

# Connected Lending of Last Resort

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## **Impressum:**

CESifo Working Papers

ISSN 2364-1428 (electronic version)

Publisher and distributor: Munich Society for the Promotion of Economic Research - CESifo GmbH

The international platform of Ludwigs-Maximilians University's Center for Economic Studies and the ifo Institute

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Editor: Clemens Fuest

<https://www.cesifo.org/en/wp>

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# Connected Lending of Last Resort

## Abstract

Because of secrecy, little is known about the political economy of central bank lending. Utilizing a novel, hand-collected historical daily dataset on loans to commercial banks, we analyze how personal connections matter for lending of last resort, highlighting the importance of governance for this core function of central banks. We show that, when faced with a banking panic in November 1930, the Banque de France (BdF) lent selectively rather than broadly, providing substantially more liquidity to connected banks – those whose board members were BdF shareholders. The BdF’s selective lending policy failed to internalize a negative externality – that lending would be insufficient to arrest the panic and that distress via contagion would spillover to *connected* banks. Connected lending of last resort fueled the worst banking crisis in French history, caused an unprecedented government bailout of the central bank, and resulted in loss of shareholder control over the central bank.

JEL-Codes: E440, E580, G010, G320, G330, G380, N140, N240.

Keywords: lender of last resort, fiscal backing, central-bank solvency, central-bank design, banking crises, central bank independence, Banque de France, Great Depression.

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Monnet acknowledges research support from the Agence Nationale de la Recherche. Grant Number: ANR-15-CE26-0008 and ANR-17-EURE-0001. Mitchener thanks the Center for Advanced Studies in Behavioral Sciences (Stanford) for their hospitality and research support in 2021-22. We thank Victor Degorce and João Castello Branco for excellent research assistance as well as the archivists, Frédéric Grelard and Fabrice Reuzé, of the Banque de France for their advice. We are grateful for the helpful comments and suggestions of Sriya Anbil, Asaf Bernstein, Mark Carlson, Elisa Grandi, Chris Hanes, Pierre-Cyrille Hautcoeur, Rafael Hekimian, Rainer Haselmann, Oscar Jorda, Enrique Jorge Sotelo, Christopher Koch, Arnaud Manas, Elsa Massoc, Alexander Michaelides, Guillermo Ordóñez, Francesco Pappadà, Pascal Paul, José Luis Peydró, Dongsoo Shin, Stefano Ungaro, Angelo Riva, and Victoria Vanasco; conference participants at CEPR Political Economy of Finance, Banco de España, and Mountain West; and seminar participants at Goethe University and Pompeu Fabra. We are particularly grateful to Patrice Baubeau for providing us with the daily balance sheet of the Banque de France.

## I. Introduction

An extensive literature has emphasized the importance of central-bank design for monetary policy outcomes, with much of it focusing on how central bank independence affects the stance of monetary policy and thus inflation (Barro and Gordon 1983, Reis 2013). However, considerably less is known about how design and governance influence central banks' role as lenders. Central bank charters typically specify the types of operations that can be carried out, but additional aspects of their design may affect lending, including the composition of their boards, capital ownership, and ethical rules. Today's central banks have strict rules to prevent conflicts of interest, as do other public administrations. Yet, given their role in the economy, central bankers cannot be fully isolated from private sector influence; they might be tempted to rely on their personal or professional relationships with bankers to obtain better information about who to lend to, especially during a crisis when informational problems are heightened. They might also be subject to political pressures about bank bail-out (Ball 2018) or be influenced by their past experience in the private sector, if any (Mishra and Reshef 2019). While a growing literature on connected lending has emerged over the past two decades (e.g., Khwaja and Mian 2005, Faccio et al. 2006, Duchin and Sosyura 2012, Haselmann et al. 2017, Schoenherr 2019), little is known about whether central bankers draw on personal connections during lender of last resort (LOLR) operations and what the consequences of doing so are.

To answer these questions, one needs detailed and non-anonymous central bank lending data. Contrary to government loans or subsidies that have been the focus of the political economy literature on connected lending, such data are impossible to obtain from recent LOLR operations because of privacy concerns and fears of stigma for commercial bankers that make use of emergency lending. Secrecy is the rule when it comes to central bank lending. We thus turn to previously unknown archival data from the central bank of France (*Banque de France*, or BdF), which contains the names and amounts borrowed by all the main French commercial banks. These data have been kept in the archives for the main banks and for two years (1930-1931) only. Fortunately, these two years span 10 months before and 14 months of the most severe banking panics of French history. We combine these hand-collected, historical data with new information on the relationships between the BdF's board of directors and commercial banks to understand whether these connections were utilized during a banking panic and to examine what effect they

might have had on the central bank's role as a LOLR. We demonstrate that, once the banking panic began, the BdF's lending policy indeed relied on personal connections. However, its decision to draw on these during the panic meant that it failed to follow Bagehot's dictum and lend broadly to stop the panic – the optimal policy response suggested by theory dating back to Thornton (1802) and Bagehot (1873). We show that its selective lending policy during the panic had repercussions even beyond the scope of the panic, proving costly to the State's budget and leading to a major overall of the BdF's governance.

We use newly unearthed ledgers that record the BdF's lending to commercial banks in 1930-31 as well as a unique data set on the connections between the BdF's voting shareholders and commercial banks to define commercial banks as "connected" and "unconnected." This historical setting is especially well suited to study how personal links and private interests can affect the lender of last resort policy of a central bank. Of the more than 40,000 shareholders, only the 200 largest shareholders had voting rights, and it was these shareholders that selected the Regents, the BdF's directors. This governance structure had important implications for how the central bank reacted to two waves of banking panics in the autumn of 1930 and summer of 1931.

Difference-in-difference regressions using weekly data show that, once the panic commenced, the BdF lent disproportionately more to "connected banks." Banks that had ties to the BdF's 200 largest shareholders on average received 30-40% more than banks that were unconnected to BdF shareholders. By contrast, no difference in the evolution of lending is observed between the two groups prior to the crisis nor did connected and unconnected banks differ in terms of risk or solvency. Excluding systemically important financial institutions (SIFIs) or banks that failed during the crisis increases the difference in crisis-period lending between connected and unconnected banks to more than 60%. That the results hold when the largest banks or SIFIs are excluded, and are in fact stronger, suggests that becoming a shareholder of the BdF was not a strategic choice by largest banks before the crisis (a point also confirmed by balance tests on pre-crisis bank characteristics). Indeed, since France had never experienced a systemic commercial banking crisis, the reaction of the central bank during a panic was unknown as was the potential link between BdF lending and BdF shareholders.

When the surge in demand for liquidity came in November 1930, it chose not to lend broadly to all eligible banks that approached its discount window for liquid assets. Unconnected banks had nowhere else to turn, given the BdF was the main source of short-term liquidity in the

French economy (i.e., France lacked an active and accessible interbank market), and depositors had no knowledge to whom the BdF was lending. As in Gorton and Ordonez's (2020) model, rationing credit to unconnected banks meant that the BdF provided too few liquid assets of "high quality" (i.e., "informationally insensitive") to the market to stop bank runs, and a panic ensued. As a result, the financial panic morphed into a widespread banking crisis that ultimately required government interventions to save both the central bank and halt the panic from spreading to the largest banks in the French economy. Bank runs continued in 1931, with market participants correctly surmising the Banque would not lend broadly. The second period of peak distress in autumn of 1931 only ended after the government intervened and bailed out a large failing commercial bank (BNC). The decision to lend selectively represented a failure by policymakers to internalize a potential negative externality: a panic that was not arrested could spillover even to connected banks.

Throughout the banking crisis, the BdF was overtly concerned with the welfare of its shareholders (i.e., connected banks), even as its non-performing loans ballooned, and protecting shareholder value meant paying dividends. In principle, selective lending was consistent with maximizing shareholder value. In practice, lending to banks with personal connections was financially disastrous for the Banque (as it quickly accumulated non-performing loans on its books); it ultimately destroyed shareholder value since its lending policies during the autumn of 1930 allowed the banking crisis to grow into the largest in French history and spread to connected banks. We provide new evidence that the Banque's poor financial position largely resulted from massive discount window loans it had made in the first few weeks of the panic to connected banks, decisions that less than two months later led to a bailout from the French government during the last week of December 1930. This secret Christmas-week agreement, undisclosed to the public at the time, removed non-performing discount window loans from the central bank's balance sheet, with the French Treasury assuming these liabilities. The timing was particularly opportunistic as it provided "window dressing" for the BdF's year-end annual report, allowing its managers to state publicly that the bank had positive earnings and to pay its shareholders dividends. Indeed, despite the crisis, the bank's "earnings management" enabled it to pay a larger dividend at the end of 1930 than in any year immediately prior to the panic.

Importantly, the Banque's selective lending policy had long-term repercussions for its governance and led to redesign of the central bank's lending policy. Politicians held the Banque

responsible for failing to stop the banking crisis of 1930-31. A political coalition led by Leon Blum completely overhauled the bank's governance, removing the significant influence the 200 largest shareholders had on policy by changing the voting structure to a one-share, one-vote model, and reforming the selection of the board of directors and policy committees so that it operated in the public's interest.

At first blush, one might think that a central bank run by private shareholders is sufficiently different from today that our setting is of only historical interest — for explaining the BdF's role in creating the largest banking panic in French history. On the contrary, being state-owned and having ethical rules does not mean that a central bank is beyond the reach of conflicts of interest. In many countries around the world, especially those with weak rule of law and where corruption is prevalent, the literature has shown the importance of political connections for government lending (e.g., Khwaja and Mian 2005). It is not obvious why central banks should be more immune to these problems than the governments who charter them. One question that is difficult to answer is whether, in countries with fewer conflicts of interest, central bankers will still rely on personal information about banks to conduct LOLR operations, or if their professional experience might create a bias towards some institutions. Personal connections to government agencies might matter even countries with a strong rule of law, as suggested by Acemoglu et al. (2016). Moreover, Mishra and Reshef (2019) show that past professional experience of central bankers affects their attitudes toward banking regulation. These considerations might be more important if central bankers feel constrained by potential losses of the central bank (Goncharov et al. 2021).

Another contribution of our study is to show that existing connections are particularly relevant during crises, when uncertainty increases. The existing literature on connected lending has thus far not emphasized that it may be higher in crisis times – and related to governance issues - rather than being a structural problem. An exception is Faccio et al. (2006), which shows that politically-connected firms are significantly more likely to be bailed out than similar nonconnected firms (even more when the International Monetary Fund or the World Bank provides financial assistance to the firm's home government); however, their research is unable to prove that unconnected and connected firms were similar before entering distress (the latter were in fact significantly larger). More recently, Acemoglu et al. (2016) show that that personal connections are more valuable in crisis times for financial firms: the announcement of Timothy Geithner as nominee for Treasury Secretary in November 2008 produced a cumulative abnormal return for

financial firms with which he had a prior connection. In contrast to our setting, their research does not identify or link the rise in stock prices to actual policy decisions, in particular central-bank lending or government subsidies. Our focus broadens the scope of this strand of the literature by focusing on central banks and their lending policies and shows how it can have negative spillovers to connected financial firms.

Finally, it must be emphasized that our main result was unexpected in more than one respect. First, in a setting where banking regulation and supervision were not formalized, it would have been very possible that relying on personal connections would have been an optimal policy to preserve the central bank's profit. Part of the literature on connected lending has, for example, shown that, in some instances, relying on social ties can be an effective response to problems of information asymmetry, either through the acquisition of better information or through more effective monitoring (Lamoreaux 1994, Cohen et al. 2008, Engelberg, Gao, and Parsons 2012; Fisman, Paravisini, and Vig. 2017, Babina et al. 2020). Relying on personal connections during a panic thus might also be useful for a central bank. To the contrary, we show that the BdF's connected lending policy during the panic turned out to be quite costly. It did not prevent the central bank from realizing large losses on its discount window lending and its decision to screen borrowers rather than lend broadly proved insufficient for arresting the panic. Second, the literature on the evolution of central banks suggests that best practices regarding LOLR were already well understood by the end of the 19th century — even for private shareholder-owned central banks (Goodhart 1988, Bordo 1990, Capie et al. 1994, Bindseil 2019). However, this standard view cannot explain why central bank did not play their role as lender of last resort during the banking panics of the 1930s. Our analysis suggests that LOLR is also about design and governance.

More precisely, our research relates to a newer literature that considers how political economy factors can affect central bank policy, such as the profit motive (Goncharov et al. 2021) or potential pressure from governments to borrow from the central bank rather than be rescued with public funds (Drechsler et al. 2016). It also relates to the long-standing debate on central bank design as to whether monetary policy and banking supervision should be integrated (Goodhart and Schoenmaker 1996, Lastra and Garicano 2010): while some argue that the two functions should be combined so that lender of last resort has homogeneous information on banks, others fear that merging the two functions creates a conflict of interest.



Our paper relates to research interested in understanding the institutional design of central banks (including transparency and accountability) and how the preferences of central bankers influence objectives and outcomes of monetary policy. One strand of the literature explores how monetary policy objectives might be subject to the influence of both elected policymakers and interest groups willing to capture monetary policy (Gabillon and Martimort 2004). A second examines how committee structures affect decision making (Gerlach-Kristen 2006; Hansen et. al. 2014), the role of procedural transparency in central bank deliberations (Geraats 2002; Hansen et. al. 2017). A third strand looks at how decisions of central bankers are shaped by their backgrounds and personal experiences (Göhlmann and Vaubel 2007; Bordo and Istrefi 2018; Malmendier et. al. 2021; Mishra and Reshef 2019; Monnet and Puy 2020). Our paper relates to these in that it focuses on how central bankers serving on key, policy-making committees are influenced by private incentives, how this affects their objectives (and in turn policy outcomes), and what the implications are for accountability and legitimacy given that central bankers are often assumed to be acting in the public's interest.

Our paper is also connected to research on the central bank's role as a lender of last resort, a responsibility that has received renewed attention from researchers in the wake of the Global Financial Crisis and global pandemic. Emergency liquidity assistance is seen as a core but risky responsibility of the central bank as it subjects the central bank to potential losses (our focus) and exposes the bank to moral hazard and potential reputational damage (Domanski and Sushko 2014). Of relevance to our research are recent treatments that utilize detailed micro level data on central bank LOLR activities to explore how the relationship between borrowing banks and the LOLR affects policy outcomes and thus central bank objectives (Drechsler et. al. 2016; Acharya et al. 2017). As in these studies, we employ novel confidential, high-frequency data on central bank lending and include bank-level controls for the riskiness of borrowers just prior to the panic in our estimation; however, our research question differs in that we focus on the incentives of the central bankers rather than those facing commercial banks. Further, while a large literature has explored how connections between financial institutions can propagate risk and distress during crises (Allen and Gale 2000; Calomiris et. al. 2019; Mitchener and Richardson 2019; Das et. al. 2021), less attention has been paid to the connections between a central bank and commercial banks and how these affect the provision of a credit by a central bank during a LOLR operation – the focus of our analysis.

