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ABSTRACT

The decentralized structure of the Federal Reserve System is evaluated as a mechanism for generating and processing new ideas on monetary and financial policy. The role of the Reserve Banks starting in the 1960s is emphasized. The introduction of monetarism in the 1960s, rational expectations in the 1970s, credibility in the 1980s, transparency, and other monetary policy ideas by Reserve Banks into the Federal Reserve System is documented. Contributions by Reserve Banks to policy on bank structure, bank regulation, and lender of last resort are also discussed. We argue that the Reserve Banks were willing to support and develop new ideas due to internal reforms to the FOMC that Chairman William McChesney Martin implemented in the 1950s. Furthermore, the Reserve Banks were able to succeed at this because of their private-public governance structure, a structure set up in 1913 for a highly decentralized Federal Reserve System, but which survived the centralization of the System in the Banking Act of 1935. We argue that this role of the Reserve Banks is an important benefit of the Federal Reserve's decentralized structure by allowing for more competition in ideas and reducing groupthink.

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1. Introduction

This paper evaluates the historical role of the Reserve Banks in determining Federal Reserve monetary and banking policy. It takes the view, held by others such as Meltzer (2002), that ideas matter in determining central bank policy. It also takes the view, held by Arrow (1974), that organizations need to process and learn from information. We argue that the Federal Reserve's decentralized structure was favorable to the processing and generation of ideas, that the Reserve Banks were an important entry point for new ideas into the Federal Reserve System, and that these ideas ultimately contributed to Federal Reserve policy making.

A major challenge for central bank design is that the problems faced by monetary and banking policymakers change over time. Before World War II, the main problems faced by central bank policymakers were gold convertibility, provision of an elastic currency, financial stability, stabilization of seasonal cycles in interest rates, stabilization of business cycles, and lender of last resort policies, all while operating under a gold standard. After World War II, the main problems were how to stabilize business cycles and maintain full employment while stabilizing the inflation rate under first the Bretton Woods system and then a fiat money system, how to operate effectively as a lender of last resort when banks are covered by a deposit insurance system, and how to deal with a bank structure that was highly fragmented because of branching restrictions. A central bank that is structured so that it can learn new ideas will be better able to solve problems as they arise and will be more effective.

The governance and structure of the Reserve Banks were set up in 1913 for a central bank system in which the regional Reserve Banks were autonomous, with limited oversight from Washington, and the prevailing idea about a desirable monetary system was the real bills

doctrine. In the first 20 years of the Federal Reserve System's history, there was considerable discord between the Reserve Banks and the Board in Washington and between the Reserve Banks themselves over both the conception and operation of monetary policy. As the 1920s progressed, policy conflicts were reduced somewhat by the creation of the predecessors to the Federal Open Market Committee (the Open Market Investment Committee [OMIC] and the Open Market Policy Conference [OMPC]), but the decentralized structure prevented useful coordination. Both the structure and the ideas about monetary policy led to major policy errors that contributed to the Great Contraction of 1929-33.

With the Banking Act of 1935 centralizing monetary policy in Washington, Reserve Bank autonomy was greatly reduced, though the act did not change the Reserve Banks' corporate structure much. Nevertheless, following the Treasury-Fed Accord of 1951, the governance and structure of the Reserve Banks, which were designed for a decentralized central bank, turned out to be very useful in a more centralized, federal central bank system.

To create stable, low inflation under a fiat system, a central bank needs two things. First, it needs to be independent enough to resist short-term political pressure, but not so independent that it is not accountable in the long run. Second, it needs to be able to learn how to keep inflation stable. We argue that the decentralized elements of the Federal Reserve System in the post-accord era helped provide independence to the System and helped the System learn how to control inflation.

The Reserve Banks help to provide independence for three well-known reasons: First, they partially insulate the FOMC from the political process because Reserve Bank presidents are not political appointees and this helps the FOMC take a longer-term view when making policy

decisions. Second, with their regional focus, Reserve Banks are a source of information about local economic conditions. Third, they help build support in US regions for the central bank. The writers of the Federal Reserve Act envisioned all three reasons when they set up a decentralized system.

Less well known, however, is that the Reserve Banks helped the System learn by being a source of and entry point for new ideas into the System.² They served an important role by providing a home for new ideas on monetary policy starting in the 1960s. These ideas helped the System learn how to stabilize the inflation rate under a fiat monetary system in the 1980s. The Reserve Banks were also a home for dissenting ideas on lender of last resort and related issues such as moral hazard and too big to fail policy.

This paper starts by providing an overview of the structure and governance of the Federal Reserve System and how that has changed over time. It describes the decentralized system created by the Federal Reserve Act of 1913, in which the Reserve Banks were autonomous, but subject to some oversight from the Federal Reserve Board in Washington. It then describes the structure created by the Banking Act of 1935, established in reaction to the perceived flaws of the early Fed, which formalized the Federal Open Market Committee (FOMC), centralized power in the Federal Reserve Board, yet retained a role for the Reserve Banks on the FOMC and did not change their corporate structure.

Next, the paper describes the changes due to the Treasury-Fed Accord of 1951 and internal governance reforms to the FOMC instituted by Chairman William McChesney Martin in the 1950s that created the modern form of the Federal Reserve. We will argue that Chairman

² This idea can also be found in Goodfriend (1999) and Wheelock (2000).

Martin's internal reforms, combined with the decentralized, semi-private corporate structure of the Reserve Banks, created the conditions that led to Reserve Banks being a source of and entry point for ideas.

The paper then proceeds to discuss different periods in Federal Reserve history. For each period, it discusses major economic, monetary, and financial developments. It then discusses important monetary and financial policy decisions that needed to be made. It discusses the intellectual ideas in academia and in the Federal Reserve. It then discusses to what extent the Federal Reserve's structure played a role in disseminating and developing various ideas and then to what extent these factors played a role in decision making. However, throughout the description of this familiar story, the paper integrates the less familiar story of how the Federal Reserve's structure contributed to these developments by discussing the intellectual role played by the Reserve Banks.

2. The Origins of the Fed and Reserve Bank Governance

To understand the present corporate structure of the Reserve Banks and the structure of the FOMC, it is necessary to understand the origins of the Federal Reserve and the FOMC. The history of central banking in the United States is characterized by a debate over whether there even should be a central bank. For most of the period prior to the creation of the Federal Reserve, the United States did not have one. Neither of the two attempts to create one, the First and Second Banks of the United States, lasted more than 20 years. Opposition was based on the fear that a central bank would act either for the benefit of the "monied interests," that is, Wall Street, or for the benefit of politicians, typically those in Washington DC. In 1913, when the Federal

Reserve was being created, these concerns were raised and reflected in the debate about whether the central bank should be a decentralized system or a centralized system based in Washington. In the case of the Federal Reserve Act, the resulting compromise was something in between. The Federal Reserve System is a central bank, but it is a decentralized system in which the Board represents the public and the Reserve Banks represent 12 different regions and are corporations rather than bureaus of a federal agency. The authors of the Federal Reserve Act viewed both the private and public governance features as essential to the operation of the System.³

There are two distinct periods of Federal Reserve history. The first period runs from the creation of the Federal Reserve System in 1913 through the Banking Act of 1935. During this period, the System was heavily decentralized, and responsibility and power were mainly allocated to the Reserve Banks. As mentioned above, during this period, conflicts over the responsibility for monetary policy and conceptions about the conduct of monetary policy led to coordination failures. As we will see in several examples, attempts to correct them were only partially successful, which contributed to the Great Contraction and changes to the governance of the Federal Reserve System.

The second period starts after the Banking Act of 1935, which centralized many powers in the Board of Governors.⁴ There is also an important sub-period from 1935 to the Treasury-

³ See Lowenstein (2015) for a description of the political forces behind the creation of the Federal Reserve Act.

⁴ Prior to the Banking Act of 1935, the heads of Reserve Banks were called governors, while the entity in Washington DC was called the Federal Reserve Board. The head of the Federal Reserve Board was also referred to as a governor, while a second member was referred to as the vice-governor. The other members were simply referred to as members in the act. The Banking Act changed the titles of the heads of the Reserve Banks to presidents and changed the title of all the members to governors. The idea behind the change was that governor was a more prestigious title, so with the centralization, it should be applied exclusively to Board members. Furthermore, to reflect this change, the title of the Board was changed to the Board of Governors of the Federal

Fed Accord of 1951 in which the Federal Reserve was essentially a bureau of the Treasury Department, but this relationship was established under the structure created in 1935. This sub-period is important for understanding the history of the Federal Reserve. But in terms of analyzing the Federal Reserve's institutional structure, this period mainly illustrates that under strong centralization of power in Washington DC, for example, during the New Deal or during war conditions, the institutional structure is relatively unimportant and, instead, a central bank will operate to meet the crisis needs of the federal government.⁵ However, the institutional structure did matter once the country came out of the crisis conditions of World War II. As we will discuss later, it provided a ready-made design to support a centralized central bank with some decentralized features. A Federal Reserve without Reserve Banks would have evolved very differently after the 1950s.

Reserve Bank Governance

In both periods, the corporate structure of the Reserve Banks was basically the same. From the beginning, the Reserve Banks were an unusual partnership of public and private interests. The origin of the private portion of the Reserve Banks lies in the structure of the banking industry during the National banking era. The Federal Reserve was set up to prevent the periodic financial panics of that era, and the Reserve Banks were modeled after the private clearinghouses in reserve cities that not only cleared checks, but also often took a leading role in preventing or managing financial panics.⁶ The connection to private organizations is apparent in

Reserve System. The change in names reflects which entity within the Federal Reserve System has the most influence over controlling, that is, governing, the supply of money.

⁵ This was also the case during World War I when the Federal Reserve indirectly assisted the Treasury by helping banks buy Treasury debt through preferential discount window loans.

⁶ See Timberlake (1984), Gorton (1985), Moen and Tallman (2015), and Gorton and Tallman (2018).

the legislative history. In 1913, everyone just assumed the Reserve Banks should be organized as private corporations with stock. Furthermore, the Reserve Banks were viewed as “bankers’ banks” and were organized very similarly to national banks. *The Report of the House Banking and Currency Committee* said in 1913, “Indeed, with one or two minor modifications of existing law they could be so organized under the present national bank act.”⁷

Reserve Bank Stock

The Reserve Banks are capitalized by its members contributing 3 percent of their own capital, plus the Reserve Banks can call on another 3 percent of the member banks’ capital if the Reserve Banks suffer losses. Membership in the Federal Reserve is voluntary for state-chartered banks, while it is mandatory for national banks.

An important part of the debate at that time with regard to independence and accountability was whether the stock should be owned by the commercial banks, the federal government, or the public.⁸ The resulting compromise on this issue was that commercial banks would own the stock, but with very limited financial and voting rights.

In terms of the financial benefits of stock ownership, ownership of Federal Reserve stock differs substantially from ownership of stock of private corporations. Owners of Federal Reserve stock are not residual claimants to profits. Instead, they receive dividends at a rate set by law.⁹

⁷ See House Banking and Currency Committee (1913), p. 32.

⁸ The Federal Reserve Act has a provision allowing for the public to purchase Reserve Bank stock if banks did not purchase the entire original subscription amount. Banks did purchase this amount, so this provision was never used.

