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## Abstract

This paper offers a comprehensive (short) history of central banking in France, starting in the 18th century and finishing with the creation of the Euro in 2001. We first discuss how the French experience with central banking in the 18th century shaped the drafting of the charter and the governance of the Bank of France in 1800. We then single out how the Bank implements its monetary policy in the 19th century and assess the bank achievement in terms of monetary and financial stability. Finally we discuss how the sovereign debt overhang triggered by World War I and the reconstruction subverted the model of central banking previously implemented, and how the reluctance of the Bank to be implicated in the management of the sovereign yield ultimately leads to the loss of its independence vis-a-vis the state. Against this background the use of financial repression under the guidance of the state allowed a smoother management of the debt overhang during the post WW II period, but created its own issues that were addressed effectively only with the creation of the Euro.



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# The Other Way: A Narrative History of the Bank of France*

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August 2018

**Abstract**

This paper offers a comprehensive (short) history of central banking in France, starting in the 18th century and finishing with the creation of the Euro in 2001. We first discuss how the French experience with central banking in the 18th century shaped the drafting of the charter and the governance of the Bank of France in 1800. We then single out how the Bank implements its monetary policy in the 19th century and assess the bank achievement in terms of monetary and financial stability. Finally we discuss how the sovereign debt overhang triggered by World War I and the reconstruction subverted the model of central banking previously implemented, and how the reluctance of the Bank to be implicated in the management of the sovereign yield ultimately leads to the loss of its independence vis-a-vis the state. Against this background the use of financial repression under the guidance of the state allowed a smoother management of the debt overhang during the post WW II period, but created its own issues that were addressed effectively only with the creation of the Euro.

At its inception in 1800, the Bank of France was a central bank created by the Parisian merchant bankers to refinance the Parisian trading community. Its shareholders belonged mostly to the Parisian banking establishment, who were also associated with previous attempts to create a central bank (Courtois, 1875; Bergeron, 1978). The founders of the Bank cherished the idea of an independent central bank, rendering French history of central banking very different from the conventional narrative, informed by British experience. This does, however, neither mean that the government was absent from the picture, nor that politics did not play any role in the creation or in the management of the Bank. The Bank did rely on a charter conferred by government and acted as the latter's banker. But its *raison d'être* was not to support fiscal policy or to refinance sovereign debt, as was the case for the

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Bank of England or Norges Bank. Thus, the path taken by France resembles rather those sketched out by the Bank of Amsterdam or the Riksbank that had also been created with the aim of conducting monetary policy to stabilize the payment system and/or the economy.

It is only with World War I that the Bank of France becomes permanently involved in the management of sovereign debt, and hence converged towards the British understanding of a central bank (Capie and Goodhart 1994). But even before fulfilling the conditions of this peculiar definition, the Bank of France had all the attributes of a central bank: it organized the payment system, managed the government account and provided lending of last resort services to private agents during crises and to public agents during wars or extreme political events. If it was not for the Bank, who then took care of managing the sovereign debt overhang before 1914? As in many other countries, sinking funds and notably the *Caisse d'Amortissement de la Dette Publique* and later on the *Caisse des Dépôts et Consignation* did (Priouret, 1966).

World War I created a *de facto* dual mandate, as the Bank had to hold massive amounts of sovereign debt without disrupting its policy of accommodating private agents hit by liquidity shocks. These the objectives were occasionally conflicting and it took some time and continued tensions with the executive branch before the operational framework adapted to the new dual mandate. The Interwar further transformed the Bank, as the long struggle with the executive branch ended in the formal loss of independence in 1936; independence was only restored in 1992 in view  the creating the euro area.

This paper reviews the history of the Bank of France, emphasizing how its operational framework addressed the loopholes in the French financial system. We demonstrate that finding a framework to stabilize the financial and the payment system took some time. While the Bank's operational framework was affected by the negotiations regarding the periodic renewal of the Bank's charter, the Bank only lost its independence in terms of policy rate decisions with its nationalization at the end of WW II. As a counterpart to loosing independence, the Bank became actively involved in the regulation of the banking system and in the formulation of an active credit and monetary policy. Before 1936, monetary policy decisions were in the hand of a council in which shareholders representatives had the majority over government-nominated representatives.

This paper is organized as follows. We first describe how contemporaries viewed the design of the central bank and how this influenced the drafting of the Bank's charter. A

second part assesses the Bank's achievements in terms of financial and monetary stability throughout the long 19th century history. Starting with the outbreak of WWI in 1914, we finally, write down the Bank's history of the 20th century.

## I. Designing the Bank of France: independence and threats to the payment system

It took three failures to create a bank of issues before the Bank of France was conceived to monetize the debts of other agents. The lessons drawn from these experiences explain both the governance structure of the Bank of France and a degree of independence from government intervention similar to the one many modern central banks enjoy today. Adjustments to the operational framework helped to stabilize the payment system in times of crisis.

### *1. Lessons from the forerunners of Bank of France in terms of independence*

The Bank of France was created in 1800 at the dawn of the Napoleonic Empire. Although Napoleon was one of the largest shareholders (Dauphin-Meunier, 1936; Bergeron, 1977), the Bank's charter reflected the legacy of the 18th century's troubled monetary history on two dimensions. First, it took three failures of banks of issues to establish the principle that the Bank of France would abstain from any medium to long-term public debt financing. Second, the Bank was created to fix the periodic threats to the smooth working of the payment system created by using two types of payment instruments: coins and bills of exchanges.

Due to its high degree of independence from government interference, the Bank's charter differed sharply from those of other contemporary banks of issue like the Bank of England or the Bank of Austria in Vienna (Courtois, 1875). The Bank was neither modeled after the Bank of Amsterdam, since it secured the right to issue bearer notes.

The first dramatic experience with a bank issuing bearer notes was the episode instigated by John Law in 1716. A Scot by birth but a European by life (and perhaps by chance since he fled London to avoid a death sentence), John Law settled in Paris in 1714. By 1716, he had managed to convince the regent of King Louis XV to grant him the privilege of creating a bank endowed with the right to issue bearer notes. In 1718, he was also authorized to found a company undertaking the collection of government taxes and the

trades with the Louisiana (Courtois, 1875). Various political and financial engineering arrangements transformed the enterprise into a gigantic attempt at restructuring the king's debt overhang. This was a novelty compared to the traditional mix of tax increases, partial default and monetary devaluation (Velde, 2007). Issuing equity shares of a bank was to finance the purchase of government debt (Velde, 2003). At the same time, the bank' issued bearer notes were to be used in lieu of species. The experience ended in the crash of the system in 1720 with hyperinflation and demonetization of banknotes occurring (Velde, 2009). The lesson learned was that the management of sovereign debt had to be separated from the management of the payment system (Du Pont de Nemours, 1806). In particular, various forms of sinking funds were assigned to hold and amortize the public debt (Luftalla, 2006).

Further attempts were made to re-establish a note-issuing bank. In 1767, the *Caisse d'Escompte* was created with the aim of financing the King's court, but it was dissolved before any significant operations were implemented (Courtois, 1875, p. 69). A second attempt occurred in 1776 when a coalition of Parisian merchant bankers created another *Caisse d'Escompte*. The *Caisse* discounted traders' bills but was also involved in the financing of the state. Interestingly, and contrary to other discounters, the *Caisse* was barred from trading in commodities. This insulated the *Caisse* from the business cycle fluctuations and reinforced its ability act as a discounter of last resort in times of falling commodity prices. It was only in 1783 that the government started to ask the *Caisse* to finance short-term loans. The *Caisse* was dissolved in August 1793 after the government had borrowed heavily during the Revolution (Courtois, 1875).

The free-market principles enshrined in the legislation of the Revolutionary regime left its imprint on banking regulation post 1793. The government did not want to choose its champion, and so several banks of issue were allowed to be created. In Paris, at least four banks discounted bills against bearer notes once the hyperinflation of the Assignats had been stabilized. The *Caisse des comptes courants* founded in 1796, the *Caisse d'escompte de commerce* founded in 1797, and the *Comptoir Commercial* founded in 1800; Courtois (1875) and Jacoud (1996) mention the existence of a few other smaller banks including the *Factorerie*. In other regions, similar banks of issue were created, such as *Societé générale du commerce de Rouen* in Rouen founded in 1798. In January 1800, the Bank of France merged with the *Caisse des Comptes Courants*. It was only in April 1803 that the Bank of France

secured the monopoly of notes issuance in Paris when it merged with all other Parisian banks of issue.

It took a last round of dramatic events during the fall of 1805 to pin down the public belief regarding the contours of the Bank independence vis-à-vis the government. The financial crisis ruined many Parisian merchant bankers that were involved in financing the War of the Third Coalition opposing France on the one side and England, Austria, and Russia on the other side. While Napoleon was defeating his opponents in Ulm and Austerlitz, the scheme used to finance his military campaign crumbled with the failures of several army suppliers including Ouvrard (Bergeron, 1977). The directors of the Bank who had financed army the supplies relied on the Bank's discount to roll over their liabilities. This crowded out other traders' discounting with the Bank and triggered a public outcry against. At the same time, uncertainty regarding the Bank's ability to maintain convertibility triggered a run on the Bank and led to the first suspension of convertibility of the notes into specie. Bank director Récamier resigned and the Bank's charter was rewritten. With the law of 22 April 1806, shareholders lost their privileged access to the discount window, and renounced to choose the Bank's president.

The demise of the Napoleonic Empire did not affect the Bank's independence despite the inherited debt burden and sizable reparations imposed by the victors (White, 2001). A sinking fund and an appropriate management of public finance allowed a smooth management of the interest rate and sovereign debt consolidation (Oosterlinck, Ureche-Rangau and Vaslin, 2014). The Bank remained insulated from sovereign debt management,, making France an outlier in post-1815 central banking (Jobst and Ugolini, 2016)

The long-lasting lesson consisted in the Bank being endowed with a governance structure that allowed a high degree of operational independence from the fiscal authority. Here we follow the current understanding of central bank independence, which implies that fiscal authorities do not influence monetary policy decisions, and conversely that monetary policy does not affect fiscal policy. Put differently, monetary policy is neither designed to relax the government's long-term borrowing constraint n or to actively manage the interest rate on government debt. Money doctors of the times were well aware of this definition. Dupont de Nemours (1806), for instance, emphasized that it was necessary to unburden the central bank from financing government debt, pointing out at the same time that such a governance structure contributed to reducing the public's borrowing rate. As a result, the

Bank was "governed" by three people that were nominated by the executive branch. It were, however, still shareholders speaking through the Banks' directors who decided on which bills were to be discounted; these decisions had to be signed by the governor (Courtois, 1875).

## 2. *At origin: Rationale for the founding of a central bank*

What type of public benefit was expected from a privileged bank? What were the frictions that the Bank was able to solve while the market was not? There is no historical account of what the founding bankers intended. That said intentions may not reveal the function its founders assigned to the Bank of France. At the time, monetary theory remained within the realm of day-to-day banking and payment business. A few articulated monetary theories circulating in pre-modern France may have explained how creating a bank of issue may have helped to stabilize the payment system. But overall, we are left with hypothesizing the (theoretical) reasons for which the Bank could have alleviated the regular panics that plagued 18th century French financial history.