Previous quantitative scholarship on interwar France has almost entirely neglected the role that the central bank played in the panic.<sup>1</sup> Like Friedman and Schwartz's (1963) characterization of the Federal Reserve during the U.S. Great Depression, the Banque of France also appears responsible for "sins of omission and sins of commission," which exacerbated and prolonged its banking crisis. The BdF's failure to lend broadly at the start of the panic was its sin of omission. Its sin of commission was to pursue a selectively lending policy through 1931 to minimize losses and maximize shareholder value at the expense of liquidity-starved commercial banks. Given bank runs in France explain roughly one third of the drop in output in 1930-1 (Monnet et. al. 2020), social welfare losses arising from the Banque's selective lending policy appear substantial.

## II. The Panic of November 1930 and the Absence of LOLR

The origins of the crisis began at a modest bank (Banque Oustric) with a short history (dating only to 1919) that had invested heavily in stocks, unusual for French commercial banks of that era.<sup>2</sup> Oustric's failure may have had minor consequences if it had not become the main shareholder of Banque Adam in 1929, a well-respected, solvent, and long-established commercial bank in the North of France. Through this connection, contagion spread from the Paris Bourse to the Oustric group's banks and then, more broadly, to the commercial banking system. Heavy withdrawals commenced at both the Banque Oustric and the Banque Adam in the first week of November.<sup>3</sup> These two banks and three other affiliated banks ran out of liquid assets and declared themselves bankrupt.<sup>4</sup> At that time, there was no banking regulation in France: depositors were not insured and were treated like other creditors in case of bankruptcy (Baubeau et al. 2021).

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<sup>1</sup> For example, Bordo (1990, p.24) concludes actions by the Bank of France in 1882, 1889, and 1930 prevented incipient banking crises from developing into panics. French historians are divided on the whether the Bank of France played a role as a LOLR. (See Baubeau et al. 2021 for a recent review.)

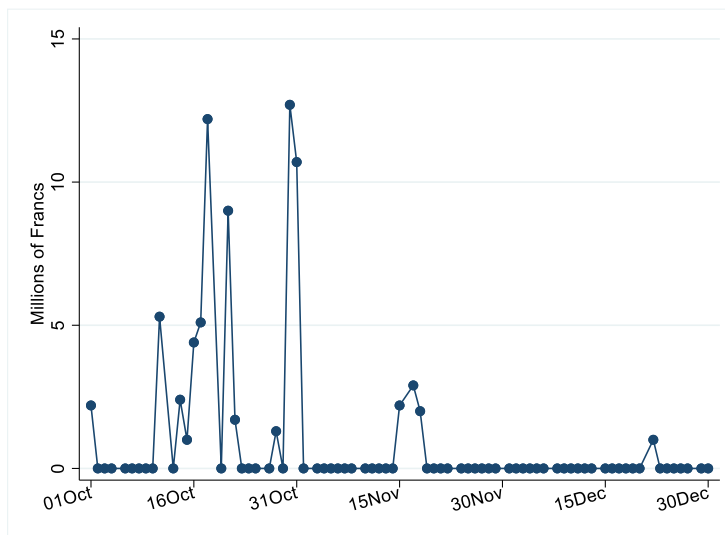
<sup>2</sup> On average, only 3% of French banks' assets were invested in securities.

<sup>3</sup> The run on *Banque Adam* started on Monday November 3th, 1930 at the same time as the closing of the *Banque Oustric*. *Banque Adam* also suspended payments and entered liquidation on November 5th. These dates appear in the liquidation files (cf. Crédit Agricole SA Archives (CASA), 129AH110, « Tableau de bord des causes des banques en difficulté») and various Archives of the Bank of France (ABF): ABF, 0014201201 / 213 to 216 and 1069199113 / 1 (Banque Adam), 1069199113 / 20 to 22; 1180200501 / 559 (Banque Oustric).

<sup>4</sup> *New York Times*, "The Waiter who Toppled a Ministry," December 14, 1930, p.7.

Depositor withdrawals increased pressure on banks to acquire short-term liquid funds.<sup>5</sup> On November 3<sup>rd</sup>, facing runs, Banque Adam asked for liquidity from the BdF but the central bank refused to provide it with discount window loans.

Figure 1. Banque de France Daily Lending to Banque Adam (October-December 1930)



Source: ABF, *Comptes Principaux* (See the text.)

Notes: The run on Banque Adam started on November 3 and the bank entered into bankruptcy on November 5. On November 11, a syndicate was created to organize the liquidation of the Banque Adam. After this date, loans were granted by the BdF to help the liquidation of the bank.

Figure 1 displays central bank lending to Adam and Oustric using a new daily data set on BdF discount window lending we collected from the BdF’s archives. The figure shows that the central bank was still lending to Adam and Oustric on the Friday during the week preceding the run of Monday November 3 – 10.7 million to Adam and 2.3 million to Oustric. However, lending to these institutions fell once the panic commenced. The Banque’s decision not to provide sufficient liquidity support to these banks to fend off runs suggests it might not have been following Bagehot’s responsibility doctrine and lending broadly to stop the panic.

Recognizing that the liquidity crisis was spreading to the entire financial system, the French government turned to the largest commercial banks in the country and requested that they lend to Adam; it failed to obtain their support. Lacking short-term liquid funds, Banque Adam thus entered bankruptcy on November 4<sup>th</sup>. This event triggered social protests since most traders in the port of

<sup>5</sup> In contrast to other advanced economies, France had not entered into a recession by the fall of 1930.

Boulogne – a major port in the North of France – borrowed from Adam and suddenly lacked an alternative and immediate source for credit.

Bank runs spread to other regions of France. In response, under the impetus of the government, a syndicate of banks was formed on November 11<sup>th</sup> to liquidate the storied Banque Adam and arrange for its re-organization. The government published an announcement on November 12<sup>th</sup> stating that its intervention was motivated by the acknowledgment of important “worries” across France, despite Adam’s failure being a “local event,” and that this situation was becoming “harmful to the interests of savers” (*nuisible aux intérêts de l’Epargne*).<sup>6</sup> The organizing principles of this operation were based on the 1889 “lifeboat operation” in which the BdF had participated as well as an identical procedure used to liquidate a regional banking group in 1921. The procedure called for a failing bank to be liquidated in an orderly fashion rather than receiving liquidity from the central bank or from the state (Hautcoeur et al. 2014).<sup>7</sup> A syndicate of banks was formed to reimburse the depositors, and thus bear the risk if the assets of Banque Adam could not be recovered. Board members of the Banque Adam contributed 20 million francs to the syndicate while the BdF contributed only 10 million francs. The BdF’s stake and role in the syndicate cannot be interpreted as large or significant, in terms of either the central bank’s balance sheet (see Section V for comparisons to its loans, capital, and provision for losses) or in terms of providing a substantial safety net aimed at stopping a banking panic.<sup>8</sup> As shown on Figure 1, the BdF lent briefly to the syndicate to help the liquidation of the Banque Adam in the end of November.

The syndicate, however, had little effect in stopping the banking crisis. Runs on commercial banks continued after the lifeboat operation into December, leading to non-Oustric associated bank failures in Paris (e.g., Société financière de Paris and Lloyd Financier), runs outside the nation’s capital, and runs on a large national bank with branches over the whole territory, i.e., *Banque Nationale du Crédit* (Monnet, Ungaro and Riva 2021). Contemporaries recognized that the root of the problem was illiquidity and that a contagion of fear among depositors had spread. Rumors led to runs that affected solvent banks.<sup>9</sup> Paul Reynaud, Minister of Finance, gave his account of the

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<sup>6</sup> Archives National du Monde du Travail, Fonds Rothschild, 132 AQ 127, folio « Banque Adam », « L’histoire de la Banque Adam par Paul Fleuriot », p.7-8.

<sup>7</sup> This procedure was used to liquidate the Société centrale des banques de Province in 1921, a major banking group with branches throughout France. Archives National du Monde du Travail, Fonds Rothschild, 132 AQ 127, folio « Société centrale des banques de Province ».

<sup>8</sup> Archives National du Monde du Travail, Fonds Rothschild, 132 AQ 127, folio « Banque Adam ».

<sup>9</sup> As described by a banker of the *Crédit du Nord*: “Depositors’ fear was vigorously exploited by a very violent campaign of denigration which did not hesitate to attack the healthiest banks [...]. This insidious campaign was

bank runs in front of the Commission of Finance of the Senate on February 28, 1931: “It was then, as a result of the emotion caused by the closing of this bank [Banque Adam], that we found ourselves in this anxious situation of banks, even excellent ones, threatened to collapse.”<sup>10</sup> By the end of November, the Banque de France was acknowledging that its minor participation in the syndicate had not stemmed the tide of the banking crisis: “the failure of *Banque Adam* had repercussions, not only in the north, but throughout France, on the public mind, and especially on small depositors.”<sup>11</sup> What was not clear to market participants at the time was why its discount window lending had not done so.

### III. Discount Window Lending and the BdF Policy Framework

#### A. The “Bankers’ bank” and its Constraints

The BdF was viewed by market participants as “the bankers’ bank” and as the “regulator of the money market.”<sup>12</sup> The interbank market was small and underdeveloped, and most banks – outside the five largest ones in the country– had no access to it (Roulleau 1914, Eichengreen 1986, Bazot et al. 2016). Importantly, regular lending to commercial banks through its discount window was a primary revenue stream of the Banque de France, and it employed risk-management practices very similar to those of a private bank to manage its lending portfolio. (Appendix B provides further details on the importance of the BdF’s lending to its revenue and to the French banking system.) Bank management believed that the discount rate should remain as stable as possible and should only be altered to defend the fixed exchange rate and operation of the gold standard (Bopp 1952, Bazot et al. 2016). As a result, the discount rate did not change appreciably during our sample period.<sup>13</sup>

The statutes of the central bank were quite specific about the distribution of shares and the voting power of the shareholders, but they did not stipulate a precise objective in terms of monetary

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skillfully carried out, spreading by sophisticated means, such as anonymous telephone calls to customers, false telegraphic stock exchange orders, etc. [our translation]” (Bonin 2000, vol.1, p.457).

<sup>10</sup> Cited in the newspaper *Le Temps*, March 1st, 1931.

<sup>11</sup> ABF, Procès verbaux du Conseil général (hereafter PVCG), November 27<sup>th</sup>, 1930. See also ABF, Comité des livres et portefeuilles (CLP), December 4<sup>th</sup>, 1930.

<sup>12</sup> See the interview with Georges Pallain, governor of the BdF, in Aldrich (1910, p.239).

<sup>13</sup> Since France returned to the gold standard in 1928, the BdF typically only changed its discount rate if the Bank of England or the Federal Reserve did so. On January 2, 1931, two weeks after the U.S. Federal Reserve changed its rate slightly, the BdF followed suit and lowered its discount rate from 2.5% to 2%. This rate change occurred well after the first period of bank runs, and it was explicitly justified by large capital inflows (ABF, PVCG, 2 January 1931). Later in 1931, on October 9<sup>th</sup>, the BdF again followed the Fed and increased its discount rate back to 2.5%.

or financial stability.<sup>14</sup> They precisely delimited the lending operations that the central bank was allowed to carry out. It could lend against government securities or gold as collateral (i.e., advances). It could discount commercial bills (3-month maximum) with three signatures and two signatures only for “notoriously creditworthy” borrowers. The statutes explicitly required the BdF to apply the same interest rate to all borrowers, all across the country. The law of 25 June 1928 (“monetary law”) for the first time set a quantitative objective for the BdF: it was required to hold gold reserves equal to 35% of its banknotes and current accounts in order to ensure the convertibility of its banknotes into gold for the bearer and on demand.<sup>15</sup>

It is important to note that, during our sample period (1930-1931), the BdF’s domestic lending to banks was not constrained by its commitment to maintain gold convertibility because France was a net global recipient of gold and financial assets (Eichengreen 1986). The ratio of gold reserves to banknotes and current accounts far exceeded the 35% requirement. In November 1930, just before the panic began, this ratio was 62%. In December 1931, due to the influx of gold, it was 71%. The BdF’s gold stock increased from 42 to 54 billion FF over the year 1930 and reached 70 billion FF at the end of 1931 (Baubeau et al. 2021, Figure 9). Meanwhile, the total domestic loans of the BdF – including discount lending to banks and non-banks – remained constant throughout 1930 (about 7 billion FF) and decreased in 1931 to 6 billion FF. In short, as already recognized by previous economic historians (e.g., Eichengreen 1986, 1992; Baubeau et al. 2021), the BdF could have expanded lending to French banks tenfold during any panic without jeopardizing its gold coverage ratio and its adherence to the gold standard.

Rather, the Banque de France’s lending policy and quantity of lending were highly discretionary, and it is this discretion that figures prominently in its lending during the panic. The Banque de France was involved in relationship banking and collected information on the borrowers, but the archives reveal little about how it used such information on a day-to-day basis.<sup>16</sup> Moreover, the Banque’s lending was also kept completely secret. Neither the government nor banks could obtain information on the identities or quantities of individual discount-window loans.

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<sup>14</sup> *Décret Relatif aux statuts fondamentaux de la Banque de France du 16 janvier 1808.*

<sup>15</sup> During the classical gold standard, the BdF held large gold reserves but had no legal requirement to do so (Bazot et al. 2016).

<sup>16</sup> The “fiches d’escompte”(bank-by-bank sheets written by the Comité d’escompte, containing information about the bank and its reputation) contained little quantitative information. A typical sheet (strictly speaking, a recto-verso card) included: the name and address of the bank, the size of its capital, the names of two or three individuals or banks recommending the institution when an account was opened at the BdF for the first time, and 3 or 4 lines on the reputation, activity or quality of the bank. See ABF, fund n° 0011199301 (Alphabetical order).

As recognized by the Governor of the Banque, Clément Moret, in 1931: “Within the limits set by the law, the Banque de France, responsible for the public and private interests, enjoys the fullest discretion”.<sup>17</sup> The BdF presented itself as the “supreme resource” to other banks and, as stressed by Moret, claimed to serve the public interest.<sup>18</sup> Yet, since France had never experienced a systemic commercial banking crisis similar to what happened in 1930-1931, it was unknown how the central bank would use its discretionary lending during a nationwide panic.<sup>19</sup>

Thus, like other central banks of that era, the Banque de France was “the bankers' bank” but its charter did not include any specific objectives or requirements that would have made commercial banks anticipate how it would respond to a major banking panic or economic crisis. The BdF could carry out a variety of lending operations and had discretion over its lending decisions, but it was required to charge a single interest rate to all borrowers. The BdF's discount rate was closely linked to the rate of other central banks during the gold standard, but the BdF's lending was not limited by its legal gold ratio as it had ample gold reserves in 1930 and 1931. A stronger constraint on the BdF - clearly stated in its statutes - was its obligation to pay dividends to shareholders. The fact that the BdF had to avoid losses in order to pay dividends to shareholders and that the BdF's board of directors and annual report had to be approved by the meeting of the 200 largest shareholders (who had the right to vote) was a strong governance constraint for the BdF. We now discuss how these governance rules might have affected its lending during a crisis.

