

**Could the United States Have had a Better Central Bank? : An Historical Counterfactual Speculation**

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**Paper Written for the Symposium on “The Federal Reserve’s Centenary” Journal of Macroeconomics**

**Preliminary Draft December 2011**

## Could the United States Have Had a Better Central bank? : An Historical Counterfactual

The Federal Reserve's Centenary will be in 2014. It is time to reflect on how the institution has done in its first 100 years—on its successes and failures. Much has been written on the history of the Federal Reserve. The key books are by Milton Friedman and Anna Schwartz in the A Monetary History of the United States 1867 to 1960 and Allan Meltzer A History of the Federal Reserve (2003) and (2010) and two recent books are also important : John Wood . A History of Central Banking in Great Britain and the United States (2005) and Robert Hetzel The Monetary Policy of the Federal Reserve: A History (2008).

The general thrust of the evaluation of the Fed's performance is that it did well in the 1920s, the 1950s, and from the mid 1980s to 2006( The Great Moderation) but that it performed badly in the Great Depression of the 1930s and the Great Inflation from 1965 to 1980. Many also have criticized the Fed for its performance during the recent financial crisis and Great Recession ( eg Meltzer 2010, Taylor 2009 and Hetzel 2012) but it will take more time to conclude that this experience should be ranked as badly as the Great Depression and Great Inflation.

This literature is critical of the Fed for following flawed doctrine, for its lack of independence from political pressure and for flaws in its structure. However despite its serious failures the consensus would argue that the Fed during its hundred years has exhibited the ability to learn from its past errors.

George Selgin , William Lastrapes and Lawrence White (2011) go farther than the main stream view .They argue that the Fed has never done better with respect to price stability, real economic stability and financial stability compared to the regime which preceded it-- the classical gold standard , national banking, US Treasury and Clearing House regime.

This paper does not directly engage into the debate over how well or badly the Fed did in its first 100 years. Rather I focus on whether the track record of economic performance could have been improved if the development of a US central bank had followed two quite different historical paths which were presented at key junctures in the past. The first scenario is to assume that the charter of the Second Bank of the United States had not been revoked by Andrew Jackson in 1836 and the Second Bank had survived. This is not a totally unrealistic scenario since absent Jackson's veto the Bank would have survived and the Congress came reasonably close to overriding the veto. The second scenario takes as given that the Second Bank did not survive and history had evolved as it did, but considers the situation in which the Federal Reserve Act of 1913 was closer to the original plan for a central bank for the United States proposed by Paul Warburg in 1910. Both of these scenarios would have led to greater financial stability than we had in the twentieth century and possibly better overall macro performance and price stability.

Section two develops the Second Bank counterfactual. Section three considers the Warburg scenario. Section four speculates on whether these alternative arrangements would have given us better overall financial ,macroeconomic and price stability performance throughout the twentieth century than we had. Section five concludes with some policy relevant lessons from history.

## **Section 2. Had the Second Bank of the United States Survived.**

In 1790 Alexander Hamilton proposed a financial reform package for the U.S to overcome the economic paralysis of the Confederacy. It would serve as the basis for U. S. financial development and lead to a financial revolution which underpinned long run economic growth ( Sylla and Rousseau 2003). A key plank of Hamilton's plan was the creation of a national bank, the First Bank of the United States . This

bank modeled after the Bank of England, would have both public and private ownership and would provide loans to both sectors. It would be sufficiently well capitalized to be able to provide the government with medium term bridge loans to finance shortfalls in government tax receipts. It was also hoped that its loans to the private sector would spur economic development but it was deemed imperative that it also hold sufficient specie reserves to always maintain convertibility of the notes. The First Bank of the United States was chartered in 1791 with a capital of \$10 million ( it was the largest business enterprise in the country).( Bordo and Vegh 2004)

There was strong opposition to the First Bank from Hamilton's initial proposal. The opposition was on both constitutional issues and populist distrust of the concentration of economic power. The Constitution had merely said that the Federal government could coin money and regulate its value; it said nothing about setting up banks . The constitutional debate that has followed since then reflected the fundamental political question of how power was to be divided between the Federal government and the States. The second source of opposition was a deep seated populist distrust of the concentration of economic power in a national bank located in Philadelphia with branches in every state. As a consequence of this opposition the First Bank had its charter revoked after 20 years in 1811.

A Second Bank of the United States with terms similar to the First Bank was chartered in 1816, in the face of financial disarray following the War of 1812, with a capital of \$50 million. Once again opposition to the Second Bank arose from politicians, especially in the South, who wished to preserve as much power in the states as possible, and from citizens concerned about the concentration of power. This pressure was taken up by Andrew Jackson who made it a centerpiece of his agenda to close the Second Bank under Nicholas Biddle.

As a result of this opposition the charter of the Second Bank was not renewed and the chartering of banks became the sole prerogative of the States. The succeeding 80 years was characterized by considerable financial instability-- the Free Banking era from 1836 to 1863-- with a flawed payments system, numerous bank failures and several notable banking panics, followed by the National Banking era which did create a uniform currency but was punctuated by four serious banking panics and several minor ones. The system did not solve the problem of “ the inelasticity of high powered money” ( Friedman and Schwartz 1963). The outcry following the Panic of 1907 led to the reforms leading to the Federal Reserve.

My counterfactual , which is close to that of Bray Hammond (1957), is that had the Second Bank not been destroyed by Andrew Jackson in 1836 that U.S. monetary history would have been very different. Monetary and financial instability would have been considerably less.

The Second Bank of the United States under Nicholas Biddle in the decade before the Bank War had developed into a first rate central bank. According to Redlich ( 1951) Biddle had read Henry Thornton “s An Inquiry into the Nature and Effects of the Paper Credit of Great Britain ( 1802) and understood the principle tenets of monetary theory. Biddle had a remarkably clear understanding of the role of the Bank in stabilizing exchange rates and maintaining adherence to the gold standard, smoothing seasonal and cyclical shocks and acting as a lender of last resort to the banking system. In many respects he was ahead of his contemporaries at the Bank of England.

Had the Second Bank survived, the U.S. may have adopted nationwide branch banking as Canada did. The State banks were already competing with the Second Bank in the 1830s and it is likely that the Second Bank would have expanded and extended its branching network. It is unlikely that the federal government would have blocked chartering competitors for the Second Bank as happened in France in

this period. Moreover the states would likely have moved to promote interregional branching because their banks would have found it difficult to compete with the Second Bank without cross state branching. Had nationwide branch banking come on the scene the U.S. would have developed a more resilient banking system as in Canada where banks could pool risk across regions and the incidence of banking panics would have been less ( Bordo, Redish and Rockoff 2011).