Understanding the reasons why banknotes could have tamed financial crises requires an understanding of the 18th century payment system. In a context of limited use of checks, the bill of exchange was the main payment instrument (Gautier, 1839; Marsal, 1928). Discount banks traded bearer notes payable on demand at the bank of issue– in gold or silver coins– against bills of exchanges–a note payable at a specific location of an individual on a given date. When accepted in circulation, banknotes and bills of exchanges[3] were an effective cost-saving payment instrument compared to coins. But banknotes and bills had different properties in terms of payment.

Compared to bills, issuing banknotes increased opportunities of risk sharing for the following reason. When accepted by the payer, a bill could have been easily sold to someone else. Each transfer of a bill (i.e. each discount) left the previous owners with a joint liability vis-à-vis the purchaser of the bill (the discounter), which was an acknowledgement of their commitment to pay the bill in case the payer defaulted. Exercising the joint-liability clause was quick and easy. Cheating or defaulting on the bill's payment at maturity was harshly punished in courts. This incentivized the careful screening and monitoring of counterparty

[3] A bill is a payment order addressed to an identified person (the payer) who has to disburse a certain amount of money on a given day.

risk but limited bill endorsement within the confines of personal networks and the financial intermediaries with an ability to monitor debtors, thus restricting risk sharing. The discount of bills increased risk sharing opportunities.

Banknotes were mostly thought of as a tool to stabilize the economy in times of commercial crises (Juglar, 1862). During a crisis, the credit risk of some traders increased as commodity prices dropped. The pervasiveness of discount and endorsement in an economy that relied on bills as payment instruments transformed commodity price reversals into a correlated increase in the default probability of endorsers. Coins started to be in short supply when the acceptability of bills in payment declined. But minting coins was costly and time-consuming, rendering the supply of gold and silver inelastic. Discounting bills replaced debts of a specific group of individuals against an 'anonymous' banknote that was valued as long as the credibility of the issuer was not questioned.

The above displays a clear analogy with the model of Gorton and Ordoñez (2014). In normal times, when everybody is thought solvent, bills of exchange are information-insensitive as agents do not need to screen debtors' or endorsers' quality. Bills circulate as means of payment, and are hence endorsed many times before they come to maturity. But in periods of commercial distress–that is when prices of certain commodities decline–some merchants' signature starts being questioned as everybody worries how the price drop will affect other merchants' credit risk. As people start screening the quality of endorsers, bills become information-sensitive,, which reduces their liquidity on the market.

Banknotes, on the contrary, were information-insensitive including in times of commercial distress. Because the bank was not involved in regular commercial business, the value of banknotes did not fluctuate with commodity price movements in times of commercial tensions. This also relates to Gorton and Penacchi's (1990) idea that bank debt is liquid because it protects uninformed agents against the costs of information asymmetries.

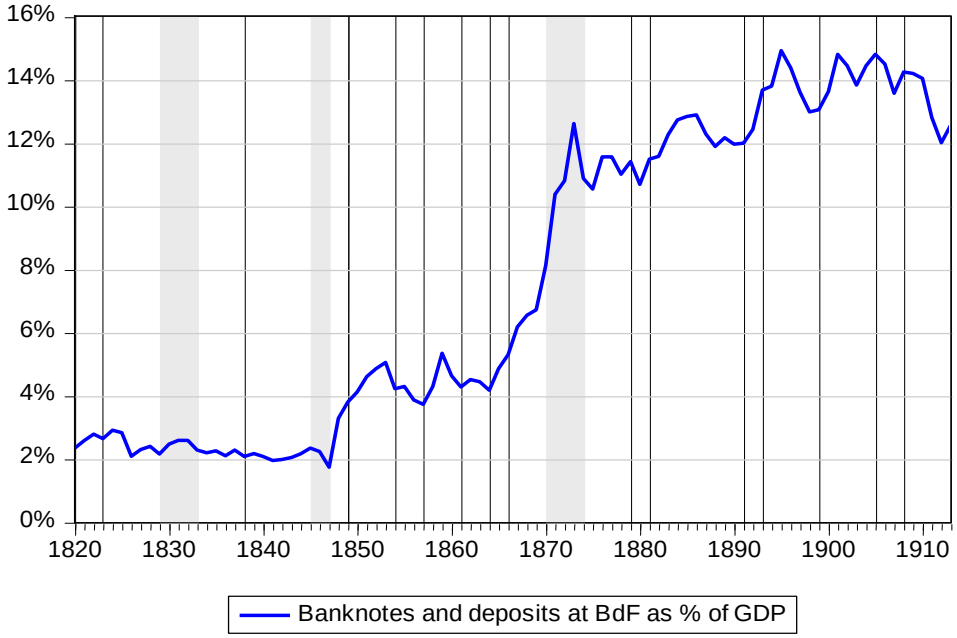
## II. The quest for a stable payment and financial system: the long 19th century (1800-1914)

Alleviating panics triggered by commercial crises required a clear and predictable operational framework to implement the Bank's policies. In doing so the Bank faced two constraints. First, it has to decide which types of bills it wanted to purchase against which guarantee. This amounted to choosing the share of the population that would be granted

access to the discount window. Second, to secure the funding of its activity, the Bank had to reassure banknote holders regarding the credibility (viability) of its lending strategy. In 19th century France, this meant ensuring the banknotes' convertibility into gold or silver coins.

## 1. *The monetary regime*

Banknotes represented a large share of the Bank's liabilities. Notes were not interest-bearing. Their main advantage resided in their payment services, notably the fact that they were accepted as a means of payment and that compared to specie they were safer regarding the risk of theft, and. In 1810, notes financed 44% of Bank's total assets. In 1913, their share had grown to 83%. Over the same time span, demand deposits, which had represented 18% of total assets in 1810, decreased to 8% of assets in 1913. As a share of French GDP, the Bank's liabilities plateaued at about 2% from the 1820s to 1840s; they reached 12-14% in the 1870s-1900s, as can be seen in Figure 1.




vertical lines are years of stress on the money market according to Thorp - Business Annals

Figure 1: The size of central bank reserves as a share of the French GDP
Source: BoF annual reports and Toutain (1987) for GDP, Thorp (1926) for crisis years

Convertibility of banknotes into French gold and silver coins was the norm. Post-1815, suspensions were explained by political events such as wars or revolutions. Absent any separation between an issuing and a banking department at the Bank of France, the suspension of banknote convertibility was rarely used as a tool for crisis management since the Bank could simply increase its discounts. like any other bank who could not force

investors to hold its liabilities, the ability of the Bank of France to finance its discount activity rested on the stability of its funding model. Three important features of convertibility could have impeded the Bank's ability to deal with financial turmoil.

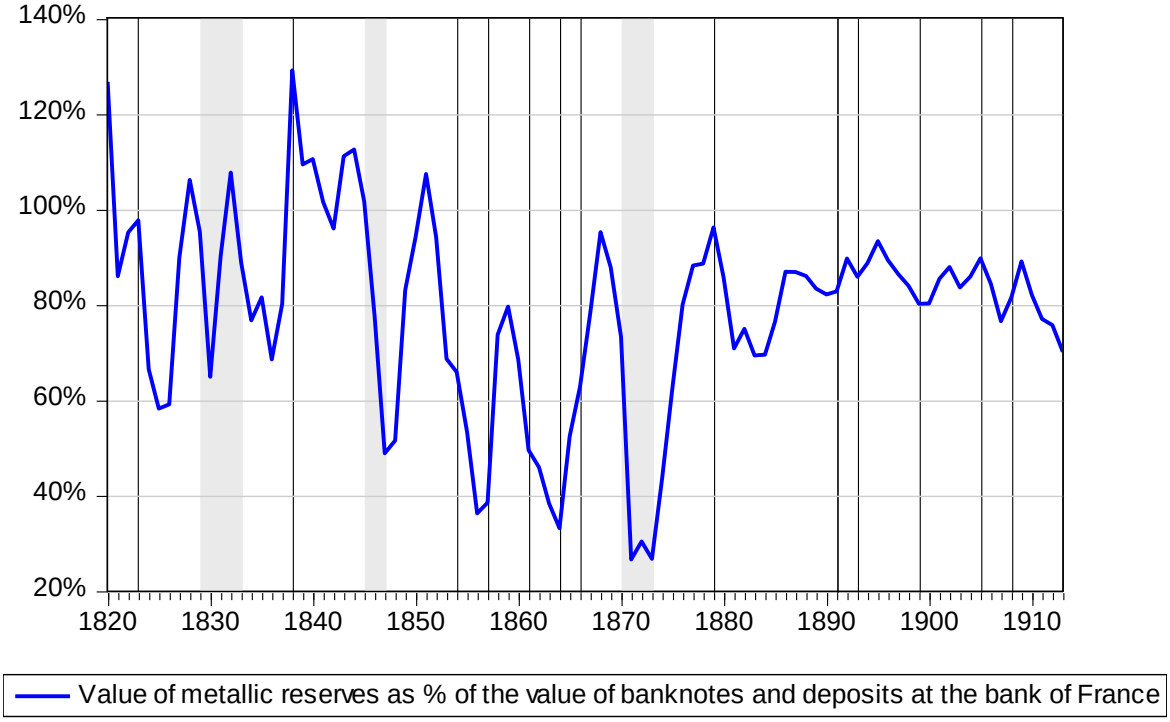
First, banknotes were not legal tender. Although the risk of run on Bank notes did not materialize except in 1805-6, the Bank of France's predecessors suffered runs for fear of banks asset mismanagement (Courtois, 1875) in a classic mechanism à la Diamond and Dybvig (1983). This provided an incentive for the Bank to preserve the quality of its balance sheet by purchasing only bills that would be paid at maturity.

Second, having to convert notes on demand served as a commitment device that allowed agents to monitor the Bank's performance in anchoring expectations regarding its notes' purchasing power. In a context in which little macroeconomic information was produced, and because the stock of gold and silver was limited, convertibility signaled the Bank's commitment to maintain the banknotes' value over time and to not deviate from a non-inflationary path (Flandreau, 2008). Consequently, the public closely monitored the ratio of gold and silver reserves to banknotes.

Third, variations of gold or silver prices abroad or of interest rate on offshore markets could have caused outflows of coins, entailing constraints on the Bank's note issue(see Flandreau (1995, 2004) for a history of specie movement between London and Paris in mid-19$^{th}$ century).

As shown in figure 2, most of the time the cover ratio was very high. The value of the Bank's gold and silver reserves increased twenty times between 1820 and 1913.