#### B. Central bank objectives and theoretical predictions

Theoretical and empirical literature recognizes that central banks care about losses (Reis 2015; Goncharov et al. 2020). In lending to commercial banks, central banks may realize losses if posted collateral is ex post of insufficient “quality” to cover the losses on loans issued by the lending facility (Choi et al. (2021) and Koulischer and Struyven (2014)). As a consequence, central banks implement a wide range of risk management practices and rules about collateral quality (Drechsler et al. 2016). In similar fashion – and since the 19<sup>th</sup> century – the BdF developed many tools to obtain information on borrowers and collateral (see Appendix B, and Roulleau 1914,

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<sup>17</sup> National Archives of France (NAF), Collection 28201, Box 53. Letter of the Governor of the Banque de France (Clément Moret) to Monsieur Louis Marin, President of the Parliamentary Commission of Inquiry, February 23, 1931.

<sup>18</sup> To Aldrich's question (“Do the banks rely implicitly on the Bank of France to grant them credit when they require it?”), the Governor of the BdF in 1910 (Pallain) replied, “They know very well that in times of difficulty we are the supreme resource” (Aldrich 1910, p.206).

<sup>19</sup> See Hautcoeur et al. (2014) on how the BdF organized the rescue and liquidation of a large bank in 1889. The 1889 crisis was not characterized by bank runs on commercial banks throughout the country.

Plessis 1967, Nishimura 1995, Avaro and Bignon 2019). However, during panics, asset prices are more volatile, counterparty solvency risk rises, and heightened asymmetric information makes it costly for a central bank to discern the quality of any collateral presented at the discount window (Goodhart 1999). Further, since banks utilizing the discount window may not survive the panic, charging a penalty rate *ex post* may do little to deter borrowers from hiding the true quality of the assets when presenting them for discounting. A cost-efficient alternative for discerning collateral quality and the counterparty risk during a panic would be to ration the quantity of borrowing and lend to those you trust or “know best.”<sup>20</sup> In normal times, a central bank can practice a “trust and verify” strategy in its lending portfolio, but when demand for liquidity spikes, banks may not have the time or resources to “verify” the quality of paper being discounted (and the quality may become harder to discern), so a bank may rely more on the “trust” part of its lending. Screening models and related empirical research suggests that “insider lending” can reduce asymmetric information between lenders and borrowers (Stiglitz and Weiss 1981, Rajan 1992, Lamoreaux 1994, La Porta et al. 2003). In these models, selective lending would be incentive compatible with the bank’s shareholders in that it would minimize losses and ensure payment of positive dividends.

Alternatively, as emphasized in the literature on corruption, central bankers may simply lend to “insiders” to confer advantages. For example, the board of directors of a shareholder-owned central bank may choose to lend more to banks with which it has personal connections to help them gain market share from unconnected banks. In the absence of governance rules that prohibit lending to the banks owned by shareholders, it can be difficult to distinguish this motive from the previous, though *ex post* realizations (e.g., large central bank losses on lending) may point to which approach central bankers took. And while the motive for selective lending is somewhat different in this case, the ultimate goal from the central banker’s perspective is similar: protect shareholder value. This objective can either be done by avoiding losses and paying dividends or by providing a direct “subsidy” – conferring advantages relative to competitors. Our research question is thus whether central banks ever decide to lend selectively during LOLR operations and what the consequences of these lending policies are.

All that said, selective lending may not be socially optimal – certainly if the bank places any weight in its objective function on the public’s interest, but even in case where it is only

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<sup>20</sup> A related literature suggests that personal connections can prove valuable during crises (Acemoglu et. al. 2016, Babina et. al. 2020).



concerned with shareholder welfare. By lending relatively more to financial institutions for which it can obtain relevant information readily (perhaps through business or personal connections) and reducing lending to “outsiders” during a panic, a central bank could clear the market by restricting quantity rather than charging different prices. However, if the aggregate amount of lending is insufficient to stop a panic, then commercial banks that are liquidity constrained may default, resulting in losses to the central bank.<sup>21</sup> The central bank may not internalize the externality arising from the spillovers associated with a liquidity crisis (e.g., contagious bank runs), ultimately leading to a more severe banking crisis which, in turn, could lower shareholder value in two ways: (1) reduced dividend payments to shareholders and (2) losses at connected commercial banks due to contagion effects. Ultimately, it is an empirical question whether, during a panic, a central bank lends sufficiently to end the panic. Thus, we now turn to analyzing the BdF’s lending in 1930-31.

## IV. Did the Banque of France Lend more to Connected Banks during the Panic?

### A. New High-Frequency Data on Discount Window Lending

To understand the Banque’s response to the panic, we hand collected a novel data set of daily discount window lending from the BdF’s archives. Typically, data of this nature are challenging to acquire because the identity of borrowers at the discount window is kept confidential, due to privacy laws or because commercial banks fear the stigma associated with such borrowing. An important contribution of this paper is the unearthing and collection of high-frequency, panic-period, borrower-level data for a central bank. Indeed, previous histories of French central banking assumed that all detailed information of the Banque’s lending had been destroyed, as is the case for most central banks. A key feature of the data we have unearthed from the BdF’s archives is that it is aggregated at the level of the borrower, which allows the researcher to observe borrowing from individual banks daily.<sup>22</sup> Only very recently have some central bank

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<sup>21</sup> This point is emphasized in Gorton and Ordoñez (2020): lending broadly during a panic is necessary to convince market participants that the assets backing deposits or a financial institution’s short-term liabilities are of sufficient quality such that there is no longer a need to “produce” information to verify the quality of a given bank’s assets.

<sup>22</sup> This stands in contrast data from the Bank of England, the other known source of comparable lending data for a *private* central bank and that are accessible to researchers. Using these data involves the extremely laborious task of aggregating all the hand-written individual transactions to the commercial bank level. Historians who have exploited the Bank of England ledgers for a single year (1847) found that there were 97,000 bills of exchange recorded for this year (Anson et al. 2020). This number would likely be much higher for the Bank de France in the interwar. The record of each transaction is handwritten. As a result, Anson et al. (2020) study a random sample of these bills, which prevent

researchers have been allowed to use similar confidential data to study lending during the 2008-2009 crisis (Drechsler et al. 2016, Acharya et al. 2017), but without being able to relate these data to non-financial information about banks, such board members.

Data from the archives of the BdF provide a daily record of discount window lending by the central bank for the period January 1930 through December 1931. This unique compilation was only undertaken for these years of exceptional crisis. Other records of BdF discount operations have not survived.<sup>23</sup> The data sheets, entitled “*Comptes Principaux*,” display the name of principal or “main” borrowers, the amount of approved borrowing, and the day of borrowing at the discount window. As of 1929, France had 230 deposit-taking banks (Baubeau et al. 2021). The “*Comptes Principaux*” (main accounts) systematically records the discount window borrowing at the BdF of 65 of them. These 65 banks constituted 85% of all assets in the French banking system prior to the panic. Commercial banks not included in *Comptes Principaux* were, on average, small and local and did not appear in the because they did borrowed infrequently and/or little from the BdF’s discount window.

We exclude lending to merchant or investment banks (“*Haute Banque*”) as well as to foreign banks from our final sample because we have no information on the balance sheets of these banks. Overall, lending to these two categories of financial institutions represented no more than 3% of total lending shown in the *Comptes Principaux*.<sup>24</sup> Large merchant banks such as Rothschild or Neuflyze, which were well represented among BdF shareholders, also borrowed from the BdF but in a very small amounts because they were not funded by deposits. We have no information on the balance sheet of these banks since they were not public companies.

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them from constructing the total borrowing for a single bank. The Bank of Japan’s data has data on “special loans,” but it is not systematic discount window lending data.

<sup>23</sup> We suspect that it was compiled retrospectively to provide information to the Portfolio committee of the Banque in 1931 and 1932 when this committee undertook a thorough review of the risk. This review was presented at the meeting of the General council on 17 March 1932 (ABF, PVCG 1932, p. 192-231). In their study of the BdF in late 19th century, Nishimura (1995) and Avaro and Bignon (2019) examine a sample of a few outstanding loans in some regional branches of the BdF, based on internal audit reports. This source, however, provides only irregular annual data, has limited geographic coverage, and excludes the major banks that borrowed primarily in Paris.

<sup>24</sup> It should be noted that data on *Comptes principaux* reports borrowing from more than these 65 banks. In total, 282 institutions appear. The remaining 217 institutions were foreign banks or other financial institutions, for which we have no other information (usually not limited liability companies and, as a result, without annual reports to shareholders). These other financial institutions represented a very small share of the total borrowing from the Banque, roughly 3%, on average, as shown on Figure C.1 in the Appendix. Thus, our analysis of the 65 banks provides almost complete coverage of the Banque’s lending activity to banking and financial institutions during the crisis.

To compute total BdF lending to the main commercial banks, we also collected data on the advances on securities (i.e., Lombard loans) for all banks during this period using a second archival source from the BdF.<sup>25</sup> Although not considering loans on securities could potentially bias statistical analysis, the use of Lombard loans was infrequent and small for commercial banks during our sample period. Note that these daily data on discount window and advances are statistics on new loans only. Data on outstanding credit or repayments are unavailable. We know, however, that, *de jure*, the maturity of these loans could not exceed three months, and that, *de facto*, it was usually around 25 days (Roulleau 1914, p.44).

We complement the discount-window data with balance sheet data of commercial banks.<sup>26</sup> The standardized balance sheet that can be used for all banks contains seven asset categories and six liabilities categories. We use these data to compute financial ratios for comparing banks before the panic and use them as control variables.

## B. Defining and Examining Connected and Unconnected Banks

Given the discretion in BdF lending policy, whether the discount committee screened borrowers during the financial panic of 1930 is central to understanding whether a shareholder-owned central bank, like the BdF, might deviate from acting as a LOLR during a panic. We therefore constructed a second data set from primary sources to identify the connections between commercial banks and the BdF on the eve of the panic.

The BdF's governance structure provides a natural way to identify the connections on which the central bank management may have relied to decide on lending during the panic. In 1800, the organizing statutes of the BdF established a shareholder-owned institution whereby voting rights were only conferred upon the 200 largest shareholders.<sup>27</sup> These 200 shareholders composed the General Assembly (*Assemblée Générale*) which, by law, represented the interests of all shareholders.<sup>28</sup> The General Assembly, in turn, determined the composition of the Banque's

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<sup>25</sup> These data are from the appendix of the PVCG, that is the weekly meeting of the General council.

<sup>26</sup> Balance sheets were published annually by any company with shareholders. Since there was no banking regulation that standardized content, reporting could differ significantly across banks. The balance sheets were standardized and recorded by the Crédit Lyonnais in a massive ledger: the *Album*. It was lost in the archives for more than half a century until being rediscovered by a team of historians and archivists (Baubeau et al. 2021).

<sup>27</sup> Articles 6-11 of the 22 April 1806 law on the Banque de France. See also Manas (2019). In the interwar, there were more than 40,000 shareholders.

<sup>28</sup> Each of the 200 had to own at least 5 shares. Included in the 200 largest shareholders in 1930 are six non-profit organizations (including the Academy of sciences, the city of Paris and the pension fund of the employees of the BdF) and 51 private companies. Among these companies, 20 were insurance companies, five were commercial banks and nine were merchant banks or financial trusts.

15-member board of directors, known as the Council of Regency (or simply “Regents”), chose the three censors (the auditors and authors of the annual report), and approved the members of the *Conseil d’escompte* (the Discount Committee or policy committee of the BdF). (See Appendix A.)

A shareholder-owned central bank that is averse to losses cannot cut liquidity to its shareholder-connected banks during a panic because the illiquidity of those banks may impose a financial loss on those shareholders. This would be de facto equivalent to the central bank ceasing to pay positive dividends. Moreover, as discussed in section III.B, shareholder connections can be useful during a panic when risk and information uncertainty rise. Section V.A provides archival evidence that the BdF attempted to use these connections (not always successfully) to obtain loan guarantees in the absence of good collateral. For these two reasons, its aversion to loss making could have potentially led the BdF to lend freely during the panic to banks connected to its shareholders while rationing credit to unconnected banks that regularly borrowed in normal times.

We use the following definition of central bank connections. The BdF was directly *connected* to a commercial bank either because (1) a board member of a commercial bank was a *voting* shareholder of the BdF (including shareholders who were then elected as a board member of the BdF) or (2) the commercial bank itself was a corporate shareholder of the BdF.<sup>29</sup> As a robustness check to our econometric results, we consider alternative definitions of connectedness later in the paper (and in Appendix E). We hand collected the identity of board members from annual reports of the banks (sent to shareholders) or – when banks were listed on – from the *Annuaire Desfossés*, which published information on all firms listed in the stock market in Paris.<sup>30</sup> Information on the 200 voting shareholders and board members of the BdF were collected from the Banque’s archives so that we could create linkages to the Banque. The only list of shareholders available in the archives concerns these 200 shareholders.

We begin by examining “connected” and “unconnected” banks just prior to the panic. It could have been the case that the BdF simply screened out “weak” or very risky banks once the crisis hit and that unconnected banks were, on average, higher credit risk. Under this hypothesis, withholding lending to unconnected banks would represent an efficient response to a crisis because these banks were more likely to become insolvent. As discussed above, the BdF used balance sheet

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<sup>29</sup> 26% of banks in the sample are linked through a board member of a bank being one of the 200 large shareholders of the BdF while 5% of banks in the sample are linked through the bank itself being one of the 200 largest shareholders.

