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#### **Author**

Eichengreen, Barry

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UNIVERSITY OF CALIFORNIA AT BERKELEY

Department of Economics

Berkeley, California 94720

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**Designing A Central Bank For Europe:  
A Cautionary Tale from the  
Early Years of the Federal Reserve**

Barry Eichengreen

Economics Department  
University of California  
Berkeley, CA 94720

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## I. Introduction

Important questions concerning the structure and operation of a European central bank (ECB) remain to be answered. How much independence should national central banks retain during the transition to a single currency? What voting or mediation rules should be used to resolve conflicts among the national representatives on the ECB's governing council? What role should be played by existing central banks in implementing pan-European policies once the ECB comes into operation?

The Delors Report and the provisional statutes of the ECB, drafted by the governors of European Community central banks in Basel in November 1990, provide clearer answers to some of these questions than others. According to the Delors Report, during the transition to a single central bank ("Stage 2" of the process of monetary unification in the language of Brussels), national central banks will retain full nominal independence in the sense of continuing to issue their own national currencies and to intervene in domestic financial markets, but little real autonomy in that exchange rates will become immutably fixed and hence money supplies and interest rates will be determined by market forces. According to the draft statutes of the ECB, the policies of the new institution will be decided by votes cast by members of the bank's council, comprised of the 12 governors of the existing central banks and 6 executive directors appointed by the European Council. Voting will be by simple majority.<sup>1</sup> Governors and executive directors will be forbidden to accept instructions from national governments or from the European Parliament and Council. Once the ECB comes into operation, national central banks will forsake their remaining autonomy and become mere branch offices of the new institution.

Although there exists no precedent for the process of institution-building in which the European Community is currently engaged, the founding and early operation of the Federal Reserve System in the United States provides a suggestive parallel with ongoing developments in Europe. In the

early years of the Fed, the individual reserve banks, while issuing bank notes that traded at fixed exchange rates vis-a-vis one another, essentially controlled their own discount policies. As American officials came to appreciate the problems posed by this arrangement, control over policy was gradually transferred to Washington, D.C. The stance of policy came to be determined by the Federal Reserve Board and an Open Market Investment Committee dominated by representatives of the 12 district reserve banks, just as representatives of the 12 European nations are envisaged as sitting on the council of the ECB. Implementation, especially of open market purchases, remained a matter for the individual reserve banks, however. Shifting authority to Washington, D.C. did not eliminate regional conflicts in and of itself; neither did it resolve problems of policy implementation so long as individual reserve banks could opt out of System transactions. Only after authority was definitively centralized in the hands of the Board of Governors and the Federal Open Market Committee did the new institution finally come to operate smoothly.

The early history of the Federal Reserve System thus should be read as a cautionary tale.<sup>2</sup> It suggests that Stage 2 of the Delors Plan contains potential sources of instability. It provides an argument for a direct transition from Stage 1 (national monetary autonomy) to Stage 3 (complete centralization of authority).<sup>3</sup> It suggests the need for more thought about the voting and mediation procedures to be used to reconcile and aggregate national interests. It points to the advisability of reducing existing European central banks to mere branch offices of the ECB or of eliminating them entirely.

## II. Institutions for Decision Making in the Early Years of the Fed

In the early years of the Federal Reserve System, authority was much more decentralized and disputed than suggested by many histories of the US central bank.<sup>4</sup> Decentralization created problems not anticipated by the

framers of the Federal Reserve Act. In response to those problems, the institutional arrangements initially envisaged were gradually reformed. The first 22 years of the Federal Reserve System's existence (from the Federal Reserve Act of 1913 to the Banking Act of 1935) thus can be characterized as a trial-and-error process leading ultimately to the effective centralization of authority.

A. The Consequences of the Federal Reserve Act

It seems remarkable, given the extent of decentralization and confusion over the locus of authority, that the newly-created Federal Reserve System succeeded in operating at all. Two factors were responsible for the peculiar state of affairs in which the Federal Reserve Board and the reserve bank Governors found themselves. First, the framers of the 1913 Act, while sensitive to the scope for regional conflict, finessed the issue by creating a federal structure but essentially declining to address the question of how it should operate. Second, the framers inadequately anticipated the problems with which the new institution would be confronted and the instruments with which those problems would be addressed.

The Federal Reserve System was created to provide an "elastic currency" -- that is, one which would be available in the quantities required by the changing needs of commerce and industry. Notes issued by the reserve banks had to be backed with gold to the extent of 40 per cent. The remainder of the collateral could take the form of eligible paper (commercial, agricultural and industrial paper and bankers acceptances), but insofar as eligible paper fell short of 60 per cent, gold had to make up the difference. These regulations applied by federal reserve district. Insofar as a reserve bank possessed gold in excess of that required, it could inject additional notes into circulation.

The framers anticipated that discount policy would be the principal instrument through which elasticity would be lent to American credit markets.

When demands for credit rose, for seasonal or other reasons, member banks would discount commercial paper with reserve banks. The volume of discounts provided by the latter could be regulated by adjusting reserve bank discount rates. Discount policy was buttressed by a separate rate charged by each reserve bank for advances on acceptances and government securities.

The Federal Reserve Act was ambiguous about the role of the reserve banks and the Federal Reserve Board in determining the rates charged for discounts and advances. The 1913 Act stated only that "Every Federal reserve bank shall have the power...to establish from time to time, subject to review and determination of the Federal Reserve Board, rates of discount to be charged by the Federal reserve bank for each class of paper, which shall be fixed with a view of accommodating commerce and business."<sup>5</sup> A possible interpretation of this passage is that the initiative to alter discount rates lay with the reserve banks but that the Board possessed veto power. Another is that the Board, using its power of "determination," might order a change in prevailing discount rates.

As early as January 1915, reserve bank Governors began to complain that the Federal Reserve Board was exceeding its authority in the specificity and scope of its instructions regarding discount policy. They established the Governors Conference as a venue in which to meet and defend their independence.<sup>6</sup> At its second meeting, a number of Governors asserted that the Board had no legal right to impose restrictions on the type of acceptances that could be purchased by reserve banks. Rolla Wells, Governor of the St. Louis Fed, complained that the Board's practice of suggesting discount rates infringed on the prerogatives of the reserve banks. Benjamin Strong, the influential Governor of the Federal Reserve Bank of New York, shared this opinion.<sup>7</sup> Toward the end of 1915 the Governors Conference adopted a resolution criticizing the Federal Reserve Board for its "exercise of pressure."<sup>8</sup> The Board's response was to demand that the Governors Conference be discontinued and to insist that the Governors should meet only when called

by the Board.<sup>9</sup> Thus, the question of whether the Board or the reserve banks had the final say over discount policy remained far from resolution.

Even more problematic was that the framers of the Federal Reserve Act, having failed to anticipate the importance of open market operations, said even less about the conduct of security transactions than about discount policy. Other than stating that the Federal Reserve Board could issue regulations governing the types of securities the reserve banks might buy and sell, the 1913 Act had made virtually no mention of them. Between 1915 and 1923, the Board made no effort to do significantly more than this.<sup>10</sup>

In particular, the 1913 Act made no provision for coordinating the security sales and purchases of the individual reserve banks. The assumption was that each reserve bank would conduct such purchases and sales independently.<sup>11</sup> Insofar as there existed financial markets outside of New York in which municipal warrants and Treasury securities were traded, there arose the prospect that reserve banks would bid against one another when entering the market. It might seem perplexing that Fed officials worried that competitive open market purchases would have put undue upward pressure on bond prices (downward pressure on interest rates), especially if one assumes that the purpose of open market purchases was to lower interest rates. But in fact, in the early years of the Federal Reserve System, the main purpose of open market purchases was not to lend elasticity to the currency or to otherwise contribute to the conduct of what we would now call monetary policy. Rather, it was simply to enable the reserve banks to accumulate a portfolio of earning assets out of which to pay their expenses. Only after 1922, when the case for open market operations as an instrument for controlling commercial bank reserves had been articulated by W. Randolph Burgess, among others, did the technique begin to come into systematic use.