⁹ The Federal Reserve Act set the dividend rate at 6 percent. It remained at that level until the FAST Act of 2015, which changed it to the 10-year Treasury rate for banks with over \$10 billion in assets, a threshold indexed to inflation. Presently, that rate is substantially lower than 6 percent, but during the 1970s, the 6 percent rate was lower than market rates and was a factor in banks deciding whether to be Federal Reserve members.

Profits in excess of the dividend are paid to the federal government.¹⁰ Unlike the stock of a private corporation, Federal Reserve stock cannot be hypothecated, pledged, or sold. Also unlike a private corporation, if a Reserve Bank were to be liquidated, the proceeds above paid-in capital would accrue to the federal government. Ownership of a Reserve Bank's stock does not provide the same financial benefits that ownership of a private stock does. Instead, it is much more limited and closer to that of preferred stock.¹¹

Voting rights are also more limited than in a private corporation. Owners of Federal Reserve stock cannot vote on any corporate policies or decisions. Instead, they vote only for a Reserve Bank's directors, and, furthermore, they elect only six members (two-thirds) of the board of directors. The Board of Governors chooses the remaining three directors to represent the public interest, and the Board of Governors chooses the Chair and Vice Chair from this latter group.

The mix of directors was also chosen in order to represent both public and private interests. There are three classes of directors, each with three members, for a total of nine directors. The Class A directors are bankers. The Class B and C directors cannot be bankers and are to be selected "with due but not exclusive consideration to the interests of agriculture, commerce, industry, services, labor, and consumers." Both Class A and Class B directors are

¹⁰ How profits accrued to the Treasury has changed over time. Originally, there was an excess profits tax that was applied once the Reserve Banks built up their capital surplus. Later, Reserve Bank earnings after expenses and contributions to its capital surplus account were distributed to the Treasury. The FAST Act of 2015 changed the Federal Reserve's capital surplus account by taking funds from it on a one-time basis and then capping it at \$10 billion. In 2018, Congress reduced the cap first to \$7.5 billion and then further to \$6.825 billion.

¹¹ Until the Monetary Control Act of 1980, however, membership provided several other benefits, including check clearing services, a reserve account, and access to the discount window.

elected by member banks, while the three Class C directors are appointed by the Board of Governors.¹²

Board of Directors

While directors have many of the powers of a corporate board of directors in that they can set policies for the Reserve Banks, they do have substantial constraints that a corporate board of directors does not have. For example, while they must approve the Reserve Bank's budget, so must the Board of Governors. They are not involved in supervisory decisions.¹³ The primary power of the board of directors comes from their ability to choose the president, first vice president, and other officers of the organization.¹⁴

The Banking Act of 1935

Under the Federal Reserve Act, the Reserve Banks were very autonomous. The Banking Act of 1935, however, centralized a lot of power in the Board of Governors. Nevertheless, the 1935 act preserved an important role for the Reserve Banks in setting monetary policy. It took the Reserve-Bank-run Open Market Committee, which was an informal arrangement put together by the Reserve Banks in the 1920s to conduct open market operations, and made it into

¹² Like other features of Federal Reserve governance, the election procedure for the six elected directors is unusual, but designed to balance various interests, in this case that of classes of banks, i.e., the city and country banks. Voting by banks for directors is not one vote per share, but instead one vote per member bank. Furthermore, banks within each Federal Reserve District are split into three size categories: small, medium, and large. Member banks within each category elect one Class A director, who must be from their corresponding size class, and one Class B director; so each class of banks elects two directors each.

¹³ While bank supervision is performed by the Reserve Banks, they carry out this activity as a delegated function of the Board of Governors. The legal power to write bank regulations lies with the Board of Governors. The supervisory staffs at the Reserve Banks only examine banks and enforce the rules.

¹⁴ The Dodd-Frank Act of 2010 removed the Class A directors from the selection process for Reserve Bank presidents.

the Federal Open Market Committee (FOMC).¹⁵ The structure of the FOMC centralized control in the Board by giving them seven votes on the Committee, but preserved elements of the decentralized structure of the Federal Reserve Act by giving the Reserve Banks five votes on the Committee. A 1942 amendment to the act set the existing voting rotation schedule, with the New York Fed receiving a permanent vote on the Committee and the other 11 Reserve Bank presidents receiving four votes on a rotating basis.¹⁶

The changes made to the Federal Reserve by the Banking Act of 1935 centralized power in Washington, but left the corporate structure of the Reserve Banks relatively unchanged. In terms of Reserve Bank governance, however, there was one significant change. The act gave the Board of Governors the power to approve or disapprove appointment of Reserve Bank presidents. Before the act, it only had the power to approve their salaries.¹⁷

3. The Role of Ideas and Federal Reserve Structure: Before the Banking Act of 1935

The decentralized structure of the Federal Reserve was developed under the influence of the real bills doctrine. Central banks were to lend against eligible paper, which, under the Federal Reserve Act, would be brought to the central bank by member banks. Under the doctrine, as long

¹⁵ Actually, the 1933 Banking Act created the FOMC as a committee of the 12 Reserve Bank governors. The 1935 Act gave the FOMC its current powers and set up the current structure with the allocation of votes between the governors (of the Board) and the Reserve Bank presidents.

¹⁶ The Banking Act of 1935 also made changes to make the governors more independent of political control. In particular, it removed the Secretary of the Treasury and the Comptroller of the Currency from the Board (previously they were *ex officio* members) and changed the number of governors and their terms so that there would be seven governors appointed to serve overlapping 14-year terms. By specifying long terms, the framers of the Banking Act believed that the System would be governed by individuals appointed from multiple administrations who could take a long-term view on policy. In practice, this goal has not been met. Starting in the 1970s, the typical term of a governor is far shorter than 14 years.

¹⁷ See Meltzer (2002), p. 468. Still, the Federal Reserve Act in 1913 gave the Federal Reserve Board the power to remove any officer or director of a Reserve Bank. So, at least indirectly, the Board has always had the power to approve or disapprove the appointment of Reserve Bank presidents.

as the collateral for the loans was based on real bills — that is, safe, self-liquidating short-term loans — the central bank would always create the appropriate amount of money. Under the Federal Reserve Act, the Reserve Banks were to follow this principle and set their own discount rates consistent with local money market (business) conditions. The purpose of the Federal Reserve Board in Washington was to oversee the system and coordinate monetary policy across the System. In a sense, the Federal Reserve System's provision of money was meant to be virtually automatic, and it was believed that if these policies were followed, there would be no need for a lender of last resort.

The Federal Reserve Banks opened their doors in November 1914 just in time for the outbreak of World War I in Europe. The war meant that the Fed faced a very different environment than its framers envisaged, and it consequently changed its operations in novel ways.

Because of the war, most countries left the gold standard. Then, once the United States entered the war, the Fed began discounting commercial bills backed by government securities. Furthermore, as the war progressed, the Fed pegged long-term interest rates to help the Treasury finance the war. This meant that it gave up its independence to the Treasury.

At the end of the war, in 1918, the Federal Reserve kept its discount rate low at the Treasury's behest. This fueled a massive commodities price boom and inflation. Faced with declining gold reserves in late 1919, the Federal Reserve Banks (with approval by the Board) raised discount rates. This led to a serious deflation and recession, which Friedman and Schwartz (1963) termed the Fed's first policy mistake, for waiting too long to cut its rates. The recession

also led to severe criticism of the Federal Reserve, causing it to cut back on its use of discount rates as its key policy tool and shift toward the use of open market operations.

In the 10th Annual Report of the Federal Reserve, new operating procedures based on open market operations – the Burgess-Riefler-Strong doctrine—were developed, which were an implementation of the real bills doctrine (Meltzer (2000)). The theory was that member banks would only turn to the discount window in the case of need; hence, the Fed would use its open market operations to pressure member banks to come to or to avoid coming to the discount window. The Burgess-Riefler-Strong doctrine provided a guide to monetary policy based on two indicators of the stance of monetary policy: member bank borrowing at the money center Federal Reserve Banks (New York and Chicago) and the level of short-term nominal interest rates. In the 1920s, the Fed, following these principles, was relatively successful in stabilizing the US economy, although it may be due more to luck than the doctrine. According to monetarist views, in the 1930s, pursuing this doctrine led to disaster.¹⁸

Brunner and Meltzer (1964) and Meltzer (2002) criticized the Burgess-Riefler-Strong doctrine because they believed it was based on misleading indicators. They believed that the short-term nominal interest rate could be high or low, reflecting expected inflation or deflation, while member bank borrowings were misleading because they did not distinguish between ex ante and ex post borrowing needs.

Within this theoretical context, conflict among the Reserve Banks and between the Reserve Banks and the Board began quite early over the lack of cooperation in setting discount rates and conducting open market operations. This occurred because the act wanted the Reserve

¹⁸ See Bordo (2018c).

Banks to conduct their own monetary policies to influence economic conditions in their own Districts; however, money markets were national and the Board's coordinating authority was not clear; that is, it was not clear whether the Reserve Banks had to follow the Board's instructions.

To create a coordinating mechanism, the Reserve Banks, without the Board's consent, set up the Governors' Conference in 1921 to coordinate both discount rate and open market operations.¹⁹ In April 1922, the Board asserted its authority and disbanded the Governors' Conference, setting up in its place the Open Market Investment Committee (OMIC) to coordinate open market operations at the national level. It was composed of the governors of the Reserve Banks of New York, Chicago, Boston, Philadelphia, and Cleveland.

As it turned out, Governor Benjamin Strong of New York became the de facto leader of the OMIC. According to Friedman and Schwartz (1963), the OMIC under Strong was very successful at stabilizing the economy and producing what they called "the high tide of the Federal Reserve." Nevertheless, many of its actions were resented by the seven Reserve Banks that were not on the committee as well as by the Board, which often felt its authority was being challenged (Eichengreen (1992)). Also, although the Board had ultimate authority on setting rates and conducting open market operations, individual Reserve Banks could opt out.

A number of famous examples of conflict provide a strong flavor of the coordination problems that the system faced in its early years (Bordo (2016)). One episode occurred in 1927, when Strong arranged a meeting on Long Island between himself and the governors of the central banks of England, France, and Germany. At this summit it was agreed that the New York Fed would lower its discount rate to help the Bank of England in its struggle to stay on the gold

¹⁹ Recall that prior to the Banking Act of 1935, the leaders of the Reserve Banks were called governors.

standard. The Board was not part of the negotiations. After the meeting, there was a vociferous debate at the Board and in the other Reserve Banks about going along with the rate cut. In the end, the Board reluctantly approved Strong's action, but the Chicago Fed held out. The Board subsequently forced Chicago to cut its rate. Adolph Miller of the Board, the only professional economist in the System, later argued that Strong's policy fueled the Wall Street stock market boom that led to the Great Depression, a view adopted much later by Herbert Hoover in his memoirs.

A second notable example of discord was in 1929 when New York and Chicago disagreed over raising rates to stem the stock market boom. In the end, the Fed followed a tightening open market policy (Wheelock (2000)).

A third example was when the Board and New York disagreed over how to stem the Wall Street boom. The Board wanted to engage in moral suasion to ration credit against loans to finance stock market speculation.²⁰ New York and the other Reserve Banks on the OMIC doubted such a policy would work and pushed for raising discount rates. The Board blocked New York 10 times until finally acquiescing in the early summer of 1929 when it was too late.

