEPOSITS (6) | | OTHER TIME DEPOSITS | | | | CURRENCY AND COIN (8) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | DUE TO BANKS (1) | | U.S. GOV'T DEMAND DEPOSITS (2) | | OTHER DEMAND DEPOSITS (3) | | | | | | | | DENOMINATIONS LESS THAN $100,000 (7A) | | DENOMINATIONS $100,000 AND OVER (7B) | | | |
| | | *millions* | *thou.* | *millions* | *thou.* | *millions* | *thou.* | *millions* | *thou.* | *millions* | *thou.* | *millions* | *thou.* | *millions* | *thou.* | *millions* | *thou.* | *millions* | *thou.* |
| Thursday | | | | | | | | | | | | | | | | | | | |
| Friday | | | | | | | | | | | | | | | | | | | |
| Saturday** | | | | | | | | | | | | | | | | | | | |
| Sunday** | | | | | | | | | | | | | | | | | | | |
| Monday | | | | | | | | | | | | | | | | | | | |
| Tuesday | | | | | | | | | | | | | | | | | | | |
| Wednesday | | | | | | | | | | | | | | | | | | | |
| **TOTALS** | | | | | | | | | | | | | | | | | | | |

*I CERTIFY THAT THE REPORTED CLOSING BALANCES ARE CORRECT FOR THE ABOVE DATES.*

AUTHORIZED SIGNATURE

TITLE

TELEPHONE NO. *(Include Area Code and extension)*

## DEFINITIONS

| REPORT COLUMN | CORRESPONDING ITEMS ON REPORT OF CONDITION | ADDITIONAL DEFINITION |
|---|---|---|
| 1. Demand Deposits Due to Banks | Schedule E *(items 1, 7, and 8)* | |
| 2. U.S. Gov't Demand Deposits | Schedule E *(item 4)* | Includes balances in Treasury tax and Loan Account and Series E Bond Account |
| 3. Other Demand Deposits | Schedule E *(items 2, 5, 6, and 9)* | |
| 4. Cash Items in Process of Collection | Schedule D *(item 1)* | |
| 5. Demand Balances Due from Banks | Schedule D *(item 2)* | |
| 6. Savings Deposits | Schedule F *(item 1 and part of item 4)* | Includes Christmas savings, vacation club and similar accounts that are covered in Schedule F, item 4 |
| Other Time Deposits* 7a. Denominations Less than $100,000 | Schedule F *(items 3, 4, 6, 7, 8, 9, and 10) (excluding part of item 4)* | Excludes Christmas savings, vacation club and similar accounts that are covered in Schedule F, item 4 and that are reported in Column 6. Include both single and multiple maturity accounts and instruments. Include both negotiable and nonnegotiable instruments issued to any holder. |
| 7b. Denominations $100,000 and Over | | |
| 8. Currency and Coin | Schedule D *(item 5)* | |

**Deposits accumulated for payment of personal loans* (Schedule F, item 2) *are not covered by this report.*

***If not open, repeat balances for the most recent open day.*

Any questions regarding this report should be directed to the Division of Research: (202) 389-4331.

IMPORTANT: This report is to be submitted on the first business day following the close of each reporting period.

FDIC 8020/42 (8-74)

$D_T$ = sum of entries in columns (6), (7A), and (7B).

CIPC = entry in column (4).

Since the FDIC survey developed over 150,000 readings on 9 variables (46 weeks x 7 days x an average of roughly 500 banks), checking the accuracy of the data was a difficult task. Our primary safeguard against misreported data was to delete every observation that showed a negative entry in any column. Also, besides using CIPC as a regressor in some runs, our study used CIPC values as a screen for editing out defective reports and as a way to eliminate a particular class of reporting errors. Sample banks that reported zero figures in this column are presumed to be mistakenly including "cash items" in collected balances due from other banks (see Knight).

It took almost three years and three research assistants to compile a satisfactorily edited tape of survey responses. Disaggregating our sample — over time and across banks that differ in size or are located in states with different reserve-requirement frameworks — uncovered additional evidence of measurement error and nonresponse. The number of banks responding to the FDIC survey varied from week to week and declined on average during the life of the survey. The FDIC never established a mechanism for policing responses. Less than half of the large nonmember banks in the sample (74 out of 181) filed an accurate report every week, although 69 of the other large banks missed no more than a few weeks. However, only 255 of the 396 small banks reported with reasonable regularity and accuracy. Rather than introduce extraneous gaps or extrapolations, we decided to ignore irregular and inaccurate respondents. Also, because Saturday and Sunday observations were not reported consistently, it seemed wise to restrict ourselves to Monday-through-Friday data.

Two problems developed in disaggregating the data over time. First, four weeks of data for January 1975 unaccountably failed to be punched and read onto

the project tape. Second, splicing small banks into the sample in August 1974 presented awkward problems, which we handle by explicitly testing for a common structure between small and large banks in the subset of weeks in which both groups were surveyed. Since banks' demands for correspondent services are apt to differ qualitatively with bank size and unspecified omitted variables, it is reasonable to expect to find differences in structure across various subsamples.