In addition the Second Bank would have learned to act as a lender of last resort just as the Bank of England did. Thus even if the States had developed free banking and not gone the Canadian route, the Second Bank would have learned to stem incipient panics, the interstate branching network of the Second Bank would have continued to create a unified national currency and also an efficient payments mechanism. Moreover the Second Bank under Biddle had been developing and strengthening the two name bill of exchange market which in Europe developed into the deep and liquid bankers acceptance market. A unified money market would have developed more rapidly than it did ( Knodell 2001). Given the development of a deep and liquid money market the Second Bank would have been able to use its discount rate to backstop the market and provide liquidity when needed. It would also have developed open market operations as the Bank of England did to make “Bank Rate effective’ ( Sayers 1976).

Had the Second Bank learned to deal with the financial crisis problem as was the case of the Bank of England after the Overend Gurney crisis of 1866 (when the Bank heeding Bagehot’s ( 1873) criticism of its actions in not allaying the panic), adopted his Responsibility doctrine to subsume its private interest to that of the public. It also learned to follow Bagehot’s rule to lend freely to the money market on the basis of sound collateral. Had the Second Bank adopted similar strictures, the U.S. would not have needed to found the Federal Reserve and the US central bank would likely not have made the mistakes it did between 1929 and 1933. In addition the Second Bank had already begun by 1830 to iron out the seasonal in the money market removing another reason to establish a new central bank.

Had the Second Bank developed into a best practice mid nineteenth century central bank then the Civil War would have been financed in a more efficient way than it was, just as the Bank of England learned to do in the Napoleonic Wars by freely discounting exchequer bills at a low pegged discount rate ( Bordo and White 1991). This may have obviated the need to issue greenbacks. Moreover there would not have been the need to develop the National Banking system to provide a new source of currency .The gold standard would have been temporarily suspended according to the gold standard contingent rule ( Bordo and Kydland 1995) and given the credibility of the Second Bank the Federal government would have been able to issue debt at higher prices than would otherwise have been the case.

Finally the Second Bank would have continued to adhere to the gold standard convertibility rule and to follow the rules of the game as the other central banks learned to do in the nineteenth century, as Biddle had learned to do in the 1830s. He intervened in the foreign exchange market to smooth balance of payments adjustment ( Bordo, Humpage and Schwartz 2006). By adhering to the convertibility rule, the Second Bank would have gained the credibility to use its tools to temporarily smooth interest rates and offset shocks to the real economy acting within the target zone provided by the gold points ( Bordo and MacDonald 2007). This suggests that the Second Bank could have smoothed the price level and dampened the international price and output shocks that characterized the experience under the pre 1914 classical gold standard. Business cycles in the US would have been milder than they were both because banking panics would have been prevented by the Second Bank and because of its smoothing operations.

The Second Bank by following the gold standard rules would have aided in the implicit international cooperation that strengthened the system( Eichengreen 1992) . Indeed the creation and backstopping of the bankers acceptance market would have facilitated the ability of US merchant banks to issue dollar denominated trade and bankers acceptances and would have reduced the reliance on and transfers to

the British merchant banks who supplied the sterling bills needed to finance U.S. trade with the rest of the world ( Broz 1997). This would have allowed the dollar to become an international currency sooner than it did. This would also have obviated the need for establishing the Fed in 1913.

Counter to my Second Bank counterfactual, one could argue that deep seated American populism and distrust of centralized power as well as states' rights sentiment would have eventually terminated the Second Bank even if the Bank War between Andrew Jackson and Nicholas Biddle had not happened. A possible response to this objection is that, as was the case with the Bank of England in the eighteenth and nineteenth centuries, the Second Bank would have learned some self protective skills to create a constituency in the nation and especially in the Congress, to ward off incipient threats to its charter. This would suggest that the Jackson Biddle War was sui generis, reflecting a head on collision of two very strong willed individuals that would not necessarily have repeated itself.

### **The Second Bank in the Twentieth Century.**

With the Second Bank as the U.S. central bank, assuming that it evolved in the way other advanced country central banks had evolved ,the events of the twentieth century may have been different than they were. World War I would likely have been financed in the way it was and the gold standard would have been suspended as it was during the Civil War or partially suspended as it was under the embargo on gold exports from 1917 to 1919. The postwar instability in Europe wouldn't have been much different than it was and the real exchange rate misalignments would not have been much different than they were. The Gold Exchange standard would likely have been established as it was and would have had the same problems as it had , although a longstanding US central bank might not have sterilized gold inflows in the 1920s and would have allowed the adjustment mechanism to work ( although if France had followed its pro gold sterilization policies, deflationary pressure would have still



been prevalent ( Irwin 2011)). Bordo and Eichengreen (1998) argue that if the Great Depression hadn't happened that the gold exchange standard could have lasted much longer , at least until the 1960s when it would have collapsed because of the Triffin Dilemma and the world would then have moved towards a fiat money system.

Most important for the monetary history of the twentieth century is the likelihood that the US central bank would not have allowed the Great Depression to happen because it would not have been hobbled by the orthodoxy of the real bills doctrine embedded in the Federal Reserve Act( Meltzer 2003). This suggests that it would not have followed the tight monetary policies it did in 1928-29 to stem the stock market boom and it would have learned to follow orthodox lender of last resort policy --to use open market operations to provide liquidity to the money market or else discount freely to all commercial banks on the basis of sound collateral -- to prevent the type of banking panics that occurred in the early 1930s. Moreover the flaws in the structure of the Fed emphasized by Friedman and Schwartz ( 1963) would have been absent. Had the Great Depression not happened then monetary history would have been very different indeed and we might not have had World War II, Keynesian economics and the Great Inflation.

### **3.Had Paul Warburg's plan for a U.S. Central Bank been adopted**

Our second counterfactual scenario for a U.S. central bank is somewhat less radical than the previous one. We assume that the Second Bank was destroyed and the financial history of the nineteenth century played out as it did. During the Civil War the framers of the National Banking system wanted to rectify the perceived major shortcoming of the Free Banking system which prevailed from 1836 to 1863-- the absence of a uniform currency. This was achieved by the creation of National banks which issued

national bank notes fully backed by US government securities. National banks were also required to have higher capital requirements than did the state banks as well as higher reserve requirements. They were also tightly supervised by the Comptroller of the Currency ( White 2011).

However the National Banking system had a number of fatal flaws which contributed greatly to the frequent serious banking panics which occurred in the succeeding 50 years. The two fatal flaws of an inelastic monetary base and the inverted pyramid of credit engendered several reform movements in the 40 years period.