The approach to the conduct of open market operations agreed to by the members of the Governors Conference was to establish maximum and minimum prices at which transactions would take place. In practice, the reserve banks



repeatedly violated the agreement when it threatened to prevent them from acquiring the earning assets needed to meet their expenses.<sup>12</sup>

The consequences of these arrangements were highlighted during the business cycle downturn that began in 1920. As a result of the decline in economic activity, the volume of rediscounts fell off, eroding the interest income of the reserve banks. To restore their earnings, they purchased considerable quantities of government securities.<sup>13</sup> The Treasury and the Federal Reserve Board objected that the reserve banks were bidding against one another in the execution of orders and destabilizing the prices of government bonds.

#### B. Formation of the Open Market Investment Committee

In response, in May 1922 there was created on the recommendation of the Governors Conference a committee, comprised of the governors of the New York, Boston, Philadelphia and Chicago reserve banks, to centralize the execution of orders for purchases and sales of securities.<sup>14</sup> At first, this was just a mechanism to prevent the reserve banks from bidding against one another for earning assets. But in October of the same year the Governors Conference voted to give the committee power to "make recommendations" to the reserve banks regarding purchases and sales of government securities.<sup>15</sup> Whether their recommendations were binding and whether reserve banks retained the right to conduct open market operations on their individual initiative was left unclear.

These ambiguities were addressed in March 1923, following an extended study of open market operations by the Federal Reserve Board. This study came at the end of a protracted dispute between the Board and the reserve banks, led by the New York Fed. Treasury officials objected that reserve bank transactions in government securities were disrupting their debt management operations, and insisted that the Board force the reserve banks to divest their portfolios of government bonds.<sup>16</sup> Adolph Miller, the economist on the

Board, presented to his colleagues a proposal that the Board assert its control over the open market policies of the reserve banks. Learning of Miller's plan, the reserve banks rebelled. Governor W.P.G. Harding of the Federal Reserve Bank of Boston denied that the Board possessed more than "broad supervisory power" and questioned whether it could do more than regulate the type of securities in which the reserve banks could transact.<sup>17</sup> On behalf of the Board, Miller responded that Washington possessed the power to dictate both the volume and composition of the open market transactions of the reserve banks.

A resolution approved by the Board on March 22nd asserted that the Board possessed the authority to "limit and otherwise determine the securities and investments purchased by Federal Reserve banks."<sup>18</sup> It added to the committee comprised of 4 reserve bank governors a fifth member, to be appointed by the Federal Reserve Bank of Cleveland, and named the body the Open Market Investment Committee (OMIC). According to the March 22nd resolution, the new committee came "under the general supervision of the Federal Reserve Board." This reorganization can be read as an attempt to assert the authority of the Board over the New York Fed in the conduct of open market operations. A separate Federal Reserve System open market investment account, operated by the New York Fed but under the supervision of the OMIC, was established to free the other banks from having to maintain accounts with the New York bank.<sup>19</sup>

The thrust of this resolution was that, while the OMIC would recommend open market purchases and sales to the reserve banks, its recommendations would be subject to approval by the Federal Reserve Board.<sup>20</sup> In practice, the OMIC almost exclusively recommended purchases and sales of bankers acceptances and short-term government securities. Actual purchases and sales were still delegated to the New York Fed and on occasion to other reserve banks.

The critical variables determining the volume of acceptances purchased by the reserve banks were their acceptance rates, which determined the

quantity of acceptances offered. In turn, the most important acceptance rate was that of the Federal Reserve Bank of New York, since far and away the largest acceptance market was New York City. In light of this asymmetry among reserve banks, procedures were adopted to redistribute acceptances from New York to other Federal Reserve districts. As acceptances came into the New York Fed, they were allocated to the other reserve banks in proportions set by the OMIC. Open market purchases of government securities, when undertaken by the New York Fed on instructions issued by the OMIC, were then apportioned to the other reserve banks in agreed percentages.

In principle, an OMIC decision to conduct open market purchases not only had to be approved by the Federal Reserve Board but also had to be submitted to the individual reserve banks, which could decline to participate. Similarly, reserve banks had the option of refusing to take their share of the securities accepted by the New York Fed, even though the shares were established by the OMIC. On occasions when this occurred in the 1920s, the New York bank absorbed the residual.<sup>21</sup>

The reserve banks did not concede the Board's right to dictate their open market operations.<sup>22</sup> The 1923 resolutions of the Federal Reserve Board left the reserve banks the right to opt out of open market operations recommended by the OMIC and the Board. More controversial was whether reserve banks were also entitled to conduct open market operations of which the Board did not approve. Some reserve bank officials asserted that this was the case.<sup>23</sup> They threatened to enter the market on their own volition even if the Board disapproved.<sup>24</sup> It appears that they did so on more than one occasion in the 1920s.<sup>25</sup>

These disagreements were aired in meetings of the OMIC and in its dealings with the Board. As early as April 1923 the Board instructed the OMIC to conduct large-scale open market sales, for the purpose of liquidating reserve bank holdings of government securities.<sup>26</sup> The OMIC first voted that maturing Treasury certificates should not be replaced, and then, under Federal

Reserve Board and Treasury pressure, agreed to \$50 million of sales from reserve bank portfolios. This was not enough for several members of the Board, however, who chastised the head of the OMIC, J.H. Case (chairing the Committee in Strong's absence), for not carrying out the Board's instructions. Case complained that the Board had exceeded its authority by ordering security sales. In his view, the limits on the Board's authority were the same as those which had prevailed prior to the March 1923 resolutions. Ultimately, the OMIC bowed to Washington's pressure, selling a second \$50 million of government securities, and thereby reducing its holdings from more than \$200 million in April to less than \$100 million in July.

#### C. Establishment of the Open Market Policy Conference

By the end of the 1920s, complaints about the growing influence of the Federal Reserve Board and OMIC were widespread in the Southern and Western United States, regions whose reserve banks were not represented on the five-member OMIC. Representatives of these districts argued that the excessive expansion of credit in 1927-29, which supposedly had led to the stock market boom and crash, was the fault of the reserve banks beholden to Wall Street interests that dominated the OMIC. They criticized the latter as a power-hungry, extra-legal body not provided for by the Federal Reserve Act.<sup>27</sup>

Such criticisms were largely responsible for the Federal Reserve Board's decision to dissolve the OMIC in March 1930 and to replace it with a new committee, the Open Market Policy Conference, or OMPC. All 12 reserve banks were represented on the OMPC. The Board endowed it with an executive committee, once again limited to representatives of 5 reserve banks. This time, however, the executive committee was responsible only for executing, not initiating, policy.<sup>28</sup> Substantive policy decisions were to be made instead in regular meetings of the OMPC, with representatives of all 12 reserve banks present. Nothing insured the leadership or even participation of the Governor of the New York Fed on the executive committee. Thus, the reorganization of

the OMIC into the OMPC was seen as an attempt to "curtail the control exercised by the New York Reserve Bank."<sup>29</sup>

The establishment of the OMPC significantly clarified lines of authority and control. Once again, however, ambiguities remained. The 1930 resolution was less than clear about who possessed final say about the conduct of open market operations. It stated that "The conclusions and/or recommendations of the Open Market Policy Conference, when approved by the Federal Reserve Board, shall be submitted to each Federal Reserve bank for determination as to whether it will participate in any purchases or sales recommended; any Federal Reserve bank dissenting from the proposed policy shall be expected to acquaint the Federal Reserve Board and the chairman of the executive committee for the reasons for its dissent."<sup>30</sup> Apparently reserve banks could still decline to engage in open market operations recommended by the OMPC.