A fourth example was after the Wall Street crash in October 1929. The New York Fed, under Governor Harrison, engaged in open market operations to provide liquidity to the New York money market to prevent a banking panic. The Board criticized his actions for not following protocol. Later in November, the Board blocked Harrison's request to further ease policy, undoubtedly worsening the recession.

²⁰ The Board referred to this as "direct action." See Chandler (1971).

In March 1930, the Board disbanded the OMIC and created the Open Market Policy Committee (OMPC), which consisted of all 12 Reserve Bank governors. According to Friedman and Schwartz (1963), this reorganization was a huge mistake because the larger committee, without the leadership of Benjamin Strong, who died in October 1928, was unable to be decisive. Its defects became apparent as the Depression worsened and the Fed failed to stem a series of worsening banking panics.

By the spring of 1932, under pressure from Congress, the Federal Reserve began a massive open market purchase program led by Governor Harrison of New York. It was quickly successful in reversing the recession, but it was short-lived. Reserve Bank governors began to worry that their gold reserves were declining toward the statutory limits. Some Reserve Bank governors and the Board, along the lines of the real bills doctrine, also worried that the purchases would lead to speculation, an asset price boom, and inflation. Once Congress went on recess, the purchases stopped (Friedman and Schwartz (1963), Meltzer (2002)).

The final and most serious example of discord in the System was in the first week of March 1933, during the final panic of the Great Contraction. This panic, unlike the preceding ones, involved a speculative attack against the New York Fed's gold reserves. Some argue that the attack reflected the market's belief that the newly elected president, Franklin Roosevelt, would take the United States off the gold standard (Wigmore (1987)). The attack led to a depletion of the New York Fed's gold reserves toward the statutory limit, after which it would have to cease conducting lender of last resort actions. The New York Fed turned to the Chicago Fed, which had ample reserves, and requested a temporary loan of gold. Chicago turned New York down and the

Board refused to intercede. The crisis worsened and was only ended when Roosevelt took office and declared a banking holiday.

Bad Structure or Bad Ideas?

Friedman and Schwartz cited these examples in their indictment of the Federal Reserve for causing the Great Contraction. They believed that had Benjamin Strong lived, he would have effectively used the OMIC to prevent the mistakes that followed his death. They were in favor of the consolidation of power in the Board that followed in 1935. Eichengreen (1992), using the tools of game theory, argued that had the Reserve Banks and the Board coordinated policy during the above examples of discord, the US economy would have been much more stable. For this reason, he also supported the consolidation of the System in 1935.

On the other hand, Brunner and Meltzer (1968), Meltzer (2002) and Wheelock (1991) argued that the real problem that the Federal Reserve faced was not structural but resulted from the theory of monetary policy it followed. They argued that the Federal Reserve followed misleading indicators of the stance of the economy based on the Burgess-Riefler-Strong doctrine. In particular, from 1930 to 1933 interest rates were low and member bank borrowing was low. Therefore, the Fed viewed its policy as largely accommodative, and hence, did not see the need for further loosening. Meltzer argued that Strong and most Reserve Bank governors as well as members of the Board believed in this flawed doctrine and that was the reason for the policy mistakes. Hence, according to these authors, the Roosevelt consolidation of the Federal Reserve was not really necessary.²¹

²¹ There are other ideas for why the Great Contraction was so severe. Bernanke (1983) emphasizes the role of the bank panics, while Ohanian (2009) emphasizes the combination of Hoover's policy of keeping nominal industrial wages up under conditions of a severe deflation.

4. The Role of Ideas and Federal Reserve Structure in Monetary Policy: After the Banking Act of 1935

In this section we break up our discussion of monetary policy into different periods. There were significant changes in monetary policy in this period and different ideas on monetary policy developed at different times. Therefore, it is useful to break the discussion of monetary policy into sub-periods.

4.1 The Fed as a Bureau of the Treasury: 1936-1951

While the Banking Act of 1935 preserved the Federal Reserve and, in terms of appointments, strengthened the separation between the Board of Governors and the Administration, in practice, the Federal Reserve was mainly subservient to the Treasury department at the time. This was due to the heavy centralization of powers in the presidency during the New Deal era and later the United States' entry into World War II. What this meant in practice was that the main concern of the Federal Reserve during this period was to support the Treasury's financing of government spending. This was particularly the case during World War II. Monetary policy during the war was based on the goal of targeting the yield on long-term government debt and making sure that there was "an orderly market" in government debt.

The other important development in this period was the passage of the Employment Act of 1946. The act did not enumerate specific actions for the Federal Reserve, but it did lay out objectives the federal government should aim for, such as full employment and price stability. The philosophy of the act was based very much on the ideas of Keynes, and its dual mandate set an agenda that influenced Federal Reserve priorities later, particularly starting in the 1960s.

The Treasury-Fed Accord of 1951

Following the end of World War II, tensions arose between the Federal Reserve and the Administration over the policy of targeting the yield on long-term government debt. President Harry Truman and his Secretary of the Treasury wanted it to continue, but the Federal Reserve wanted it to stop because of fear of inflation. On this issue, the Federal Reserve had substantial support from Congress as well as the financial press.

The tensions between the Federal Reserve and the Administration erupted after an event at which the FOMC met with President Truman at the White House, discussed the policy, and the White House released a statement claiming that the FOMC agreed to back Truman's policies when, in fact, it had not. Former Fed Chairman Marriner Eccles, who was still on the Board, leaked information to the financial press countering Truman's claim. The ensuing events ultimately led to a compromise in which the Board and the Treasury agreed to a short statement, and Fed Chairman Thomas McCabe stepped down and was replaced by William McChesney Martin, who was a Treasury official.²²

While the appointment of Martin as Chairman suggested a victory for the Administration, that was not the case. Once he was Chairman, Martin acted in support of Federal Reserve independence and used the accord to break the tight link between the Treasury and the Federal Reserve and allowed the Federal Reserve to more independently set monetary policy.

²² For more details on the 1951 accord and the events leading up to it, see Hetzel and Leach (2001a, 2001b).

4.2 The 1950s and Early 1960s

In this period, the main development for the Federal Reserve was political in that it gained its independence from the Treasury. There was little connection between academic ideas and monetary policy during this period. Chairman Martin was strongly anti-inflation, but did not rely on economic analysis (Hetzel (2008), Meltzer (2009b), p. 1222). He based his policy on following the money markets and short-term interest rates to judge whether the Federal Reserve was being sufficiently accommodative. He believed that government deficits determined inflation (Meltzer (2009a)). He generally followed a policy of leaning against the wind.

While Chairman Martin was not a believer in economic theory, he did institute changes to the FOMC that, while reducing the influence of the New York Fed, also had long-lasting consequences for the role of the Reserve Banks and the influence of economic ideas on the Federal Reserve. Shortly after Martin became Chairman, an ad hoc subcommittee of the FOMC was created in 1952 to review the FOMC's operating procedures. This study was part of a battle for control between the Board and New York for supremacy over monetary policy, but it was also a debate about the appropriateness of different monetary policy operating procedures.

New York, under the leadership of the formidable Alan Sproul, believed that monetary policy required that the FOMC target the entire yield curve and to do this required active involvement in all parts of the Treasury market by the Desk. In contrast, Martin and Board staff believed that a bills-only policy in which the FOMC targeted only the short-term rate was sufficient and that financial markets would be able to determine the yield curve without Fed intervention.

In pushing for this change, Martin also changed how the FOMC operated. Previously, the FOMC delegated decisions to an executive committee. The executive committee consisted of the Chairman, two governors, the president of the New York Fed, and the president of one other Reserve Bank.²³ The committee was basically run by the Chairman and the New York Fed president. New York's influence came from being so integrated into the money markets that often the committee would defer to New York due to its superior knowledge.

Martin succeeded in this effort and the executive committee was abolished in 1955. With Martin's changes, the entire FOMC became more involved with the open market decisions and had to form and express opinions on these matters. Furthermore, by changing the focus of monetary policy to a bills-only policy, the FOMC could focus on a single, easy-to-measure rate to guide open market operations.²⁴

The immediate effect of the change was that the Board asserted supremacy over New York on monetary policy, and, indeed, Alan Sproul resigned shortly after the change and was replaced by Alfred Hayes, a community banker with little experience with the Federal Reserve.²⁵ However, the change to the FOMC also contributed to some longer-term and more subtle changes in how the FOMC, the System, and the non-New York Reserve Banks operated.²⁶

²³ Often, the other Reserve Bank was Philadelphia or Richmond because they were both close to Washington DC, and with the travel times of that era, it was much easier for their presidents to get there than it was for other presidents.

²⁴ This is not quite right. At the time, bank net free reserves were viewed as an important signal about the appropriateness of monetary policy as well (Bordo (2018a)). Reserve requirements were set by the Board and not the FOMC.

²⁵ The view that appointing Hayes symbolized the Board asserting supremacy can be found in *The Economist* (1956).

²⁶ Part of Martin's motivation for the reforms may be that he believed that the System was a trustee of the money stock and that all the elements of the Federal Reserve should act in the System's best interests. However, he was also certainly cognizant of the political economy benefits of strengthening the Reserve Banks (see Hetzel (1995)). It should not be forgotten that Martin undertook these reforms shortly after the Fed regained its independence from the Treasury under the 1951 accord, and it was by no means certain that the Fed would not lose it again.

First, the FOMC began to meet more often. Previously, it met only four times a year, but after the changes, it met seven times a year (Meltzer (2009a)) and meetings were attended by the Board of Governors and all 12 Reserve Bank presidents (Whittlesey (1963)). As a result, Reserve Bank presidents and their staff came into frequent contact with the rest of the System, and the meetings turned into an educational forum in which monetary policy ideas could be discussed (Whittlesey (1963)).

Second, the expansion of decision-making authority from the executive committee to the entire FOMC forced the rest of the Reserve Banks to focus more attention on monetary policy. The effects of this change can be seen in a 1956 article in a news weekly that described the activities of the Federal Reserve Bank of Cleveland (*Business Week* (1956)):

“[Federal Reserve Bank of Cleveland President Wilbur] Fulton disclaims any desire to be known as a leader in the System. But he is a prime example of the type of policymaker now being developed.

Until the 1951 accord, most Fed bank presidents, with the exception of Alan Sproul in New York, spent most of their time overseeing technical operations and ironing out regional banking problems. Although Fulton was trained as a practical banker rather than a student of monetary policy, he had managed to learn the ropes of central banking. ... His own experience has taught him that there is a pressing need to develop personnel who can grapple with the complicated problems of monetary policy.”