The inelasticity of the monetary base( high powered money) problem stemmed from the fact that there was no institutional mechanism in place to serve as a lender of last resort in the face of a banking panic when the public en masse attempted to convert their deposits into currency. The only way to increase national bank notes was by increasing the value or quantity of government bonds backing the notes. This would be hard to do in the conditions of a banking panic ( Cagan 1964). Two mechanisms were developed in the national banking era to provide emergency currency: the Clearing Houses in New York City and other major financial centers would issue clearing house loan certificates based on the pooled assets of the member banks. These would serve as a substitute for bank reserves thus allowing the banks to pay out cash to the public. The other mechanism was the independent US Treasury which had some rudimentary tools of monetary policy at its disposal (especially lending for short periods to commercial banks tax and custom receipts, which were held in gold at its branches ( Timberlake 1993). These substitutes for a central bank engaging in Discount Window Lending or conducting open market operations (as was done at the time by the Bank of England and other European central banks) were successful in allaying panics on several occasions ( 1884 and 1890) but were used too little and too late to prevent major panics from erupting in 1873, 1893 and 1907 ( Schwartz 1986). Under the national banking system the Country national banks in small cities could hold half of their 25% reserve

requirements as correspondent balances earning interest in Reserve City banks( larger cities), Reserve City banks in turn could hold half of their reserves as correspondent balances earning interest in the Central Reserve City banks in New York, Chicago and St. Louis( Bordo, Rappoport and Schwartz 1992).As it turned out much of the nation's reserves ended up in the New York money center banks who would invest them in the call loan market. Call loans ( viewed as highly liquid) were used to finance purchases of stocks on the New York stock exchange. The tight connection between the nation's bank reserves and the stock market linked stock market crashes to banking panics ( Sprague 1910) .

A third problem of the National Banking system was seasonal stringency in the money markets which could exacerbate financial crises. In the autumn crop moving season, the demand for credit would tend to push up short term interest rates. If other factors leading to financial stringency occurred at the same time (such as the Bank of England raising its discount rate to protect its gold reserves, hence reducing the supply of sterling bills of exchange used to finance the export of grain from the U.S.) , then a panic could arise. Most of the panics under the National Banking system occurred in the fall ( Miron 1986).

These three flaws of the National Banking system led to a series of proposals following each major panic for reform of the financial system ( West 1977). However nothing substantive was changed until the Panic of 1907 which was 'the straw that broke the camel's back'. The Panic of 1907 led to the Aldrich Vreeland Act of 1908 which institutionalized the emergency currency creation procedures developed by the Clearing houses. Groups of banks were allowed to form National Currency Associations to temporarily issue emergency currency in the face of a panic on permission from the Secretary of the Treasury. In addition to the creation of National Currency Associations, the Aldrich Vreeland Act created the National Monetary Commission with a mandate to draft by 1912 a plan for a US style central bank.

Paul Warburg, a successful German investment banker who had immigrated to the U.S., proposed a plan for reform of the US system along the lines of the European financial systems that he was familiar with. Warburg succeeded in convincing Nelson Aldrich, the Chairman of the Senate banking committee ,of the efficacy of his plan at a secret meeting of prominent bankers held at Jekyll Island , Georgia ( Wicker 2005).

Warburg made the case for a European style central bank for the U.S. He argued that in the advanced countries of Europe the presence of a discount market and a central bank providing the liquidity to back it up, and serve as lender of last resort in times of stringency ,would prevent the type of financial instability experienced in the U.S. . Warburg believed that a market for bills of exchange ( two name bills) like the market for bankers acceptances in use in Europe would be more liquid than the existing U.S. commercial bill market( based on single name promissory notes). Warburg argued that the U.S. money market would be more liquid if national banks were permitted to issue bankers acceptances. Moreover he believed that the creation of a U.S. acceptance market would break the monopoly that sterling bills had over U.S. international commerce and would help the dollar become an international currency ( Broz 1997, Eichengreen 2010)).

The European financial systems that Warburg wanted the U.S. to emulate were highly sophisticated ones that had taken centuries to evolve. In the English system the Bank of England would discount paper for the discount houses on the basis of the quality of the collateral offered. The discount houses in turn would then provide liquidity to the banking system. In times of panic the Bank of England would lend anonymously to the money market, as if through a frosted glass window.

“ The mechanism can be envisaged as the central bank having a discount window made of frosted glass and raised just a few inches. Representatives of institutions could appear at the window and push

through the paper they wanted discounted. The central banker would return the appropriate amount of cash, reflecting the going rate of interest. The central banker does not know, nor does he care, who is on the other side of the window. He simply discounts good quality paper or lends on the basis of good collateral. In this way, institutions holding good quality assets will have no difficulty in obtaining the funds they need. Institutions with poor quality are likely to suffer. In times of panic the interest rate would rise.”( Capie 2002 p 311).

In addition to not having a unified money market based on bankers acceptances and a central bank using its discount rate to back it up and serve as lender of last resort ,the institutional framework of the European banking systems were very different from the U.S. in the National banking era. The European banking system was relatively concentrated in a few large nationwide branching banks versus the U.S. with thousands of unit banks.

With these institutional differences in mind Warburg ( 1910b) proposed the creation of a central bank with 20 regional branches controlled by bankers but regulated to some extent by government officials. His proposed United Reserve Bank would rediscount bills of exchange for its member banks, thereby providing liquidity to the market and establishing a lender of last resort following Bagehot’s rule to lend freely in a banking panic.

“ The relationship between the central bank and the discount market is a most important one. While in normal times only a small proportion of the business is done by the central bank, the existence of this bank is all important to the whole financial structure, because even if a bank makes it a rule not to rediscount with the central bank and in its general business keeps independent of this institution, the fact remains that in case of need it can nevertheless rediscount with the central bank every legitimate bill, both bankers or mercantile acceptance, so that every legitimate bill represents a quick asset, on the

realization of which every bank or banker can rely. Consequently no investor, bank, banker, private capitalist or financial institution will ever hesitate to buy good bills. Furthermore, there will not be in critical times any rush to sell good bills, as everybody in these countries knows that there is no better and safer investment, because for no other investment is there an equally reliable market. “ ( Warburg 1910a p 37.)

Under Warburg’s plan the discount rate would be the key instrument of monetary policy and it would be supplemented by open market operations to help make the discount rate effective, ie to ensure that changes in the discount rate could always determine the behavior of market interest rates. He wanted the discount market to replace the call loan market as the key source of liquidity for U.S. banks and hence eliminate the link between the stock market and the banking system under the inverted pyramid of credit. As in Europe adherence to the official gold parity would anchor the price level and the new central bank would issue currency backed by bills of exchange and gold ,and would manage the gold standard by intervening in the foreign exchange market and manipulating the gold points according to the ‘rules of the game’.

Nelson Aldrich incorporated much of the Warburg Plan into the Aldrich bill which was presented to the Senate in 1912 and rejected. The succeeding Democratic Congress put forward a bill drafted by Carter Glass and H Parker Willis which , with some minor alterations, became the Federal Reserve Act. The Federal Reserve Act took on board many of the key monetary and international policy provisions of the Aldrich bill but differed from it radically in terms of structure and governance. Rather than a central bank with many branches, the Federal Reserve System had 12 regional Reserve Banks and the Federal Reserve Board in Washington. The key monetary policy difference between the Federal Reserve Act and the Aldrich Plan was that individual Reserve banks would set their own discount rates and keep a minimum reserve in terms of gold and ‘eligible’ paper against its notes and deposits.