#### D. The Banking Acts of 1933 and 1935

The Federal Reserve Board at last acquired definitive control over open market operations as part of the Banking Act of 1933. The Open Market Policy Conference was renamed the Federal Open Market Committee (FOMC) and finally given legal standing. In keeping with practice since 1930, it was composed of one representative from each of the 12 reserve banks. At last it was explicitly stated that "no Federal Reserve bank shall engage in open-market operations under section 14 of this Act except in accordance with regulations adopted by the Federal Reserve Board." If a reserve bank wished to purchase or sell government securities for its own account, it was now required to first obtain the consent of the Board. Rates of interest and discount on acceptances and bills of exchange had to conform to the regulations of the Board. Final authority over these matters now clearly rested with the Board in Washington, D.C.

The individual reserve banks still retained limited autonomy under the 1933 Act. While prohibited from initiating open market transactions on their

own, they had the right to refuse to participate in open market operations recommended by the Board. Moreover, individual reserve banks were still permitted to buy government securities in an emergency as needed to afford relief to banking institutions in their districts.<sup>31</sup>

The 1933 Banking Act contained two other revealing provisions. It specified that no officer or other representative of a federal reserve bank was permitted to negotiate with a foreign bank except with the Board's permission. It asserted that the Board was entitled to be represented in all such negotiations and that it had the right to oversee all relations with foreign central banks. This clause was a reaction to a controversy which had arisen in 1927, when Benjamin Strong, the Governor of the Federal Reserve Bank of New York, had initiated negotiations with a group of foreign central bankers and failed to keep the Board apprised.<sup>32</sup> Another provision of the 1933 Act authorized the Federal Reserve Board to fix for each federal reserve district the percentage of member bank loans secured by stock or bond collateral. This clause was an outgrowth of the Board's attempt in 1929 to utilize a policy of "direct pressure" to ration stock market speculators out of the loan market, a tactic whose implementation was resisted by the New York Fed.<sup>33</sup>

These reforms were consolidated by the Banking Act of 1935.<sup>34</sup> The Federal Reserve Board's name was changed to the Board of Governors of the Federal Reserve System. The composition of the FOMC was changed so that it was now composed of the 7 members of the Board of Governors plus 5 representatives of the reserve banks. The 5 reserve bank appointees were to represent all parts of the country, not just the Northeast and Middle West, as had been the case in the 1920s with the OMIC. Thus, the dominance of Washington, D.C. over the formulation of monetary policy was insured as much by reducing the influence of the reserve banks of the Northeast and Midwest as by elevating the influence of the Board. Finally, decisions of the FOMC were made binding. Reserve banks were prohibited from engaging in, or (for the

first time) declining to engage in, open market operations mandated by the FOMC.

### III. Impact on Policy

To analyze the impact on policy of the conflicts that arose in the early years of the Federal Reserve System over the control of open market operations and of the different institutional arrangements used to resolve them, I first specify a simple analytical model with which these issues can be addressed. I then use this model to structure my discussions of five critical episodes from the early history of the Fed.

#### A. An Analytical Model

The model utilized here is an adaptation of that in Eichengreen (1985). I use it in this case to analyze the incentives facing district reserve banks in a national setting, instead of the more familiar problem of the incentives facing national central banks in an international setting. The parallels will be obvious.

Consider the interaction of two reserve banks, referred to as "New York" and "Chicago" for reasons that will become evident in Section B below.<sup>35</sup> Each reserve bank minimizes a loss function  $L$ . The loss increases as earnings on its bond portfolio deviate from their desired level and as output deviates from its target.

$$L = -[(B - \bar{B})^2 + \alpha(Y - \bar{Y})^2] \quad L^* = -[B^* - \bar{B}^*]^2 + \alpha(Y - \bar{Y})^2 \quad (1)$$

Variables with asterisks refer to the Chicago bank, those without them to New York.  $B$  ( $B^*$ ) denotes bonds in the reserve bank's portfolio,  $\bar{B}$  the corresponding target number of bonds.  $Y$  is nominal income in the economy,  $\bar{Y}$  its corresponding target level.<sup>36</sup>  $\alpha$  ( $\alpha^*$ ) is the weight attached to income

deviations relative to earnings deviations in the loss function.

$\bar{B}$  can be thought of as the bond portfolio that optimally trades off current interest earnings (which increase with  $B$ ) against future lender-of-last-resort capacity (which is a decreasing function of  $B$ , since additional lending requires open market purchases which are constrained by gold cover restrictions). Similarly,  $Y$  can be thought of as indexing not only the current level of income but also the current stability of the banking system.

$Y$  is an increasing function of the (cumulated) open market purchases of the two central banks. The simplest possible specification makes that function linear and additive:

$$Y = B + B^* \quad (2)$$

Expansionary open market operations can raise nominal income by increasing the monetary base (Friedman and Schwartz, 1963) or by countering disintermediation and debt deflation (Bernanke, 1983). In the historical context at hand, I have in mind expansionary open market operations as a means of providing liquidity to a banking system unable to restore its liquidity itself because of asymmetric information about the quality of bank assets and problems of adverse selection.<sup>37</sup>

Each central bank possesses one instrument (open market operations) with which to minimize its loss function.<sup>38</sup> Consider first the simple case in which the two reserve banks are identical in all respects. Substituting (2) into (1) and minimizing the loss subject to the assumption that the policy of the other reserve bank is given yields the reaction functions for the two banks:



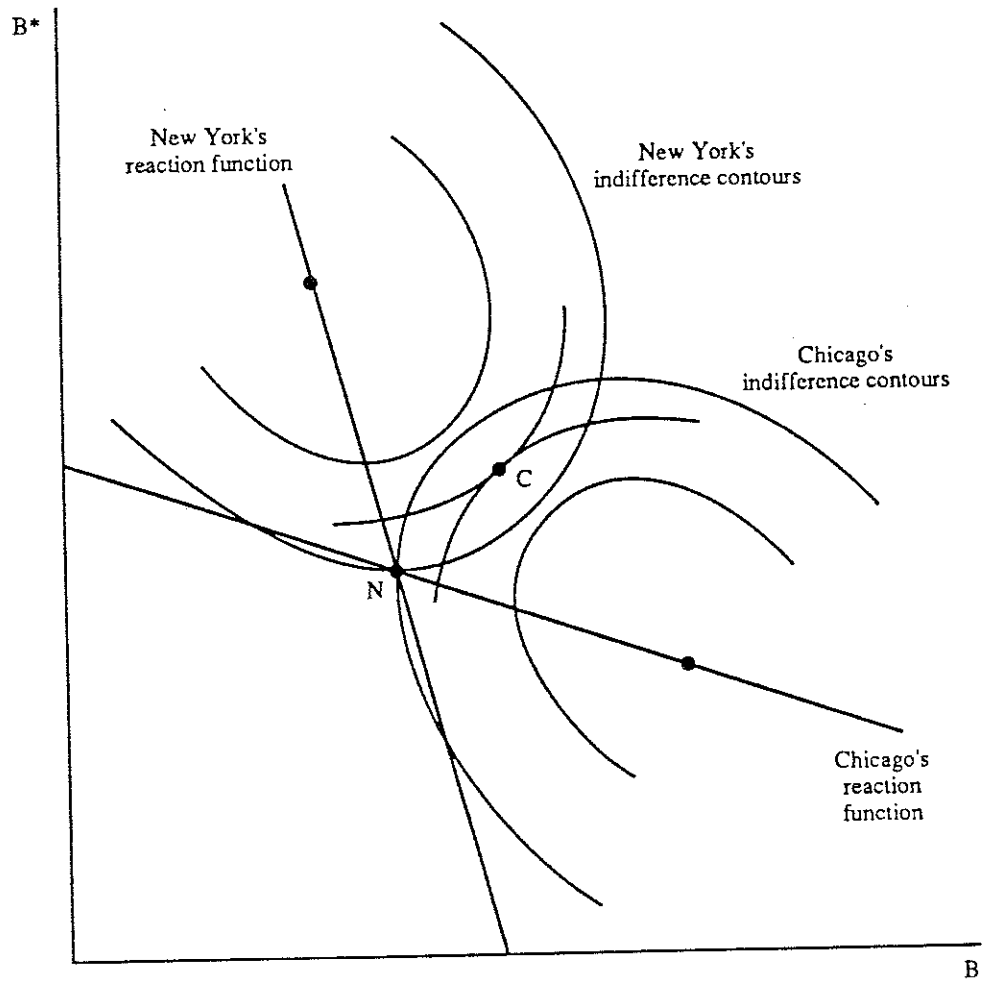
$$dL/dB = - [\alpha/(1+\alpha)] B^* + [1/(1+\alpha)] \bar{B} + [\alpha/(1+\alpha)] \bar{Y} - B = 0 \quad (3a)$$

$$dL^*/dB^* = - [\alpha/(1+\alpha)] B + [1/(1+\alpha)] \bar{B} + [\alpha/(1+\alpha)] \bar{Y} - B^* = 0 \quad (3b)$$

The reaction functions are depicted in Figure 1.  $B$  and  $B^*$  are lower at the Nash solution  $N$ , where the two reaction functions intersect, than at the cooperative solution  $C$ , the point where the indifference contours of the two reserve banks are tangent.<sup>39</sup> Each central bank has two objectives: stabilizing the level of output and the banking system, and holding lender-of-last-resort capacity in reserve for the future. Since future lender-of-last-resort capacity depends only on its own bond portfolio, while output economywide depends not only on its own bond portfolio (the larger its bond portfolio, the greater its expansionary open market operations and hence the higher the level of output) but also on the bond portfolio of its counterpart, each reserve bank holds a smaller bond portfolio and engages in fewer expansionary open market operations when it behaves noncooperatively than when it cooperates. Each reserve bank derives only some of the benefits of open market purchases; the rest accrue as a positive externality to the other bank. At  $N$ , it does too little to stabilize output and the banking system currently. Cooperation, were it to be forced on the two central banks by the Board of Governors, is a way of internalizing this externality. Note, however, that starting from the cooperative point  $C$ , each reserve bank has the option of reverting to its reaction function so long as it retains the alternative of opting out from cooperative actions mandated by the Board.

What is the effect of introducing asymmetries into the model? Assume for example that  $\alpha > \alpha^*$ . There are a number of rationales for such an assumption. One can imagine that, compared to Chicago, New York better appreciates the impact of open market operations on macroeconomic stability or

Figure 1



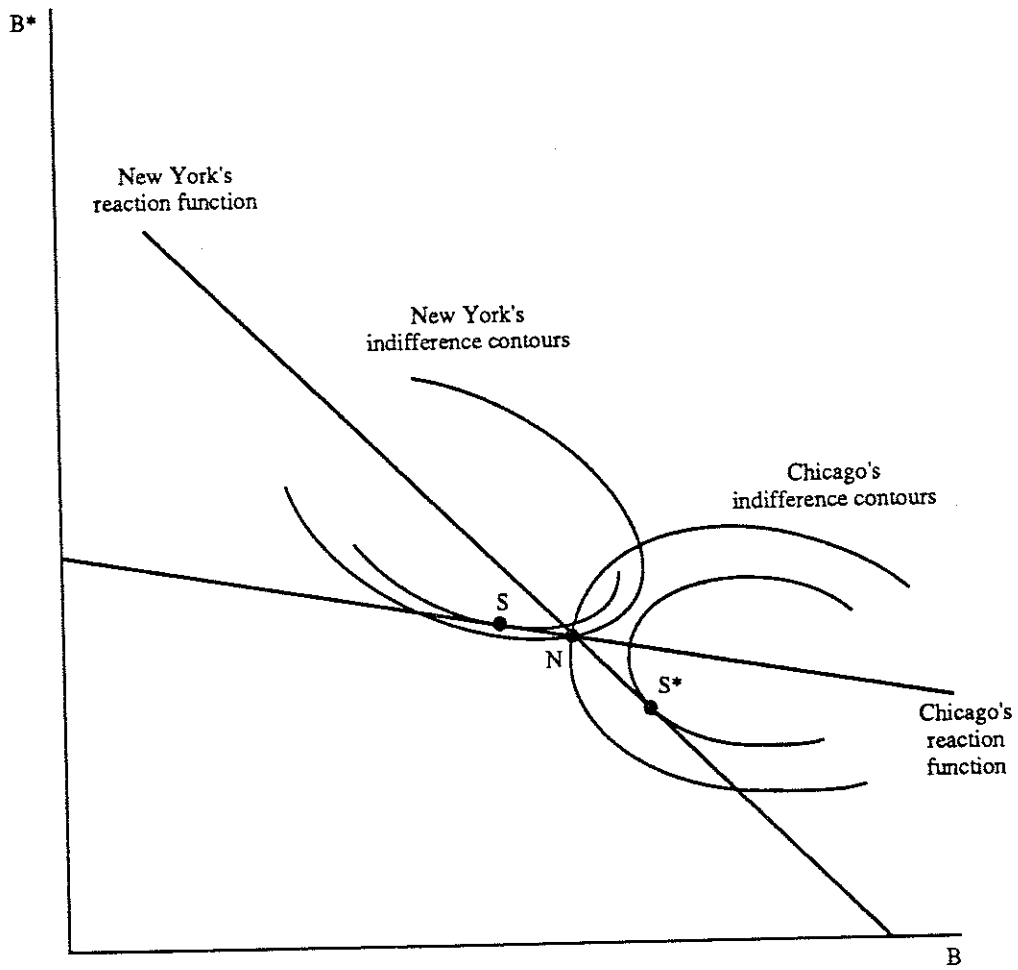
attaches a higher weight to economic stability itself. Alternatively, if  $Y$  is interpreted as proxying not only for the level of income but also for the stability of the banking system today, Wheelock's (1988) evidence for the 1920s and 1930s that open market purchases, by whatever Federal Reserve bank they were initiated, disproportionately increased the reserves of member banks in the New York district provides a further rationale for the assumption. In this case, open market purchases can be seen as enhancing the stability of the New York Fed's client banks to a greater extent than it enhances the stability of the member banks of the Chicago district, thereby justifying the assumption that  $\alpha > \alpha^*$ .