<sup>30</sup> For unlisted banks, the reports were found in the archives of the Crédit Lyonnais or at the French National Library.

information of borrowers in making decisions about lending, so we examined key balance-sheet characteristics of the sample of 65 banks that regularly accessed the Banque de France’s discount window for the period just prior to the start of the banking crisis. Appendix D displays balance tests for balance-sheet categories and indicators of financial health for connected and unconnected banks in 1929, the year before the crisis.<sup>31</sup> As seen on Table D.1 (full sample), the means for the return on equity (ROE), the liquidity ratio, and the ratio of deposits over assets are very similar for the two groups.<sup>32</sup> Unconnected banks are, on average, slightly larger in terms of both deposits and assets, and have only slightly lower reserve ratios and ROA; however, balance tests reveal that the means for the two groups are not statistically significantly different for any characteristic. Appendix Table D.2 presents the same statistics on a sample from which the four largest French banks are excluded. In Section C.2 below, we explain why it is important that our results are not driven by those large banks that accounted for 40% of total deposits before the crisis and near 60% afterwards and can be considered too big to fail (or “systematically important financial institutions”, i.e. SIFIs). When these four banks are excluded, there is still no significant difference between the means of the two groups. And with the obvious exceptions of the size of total assets and deposits, the means of the variables are very similar to those in Appendix Table D.1. In summary, unconnected and connected banks look quite similar in terms of observable characteristics prior to the panic of 1930: unconnected commercial banks were neither systematically “weaker” nor less profitable.

### C. Testing for Selective Lending during the Panic

If the BdF were concerned with unconnected banks being systematically weaker prior to the crisis, one would expect to see this reflected in its lending patterns. In terms of the average quantity, the volume of BdF lending to unconnected banks was in fact twice as large as lending to connected ones in the year prior to the crisis – 1 billion vs. 500 million FF. It is worth noting that the BdF actively lent to banks in non-crisis periods (both connected and unconnected) and derived

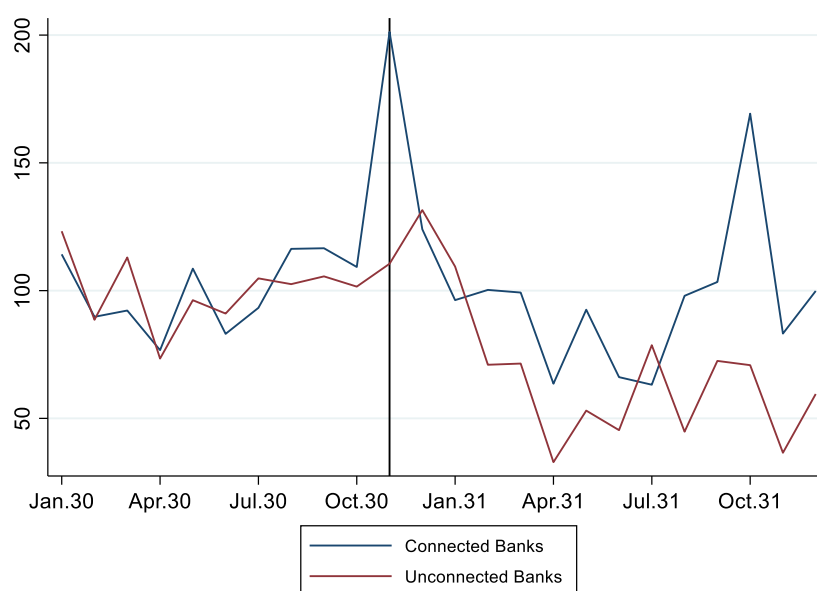
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<sup>31</sup> We reach similar conclusions if we average these characteristics over the two, three, or four years preceding the crisis.

<sup>32</sup> The liquidity ratio is the sum of cash, deposits at the central bank and short-term commercial bills expressed as a percent of total assets. The capital ratio is computed as total equity divided by total assets. Appendix Table D.1 also includes a comparison between capital ratios (the difference being non-significant) although this measure of risk is ambiguous during this period in France given the absence of banking regulation. That is, because riskier banks experienced difficulties attracting deposits, they often had higher capital ratios (Baubeau et al. 2019).

significant revenue from its discount window loans. Figure 2 displays total BdF lending to connected and unconnected banks monthly, where the figures have been indexed to pre-period borrowing (100 equals the mean of January-October 1930). Prior to the panic, the two lines move in lock step. Thus, contrary to a “weak bank” hypothesis, there was no difference in pre-trends: the BdF was readily willing to lend to unconnected banks prior to the start of the panic and did so in large quantities. Indeed, the BdF seemed quite willing to make money off of its discount window lending by lending to all eligible banks prior to the panic. Once the banking panic began (as indicated by the vertical line), demand for short-term funds spiked; however, the central bank only dramatically increased its discount window lending to connected banks. Lending to unconnected banks barely moves in relation to its pre-trend in November 1930 – the first month of the panic. It increases slightly in December, but then falls below its pre-trend average thereafter.

Figure 2. Lending to Connected and Unconnected Banks (Index: Pre-crisis average = 100)



Source: ABF, *Comptes principaux* See the discussion in the text for details.

Note: The vertical line (November 1930) denotes the first month of banking panic

Expectations of a sterling devaluation and fears of devaluation risk in the holdings of French banks, including the BdF, led to additional depositor withdrawals from banks and falling share prices during the summer months of 1931.<sup>33</sup> The difference between lending to connected

<sup>33</sup> Given the declining health of its balance sheet from its non-performing loans and to prevent the possibility of further losses caused by a devaluation of sterling, the BdF had started selling its large holdings of pound sterling (Accominotti 2009). Its decision to do so was widely commented in the financial press, and triggered concerns over the safety of the French financial system (ABF, PVCG, 16 and 18 July 1931).

and unconnected banks spiked again from September-October 1931 (Figure 2), when a second large and severe wave of bank runs occurred. During these two months, BdF lending to unconnected banks only reached 75% of its pre-crisis value whereas its lending to connected banks surged to roughly 50% more than pre-crisis levels.<sup>34</sup> In 1931, total average lending to unconnected banks dropped to values that were close to the average lending to connected banks (500 million). During the two peaks (November 1930 and October 1931), lending to connected banks soared to above 1 billion FF, an amount without precedent in the pre-crisis period.

Another possible explanation for the difference that emerged once the panic started is that unconnected banks were, for some reason, not liquidity constrained. This hypothesis also does not seem supported by the facts. First, unconnected banks' average liquidity ratios were roughly equivalent to connected banks (Appendix D). Second, as we described in our narrative account of the panic, many unconnected banks were very much in need of short-term, liquid funds from the central bank. Patient zero, Banque Oustric, and Patient one, Banque Adam, of the financial contagion, had no connections to the BdF through their boards, and faced large withdrawals of deposits in early November. Several other unconnected banks were then run by depositors in the first month of the panic and again in 1931, including the notable and specific case of the BNC described earlier. In response, these banks had an increased demand for liquid, short-term funds.

### C.1. Event-Study Analysis

To test whether the BdF lent more to connected banks, we estimate difference-in-difference models using monthly and weekly data for a variety of definitions of “connectedness.”<sup>35</sup> We begin by displaying a time-series plot of the coefficients estimated from a standard dynamic difference-in-differences model, akin to an event study. We estimate the following equation using monthly data:

$$(1) \log(Y_{i,t}) = \alpha + d_t + b_i + \sum_{\tau=-q}^{-1} \beta_{\tau} (\text{Connected}_i * \text{Panic}_{\tau}) + \sum_{\tau=1}^m \delta_{\tau} (\text{Connected}_i * \text{Panic}_{\tau}) + \gamma X_{i,t} + \epsilon_{i,t},$$

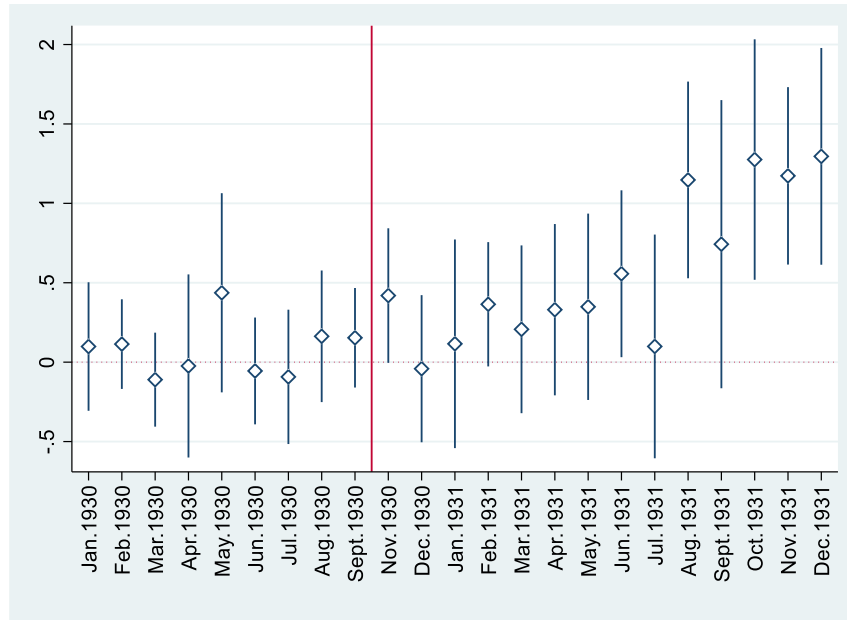
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<sup>34</sup> Differences in BdF lending to connected and unconnected banks is very similar if we exclude unconnected banks that failed from the sample, meaning that the pattern is not simply driven by attrition and a higher potential probability of failure of unconnected banks.

<sup>35</sup> Our setting corresponds to the case that De Chaisemartin and d'Haultfoeuille (2020) characterize as unbiased for OLS estimations: the treatment is binary and all treated groups start receiving the treatment at the same date (first week of November 1930).

where  $Y_{it}$  is lending to bank  $i$  in month  $t$ . *Connected* is a dummy variable indicating whether the commercial bank is connected to the BdF through shareholding. *Panic* is an indicator variable that takes on the value of 1 beginning in November 1930.<sup>36</sup>  $d_t$  and  $b_i$  are month and bank fixed effects. The  $q$  leads (anticipatory effects) and  $m$  lags (post-treatment effects) of this variable capture the dynamic of the advantage of being a connected bank over time, for each month shown on the x-axis of Figure 3.

Figure 3. Monthly Results in an Event-Study Design



Note: This figure plots the coefficients  $\beta_t$  and  $\delta_t$  of equation (2). The equation is estimated with monthly data ( $t$  is a month). October 1930 is denoted by a vertical red line on the figure. The crisis started in November 1930. On the y-axis, a value of 1.0 means that BdF lending to connected banks was 100% higher than lending to unconnected banks in a given month. Each coefficient is plotted with its 95% confidence interval.

The red vertical line shown in Figure 3 represents October 1930, the month just before the panic started.  $X_{i,t}$  is a set of pre-crisis bank-specific control variables (the liquidity ratio and the log of total assets, as defined below that are interacted with monthly fixed effects. Because many observations of  $Y$  take on the value of zero, we estimate equation (1) with a zero-inflated Poisson model (discussed in further detail below when estimating models with weekly data).<sup>37</sup> As a starting

<sup>36</sup> To determine when the crisis started, we employed three different methods – all of which reached the same conclusion. First, we rely on the narrative approach and use newspaper accounts of the panic; these link it to the first week of November. Second, we created weekly averages of total BdF lending and identified the first week in which this series rose by two standard deviations relative to the pre-period average and sustained that increase for more than one week. Third, we ran structural break tests.

<sup>37</sup> 40% of the monthly observations are zeros.



point, we define connected banks as those that are linked directly through one of the two ways discussed in the previous section or indirectly through one-degree of separation, i.e., a board member of a commercial bank belongs to the same family (sibling, cousin, parent) as a board member of the BdF (13% of banks in our sample). These three types of connections account for 44% of the banks in the sample.<sup>38</sup>

The coefficients of interest from the dynamic diff-in-diff are plotted in Figure 3 and confirm that the difference in lending between connected and unconnected banks seen in the unconditional plot (Figure 2) is concentrated in months when demand for liquidity surged once the panic started and is robust to the inclusion of controls. The coefficient on the interaction term rises to a statistically significant 49% difference in lending in November 1930, the month when widespread bank runs and financial distress began. The coefficient rises to an even higher level in the summer of 1931, reaching a maximum difference in lending between connected and unconnected banks of around 130% in October of that year. Figure 3 also shows that there was no pre-trend: the evolution of lending to connected and unconnected bank was similar before the crisis started. This result is important as it demonstrates that the use of connected lending was clearly linked to the panic, when uncertainty rose. In summary, the average post-crisis effect is most pronounced when narrative accounts describe banks as facing runs and in need of liquidity, in the Fall 1930 and in the second semester of 1931.

## C.2. Estimating Differences in Lending Using High-Frequency Data

Because the demand for liquidity might spike over shorter intervals of time, we exploit the high-frequency nature of the BdF lending data and report on results using weekly data (6,708 bank-week observations).<sup>39</sup> The basic estimation equation (2) takes the form:

$$(2) \quad \log(Y_{i,t}) = \alpha + d_t + b_i + \beta (\text{Connected}_i * \text{Panic}_t) + \gamma X_{i,t} + \epsilon_{i,t},$$

where  $Y_{it}$  is lending to bank  $I$  on day  $t$ , measured in French francs. *Connected* is once again an indicator variable denoting whether the commercial bank connected to the BdF and  $b_i$  bank fixed effects. Time fixed effects,  $d_t$ , absorb common factors that affect the demand of all banks at the BdF discount window. Standard errors are clustered at the bank level.

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<sup>38</sup> Appendix E, Figure E.1, uses only direct linkages, excluding family connections. The plot is quite similar.

<sup>39</sup> At this frequency, the maximum likelihood estimator converges with a full set of bank and time-fixed effects. Using daily data leads to a model that does not converge due to high dimensionality. This is the case even when we exclude all the days when no bank borrowed.

In our higher-frequency setting, *Panic* now takes on the value of 1 on November 3, 1930.  $X_{i,t}$  is a matrix of time-varying, bank-specific control variables, and following the empirical diff-in-diff literature, taking one of two forms. The first set of controls are generated by interacting pre-crisis (1929) values of balance-sheet characteristics of a commercial bank, its liquidity ratio and the log of total assets, with the indicator variable, *Panic*. When these interactions are used, they are denoted in the table of results as “post-crisis interactions.” Interacting the pre-crisis value of relevant characteristics with the post-crisis dummy creates a bank-specific shock that captures how the crisis may have affected a given bank as a result of these characteristics. The second set of time-varying controls interacts the pre-crisis values of the same bank-specific, balance-sheet characteristics (the liquidity ratio and the log of total assets) with all daily fixed effects, instead of the variable *Panic*. This specification provides an explicit method to control for pre-trends. In each period, the borrowing of a bank at the BdF is affected by a specific shock that depends on a bank’s pre-crisis characteristics. When the variables are included in the regressions, they are denoted in the tables as “weekly interactions.”