Finally, disaggregating the data across groups of states with similar reserve requirements for demand deposits uncovered a few anomalous estimates and missing observations that further helped us to sharpen our screening procedures.

Overall Results. Table 1 presents estimates of model (3) for two different subsamples: the "minimum-frequency subsamples" of banks that filed accurate reports in the vast majority of weeks in which their size group was sampled:

1. 143 large banks that filed in at least 39 of the 42 weeks.
2. 255 small banks that filed in at least 28 of the 33 weeks.

The principal qualitative result is that, in these and nearly every run we performed, $b_V > b_O > b_T > 0$. Just as we anticipated, suppliers of correspondent services imposed higher balance requirements against a bank's more-volatile deposits. This is why differences in deposit volatility belong at the center of the debate over the equity of differential reserve requirements. Even after the Fed institutes explicit pricing, Fed reserve requirements will be a tax only to the extent that they force a bank to hold "idle" reserves that it would otherwise have invested at interest. With implicit pricing, universal reserve requirements on demand deposits would not have imposed a uniform "burden" on all banks. Because of the structure of correspondent service fees, universal reserve requirements would have caused less inconvenience to banks whose deposits were

TABLE 1

ESTIMATED PARAMETERS FOR MODEL (2) OF SUPPORTING-BALANCE REQUIREMENTS AT NONMEMBER BANKS, USING FDIC SURVEY DATA

| Variable Name and Symbol | 143 Minimum Frequency Large Banks | 255 Minimum-Frequency Small Banks |
|---|---|---|
| Volatile Demand Deposits, $D_V$ | .36 | .46 |
| Other Demand Deposits, $D_O$ | .17 | .19 |
| Time and Savings Deposits, $D_T$ | .003 | .001 |
| Federal Funds Rate, FFR | -41.4 | -25.7 |
| Cash Items in Process of Collection, CIPC | -.40 | -.56 |
| Intercept (in thousands of dollars) | 1.67 | .29 |
| $R^2$ | .79 | .67 |

Note: All Coefficients are significantly different from zero at 5 percent.

volatile than to those whose deposits rested quietly on their books. This asymmetry explains why sample-period reserve requirements (listed in Table 2) bothered some banks more than others.

It is no accident that traditionally nonmember banks were disproportionately smaller and held disproportionately fewer correspondent and Treasury balances than member banks. Because small banks' deposits are typically less volatile, they derived fewer direct benefits from Fed services. Even with graduated requirements, net costs of membership tended to be higher for such banks. Arguing from revealed preference, it would have cost nonmember banks more on average to comply with the Fed's schedule of reserve requirements than such compliance actually cost the average member bank.

Tests of Alternative Model Specifications. Deleting CIPC from the model forces d in equation (3) to equal zero. Table 3 reports estimates of the CIPC-deleted model for four subsamples: the two minimum-frequency subsamples and the "consistent subsamples" of 74 large banks and 166 small banks that filed an accurate report in every week that their size group was surveyed. We still include FFR, although we can report that its inclusion or deletion affects the estimated intercept and $b_V$, but not estimated balance requirements for $D_O$ and $D_T$. CIPC provides a direct measure of the amount of clearing services a bank's depositors put through the bank's correspondent system. Recognizing that CIPC may be simultaneously determined with $D_V$ (i.e., that CIPC is likely to be highest for banks with high levels of volatile deposits) helps to explain why the principal effect of deleting CIPC is to lower $b_V$.

A second class of specification experiments focused on differences in estimated coefficients between the various subsamples of large and small banks. With reference to the Table 3 results, formal covariance tests establish that,

TABLE 2

RESERVE REQUIREMENTS ON DEPOSITS OF MEMBER BANKS, NOVEMBER 1972 THROUGH MAY 1975
(Deposit intervals are in millions of dollars.
Requirements are in percent of deposits.)

| Effective Date | On Net Demand Deposits | | | | | On Time Deposits | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Other Time | | |
| | | | | | | | 0-5 | Over 5, maturing in | |
| | 0-2 | 2-10 | 10-100 | 100-400 | Over 400 | Savings | | 30-179 days | 180 days and over |
| 1972—Nov. 9 | 8 | 10 | 12 | 16-1/2 | 17-1/2 | 3 | 3 | 5 | |
| Nov. 16 | ... | ... | ... | 13 | ... | ... | ... | ..... | |
| 1973—July 19 | ... | 10-1/2 | 12-1/2 | 13-1/2 | 18 | ... | ... | ..... | |
| 1974--Dec. 12 | ... | ... | ... | ... | 17-1/2 | ... | ... | 6 | 3 |
| 1975—Feb. 13 | 7-1/2 | 10 | 12 | 13 | 16-1/2 | ... | ... | ... | ... |
| In effect May 31, 1975 | 7-1/2 | 10 | 12 | 13 | 16-1/2 | 3 | 3 | 6 | 3 |

| Legal limits: | Minimum | Maximum |
|---|---|---|
| Net demand deposits, reserve city banks... | 10 | 22 |
| Net demand deposits, other banks..... | 7 | 14 |
| Time deposits..... | 3 | 10 |

Source: Federal Reserve Bulletin, 61 (June 1975), p. A7.