The Federal Reserve Act incorporated many of Warburg's ideas but left out or downgraded others. First, consistent with his views, member banks were required to maintain reserve balances with the Reserve Banks which would reduce the concentration of correspondent balances in the New York call loan market and the transmission of instability from the stock market to the banking system .

Second consistent with Warburg's plan, to address the problem of inelastic currency the Act permitted member banks to rediscount eligible paper with the Reserve banks in exchange for currency or reserve deposits. Third, Warburg's views were also reflected in the sections of the Act that permitted member banks to offer bankers acceptances based on international trade and which authorized the Reserve Banks to rediscount or purchase acceptances in the open market. The Reserve Banks would set the ' bill buying rates' on acceptances they offered to purchase in the open market. The Fed's acceptance buying facility was closer in form to the Bank of England's discount facility than the Fed's discount window. Typically Reserve Banks would purchase all of the eligible acceptances offered to them at their set bill buying rates.

In other respects the Act departed from Warburg's vision. First, it did not contain explicit instructions for how the Fed should respond in the event of a banking panic, i.e how it should serve as a lender of last resort .Unlike Warburg(1910a) it does not state Bagehot's rule.

" Thus certain periodic and normal demands for cash , as well as a domestic drain caused by distrust, must be met by paying out freely. A foreign drain, on the other hand, must generally be met by an energetic increase of the rate, while a drain both domestic and foreign must be treated by various combinations of both methods." ( Warburg 1910a, p 37)

The framers believed that they had created a fool proof mechanism that would prevent panics from occurring in the first place.

Second, the Act did not address sources or forms of financial instability outside the banking system, eg from the trust companies. Moreover only member banks were given access to the Fed's services and this left out nonmember state banks( as well as trust companies and other financial institutions).

Third, the Federal Reserve Act limited the types and maturities of loans and securities that member banks could rediscount with the Reserve Banks. Glass and Willis were strong proponents of the real bills doctrine. They believed that Federal Reserve Credit should be extended only by rediscounting self-liquidating commercial and agricultural loans. The Federal Reserve Act allowed the rediscounting of notes based on commercial transactions but forbade the rediscounting of loans and securities from the financing of financial assets except U.S. government bonds. The provisions of the Federal Reserve Act defining eligible paper were similar to those in the Aldrich bill but the Aldrich bill would have permitted the rediscounting of any direct obligations of the borrowing bank if approved by the Secretary of the Treasury. Thus the lender of last resort function envisaged by the Federal Reserve Act fell short of what Warburg had planned. This became an issue in the Great Depression ( Bordo and Wheelock 2011).

### **The Federal Reserve's performance in the 1920s and 30s**

The Federal Reserve began operating in 1914. It successfully helped finance World War I by discounting loans secured by government securities and by using open market operations. After the war the Fed, according to Friedman and Schwartz, made its first policy mistake by delaying tightening in 1919 in the face of rising inflation, and then once it did tighten in late 1919 , it waited too long to ease precipitating a serious recession in 1920 -21. The Fed tightened in 1919 when it observed its gold reserves declining . It raised its discount rates in classic European central bank style. Friedman and Schwartz gave the Fed high marks for maintaining price and real economic stability in the 1920s, for conducting countercyclical



monetary policy to offset two minor business cycles. They also praise the Fed for smoothing out the seasonal cycle in interest rates and thereby achieving one of the goals of its framers.

Meltzer( 2003) criticizes the Fed for basing its policy actions in the 1920s and 30s on a variant of the Real Bills doctrine—the Burgess Rieffler Strong Doctrine-- which encouraged the Fed to base its decisions to tighten or ease policy on the level of short-term nominal interest rates and the level of member bank borrowing in the key money market cities. Following this rule, according to Meltzer( 2003), Wheelock(1991) and Wicker ( 1966),worked well in the tranquil 1920s but created problems in the 1930s in the face of deflation and a collapsed demand for loans. Friedman and Schwartz also criticized the Fed for following the Real Bills proscription against discounting financial paper.

The Fed largely adhered to gold standard orthodoxy in the 1920s and attached higher weight to external than internal balance ( Wicker 1966). Its major departure from orthodoxy was sterilization of gold inflows which impeded the classical price specie flow adjustment mechanism from working and also imposed deflationary pressure on the rest of the world ( Meltzer 2003).

Federal Reserve policy during the Great Contraction departed radically from what Warburg had in mind for a lender of last resort. Following the Stock market crash of October 1929 the New York Fed used its discount window lending and open market operations to inject reserves into the banking system and prevented the crash from turning into a liquidity panic. Thereafter, the Fed did not use its policy tools to effectively prevent a series of banking panics from playing out-- leading to a collapse of money supply, prices and real output.

There is a vast literature considering why the Federal Reserve failed to act effectively as a lender of last resort during the Great Contraction. Friedman and Schwartz ( 1963) emphasize the Fed's flawed structure and lack of strong leadership. After the death of Benjamin Strong, Governor of the New York

Fed , who had exerted powerful control over the key Open Market Investment committee, the System became paralyzed by in-fighting, petty jealousies and sharp differences of opinion. Other studies contended that the policies followed by the Fed during the Depression were fundamentally consistent with those of the 1920s ( Wicker 1966, Wheelock 1991 and Meltzer 2003). Those studies posit that Fed officials misinterpreted the behavior of nominal interest rates and the level of borrowing from the Fed's discount window. Low nominal interest rates after 1930 and little borrowing at the discount window were treated as evidence that monetary conditions were exceptionally easy and that there was little more the Fed could or should do to promote recovery.

Temin ( 1989) and Eichengreen (1992) focus on the role of the gold standard. The Federal Reserve Act affirmed the fundamental role that the gold standard played in the U.S. monetary system. The Reserve Banks were required to maintain gold reserves to back their note and deposit liabilities. Although the Act permitted the Federal Reserve Board to suspend the System's gold reserve requirement, Fed officials were very reluctant to take any action that would threaten the gold standard.

In addition to these factors a key reason why the Fed failed was because it did not recreate the features of the European banking system that made the Bank of England, the Reichsbank and other central banks effective lenders of last resort ( Bordo and Wheelock 2011). The framers of the Federal Reserve Act intended the discount window to be the primary means by which the Fed would furnish an elastic currency. They sought to provide a mechanism that would ensure ample supplies of currency and bank reserves to support commercial and agricultural activity, but not be a source of funds for speculation or long-term investment. Thus the types of paper that were eligible for rediscounting with Federal Reserve Banks were restricted to short-term commercial and agricultural paper ( and U.S. government securities) . During the Depression, many banks apparently lacked paper that was acceptable for rediscounting with the Federal Reserve Banks.