As before, equation (2) is estimated with a zero-inflated Poisson model (ZIP). Because banks did not borrow every week from the discount window, there are a large number of observed zeros in our dataset (63% of total weekly observations), which prevents us from employing OLS with the dependent variable expressed as a natural logarithm. An alternative would be to use a Poisson regression to estimate a log-linear model; however, this would not rule out the problem of excess zeros. The Poisson model assumes that the conditional variance of the dependent variable is equal to the conditional mean. Because of “excess zeros,” the conditional variance is greater than the conditional mean, and the data exhibit overdispersion. A zero-inflated Poisson (ZIP) model allows to account for this overdispersion by estimating two models. A logistic regression first predicts the probability  $p$  that our variable of interest equals zero. The second step estimates the Poisson model, assuming that a Poisson random variable is observed with probability  $1-p$  (Lambert 1992, Greene 1994).<sup>40</sup> In the first step (the logit predicting zeros), we use the bank-fixed effects as explanatory variables. Adding other variables (time-fixed effects or time-varying controls) to this model does not produce significantly different results. Following Wilson’s (2015)

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<sup>40</sup> This estimation method is common in many fields using count data with excess zeros. To our knowledge, it has mostly been used in economics when analyzing innovation, since many firms have zero patents; see for example Aghion, Blundell, Griffith, Howitt and Prantl (2009).

recommendation, we verified that the BIC and AIC criteria favor a ZIP model over the Poisson model (see Appendix E, Table E.1).

Table 1 shows several specifications using the weekly data on lending. Column (1) estimates a simple model that only includes bank and time fixed-effects and the variable of interest, *Connected\*Panic*. On average, a connected bank borrowed roughly 41% more than an unconnected bank in the crisis period, relative to its pre-crisis average. Column (2) adds time varying controls (denoted “post-crisis interactions”) where the log of assets and the liquidity ratio of the bank in 1929 are interacted with *Crisis*. The measured effect is again quite large and similar in size (39.8%) and more precisely measured (significant at the 5-percent level). Column (3) includes the alternative set of time-varying, bank controls use to account for pre-trends, where assets and the liquidity ratio of each bank in 1929 are interacted with time-fixed effects (denoted “weekly interactions”). Including a large number of additional controls rules out many other potential confounders but, of course, absorbs a significant amount of variation in the data. As Column (3) shows, however, the coefficient on connected lending interacted with panic remains large (37.7%) and statistically significant at conventional levels.

*Table 1: Estimating Differences in BdF Lending during the Crisis using Weekly Data*

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	All	All	All	Excl. SIFIs	Excl. bankrupt	Excl. SIFIs & bankrupt
Connected*Panic	0.411* (0.214)	0.398** (0.195)	0.377** (0.177)	0.658*** (0.165)	0.632*** (0.0960)	0.579*** (0.146)
Constant	15.28*** (0.172)	14.58*** (0.465)	12.90*** (2.529)	18.56*** (2.465)	13.61*** (3.129)	19.55*** (2.497)
Observations	6,708	6,708	6,708	6,292	5,876	5,564
Week FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Post-crisis interactions	NO	YES	NO	NO	NO	NO
Weekly interactions	NO	NO	YES	YES	YES	YES

Standard errors clustered at the bank level in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Notes: Regression estimates are based on weekly borrowing data for each bank in the sample. Estimated using a zero-inflation Poisson model. Standard errors are clustered at the bank level. Column (1) estimates the model with bank and time fixed effects. Column (2) adds time-varying controls where the log of assets and the liquidity ratio of the bank in 1929 are interacted with the dummy taking the value =1 in the crisis period. Columns (3), (4) and (5) use time varying controls where the log of assets and the liquidity ratio of the bank in 1929 are interacted with time-fixed effects. In column (4), the sample is restricted to banks that are not “systemic”, that is they did not have a nationwide network of branches. Column 5 drops those banks that failed in 1930-31 from the analysis.

Using the regression set up from Column (3), the last three columns of Table 1 perform a series of robustness checks on subsets of our full sample. Column (4) excludes four banks that are SIFIs, defined in this earlier era as banks that were large and had a nationwide network of branches: the Crédit Lyonnais, Société Générale, Comptoir d'escompte and – importantly – the Banque Nationale de Crédit (BNC), a bank that was bailed out by the government in 1931.<sup>41</sup> Excluding SIFIs is also a way to account for banks that might have access to the money market (as an alternative source of lending to the BdF discount window) since this market was limited to a handful of these large commercial banks (Roulleau 1914). Comparing the results in Columns (3) and (4) shows that these nationally-important banks are not driving the results. When they are excluded, the coefficient on the interaction term is considerably larger (0.658 vs 0.377), suggesting that, on average, non-SIFIs that were connected received nearly two-thirds more liquidity support during the panic than unconnected non-SIFIs in the panic period.

In column (5), we drop banks that failed, and present results for banks that survived the crisis of 1930-31.<sup>42</sup> Even among the sub-sample of surviving banks, connected banks still received 63.2% more loans from the BdF than unconnected banks after the start of the panic. This restricted sample result is an important robustness check for two reasons. First, it excludes the BAL which, as we discuss below, received a significant fraction of BdF discount window loans in November and December 1930. The statistically and economically significant result in column (5) thus shows that our findings are not driven by BAL or other outliers. Second, the sample of surviving banks includes only the unconnected banks that remained solvent throughout the crisis. Even though the statistical evidence on pre-crisis characteristics (balance tests) presented in Appendix Tables D.1 and D.2 suggest otherwise, one might still worry that unconnected banks were somehow more likely to become insolvent during the crisis (perhaps for some unobserved factor) and that this was the reason why they received less credit. Excluding failed banks confirms that BdF selective lending cannot be explained by a strategy of letting insolvent banks fail: even solvent unconnected banks received less. Further, as we discuss in more detail in Section VI.A, many more banks that were unconnected failed during the crisis and our results suggests one reason this may be true: initially solvent, but illiquid connected banks were able to obtain short-term liquidity from the

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<sup>41</sup> The Crédit Industriel et Commercial (CIC) – also often considered as one of the largest French banks during this period – does not appear in our dataset because it was not a single bank but a cooperative of several small entities.

<sup>42</sup> The BNC is the only bank included in both Columns 4 and 5.

central bank whereas solvent, but illiquid unconnected were not, leading them to undertake fire sales of assets during the liquidity crisis. Finally, Column (6) shows that when we restrict the sample to exclude both SIFIs and banks that failed during the crisis, the coefficient on connected lending\*panic remains statistically significant and large (0.579).

The results presented in Column 2 of Table 1 include pre-crisis period interactions, which allow us to control for potential pre-crisis bank characteristics that may have determined the demand at the discount window during the crisis. Dimensionality constraints prevent us from adding more than two time-varying controls in the ZIP estimates; however, we show that results are unchanged if we choose other combinations of balance-sheet or income statement items as the controls that are interacted with the panic indicator variable. Appendix E, Tables E.2, E.3, E.4 show the results when the liquidity ratio is replaced by other pre-crisis indicators of financial health, which may have also affected bank borrowing during the crisis: the capital ratio, the ROE and ROA. The coefficient on connected\*panic remains statistically significant at conventional levels, and the size of the coefficients are comparable, if not slightly larger.

To further explore our results with respect to the ties between the central bank and commercial banks, Table E.5 in the appendix presents regression results based on two alternative definitions of connections to the BdF, where the reference regressions are Columns 2 and 3 of Table 1, i.e., those including both post-crisis and weekly interactions. The difference in lending between connected and unconnected banks during the panic declines only slightly (to between 28-32%) when we consider only direct connections and remains statistically significant. It declines a bit more when we further restrict connection to individual shareholders, i.e., when we exclude corporate shareholders. However, using this narrower definition still leads to a sizable difference in lending between connected and unconnected banks during the panic – with connected banks receiving between 26-30% more. As in Table 1, the effect is about twice as large if we exclude SIFIs and bankrupt banks (not reported here).

## V. “Unpaid Bills,” Window Dressing, and Bailing out the Central Bank

The econometric results provide evidence that the BdF lent more to connected banks, regardless of whether that lending was ultimately sufficient to help these banks survive. Of course, the flipside of these results is that unconnected banks that had previously been able to borrow in non-panic periods from the BdF could not count on its support when it was needed most – when demand for liquid assets rose in response to heavy depositor withdrawals and bank runs. Banks

that needed liquidity during the panic had little recourse if the BdF refused to lend since it was the main provider of short-term liquidity in France: depositors were, on net, making withdrawals during the panic out of fear and the interbank market, which was quite small, was limited to premium bills exchanged by only a handful of the very largest banks. Most banks had no access to the prime “interbank market” (Rouilleau 1914, p.76, Lauffenburger 1940, p. 314 et al., Eichengreen 1986), making BdF discount window lending critical during the panic.<sup>43</sup>

To better understand why the BdF rationed its lending and failed to provide sufficient liquidity after November 1930 to arrest the panic, we present new archival evidence on the BdF’s financial situation. Although it is impossible to know the precise reasons why the discount committee lent more to banks with shareholder and family ties, the financial records of the bank (i.e., the official paper trail) provides evidence that their lending decisions were consistent with management practices and objectives aimed at protecting shareholder value, i.e., the BdF was averse to reporting negative profits and sought to pay dividends to its shareholders. As mentioned earlier, it is also possible that policymakers within the banks may have had additional reasons to lend to banks with personal connections. Our main contribution, however, is to establish that the Banque clearly had a motive to lend to connected banks, who also happened to be shareholders. If, for example, they designed their lending policies to confer explicit benefits on connected banks (e.g., “pure corruption), then the evidence presented in this section would simply imply that connected banks initially received a “double dividend” – a share of the Banque’s profits as well as a strategic dividend. Indeed, the interests of shareholders and the BdF seemed so intertwined that we found at least one case where the central bank asked a shareholder to provide a personal guarantee to a loan to a distressed bank.

We present new archival evidence on the balance sheet of the BdF from 1930 and 1931 that makes two key points. First, the BdF had accumulated significant portfolio exposure to Banque d’Alsace et de Lorraine (BAL), a connected bank, through its lending early in the panic. As a result, the potential for large losses was a distinct possibility and that factored into the BdF’s discount-window lending throughout the panic period. Second, its commitment to pay dividends

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<sup>43</sup> Almost all discounting operations in France were conducted at the interest rate of the central bank rather than at the “interbank” market rate, i.e., the money market rate published in the *Economist* (Rouilleau 1914, pp.78-79). Clearinghouses are an alternative institutional solution for resolving panics, and played an important role in mitigating banking panics in 19th century U.S. (Gorton and Tallman 2014). In our empirical setting, there were neither important discount houses nor clearinghouses to settle transactions between banks. In short, the central bank “was the money market” and the clearing system was mostly within the central bank (Rouilleau 1914, p. 184).

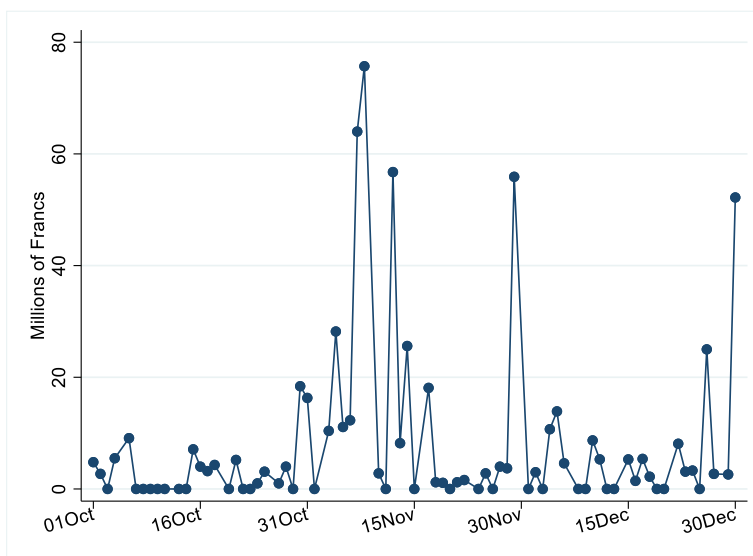
to shareholders played a clear role in the decision making of BdF management (including its financial reporting) once the panic commenced.

#### A. Selective Lending in Practice

New archival evidence, in fact, suggests that the Banque was lending during the panic, but selectively. Rather than lending to all banks facing runs and in need of short-term liquidity, the BdF lent substantial sums to the Banque Alsace Lorraine (BAL) during the panic – a regional bank located in the northeast of France.

The BdF lent heavily to the BAL every single day in the first two weeks of the crisis (Figure 4). Between November 3 and November 14, BAL received 295 million FF via the BdF discount window, a very large and unusual amount for a medium-sized, regional bank. As was the case with all discount window loans, the amount the BdF had lent to BAL was not disclosed to the press nor to government officials.

Figure 4. Loans to Banque d’Alsace et Lorraine (October-December 1930)



Source: ABF, *Comptes Principaux* (See the text.)

When the BdF began to provide large-scale discount window loans to the BAL during the first weeks of the panics, the BdF asked Henry Bauer to provide a personal guarantee that the lending was of “good quality” (ABF, PVCG, 4 December 1930). In other words, the BdF relied on its shareholder connections, with individuals like Henry Bauer, to decide who to lend to during a panic. The fact that the BdF could use its connections to shareholders such as Bauer to vouch for

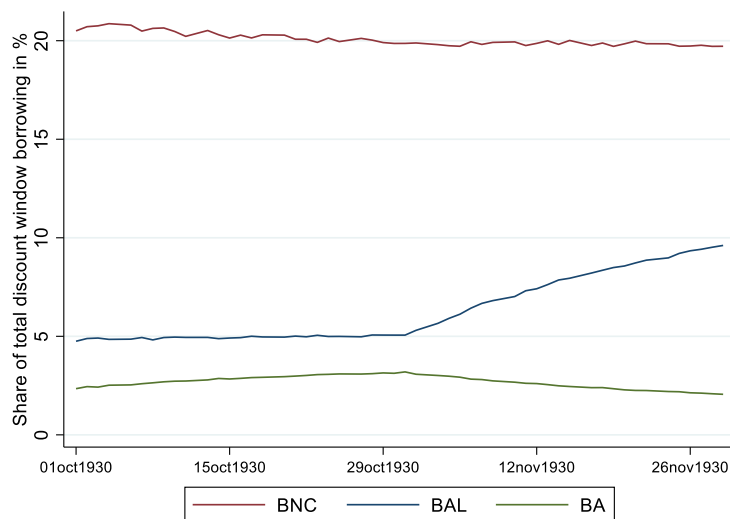
collateralized loans accelerated the otherwise time-consuming and difficult task of evaluating bank portfolios during a panic. Lending to the BAL, whose board member was a prominent shareholder, allowed the BdF to gather information about the bank's loan book efficiently, and even elicited a pledge by the owner. When asymmetric information becomes pronounced during a panic, lending to a connected bank where information could be more easily and quickly obtained ex ante might have appeared less risky to Banque management than lending to Adam and Oustric – banks without any shareholder ties to the BdF. Ex post, as we show below, it does not seem that this information had much value to the bank, i.e., it realized large losses in its lending to connected banks.