This situation is depicted in Figure 2. Chicago's reaction function is flatter than New York's. New York is more inclined than Chicago to respond to open market purchases by the other reserve bank with open market sales of its own, since New York attaches greater weight to the stock of bonds in held outside the Federal Reserve System, upon which the level of economic activity depends. By comparison, Chicago is less inclined to respond to New York's open market sales with open market purchases of its own, since member banks in New York benefit more than member banks in Chicago from an increase in the stock of bonds held outside the Federal Reserve System.

Again, current stabilization is underprovided. Both reserve banks hold smaller stocks of earning assets and do less to stabilize output and the banking system at the Nash solution than would be the case if they cooperated.

In summary, the decentralization of control over open market operations for most of the interwar years is likely to have led the stabilization function to be undersupplied. Moreover, reserve banks such as New York whose member banks benefit most from stabilization are likely to have borne a disproportionate share of the burden of supplying it. How important this was for policy can only be determined through the examination of particular historical episodes.

Figure 2



## B. Case Studies

Case studies provide a second approach to analyzing the impact of differences and conflicts over policy within the Federal Reserve System. They illustrate how the Board's failure to properly impose cooperative behavior on the reserve banks led the stabilization function to be undersupplied. They show how disputes between the Board and the reserve banks led to delays that caused intervention to be provided at inappropriate times, and how differences of opinion between the Board and the reserve banks sometimes led the banks to provide even less of the stabilization function than they would have wished.

### 1. The 1927 Discount Rate Reductions

The first episode of controversy occurred in 1927. The economy was in a short-lived recession, popularly attributed to Henry Ford's decision to shut down his assembly lines for six months to shift over from the Model T to the Model A. Great Britain and Germany were experiencing gold outflows yet hesitated to apply the orthodox medicine, higher interest rates, because economic activity was slowing down. The dilemma led to a famous meeting of Benjamin Strong of the New York Fed, Charles Rist, Deputy Governor of the Bank of France, Hjalmar Schacht, President of the German Reichsbank, and Montagu Norman, Governor of the Bank of England. The four central bankers assembled on Long Island in July 1927 to negotiate a cooperative response. Their solution was a commitment by the Bank of France not to present sterling for conversion at the Bank of England, and a reduction in the Federal Reserve Bank of New York's discount rate designed to repel gold inflows.<sup>40</sup>

These negotiations had been undertaken unilaterally by the Governor of the New York Fed. Strong had kept only one member of the Federal Reserve Board, Daniel Crissinger, apprised of his intentions, and invited only members of the Open Market Investment Committee to attend formal sessions of the summit.<sup>41</sup> Unsurprisingly, Board members and reserve bank officials resented his initiative.<sup>42</sup> Only with reluctance therefore did the OMIC agree on July

27th to discount rate reductions. Several of the reserve banks remained unsupportive, however. In particular, the Chicago Fed, more worried about inflation and speculation than about the weakening economy, refused to go along. On September 6th, the Federal Reserve Board held a special meeting, voting 4 to 3 to force the Chicago Fed to reduce its discount rate.<sup>43</sup> The Chicago bank surrendered.

This decision remains controversial. Adolph Miller argued subsequently that the decision to lower discount rates set the stage for the excessive speculation of the Wall Street boom and ultimately for the crash that inaugurated the Great Depression.<sup>44</sup> I have argued elsewhere that this view is misleading.<sup>45</sup> The 1927 cut in discount rates actually helped to abbreviate the 1927 recession, and there is no evidence that it was in fact responsible for the stock market boom and crash.

In terms of the theoretical model of Section III.A, this episode can be thought of as an early instance in which the Board compelled the individual reserve banks, principally New York and Chicago, to move from a point like N to one like C. The Board's authority to do so remained disputed, however. Indeed, the controversy provoked by its action inhibited it from taking similar steps in 1928-29.

## 2. The Fed's Response to the Great Bull Market

A second episode of controversy over authority and control swirled around the restrictive monetary measures taken in response to the 1928-29 stock market boom. The Fed's decision to tighten in order to restrain the rise of the stock market is now regarded as a grave policy error that set the stage for the Great Depression.<sup>46</sup> The impetus to do so came not from the Board, however, but from the Chicago Fed, the same reserve bank that had opposed discount rate reductions in 1927 on the grounds that they encouraged speculation. In January 1928 the directors of the Chicago bank voted to increase its discount rate. This can be thought as an attempt by Chicago to

defect from the cooperative solution -- that is, to move from C, the equilibrium imposed on the reserve banks by the Federal Reserve Board in September 1927, to a point directly below it on the Chicago bank's reaction function.

This time Chicago's decision was reluctantly accepted by the Federal Reserve Board, which, according to Wicker, wished to avoid repeating the episode of the previous September in which it had embarrassed the Chicago Fed.<sup>47</sup> Only two Board members, Edmund Platt and George James, actually favored the Chicago Fed's proposal to raise the cost of credit. Others worried about seeing "business penalized for the excesses in the stock market" but yielded on grounds of reserve bank autonomy.<sup>48</sup>

The Chicago Fed's position, that increases in discount and acceptance rates were needed to contain stock market speculation, spread to other parts of the Federal Reserve System in 1928. This is a prediction of the model: once the cooperative solution C cannot be sustained and one reserve bank defects, the other reserve banks will also revert to their reaction functions, raising discount rates and/or reducing open market purchases until the Nash solution at N is reached.

Yet some opposition to higher discount rates remained. Governor Roy Young of the Board continued to oppose rate increases on the grounds that they would injure industry and trade.<sup>49</sup> Young protested when on January 3, 1929 the directors of the New York Fed voted to raise the buying rate on acceptances. He asserted that the action required the prior approval of the Board, a position which George Harrison, the new Governor of the New York Fed, disputed.<sup>50</sup>

This controversy can be understood in terms of two fundamental disagreements within the Federal Reserve System. One concerned the best way to contain speculation on Wall Street without doing damage to business and trade. Members of the Federal Reserve Board, including a reluctant Young, preferred a policy of "direct pressure" -- moral suasion to deter member banks

from extending brokers loans and other credits that might be used for speculative purposes. Direct pressure was intended to ration speculators out of financial markets without disrupting the access to credit of legitimate borrowers. The New York Fed preferred discount rate increases, both because it doubted the effectiveness of direct pressure given the fungibility of funds, and because it did not wish to discriminate against its Wall Street clientele.

The second fundamental disagreement concerned reserve bank autonomy. At the first meetings of the OMIC following Benjamin Strong's death in 1928, the Board submitted to the reserve bank governors a proposal to revise procedures for conducting open market operations. It proposed expanding the size of the OMIC from 5 to 12 members in order to eliminate the dominance of the 5 reserve bank governors from the Northeast and Midwest. No immediate action was taken, however.<sup>51</sup> Two weeks later the Board for the first time vetoed a recommendation forwarded by the OMIC.<sup>52</sup> Both actions were intended to assert the Board's authority over the OMIC, and to signal that henceforth the Board would oversee even the smallest decisions of the latter.