This focus on monetary policy likely shifted leadership in top management at the Reserve Banks toward personnel trained as economists (Whittlesey (1963), p. 38).²⁷ Whittlesey writes:

“The most striking, though not necessarily the most significant, manifestation of the rise of economists has been their appointment to topmost administrative positions. By 1961, the

²⁷ Other than at the New York Fed, professionally trained economists had a much smaller role in Reserve Banks in the 1940s. In a study on research at the Reserve Banks, the agricultural economist T.W. Schultz found that the Research departments were typically underused and poorly managed. He recommended several organizational changes, such as increasing the professionalization of researchers (Schultz (1943)). Similarly, Bach (1950) says that only the Board and the New York Fed had large staffs devoted to research. For example, Bray Hammond was assistant secretary to the Board of Governors from 1944 to 1950. Later, he won the Pulitzer Prize for his 1957 book *Banks and Politics in America from the Revolution to the Civil War*.

presidents of six of the twelve Federal Reserve Banks were professional economists, all but one of them holders of the Ph.D. degree. Trained economists were also conspicuous at the vice-presidential level. As far as the Federal Reserve is concerned, a background in economics now seems to provide better credentials than experience in law or banking for the responsibilities of a central banker.”

Whittlesey’s observation can be seen during this time period in the leadership of the Federal Reserve Bank of Cleveland. President Fulton’s background was in banking, but his research director, Merle Hostetler, and his first vice president, Donald Thompson, were economists. Furthermore, his successor, Burt Hickman, who was appointed in 1963, was a Ph.D. economist, the first one to serve in the role of president at the Cleveland Fed.

Economists, Organizational Theory, and the Federal Reserve

The increased role of economists in the System and the Reserve Banks was important for several reasons. First, it allowed for an improved flow of information and ideas within the System and with economists outside the System. Second, the Reserve Banks, with their semi-independent corporate structure, allowed for new and sometimes dissenting views to develop and survive in the System without being viewed as an expression of disloyalty.

One thing any organization must do well in order to succeed is to efficiently process information.²⁸ Within the System, Reserve Banks are usually viewed as processing information by using their deep ties to the local business community to collect regional information that they filter and report, ultimately, to the FOMC. This particular role of the Reserve Banks in processing information is important, but the Reserve Banks have also excelled at the important job of processing monetary and banking policy ideas.

²⁸ For a discussion of organizations in these terms, see Arrow (1974).

Transmitting complicated technical information requires that both the sender and the receiver speak a common language. In the System, the common language has become economics. It is an expensive language to learn; the usual way someone learns it is through the time-consuming ordeal of earning a Ph.D. However, it is a necessary language, given the technical nature of setting monetary and banking policy.

These communication channels were created, often slowly, in the System by the increased professionalization of researchers and leaders of the various Federal Reserve organizations. Our view is that this process created numerous communication channels that helped improve the flow of ideas within the System, as suggested by Whittlesey, but also with economists outside the System, both those in academia and those in private markets.²⁹ However, what is unique about the Federal Reserve, at least compared with other entities created by the federal government, is that the Reserve Banks' semi-independent corporate structure allows for ideas to be communicated to the System — an outcome that would result from professionalization in any organization. Moreover, it also allows for new and sometimes dissenting views to develop and gestate within the System. without being viewed as an expression of disloyalty that undermines the organization as a whole, as would be more likely within a government bureau. This latter development started to develop in the 1960s, though not always smoothly, as we will see in the following analysis.

²⁹ One communication channel that developed as early as the 1960s was "System Committee" meetings, which were workshops where System economists and analysts presented their work on research and policy. Before electronic communications, these were a very effective way for System economists to keep apprised of what other researchers in the System were working on.

4.3 The Mid-1960s: The Beginnings of the Great Inflation

In the first part of the Martin era, through the early 1960s, the Federal Reserve was most concerned with maintaining a low inflation rate and managing the balance of payments to preserve the Bretton Woods System. The governors' backgrounds were in banking and business, not academia. Martin was not interested in using economic theory to guide monetary policy (Meltzer (2009a), p. 35); he tended to look at money market conditions and bank reserves to guide monetary policy.

In contrast, by the 1960s, the prevailing economic view in academia had become Keynesianism, which emphasized the importance of coordinating fiscal and monetary policy and believed that the Phillips curve could be exploited to keep unemployment down. Furthermore, there were important methodological developments in academia, particularly, the development of large-scale macroeconometric models by Lawrence Klein, which were based on Hicks' IS-LM formulation of some of Keynes' ideas. Despite Martin's not being a believer in Keynesianism and economic theory, these ideas entered the System through other means, particularly through the appointment of governors and the hiring of economists within the Federal Reserve System.

The force behind bringing in governors with Keynesian ideas was Walter Heller, who was chairman of the Council of Economic Advisers under Presidents Kennedy and Johnson. For Kennedy's first appointment to the Board, Heller wanted a trained economist who would be a "liberal expansionary influence" (Bremner (2004), p. 160). Along these lines, Kennedy appointed

George Mitchell, who was the chief economist of the Chicago Fed. Later, Johnson appointed two more economists with Keynesian views: Sherman Maisel in 1965 and Andrew Brimmer in 1966.³⁰

The governors were not the only way in which Keynesian ideas entered the Federal Reserve. The ideas also entered through the staff (Hetzel (2008), pg. 70, Meltzer (2009a), p. 37). The hiring of young staff out of graduate school led to the introduction of econometric forecasting and modern economic models into the policy process at the Board (Meltzer (2009a), p. 498). One illustration of this flow of ideas is the development of a large-scale econometric model of the Lawrence Klein variety. In this period, these models were the state-of-the-art technique in macroeconomics. Work at the Board on one of these models first started in 1966 as a joint project between academic economists and members of the Board's Division of Research and Statistics. The academics who led the project were Franco Modigliani of MIT and Albert Ando of the University of Pennsylvania. This project became the Board's well-known MPS model. Later, in the 1970s, with the end of the Bretton Woods system, the Board's International Finance Division developed a multi-country model to use for policy analysis that was also a large-scale econometric model.³¹

In practice, under the influence of Keynesian ideas and under pressure from the Johnson Administration to follow expansionary monetary policy to ease the Treasury's financing of the Vietnam War and the Great Society, the FOMC tried to exploit the Phillips curve to lower unemployment and the Board followed "even keel" policies to accommodate Treasury

³⁰ Kennedy's second appointment was Dewey Daane, who was also an economist, but not a Keynesian. Heller wanted to appoint Seymour Harris, who was a Keynesian economist and a liberal. For this appointment, Martin outmaneuvered Heller by working with Secretary of the Treasury C. Douglas Dillon to push for Daane and convince Kennedy to choose him.

³¹ For a history of models at the Board, see Brayton, et al. (1997).

operations.³² The consequence of these expansionary policies was a buildup in inflation (Meltzer 2009a).

The Federal Reserve Bank of St. Louis and Monetarism

At the same time that Keynesian influences were becoming stronger among the governors, the Board staff, and the staffs of many of the Reserve Banks, a very different view about monetary policy was developing at the Federal Reserve Bank of St. Louis. The catalyst for St. Louis' different view was that President D.C. Johns felt that the Board of Governors was ignoring his opinions, as well as those of the other Reserve Banks, and he responded by hiring Homer Jones as research director in 1958 (Melzer (1989)).

Jones had taught Milton Friedman and had been closely associated with Clark Warburton at the Federal Deposit Insurance Corporation, who had advocated for monetary control since the 1920s (Bordo and Schwartz (1979), Melzer (1989)). Under Jones and a succession of presidents, such as President Darryl Francis, the St. Louis Fed adopted Friedman's quantity theory views and emphasized monetarist signals for evaluating policy. Andersen and Carlson (1974) report that the St. Louis framework developed in the early 1960s was at first mainly implemented by looking at charts but, in the late 1960s, was implemented using regression analysis.

As an example of what the decentralized Federal Reserve structure could support in terms of ideas, the St. Louis example is illuminating. St. Louis adopted a dissenting view and that institution stayed monetarist in its monetary views for a very long time. Furthermore, the St.

³² For analysis of how "even keel" policies, which were monetary operations designed to reduce short-term fluctuations in interest rates when the Treasury sold debt, contributed to monetary expansion, see Meltzer (2009a) and Consolvo, Humpage, and Mukherjee (2019).

Louis Fed developed a research staff that worked on these issues through the 2000s. This would not have been possible in an institution in which there is regular turnover in leadership by political appointment. Furthermore, some other members of the FOMC held monetarist views during the 1950s and early 1960s, particularly, President Malcolm Bryan of the Atlanta Fed, (Hafer (1999), Wheelock (2000)), but at Atlanta, these ideas rose with him and disappeared when he retired. St. Louis avoided this route not only because a succession of presidents held monetarist views, but also because the Research Department, with its close ties to leading academic monetarists such as Karl Brunner, Milton Friedman, Alan Meltzer, and Anna Schwartz, gave continuity to this line of thinking within the Bank.

While monetary debates of the 1970s were often construed as a debate between Keynesians and monetarists, St. Louis' criticism of Federal Reserve monetary policy in the early 1960s was initially aimed at the prevailing view of the Board and Martin, which was based on targeting "net free reserves" (excess reserves less borrowings) and short-term interest rates to control the "tone and feel of the money market." The monetarists viewed these measures as providing misleading signals about the accommodativeness of monetary policy (Brunner and Meltzer (1964)). Brunner and Meltzer (1964) especially wanted the Fed to base its operating framework on the monetary base and the money multiplier (Bordo (2018b).) Researchers at St. Louis presented evidence against the free reserves doctrine (Meigs (1976)).³³ Along these lines, they also made a theoretical and empirical case for the Fed to focus on targeting monetary aggregates and total reserves.

³³ A successor to the Burgess-Riefler-Strong doctrine (Brunner and Meltzer (1964) and Calomiris and Wheelock (1998)).

St. Louis' emphasis on monetarism continued after Keynesian views began to dominate the Federal Reserve in the mid to late 1960s. St. Louis argued that if the Fed controlled the money supply, it could reduce inflation. Presidents Francis' and Jones' advocacy did not sway the Board in the 1960s. Furthermore, the differences in opinion led to some tensions with Washington. Indeed, some governors and Board staff wanted to stifle dissent and have the entire System speak with one voice, but Martin believed in tolerating dissent. In an article about the St. Louis Fed's maverick reputation, *Business Week* (1967) reported:

“[Martin] prides himself on tolerating dissent within the Fed system. ‘He has resisted all efforts to clamp down on Homer,’ says one of his aides.”

Martin's successor, Arthur Burns, was less tolerant of dissent, which sometimes created tensions between the Board and the Reserve Banks. For example, *Business Week* (1979) reported on disagreements between Philadelphia Fed researchers and Board staff over measures of the money supply and points out that the Board started reviewing Reserve Bank publications under Burns. (It was later ended during Greenspan's chairmanship.)³⁴ In the case of St. Louis, President Francis supported his Research Department, and with the support of St. Louis' board of directors, he was able to resist pressures to conform.³⁵ Still, St. Louis' monetarist ideas had little short-term effect on policy. Instead, the St. Louis Fed's dissenting view was valuable in the long run because it helped build an intellectual case within the System and outside it for ideas that eventually culminated in Chairman Paul Volcker's actions to stop inflation.

³⁴ While Burns was known for wanting complete control over monetary policy, another factor in this period for the Board asserting control was that the Federal Reserve was under strong political attack from powerful congressmen, and the Board was rightfully concerned that public disagreements between the Board and the Reserve Banks would be used to attack the System.

³⁵ See the Rasche and Wheelock (2012) interview with Jerry Jordan, who was an economist at the St. Louis Fed during this period and later president of the Cleveland Fed.