The second problem with the discount mechanism under the Federal Reserve Act was that member banks were quite reluctant to borrow from the Fed in a crisis. In part this reluctance stemmed from the Fed's administration of the discount window. Throughout the 20s, according to Meltzer ( 2003,pp161-65) Fed officials had tried to discourage banks from continuous borrowing and wished to instill the idea that banks are hesitant to borrow from the Fed and do so reluctantly when confronted with a short-term liquidity need. Fed officials also were concerned that banks were borrowing from the Fed to finance loans for the purchase of stocks.

A third problem was that of stigma, during the Depression banks became reluctant to turn to the discount window because they feared that depositors would interpret this as a sign of weakness hence increasing the likelihood of a run on the bank ( Friedman and Schwartz 1963 pp 318-319).

The Fed had a second mechanism to supply currency or reserves during a crisis—the purchase of bankers acceptances, the mechanism that Warburg favored. Although the Fed did make large purchases of bankers acceptances during the banking panics in the fall of 1931 and the spring of 1933 these purchases were not large enough to offset the effects of currency and gold withdrawals from the banking system.

Although the Fed's purchases of bankers acceptances provided some support to the banking system during the panics , the acceptance market was small and highly concentrated in New York City, which limited the usefulness of Fed purchases during a crisis. Conceivably the Fed could have made it more attractive for banks to sell acceptances to the Reserve banks by lowering their bill buying rates, but it seems doubtful that they could have purchased enough acceptances to prevent declines in bank reserves. ( Bordo and Wheelock 2011 page 30).

The Federal Reserve's decentralized system also created problems in responding to a financial crisis. The framers wanted a federal system of reserve banks to respond to and support the banking and currency needs of their individual districts. Thus, each Federal Reserve bank had the discretion to set its own discount rate and administer its discount window. The Fed's decentralized structure proved unwieldy in responding to financial crises. The individual Reserve banks acted competitively rather than cooperatively at critical points during the Depression. For example, in March 1933, the Federal Reserve Bank of Chicago refused a request from the New York Fed to exchange gold for U.S. government securities when gold outflows threatened to push the New York Fed's reserve ratio below its legal minimum (Meltzer 2003, P.287).

The act left considerable discretion to the individual Reserve Banks and the Federal Reserve Board for implementing policy. Some of the Reserve Banks moved more aggressively than others to supply currency to banks threatened by a panic. Richardson and Troost (2009) compare the liberal lending policies of the Atlanta Fed to those of the St. Louis Fed. They find the incidence of bank failures to be much greater in the half of Mississippi under St. Louis's jurisdiction than the half under Atlanta's jurisdiction. Another example of discretion by a Reserve Bank was the New York Fed's aggressive response to the 1929 stock market crash.

The actions by the New York and Atlanta Reserve banks suggest that the Federal Reserve had the tools and the power to respond effectively to financial crises. However an effective response required leaders who were willing to improvise and test the limits of the Federal Reserve Act. The Act did not provide an automatic, fool-proof mechanism for dealing with crisis, as the founders had hoped. Instead, effective lender of last resort action depended a great deal on the discretion of individual policymakers (Bordo and Wheelock 2011).

The Fed's early history shows that a lender of last resort system that works well in one environment may not work in another environment. Paul Warburg sought to emulate the European Central bank mechanism and discount market. For political economy reasons ( especially the ingrained fear of concentration of power) U.S. banking institutions were not fully adapted to the European system. The Federal Reserve Act overcame some of the flaws of National Banking system ( e g the inelastic currency and the seasonal in short-term interest rates) that promoted instability, but not all of them. Perhaps the Fed's lender of last resort mechanism would have performed better with a Canadian/European style branch banking system coupled with a deep acceptance market.

Had Warburg's original plan have been adopted many of the barriers to effective LLR action would have been overcome. These include ; decision making authority concentrated in a unique central bank with many branches , a uniform discount window policy, access to the discount window for all commercial banks, a much wider range of eligible securities , a more extensive market for acceptances, a US central bank acting to provide liquidity to the money market as a whole, and the explicit adherence to a Bagehot type rule. These institutional changes would very likely have prevented the banking panics of the Great Depression. Similar to the Second Bank scenario discussed above, had the Great Depression been avoided the rest of the monetary history of the Twentieth century would have been very different than it was.

### **The legacy of the Great Depression**

Amendments to the Federal Reserve Act in the 1930s addressed many of the technical flaws that caused the Fed to be an effective lender of last resort in the Great Depression. These included a new authority to lend to member banks ( relaxed collateral requirements); a new authority to lend to nonmember banks; a new authority to lend to nonbank firms and individuals ( Section 13(3)), which in the 2008 crisis

was used to justify many of the Fed's credit operations; and increased authority of the Board of Governors to determine Reserve Bank discount rates and lending policy. The problem of decentralization was dealt with by greatly increasing the power of the Board of Governors in Washington.

In addition other reforms promoted stability of the banking system such as Federal deposit insurance , the Glass Steagall separation of commercial and investment banking, deposit interest ceilings and enhanced supervision. There were no changes to the dual banking system or to the prohibition to interstate banking and hence the U.S. banking system did not move in the direction of a Canadian or European style nationwide branch banking system. These changes created a banking system that was slow to innovate and lost business to less regulated financial institutions and markets ( the shadow banking system) ( Bordo and Wheelock 2011).

These reforms and a regime of low inflation under the Bretton Woods system led to three decades of both financial and macroeconomic stability. Beginning in the 1970s with the breakdown of the Bretton Woods system and the run up in inflation, financial stress reappeared in the mid-1970s with several important bank failures.. In dealing with banking instability for the next three decades the Fed moved away from the classic Bagehot's rule LLR doctrine posited by Warburg towards concern over systemic risk and 'too big to fail'.

The reforms of the 1930s focused on protecting bank depositors and preventing runs by depositors and hence they proved only partly helpful during the crisis of 2007-08. As with the original Federal Reserve Act, the 1930s reforms did not contemplate how to protect the banking system from instability coming from outside the banking system ( e.g. runs on investment banks). The section 13(3) lending programs created by the Fed in 2007-2008 were , for the most part helpful in alleviating the crisis , but required

considerable discretion and judgement on the part of Fed officials. Moreover the Fed seemed to have had no way to save the financial system without resorting to bailouts and these actions both led to moral hazard and a compromise of the Fed's independence ( Bordo and Wheelock 2011). Thus the reforms that followed the Great Depression only went part way in moving the Fed closer to Warburg's original vision .

#### **4. Could the alternative scenarios for a US central bank have delivered better inflation and overall macro performance than did the Fed?**

A key part of the Federal Reserve Act was that the Fed would adhere to the gold standard as did all other major central banks in 1914. Adhering to the gold standard provided a credible nominal anchor to the price level .There is considerable evidence that world price levels under the gold standard tended to be mean reverting reflecting the stabilizing properties of the commodity theory of money ( Bordo 1981 and Bordo and Gavin 2007). Although prices reverted towards the mean, in the short run there was considerable price variability reflecting the operation of the price specie flow mechanism and shocks to the gold market. There were also long swing movements in prices consequent upon major gold discoveries and countries joining the gold standard.