Numerous papers explain how the peculiar procedures the Bank used to convert notes into gold or silver made it more costly for arbitrageurs to do so as well. These are known as "gold devices" in the literature. The devices aimed at making it more complicated to exchange banknotes against coins at the Bank's offices. Flandreau (1996a) has shown that in a Bimetallic system the availability of two metals to reimburse banknotes allowed the Bank to choose the metal that was in excess supply, thus adding a layer of arbitrage cost. The Bank used various tools to discourage the outflows of metallic reserves during crisis times, such as reimbursing banknotes in silver rather than in gold when France was legally only on gold (Contamin and Denise, 1999).




vertical lines are years of stress on the money market according to Thorp - Business Annals
Figure 2: The convertibility ratio of the Bank of France (1820-1913)
Source: Authors using Bank of France balance sheet data

Part of the recent historical literature studies the Bank's monetary policy autonomy. The issue has been framed as attempting to answer how the convertibility of notes into gold and silver (the gold standard rule) constrained the Bank's policy and how gold devices helped relaxing the constraint. Bloomfield (1959) (re)introduced the idea that free convertibility may have constrained central bank monetary policy autonomy during the gold standard. Economists have framed this issue into the Mundell trilemma according to which , there is no monetary policy autonomy for a central bank in a world of free capital movements and fixed exchange rates caused by the convertibility into gold. Within this context, the gold devices were thought as a tool used by the Bank of France to gain some policy autonomy. Notice also that the monetary regime could have rendered arbitrage stickier. Friedman (1990a) and Flandreau (2002) argue that bimetallism also contributed to creating space for monetary policy autonomy by enlarging the band inside which the exchange rate fluctuated compared to a gold standard only regime. This explains why Friedman saw the decision by France to leave the gold standard in 1873 as a crime: the reduction of the band of fluctuations induced by the move to gold must have reduced monetary policy autonomy (Friedman, 1990b; Flandreau, 1996b). Contamin (2003) describes how the "politics of

species" contributed to monetary policy autonomy during the gold standard period of 1880-1913. Bordo and McDonald (2005) use an econometric model to estimate that the Bank was thus able to reduce its policy rate by about 100 basis point compared to foreign interest rates (see also Tullio and Wolters (2003) and Bazot et al. (2016)).

## 2. *Discount operations and lending of last resort : Learning to cope with crises*

Agents could also turn to the Bank for discount or for Lombard credit. The latter was a repo agreement in which a loan granted against the guarantee of marketable securities with an agreement that those securities will be repurchased in a fixed period of time (usually 3 months). Discounting was by far the more important activity. It represented on average 91% of central bank operations over the period 1826-1913. The operation involved agents in need for cash asking for the discount of a bill by the Bank of France. This meant that the Bank bought the claim at its nominal value, deduction made for a discount that was determined by the residual maturity of the bill and the discount rate. The discount rate was set by the bank and applied, according to the 1808 decree that organized the statute of the bank, indiscriminately in any of the places where the bank had an office. This provision forbade the bank to adjust the discount rate to local conditions.

The Bank implemented its monetary policy as a standing facility (it was the traders that asked for refinancing, not the Bank) and through a floor system (the Bank rate was the floor in the market). The main advantage of this system consisted in the fact that the Bank did not have to calibrate its reaction to the liquidity or credit situation. Rather, it only had to accommodate any demands from solvent traders as long as the convertibility of its banknotes into gold or silver was not questioned. This was of course a substantial condition, and it took a while before the Bank freed itself from the convertibility issue. During the first half of the 19$^{th}$ century, the success and failures of the Bank's lending of last resort interventions were tied to the Bank's ability to manage the credibility of its lending of last resort function while keeping the convertibility of its banknotes credible.

Because discounting is an outright purchase and may reduce the Bank's profit, the Bank charter aligned risk management incentive with shareholders' interests. Assessing the credit quality of bills was delegated to a discount committee that relied on information collected by the Bank and verified by supervisors (Avaro and Bignon, 2018). The discount committees comprised 3 persons chosen among the shareholders of the Bank. It was monitored by the

Portfolio committee, composed of board members. Finally, the selection of the discount committee was made by three shareholders (censeurs), who were elected by the shareholders. A special body of supervisors –the inspecteur –monitored the collection of information on counterparties to the discounting facility. This system of monitoring the operational risk associated with discounting was ceased only when the discounting facility itself was shut down in the early 1990s.

Risk management was facilitated by three levels of guarantees; see Nishimura (1991) for a discussion. First, each bill was payable not only by the debtor but also by any agent who had endorsed it. Second, both the endorsers and the debtor pledged their wealth and their right to manage an independent business as a guarantee for the favorable conclusion of the transaction. Third, the law required the Bank to only accept to discount bills that were endorsed by at least three persons who were notoriously solvent.

The discount policy of the Bank went through three different phases before 1914. The first period spans from 1815 to 1850. The Bank followed the policy advocated by Du Pont de Nemours of rationing discount when too many banknotes flew back to be converted (Ramon, 1929). In the 1850s, the Bank implemented the continental equivalent to Bagehot's dictum of lending freely against good collateral of normal times and increasing interest rates in crisis times (Bagehot, 1873; Bignon, Flandreau and Ugolini, 2012). The last phase commenced in the 1870s, when the bank continued this Bagehot-like policy but refrained from increasing the policy rate in times of crisis.

Before 1850, the Bank's crisis management was criticized by many observers. During the crises of 1806, 1830 and 1847-8, the public outcry grew louder against the Bank's policy of rationing discounts when convertibility was at risk. Economists and politicians discussed two main solutions to this issue. Some blamed the monopoly position of the Bank, making France an active spot of free banking theories (Fazy, 1826, 1830, Coquelin, 1859, see Domin 2007 for a survey). Others called either for increases in the Bank's capital and therefore loss absorption capacity or for increases in the gold and silver reserves to relax the convertibility constraint. The failure of the Bank to accommodate more discount also led to the founding of new institutions such as the municipal "discount houses" (*Comptoirs d'escompte*).[4]

[4] See Delamathe (1848). The foundation of the Comptoir National d'Escompte in 1848 is said to have been inspired by the role assigned to the various Comptoirs d'escompte during the 1830 crisis.

The problem was, however not one of inaction, as Ramon (1929) demonstrates in his description of how the Bank managed financial crises. A quantitative proof is given by figure 3, which plots the size of the Bank's increases in discounts during crises. In particular, the left panel shows that it was usual for the Bank to increase its volume of refinancing by 20%. The right panel depicts that this pattern unraveled a huge increase of the permanent volume of discount, underlining a regime change in the 1870s.

The Bank also changed its operational framework to render it more comprehensive (Leclerq, 2010). For example, in 1834 the Bank started discounting also during the last two days of the month (Beaubau, 2004). In 1837, it offered daily services at the discount windows and started opening branches outside of Paris. Branching was undertaken in reaction to the growing pressure by local business communities to sought access to the services of a local bank of issue.

Consequently, access to the Bank's lender of last resort facility broadened beginning in 1837 when the Bank started opening branches outside of Paris.[5] Opening further branches translated into an increase of eligible collateral and a substantial broadening of the proportion of agents eligible to the discount window (Bignon and Jobst, 2017). The Bank policy of geographic expansion intensified in the 1850s when the Perreires tried to compete with the Bank of France in issuing banknotes.[6] By 1913, the inhabitants of 218 cities and their surrounding areas were allowed to open an account with the Bank to access the discount window. In 1913, 86,200 persons had taken this opportunity (Lescure, 2003, p. 139). According to Courcelle-Seneuil (1840), this reduced the 'exorbitant' interest rate that some were obliged to pay in stressed times in cities from which the Bank was absent. For the Bank's clients the savings were important, since in times of crises interest rates reached 24% per annum according to Gille (1970).

[5] The extension of the network of branches by the Banque de France followed a first attempt made during the Napoleonic period (see Pruneaux, 2009 for details).
[6] On the daily discount and the Perreire, see Leclerq (2010). On the local issuing banks, see Gille (1970).

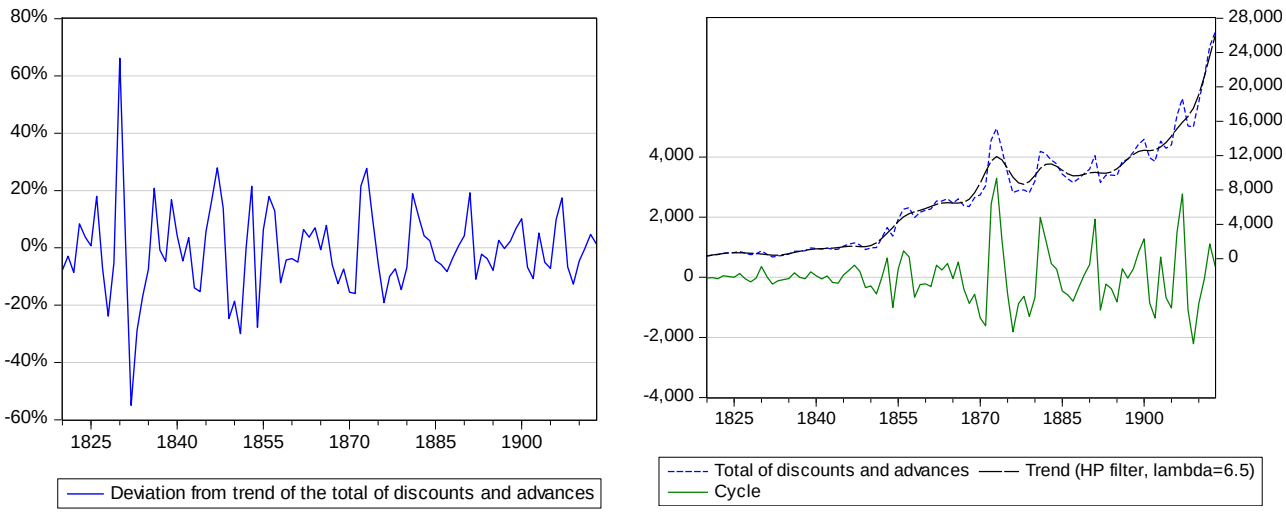



Figure 3: (a) Deviation from trend of discounted bills and advances on securities at the Bank of France (left) and (b) trend and cycle of CB discounts and advances (right)
Sources: INSEE statistical yearbook, 1946, retrospective part (p. 143*-144*)

## 3. *Measuring the achievements in terms of financial stability*

Schwartz (1986) argues in favor of a active monetary policy management when the functioning of the payment system is threatened, in order to avoid liquidity squeeze. The numerous structural changes that occurred in the financial sector make it impossible to construct comprehensive and century-long indices of financial (in)stability. No single price or interest rate provides a common metric to measure such instability.

The structural transformations of the financial system –from private short-term finance to a mix of public and long-term securities cum bank-intermediated bills of exchanges–forbids any attempt to consider a class of financial intermediaries (such as banks or the stock exchanges) as representative of the century-long history. Finally, the absent any legal entry regulations into the banking sector before 1942 explains why we lack comprehensive quantitative information on banks.

To nonetheless assess century-long measures of financial stability in a changing environment, we rely on three statistics: 1) the number of financial crises per decade; 2) the gross default rate of financial intermediaries; 3) the delinquency rate on the most used financial instrument. Table 1 presents our first metric, the number of crises per decade. With about 2 to 3 per decade, the latter did not vary widely, except in the 1890s, when it was lower.

| | (1) | (2) | (3) | (4) | |
|---|---|---|---|---|---|
| **Decade** | Thorp's "Business annals" | Juglar's criteria | Peaks of 3-months implicit interest rate | Drops in stock index | Very large drop of stock index |
| **1820s** | 2 | 1 | 3 | 2 | 1 |
| **1830s** | 2 | 3 | 3 | 2 | 1 |
| **1840s** | 2 | 1 | 3 | 1 | 2 |
| **1850s** | 2 | 1 | 3 | 2 | 1 |
| **1860s** | 3 | 1 | 3 | 2 | 0 |
| **1870s** | 3 | 1 | 3 | 3 | 0 |
| **1880s** | 2 | 1 | 3 | 1 | 1 |
| **1890s** | 2 | 1 | 1 | 1 | 0 |
| **1900s** | 2 | 2 | 3 | 2 | 0 |

Table 2: The number of crises per decade in France 1820-1910
Source: author's compilation using table A.2. in the appendix.