4.4 The 1970s: The Great Inflation

The 1970s were characterized by stagflation, that is, high inflation rates and high unemployment rates. At the time, high inflation was attributed to supply shocks and, in particular, the OPEC-driven increases in oil prices in 1973 and 1979. This view that supply shocks cause inflation is often called the cost-push theory of inflation. At the time, Arthur Burns, who was Chairman of the Fed from 1970 to 1978, subscribed to the cost-push ideas as did prominent academics such as Robert Solow and Paul Samuelson (Hetzel (2008), Blinder and Rudd (2013)). The second and more modern interpretation of high inflation is that the FOMC was unwilling to raise short-term interest rates and reduce monetary growth in order to reduce inflation because the Committee and the various administrations were worried about the social and political costs of high unemployment (Bordo (2018a), Meltzer (2009b)).

Despite the focus on the Phillips curve and cost-push ideas of inflation, monetarist ideas did begin to get attention within the System and had some influence on the Fed's unsuccessful attempt to reduce inflation. At this time, Milton Friedman's natural rate hypothesis was being accepted within the Nixon Administration and the Board. The belief was that the Fed could gradually reduce money growth and lower inflation while only temporarily raising unemployment. Research staff at the Board, following St. Louis' lead, began to present data on monetary aggregates, and the Humphrey–Hawkins Full Employment Act of 1978 required that the Fed present successively lower target ranges of money growth to gradually reduce inflation and to justify significant departures from the targets.

The Federal Reserve also began to target money growth in the 1970s, but its method was operationally flawed. The Board staff estimated a short-run model of money demand for M1

based on Chow (1966) to back out the short-term interest rate that would be required to hit the Fed's money growth targets. The Fed believed that money growth could only be controlled by short-term interest rates rather than by directly operating on the monetary base. Their procedure assumed that short-run money demand was stable, which turned out not to be the case. Financial innovation as a response to inflation and regulations led to instability in the money demand function (Goldfeld (1973), Laidler (1993)). Consequently, monetary targets were regularly missed. Similar issues arose in other countries, such as Canada and the United Kingdom, that adopted a monetary targeting framework (Bordo, Choudhri, and Schwartz (1990)).

The second problem with the Fed's strategy to reduce inflation was its gradual approach. This approach was originally Milton Friedman's idea and came into the System through Friedman's communication with Burns. Gradualism began in 1969 and lasted until 1979-1980. The result of this approach was a pattern in which inflation ratcheted up over time. In particular, as inflation would rise, the Fed would tighten, a recession would occur, and under political pressure, the Fed would re-inflate, causing inflation to rise to a higher level. As mentioned above, the Fed feared tightening sufficiently to completely roll back inflation because of the political consequences of disinflation creating high unemployment (Meltzer (2009), Bordo (2018a)). This gradual approach, combined with flawed operational procedures in which monetary targets were regularly missed, made the public doubt that the Fed would reduce inflation and the Fed lost credibility over time.³⁶

³⁶ There are other interpretations of this era. For example, Cogley and Sargent (2002) argue that the statistical pattern of the data is consistent with a story in which policymakers are misled by the patterns to try and exploit the Phillips curve, which leads to higher inflation. Orphanides (2003) argues that mismeasurement of full employment using real-time data led to monetary policy that was too expansionary.

The alternative to gradualism was to go cold turkey, that is, to take forceful, strong actions that indicated the Fed was serious about controlling inflation (Bordo, et al. (2017)). This is exactly what Paul Volcker did when he became chairman of the Fed. He went cold turkey in October 1979. He relied on monetarism in the sense that he announced that he would target the money supply and let short-term interest rates go to wherever they would go, which was as high as 21 percent in 1981. This put the United States into a very severe recession in which unemployment reached 10.8 percent in 1982, but the recovery was quick and inflation declined substantially. The success of his strategy can be interpreted in terms of the concepts of rational expectations and credibility in that the public came to believe that he would stick with his strategy because he took forceful actions and had the backing of President Ronald Reagan to bear the short-term costs of the recession (Meltzer (2009b)).

The importance of expectations and the credibility of the central bank in controlling inflation is also tied to ideas developed at a Reserve Bank, albeit a different one than St. Louis. While the increased emphasis on monetary aggregates in the 1970s can be tied back to ideas associated with the St. Louis Fed in the 1960s, the increased emphasis on expectations and credibility in the 1980s can be tied to the ideas associated with the Federal Reserve Bank of Minneapolis starting in the 1970s. These latter ideas explain why Friedman's gradualism strategy did not work. It was not credible. The public did not believe that the Fed would stick with the strategy, and in the 1970s, the public was correct.

4.5 Great Moderation: 1980s, 1990s, and Early 2000s

The period from the mid-1980s to the early 2000s are accurately described as the Great Moderation. After Chairman Volcker substantially reduced inflation by 1983, inflation rates gradually trended further down, GDP exhibited less variability, and the recessions of the early 1990s and early 2000s were milder than previous ones. Still, during this period, the Fed's credibility in fighting inflation was still in some doubt. There were inflation scares in 1983, 1987, and 1994 in which the Fed raised the fed funds rate out of fear that inflation would rise again (Goodfriend (1993, 2007)). These moves cemented the Fed's credibility that it would aggressively react to perceived increases in the inflation rate.

The Federal Reserve Bank of Minneapolis: Rational Expectations, Credibility, and Macroeconomic Methodology

Analogous to how the monetarist influences on Federal Reserve policy can be tied to the introduction of monetarism into the Federal Reserve via the St. Louis Fed in the 1960s, the importance of expectations and credibility was introduced into the Federal Reserve primarily via the Minneapolis Fed in the 1970s and 1980s. This Reserve Bank became closely associated with and was a major contributor to the rational expectations revolution in macroeconomics that started with Robert Lucas (1972). The role of the Minneapolis Fed in influencing central banking is even stronger than that of the St. Louis Fed because not only did it directly influence policy, but it also changed how the profession did macroeconomics and thus the tools used at most central banks. It was directly involved in the methodological development of dynamic general

equilibrium models of the macroeconomy, which became the standard methodology for macroeconomics.

The Minneapolis Fed's connection to rational expectations started in 1970 when John Kareken, a professor of economics at the University of Minnesota and an adviser to the Minneapolis Fed, formed a group to build an econometric model in which to derive optimal policy rules.³⁷ The group consisted of John Kareken, Neil Wallace, Thomas Muench, and Thomas Sargent. After starting the project, they read a draft of Lucas' 1972 paper and realized that it implies that past behavior couldn't be used to predict future behavior under different policies because the new policies would change people's expectations and behavior, so the conceptual basis of their project was flawed.³⁸

The implications of Lucas' work for central bank policies were enormous. First, it meant that the statistical Phillips Curve relationship between inflation and unemployment would not necessarily hold if the FOMC changed its behavior to try to exploit these relationships. This result undercut Keynesian macroeconomic policies.³⁹ Second, it meant that credibility about future policy behavior was important in how the public formed expectations about inflation.⁴⁰

As with St. Louis' monetarist views in the late 1960s, the short-term effects of these insights on the FOMC were minimal. Presidents Bruce MacLaury and Mark Willes of the

³⁷ Ironically, the person who connected Kareken with the Minneapolis Fed was Walter Heller, who, as we described earlier, placed Keynesian governors on the Board in the early 1960s. Heller was a professor at the University of Minnesota and knew Hugh Galusha, the president of the Minneapolis Fed (personal communication with Art Rolnick).

³⁸ For more details, see Clement (2000).

³⁹ Much important work on the implications of rational expectations for monetary policy was done by Thomas J. Sargent and Neil Wallace, for example, Sargent and Wallace (1975), both of whom were consultants to the Minneapolis Fed.

⁴⁰ More technically, the analysis said that the ability to do policy analysis with the Board's econometric models was limited because the parameters in the models were not structural.

Minneapolis Fed raised these issues at the FOMC in the 1970s (Clement (2000)), but as we discussed, FOMC behavior did not dramatically change until Volcker became Chairman.

In contrast, the long-term effects of these insights on the FOMC and the profession were dramatic. The failure of stagflationary policies in the 1970s and the success of Volcker's cold turkey strategy raised the prominence of rational expectations-based theories of monetary policy within central banks. Where the rational expectations insights became influential was in the successive implications for including expectations in monetary policy strategy as well as setting the stage for how to design central bank policies and institutions to create credibility while keeping inflation down.

The importance of credibility is very much illustrated by the ratcheting up of inflation over the 1970s. The public did not believe that the Federal Reserve had the will to defeat inflation, and this belief was borne out until Volcker, with President Reagan's support, decisively took actions to reduce inflation in the early 1980s. The economic idea that illustrated this was the idea of the time inconsistency of macroeconomic policy, which was developed by Kydland and Prescott (1977) in a broad context and applied to monetary policy by Barro and Gordon (1983).

Time consistency treats the interaction between policymakers and the public as a dynamic game in which policymakers cannot commit to future policies. Instead, policymakers re-optimize each period when deciding what to do. What Kydland and Prescott showed was that even if the policymakers were perfectly benevolent — that is, they maximized the public's welfare — they would still not follow the optimal long-run policy. Instead, when they re-optimized, they would not incorporate how their behavior today affected past expectations of

the public. The public knew this, formed expectations, and behaved accordingly, which led to suboptimal outcomes.

The time-consistency logic illustrated the importance of commitment in implementing a good long-term policy, even if that policy was costly in the short run. More generally, it led to an emphasis on the importance of rules versus discretion as well an understanding that the institutional structure mattered for the central bank's ability to commit to a rule, an insight that the founders of the Federal Reserve understood, but which the then-dominant Keynesian view did not subscribe to and had not been previously formalized in the language of modern economics. The use of discretion and a lack of commitment were good descriptions of monetary policy in the 1970s, when the Federal Reserve would back down on fighting inflation once unemployment became high because they thought the social costs were too high to bear politically.^{41,42}

The Minneapolis Fed's connection to this work was both direct and indirect. Thomas Sargent and Neil Wallace were advisers to the Minneapolis Fed in the 1970s, where they worked out many of the implications of rational expectations for monetary policy. Later, Edward C.

⁴¹ There is a subtle difference in objective functions between the time inconsistency of Kydland and Prescott policymakers and the analysis of policymaker behavior in the 1970s. In Kydland and Prescott, the policymakers are maximizing the public's welfare. The criticism of policymakers in the late 1960s and 1970s was that the Federal Reserve chose monetary policy to satisfy the political goals of the party in power at the expense of inflation. This was the case with President Johnson's pressure on Martin and President Nixon's pressure on Burns. (See Meltzer (2009b), Chapter 6.) What made the Kydland and Prescott argument so powerful is that they showed that the short-term focus of policy was not just a matter of who was in charge but could also come from benign motivations.

⁴² Another argument put forward by Milton Friedman (1986), following Buchanan and Tullock (1962) and Niskanen (1971), was based on public choice. According to this view, the Fed should be viewed as a government bureau whose objective function was to maximize its revenue and power, and expansionary monetary policy would achieve this result.