TABLE 3

ESTIMATES OF CIPC-DELETED MODEL OF SUPPORTING-BALANCE REQUIREMENTS AT SELECTED NONMEMBER BANKS, USING FDIC SURVEY DATA

| | Large-Bank Subsamples | | Small-Bank Subsamples | |
|---|---|---|---|---|
| | 143 Minimum Frequency Banks | 74 Consistent Banks | 255 Minimum-Frequency Banks | 162 Consistent Banks |
| Volatile Demand Deposits, $D_V$ | .24 | .31 | .42 | .52 |
| Other Demand Deposits, $D_0$ | .16 | .16 | .18 | .19 |
| Time and Savings Deposits, $D_T$ | -.001* | .006 | .001 | -0* |
| Federal Funds Rate, FFR | -56.9 | -67.8 | -27.4 | -26.9 |
| Intercept (in thousands of dollars) | 2.33 | .84 | .35 | .24 |
| $R^2$ | .75 | .86 | .66 | .86 |

*Not significantly different from zero at 5 percent.

while the FFR coefficients do not, the b estimates differ significantly between the following pairs of subsamples:

1. Consistent small banks versus consistent large banks over the last 33 survey weeks.
2. Minimum-frequency small banks versus minimum-frequency large banks over the same 33 survey weeks.
3. Consistent small banks versus other minimum-frequency small banks.
4. Consistent large banks versus other minimum-frequency large banks.

The differences between parallel samples for large and small banks suggest that private suppliers of correspondent services perform a greater range of services for small banks. In addition, 30 sample banks averaged more deposit balance due to other banks than due from them. These nonmember banks may be labeled "net sellers of correspondent services." Substantial differences between the consistent and other minimum-frequency subsamples are observed only for $b_V$. Although this difference might reflect measurement error or nonresponse bias, it probably indicates that other variables could usefully be included in the specification.

To investigate this, two other classes of specification experiments were run. One set looked at day-of-the-week and week-by-week seasonal variation in estimated coefficients. While the intercepts bounced around a good deal (presumably capturing seasonal influences), the b coefficients generally fluctuated within the plausible range of values. A final set of experiments grouped sample banks into subsamples that operated under similar structures of state reserve requirements. The evidence failed to establish a systematic relation between any model coefficients and the severity of statutory reserve requirements.

## Unbundling Fed Service Charges

Fed-produced correspondent services may be viewed as banking chores performed for banks and other deposit institutions. In performing these chores, the Fed finds itself running both a transportation and a communications network. Interregional clearing of paper instruments and coins puts the Fed into the courier business and turns the Fed's banks and branches into a nationwide network of clearinghouses. As electronic substitutes for paper instruments developed, the Fed was led first into high-speed wire communications and then into batch processing of magnetic tapes of payments instructions that travel between so-called automated clearinghouses (ACHs).

In the past, competitive pressures led the Fed to subsidize inferior forms of funds transfer. The DIDMC Act requires the Fed to set explicit cost-based fees for a series of services that, by and large, it used to perform for members gratis: "(1) currency and coin services; (2) check clearing and collection services; (3) wire transfer services; (4) automated clearinghouse services; (5) settlement services; (6) securities safekeeping services; (7) Federal Reserve float; and (8) any new services which the Federal Reserve System offers, including but not limited to payment services to effectuate the electronic transfer of funds."

So far (specifically, since January 29, 1981), the Fed is charging only for wire-transfer and net-settlement services. Check-collection and ACH pricing is currently scheduled to begin on August 1. The proposed fees are reported in Table 4. Target dates for imposing fees on securities and safekeeping services are set for October, with fees for currency services to follow in January, 1982.

How to reduce or to price float is still up in the air. Float exists because the Fed has adopted availability schedules that exceed Reserve Banks' collection capabilities. Float consists of credit the Fed has given to senders of collection

TABLE 4

FEE SCHEDULE FOR FEDERAL RESERVE COMMERCIAL CHECK SERVICES
in cents per item, effective Aug. 1, 1981