The number of financial crises is identified using 4 criteria. We rely on the informed judgment of contemporary observers or of academics, notably the list of financial crises compiled by former N.B.E.R. director William Thorp (1926)[7] and the dating of financial crises by economists Clément Juglar (1862, 1889) and Siegfried (1906).[8] We also identify crises by above-normal peaks in the 3-months offshore interest rate of monetary condition in Paris (when liquidity disappeared in Paris, traders relied increasingly on offshore markets to borrow).[9] Finally, we measure the number of large drops in the Paris stock market index either by declines in the detrended index that followed a steady increase or by reductions larger than 1 standard deviation.[10] According to this last criterion, the severity of financial crisis decreased over time as only one crisis during the 1870-1913 period was larger than 1 standard deviation.

[7] The accounts used were official documents, reports by contemporary observers and students of economic history, periodicals, pamphlets, and books. The date corresponds to years for which there is a mention that "Money was tight" or "Money very tight" or "Financial panic" or "Money tightens".

[8] Juglar was praised for his forecast in a newspaper article of the 1857 crisis, evidencing his claim that the study of the evolutions in the key items of the Bank's balance sheet allowed anticipating crises (Niehans, 1992, p. 548). He labeled those crises commercial since the main financial instrument used was bills of exchange and the main financial activity was the discount of those bills by the banks.

[9] The method for computing those implicit interest rate relied on the use of the prices in British Pounds of spot (3-days sight) and forward (3 months) bills of exchange on Paris in London. There are two components in those prices, an exchange rate component and an interest rate component. Following Flandreau et al. (2012) and assuming that exchange rate expectations are constant, the ratio of the spot over the forward prices is an estimate of the short-term (implicit) interest rate on Paris.

[10] We use the Arbulu (2006) stock price index and derive the deviations from the trend using a Hodrick-Prescott filter with $\lambda$ set equal to 6.25.

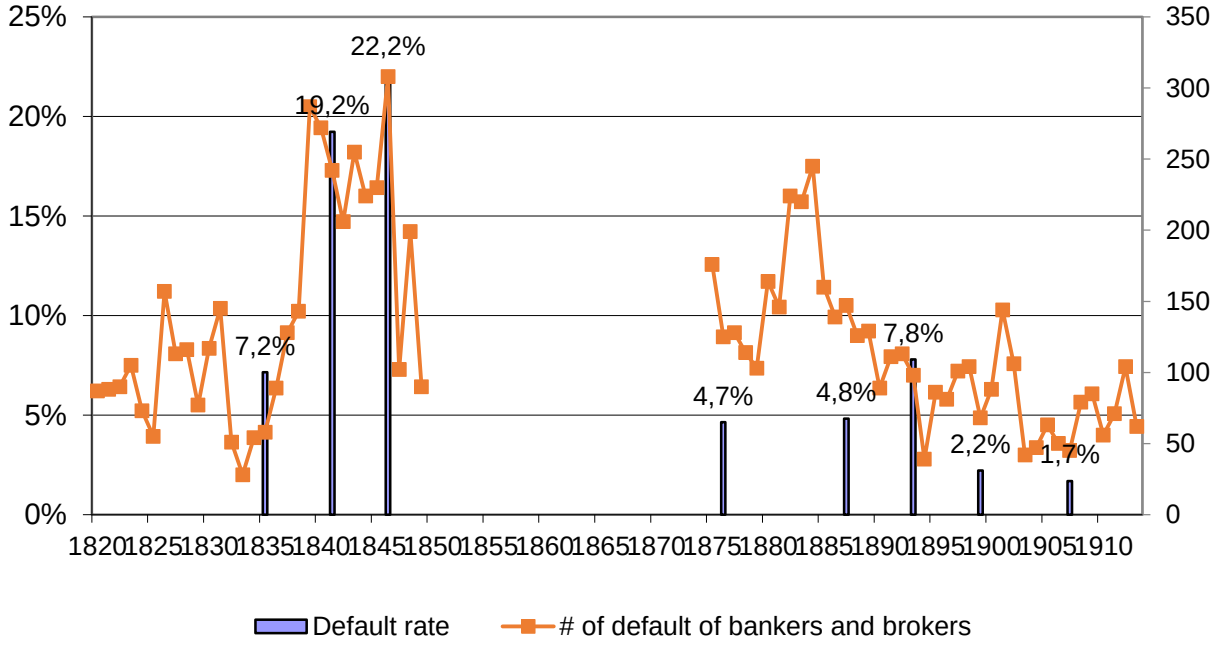



Figure 4: Number of and rate of default of financial intermediaries, France (1820-1913)
Sources: Defaults between 1820 and 1849 are from National Archives (F20 720-1/2) and between 1875 and 1913 are from *Compte général de la justice civile et commerciale*. The number of financial intermediaries are from Hoffman et al. (2015) using Annuaire Didot-Bottin except 1856 (French census), 1892 (Plessis, 1999, p. 205) and 1906 (Nishimura and Yago, 2006, p. 200)

The default rate of financial intermediaries allows us to assess the magnitude of financial crises. There are very few records of systemic banking panics, partly for lack of development of deposit banking–the French kept their wealth in cash or in saving banks (François-Marsal, 1928)–but also because panics are endogenous to the broadness of lending of last resort and the Bank's asset/liability management. We know from the historian Gille (1959, p. 324, p. 370) that the banking system collapsed both during the 1830 and the 1847-8 crises. We know from White (2007, p. 115) that the crash of 1882 "presented the Bourse with its worst crisis of the nineteenth century".

Figure 4, which plots the default rate of financial intermediaries, exhibits an upward trend between 1820 and 1847. This echoes Cameron's (1967) account of systemic financial intermediaries' failures/problems such as Jacques Laffite's in the 1830-40s. Starting in the 1870s, the default rate dropped, which suggest that financial system became more stable in the last part of the century. Although the financial market crashed when large banks failed in 1882 and 1889 (Bouvier, 1961; Bonin, 2006; Hautcoeur et al., 2014), those failures occurred in a financially more stable economy.

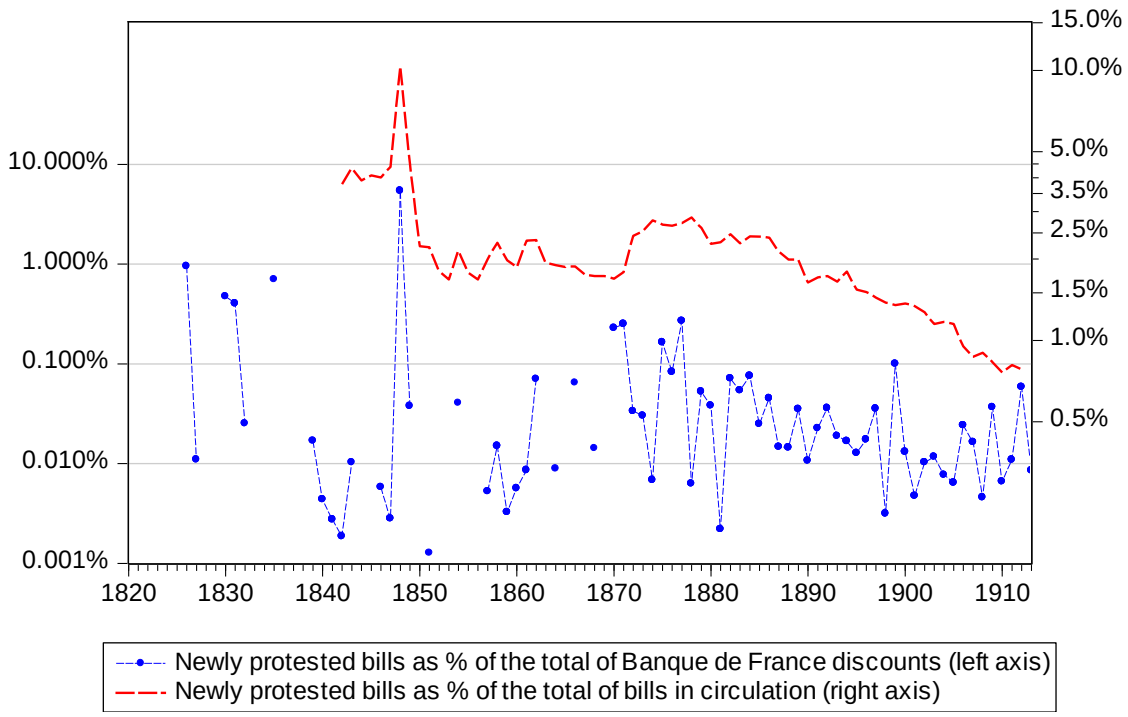



Figure 5: Delinquency rate of bills as % of stamped bills of exchanges in France (1850-1912)
Sources: Author's computation using Roulleau (1914)

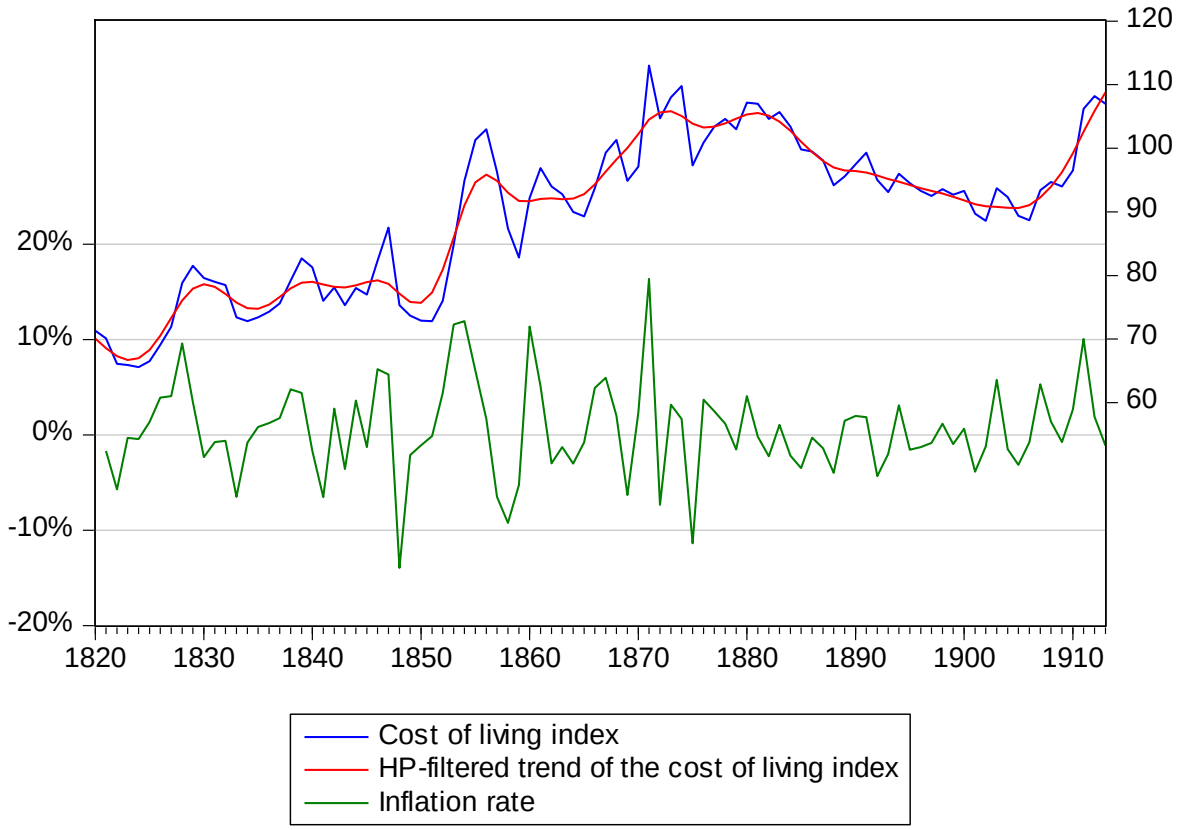
This diagnosis is confirmed by the evolution of the delinquency rate on bills, plotted as the share of stamped bills in figure 5 (Roulleau, 1914).[11] The so-defined delinquency rate declined from 5% in the 1840s to about 2% in the 1850s, before decreasing to 0.8% in 1912. On average and excluding 1847-8, there was a 1.8% chance of a bill remaining unpaid at maturity. This is for instance half the average delinquency rate of on US consumer credit card loans between 1985 and 2011.[12] This low level suggests that discounters made fewer errors when screening bills, in line with the major improvements of the organization of the banking and payment system (Cameron, 1961; Vidal, 1910; Leclerq, 2010).