Prescott became an adviser in 1981 and Christopher Sims in the mid-1980s.⁴³ All were at the University of Minnesota, and the tight interactions between these two institutions generated a mutually beneficial flow of ideas between the central bank and the group of macroeconomists who worked on rational expectations models and time series analysis, of which the University of Minnesota was one of the primary centers. Furthermore, the macroeconomic methodology of using dynamic general equilibrium models with rational expectations was developed partly at the Minneapolis Fed and the University of Minnesota.⁴⁴

Several important ideas about monetary policy and macroeconomics came directly from the rational expectations and time-consistency insights of the 1970s. Several, though not all, were developed or initially supported at a Reserve Bank and only later became part of the thinking among the System as a whole. The other feature of this period is that the development of ideas became an activity in which Fed economists, both Board and Reserve Bank staff, increasingly engaged in, often through interaction with academics.

Institutions: Independent Central Banks

One idea descended from the dynamic general equilibrium models with rational expectations was that the institutional design of a central bank was important for initiating rule-like monetary policy and reducing discretion. This led to considerable work examining the value of an independent central bank by authors such as Cukierman (1992), Persson and Tabellini

⁴³ Kydland and Prescott's (1982) work on business cycles had the implication that the business cycle was caused by technological shocks — hence, the name “real business cycles” — rather than monetary policy shocks as emphasized by the monetarists. This has strong implications for the validity of using monetary policy for stabilization policy.

⁴⁴ Other universities at the time that were closely associated with this development were Carnegie-Mellon, Chicago, and Rochester.

(1993), and Rogoff (1985). Empirically, Alesina and Summers (1993) showed that better macroeconomic outcomes were correlated with independent central bank institutions.

Here, unlike in Friedman and Schwarz's view of the Federal Reserve in the 1930s, the structure of the Reserve Banks played a valuable role. The modern Federal Reserve, as created by Chairman Martin, had a built-in force for independence with the Reserve Banks. As was discussed earlier, the founders of the Federal Reserve System well understood the value of a decentralized system with checks and balances, but the predominant intellectual line of thought of the 1960s and 1970s emphasized coordination of fiscal and monetary policy, which pushed for a more centralized and less independent central bank. When thinking changed from this coordination perspective toward an appreciation for credibility and commitment to a rule, the semi-independent Reserve Banks served as a device for helping the FOMC commit.

The Reserve Banks also played another useful role in the effort to reduce inflation. One line of research into how to design a more independent central bank found that hiring a conservative central banker – not in the political sense, but in the sense of wanting to keep inflation low – would help with outcomes (Rogoff (1985)). Again, this tied into the history of the Reserve Banks, where historically, at least in the 1970s and 1980s, their presidents had more aversion to high inflation than the average governor (Bordo and Istrefi (2018)).⁴⁵

⁴⁵ There are plenty of exceptions to this statement, but in general, Reserve Bank presidents have dissented in favor of tighter policy more often than governors (Belden (1989)). Our conjecture is that this may partly be due to the legacy of the gold standard. For bankers, a run on the currency would be a disaster, so at least through the Bretton Woods era, that was one motivation for them to prefer “hard” money.

Taylor Rule

A second descendant idea was John Taylor's empirical work on the advantage of monetary policy rules over discretion (Taylor (1993)). Taylor was influenced by the work of Bryant, Hooper, and Mann (1993), who examined a number of large multi-country econometric models incorporating rational expectations and found that instrument rules based on policy interest rates would give the best performance. In particular, the policy interest rate would react to deviations from expected inflation and the output gap, which are connected to the Federal Reserve's dual mandate of keeping inflation and unemployment low. These rules performed better than target rules like Friedman's constant money growth rate and outperformed rules using monetary aggregates.

The Taylor rule can also be used to ascertain the extent to which central banks are following rule-like behavior by comparing the actual policy rate to the rate predicted by the Taylor rule. Taylor (2012) and Papell, Nikolsko-Rzhevskyy, and Prodan (2014) find that the federal funds rate was closest to the Taylor rule during the Great Moderation era from 1983 to 2003, when Paul Volcker and Alan Greenspan were Chairmen of the Federal Reserve. Deviations from rule-like behavior were considerable during the Great Inflation period in the 1970s, a regime characterized by Friedman (1982), Meltzer (2009b), and Taylor (2012) as discretionary. Now, the Taylor rule, even if it is not necessarily followed, is often used as a simple benchmark by the FOMC.

Transparency

Prior to the early 1990s, the FOMC's monetary policy decisions were not revealed to the public. The FOMC would give instructions to the Desk at the New York Fed and the Desk would

operate in the fed funds market to implement the instructions.⁴⁶ As a consequence, there was a large industry of Fed watchers who would try to discern the FOMC's instructions based on what they observed in the money markets. Through the 1980s, the Board preferred this arrangement, as shown by its long legal fight against a Freedom of Information Act request in 1975 for the FOMC to reveal its minutes (Goodfriend (1986)).

On this issue, the Richmond Fed, where Marvin Goodfriend worked, took a dissenting position. Starting in the 1980s, the Richmond Fed maintained that the arguments for FOMC secrecy were not that strong (Goodfriend (1986)). Goodfriend's (1986) arguments were based on equilibrium models with rational expectations that were developed in academia, thus again illustrating the importance of the flow of ideas between academia and central bank policy as well as the importance of rational expectations. Later, as the FOMC started announcing its policy decisions in 1994, there was little ill effect on markets, and the transparency view became accepted within the System and became part of a strategy of supporting inflation targeting and helping the Federal Reserve to be accountable (Blinder (1996), Woodford (2005), Svensson (2011)).

Inflation Targeting

Inflation targeting is a central bank strategy that has a fixed inflation rate or, in some versions, price stability, as its primary goal. The idea is for a central bank to announce a numerical inflation target, an implementation of monetary policy that focuses on the inflation forecast, and transparency and accountability (Svensson (2011)). An inflation-targeting regime was very

⁴⁶ According to Brunner and Meltzer (1964), because the Fed had followed the opaque free reserves doctrine earlier on, the manager of the New York Desk had acquired considerable discretion to set monetary policy.

controversial in the 1980s, but was advocated by several Reserve Banks, particularly the Cleveland Fed under President Lee Hoskins (1987-1991). For example, the Cleveland Fed's 1989 and 1991 Annual Reports contained essays advocating for price stability. As with earlier ideas pushed by Reserve Banks, the FOMC did not immediately accept inflation targeting. Instead, the idea was first adopted by the Reserve Bank of New Zealand in 1990, then by the central banks of Australia, Canada, Sweden, and the United Kingdom, followed later by the FOMC in 2012, when it set an inflation target of 2 percent for the price stability portion of its mandate.

Econometric Methods

The Minneapolis Fed, along with the University of Minnesota during the 1970s and 1980s, also made important advances in econometric methods to use in evaluating macroeconomic models. The two advances were the incorporation of rational expectations restrictions on estimating econometric models, for example, Sargent (1973, 1976, 1978), and the development of vector autoregression (VAR) models by Sims (1980).⁴⁷ While both developments were major intellectual discoveries (Sargent and Sims won Nobel prizes in 2011 for their work), they were also serious attacks on prevailing monetary policy practices. Both approaches, though for different reasons, implied that the primary Keynesian econometric model, which was used at the Board, was vulnerable to rational expectations and identification critiques.

New Keynesian Economics

A second-generation idea that in terms of methodology can be traced to the rational expectations idea was the development of New Keynesian models. These models were not

⁴⁷ Robert Litterman, who was at the Minneapolis Fed, used the VAR methods that Sims developed for forecasting purposes and showed that Bayesian VARs using the "Minnesota" prior were excellent at forecasting (Litterman (1986)).

initially developed in the Federal Reserve, but they used the methodology of a dynamic stochastic general equilibrium economy with optimizing agents. But rather than using competitive markets, they adopted monopolistic competition.⁴⁸ Furthermore, they introduce nominal rigidities in the form of sticky prices (Taylor (1979), Calvo (1983)) to generate short-term non-neutralities of money, while they kept the long-term neutrality of money of monetarism.⁴⁹ The advantage of these models was that their underlying parameters were structural, so policy rules could be analyzed. They included rational expectations and dynamic optimization, and therefore, they were not subject to the critiques by Lucas and Sargent of Keynesian models.

These models were initially developed in academia (for example, Taylor (1979), Calvo (1983), Rotemberg (1987)), but economists associated with the Federal Reserve were significant contributors to their development (for example, King and Wolman (1996)). The culmination of these models was Michael Woodford's 2003 book on New Keynesian models. Today, this class of models is heavily used at many central banks.

Other Monetary Policy Ideas

A variety of other monetary policy ideas came out of the Reserve Banks. We list only a few. Out of the Minneapolis Fed and the University of Minnesota came Sargent and Wallace's (1981) work on "some unpleasant monetarist arithmetic," which demonstrated that the government's intertemporal budget constraint was an important factor in determining inflation. J. Alfred Broadus, president of the Richmond Fed, and Marvin Goodfriend argued in the Richmond Fed's 1995 Annual Report that the Federal Reserve in assisting the Treasury

⁴⁸ For a nice description of the connection, see Green (2005).

⁴⁹ These models are descendants of Lucas (1972) not only methodologically, but also in the sense of adding frictions. Lucas (1972) used an information friction to develop a Phillips Curve relationship.

Department with its use of the Exchange Stabilization Fund blurred the lines between fiscal and monetary policy.⁵⁰ In a related essay, both authors also argued in the Richmond Fed's 2000 Annual Report that the Federal Reserve needs to be careful about the assets it buys to avoid the risk of using the balance sheet to allocate credit and thus jeopardizing central bank monetary independence.

4.6 Summary of the Role of Federal Reserve Structure in Determining Monetary Policy

The previous examples illustrate an unusual feature of the Federal Reserve. Important ideas on monetary policy, several of which later became accepted, originated in the Reserve Banks and they were tied to intellectual developments in academia. Furthermore, some of these ideas were critical of existing policies at the time. St. Louis with monetarism and Minneapolis with rational expectations are the two most prominent examples. However, as we illustrated, Richmond on transparency and Cleveland on inflation targeting were others.⁵¹

5. Lender of Last Resort, Deposit Insurance, Moral Hazard, Too Big to Fail, and Financial Crises

One of the most important functions of the Federal Reserve, and all central banks for that matter, is the lender of the last resort function. The Federal Reserve was established to prevent the panics of the National banking era, and along this line, the Federal Reserve Act says the

⁵⁰ See also Bordo, Humpage, and Schwartz (2015) and Humpage (2017).

⁵¹ There are other examples of new ideas developed by Reserve Banks, but in the interest of space, we do not discuss them. We picked the Cleveland and Richmond examples because several ideas associated with these two Banks were later adopted by the FOMC and because of our familiarity with them. The second author has worked for both institutions.

purpose of the Fed was to “provide an elastic currency,” with the idea that this would eliminate the financial panics.⁵²

Earlier we discussed the issues with the Fed’s use of the discount window in the pre-1935 period. The biggest change in the Banking Acts of 1933 and 1935 in terms of financial stability was to no longer rely alone on Federal Reserve lending, but to institute federal deposit insurance and to create the Federal Deposit Insurance Corporation (FDIC) to run it. However, Federal Reserve lending powers were also expanded with an amendment to the Federal Reserve Act, Section 13(3), which allowed the Federal Reserve to lend to any “individual, corporation, or partnership” in “unusual and exigent circumstances.”⁵³

The question of what the appropriate lender of last resort powers are for a central bank is an old one. The classical prescription from Bagehot (1873) was to lend freely in the money markets and at a penalty rate that discourages moral hazard.^{54,55} From the late 1930s through the mid-1960s, discount window policy was not a major issue, mainly because the banking system was very stable in this period. The banking industry was highly regulated, there were few bank failures, and macroeconomic conditions were relatively stable.