On February 14, 1929, the directors of the New York Fed voted unanimously to increase the discount rate and telephoned the Board to obtain confirmation. When the Board instructed the New York bank to hold off until the Board considered the matter the following day, the directors in New York informed the Board that they would not leave the bank premises until they received a response from Washington, D.C. To assert their dominance, the Board then voted unanimously to veto New York's decision.<sup>53</sup>

This sequence of events repeated itself 10 times over the subsequent 4 months. The directors of the New York Fed voted repeatedly to raise the discount rate; the Board repeatedly vetoed their action. While "no one questioned the legal right of the Federal Reserve Board to veto our rate increases," in Harrison's words, continued refusal was "seriously disturbing to both the officers and directors of the several Federal reserve banks."<sup>54</sup>



Several of the New York directors threatened resignation on the grounds that their powers had been usurped. The directors were invited to Washington to confer with the Board. Finally in August of 1929 the New York Fed was allowed to raise its discount rate.

In terms of the model, these events are best understood as an attempt by the Board to reassert its authority over the reserve banks in the wake of its loss of influence in 1928. Ironically, that reassertion, while it should have had beneficial consequences in the long run (by facilitating cooperative solutions to the policy game), had adverse consequences in the short run. The conflict delayed the New York Fed's efforts to raise its discount rate to the point that, when the increase finally came, it was no longer timely. But New York's desire to assert its autonomy encouraged it to go through with the increase anyway. By August, when the discount rate increase finally came, industrial production in the United States had already begun to decline. Discount rate increases lent further impetus to the downward spiral of activity.

### 3. The Fed's Response to the 1929 Crash

A third conflict occurred in the aftermath of the October 1929 Wall Street crash. The crash created a liquidity crisis in New York. Brokers who had borrowed from New York banks, pledging stock as collateral, found themselves unable to repay. Almost half of the loans of central reserve city member banks in New York were collateralized by securities; a third were extended directly to stock brokers and dealers in New York City. Immediately following the crash, banks in the interior of the country which had placed money at call in New York repatriated their funds. The New York Fed, seeing its member banks placed at risk, intervened by purchasing \$100 million of government securities on the open market.

In terms of the model of Section III.A, the crash can be thought of as shifting New York's reaction function to the right. This induced open market

purchases by the New York Fed (a rise in B) and, given the flatness of their reaction functions, little response by the other reserve banks.

New York's action was undertaken without prior approval by the Federal Reserve Board. Indeed, Harrison authorized this intervention even without consulting all of his own bank's directors.<sup>55</sup> Officials in Washington, D.C. were torn. The majority of Board members approved in principle of providing additional liquidity to financial markets in distress, but they were alarmed by the precedent represented by New York's unauthorized, unilateral action.<sup>56</sup> Harrison was called on the carpet. He protested that the 1923 agreement between the Board and the reserve banks permitted the latter to purchase securities for their own account. If doing so was ever justified, this was the case in extraordinary circumstances like those of October 1929. Once again the Board disagreed. Open market operations, its members asserted, were at the Board's volition and its volition alone. Governor Young of the Board noted that the Board "had been given most extraordinarily wide powers [and] that so long as the Board had those powers, they would feel free to exercise them."<sup>57</sup> Having repeatedly vetoed the New York Fed's attempts to alter its discount rate, the Board threatened to do so again unless the New York bank promised to refrain from engaging in further unauthorized open market purchases. The Board authorized the Governor, should the Board not be immediately available, to act on its behalf in the event of an emergency.

For the moment, the controversy remained unresolved. So long as it persisted, the dispute continued to disrupt the Federal Reserve System's attempt to engineer a concerted response to the economic slump. On October 1st the OMIC had been authorized by the Board to purchase short-term government securities in amounts not to exceed \$25 million a week. On November 12th the OMIC, led by Harrison, recommended that the ceiling be raised. The Board vetoed its decision on the grounds that "the general situation is not sufficiently clarified for the system to formulate and adopt a permanent open market policy at this time."<sup>58</sup> A bargain was hammered out

under which the New York Fed agreed to refrain from further open market purchases for its own account, at least until their legality had been determined, in return for the Board's approval of the OMIC's recommendation. On November 25th the Board confirmed this deal by a narrow margin.<sup>59</sup>

#### 4. Open Market Operations in 1932

A fourth conflict concerned the use of open market operations in 1932. Until the Glass-Steagall Act came into effect at the end of February, open market purchases were constrained by the availability of free gold. Glass-Steagall eliminated the constraint and allowed the Fed to inject additional notes into circulation by purchasing government securities.<sup>60</sup>

The Governors of the 12 reserve banks were divided on the efficacy of doing so, however. The majority apparently believed that, in light of the deflation and depressed business conditions that by early 1932 had persisted for almost 2 1/2 years, open market purchases could not hurt and might actually stimulate recovery. A vocal minority, led by the Governors of the Chicago and Boston banks, warned that open market purchases would only provoke another round of inflation and unhealthy stock market speculation.<sup>61</sup> Since money was already plentiful, they argued, open market purchases would serve no useful purpose. It was better, as this view was articulated by James McDougal, Governor of the Chicago Fed, for the Fed to hold its note-issuing capacity in reserve for some future time when it would be of greater value.<sup>62</sup>

Thus, the dispute within the Federal Reserve System is typically portrayed as a disagreement over doctrine.<sup>63</sup> Epstein and Ferguson (1984) suggest, however, that the Chicago and Boston reserve banks had ulterior motives. Member banks in their districts held or were acquiring short-term securities in disproportionate numbers. The earnings of those banks would suffer if open market purchases were initiated and interest rates were reduced. This prompted the Boston and Chicago reserve banks to intervene on their members' behalf by opposing open market purchases.<sup>64</sup>

With the majority of Governors nonetheless supporting open market operations, Harrison attempted to push a purchase program through the OMPC and the Board. On April 12th, 1932, the OMPC approved by a vote of 10 to 1 Harrison's resolution authorizing an additional \$500 million of open market purchases to be undertaken as soon as possible. Only Roy Young, now Governor of the Boston Fed, voted no, although McDougal of Chicago warned that this inflationary policy might undermine public confidence.<sup>65</sup> The OMPC purchased \$100 million of securities weekly before exhausting its authorization. At that point the OMPC approved an additional \$500 million of purchases, despite negative votes by Young and McDougal.<sup>66</sup>

So far there is nothing exceptional about this episode. A difference of opinion existed among the members of the OMPC, and policy was determined by majority vote. The story gets interesting when one observes that the Chicago and Boston reserve banks, and the former in particular, could and did increase the cost to the other reserve banks of carrying out the policy. Chicago and Boston threatened to sit on the sidelines while the other reserve banks purchased securities. Since gold backing restrictions on notes applied individually to each reserve bank, this raised the danger that the cover ratio of the New York Fed or another reserve bank would fall below the legal minimum.<sup>67</sup>

By the end of the June, the gold cover ratio of the New York bank had fallen to 50 per cent, while Chicago's was still 75 per cent.<sup>68</sup> If the New York Fed continued to purchase securities without Chicago's support, its capacity to provide future lender-of-last-resort facilities to banks in its district would be eliminated.<sup>69</sup> In principle, the Board could have forced Chicago to rediscount on behalf of New York, transferring some of its gold there, but officials within the System viewed this step as undesirable on the grounds that it would reveal the depth of division within the Federal Reserve System and therefore demoralize the markets. By June, Harrison himself was questioning the advisability of continuing the program of open market

purchases unless Chicago and Boston agreed to participate. As he put it, "I do not see how this bank [New York] can continue to carry so much more than its share of the load."<sup>70</sup>

Harrison's efforts to win over officials in Chicago and Boston proved unavailing. Nor did his efforts to get his acquaintances in the Chicago banking and business community to pressure the Chicago Fed bear any fruit. Mounting gold losses compelled the OMPC and the Board to halt open market operations in August.<sup>71</sup> Thus, resistance by a minority of reserve banks, notably Chicago, increased the cost to the others of providing the stabilization function, forcing open market purchases to be abandoned sooner than would have otherwise been the case. In terms of the model of Section III.A, inadequate cooperation led the stabilization function to be undersupplied.