## 4. *Measuring achievements in terms of monetary stability*

Before 1914, the Bank did not have an explicit inflation target but convertibility of banknotes into gold and silver effectively acted as an anchor to price expectations. No statistical office

[11] The number of bills unpaid at maturity is known as the protestation data ("protêt"), which was the only legal action that allowed the creditor to activate the guarantee created by the joint liability clause. The protestation also permitted the bill's bearer to seize court in an attempt to recuperate the amount due, provided the characteristics of the bill fulfilled legal requirements (articles 162 and 173 of the commercial code, see Bravard-Veyrières and Demangeat, 1862, p. 421 and Dalloz and Tournemine, 1825, p. 179). For a protest to be received in court, a bill had to contain the following information: The location and the identity of the borrower, the amount to be paid, the date of the payment, the place at which it would occur and the means of payment.
[12] http://www.federalreserve.gov/releases/chargeoff/delallsa.htm

produced a price index that could act as an observable measure of the central bank's achievement in terms of price stability. As this complicates assessing the Bank's performance along this dimension, any conclusion remains speculative and disputable. Using the cost of living index computed by Levy-Leboyer and Bourguignon (1985), reveals a continuous increase of the cost of living during the 1820-1870 period, as depicted in Figure 10. During the 40 years that followed 1870, the cost of living decreased quite continuously before rising again between 1906 and1913.




Source: Levy-Leboyer and Bourguignon (1985, series "Coût de la vie")

Figure 6 : The French price index, 1820-1913, its trend and the inflation rate

Source: Trend is HP filtered with parameter Lambda equal to 6.5, inflation is computed as the first difference of the cost of living index.

The inflation rate–computed as the year-on-year growth rate over the cost of living index–was on averaged 0.55% during the 1821-1913 period. This level is lower than the contemporary target of modern central banks, but it reveals that the Bank of France achieved monetary stability. The median inflation rate is negative at –0.2%. Inflation was quite volatile, with an average of -3% in years of negative inflation and 4.3% in years of positive inflation. The average inflation of the 1820-1870 period is however more volatile than during the latter part of the century. The cost of this quite high volatility is difficult to assess, as we know little on the degree of price rigidity in those economy.

## III. 1914–2001: The tumultuous road to the loss of independence and its recovery: World Wars and post-war debt overhangs

So far, the available evidence suggests that the second half of the 19th century in France was characterized by a more resilient financial system operating under (relative) monetary stability. We have suggested that the Bank's operational framework implemented contributed to financial and monetary stability. In this section, we discuss how the World Wars acted as a game changer, both by forcing the Bank to radically change its operational framework and by costing the Bank its operational independence from government.

### *1. Dealing with the debt overhang of World War I*

When the war broke out in July 1914, the Bank policy quickly adapted to the situation by implementing policy to address the financial turmoil. As the war froze international transactions, numerous payments became impossible and the balance sheets of private agents became illiquid. The closure of the stock exchange– only re-opened during the winter of 1914–was another reason for the Bank to propose what the market could no longer do: liquefy balance sheets by exchanging illiquid assets against banknotes. Massive lending of last resort interventions avoided a wave of failures. As a further step, various pieces of legislations were enacted to suspend indefinitely some of the payments due.

The war also led the Bank to be more involved in government financing. The first occasions were benign. The Bank advanced emergency liquidity o the government and launched public campaigns to repatriate gold and silver in order to finance the purchases of foreign goods. As the situation became more complicated, the government chose to delay the tax increases necessary to finance the war expenditures (Mouré, 2002). Most outlays were financed by monetary creation and to a lesser extent by long term borrowing, leading to substantial increase in the money supply and in inflation (Blancheton, 2001).

When the war ended in 1918, the Bank's main policy goal was to organize the return to the pre-war *status quo* of monetary stability. This required restoring the convertibility of banknotes into gold, and hence adjusting the Bank's balance sheet. The latter had increased with the Bank's financing of public short-term debt. Using the threat of not renewing the advances made, the Bank secured an agreement with the government in 1920, in which the government committed to gradually reimburse the war debt to the Bank. The government's

fiscal situation was dire. Not only had it to reimburse the Bank; it was also to compensate wounded soldiers and widows. In addition, since most of the battles had happened on the French territory, the government also had to finance the reconstruction of the numerous areas in the East and North of the country that had devastated by four years of warfare.

No government was able to build a majority in Parliament that would prioritize the reimbursement of war debts to the Bank over the costs of reconstruction. Moreover, reconstruction involved increasing public expenditures: the government had to rather borrow more than less from the Bank. In such a profound fiscal crisis, the government had to choose between defaulting on its debt and devaluating the currency vis-à-vis gold or implementing some institutional scheme to consolidate the public debt and increase taxation to repay it gradually. The Bank campaigned publicly in the press against any devaluation of the Franc. Between 1918 and 1926, governments, from the left or the right of the political spectrum, aligned with the Bank in refusing to default and devalue.

The Interwar was not a period of institutional creativity in terms of operational framework. The main innovation consisted in the creation of a trading desk that was to intervene on the foreign exchange market. Before 1926, no serious attempt was undertaken to consolidate the floating debt into long-term bonds or to create or endow a public institution with the goal of holding the debt overhang. Everybody denied the severity of the situation, and repeated like a mantra that France had to return and remain on gold. The fiscal crisis would be solved by the reparation payments that the Versailles treaty had enacted.[13] The reparations became the excuse to avoid confronting the fiscal crisis. The debt overhang was not consolidated, weakening governments by exposing them to hard fiscal choices in times of crisis and to the goodwill of its financiers and notably the Bank of France. In the meantime, various political crises precipitated regular debt and exchange rate crises. These crises were characterized by looming government default that in turn was caused by the threat that the floating debt would not be rolled over. Of course, during these crises

[13] World War I was also a game changer in terms of post-war management. The Versailles treaty revisited the old idea that the defeated had to pay a tribute to the victors but with two twists. First, reparations now accounted for the prejudice suffered and were not a tribute to the victors. Second, rather than the victors, it was the international community that negotiated the treaty and made sure that the treaty would be enforced. These two changes proved hard to implement for two reasons. First, disputes arouse regarding the evaluation of destruction suffered and of the defeated ability to pay. Endless international discussions followed, and led to two main amendments to the initial amount (which ones?). Second, in a world that required international cooperation, diverging interests created a very divisive international community.

market participants feared that the exchange rate vis-à-vis the pound and the dollar would depreciate.

With a balance sheet charged by a significant (and growing) amount of public debt, the Bank had to navigate in unknown territory. It was not helped by the existence of a clear monetary theory on how to deal with situation of fiscal dominance. The lessons of how other central banks had managed the sovereign debt overhang of the French Wars were not remembered. Neither was the Bank helped by the view held among the central bankers that the exit strategy from a public debt overhang had to be implemented very quickly, and that it involved a quick restoration of fiscal discipline. Against this background, it is fair to say that the Bank's policy was often characterized by a denial of the policy issues at stake in the new situation. Political infighting in an attempt to impose the Bank's view in the public also had to do with it.

The directors felt uncomfortable with the changes that the debt burden involved. The debt crisis crystalized regularly in the periodic conflicts between the Bank directors and the government that were involved in renegotiating the level of the Bank's debt holding. The Bank resisted all increases, as it aimed at restoring the pre-war discount system, in which credit lines to the government were limited and seldom used. Moreover, before 1914, the Bank had rarely intervened on the sovereign debt market to support interest rates. During the Interwar, it resisted fiercely to intervene in the foreign exchange market (before 1925) and throughout the whole period to any open market operations. That remained the case even after 1928 when the Bank was under mounting international pressure by Bank of England and the New York Fed to reduce the interest rate differential between their currency and the Franc (Mouré, 1991; Barbaroux, 2014).

Between 1920 and 1926, the Bank wanted to return to the Franc's gold convertibility, making this the ultimate goal of its policy. But the public read the Bank's policy by looking at the monetization of public debt, as reflected in the weekly press disclosures of the Bank's main balance sheet items of the Bank. More than once, disclosure fueled political struggles and exerted pressure to rebalance of the budget. This in turn forced the Bank to push even further debate for fiscal consolidation in the public. Politicians in turn called the payment of reparations.

For lack of a clear conceptual framework on how to deal with debt overhang without imposing a deflation and hence stabilize the public debt yield and encourage the rolling over

of the floating debt, the Bank started voicing publicly its concern with accommodative fiscal policy in an attempt to trigger the reimbursement by the government of the advances made by the Bank to the government. The Bank goal was to restore its pre-war monetary policy and protect the exchange rate. The Bank became heavily involved in the political debate regarding the need for fiscal consolidation. It insisted on the need for deflation to adjust for the lack of French competitiveness. It took a stance in the debates between the left and the right, and tried to shape the public opinion by regularly subsidizing the press to publish articles favoring fiscal discipline and a quick return to gold (Jeanneney, 1984, Mouré, 2002). Some Bank directors, who were also active policy makers, were especially active in the public debate, and even succeeded at times in securing the dismissal of finance ministers or governments (Jeanneney, 1976).