The Fed was set up like the European central banks to credibly adhere to gold and to manage the gold standard, I e to smooth interest rates and offset temporary real shocks ( Goodfriend 1988). Adherence to the gold standard was ended during World War I by most countries, although the US never formally left gold but an embargo on gold exports was imposed from 1917 to 1919. The price level in the US more than doubled during the war years but increased less than in the major other belligerents. After the war in 1919 the Fed like other central banks followed contractionary policy to reduce prices and

return to the prewar status. Tight Fed policy led to a massive deflation and sharp recession from 1920-21. The ensuing decade of the 20s exhibited stable prices and relatively stable and rapid real economic growth.

The Great Contraction from 1929-33 experienced both a massive deflation of close to 35% and an unprecedented drop in real activity of similar magnitude. As mentioned above fatal policy errors by the Fed and "golden fetters" were largely responsible for the debacle. After the Depression the US had both rapid growth and reflation. The U.S. left the gold standard in April 1933 and then returned in January 1934 after a massive devaluation. World War II like World War I exhibited rapid inflation. After the war the US became part of the Bretton Woods System with the dollar anchored to gold and the rest of the world pegged to the dollar. The U.S. returned to price stability in the 1950s and early 1960s.

Chairman McChesney Martin and Presidents Eisenhower and Kennedy believed in adhering to gold standard rules and the primacy of price stability. The 1950s also were characterized by good overall macro performance very similar to the 1920s. Business cycles were mitigated by well timed countercyclical monetary policy ( Meltzer2003, Bordo and Landon Lane 2010).<sup>1</sup>

Price stability ended with the Great Inflation which began in 1965. The initial run up in inflation reflected the Martin's Fed decision to give up its independence and coordinate monetary policy with the expansionary fiscal policy of the Johnson administration( Meltzer 2010). It also reflected the growing acceptance in the Fed and the Administration in the Phillips curve tradeoff between unemployment and inflation. The Great Inflation worsened in the 1970s, peaking at 15% in 1980.

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<sup>1</sup> This was not generally the case in other periods where the Fed often tightened monetary policy too late in the business cycle upswing to prevent inflation and loosened too late in the downswing to mitigate recession. ( Bordo and Landon Lane 2010).



There are a number of competing explanations for it. ( Bordo and Orphanides 2012). These include accommodation of the oil price shocks of 1973 and 1979, and the Fed's unwillingness in the face of political pressure, to follow through on the contractionary monetary policy needed to break the back of inflationary expectations .This was because of the concern over the rise in unemployment that would ensue. By the end of the 1970s inflationary expectations became unanchored and the US dollar plunged dramatically. In response President Carter appointed Paul Volcker as chairman of the Federal Reserve with the prescription to break the back of inflation and inflationary expectations.

The Volcker shock of 1979 involved a shift in monetary control procedure away from the traditional use of short term interest rates towards monetary aggregates. Tight money produced a spike in interest rates , a severe recession and by 1982 inflation had been halved. From the mid 1980s until 2007 the Fed kept inflation low ( close to 2%) and stable. Inflationary expectations declined drastically by the end of the 1980s and the real economy grew rapidly punctuated by two mild recessions. In this Great Moderation period the Fed was acclaimed for adopting a credible low inflation rule like policy which echoed the experience of the 1920s and 1950s, and in some respects the pre 1914 gold standard (Bordo and Schwartz 1999).

The benign environment of the Great Moderation was shattered by the Subprime Mortgage Financial Crisis of 2007-2008 and the Great Recession of 2007-2009 followed by a still anemic recovery. The Fed dealt with the liquidity crisis using both its traditional DWL tools and, by the use of unconventional credit policy . Its role in the crisis has been criticized for compromising its independence by conducting fiscal policy and for moving away from the rule like behavior that it had followed in the Great Moderation towards the use of discretion( Meltzer 2010). It has also been criticized for keeping interest rates artificially low from 2002-2006 to offset an imaginary threat of deflation ( Taylor 2009), and then pausing in its expansionary actions in early 2008 and keeping interest rates too high until late 2008

thereby guaranteeing a serious recession ( Hetzel 2008). The Fed's shift to Quantitative Easing( QE1) and purchasing massive amounts of long term Treasuries and mortgage backed securities in December 2009, once it had reached the zero lower bound, may be largely responsible for ending the recession. A second round of QE in response to a sluggish recovery in the fall of 2010 has not been viewed as successful in stimulating the economy( Goodfriend 2011). This also seems to be the case with its 2011 policy of twisting the yield curve by substituting long term for short term securities in its portfolio ( Goodfriend 2011).

The present recovery differs markedly from past recoveries following deep recessions. What seems to be different is the moribund housing sector after the massive nationwide housing bust since 2006 reflected in a collapse in residential investment ( Bordo and Haubrich 2011)—a problem which monetary policy may not be able to address.

An open question is whether the expansionary policies that the Fed has been following will eventually lead to a run up in inflationary expectations in the future. What also is an open question is whether the Fed's lapses from rule like behavior between 2007-2011 and its extensive use of fiscal policies which has undermined its independence and exposed its balance sheet to credit risk, will end its good track record of maintaining price stability during the Great Moderation.

Would the revived Second Bank or the Warburg inspired central bank have performed better than the Fed did with respect to price stability and overall macro performance? Both hypothetical central banks were based on the gold standard as was the original Fed, so the answer depends on whether the gold standard would have survived if the Great Depression( which many believe was caused by the failures of Fed policy) had not happened. Bordo and Eichengreen(1998) have argued that the gold exchange standard would have survived and ,assuming that World War II had happened ( which is also

questionable given that Hitler's electoral success had a lot to do with the fact that Germany suffered badly in the Great Depression (Temin 1996))it would have been suspended during the war and then, following the gold standard contingent rule ( Bordo and Kydland 1995) it would have been restored. The counterfactual exercise that Bordo and Eichengreen conducted ,based on a model of the global gold exchange standard, showed that the gold exchange standard could have lasted until the mid 1960s but would then have collapsed because of the Triffin dilemma. The U.S. would have been the key reserve country as it was since the mid 1920s ( Eichengreen and Flandreau(2008)) and the US gold reserves would have been threatened as the rest of the world used dollars as their reserve currencies.

Moreover the world would have shifted to a fiat regime to overcome the resource costs and vagaries of the gold standard that the great economists, Irving Fisher, Alfred Marshall ,Knut Wicksell, John Maynard Keynes and Milton Friedman had posited . Also the financial innovation that began pre 1914, with the gold points serving as a credible target zone to allow central banks to use monetary policy to offset shocks and smooth interest rates ,would have continued ( Bordo and Flandreau 2003).In addition if we hadn't had the Great Depression then Keynes would not have published the General Theory and Keynesian economics and the Phillips curve would never have developed. This would mean that the Fed would have learned to follow a stable nominal anchor with fiat money several decades before they did.