#### 5. The 1933 Banking Crisis

A fifth conflict (the final one considered here) arose out of the banking panic with which Franklin Delano Roosevelt was greeted upon taking office.<sup>72</sup> Panic surfaced first in Michigan in February 1933; by early March bank runs had spread to virtually every state of the union. The question is why the Fed did not do more to stabilize the banking system. Officials throughout the Federal Reserve System recognized the banking system's need for liquidity. By early March, however, the gold cover ratio System-wide had fallen to 45 per cent. The provision of additional liquidity threatened to violate this most basic provision of the gold standard and, in the prevailing view, to further demoralize financial markets.

Gold losses were borne unevenly by reserve banks, with New York experiencing far and away the greatest pressure. Foreigners, fearing a possible devaluation of the dollar, scrambled to get their money out of the country in order to avoid the capital losses that would result.<sup>73</sup> Since the vast majority of foreign deposits was held by New York banks, gold was drained

from the coffers of the New York Fed. In addition, difficulties in Michigan and throughout the interior prompted the liquidation of correspondent balances in New York. In the three weeks ending on March 8th, 1933, New York suffered more than 100 per cent of the gold losses of the Federal Reserve System.<sup>74</sup> On March 4th, when US monetary gold reserves were 44 per cent of the note and deposit liabilities of the Federal Reserve System, the gold backing of the notes of the New York Fed had fallen to the 40 per cent statutory minimum.<sup>75</sup> In terms of the model of Section III.A above, this is an example of the situation in which New York was forced to bear a disproportionate share of the stabilization function.

As in 1932, the Chicago Fed was the principal repository of the System's excess gold reserves. At the beginning of March 1933, the Chicago bank's gold reserve was still 65 per cent. In principle, the New York Fed might have obtained additional gold from Chicago. On March 1st, the Chicago Fed lent \$105 million to its New York counterpart by purchasing a matching amount of New York's government securities and acceptances under a repurchase agreement. On March 3rd, however, Chicago withdrew its cooperation.<sup>76</sup> Spokesmen for member banks in Chicago were skeptical that the New York banks would be significantly strengthened by the transfer of funds, but they were convinced that their own position would be weakened. They pressured the Chicago Fed to withdraw its support for New York.

On March 4th the Federal Reserve Board considered the situation but declined to compel the Chicago Fed to aid New York.<sup>77</sup> The New York Fed was forced to curtail its lender-of-last-resort activities.<sup>78</sup> The New York Stock Exchange and other exchanges nationwide suspended operations the same day. The bank holiday followed immediately. This can be thought of as the situation at point S\* in the analytical model, where Chicago acts as a Stackelberg leader. Chicago was aware of New York's commitment to support its member banks and the stock exchange. It could reduce its contribution to stabilizing financial markets in anticipation of New York taking up a part of

the slack. Chicago's refusal to provide part of the stabilization function forced New York to shoulder a disproportionate share of the burden. Since the cost to New York of additional lender-of-last-resort activities eventually proved prohibitive, less of the stabilization function was provided than would have been the case had the Board forced the reserve banks to cooperate.

On March 7th the Federal Reserve Board finally compelled Chicago and the other reserve banks to resume interdistrict rediscounting on behalf of the New York Fed. This allowed the latter to resume discounting on behalf of member banks. It became possible to gradually reopen the commercial banks whose operations had been suspended by the bank holiday. The stage was set for reconstruction of the American financial system.

#### IV. Implications for a European Central Bank

While the particulars of this history will not carry over to Europe in the 1990s, some general lessons are certain to apply. In this conclusion I emphasize four implications of the early history of the Federal Reserve System for the design of a European central bank.

The first implication is the importance of close coordination among national central banks once monetary unification is achieved. Any attempt to decentralize monetary control at the level of national central banks creates the danger that their stabilization function will be underprovided. Since stabilization has the character of an international public good, no national central bank has the incentive to internalize all of the international spillovers created by its actions. Efficiency requires transnational control.<sup>79</sup> The dangers raised by its absence are acute whether goal of stabilization policy is output or price stability. European policymakers have clearly stated the need to centralize control once a European central bank comes into operation. But the point applies equally well to Stage 2 of the monetary unification process, when exchange rates are immutably fixed but national central banks may retain a considerable degree of autonomy. From

this point of view, the current approach to Stage 2 poses considerable dangers.

A second implication is the importance of resolving in advance controversies over the locus of control. If residual uncertainty remains, it is likely that monetary unification will be followed by a period in which national central banks test the limits of their autonomy and take independent action as a way of demonstrating to the newly-established European central bank that some such autonomy remains. This is likely to evoke a strong response by the ECB designed to demonstrate authority. In the early history of the Fed, this process of thrust and parry led to disastrous delays.

A third implication is that, to prevent such controversies from arising, issues of autonomy and control should be addressed explicitly. The same point applies, of course, to the managerial hierarchy of any enterprise, not just to a central bank. But it is in the public sector, where questions of authority and control become politically charged, that the temptation to circumvent them is greatest. Given the politically-charged nature of these issues, the framers of the Federal Reserve Act sought to avoid them. This led to the disputes which disrupted policy for fully two decades. The draft statutes of the European central bank, in their current form, leave open substantial questions of authority and control. The early history of the Fed underscores the need to provide definitive answers before the new institution comes into operation.

The fourth and final implication of this cautionary tale is the importance of endowing any new institution with a model of the central banking function that is coherent and pertinent. In the case of the Fed, this model was missing; hence the centralization of authority in the 1930s was a mixed blessing. On the one hand it permitted the emergence of an institutional structure capable of internalizing the interregional externalities that characterize monetary policy and resolved the disputes over authority and control that had created extended policy deadlocks. On the other hand it