| | TYPES OF CASH LETTER DEPOSITS (1) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Accepted only from Institutions located within the U.S. office territory | | Accepted from institutions located in any F.R. office territory (2) | | | | |
| Federal Reserve Office | Mixed | Other Fed | City | Country or RCPC | Package Sort | Group Sort | Non-Machinable |
| Boston (as well as Lewiston and Windsor Locks) | 1.81 | 4.29 | 1.60 | 1.81 | 0.42 | 1.65 | 5.54 |
| New York | 2.87 | 5.30 | 2.74 | 2.87 | 0.47 | | 9.04 |
| Buffalo, Cramford, and Utica | 1.66 | 3.99 | 1.51 | 1.66 | 0.79 | 1.46 | 6.08 |
| Philadelphia | 2.30 | 4.64 | 1.79 | 2.30 | 0.87 | 1.98 | 5.33 |
| Cleveland (as well as Cincinnati, Pittsburgh, and Columbus) | 1.92 | 4.16 | 1.48 | 1.92 | 0.82 | | 5.12 |
| Richmond | 1.85 | 4.03 | 1.39 | 1.85 | 0.67 | | 5.54 |
| Baltimore | 1.97 | 4.37 | 1.67 | 1.97 | 0.63 | | 5.86 |
| Charlotte | 1.50 | 3.96 | 1.29 | 1.50 | 0.49 | | 5.24 |
| Columbia | 1.52 | 4.01 | 1.37 | 1.52 | 0.44 | | 4.68 |
| Charleston | 1.75 | 4.10 | 1.40 | 1.75 | 0.52 | | 5.30 |
| Atlanta (as well as Birmingham, Jacksonville, Nashville, New Orleans, and Miami | 1.86 | 4.15 | 1.46 | 1.86 | 0.98 | | 6.13 |
| Chicago | 2.94 | 5.02 | 2.36 | 2.94 | 0.94 | | 6.29 |
| Detroit | 1.57 | 3.93 | 1.46 | 1.57 | 0.56 | | 3.97 |
| Des Moines | 1.99 | 4.17 | 1.65 | 1.99 | 0.73 | | 5.88 |
| Indianapolis | 1.50 | 3.79 | 1.24 | 1.50 | 0.48 | | 3.23 |
| Milwaukee | 1.82 | 4.06 | 1.41 | 1.82 | 0.61 | | 3.59 |
| St. Louis (as well as Little Rock, Louisville, and Memphis) | 2.51 | 4.54 | 2.06 | 2.51 | 0.78 | | 5.09 |
| Minneapolis (and Helena) | 2.22 | 4.68 | 1.80 | 2.22 | 0.62 | 2.10 | 5.60 |
| Kansas City | 2.80 | 4.67 | 2.12 | 2.80 | 0.45 | 0.89 | 7.55 |
| Denver | 1.63 | 3.97 | 1.24 | 1.63 | 0.72 | | 7.98 |
| Oklahoma City | 1.90 | 4.11 | 1.52 | 1.90 | 0.67 | | 6.94 |
| Omaha | 1.76 | 4.06 | 1.27 | 1.76 | 0.46 | | 6.26 |

TABLE 4 (CONTINUED)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Dallas (as well as Houston, San Antonio, and El Paso) | 2.22 | 4.64 | 1.74 | 2.22 | 0.80 | 1.64 | 7.19 |
| San Francisco (as well as Los Angeles, Portland, Salt Lake City, and Seattle) | 1.71 | 4.12 | 1.54 | 1.71 | 0.58 | | 7.99 |
| Consolidated shipment surcharge for transportation from local F.R. office to collecting F.R. office (3) | | | 0.64 | 0.64 | 0.64 | 0.64 | 0.64 |

(1) Depository institutions should consult with their local Federal Reserve office about the availability of check services at any F.R. office, since all services are not available at all offices.

(2) Accepted by a F.R. office for presentment to depository institutions located within that F.R. office territory.

(3) A collecting F.R. office is responsible for presentment of cash letters to the paying institutions in its territory.

Source: The American Banker, March 26, 1981.

items that it has not yet been able to collect from the banks on which the items are written. In 1980, float averaged $4.2 billion per day.

Rising interest rates increase the value to check writers of delays in collection. With the Fed absorbing the interest costs of difficult collection routings, banks have an incentive when interest rates are high to arrange for their customers to make disbursements from remote locations. To reduce this incentive, on April 23, 1981, the Board of Governors authorized improvements in its handling of checks that will place some of the onus from float costs on the writers of checks.

Float can be reduced either by speeding up collection or by delaying availability. For a given set of fees, faster collection (which could be achieved, e.g., by changing check writers' incentives or instituting electronic collection of all but the smallest checks) would improve the quality of Fed correspondent services, but would presumably also raise Fed costs. Under the DIDMC Act, this would force the Fed eventually to raise its fees. Cutting back the availability of uncollected items to match Fed collection capabilities could be achieved straightforwardly by making only fractional amounts of uncollected items available to sending banks. While this would reduce incentives for remote disbursement, it would lower the quality of Fed correspondent service and make it harder to compete with private correspondents.

In lobbying activity preceding the DIDMC Act, substantial lip service was paid to substituting explicit Fed income from service charges for the implicit Treasury revenue to be lost by lowering reserve requirements for member banks. But in pushing Congress to require the Fed to price its services explicitly, correspondent bankers had high hopes of shaking loose profitable new business for themselves. Confident that profit-oriented institutions could outcompete a

bureaucratic agency, they expected to take away respondent-bank business from the Fed and to supply profitable instrument-collection, data-processing, and interbank communications services that thrift institutions would need to administer their customers' newly authorized NOW accounts.