An illuminating piece of evidence about the lack of interest in the Fed’s lender of last resort function is what is *not* contained in the System’s 1965 study of the discount window, the

⁵² One problem the Federal Reserve faced and successfully solved in its early years was the elimination of seasonality in money market interest rates. The problem is one that has received little attention in the economic literature, though Miron (1986) is an exception.

⁵³ In 1934, the Reserve Banks were also authorized to make working capital loans to established companies if the business was unable to obtain funds from private markets and there were emergency conditions. This authority, Section 13(b), was later repealed by the Small Business Investment Act of 1958 (Sastry (2018)).

⁵⁴ See Humphrey (1975) and Bordo (1990, 2014) for histories of the lender of last resort function.

⁵⁵ Bagehot (1873) argued that in the case of an internal drain, that is, a banking panic, the central bank should lend freely. In the case of an external drain, the central bank should charge a high rate. In the case of both, it should “lend freely at a penalty rate.” He also posited that the central bank should only lend to illiquid but solvent banks.

results of which were published in 1971 (Board of Governors (1971)). This study was prepared by staff throughout the System and also included a collection of responses to questions about the discount window that Lester Chandler, of Princeton University and academic consultant to the Federal Reserve Board, sent to numerous academics, including such well-known economists as Karl Brunner, Alan Meltzer, Franco Modigliani, Hyman Minsky, and James Tobin (Chandler (1970)).

Despite several of the academics discussing lender of last resort functions, one striking feature of the 1971 report is how little of the analysis focused on the lender of last resort function of the discount window. The report lays out three main purposes of the discount window: short-term adjustment credit, seasonal credit accommodation, and emergency credit assistance (the LOLR function). While the report prominently mentions the LOLR function, most of the accompanying documents are about the other two goals and focus on topics such as the difficulties for small and rural banks in borrowing, how financial innovations affected liquidity management, and seasonal demands for liquidity, particularly by agricultural banks. It also extensively discusses how to prevent the discount window from being used by banks as a source of long-term funding. The lender of last resort role is not analyzed in any detail in the study and is not critically analyzed. We suspect that one reason for the lack of interest was that without any financial crises since 1933, the academic profession, for example, Friedman and Schwartz (1963), believed that deposit insurance was enough to prevent financial instability.

As with the lender of last resort, the other major tool for financial stability, deposit insurance, was a minor concern during the 1940s, 1950s, and 1960s, again because the banking industry was relatively safe due to tight supervision, stable macroeconomic conditions, and heavy

protection from competition due to branching and entry restrictions.⁵⁶ Bank failures were few, and those that did occur did not lead to any panics because of the existence of deposit insurance. During this period, financial instability was not a source of concern.

Financial stability issues did arise again in the 1970s, when macroeconomic instability and structural changes in banking, such as the development of the Eurodollar market and financial arbitrage, led to more bank risk taking and more fragile bank liability structures. Unlike in the 1930s, the Federal Reserve adopted a very activist policy with its lender of last resort policy and, along with the FDIC, intervened to prevent the failures of some surprisingly small financial institutions.⁵⁷

The first significant financial stability event in this period was the Penn Central railroad bankruptcy in 1970.⁵⁸ Afraid that a Penn Central bankruptcy would damage the commercial paper market and that would spread to other markets, the Fed opened its discount window to the money center banks and encouraged them to lend to back up the commercial paper market.⁵⁹

It was about this time that the moral hazard costs of deposit insurance became evident and the related too big to fail problem started to develop. In 1972, the FDIC bailed out the \$1.2 billion Detroit-based Bank of the Commonwealth. Commonwealth had grown dramatically in the

⁵⁶ See Keeley (1990), who was at the San Francisco Fed at the time. He argues that there were few failures during this period because banks had monopoly rents due to branching and entry restrictions. This stream of rents was valuable, so a bank wanted to keep risk low to avoid losing these rents.

⁵⁷ For a summary of the evolution of the Fed's lender of last resort function, see Carlson and Wheelock (2015).

⁵⁸ The discount window was used to deal with the "credit crunches" of 1966 and 1969, when nonmember banks and savings institutions (until 1980 only member banks could normally borrow from the Federal Reserve) were subject to deposit drains and the Board used its powers in Section 19(e), among other things, to allow Federal Reserve credit to be lent to them via member banks (Hackley (1973), p. 120). These actions seem to have been done more to support credit conditions than to preserve financial stability; therefore, we consider Penn Central to be the first time the discount window was used for financial stability purposes since the 1930s.

⁵⁹ For a detailed description of this event, see Calomiris (1994) and Bordo (2014).

late 1960s, increased the fragility of its liabilities, and put a lot of long-term municipal debt on its balance sheet in order to profit when interest rates fell. Instead, interest rates rose and the bank soon became insolvent. Partly because of fears of the consequences of a bank failure, the Federal Reserve lent to keep it open until the FDIC injected capital to keep it open.⁶⁰

Following the Commonwealth bailout, there was a sequence of bailouts of banks in the 1970s and 1980s in which the Federal Reserve lent to and the FDIC assisted the failing bank because the Fed feared that the failure of a large bank would lead to contagion or problems in a particular financial market.⁶¹ One well-known example is the bailout of Franklin National in 1974, in which not only did the Fed lend to the bank to replace running depositors, but the New York Fed took Franklin's foreign exchange positions on its books in order to prevent disruptions to the foreign exchange market. The most famous example of this period is the bailout of Continental Illinois in 1984, in which the Federal Reserve lent to the bank to keep it open until the FDIC could arrange a bailout.⁶²

These uses of the FDIC's bailout power and the Fed's lender of last resort function made worse the moral hazard and distortions inherent in a deposit insurance system and revealed the too big to fail problem. Andrew Brimmer, who served on the Board during the Penn Central and Franklin National events, said this about the Fed's lender of last resort function:

"In general, the Federal Reserve subscribes to – and seeks to carry out – the prescription described above [Bagehot's rule]. However, on several occasions, it has also digressed from its overall strategy on monetary control to undertake a tactical rescue of individual institutions. It

⁶⁰ For more information on Commonwealth, see Nurisso and Prescott (2017).

⁶¹ See Nurisso and Prescott (2017) for other examples.

⁶² Brimmer (1984, 1989) also discusses the Federal Reserve's role in resolving problems in the silver market in 1980, and Brimmer (1989) discusses the Fed's response to the stock market crash of 1987. In both of these cases, the Federal Reserve encouraged banks to lend to affected participants in order to support the market and prevent failures, as it did with the commercial paper market in 1970.

has defended its actions on the ground that the actual failure of the distressed institution would have severely damaged the financial fabric of the country at large” Brimmer (1984, pp. 4-5.)

Brimmer’s statement that the Federal Reserve would save an individual bank because of fears of systemic risk is a departure from the Bagehot principles of lending broadly in the market and only lending to individual institutions that were illiquid but solvent.

In contrast to the early days of the Federal Reserve, the post-1935 structure of the Federal Reserve did not have an internal coordination problem in doing emergency lending.⁶³ Crisis-related lending decisions were handled by the Board and the New York Fed, the latter because of its knowledge of and interaction with the money markets and money center banks. What was less clear, however, was what the proper use of the lender of last resort function should be. Bagehot was certainly worried about this, and concerns about moral hazard were a reason for his famous dictum.

Two developments during this period raised interest in measuring the costs and benefits of using deposit insurance and central bank lending to preserve financial stability. The first was observational. There were wide-scale problems with banks and thrifts during the 1970s and 1980s. As we already noted, there were several bailouts of large banks during these decades, but during the 1980s, a large number of smaller commercial banks and thrifts also failed. These developments demonstrated that there were substantial costs to using deposit insurance and central bank lending to provide financial stability.

⁶³ While there were no internal coordination problems, when dealing with a troubled bank, the Federal Reserve needed to work closely with the FDIC and state regulators or, in the case of a national bank, with the OCC, so coordination problems still existed.

The second development was advances in academia in which old ideas about incentives, such as moral hazard and adverse selection, were formalized into mathematical economic language. This development occurred about the same time that the dynamic general equilibrium models with rational expectations were being developed in macroeconomics. This new language was powerful in that it provided for a better understanding of the concepts, allowed for measurement, and helped communicate the ideas along the lines of Arrow (1974). These concepts expressed in the new language were naturally applied to deposit insurance, too-big-to-fail bailouts, and Federal Reserve lending.⁶⁴

As with monetary policy during this period, some ideas for reform entered through the Reserve Banks. As with rational expectations for monetary policy, the Minneapolis Fed played an early role. One of the earliest analyses of the effect of bailouts and deposit insurance on bank incentives is in Kareken and Wallace (1978), both of whom were affiliated with the Minneapolis Fed. Furthermore, not too long after, Kareken wrote his famous paper titled “Deposit Insurance Reform; Or, Deregulation Is the Cart not the Horse,” which appeared in the Minneapolis Fed’s *Quarterly Review* in 1983. He argued that Congress had made a mistake by deregulating the savings and loan industry before reforming the deposit insurance system. His assessment was soon vindicated by the subsequent savings and loan crisis.

Ideas for reform also came out of the Chicago Fed during this period. George Kaufman, who was an economist at the Chicago Fed during the 1960s, returned in the 1980s as an academic

⁶⁴ Prominent early academic works in this area include Harris and Townsend (1981), Holmstrom (1979), Mirrlees (1971), and Myerson (1979). Related, researchers in finance at this time were starting to incorporate incentives into models of corporate finance, for example, Jensen and Meckling (1976), as well as developing dynamic models that were used to examine and measure the value of the deposit insurance put options, that is, the value to a bank of having deposits insured by the federal government (Merton (1977)). As we said earlier, these ideas were not new, but formalizing them lets people better understand them and quantify various effects.

consultant and was heavily involved in running the Chicago Fed's Bank Structure Conference. During this period, this conference became a well-known venue for discussions of deposit insurance and bank regulation.⁶⁵ At this time, the Chicago Fed's Research Department was closely tied to the Shadow Financial Regulatory Committee, which Kaufman helped found. Kaufman and George Benston were influential in developing the ideas behind the prompt corrective action provisions in the FDIC Improvement Act (FDICIA), and they published an early version of this idea in the Chicago Fed's working paper series (Benston and Kaufman (1988)). Similarly, the Chicago Fed's president, Silas Keehn, made a proposal for bank regulation and deposit insurance reform in 1989 (Keehn (1989)).

Our sense is that interest in deposit insurance reform was fairly widespread throughout the System in the 1980s at both the Board and the Reserve Banks, and ideas were generated by both Board and Reserve Bank staff. Maybe because deposit insurance was the purview of the FDIC rather than the Fed, there was less pressure for having a common "System view" on deposit insurance than having one on monetary policy. However, on some lender of last resort issues, some Reserve Banks took dissenting views.