Many searched for a scapegoat to blame. Some blamed the Franc depreciation for capital flight, but as shown by Hautcoeur and Sicsic (1999), it was the threat of a capital levy that mattered most for this matter. Foreign speculators were criticized for exchange rate crises (Mouré, 2002). Everybody condemned Germany for defaulting on its sovereign debt. The growing political crisis led to acrimonious relations with the Bank and one governor was even dismissed for its lack of government support. The regular conflicts between the Bank and the government became public, which led critics to voice their concerns in the headlines of newspapers. In 1924/5, the Bank even published fake balance sheets, to conceal that its government support exceeded the ceiling. The Bank's credibility was struck even though most of the blame was directed to the center left government, who ultimately resigned.

It was not before 1926 that French politicians stopped living on the idea that the financial costs of the war would be covered by the reparations. The exchange rate crisis had become so severe that a consensus formed on the need for a government of national unity. The latter was to vote the necessary tax increases securing the cooperation of the Bank of France by adopting an agenda that consistent with the one of the Bank directors. The Franc started to appreciate against the Pound. During the two years between 1926 and 1928, the debate raged within the media and the Bank with regards to the level at which the Franc should have been stabilized. Some argued in favor of returning to the pre-war parity, while others underlined the depressing effect of the appreciation on the competitiveness of French exports. In 1928, the Franc was devalued by 80% and made convertible into gold. Sicsic (1992) has shown that at this level the Franc was clearly undervalued.

## 2. *The Great depression and the loss of independence*

Following the stabilization of 1926-8, the economy started booming and foreign reserves flew in massively, mostly because of the repatriation of capital that had fled during the inflationary period (Sicsic and Villeneuve, 1993). The Bank sterilized part of the reserves. Certain British and American contemporary critics have reprimanded the Bank of France for having sterilized the capital inflows rather than expanding the money supply. The latter option would have relieved the pressures exerted by capital outflows on the Pound and the Dollar. Eichengreen (1996) explains that this led many developed countries to devalue in the early 1930s, ultimately ushering in the collapse of the international monetary system. He explains that the Interwar was rigged by a lack of cooperation between the central banks of the Gold bloc (Switzerland, Belgium, France and the Netherlands) and those of countries on deficit of balance of payments. Flandreau (1997) and Mouré (2002) however argued that central bank cooperation was a myth already during the 19$^{th}$ century. They hence challenge the view that it was the sudden lack of international cooperation aggravated the Great Depression.

Between 1930 and 1933, France suffered from a massive banking crisis that unfolded in three waves of banking panics (Lacoue-Labarthe, 2005). During the fall and winter of 1930-1, and following the failure of the Oustric bank, many major regional banks were affected by a run on deposits (Bonin, 2000). In the fall of 1931, the fourth national deposit bank was hit by a run that depleted 50% of its deposits in three months and ultimately led to its liquidation. Following this run, many other regional banks failed. Finally, the third wave started in February 1932 and attained again many regional deposit banks. As a result, the aggregate number of bank branches decreased by 15% between 1932 and 1931. The Bank of France supported the banks in need of liquidity stress. It also assisted the broader economy directly by accommodating discounts, which in the context of the 1930s consisted in discounts the central bank granted to non-bank agents. Already in the 19$^{th}$ century, direct discounts were the Bank's main instrument to inject money during periods of credit contraction, since direct discounts allowed it to neutralize the adverse impact the waves of massive bank failures had on the money supply (Friedman and Schwartz, 1963; Bernanke, 1983). Consistently with the role of direct discounts in the transmission of an accommodative policy, Bridji (2013) has shown against Sauvy (1984) that the banking crises

had a depressing effect on the economy mainly through the increasing cost of financial intermediation *à la Bernanke* and not through a contraction of the money supply.

During a banking crisis, monetary policy remained tight in the sense that interest rate were still used to manage the exchange rate. The Bank sought to protect the Franc's convertibility in a world in which almost all currencies had gone off-gold and had massively depreciated. The reaction of the Bank to the devaluation abroad was to oppose publicly and fiercely any devaluation; deflation occurring in foreign countries was ultimately imported. The rationale of this stubbornness is still debated, but it is hard to overlook the Bank's willingness to preserve its credibility. After all, the discourse on gold was the main argument used by the Bank in its public interventions to push for a fiscal consolidation. After 1932, and the devaluation of the Dollar and the Pound, pressure on the Bank grew in the press and among politicians to devalue and de-anchor the Franc from gold. But again the Bank managed to convince politicians to stick to a policy of strong currency. It formed with Belgium, Switzerland and the Netherlands the Gold bloc though the bloc was not endowed with any tool that would have allowed defending the gold convertibility. In the end, the economies of the Gold Bloc did not resist the relative overvaluation of their currencies and deflation commenced. All countries moved off-gold, devalued and imposed capital controls. France was the last to devalue in early October 1936. Consequently, France entered the Great Depression in the mid- 1930s when all other countries that had moved off-gold were on the road to recovery.

During the Interwar, the Bank had taken a policy stance against government on two major policy issues that were partly foreign to monetary policy and financial stability and had defended it fiercely in the media (Jeanneney, 1976; Mouré, 2002). As noticed by Mouré (2002), this had made the Bank a target for criticisms. Columnists started arguing that the Bank was trying to influence the vote in favor of certain political parties (Dauphin-Meunier, 1936). In the meantime, deflation had taken hold, partly because of foreign currency devaluation and partly because of the banking crisis. Failed bankers started voicing criticisms against the Bank's policy of direct discount, accusing the lender of last resort to have participated to the weakening of the banking system (see for example Charpenay, 1939).

The failure to deliver economic prosperity and the Bank's regular intervention in the political debate backfired with the law of 24 July 1936. Following the election of a coalition of left parties in 1936, the governor was dismissed and the governance of the Bank modified.

The 1936 change of statute did not nationalize the Bank–the capital was still in the hands of the shareholders. The law1) barred Bank directors from being elected as policy makers in order to complicate their ability to form coalitions in parliament; 2) changed the board's composition by removing bankers from it and replacing them with representatives of the economic and social interests and government officials from the Treasury. As Gonzo (2011) noticed, the change of governance meant the beginning of an era of lost operational independence. Government officials and the governors (nominated by the government) now had the majority in the main council that decided on monetary policy. As a result, interest rate decisions were made by the Treasury rather than the Bank. The choice of governors also became more political, with evidence of greater correlation between changes of the government and changes of governors. Margairaz (2011) noted that in the decade between 1935 and 1947, five different governors ruled the Bank. He also remarked the greater political acquaintances of governors with the color of the government.

## 3. *The road to modernity: inflation and monetary policy in post WW II France*

After the 1936 change of governance, and under the pressure caused by the general atmosphere of rearmament in Europe, both monetary and fiscal policy became more accommodative starting in 1938 (Mouré, 2001). Open market operations were allowed by a 1938 law (Saint-Marc, 1938). After the outbreak of the war in 1939, and the occupation that followed the capitulation of June 1940, France had to pay each year between 1940 and 1944 the equivalent of 35% of its GDP to Germany (Occhino, Oosterlinck and White, 2008). This and the blow on productive capacity triggered by the many war prisoners weighted heavily on the budget: the fiscal deficit jumped from 21% of the GDP in 1939 to 57% in 1943. Consequently, and despite active price and wage controls, and a very active black markets for consumer goods (Debu-Bridel, 1947; Mouré, 2010), the price level increased by 155% between 1940 and 1944 (Patat and Luftalla, 1986).

In terms of managing of a debt overhang, the political lessons of the post WWI situation had been learned. The government chose to not default on its debt but consolidated it in January 1945. The Treasury organized a closed circuit, in which deposit banks were incentivized to use deposits to hold the sovereign debt. The main advantage was to avoid discussions in the media on the opportunity of increasing the ceiling on sovereign debt held by the Bank. Finally, price controls had created forced savings that agents kept in

overly liquid portfolios (Saint-Marc, 1980). Contrary to other countries, the government did not cut liquid holdings by forcing a deflation through a conversion of banknotes (Gurley, 1953). Inflation reached 50% in the late 1940s, reducing the interest rate burden massively.

The financial system was entirely reorganized to avoid that a fiscal crisis degenerated into a debt crisis. In December 1945, the Bank of France and all deposit banks were nationalized. The regulation of the banking system was composed such that government banks and other financial intermediaries had an incentive to subscribe and hold Treasury bills. A National Credit Council presided by the minister of finance decided over the aggregated volume of credit and its allocation to each bank.

Monetary policy fell into a regime of fiscal dominance. The interest rate paid on public debt became the main constraint in the determination of monetary policy well into the 1960s (Gonzo, 2011). More than half of the deficit was financed by the monetization of public debt by the Bank. In 1944, almost all assets held by the Bank were claims on the Treasury. The Bank was still in charge of determining monetary policy to limit inflation, but the organization of the financial system pyramided in the ministry of finance. Hence, the Bank lost the few conflicts between monetary policy on the one and credit or fiscal policies on the other hand that occurred in the immediate aftermath of the war(Gonzo, 2011).

The operational framework of monetary policy was changed along two dimensions. First, the refinancing instruments of were actively used as tools of industrial policy; as such they were aimed at boosting construction activity and encouraging external trade (Koch, 1983). The balance sheet of the Bank changed tremendously. Medium term claims became important, short-term rediscounting levelling off at 8% in 1968. The Bank defined two main (but impaired) policy rates. The discount rate on bills of exchanges acted as its main rate, but it was not the most effective rate as the Bank an upper volume limit of refinancing at this rate that varied across banks.

Second, the segmentation of the banking system radically changed the way the Bank implemented its monetary policy. The Bank applied bank-specific ceilings on the its various discount facilities to influence the behavior of the banking system (Patat and Luftalla, 1986). Thus, quantitative instruments became an important device for the transmission of monetary policy (Monnet, 2014). To manage the liquidity of the banking sector, the Bank set 15 different refinancing and preferential rates. There were three preferential discount rates

on construction activity, two preferential rates on exports, and the pension on private bills were potentially compelled to a “super-hell” rate equal to the discount rate plus 2.5 %.

The consequence in terms of organizing of the economy’s financing were long lasting (Patat and Luftalla, 1986). The level of interest rates was so low that the French switched their savings from bonds and stocks to very liquid instruments such as banknotes (that were also very useful to pay for black market trades) or inflation-protected assets such as gold or gold-indexed government bonds. The French economy became bank based. There was more public intervention, more regulations and more segmentation. The banking license was introduced in 1941. Banks were specialized in the financing of a specific sector or a specific activity (e.g. mortgages, consumption loans, loans to SMEs). The allocation of savings suffered many distortions (Saint-Marc, 1980).

During the 1960s, the Bank’s policy started being heavily criticized for its complexity and for creating inefficient market segmentation that limited price discovery on the money market (Saint-Marc, 1980). Episodes of quantitative tightening were often bypassed by banks, notably by using the preferential rediscounting facilities dedicated to the construction and export activities. More importantly, this system was hardly compatible with a policies aimed at fostering the free movement of capital flows that trade liberalization and the European project implied. Various amendments to the post-war policy framework were implemented, all with the aim of making the system less regulated and more market-based (Patat and Luftalla, 1986). The publication of a report written by Marjolin, Sadrin and Wormser (1968) marked a “monetarist” turn for the Bank (Monnet, 2015). Written by a Bank official, a university professor and a representative of the Treasury, this report read as a market-driven proposal. It aimed at 1) simplifying and reviving a genuine money market, 2) setting the discount rate above the fine-tuned money market rate to insulate the retail and business interest rates from variations in monetary policy and 3) focusing on treasury bills and bankers promissory notes to transmit monetary policy. Many of those reforms were implemented in the 1970s, and ultimately led to the financial “big bang” of the mid-1980s that was characterized by a de-segmentation and a loosening of banking regulation.