The examples of Germany and Switzerland both of whom had a much better record of maintaining price stability in the post war than the Fed and many other central banks suggests that it could have been done (Beyer et al 2009 , Bordo and James 2008). Germany's stability culture came out of its drastic experience with hyperinflation in the 1920s. Switzerland's stability culture goes back to the founding of the Swiss National Bank in 1907 and the importance that price stability meant to a country whose major industry was providing financial services ( Bordo and James 2007).

Thus a reasonable case could be made that either variants of alternative models for a US central bank could have done a better job in maintaining price stability and overall macro stability to the extent that price instability is an important cause of real instability( Lucas 1973, Schwartz 1995)<sup>2</sup>. This analysis is based on the path dependency that follows from key innovations in the past which set the economy on trajectories that would otherwise have been different.

My story about what would have happened assumes that both counterfactual historic central banks would have learned to be effective central banks as was the case with the Bank of England and other long lived institutions during the nineteenth century and then painfully, in the twentieth century, by the Federal Reserve. This is not to say that the Bank of England was perfect. It had a worse record than the Fed in the post World War II period but its poor inflation performance had a lot to do with the Keynesian legacy of the Great Depression and the aftermath of World War II and the creation of the welfare state( Capie 2010). Had the Great Depression not happened it seems reasonable to hypothesize that the Bank of England, the Banque de France and other central banks would have had better records too.

Conclusion: Some Lessons from History

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<sup>2</sup> It is also not clear that these alternative central bank scenarios would have done better than did the Fed in following countercyclical monetary policy since such policies as a general rule were not followed by central banks before World War I. Given that the flaws of the Fed with respect to financial stability would have been avoided, the need for countercyclical monetary policy may have been less.

In this paper I have argued that had the Second Bank of the United States not been destroyed in 1836 that the U.S. could have had a better history with respect to financial stability, price stability and overall macro performance. Had history played out as it did and the Second Bank been terminated then a second more modest counterfactual which assumes that a US central bank closer to the Warburg plan of 1910 would also have done better than the Fed throughout much of the twentieth century.

These hypothetical central banks had several key features which were crucial to their hypothetical success. The first was adherence to a commitment to a credible nominal anchor, the gold standard, and then a fiat money standard operated on lines like the gold standard. The second was following a rule to preserve financial stability—following Bagehot's rule as interpreted by the Bank of England in the second half of the nineteenth century--- to provide liquidity freely to the money market in the face of a panic. Third was independence from the fiscal authorities which was a key tenet of the classical gold standard.

The Fed departed from these rules over much of its history. It learned to be a lender of last resort after the Great Depression but has pushed that notion way beyond what the framers expected of it, to protect the integrity of the payments system. Today it has expanded its mandate to the guarantee of the stability of the entire financial system.

The Fed achieved price stability in the 1920s, 1950s and between 1985 and 2007. It also learned from its bad behavior in the Great Inflation to follow a credible rule like commitment to maintain low inflation during the Great Moderation. It then followed a period of keeping interest rates too low for fear of deflation between 2002-2006 which added fuel to the fire of the subprime crisis and since the recession has ended may have kept policy too loose to not avoid future inflation.

The Fed was granted considerable independence at its inception. It abused this independence during the 1930s and from the mid 1930s to 1951 it effectively became a branch of the Treasury. It regained its independence in the 1951 Treasury Federal Reserve Accord but under Chairmen McChesney Martin, Arthur Burns and G William Miller it again allowed monetary policy to become subservient to the needs of the Treasury. Since Paul Volcker became chairman in 1979 the Fed's independence has been restored and the Fed between 1985 and the early 2000s has conducted monetary policy as good as any contemporary or historic central bank. Its record since 2007 once again suggests that its independence has been sacrificed. It is too soon to tell how permanent this will be.

The hypothetical examples that I have constructed suggest that the U.S. could have had a better central bank. The actual history of the Federal Reserve suggests that with considerable effort that the Fed by the early 2000s had learned from its past mistakes and had moved closer to these history based hypothetical examples. It may have regressed in the run up, the management, and the aftermath of the recent Financial Crisis and the Great Recession. Whether it will return to this path is an open question.

## References

Walter Bagehot ( 1973). *Lombard Street*. London

Andreas Beyer, Vitor Gaspar, Christina Gerberding, Otmar Issing ( 2008) " Opting out of the Great Inflation: German Monetary Policy after the Breakdown of Bretton Woods." *NBER Working Paper* 14596

Michael D. Bordo ( 1981) ' The Classical Gold Standard: some Lessons for Today' Federal Reserve Bank of St.Louis Review. Vol 63, No.6 May.

Michael D. Bordo and Eugene White, ( 1991) “ A Tale of Two Currencies: British and French Finances During the Napoleonic Wars.” Journal of Economic History. June

Michael D. Bordo, Peter Rappoport and Anna J.Schwartz. ( 1992), “ Money and Credit During the National Banking Era-1880 -1914” in Claudia Goldin and Hugh Rockoff ( eds) Strategic Factors in Nineteenth Century American Economic History. University of Chicago Press; Chicago

Michael D. Bordo and Anna J. Schwartz, ( 1999) ‘ Monetary Policy Regimes and Economic Performance: The Historical Record.’ Chapter 2 of the *North Holland Handbook of Macroeconomics*, edited by John Taylor and Michael Woodford. North Holland. New York.

Michael D. Bordo and Barry Eichengreen ( 1998), “ Implications of the Great Depression for the Development of the International Monetary System,” in Michael D. Bordo,Claudia Goldin and Eugene N. White (eds). *The Defining Moment: The Great Depression and the American Economy in the Twentieth Century*. University of Chicago Press for the NBER, Chicago

Michael D. Bordo and Finn Kydland ( 1995), “ The Gold Standard as a Rule: an Essay in Exploration.” *Explorations in Economic History*. October

Michael D. Bordo and Carlos Vegh (2002), What if Alexander Hamilton had Been Argentinian? A Comparison of the Early Monetary Experience of Argentina and the United States.” Journal of Monetary Economics. April.

Michael D. Bordo and Marc Flandreau( 2003), “ Core, Periphery, Exchange Rate Regimes and Globalization” in Michael D. Bordo , Alan Taylor and Jeffrey Williamson ( eds) Globalization in Historical Perspective. Chicago: University of Chicago.

Michael D. Bordo and Harold James ( 2007), “ From 1907 to `1946 : A Happy Childhood or a Troubled Adolescence?” Ch 2 in The Swiss National Bank 1907-2007 “ Swiss National bank. Zurich” Neue Zurcher Zeitung.

Michael D. Bordo, Owen Humpage and Anna Schwartz, ( 2007) “ The Historical Origins of U.S. Exchange Market Intervention” International Journal of Finance and Economics. Vol 12, No.2, April 2007 , pp109-132.