The daily discount-window data show that the Banque continued to lend to BAL until the end of December. By this point in time, the BdF had accumulated an enormous exposure to a single counterparty through its discount window lending – the type of risk that has resurfaced in recent discussions of central bank balance-sheet risk and fiscal backing. Overall, BAL had borrowed 1.2 billion francs between October 1<sup>st</sup> to December 31<sup>st</sup>. As of the end of December 1930, the BdF's remaining outstanding exposure to BAL was still 760 million. This amount represented 9% of all discounted commercial paper held by the BdF. It was high given that the BAL was only the 17<sup>th</sup> largest bank in terms of assets in France at that time, and the assets of the BAL represented 1.5% of the assets of French commercial banks in 1929.

From early November to the end of December, cumulative BdF lending to BAL increased from 5% to 10% of all its loans to main banks. By contrast, BdF lending to Banque Nationale du Crédit (BNC), remained constant, at roughly 20% (Figure 5). It did not increase despite the fact that BNC – the only French bank with a nationwide network of branches and the third largest bank in France (measured by assets) – a bank that, today, would be characterized as a SIFI – experienced runs in November and December of 1930.



Figure 5. BdF Lending Exposure to Banque Adam (BA), Banque d'Alsace Lorraine (BAL) and Banque Nationale du Crédit (BNC) during the the Panic of 1930



Source: ABF, *Comptes Principaux* (see the text).

Note: the exposure is estimated as the share of total discount borrowing, summing all loans since September 1, 1930.

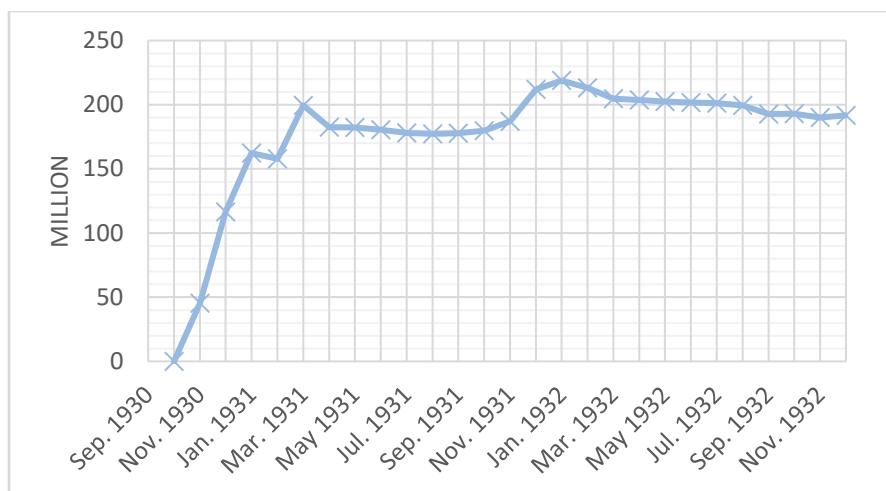
#### B. From Selective Lending to the Secret Bail out the Central Bank

Figure 6 shows data on the non-performing loans of the BdF. When the BdF could not get its money back at the time of the maturity date of a loan (“*échéance*”) it had extended, the central bank contacted the original debtors and guarantors and assessed the market value of the securities held as a guarantee. At this moment, when collateral was marked to market, the assets became “*effets en souffrances*” – non-performing loans or “unpaid bills” on the balance sheet of the BdF. As Figure 6 shows, unpaid bills (bills that banks had discounted at the central bank but could not repay) surged in response to the autumn panic, increasing from roughly zero in October to more than 130 million by December and over 200 million FF by January 1931.<sup>44</sup> In December 1930, the BdF estimated that for the Banque Oustric, Banque Adam, and Société Financière de Paris (SFP), 35%, 11%, and 25% of loans to these institutions, respectively, were non-performing.<sup>45</sup> The low estimate for Adam comes from the fact that the syndicate formed by the largest banks to liquidate the bank in November meant that most losses were in fact guaranteed by *commercial* banks. Indeed, the BdF eventually did not experience any losses on its lending to Adam.

<sup>44</sup> This surge in unpaid bills led to the creation of a new category in the daily unpublished balance sheet of the Banque de France in October (named “1930 on”) whose amount exceeded greatly the regular unpaid bills for which a category had been previously created in 1889 (named “1889 on”).

<sup>45</sup> ABF, PVCG, 26 December 1930. The SFP was also an unconnected bank, according to our definition.

Figure 6. Non-Performing Loans in the (unpublished) Balance Sheet of the BdF, September 1930 – December 1932



Source: Authors’ calculations based on unpublished daily balance sheet of the Banque de France (ABF, 1370201203/36). Category “unpaid bills” (*effets en souffrance*) created in October 1930. End of the month values.

BAL produced the largest increase in non-performing loans. In lending to connected banks, including large amounts to BAL, the BdF’s balance-sheet risk had become unmanageable by the end of the year. So much so, that in December of 1930, the Banque recognized it had a serious problem on its hands if it wanted to continue to pay dividends to its shareholders. In addition, its share price had plummeted from 22,000 FF in September to 18,010 FF by the end of 1930, putting additional pressure on management to protect shareholder interests.

How damaging were the non-performing loans to the Banque? The BdF elected to close its accounting books on December 24, 1930. The Banque reported its non-performing loans as 130 million francs on this date, as recorded in its 1930 annual report. However, as revealed by our archival research, this was “window dressing.” Just two days later, the bank reported internally, and not publicly, that its non-performing loans were actually 178 million francs or 37% larger than the figure made public. Additional archival information shows that the BdF under-reported its non-performing loans associated with Banque Oustric by 56 million francs and those due to Société Financière de Paris by 15 million – two banks that failed in the fall of 1930 (ABF, PFCG, 26 December 1930). When the Banque classified a loan as non-performing, it was also supposed to record it as a “provisioned loan loss” on its income statement. It could also provision for *expected* losses on its balance sheet. In 1929, before the panic, the BdF provisioned 91 million francs for

potential or expected losses. In 1930, despite both the publicly reported and internal figures showing significantly higher amounts of non-performing loans and a widespread banking panic, the BdF provisioned only 70 million francs for loan losses.

What did these undocumented and extraordinary losses mean for shareholders and their dividend payments? Quite surprisingly, it turned out to be a windfall. If one only drew inferences from published information, the Banque would appear to have weathered the financial storm by simply drawing down its reserves. By the end of 1930, its reserves had plummeted – from 103 million francs in 1929 to 46 million francs. However, despite increased provisioning for loan losses and much lower earnings in 1930 than the previous year (primarily due to lower revenues on foreign assets), the BdF increased its total dividend payments to shareholders – from 94 million (or 6% of revenue) in 1929 to 113 million francs (or 10% of revenue) in 1930!

How could the BdF actually increase its dividend payments to shareholders after a costly financial panic? What the BdF's annual report failed to disclose was the Banque's massive exposure to BAL. Archival evidence shows that BAL owed the central bank 760 million francs in late December 1930, which it could not pay back; however, the BdF's loan-loss provisioning in its annual report of December 24<sup>th</sup> did not account for this.<sup>46</sup> Had it done so, the Banque could not have paid out positive dividends. BAL's obligations to the Banque amounted to more than five times what the BdF paid out in dividends in 1930!

So, how could it pay higher dividends in 1930 than in 1929? As archival documents show, it was able to paper over these potential losses because it negotiated a secret agreement with the government in late December. By this point in time, it had become clear to the Banque's management that BAL was insolvent and that potential losses arising from the BdF's lending to BAL would eventually be realized, creating a huge loss to the equity holders of the Banque. Losses arising from lending to BAL would completely wipe out the Banque's reserves, and shareholders would have to take a combined hit to equity of at least 710 million French francs. This sum also exceeded the capital of the BdF. As valued on its balance sheet – this amounted to 182.5 million FF (182,500 shares of 1000 FF each). The central bank was effectively insolvent. Given the inequality in BdF shareholding (only 264 individuals out of more than 40,000 held more than 50 shares), losses would have been borne disproportionately by the largest 200 shareholders – the

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<sup>46</sup> This amount of total exposure of the BdF to the BAL was presented to the board; see ABF, PVCG 27 June 1931.

powerbrokers of the Banque given its governance structure. Clearly, management found this an unacceptable outcome and thus sought succor.

On December 23<sup>rd</sup>, 1930, the Banque's Regents approached the Ministry of Finance (MoF) for assistance.<sup>47</sup> In meetings not made public that year (no newspaper articles exist and no scholars had written about the BdF-BAL relationship until we located new archival evidence), MoF agreed on December 24<sup>th</sup>, the day the Banque closed its books for 1930, to bail out BAL, relieving the BdF of its losses and removing these from its balance sheet (ABF, CLP, 26 December 1930). On December 26<sup>th</sup>, the financial press announced that BAL had been bought by the Crédit Industriel et Commercial (CIC). Again, no mention was made of the government's role in the bailout. Unbeknownst to reporters, the CIC was commissioned by the Ministry of Finance to purchase and reorganize the BAL, with the government absorbing the losses from CIC's acquisition to BAL. The assistance was granted by the Ministry of Finance by using the cash flows of the Treasury: it did not appear in the official budget of the State and thus did not require a Parliamentary approval. An anonymous internal document stated that, "the Council of Ministers decided that the Chambers [Parliament and Senate] should be briefed of the issue when it is no longer inconvenient to do so."<sup>48</sup> According to a 1933 report, the government eventually realized losses amounting to 700 million francs (out of its initial injection of 900 million francs) – an amount roughly equal to the projected losses of the BdF.<sup>49</sup> As for the Banque, its books were wiped clean of the losses attributable to BAL. With the help of this massive and unprecedented bailout, the BdF was able to paper over its exposure. It closed its books on the day of the secret agreement and was thus able to announce in its annual report that it would pay record dividends to shareholders. However, the annual report did not reveal that the BdF could do so because of its secret agreement with the MoF. It was only much later, in November 1931, when analyzing the Treasury cash flows, that the Finance Commission of the Parliament discovered that the Ministry of Finance made loans to the BAL.<sup>50</sup> Losses, which would have been the largest in the Banque's 130-year history as a private

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<sup>47</sup> ABF, 1069199113 2, Folio "Faillites - Banque d'Alsace-Lorraine - Notes et Correspondance - 16/04/1929 au 28/05/1951", "Note remise le 23 Décembre 1930 par M le Gouverneur au Ministre des Finances".

<sup>48</sup> Anonymous document written in 1932 at the Treasury. Available in Centre des archives économiques et financières (CAEF), B-0064907/1, folio "Renflouement; principes de la liquidation".

<sup>49</sup> Archives Nationales, Archives Flandin, 28201 Boîte 60, rapport Maringe de novembre 1933 sur la liquidation de la Banque d'Alsace et de Lorraine.

<sup>50</sup> In June 1931, a debate took place at the French parliament as a representative asked why the CIC had been chosen by the Ministry of Finance to liquidate the BAL (Xavier Vallat, 23 June). On 17 July, the Minister of Finance (Pierre-Etienne Flandin) replied that it has been jointly decided by the BdF and the Treasury. He neither mention the financial intervention of the Treasury, nor the financial exposure of the BdF. See *Journal officiel de la République française*.

bank and would have been borne by the private central bank's equity holders, were thus socialized, setting a French precedent for bailing out shareholder-owned banks and providing ex post fiscal backing of the central bank of France.

## VI. Consequences of the Banque's Lending Policy

### A. Panics and Failures

The Banque's selective lending policy had both immediate and far-reaching consequences. First, its failure to lend unconditionally in the autumn of 1930 led to France's most severe banking crisis, a historical fact that has not been previously documented. To be anachronistic, the decision not to lend to Oustric and Adam (the first two banks facing runs) and to let them fail ultimately proved to be the "Lehman moment" in the French banking panic of 1930-31. Because the central bank did not demonstrate that it was willing to lend to all banks in need of liquidity, the Banque sent an implicit signal to depositors that it could not be counted on to act as a lender of last resort *a la Bagehot's dictum*. From this perspective, it is not surprising, then, that the lifeboat operation for Banque Adam failed to quell fears. Market participants and depositors had already reached the conclusion that the central bank was unwilling to provide liquidity to all distressed banks that approached the discount window – even if the bank was, in fact, lending large amounts to banks such as BAL. Its lack of support to banks that were known to be facing runs by the public led to contagion. Banks that were either too small to gain regular access to the discount window (recall the BdF's screening) or unconnected were particularly squeezed by the unavailability of short-term liquidity. After one month, 11 commercial banks had failed, four in Paris (ABF, PVCG 26 December 1930). However, these failures also included connected banks, meaning the failure of the BdF to arrest the panic ultimately also imposed costs on connected banks.

A second consequence was that the BdF's lending during the panic led to a dubious precedent; it became the first bank, commercial or otherwise, in French history to receive a government bailout. Before December 1930 (and including the operation involving Banque Adam in November 1930 discussed in Section II), syndicates were organized to liquidate failing banks.

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*Débats parlementaires. Chambre des députés : compte rendu in-extenso*, 23 June, 17 July 1931 and 27 November 1931. On 27 November 1931, the Minister of Finance Germain-Martin justified the bail-out of the BAL by saying that it was a national priority since the government did not want that the assets of the BAL (which operated in the Eastern part of France) be taken over by German banks. This argument has later been restated by the Ministry of Finance and French historians. However, we have not found any mention of this issue before November 1931, neither at the Treasury nor at the Banque de France, that could justify BdF lending to the BAL in November and December 1930.

By contrast, the BdF lent extensively to the BAL until the government had to intervene to bail out the BAL in order to save the BdF in December 1930. Technically, the government lent to the BAL, not directly to the BdF, but as archival evidence shows, the motivation was to bailout the BdF.

A third consequence of its discount window lending decisions was that its failure to lend broadly prolonged the banking crisis for another year. Here again, both connected and unconnected banks eventually suffered from the BdF selective lending policy. Market participants interpreted the runs and failures of banks in the autumn of 1930 as a clear signal that the Banque had not lent broadly. Its decision to lend selectively to connected banks was not known to the public, but its failure to lend to all banks in need of short-term funds in November 1930 signaled that, if banks faced additional heavy withdrawals in the future, they could not count on support from the central bank. When banks faced heavy withdrawals again, in the summer of 1931, there was no expectation that the central bank would provide liquidity and panic ensued.