⁶⁵ The Bank Structure Conference started in 1963 to discuss market structure and performance issues in financial markets. Federal Reserve interest in these issues started in 1960 when the Supreme Court decided that antitrust laws applied to bank mergers (Evanoff, et al. (2008)). The decision created a need to understand and study questions such as definitions of market and products in order to do anti-trust analysis. Furthermore, the United States' long history of restrictions on bank branching naturally led to debates and an interest in measuring the costs and benefits of these size restrictions. While we do not discuss these issues in this paper, market structure and performance policy is another example that supports the thesis of this paper. It is an area that the System has had to learn about, and it is an area in which the problems have changed over time, particularly due to legal and technological changes. It is also an area where there has been active communication between the Federal Reserve and academia, in this case, the industrial organization economists. One difference, though, from monetary policy and, to a lesser extent, lender of last resort policy, is that it is not a problem in which reform ideas were aimed at existing Federal Reserve policies. Instead, the reform ideas were aimed typically at the legal restrictions, and our sense is that these ideas came out of and were supported at various times by Reserve Banks and the Board. For example, it is clear from looking at the programs of the Bank Structure Conference that ideas were being generated by staff from the Board, the Reserve Banks, and the other federal bank regulatory agencies.

The Richmond Fed became closely associated with identifying the costs of lender of last resort actions. While his work is not a direct critique of Federal Reserve lending policies, Thomas Humphrey (1975) of the Richmond Fed wrote an essay on the classical view of the lender of last resort and linked the issues that the classical writers, such as Henry Thornton and Walter Bagehot, wrote about to lender-of-last-resort issues that the Fed faced in the modern financial system. Other people associated with the Richmond Fed, such as Goodfriend and King (1988), Bordo (1990), Hetzel (1991), Goodfriend and Lacker (1999), and Haltom and Lacker (2014) analyzed the costs of the lender of last resort and proposed reforms. For example, one cost they pointed out was that discount window lending gave uninsured depositors time to get their funds out of a troubled bank before the FDIC put it in receivership and thus raised the FDIC's cost of resolving the bank.

A second issue on which there were dissenting views was too big to fail. Again, the Minneapolis Fed took a prominent stance on this issue. For example, despite the FDICIA reforms in 1991, the president of the Minneapolis Fed, Gary Stern, argued in 2004 that these reforms had not solved the too big to fail problem (Stern and Feldman (2004, 2009)). At least one member of the Board did not agree with this view, as illustrated by Governor Frederic Mishkin's review of the Stern and Feldman book in 2006 (Mishkin (2006)).⁶⁶ More generally, concerns about too big to fail were raised by several other Reserve Banks, such as Cleveland (Todd and Thomson (1990)) and Richmond (Hetzel (1991)).

⁶⁶ Some caveats are in order here. The Board warned about the systemic risk of Fannie Mae and Freddie Mac. See, for example, Greenspan (2005).

6. Financial Crisis and On

The financial crisis of 2007-2009 was a major shock that led to new lending policies by the Fed, major interventions from the Treasury and other agencies, and significant financial reforms. The crisis brought out many of the themes in the debate over lender of last resort. The causes of the crisis have been well covered by many authorities and the debate still continues, so we will not delve into those details.

In contrast to the early 1930s, the Fed's liquidity response was aggressive and highly coordinated. The crisis started in the summer of 2007 when Bear Stearns liquidated two hedge funds that it sponsored and which invested in mortgage-backed securities. The Fed's initial response through the fall was to lower rates through open market operations. Later that year, in December, as financial market conditions continued to worsen, particularly with liquidity in interbank markets, the Fed did its first big lending innovation by creating the Term Auction Facility (TAF), which auctioned term funds to depository institutions against a wide variety of collateral. This was innovative in two ways. First, making it broadly used reduced the stigma problem, in which the market views a discount window borrower as weak. Second, it expanded the pool of eligible borrowers to include nonmember banks, which, in this case, were foreign banks that had acquired a lot of dollar assets and financed them in wholesale Eurodollar funding markets.⁶⁷

⁶⁷ When the Federal Reserve was set up only member banks could borrow from the Fed. For the definitive description of Federal Reserve lending functions through the early 1970s, see Hackley (1973). The Monetary

Liquidity issues continued to worsen in early 2008, and the Fed continued to lower rates through open market operations and reductions in the discount window rate. It also created the Primary Dealer Credit Facility (PDCF) in March, which lent to primary dealers against a broad range of investment-grade credit. Later in March, Bear Stearns was run and was acquired by JP Morgan Chase with the assistance of the New York Fed. Later that year, Fannie Mae and Freddie Mac were put into conservatorship. Soon after, Lehman Brothers failed in September of 2008, and AIG was bailed out.

The events in September created further liquidity problems with the suspension of the Reserve Prime Fund, which was a money market mutual fund. Then, soon after, there was a run on Washington Mutual and Wachovia, which both had large exposures to high-risk mortgages on the West Coast. At this point, the Federal Reserve and other agencies provided massive liquidity. The FDIC guaranteed all transaction deposits and newly issued short-term debt, while the Fed introduced lending programs for money market funds and commercial paper while converting the remaining investment banks to bank holding companies so they could borrow from the Fed.

At this point, the problem was clearly more than a liquidity problem; it was also a solvency problem. To alleviate the solvency problem, Congress passed the Troubled Asset Relief Program (TARP) to allow the Treasury to inject funds into banks to keep them operating. Later in 2009, stress tests were carried out on the largest banks, in which detailed examinations were done, capital needs were assessed, and the TARP money was made available to replenish capital for

Control Act of 1980 gave nonmember banks, including savings institutions, the ability to have a reserve account and borrow from the Fed. However, foreign banks without US branches do not have that power.

banks that could not raise it on their own. This finally re-established confidence in the banking system and the panic stopped.

Unlike in the 1930s, the Federal Reserve's structure was no impediment to lending or increasing the money supply. During the crisis, lending decision making was concentrated at the Board and the New York Fed. A second theme apparent in the use of lender of last resort that is apparent in the historical record is a desire to extend lending to nonmember institutions. During the crisis, the Fed used its Section 13(3) authority and other powers to lend to a variety of markets, foreign banks, and other financial institutions. Prior to the crisis, the desire to lend to nonbanks had come up, but the Fed had managed to lend or get others to lend without invoking 13(3). For example, it indirectly lent to nonmembers in 1966 (before 1980 nonmember banks could not borrow directly from the Fed), and it used moral suasion to encourage banks to do the lending, such as in the 1970 Penn Central commercial paper crisis and the 1987 Wall Street collapse.

The political reaction to the Fed's extensive lending embedded in the Dodd-Frank Act was to limit the Fed's authority to lend. Section 13(3) was modified to allow only emergency lending with broadly based lending programs with at least five eligible members, and it imposed other restrictions, such as requiring some congressional and executive notifications and approvals as well as delayed disclosure of borrowers' names.

Another important part of the crisis was the bailouts of several financial institutions because they were considered too big to fail (for example, Bear Stearns, AIG, Fannie Mae, and Freddie Mac). On this dimension, too big to fail warnings were prescient.

As with lender of last resort powers, the Dodd-Frank Act reacted to the too big to fail problem. It increased capital and liquidity standards for large banks, but it also required living wills or resolution plans for them. The idea behind these plans is to simplify large banks' legal and operational structures, so they are easier to resolve. Living wills are designed to reduce the cost of failure in order to make resolution more credible, that is, to reduce the time-consistency problem that exists not only with monetary policy but also with bank bailouts. The second change was to introduce the Orderly Liquidation Authority, which formalized government support for large financial institutions while it is being resolved. Of course, until a large financial firm experiences trouble, we will not know whether these reforms will work.

Finally, to continue our theme of the importance of ideas, since the crisis, the monetary policy environment has changed, with the Federal Reserve greatly increasing its balance sheet and reserves as well as paying interest on reserves and dealing with the zero lower bound on interest rates. Rightfully so, monetary policy under these conditions has received a lot of attention, and governors and Reserve Bank presidents have taken a variety of positions on the efficacy of various policies, while research to understand how this new environment changes economic analysis continues.

7. Bottom Line

This paper evaluated the Federal Reserve System as an organization for processing ideas. We documented that, starting in the 1960s, some Reserve Banks developed and advocated for dissenting views on macroeconomic and banking policy. This was done through tight links to academia. In the case of the St. Louis Fed, it was done through ties to the monetarists and, in the

case of the Minneapolis Fed, through ties to the rational expectations economists. The Board staff was also heavily influenced by academia, but starting in the 1960s, they were more influenced by the establishment Keynesian ideas. We showed how the anti-establishment ideas of the 1970s that were tied to several of the Reserve Banks influenced policy and were successful at controlling inflation.

We argued that the decentralized elements left in the System after the centralization under the Banking Act of 1935, along with Chairman Martin's changes to the FOMC in the mid-1950s, created the conditions under which the Reserve Banks could become a means for new ideas to enter and gestate within the System. The Federal Reserve's decentralized, regionally based corporate structure, a holdover from the early days of the Fed, turned out to be a useful mechanism for supporting a System that allowed enough independence for Reserve Banks to develop, support, and push ideas that sometimes differed from the view of the rest of the System and which, in the long run, contributed to Federal Reserve policy making as a whole.⁶⁸

While we do not explore this in detail in the paper, we think that that central bank employees can contribute more when they are involved in the development of ideas. This makes it much easier for an organization to process ideas that come from outside the organization; in the communication channels language of Arrow, the specialized technical employees serve as receivers of ideas. However, equally important central bank employees can generate ideas that outsiders would be unable to generate. They do this by dealing with central bank business on a daily basis and developing the ability to receive and process signals from practitioners. The result is that central bank employees become exposed to questions that an outsider, such as an

⁶⁸ For views less favorable to the Federal Reserve's decentralized structure, see, for example, Conti-Brown (2016).

academic, might never be aware of. For example, understanding monetary policy operating procedures, wholesale payment risks, and other areas in banking requires significant institutional knowledge. The New York Fed, which plays a particularly important role in the money markets, has generated numerous ideas on these issues. Another example is research on payments, which started to develop in the System when the Monetary Control Act of 1980 forced the System to make decisions on how to price its payment services.

Ideas are equally important to other government entities, but we are unaware of any such entity in which public disagreement is tolerated to the extent that it is tolerated by the Federal Reserve. The short-term incentives for most agencies (as well as many other organizations) are to keep all debates internal and then present a united front to the public in order to prevent outsiders from using these divisions against the agency. We think the long-term costs of that type of behavior for a central bank are significant. It leads to filtering of information and groupthink and can make it difficult for an organization to learn.⁶⁹

While the conditions in the 1960s, 1970s, and 1980s were ideal for the Reserve Banks to be important nodes in a network of ideas, information networks are a lot denser now. There has been some convergence in macroeconomic thinking, and the connections between Reserve Banks, Board staff, academia, and even foreign central banks are much more diffuse and broad. Nevertheless, we think that the Reserve Banks, with the competition in ideas they can provide, are essential in preserving the flow of information and the generation of ideas within the System and with academia; thus, the Reserve Banks ultimately help the Federal Reserve solve the

⁶⁹ An interesting comparison to test this conjecture would be to examine the experience of other central banks. Along these lines, for an analysis of the Bank of England's experience, see Tucker (2018).

changing problems it faces. A more centralized System without the Reserve Banks would be more insular and less open to new ideas.

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