Michael D. Bordo and William Gavin ( 2007 ),“ Gold, Fiat Money and Price Stability,” Berkeley Electronic Journal of Macroeconomics: Topics in Macroeconomics. June`

Michael D. Bordo and John Landon Lane ( 2010) “ Exits from Recessions : the U.S. Experience 1920-2007” NBER Working Paper 15731. February.

Michael D. Bordo and David C. Wheelock ( 2011) “ The Promise and Performance of the Federal Reserve as Lender of Last Resort” NBER working Paper 16743 February.

Michael D. Bordo and Joseph Haubrich (2011) “ Deep Recessions, Fast Recoveries and Financial Crises: evidence From the American Record” Federal Reserve Bank of Cleveland ( mimeo)

Michael D. Bordo and Athanasios Orphanides ( 2012) The Great Inflation. Chicago: University of Chicago Press.

J. Lawrence Broz (1997) The International Origins of the Federal Reserve System. Ithaca; Cornell University Press.

Philip Cagan ( 1963) “ The First Fifty Years of The Federal Reserve.” In Deane Carson ( ed.), Banking and Monetary Studies. Homewood ,Illinois; Richard D. Irwin.



Forrest Capie (2002), "The Emergence of the Bank of England as a Mature Central Bank." In The Political Economy of British Historical Experience. 1688-1914. London: Oxford University Press, pp 295-315.

Forrest Capie (2010) *A History of the Bank of England : 1950s to 1979*. Cambridge; Cambridge University press.

Barry Eichengreen (1992), *Golden Fetters; the Gold Standard and the Great Depression*. Oxford University Press, New York

Barry Eichengreen and Marc Flandreau (2008), "The Rise and fall of the Dollar, or When Did the Dollar Replace Sterling as the Leading International Currency?" NBER Working Paper 14154 July.

Barry Eichengreen (2010), *Exorbitant Privilege*. Oxford University Press. New York.

Milton Friedman and Anna J. Schwartz. (1963) A Monetary History of the United States 1867-1960. Princeton; Princeton University Press.

Marvin Goodfriend (1988), "Central Banking Under the Gold Standard" in *Money, Cycles and Exchange Rates: Essays in Honor of Allan H Meltzer*. (eds) Karl Brunner and Allan Meltzer. Carnegie Rochester Conference Series in Public Policy. Vol 29, pp 85-124

Marvin Goodfriend (2011) "Central Banking in Credit turmoil: An Assessment of Federal Reserve Practice" Journal of Monetary Economics

Charles A.E. Goodhart (1969), *The New York Money Market and the Finance of Trade. 1900-1913*. Cambridge:Harvard University press

Bray Hammond(1957) Banks and Politics in America. Princeton. Princeton University Press

Robert L. Hetzel (2008) The Monetary Policy of the Federal Reserve: A History. Cambridge University Press. New York

Robert L. Hetzel ( 2012) The Great Recession: Failure of Markets or Policy?. Cambridge University Press .  
New York

Douglas Irwin ( 2010) “ Did France Cause the Great Depression?” NBER Working Paper 16350 September

Jane Knodell ( 2003), “Profit and Duty in the Second Bank of the United States’ Exchange Operations”  
Financial History Review 10, 5-30

Robert E. Lucas Jr ( 1973), Some International Evidence on Output Inflation Tradeoffs” *American  
Economic Review* .June

Allan H. Meltzer A History of the Federal Reserve , Volume 1: 1913-1951. Chicago; University of Chicago  
press.

Allan H. Meltzer. A History of the Federal Reserve Vol 2, 1951-1986. Chicago; University of Chicago Press

Jeffrey A. Miron ( 1986) “ Financial Panics, the Seasonality of the Nominal Interest Rate, and the  
Founding of the Fed.” American Economic Review 76 ( no.1 ) March , pp 125-140.

Fritz Redlich( 1951) The Molding of American Banking: Man and Ideas. New York: Hafner publishers

Peter L. Rousseau and Richard Sylla ( 2003), “ Financial Systems, Economic Growth and Globalization” in  
Michael D. Bordo, Allan M. Taylor and Jeffrey Williamson. ( eds) Globalization in Historical Perspective.  
Chicago: University of Chicago Press.

Richard S. Sayers ( 1976) Bank of England Operations 1891-1944 . Vol I. Cambridge: Cambridge  
University press.

Anna J. Schwartz ( 1986), “Real Versus Pseudo Financial Crises’ in Geoffrey Wood and Forrest Capie (   
1986) *Crises in the World Banking System*. London . MacMillan

Anna J. Schwartz ( 1995) “ Why Financial Stability Depends on Price Stability” *Economic Affairs* .Autumn ,pp 21-25

Oliver M.W. Sprague ( 1910) *History of Crises Under the National Banking System*. U.S. National Monetary Commission, Senate Document No. 538, 61 Congress 2 Session Washington: Government Printing Office.

George Selgin, William Lastrapes and Lawrence H. White ( 2010) “ Has the Fed Been a Failure?” University of Georgia ( mimeo)

John B. Taylor( 2009) Getting Off Track: How Government Actions and Interventions Caused, Prolonged, and Worsened the Financial Crisis. Stanford; Hoover Institution Press

Peter Temin ( 1989) Lessons from the Great Depression Cambridge Mass; MIT Press

Peter Temin ( 1998) “ Comment” in Michael D. Bordo, Claudia Goldin and Eugene N. White *The Defining Moment: The Great Depression and the American Economy in the Twentieth Century*. Chicago: University of Chicago Press

Richard H Timberlake Jr. ( 1993) Monetary Policy in the United States: an Intellectual and Institutional History. Chicago; University of Chicago Press

Henry Thornton ( 1962) [1802] An Inquiry into the Nature and Effects of the Paper Credit of Great Britain. Reprint, New York, Kelley.

Paul M. Warburg ( 1910a) The Discount System in Europe. National Monetary Commission. U.S. Senate Document no.402. Washington D.C.: U.S. Government Printing Office.

Paul M.Warburg ( 1910b). “ The United Reserve Bank Plan.’ Chapter III in Paul Warburg, The Federal reserve, Volume I New York; Macmillan.

Robert Craig West ( 1977). Banking Reform and the Federal Reserve, 1863-1927. Ithaca: Cornell University press.

David C. Wheelock (1991) The Strategy and Consistency of Federal Reserve Monetary Policy, 1924-1933. New York: Cambridge University press

Eugene N.White ( 2011) “ To Establish a More Effective Supervision of Banking: How the Birth of the Fed Altered Bank Supervision” NBER Working paper 16825

Elmus Wicker ( 1966) *Federal Reserve Monetary Policy 1917-1933*. New York: Random House 1966

Elmus Wicker ( 2005), The Great Debate on Banking Reform; Nelson Aldrich and the Origins of the Fed. Columbus: Ohio State University press.