The regime of fiscal dominance and the regular deficits of the balance of payment meant that the Franc was regularly exposed to exchange rate crises. In the Bretton Woods system of fixed exchange rates, this translated into devaluations or official changes of parity. The main currency that appreciated was West Germany’s Deutsche Mark. Popular outcry

accompanied Franc devaluations, whose long-term consequences in terms of economic efficiency are still to be assessed. In reaction to the demise of the Bretton Woods system in 1971, the Bank and the Treasury aimed at fostering cooperation among European countries and at building a fixed but adjustable exchange rate system (James, 2012). Known as the European "currency snake" in the 1970s, reformed under the label of European Monetary System in 1979 (Mourlon-Druol, 2012), this fixed exchange rate system hardly diminished the periodic occurrence of exchange rate crises triggered by the combination of German current account surpluses and the French economy's lack of competitiveness.

Against this background, the creation of the Euro can be interpreted as an institutional fix to the periodic exchange rate crises. In the late 1980s, the committee of experts chaired by Jacques Delors and mandated by European governments wrote a proposal to create a single currency. As shown by James (2012), the proposal came with two main caveats. First, the fiscal rules have to limit countries' ability to vote fiscal deficits. Second, the to-be created central bank had to be endowed with the required supervisory power over the banking system. Various interests coalesced to exclude banking supervision from the treaty signed in Maastricht in 1992 that enacted the process of European monetary integration. In 1999, the European Central Bank became responsible for conducting monetary policy in the euro area and the Euro was introduced in 2001. As part of this process, the various national central banks gained independence from government intervention. In 1992, this was also the case for the Bank of France.

## IV. Conclusions

France followed its own path to central banking, a path that was paved by its past and shaped by its contemporary political and financial system. If anything, what this history of the Bank illustrates is that there are two regularities when it comes to organizing central banking. The relation between the Bank and the State is essential as it touches upon the question of independence. The latter in turn ensures a fair balance between the urgent needs of the day and the wish to preserve the value of resources through time. The other regularity regards the efficiency with which a central bank stabilizes the payment and credit systems and is partly pinned down by how effectively the operational framework of refinancing operations reduces financial frictions. In France, financial imperfections were partly caused by market frictions. But most importantly, it was the legislative loopholes

designed to define creditors rights and the trade of debts and credits that created distortions. As a central bank, the Bank of France was created to fill in those loopholes, once financiers and politicians had agreed that the cost of 18th century monetary crises were too large. Yet those loopholes must not be understood as something that could easily have been fixed by changes of the legislation. Rather they must be thought of as the equivalent of creepages but in the domain of finance.

## APPENDIX. CRISES YEAR DURING THE 19TH CENTURY ACCORDING TO VARIOUS CRITERIA

Column (1) gives the years of financial tensions identified by former N.B.E.R director William L. Thorp (1926) using accounts of business news. The accounts were official documents, reports by contemporary observers and students of economic history, periodicals, pamphlets, and books. The selected dates correspond to years for which Thorp mentioned that "Money was tight" or that "Money very tight" or that "Money tightens" or that "Financial panic" happened.

Column (2) reports the years of financial crises according Clément Juglar (1862, 1889) who used items of the balance sheets of the Bank of France to assess the occurrence of a crisis. He scrutinized two items: the total of circulating banknotes and the ratio of Bank discounts to its metallic holdings. The former measures the size of money creation and the later the Bank convertibility constraint. Siegfried (1906) added the 1890s. I extend the dating to the 1900s.

Columns (3) and (4) used the information on the implicit 3-month interest rate, annualized by taking for each year between 1820 and 1913 the maximal monthly value. Since monetary tensions could occur during only a few weeks, this is the only possible method to isolate years of funding tensions on the money market. Column (3) reports the local peak in the filtered interest rate series, thus allowing medium-run trend in the data. Column (4) reports the crises year when the cyclical component of the local interest rate was greater than one standard deviation around the mean.

Column (5) used Arbulu (2006) stock index to compute variations of the Paris stock price index greater than one standard deviation.

| (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|
| Thorp "Business annals" | Juglar's criteria | Short-term implicit interest rate, peaks of the HP filtered cyclical series | Short-term implicit interest rate, Deviation greater than 1 st. dev.) | Negative variations of the stock index, |
| | | 1821 | | 1821-23 |
| 1823 | 1825 | 1824 | | |
| | | 1826 | | 1827-29 |
| 1829-34 | 1830 | 1831 | | 1831-35 |
| | 1836 | 1837 | 1837 | |
| 1838-39 | 1839 | 1839 | 1839 | 1839-43 |
| | | 1842 | | |
| 1845-46 | | 1846 | 1846 | |
| 1847-51 | 1847 | 1848 | 1848 | 1848-51 |
| | | 1851 | | |
| 1854 | | 1854 | 1854 | 1854-55 |
| 1857 | 1857 | 1857 | 1857 | 1858-59 |
| 1860-61 | | 1861 | 1864 | |
| 1864 | 1864 | 1864 | | 1864 |

| | | | | |
|---|---|---|---|---|
| 1866-67 | | 1866 | | 1866-67 |
| 1870-71 | | 1870 | 1870-71 | 1870-71 |
| 1873-74 | 1873 | 1873 | | 1873-74 |
| 1879 | | 1875 | | 1877-80 |
| 1881-83 | 1882 | 1882 | | 1883-89 |
| | | 1884 | | |
| 1889-91 | 1891 | 1888-1891 | | |
| 1893 | | 1893 | | 1894-96 |
| 1898-9 | 1900 | 1900 | | 1901-04 |
| 1904-5 | | 1903 | | |
| 1907 | 1907 | 1907 | | 1907-09 |
| 1911-3 | 1913 | 1910 | | 1911, 1913 |

## References


Arbulu Pedro, 2006, Le marché parisien des actions au XIXe siècle, in *Le marché financier français au XIXè siècle* vol 2*,* Eds G. Gallais-Hamono, Paris : Publications de la Sorbonne.

Avaro, Maylis and Vincent Bignon, 2018, At Your Service! Liquidity Provision and Risk Management in 19th Century France, mimeo.

Bagehot, Walter, 1873, Lombard Street: a description of the money market (5th edition ed.). London: Henry S. King and Co.

Baubeau, Patrice, 2004, Les cathédrales de papiers: Naissance et subversion du systéme de l'escompte en France, XVIIIe–Premier XXe siècle. Ph. D. thesis, University of Paris Nanterre

Barbaroux, Nicolas, 2014, The Bank of France and the Open-Market Instrument: An Impossible Wedding? University of Lyons GATE Working paper 1423.

Bazot, Guillaume, 2014, Local liquidity constraints: What place for central bank regional policy? The French experience during the belle epoque (1880–1913). *Explorations in Economic History* 52, 44–62.

Bazot, Guillaume, Bordo, Michael and Eric Monnet, 2016, International shocks and the Balance sheet of the Bank of France under the classical gold standard, *Explorations in Economic History* 62, p. 87-107.

Blancheton, Bertrand, 2001, Le Pape et l'empereur, Paris: Albin Michel.

Bergeron, Louis, 1978, Banquiers, négociants et manufacturiers parisiens du Directoire à l'Empire, Paris : EHESS and New York : Mouton.

Bignon, Vincent, Chen, Jinzhao and Stefano Ugolini, 2016, Beneath the Gold Points: European Financial Market Integration, 1844-1870, working paper Banque de France.

Bignon, Vincent, Marc Flandreau, and Stefano Ugolini, 2012, Bagehot for beginners: The making of lender of last resort operations in the mid-19th century. *Economic history review* 65, p. 580–608

Bignon, Vincent and Clemens Jobst, 2017, Economic Crises and the Eligiblity for the Lender of Last Resort: Evidence from 19th century France, working paper CEPR.

Bordo, Michael and Ron McDonald, 2005, Interest rate interactions in the Classical Gold Standard, 1880-1914, *Journal of Monetary Economics* 52: 307-327

Bonin, Hubert, 2000, Les banques françaises dans l'entre-deux-guerre : L'apogée de l'économie libérale bancaire française, Paris : Editions Plage.

Bonin, Hubert, 2006, Histoire de la Société Générale, Geneve: Droz.

Bouvier, Jean, 1961, Le Crédit Lyonnais de 1863 à 1882, Paris: SEVPEN.

Bravard-Veyrières M. and Demangeat Ch., 1862, Traité de droit commercial, Volume III, Paris : A. Marescq Ainé.

Bridji, Slim, 2013, The French Great Depression: A business cycle accounting analysis, Explorations in Economic History 50(3), p. 427-445,

Cameron, Rondo. (1961). France and the economic development of Europe 1800–1914. Princeton: Princeton University Press

Cameron, Rondo. 1967, Banking in the early stage of Industrialization. Oxford: Oxford UPress.

Capie, Forest and Charles Goodhart, The future of central banking, 1994, Cambridge U Press

Charpenay, Georges, 1939, Les banques regionalistes, Paris : Nouvelle Revue Critique.

Contamin, Rémy, 2003, Interdépendances financières et dilemme de politique monétaire. La Banque de France entre 1880 et 1913, *Revue économique* 54(1), p. 157-179.

Contamin, Rémy and Caroline Denise, 1999, Quelle autonomie pour les politiques monétaires sous l'étalon-or, 1880-1913?, *Économie internationale* 78, p. 59-84

Courcelle –Seneuil ; 1840, Le credit et la banque,p. 68)

Coquelin, 1859, *Le crédit et les banques*, 2nd Edition. Paris: Guillaumin et Cie.

Courtois, Alphonse, 1875, Histoire de la Banque de France et des principales institutions de crédit depuis 1716, Paris : Guillaumin.

Dalloz, Victor and Tournemine, Armand, 1825, Jurisprudence générale du Royaume en matière civile, commerciale, criminelle et administrative, Paris : Journal des audiences.

Dalloz, Victor, 1830, Traité des effets de commerce, Paris : Tarlier.

Dauphin-Meunier, A., 1936, La banque de France ; Paris : Gallimard.

Debu-Bridel, J., 1947, Histoire du marché noir 1939-1947, Paris :La grande Parque.

Delamathe, J., 1848, Réflexions sur la crise actuelle adressées au commerce de Paris, Paris : Imprimerie Centrale des Chemins de Fer, de Chaix et Cie.

Domin, Jean-Pierre,2007, La question du monopole d'émission de la monnaie: le débat banque banque centrale contre banque libre chez les économistes français. European Journal of Social Sciences XLV(137), 185–202

Du Pont de Nemours, 1806, Sur la Banque de France, les causes de la crise qu'elle a éprouvée, les tristes effets qui en sont résultés et les moyens d'en prévenir le retour. Avec une théorie des banques, Rapport fait à la Chambre de commerce. Paris : Hatchard.

Eichengreen, Barry, 1996, Golden Fetters : The Gold Standard and the Great Depression, 1919-1939, Oxford : Oxford University Press.