18. Stabilization Hearings on H.R. 7895, 1926, p.865.
19. Burgess (1936), p.218.
20. Stabilization Hearings on H.R. 7895, 1926, pp.865-866.
21. Clark (1935), p.169.
22. Governor Strong, in letters to J.H. Case written in the spring of 1923, complained that the Board had exceeded its authority. Chandler (1957), p.228.
23. Stabilization Hearings on H.R. 7895, 1926, pp.866-867; Stabilization Hearings on H.R. 11806, 1928, p.403.
24. U.S. Congress (1971), p.102; Stabilization Hearings on H.R. 7895, 1926, p.866.
25. Chandler (1957), p.229.
26. The remainder of this paragraph draws on Chandler (1957), pp.229-232.
27. Kemmerer (1938), pp.203-204.
28. Friedman and Schwartz (1963), p.368.
29. Clark (1935), p.176.
30. Hearings on Banking Systems, 1931, p.158.
31. Thus, even had the 1933 Banking Act been in effect in 1929, the New York Fed might well have had the option of intervening on behalf of New York banks embarrassed by the liquidation of brokers loans, even without Federal Reserve Board approval. On this 1929 episode, see below, pp.27-28.
32. For an account of this episode, see below, pp.23-24.
33. On the 1929 policy of direct pressure, see below, pp.25-26.
34. A source for this is the testimony of Eccles in Hearings Before the Senate Committee on Banking and Currency, 4 March 1935, 74th Congress, First sessions, pp.179 ff.
35. Obviously, nothing of substance is affected by the convenience of reducing the number of players from 12 to 2.
36. I let  $Y$  denote nominal rather than real income or output in order to link it to monetary policy in a particularly simple fashion. Since price and output changes were positively correlated in the critical period considered here, nothing of substance is affected by this assumption.
37. On this "fire sale" problem, see Bentson et al. (1985). Stabilizing the banking system would stabilize output through the channels emphasized by both Bernanke and Friedman and Schwartz. Thus, to accept the rest of the analysis it is not necessary to buy into a particular model of the monetary transmission mechanism.
38. It is straightforward to reformulate the model so that the discount rate rather than open market operations is the policy instrument. See Eichengreen (1985) for an example. In applying the model to case studies

in Section III.C below, I refer to open market purchases and discount rate reductions interchangeably.

39. I have selected a particular point of tangency along the contract curve, that at which the losses of the two banks are equal, on the grounds that they are symmetrical in all respects.

40. The authoritative account of these meetings is Moreau (1954).

41. Wicker (1966), pp.110-111.

42. Hamlin Diaries (Library of Congress), XIV, pp.12-13, July 25.

43. Hamlin Diaries, XIV, p.29.

44. Hearings on Banking Systems, 1931, (Part VII) p.132 and passim.

45. Eichengreen (1992), chapter 8.

46. For two recent statements of the view, see Field (1984) and Hamilton (1987).

47. Wicker (1966), p.118. In terms of the model, this can be thought of as an instance where the cooperative solution C is too costly to sustain.

48. Goldenweiser Papers (Library of Congress), memorandum of January 28, 1928.

49. The Governor of the Federal Reserve Board was the 1920s equivalent of what is known today as the Chairman.

50. Harrison cited the fact the New York Fed had for many years changed its buying rate for bills "without any question or disapproval by the Board." Young retorted that "he did not intend any longer to be a rubber stamp." Harrison Papers, Conversations, Vol. 1, memorandum of January 25, 1929, p.3.

51. Recommendations of the Federal Advisory Council to the Federal Reserve Board, September 28, 1928, printed in Annual Report of the Federal Reserve Board for 1928, p.229.

52. Harrison Papers, Open Market, Vol. 1, Letter from Roy Young to Gates W. McGarrah, Acting Chairman, Open Market Investment Committee, November 27, 1928.

53. Not only was this an attempt to force the hand of the Board, but Harrison noted that the commercial bankers who served as directors of the New York Fed would be placed in an embarrassing position if the Board held its decision overnight and the bankers were then to conduct securities transactions with the inside information that the New York Fed's rate might be raised subsequently. Hamlin Diary, XV, February 14, 1929, pp.169-170; Harrison, Conversations, Vol. 1, memorandum of February 14, 1929.

54. Harrison Papers, Conversations, Vol. 1, memorandum of April 25, 1929, p.1.

55. He reached a few of them by telephone at 3:00 in the morning. Stabilization of Commodity Prices, U.S. House Banking and Currency Committee, Subcommittee, Hearings (72:1) (April 13, 1932), p.475.

56. Hamlin Diaries, XVI, pp.186-89, November 4-9, 1929.

57. Harrison Papers, Conversations, Vol. 1, memorandum of November 15, 1929, p.6.
58. Harrison Papers, Open Market, Vol. 1, Letter from R.A. Young to George Harrison, November 13, 1929.
59. Harrison Papers, Miscellaneous, Vol. 1, letter, November 25, 1929. For a more detailed account of this episode, see Friedman and Schwartz (1963), pp.366-367.
60. In arguing that free gold mattered, I follow Wicker (1966) and Epstein and Ferguson (1984) but dissent from Friedman and Schwartz (1963). The free gold problem arose from the fact that Federal Reserve notes had to be collateralized with either gold or eligible (commercial) paper. Treasury securities did not qualify. Insofar as eligible paper fell below 60 per cent of Federal Reserve notes, the remaining share had to be backed with gold. The Fed's free gold fell to less than \$400 million in late 1931 and early 1932, limiting the open market purchases that were feasible.
61. Those who had indulged in speculative excesses, in this view, should now be made to pay the price. Additional open market purchases would only reward and encourage the reckless, thereby setting the stage for another round of speculative excesses and leading eventually to another crash and an even more catastrophic slump. On the genesis of the liquidationist view, see DeLong (1990).
62. Harrison Papers, Discussion Notes, Meeting of the Board of Directors, July 14, 1932, pp.273-274; Friedman and Schwartz (1963), p.371.
63. See for example Wheelock (1988) for a recent statement of this view.
64. In terms of the analytical model of Section III.A, this situation can be thought of as one in which open market purchases have a large (and costly) impact on the first argument of the Chicago Fed's loss function (E-E).
65. Harrison, Open Market, Vol. II, minutes of meeting, April 12, 1932.
66. Harrison, Open Market, Vol. II, minutes of meetings, May 17 and June 16, 1932.
67. Harrison, Open Market, Vol. II, minutes of meetings, July 14, 1932 reported veiled threats by Boston and, especially, Chicago. Glass-Steagall had only eliminated restrictions on the 60 per cent of the backing that now could be made up of government securities as well as eligible bills, without eliminating the 40 per cent gold cover restriction that remained in place until Roosevelt suspended the gold standard in 1933.
68. Friedman and Schwartz (1963), p.387.
69. In terms of the analytical model in Section III.B above, this can be thought of as forcing New York to accept a large value of  $\bar{B}$ , insofar as  $\bar{B}$  can proxy not only for interest earnings but also for lender-of-last-resort capacity held in reserve.
70. Harrison, Discussion Notes, Vol. II, Meeting of the Board of Directors, June 30, p.252; Meeting of the Executive Committee, July 5, 1932, p.257.
71. Harrison, Discussion Notes, Meeting of the Board of Directors, July 7, 1932, p.265. Eichengreen (1991), chapter 10.

72. The account of the 1933 banking panic presented here draws on Eichengreen (1991), chapter 11.

73. This is the explanation for the 1933 banking crisis emphasized by Wigmore (1987), Temin (1989) and Eichengreen (1991) alike.

74. Wigmore (1987), Table 2.

75. New York was not the only reserve bank forced to limit its purchases of bills because of its low level of reserves. Chandler (1971, p.219) mentions Philadelphia, Cleveland, Richmond, Atlanta, Kansas City and Dallas as other reserve banks all of which suffered from the same problem.

76. Wigmore (1987), p.747.

77. James (1938), pp.1062-1063.

78. Wigmore (1987), p.748.

79. Essentially the same point, in a somewhat different context, is made by Casella and Feinstein (1989). A similar point -- that monetary policies have international spillovers that create inefficiencies when they are not taken into account -- also applies, of course, in a situation in which nations have independent currencies. See for example the contributions to Buiter and Marston (1985). But one can argue that, so long as nations have independent currencies and retain the option of changing the exchange rate, they are better able to insulate themselves from these spillovers.

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