Although the DIDMC Act focuses on Fed pricing, the Fed's long-run problem will be to compete in quality (i.e., in speed and reliability of service). Private correspondent networks see themselves as playing United Parcel Service to the Fed's U.S. Postal System. Like the federal postal system, the Fed is the nation's "clearer of last resort." Also like the Post Office, Federal Reserve Banks may (as Humphreys' analysis of 1974-76 data indicates) be operating on the upward-sloping portion of their average-cost curves. Federal Reserve Banks must underwrite services that are unremunerative if these are necessary to secure the external economies of a comprehensive national payment system. It must make sure that collectable items (no matter how intricate) can be collected and that deposit institutions in all communities (no matter how remote) retain timely connections to the national clearing system. It is hard to retain an adequate capacity to handle exceptional tasks (such as instrument returns and other reconciliation items) and isolated locations while at the same time maintaining a streamlined system for basic clearing services. In the face of private-sector competition, the Fed will be hard-pressed to maintain anything like its current 40-percent share of the correspondent-banking business.

But this does not mean that existing correspondent banks are on their way to a turkey shoot. For four reasons, traditional suppliers will find the going tough, too. The analysis presented in the last section indicates that imposing cost-based explicit fees on the (previously underpriced) services the Fed performs for banks that sell correspondent services will sharply raise these

institutions' own supply prices. Second, nontraditional competitors are responding to the market opportunity. Respondent-bank fears of monopolistic pricing by correspondent banks and of their potential for penetrating local banking markets is leading small banks to set up local clearing arrangements and cooperative regional service organizations. By January, 1981, 19 cooperative EFT systems were operational on a regional basis. Wholesale institutions designed specifically for local independent banks are already operating in Minnesota, Colorado, and Nebraska, and are scheduled to open late in 1981 in Wisconsin and Ohio. Nonbank communications and data-processing firms and regional Federal Home Loan Banks are hotly pursuing opportunities for processing, clearing, and settling thrift-institution customers' third-party payments. Such multiform competition should keep correspondent-bank profit margins at normal competitive levels. Third, if Fed efforts to reduce float succeed, they will substantially reduce the amount of cash items in process. As we have seen, about 50 percent of what are currently called due-to balances could almost equally well be classified as cash items in the process of collection.[6/] Hence, the aggregate amount of due-to-banks balances around should fall. Fourth, the fee schedules and state-of-the-art improvements in facilities that the Fed has proposed suggest a strategy of concentrating in the long run on the electronic-services market. Although Fed officials seem prepared to surrender a great deal of nonelectronic business, the System is able to draw on its seignorage profits to subsidize its correspondent-banking activity. This allows it to fight in ways that private competitors cannot afford to match for a dominant place in the evolving national system of electronic payment.

Currently the ACH system is owned by 38 regional ACH associations, 37 of which (all but the New York City ACH) are subsidized by the Fed (Mitchell).

Today, ACHs move only about one percent of interregional clearings. ACH transactions consist principally of direct deposits of social-security checks, institutional payrolls, corporate dividends, and annuity and pension payments. The 38 ACHs are linked by means of a Federal Reserve Communications Service known as the FedWire. In January, 1981, the Fed contracted to upgrade the technology of this system to expand its capacity and improve its reliability by incorporating a packet-switching approach.[7/]

Three important competitive transfer systems are owned and operated by private parties:[8/]

1. BankWire: This system is owned cooperatively by 190 commercial banks;
2. CHIPS (Clearing House Interbank Payment System): This system, which is owned by the New York Clearing House Association, clears respondent transactions through NYCHA members' reserve accounts;
3. SWIFT (Society of Worldwide Interbank Financial Telecommunications): This network, which includes foreign as well as U.S. banks, is oriented toward international payments.

Delays in clearing and in returning exception items through the Fed have boosted use of these private networks and is encouraging the development of direct-send connections between leading correspondent banks in different regions. As perhaps the most vocal spokesman for correspondent-bank interests, White has repeatedly called attention to these operating problems and wondered whether Fed pricing policies are predatory.

Understanding The Fed's Pricing Strategy

That Federal Reserve banks would try to maintain their service base (if need be, even at the expense of payments-system efficiency) is fully predictable

from the theory of bureaucracy (Niskanen). In each district, Federal Reserve Bank employees have a definite stake in maintaining the volume of services performed at district installations.

Along with stretching out the schedule for implementing explicit charges, the Fed's strategy appears to have three elements. First and most importantly, the Fed has posted low "incentive prices" on its electronic-funds transfer (EFT) services: averaging a little more than a penny an item. This was done ostensibly to promote EFT development but in full awareness that, as long as the Fed can match the quality of privately produced services, these prices simultaneously secure a paramount place in the electronic clearing ACH systems. Equally aggressive is the Fed's proposal to allow floating-rate "earnings credits" on clearings balances held at Reserve Banks by institutions that anticipate near-zero levels of required reserves. Just because these credits are openly announced, doesn't prevent them from being implicit prices. They make deposit balances at the Fed redeemable against Fed fees for service. Finally, by having certain regulatory actions rendered at the Reserve Bank level and by deciding to let its prices for most services vary regionally, the Fed has opened a number of options by which to counteract poor service performance at particular regional banks (e.g., as rumored in Dallas, San Francisco, and Atlanta) and correspondent-bank cherrypicking as it develops.