Fazy, James, 1826, Opuscules financiers sur l'effet des privilèges, des emprunts publics et des conversions sur le crédit de l'industrie en France, Paris : J. J. Naudin, 295 p.

Fazy, James, 1830, Principes d'organisation industrielle pour le développement des richesses en France, Paris : Malher.

Flandreau, Marc, 1995, L'or du monde, Paris : L'Harmattan.

Flandreau, Marc, 1996a, Les règles de la pratique. La Banque de France, le marché des métaux précieux et la naissance de l'étalon-or, 1848-1876. *Annales, Histoire, Sciences Sociales* 51 (4), 849–871

Flandreau, Marc, 1996b, The French crime of 1873: An essay on the emergence of the International Gold Standard, 1870–1880. Journal of Economic History 56 (4), 862–897

Flandreau, Marc, 1997, Central Bank Cooperation in Historical Perspective: A Sceptical View, *Economic History Review*, 50(4), p. 735-763

Flandreau, Marc, 2002, "Water Seeks a Level": Modeling Bimetallic Exchange Rates and the Bimetallic Band, *Journal of Money, Credit and Banking* 34(2), p. 491-519

Flandreau, Marc, 2004, The Glitter of Gold. France, bimetallism and the Emergence of the International Gold Standard, 1848-1873. Oxford: Oxford University Press.

Flandreau, Marc, 2008, A History of Monetary Policy Targets, 1797-1997, in *The role of money : money and monetary policy in the twenty-first century* : ECB Central Banking Conference 2006. - Frankfurt am Main : European Central Bank, p. 208-243

François-Marsal, 1928, Encyclopédie de Banque et de Bourse, Paris: Crété.

Friedman, Milton and Anna Schwartz (1963), *A Monetary History of the United States*, Princeton University Press, Princeton.

Friedman, Milton, 1990a, Bimetallism Revisited,*Journal of Economic Perspectives* 4, p. 85-104.

Friedman, Milton, 1990b, The Crime of 1873, *Journal of Political Economy* 98(6), p. 1159-94.

Gautier, J.E., 1839, article Banque, Encyclopédie du droit, Paris.

Gille, Bertrand, 1959, La banque et le crédit en France de 1815 à 1848. Paris: Presses Universitaires de France.

Gille, Bertrand, 1970, La Banque en France au 19ème siècle. Geneva: Droz

Gonjo, Yasuo, 2011, Qui a gouverné la Banque de France (1870-1980)? In L'économie faite homme – hommage à Alain Plessis, O. Feiertag and I. Lespinet-Moret eds, Genève : Droz, chapter 6, p. 91-111.

Gorton, Gary and Ordoñez, Guillermo, 2014, Collateral Crises, *American Economic Review* 104(2), p. 343-78

Gorton, Gary and Pennacchi, George, 1990, Financial Intermediaries and Liquidity Creation. The Journal of Finance, 45: 49–71.

John G. Gurley, 1953, Excess Liquidity and European Monetary Reforms, 1944-1952, The American Economic Review, Vol. 43, No. 1, pp. 76-100.

Hautcoeur, Pierre-Cyrille et Pierre Sicsic, 1999, Threat of a capital levy, expected devaluation and interest rates in France during the interwar period, *European Review of Economic History* 3, p.25-56.

Hautcoeur, Pierre-Cyrille, Riva, Angelo and Eugene White. 2014, Floating a Lifeboat : the Banque de France and the Crisis of 1889, *Journal of Monetary Economics* 65, p. 104-199

Hoffman, Philip, Gilles. Postel-Vinay, and Jean-Laurent Rosenthal, 2015, Entry, information, and financial development: A century of competition between french banks and notaries. Explorations in Economic History 55, 39–57

Jacoud, Gilles, 1996, Le billet de banque en France (1796-1803), Paris: L'Harmattan.

James, Harold, 2012, Making the European Monetary Union, Cambridge (MA) :Bellknap press.

Jeanneney, Jean-Noël, 1976, François de Wendel en république. L'argent et le pouvoir (1914-1940), Paris : Le Seuil Univers Historique

Jeanneney, Jean-Noël, 1984, *L'Argent caché : milieux d'affaires et pouvoirs politiques dans la France du XX^e^ siècle*, Paris : Le Seuil-Fayard Points-histoire.

Jobst, Clemens and Ugolini, Stefano, 2016, The Coevolution of Money Markets and Monetary Policy, 1815-2008, in Michael D. Bordo, Øyvind Eitrheim, Marc Flandreau and Jan F. Qvigstad (eds.), Central Banks at a Crossroads: What Can We Learn from History?, Cambridge University Press, p. 145-194.

Jones, Matthew and Maurice Obstfeld, 2004, Savings, Investment and Gold, in Money: A Reassessment of Historical Current Account Data, In *Capital Mobility, and Trade: Essays in Honor of Robert A. Mundell*, Eds. Guillermo A. Calvo and Rudiger Dornbusch, p. 303-63

Juglar, Clément, 1862 [1889], *Des Crises Commerciales et de leur retour périodique en France, en Angleterre et aux États-Unis*, Paris: Guillaumin

Lacoue-Labarthe, Dominique, 2005, La France a-t-elle connu des paniques bancaires inefficientes ? *Revue d'économie politique* 115(5), p. 633-56.

Leclercq, Yves, 2010, La Banque supérieure. La Banque de France de 1800 à 1914. Bibliothèque de l'économiste. Paris: Classiques Garnier

Lescure, Michel, 2003 , La formation d'un système de crédit en France et le rôle de la banque d'émission (1850-1914), in *Politiques et pratiques des banques d'émission en Europe (XVIIe – XXe siècle)*. Eds by O. Feirtag and M. Margairaz. Paris: Albin Michel. P. 131-148.

Levy-Leboyer Maurice and François Bourguignon, 1985, L'économie Française au XIXe siècle, Paris : Economica.

Margairaz, Michel, 2011, Les gouverneurs dans la tourmente, In L'économie faite homme, O. Feiertag and I. Lespinet-Moret eds, Genève : Droz, chapter 7, p. 113—133.

Marjolin, R., Sandrine, J. And Wormser, O., 1968, Rapport sur le marché monétaire et les conditions de crédit, Paris : la documentation française.

Monnet, Eric, 2014, Monetary Policy without Interest Rates: Evidence from France's Golden Age (1948 to 1973) Using a Narrative Approach," *AEJ: Macroeconomics* 6(4), p. 137-69.

Monnet, Eric, 2015, La politique de la Banque de France au sortir des Trente Glorieuses : un tournant monétariste ? *Revue d'Histoire Moderne et Contemporaine* 62-1, p. 147-74

Mouré, Kenneth, 1991, Managing the Franc Poincaré, Cambridge: Cambridge U. Press.

Mouré, Kenneth, 2002, The Gold Standard Illusion: France, the Bank of France and the International Gold Standard 1914-1939. Oxford: Oxford University Press.

Mouré, Kenneth, 2010, Food Rationing and the Black Market in France, 1940-1944, French History 24(2), p. 262-282

Mourlon-Druol, Emmanuel, 2012, A Europe Made of Money: The Emergence of the European Monetary System.Series: Cornell studies in money. Cornell University Press: Ithaca.

Niehans, Jürg, 1992, Juglar's credit cycle, *History of Political Economy* 24(3), p. 545-569

Nishimura, Shiyuza (1995). The French provincial banks, the Banque de France, and bill finance, 1890–1913. *Economic History Review* 48, 536–554.

Nishimura, Shizuya and Kazuhiko, Yago,, 2006, La masse monétaire en France, 1890-1913. *Histoire, économie et société*, 25(2), p. 195-211.

Occhino, F., Oosterlinck, K., & White, E. N., 2008, How much can a victor force the vanquished to pay? France under the Nazi boot, *Journal of Economic History*, 68, p. 1-45.

Oosterlinck, K., Ureche-Rangau, L. and Vaslin, J.-M., 2014, Baring, Wellington and the Resurrection of French Public Finances Following Waterloo, *Journal of Economic History*, 74(4), p. 1072–1102

Parker, William, 1920, The Paris-Bourse and French Finance, New York: Columbia U. Press.

Patat, Jean-Pierre and Lutfalla, Michel, 1986, Histoire monétaire de la France au XXe siècle, Paris: Economica.

Plessis, Alain, 1999, Banques locales et banques régionales en France au XIXe siècle, Alain Plessis and Michel Lescure eds, Paris : Albin Michel.

Priouret, Roger, 1966, La Caisse des Dépôts et Consignations, 150 ans d'histoire financière, Paris : PUF.

Prunaux, Emmanuel, 2009, Les comptoirs d'escompte de la Banque de France, Napoleonica 5, 14-146,

Ramon, Gabriel, 1929, *Histoire de la Banque de France d'après les sources originales.* Paris: Grasset, 503 p.

Roulleau, Gaston, 1914, *Les règlements par effets de commerce*, Paris.

Sauvy, Alfred, 1984, Histoire Économique de la France entre les deux guerres, Paris : Economica (written with the collaboration of Anita Hirsch).

Schwartz, Anna, 1986, Real and Pseudo Financial Crises, in *Financial Crises and the world banking System*, Eds. Forrest Capie and Geoffrey E. Wood, New-York: McMillan p. 11-31.

Sicsic, Pierre, 1992, Was the Franc Poincaré Deliberately Undervalued ? Expl*orations in Economic History* 29, p. 69-92.

Sicsic, Pierre and Bertrand Villeneuve, 1993, L'afflux d'or en France de 1928 à 1934, in *Du franc Poincaré à l'écu : colloque tenu à Bercy les 3 et 4 décembre 1992*, Comité pour l'histoire économique et financière de la France, Paris : CHEFF, p. 21-55.

Siegfried, Jules, 1906, L'alternance des crises économiques commerciales et des périodes de prospérité, *Revue des Deux Mondes*, pp. 823-41.

Thorp, William Long, 1926, *Business Annals*, U.S. government Printing office.

Toutain, Jean-Claude, 1987, Le produit intérieur brut de la France de 1789 à 1982, *Economies et statistiques*

Tullio, Giuseppe and Jürgen Wolters, 2003, The Objectives of French Monetary Policy during the Classical Gold Standard, 1876-1913: an Econometric Analysis of the Determinants of Banque de France's Discount Rate, *Diskussionbeiträge des Wirtschaftswissenschaft der Freien Universität Berlin,* Nr.2003/12.

Velde, François, 2003, Government equity and money: John Law's system in 1720 France," Working Paper Series WP-03-31, Federal Reserve Bank of Chicago

Velde, François. 2007, John Law's System, *American Economic Review*, 97(2): 276-279

Velde, François, 2009, Chronicle of a Deflation Unforetold, *Journal of Political Economy* 117(4), p. 591-634

Vidal, Emmanuel, 1910, History and methods of the Paris Bourse. Washington, D.C.: National Monetary Commission, Government Printing Office,

White, Eugene, 2001, Making the French Pay: The Cost and Consequences of the Napoleonic Reparations, *European Review of Economic History* 5(3), p. 337-65

White, Eugene, 2007, The Crash of 1882 and the Bailout of the Paris Bourse, *Cliometrica* 1(2), 115-144.