In the wake of the Eastern and Central European banking crisis, fear and uncertainty over the health of French banks increased in the summer of 1931 (Bonin 2002, 2010).<sup>51</sup> Depositors had concluded from the panic in autumn of 1930 that the BdF would not act as a lender of last, and the crisis became self-fulfilling. England departed from gold on September 21<sup>st</sup>, before the BdF could complete its liquidation of pound sterling, and the Banque realized a FF2.3 billion loss on its foreign currency holdings when England devalued. This was only 2 percent of its total assets, but these losses amounted to more than its total annual revenue. News of the losses worsened the second panic as it became increasingly clear that the BdF may not help all banks in need of liquidity. On September 25<sup>th</sup>, depositors ran on the *Banque Nationale de Crédit* (BNC). Our forensic accounting corroborates investors' fears: the BdF, having received a large bail out from the Ministry of Finance and facing more potential trouble on its balance sheet due to foreign currency holdings, was not about to absorb more potential losses from discount window loans that had the possibility to sour. It lent selectively (as shown in Figures 2 and 3).

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<sup>51</sup> There is some narrative evidence that French banks suffered from rumors and contagion of fears after the Eastern European crisis although information on this episode is scarce and limited to just a few major banks. Bonin (2010) documents that the Société Générale suffered from losses due to its foreign exposure during the summer of 1931 (80 million francs were invested in German banks - 1/3 were eventually recovered – while total assets of the Société Générale equaled 13 billion.). Bonin (2002) and various archival pieces at the Banque de France document that the Banque Nationale du Crédit experience some sudden (yet still modest) withdrawals of deposits in July and August 1931, before the massive bank run of September. These two banks were “unconnected”, according to our dataset.

Without broad-based central bank lending, runs continued into October 1931, including one on the *Banque Nationale de Crédit* (BNC), the fifth largest bank in the country. Given the national reach of the BNC and its size, the government committed to its second bail out of the 1930-31 crisis. This bail out took the form of a guarantee, in which the government pledged to bear any losses suffered by depositors during the bank's liquidation.<sup>52</sup> The government's bailout sent a strong signal to depositors that it would not allow a major national bank to fail and create losses for depositors: none of five nationwide banks experienced a run after the bailout BNC.

From our sample of 65 banks that borrowed regularly from the BdF, seven ended up failing during the crisis, five of which were unconnected and two of which were connected. If we expand the sample to include the smaller banks that borrowed less frequently from the BdF (and which are not reported in the *Comptes Principaux*) another 24 banks failed. Although it is not possible to obtain detailed information on the boards of these 24 small banks that failed, of the 10 for which information is available, only one of them, Bauer and Marchal, was connected through BdF shareholding. By denying unconnected banks liquidity, the BdF's LOLR policies likely contributed to the failure of on unconnected banks. But the fact that unconnected banks also failed suggests that the BdF's failure to lend broadly had negative spillovers to banks with personal connections, a consideration it failed to internalize.

In total, 13% of deposit-taking banks failed during the banking crisis of 1930-31. Why are these bank failures an outcome associated with the failure of the BdF to act as an LOLR? Unlike U.S. banks of the early 20<sup>th</sup> century, suspending depositor withdrawals was not a legal option for banks in France. Once cash in the vault of a bank was emptied and other liquid assets were depleted, a bank had to declare itself insolvent, with proceedings then moving to bankruptcy court. Hence, liquidity concerns during the panic of 1930-1 morphed into insolvency.

In addition, the panic induced a flight to safety, with depositors seeking safe haven in saving institutions. Between 1929 and 1932, overall bank credit and deposits in French commercial banks fell by about one-third. As in Friedman and Schwartz's account of US banking distress in that

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<sup>52</sup> The BNC was then liquidated and resumed its activity under another name (*Banque nationale du crédit et de l'industrie*) in April 1932. The depositors did not make losses during this operation and transferred their deposits to the newly established bank. However, the bail out of the BNC was very different from BAL. First, the bail out of BAL was the consequence of a request from the BdF. Second, the BNC was arguably a systemic bank. Third, the BNC actually had good assets and – contrary to the bail out of the BAL – the government eventually did not experience losses from the BNC bail out (Archives Nationales, Archives Flandin, 28201 Boîte 60, « Rapport Maringe de décembre 1933 sur la liquidation de la Banque Nationale du Crédit »).

same era, the banking crisis in France shrank the money multiplier, propelled deflation, and reduced national income. Banking distress accounted for about a third of the decline in French GDP (Baubeau et al. 2021).

The BdF's decision to lend selectively in November 1930 sent a clear signal in the summer of 1931 that it would not lend broadly during a panic. Had it done so, precisely how many fewer banks would have failed is difficult to surmise. We know that most of the banks that failed initially faced runs, suggesting that a liquidity crisis transformed into a solvency crisis by the Banque's selective lending policies.

### B. Central Banking in the Public Interest

Perhaps the largest cost borne by the central bank was loss of managerial control by shareholders. The political fallout from failing to provide more liquidity to banks during the crisis turned out to be enormous. With the banking crises and the Depression weighing heavily on French voters, sweeping political change came to France in 1936 with the election of the Popular Front – a coalition of left-wing parties, including the SFIC (the French Communist Party), the SFIO (the socialist French Section of the Workers' International), and the progressive Radical-Socialist Republican Party. The Popular Front was headed by SFIO leader Léon Blum and exclusively composed of republican and SFIO ministers. Given the BdF's inability to act as a lender of last resort, the economic depression and the political turmoil that followed, the 200 voting shareholders became an easy target (Anderson 1965, Le Bot 2015).

Thus, it came as no surprise that on July 24, 1936, legislation was passed that radically altered the BdF's voting governance. Indeed, one week before the election, markets anticipated that change was coming. Share prices of BdF stock fell dramatically from 7,650 francs to 5,250 on the day following the second ballot – a 27 percent decline. (Prices of BdF stock were trading at 10,800 FF a year earlier). The reform law of July replaced the Banque's 200 voting shareholders (that back to the era of Napoleon) with a one shareholder, one vote model. It made the governor of the bank, the two deputy governors, and the three censors directly elected by the general assembly, made these civil servant positions, and forbid holders of these positions from serving in commercial banks while in office or thereafter.<sup>53</sup> Finally, it created 20 councilors to replace the 15-member Council of Regents – with two councilors elected by the assembly, nine chosen to

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<sup>53</sup> See Law of 24 July 1936 on the laws and statutes of the Banque de France, article 2. More information on this reform and its consequences is provided in Monnet (2018, p.43-50).



represent “the interests of the nation,” eight chosen from “economic interests and credit users,” and one elected by bank staff. Although still a private bank (it was eventually nationalized in 1945), these governance changes effectively transformed the Banque de France from a shareholder-owned Banque with a concentrated power structure into a central bank with broad, democratic representation aimed at serving the public interest and accountable to the government.

## VII. Conclusion

The French banking crisis of 1930-31 has been easy to overlook by economists cataloguing severe Continental European financial crises during the interwar period.<sup>54</sup> Yet as we show, what started as a depositor run on a rather inconsequential Parisian bank grew into the most severe banking panic in French history – a two-year crisis that resulted in more than 30 failures of commercial banks, the first two government bailouts of banks in French history (including a secret bailout of Banque de France), and a complete overhaul of the central bank’s governance structure. How could this spectacular account possibly be missing from discussions of acute interwar banking crises? As our research shows, the smoking gun (selective lending to connected banks) that exacerbated the crisis was something that the perpetrator (the central bank) never had an incentive to disclose, and something the accomplice (the Treasury) was complicit in covering up.

Our statistical analysis and new evidence from the Banque’s archives suggest that the decision to lend selectively during the panic was the result of central bankers responding to incentives, namely the interests of shareholders and connected banks. Rather than following Bagehot’s Responsibility Doctrine and lending broadly, the shareholder-owned Banque of France chose to lend selectively to benefit those banks with which it had close relationships, which by its governance structure, happened also to be its most important shareholders. Using a unique data set of daily discount-window lending, we show that the Banque lent 30-40% more to banks that were connected to key stakeholders in the bank – directors, voting shareholders, and members of policy committees. Because the Banque rationed credit rather than lending broadly during the panic, some banks were starved of short-term, liquid assets. Consistent with theory, the panic did not subside. Moreover, unlike the U.S., in France there was no option for commercial banks to suspend

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<sup>54</sup> As previous studies, Baron et al. (2021) code a banking crisis in 1930 only, missing the continuing and stronger distress of 1931.

payments (an option that required a government decree) so many banks facing runs involuntarily liquidated. Ironically, the BdF's selective-lending policies led to an explosion of non-performing loans on its balance sheet, and eventually a secret bail-out of the central bank by the government.

Lacking governance rules ensuring that each borrower was treated equally, the BdF engaged in selective lending and this LOLR policy proved to be ineffective at stopping the panic. The failure of the BdF's LOLR policies was a key factor in the transformation of the central bank into a public entity with explicit financial support from the Treasury and without shareholder voting rights. The governance reforms thus resolved two different problems that may have motivated selective lending: fear of losses and conflicts of interest. Evidence from history thus provides a potent illustration of the critical role that central bank governance and design plays in lender-of-last-resort operations; even practices that appear to be ex ante justifiable based on heightened asymmetric information during panics can end up jeopardizing a central bank's objective of stopping panics.

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## APPENDIX

The appendix contains additional material on the governance, role, and financial revenues of the Banque de France as well as some supplementary figures and tables.

### A. The Banque de France, Dividends and the State

Although a private entity, the BdF provided a usual array of central-bank services to the government at no cost, including acting as the government's cashier, facilitating the issuance of treasury bills, issuing currency. In 1848, the BdF was granted the monopoly of issue (Goodhart 1988). The privilege of issue of the BdF was renewed several times after that (1857, 1897, 1918) and, each time, involved a new contract between the State and the central bank. The compensation of the Governor and two deputy-governors of the BdF was regulated by the State (with the highest one to be equal to the head of the Conseil d'Etat, the highest French administrative court). These three governors were appointed by the Ministry of Finance. Compensations and pension schemes of other employees had to be agreed upon by the General Assembly of 200 shareholders.

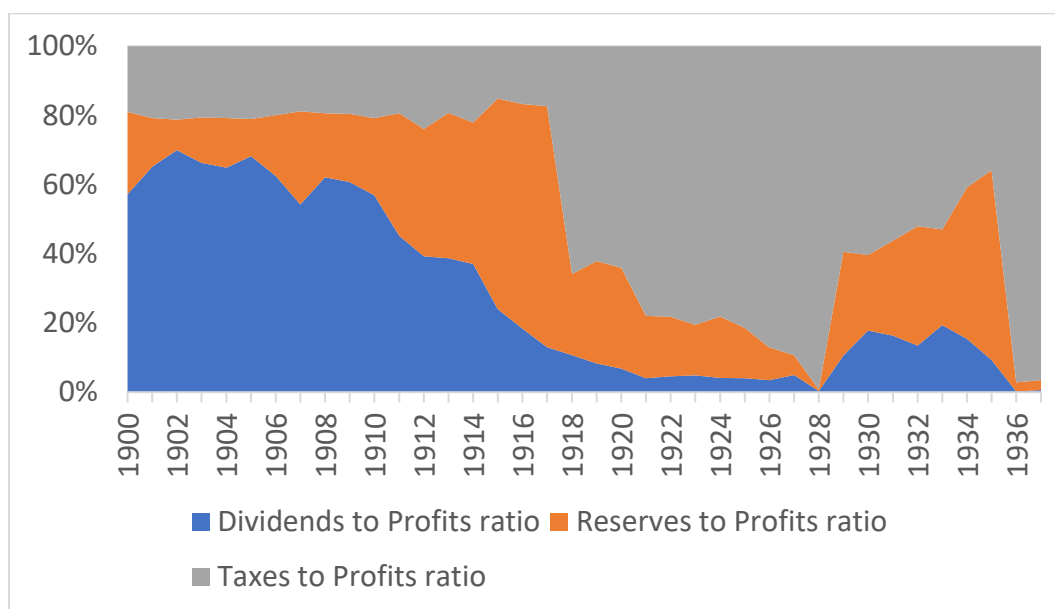
The board of directors (*Conseil général*, or General Council) of the BdF was composed of fifteen Regents and three Censors. Five Regents and the three Censors must be chosen from among the commercial and industrial classes, and three Regents must be taken from among the *trésoriers payeurs généraux*. See 1806 Law of 22 avril 1806 on the Banque de France, article 9. The *trésoriers payeurs généraux* (general paying treasurers) were civil servants in charge of collecting taxes and perform administrative accounting at the local (i.e. departmental) level. As formulated in a recent study by Manas (2019), the regents and the censors were the “agents” of the Banque de France's shareholders, elected by the 200 largest shareholders. The regents and censors were almost always automatically reelected, and some seats were held by dynasties.

Starting 1857, the BdF financed the state directly with interest-free loans whose maximum amount had to be voted by the Parliament (Monnet 2018, chp.5). In 1918, dividends were regulated so that the BdF needed to pay the State the exact same amount of dividend by share if the latter exceeded 240 FF. The two other constraints on dividends and profits were the following. First, since 1806 laws, the total paid dividends could not exceed 6% of the capital and 2/3 of the benefits in addition to the 6% of capital. Second, starting 1897, if the discount rate exceeded 6% (5% in

1917), the BdF had to keep these related benefits in a special account (rather than to pay them as dividends to shareholders).

A new constraint was applied to BdF during the First World War: BdF loans to the government were interest free. As loans to the government became a major asset in the BdF's portfolio after 1914, the state imposed special taxes on the central bank's profits to minimize the budgetary cost of monetizing the public debt. After the 1928, monetary law normalized BdF loans to the government and devaluation led to an inflow of foreign capital (i.e. increase in foreign reserves of the BdF). Dividends as share of the BdF's total profits started to rise again (Figure A.1).<sup>55</sup> The 1930-1931 banking crisis thus hit at a time when the BdF had regained control over its dividend policy.

Figure A.1. Shares of dividends, reserves and taxes in total BdF profit



Source: Manas (2019), original data published in the Annual reports of the Banque de France

<sup>55</sup> The decrease in the share of taxes in the total revenues of the BdF was a counterpart of the decrease in the share of revenues from loans to the governments. After the 1928 law, the remaining loans to the government in the BdF balance sheet did not pay interest.



## B. Banque de France's Lending

The lending policy of the Banque de France aimed at ensuring the stability of money creation and of the financial system, and to make credit widely available to French businesses. Discounting commercial paper was the Banque's main lending activity. Napoleon had set the tone in a letter to his minister of finance Mollien in 1810: "What is the object of the Banque de France? to discount the credits of all commercial concerns in France at four per cent" (Bopp 1952). The size of the discounting activity of the Banque de France was very large in respect to the total banking activity. At the end of 1929, the total volume of discounted commercial bills by the Banque de France was 8.5 billion FF while total commercial bills held by French banks were 49 billion (see Baubeau et al. 2021 for the sources of these figures). In 1931, these numbers were 7.1 billion FF and 34 billion FF, respectively.