At the same time, with surveys showing the quality of Fed check-collection services to have been deteriorating for some time, it may be in the Fed's short-run interest to shift some of its check-processing workload onto the private sector. Throughout the middle and late 1970s, the Federal Reserve Board pressured District Banks to cut their operational staffs. The DIDMC Act threatens to overwhelm these already-taut staffs with the bureaucratic effort of

plugging new institutions into their reporting and services system. It is not feasible for the Fed's staff to monitor and turn aside more than the most important incursions into the System's payments-system domain by correspondent-bank arbitrage against its service-charge schedule. Even with its nonelectronic correspondent-service workload reduced, System employees may have to work harder on average than they have in decades. This could create severe problems of labor relations at Reserve banks and branches.

Fed defense of its payments-system turf may or may not be in the public interest. The issue turns on the degree to which the net-settlement phase of the nation's payment system may be regarded as a public good, at least some of whose benefits accrue nonexclusively to every member of society. Even though the Fed is bound to be technically less efficient than profit-making firms in producing safekeeping and item-collection services, processing information, and transmitting communications, these services are produced jointly with services that vitally affect public confidence in the integrity of the U.S. payments system. At such tasks as insuring against multimillion-dollar fraud, theft, or self-interested nonperformance in EFT transactions and assuring nondiscriminatory access to clearing services, the Fed has a distinct comparative advantage. These guarantees lessen the need for private individuals to expend resources to collect, verify, or make secure information about the current financial standing of intermediate parties in a financial transaction. The Fed's vast resources and its responsibility for preventing sudden fluctuations in base money mean that it has nearly unlimited funds with which to back up these guarantees. This absolute credibility establishes a qualitative difference between the quality of Fed communications and settlement services and comparable services produced in the private sector.

While it is reasonable to expect society to value this difference, two issues remain before public production and the current Fed pricing strategy may be deemed socially optimal. First, relative to guarantees provided by large private correspondents, does the public value perfect guarantees sufficiently to cover the actuarial costs of these guarantees to the Fed (and ultimately through the Fed, to the general taxpayer). Second, in principle does not the DIDMC Act require the Fed to charge explicitly for providing these guarantees? So long as the Fed does not explicitly include in its service fees the costs of producing various kinds of insurance against illiquidity and default, private producers of EFT clearing and settlement services are at a disadvantage. To compete away the Fed's traditional correspondent-banking business, they must be that much more cost-efficient at moving instruments and information.

## Administration of Reserve Requirements Under the DIDMC Act

One of the strongest arguments for universal reserves was widespread dissatisfaction with the competitive inequities fostered by the differential regulatory treatment of large as against small banks and of banks as against other deposit institutions. Banks were particularly upset by what they saw to be the piecemeal extension of bank-like powers to thrift institutions without their being required to accept an accompanying burden of bank-like regulation. As evidenced by the Fed's membership problem, bankers were also unhappy with what — at least at then-current levels of interest rates — they regarded as unreasonably high levels of Fed requirements. The DIDMC Act addressed both issues.

Under the DIDMC Act, eligible reserve balances may be held as vault cash, deposits at the Fed, or passthrough accounts at correspondent banks that

maintain reserve accounts of their own with the Fed.[9/] Reserve requirements will be 3 percent on nonpersonal time deposits and on the first $25 million of an institution's transactions accounts. The breakpoint that will apply in future years is to be indexed to observed deposit growth. Requirements on transactions balances that exceed the breakpoint are 12 percent. For member banks, applicable ratios are being phased "down" over the next 3-1/2 years (starting in November, 1980) to the new lower levels. For purposes of reserve requirements, banks that left the System after July 1, 1979 (who may be characterized as "involuntary member banks") are treated the same as members. For other nonmember institutions, starting in November, 1980, reserve requirements are being phased "in" gradually at one-year intervals over the next eight years. However, in states where NOW accounts are newly authorized (everywhere outside of New England, New York, and New Jersey), NOW accounts have to bear the full weight of transactions-account reserve requirements from the word go. At its discretion, the Fed is empowered to lower the 3-percent requirement all the way to zero (prior to the DIDMC Act the floor for time and savings deposits was 3 percent) and the 12 percent requirement as far as 8 percent.

Lest lawyer-like thinking mislead anyone, what is important for the Fed is its expanded authority to set low requirements, not the narrowing of its discretionary power at the high end. Market reactions have always limited the Fed's ability to convert high statutory requirements into high effective ones.

Response of State Banking Commissioners

Many state banking commissioners resent Fed-imposed universal reserve requirements, viewing them as a federal power play undermining state regulatory authority over deposit institutions. Ceteris paribus, universal reserve requirements do not just eliminate the disincentive to membership. In most states, they

threaten to reverse the incentive. In any state which has nontrivial reserve requirements, the DIDMC Act subjects state-chartered nonmember banks to a dual reporting burden and at some point in the phase-in process would force these banks to hold larger reserves than comparable member banks. As the Fed's requirements first took hold, to avoid a "nonmembership penalty," banking commissioners in Georgia, California, New York, Missouri, Delaware and Pennsylvania acted to eliminate or to reduce reserve requirements for nonmember banks in their states.

In the face of their jurisdictional loss to the Fed under the DIDMC Act, state legislatures are competing against each other for banking jurisdiction more directly than ever before. Individual states are openly changing their banking laws (e.g., in South Dakota and Delaware) to attract out-of-state affiliates of bank holding companies. This competition responds to bank managements' desire to minimize the burdens nationwide that state usury ceilings and state-and-local taxation place on the net profitability of their domestic operations. Bank efforts to escape the jurisdiction of states with onerous tax and usury laws is simultaneously transforming the margin of federal-state regulatory competition from the issue of membership in the Fed to the designation of what banking activities may be legally performed by nonbank corporations.

Responses by Deposit Institutions

Whenever and wherever the reserve-requirement burden begins to pinch, deposit institutions as well as state regulators must be expected to work hard to alleviate the pain. As we have seen, an individual bank does this by reordering its activities and rearranging its balance sheet and dominant contractual forms to keep the effective level of requirements relative to total bank liabilities close to its voluntary working-balance ratio. The longer any set of differential require-

ments is held in place, the more successfully banks can shortcircuit its impact. At the margin, the effective burden from complying with reserve requirements must equal the incremental cost of avoiding that burden. In the long run, the marginal costs of avoiding the reserve-requirement tax are very low. Regulation-induced innovation and political pressure combine to make effective reserve ratios largely voluntary in the long run.

To illustrate how difficult it is to determine the effective reserve-requirement tax a priori, we may note that the Kane-Castner-Peterson study of voluntary ratios at nonmember banks suggests that in the middle 1970's the net burden of Fed reserve requirements (i.e., net of the return flow of associated Fed services) was highest for bona fide time and savings accounts, the very accounts on which gross requirements are lowest.

One potentially important avenue for alleviating an individual institution's reserve-requirment burden lies in the so-called "passthrough option" the DIDMC Act provides to nonmember depository institutions. At its own option, a nonmem ber institution can pass its required reserves through a correspondent bank, a Federal Home Loan Bank, or the National Credit Union Administration's Central Liquidity Facility (Gilbert, 1980). As highlighted in the square-root rule of inventory theory, a pool of reserve balances managed by a single correspondent bank can manage a given risk of reserve insufficiency with a much-smaller aggregate of reserve balances than members of the pool would have to hold on their own. While the benefits are ameliorated by carryover provisions in reserve accounting, the incentive for small institutions to make use of passthrough arrangements (even if they must quit the System to do so) will be very great. Understanding these incentives helps to explain why the Fed has thus far deferred (and gone on to propose a permanent exemption from) reserve require-

ments for nonmember depository institutions whose total deposits are less than $2 million. It also clarifies the competitive importance to Federal Reserve Banks of giving service credits (calculated at floating interest rates) to institutions that hold "clearings balances" with the Fed.

Moreover, the DIDMC Act's steeply graduated schedule of statutory requirements should encourage banks, ceteris paribus, to substitute holding-company affiliates in multibank systems for ordinary branch offices. This would multiply the number of low-requirement deposit brackets available to the stockholders of the consolidated firm. While the Fed can forestall crude spin-offs of existing branches into holding-company affiliates, it will be difficult to disentangle (let alone to stop) effects on decisions about future acquisitions or de novo offices.

Maintaining selectively high levels of reserve requirements on transactions balances will also encourage banks and their customers to substitute nondeposit instruments for deposits of all kinds and lower-requirement deposits for high-requirement ones. The DIDMC Act's reserve-requirement tax will also encourage nontraditional and foreign-bank competitors to develop new and improved substitutes for traditional forms of bank deposits. Subsidized pricing of electronic payment services, combined with ongoing technological change, will simultaneously change the forms in which payments can most profitably be made. These adaptations will hamper monetary policy by making the money stock that is relevant for policymaking harder to define.

On the other hand, without having to worry about provoking member-bank withdrawals, under the DIDMC Act the Fed is free to pull innovating instruments into its regulatory net as soon as they are recognized to be a problem. Last October, when Citicorp attempted to pay eight-percent interest on positive

balances in households' credit-card accounts in a Maryland-based affiliate, Fed officials blocked the scheme before it could get off the ground. Similarly, the Board of Governors took only three weeks to kill Bank of California's May, 1981 scheme to avoid deposit-rate ceilings by transferring designated small-denomination accounts to an offshore branch.

Table 5 shows that, during the next few years, nonmember institutions' operational needs for vault cash should prevent the new requirements from proving onerous. Except for involuntary members (who are simply being bureaucratically brutalized), member banks' statutory burdens will lighten steadily. Hence, while the 3 and 12 percent requirements are gradually settling into place, the Fed will have ample opportunity to gauge — as if by experiment — regulatees' reactions both to different levels of reserve requirements and to different definitions of the main classes of reservable liabilities.

As settings of the level and structure of requirements change, Fed officials can observe variations in the political heat that emanates from different sources. In this way, they can obtain a good idea of what would, from the System's point of view, constitute a politically optimal reserve-requirement framework. By simultaneously observing changes in the rate of regulation-induced innovation, they can also make judgments about the economic viability of alternative frameworks. Of course, economic and political pressure against even a statically optimal reserve-requirement tax system will rise if inflation keeps accelerating. On the other hand, authorities should be prepared to see the pressure relent if and when inflation ever decelerates.

## Effects on Fed's Policymaking Autonomy

Although the DIDMC Act promises to create a heavy transitional workload for Fed staffmembers and to threaten the survival of at least a few of the 12

Table 5

Frequency Distribution of the Conservatively Estimated* Number of Years Before the DIDMC Act's Reserve Requirements Could No Longer Be Met on a Daily Average Basis Solely By Nonmember-Bank Holdings of Vault Cash

| Estimated Number of Years | Number of Banks in Data Set | Mean Deposit Size (in millions of dollars) |
|---|---|---|
| Less than 1 | 38 | 248 |
| 1 to 2 | 146 | 173 |
| 2 to 3 | 128 | 96 |
| 3 to 4 | 74 | 36 |
| 4 to 5 | 43 | 26 |
| 5 to 6 | 18 | 17 |
| over 6 | 35 | 14 |
| Total Sample | 482 | 112 |

*Calculations are conservative because they assume no room for 1974-1975 balance-sheet ratios to adjust costlessly to the new requirement structure and because they assume that all personal time deposits are switched to transactions accounts.

Reserve Banks,[10/] it offers substantial political benefits to the Fed's Board of Governors. It simultaneously enlarges the Board's political clientele and expands its capacity to tailor reserve requirements on time and savings accounts to the low levels needed to maintain clientele allegiance. Nevertheless, although universal reserve requirements greatly increase the Board's short-run policy options, they mainly change the form of its long-run jurisdictional problem. In place of fretting about unfavorable trends in membership, the Board will find itself worrying increasingly about a secular displacement of traditional banking business to nondepository "financial-services institutions" whose operations lie similarly outside its traditional regulatory purview.

## FOOTNOTES

1. In October, 1980, Henry Reuss asked the Government Accounting Office to study this very issue. Although the GAO report found no merit in the proposal to close district banks at this time, the activity criteria used to justify this determination would lead to this reverse conclusion if events came to pass as predicted in this paper.

2. Burns (1978, p. 430) argued that, by skewing the distribution of membership toward large banks, membership attrition threatened the political sustainability of "the insulation of the Federal Reserve System from day-to-day political pressure."

3. See the sources cited and evidence developed in Gilbert (1977). For some contrary evidence, see Hume and Russell, which examines use of Fed facilities by a sample of Second District Banks. It may be that physical proximity to New York City simplifies a bank's correspondent-service needs.

4. For example, to deposit checks for direct collection by the Federal Reserve, a bank must first presort the checks by the location of the paying bank and magnetically encode them with the dollar amount and bank routing numbers involved.

5. Thanks to the linearity property of least-squares estimators, the intercepts and slopes reported for the R equations which are estimated here may be interpreted as the sums of the corresponding coefficients from separate $R_C$ and $R_D$ regressions on the same sets of exogenous variables.

6. Knight estimates that only 56 percent of demand balances due from other banks are collected balances.

7. Packet-switching is akin to putting data tapes on a real-time system directly connecting Federal Reserve Banks. The "packets that are switch-

ed" are small sets or data into which natural messages are disaggregated. The "switching" combines packets with other message fragments in transit in ways that optimize the efficiency of transmissions moving through the network. The packets are reassembled into the original messages at the receiving point, much as a fictional teleportation device (such as the Star Trek transporter) is supposed to reassemble a flow of atoms into the objects originally dispatched (Mitchell).

8. We deliberately neglect nationwide point-of-sale systems operated by bank credit-card firms and large retailers.

9. A careful analysis of incentives inherent in the proposed passthrough reserve option is presented by Gilbert (1980).

10. Recognizing that Reserve Bank Presidents have long held 5 voting places on the Federal Open Market Committee, in the first stage of consolidation five Reserve Banks might survive. Based on regional interests, New York, Chicago, San Francisco, Atlanta, and Dallas seem the best candidates. However, the last two locations may be captured as political patronage by chairmen of Congressional Banking Committees.

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