The commercial loans of the central bank (i.e. rediscount of commercial paper) were also its main stable source of revenue. Strong believers in the real-bills doctrine and in the self-liquidating features of bills of exchange, Banque de France's officials thought that sound risk management would be sufficient to avoid excessive financial risk and money creation (Monnet 2018, Baubeau et al. 2021). The discount rate should remain as stable as possible and be moved only when necessary to defend the exchange rate (Bopp 1952, Bazot et al. 2016). Hence, selection at the discount window (based on the quality of collateral and the identity of the borrower) was the cornerstone of Banque de France's policy. This selection was however highly discretionary. We know that the Banque de France was involved in relationship banking and collected information on the borrowers, but we have little information on how this information was used, practically, on a day-to-day basis. However, we do know the formal process that was implemented in order to manage the risk of the commercial portfolio of the Banque de France. This process can be described in three layers (Rouilleau 1914, Plessis 1967, Nishimura 1995, Bazot 2014, Avaro and Bignon 2019):

- *Decision on account opening.* Each company or individual wishing to borrow at the BdF discount window had to open an account. In order to do so, they had to provide comprehensive legal and financial information. The decision to open an account, in a branch or at the headquarter, was taken by the *Comité d'escompte* (discount committee) at the headquarter. For each customer opening an account, the BdF kept a "fiche d'escompte", that is a bank specific

sheet – written by the *Comité d'escompte* – containing basic information about the bank and its reputation.

- *Definition of loans and collateral.* The Banque de France was restricted by statute to discounting bills of exchange and promissory notes with maturities not exceeding three months (Article 9), and bearing at least three 'good' names (Article ii). The Banque purchased bills with 3 signatures ('good names'): the seller of the bills, the payer of the bills (the drawer) and a third party that endorse (guarantee) the bills (i.e., usually a bank). If the payment was not made at maturity, the Banque asked first the presenter and then the endorser for the payment.
- *Review process.* The Banque's inspectors (internal auditors) visited its branches annually to conduct an audit and to guide the business policies of the managers. The general lending policy was reviewed by the *Comité des livres et portefeuilles* (portfolio committee), that was also in charge of evaluating the aggregate risk of the portfolio and non-performing loans. The members of the *Conseil d'escompte* et *Comité des livres et portefeuilles* were drawn from the members of the *Conseil Général* (i.e. the Regents).

Advances on securities (Lombard loans) were also allowed and decisions and reviews were similar to the one on discounts, with parallel committees. In practice, they were mostly granted to individuals and companies rather than to banks. They represented a lower volume of loans than discounts of commercial paper (see Table B.1).

*Table B.1. Composition of the assets of the Banque de France, 1930-1931 (end of the year).*

	Gold	Foreign exchange and current accounts	Discount of commercial paper	Advances on collateral	Loans to the Treasury
1929	46%	29%	10%	3%	10%
1930	52%	26%	8%	3%	9%
1931	59%	19%	6%	4%	9%

*Source:* Assemblée Générale des actionnaires de la Banque de France, compte rendu

Despite the aforementioned process, lending was highly discretionary. It was also completely secret. Neither the government, nor banks could obtain information on loans (see the quote from Clément Moret in Section VI of the paper). In his investigation of BdF policy in the interwar, Gonjo (1996) argued that the discount policy of the BdF was “soft”, meaning the check of collateral or guarantors did not rely on strong uniform rules. The failure of the scandalous bank Oustric in 1930, and other banks to whom the BdF had lent widely, provides straightforward evidence that the lending policy of the BdF was not always based on sound collateral and monitoring of borrower before the crisis. The BdF experienced difficulties to recover its investment in these companies, meaning that neither the collateral nor the guarantors were strong.<sup>56</sup> Our archival investigation also reveals that the “fiches d’escompte” (bank-by-bank sheets written by the *Comité d’escompte*, containing information about the bank and its reputation) contained little , and usually vague, information.<sup>57</sup> For our purpose, it is important to recognize that – although the BdF had developed means of risk management – BdF lending was not free of asymmetric information or credit risk.

Before 1928, most revenue came from loans to the Government (see Table B.2), but these were fully taxed (as shown in Figure A.1). After 1928, the BdF experienced a sudden surge in revenue from foreign exchanges because of capital inflows, but BdF officials viewed it as highly volatile and transitory. In 1930, revenues from foreign-exchange reserves had decreased compared to the previous year. In 1931, revenues from foreign exchange would have been negative if the government had not compensated losses (See Note of Table B.2, and Accominotti 2009).

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<sup>56</sup> In June 1932, the BdF was still provisioning for losses due to the failures of banks that occurred in 1930 (Oustric, Loyd, Société Financière de Paris) as well as 1931 (Banque syndicale de Paris, Caisse commercial et industrielle, etc.). The amount of expected losses from Oustric’s failure was higher in 1932 (see ABF, PVCG, June 25 1932) than the one estimated by the BdF in 1930 (see ABF, PVCG, 26 December 1930). The BdF did not experience losses on Banque Adam because a syndicated had been set up to liquidate its assets.

<sup>57</sup> A typical sheet (strictly speaking, a recto-verso card) includes: the name and address of the bank, the size of its capital, the names of two or three individuals or banks recommending the institution when an account was opened at the BdF for the first time, and 3 or 4 lines on the reputation, activity or quality of the bank. See Archives of the Bank of France, Fund n° 0011199301.

Table B.2. Sources of Revenue of the BdF (Million FF)

	Loans to the Treasury	Discounting of commercial paper	Lombard loans	Foreign exchange operations
1920	474	194	116	0
1928	422	109	108	609
1929	0	272	137	1250
1930	0	185	128	738
1931	0	174	130	495*
1932	0	120	125	239
1933	0	107	123	50

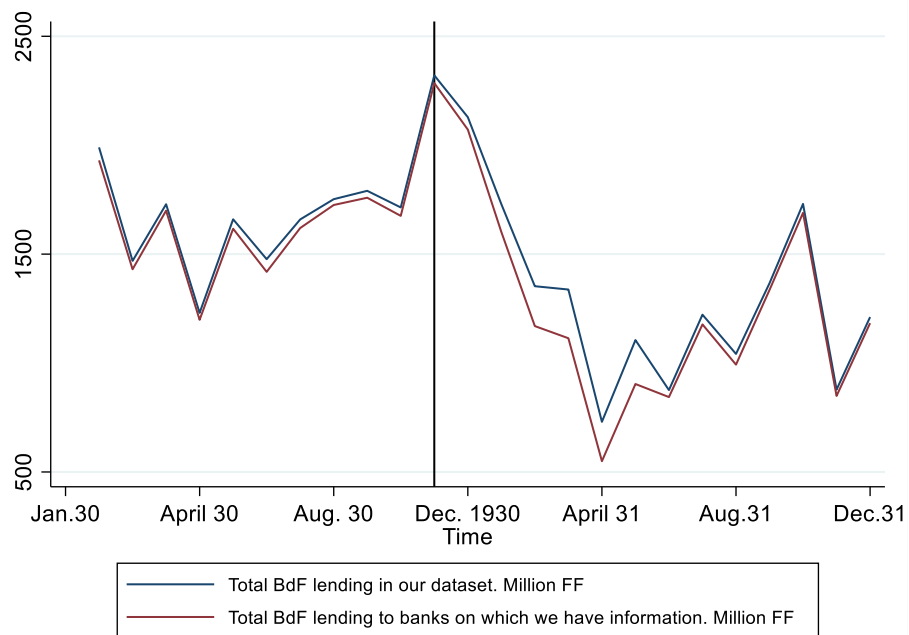
Source: Gonjo (1996), from the annual reports of the BdF.

Note: \* For 1931, revenue from foreign exchange operations was positive because the French government fully compensated the losses caused by the devaluation of Sterling in September. Losses were compensated in December, before the closing of accounts, by an amount of 2342 millions FF. (See the Annual Report of the BdF, 1931).

### C. Additional Information on Banking Sample

Data on *Comptes principaux* – used in our quantitative investigation – reports borrowing from more than 65 banks. In total, 282 institutions appear in the *Comptes principaux*. The remaining 217 institutions were foreign banks or non-bank financial institutions, for which we have no other information. (They were usually not limited liability companies and, as a result, did not have to provide annual reports to shareholders).

Figure C.1. Coverage of BdF Discount Window Lending in our Sample versus Total Lending (main accounts)



Source: ABF, *Comptes principaux*, see the text.

Note: The vertical line (November 1930) denotes the first month of banking panic

As shown in Figure C.1, these other financial institutions represented a very small share of the total borrowing from the Banque, roughly 3%, on average. Thus, our analysis of the 65 banks provides almost complete coverage of the Banque’s lending activity to banking and financial institutions during the crisis.

## D. Balance tests

Table D.1. Financial Information for Connected and Unconnected banks in 1929

Bank Attributes	Unconnected (45 banks)	Connected (20 banks)	Difference (UC-C)	p-value
<b>Assets</b>	1499.4 (440.8)	1231.6 (525.2)	267.7 (749,1)	0.72
<b>Growth of assets (%)</b>	15.2 (3.3)	11.1 (3.3)	4.1 (5.5)	0.46
<b>Deposits</b>	1196.4 (379.8)	1016.9 (461.3)	179.4 (648.2)	0.78
<b>Deposit/Assets (%)</b>	69 (2.4)	68.4 (5.3)	0.5 (5.1)	0.91
<b>Capital Ratio</b>	12.3 (1.2)	16.3 (4.2)	-4 (3.3)	0.23
<b>Liquidity Ratio</b>	49.1 (2.8)	48.8 (4.4)	.3 (5.1)	0.95
<b>Return on assets (ROA)</b>	1.4 (0.1)	1.8 (0.3)	-0.4 (0.3)	0.20
<b>Return on equity (ROE)</b>	14.5 (1.5)	13.9 (1.5)	0.6 (2.5)	0.81
<b>Regional bank</b>	44.4 (7.4)	45 (11.4)	-0.1 (0.13)	0.96

*Note:* This table reports the mean and standard errors (in parentheses), for connected and unconnected banks in the year preceding the crisis (1929), as well as the difference between these means and the p-value associated with the null hypothesis that the difference is equal to zero. Figures for assets and deposits are expressed in thousands French Francs. Capital and liquidity ratios are expressed as a percent of total assets. The liquidity ratio is the sum of cash, deposits at the central bank and short-term commercial bills expressed as a percent of total assets. The capital ratio is computed as total equity divided by total assets. ROA and ROE are calculated as the ratio of net benefits over total assets and total equity, respectively. “Regional bank” expressed as a percent of the total number of banks in each group (i.e., 45% of connected banks are regional banks).

*Source:* Balance sheets of banks, as well as the definition of “Regional bank” were obtained from the Crédit Agricole SA Archives.

Table D.2. Financial Information for Connected and Unconnected banks in 1929 (SIFIs excluded)

Bank Attributes	Unconnected (42 banks)	Connected (19 banks)	Difference (UC-C)	p-value
<b>Assets</b>	808.8 (160.3)	755.4 (233.5)	53.4 (285.5)	0.85
<b>Growth of assets (%)</b>	16.1 (3.5)	11.5 (3.3)	4.6 (5.8)	0.44
<b>Deposits</b>	592.1 (119.8)	594.1 (194.6)	-2.0 (220.9)	0.99
<b>Deposit/Assets (%)</b>	67.8 (2.5)	67.4 (5.5)	0.4 (5.1)	0.94
<b>Capital Ratio</b>	12.9 (1.2)	16.9 (4.4)	-4 (3.4)	0.24
<b>Liquidity Ratio</b>	48.1 (2.8)	47.1 (4.3)	1 (5.1)	0.85
<b>Return on assets (ROA)</b>	1.5 (0.1)	1.9 (0.3)	-0.4 (0.3)	0.22
<b>Return on equity (ROE)</b>	14.4 (1.6)	13.7 (1.7)	0.7 (2.6)	0.79
<b>Regional bank</b>	47.6 (7.4)	47.3 (11.4)	-0.3 (0.14)	0.98

*Note & sources:* Ratios and computations are the same as in Table D.1. Results reported in this table exclude the four largest banks (i.e. systemically important financial institutions or SIFIs): Société Générale, Crédit Lyonnais, Comptoir National d'Escompte and Banque Nationale de Crédit

*Note on the “regional bank” category.* National banks had their headquarters in Paris and branches throughout the country. Regional banks covered only certain departments (the French administrative division), while local banks were established in a single department and were generally single-branch banks. It was customary that private banks that had a headquarter or a branch in Paris borrowed mostly in Paris, even if they had multiple branches across the country (Nishimura 1995, Gonjo 1996, Baubeau 2004). All major regional banks also kept an office in Paris and borrowed there. Banks (financiers or local discounters) that borrowed in the branches of the Banque were financial institutions with one single branch.

## E. Supplementary Statistical Tests

Table E.1 compares the information criteria between the ZIP and the Poisson estimations presented in Table 1 of the paper. They systematically favor the ZIP estimator (i.e. AIC and BIC are lower).

*Table E.1. Information Criteria. ZIP vs. Poisson (related to estimations in Table 1)*

Model		N	AIC	BIC
Column 1	ZIP	6,708	1.53e+10	1.53e+10
	POISSON	6,708	2.94e+10	2.94e+10
Column 2	ZIP	6,708	1.51e+10	1.51e+10
	POISSON	6,708	2.93e+10	2.93e+10
Column 3	ZIP	6,708	1.29e+10	1.29e+10
	POISSON	6,708	2.63e+10	2.63e+10
Column 4	ZIP	6,292	7.76e+09	7.76e+09
	POISSON	6,292	1.79e+10	1.79e+10
Column 5	ZIP	5,876	8.16e+09	8.16e+09
	POISSON	5,876	1.74e+10	1.74e+10
Column 6	ZIP	5,564	5.88e+09	5.88e+09
	POISSON	5,564	1.30e+10	1.30e+10

Notes: the numbering of columns refers to those in Table 1.

Tables E.2, E.3, E.4 reproduce Table 1 using the capital-asset ratio, the ROE, and ROA instead of the liquidity ratio as a control variable (in addition to the log of assets). The coefficients are usually larger, but not significantly different from the ones reported in Table 1.



*Table E.2. Estimating Differences in BdF Lending during the Crisis using Weekly Data (Alternative Time-Varying Control: Capital Ratio)*

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	All	All	All	Excl. SIFIs	Excl. bankrupt	Excl. SIFIs & bankrupt
Connected*Panic	0.411* (0.214)	0.405** (0.196)	0.410** (0.180)	0.637*** (0.160)	0.624*** (0.0881)	0.545*** (0.116)
Constant	15.28*** (0.172)	15.46*** (0.373)	21.18*** (6.895)	23.83*** (5.280)	18.06** (7.467)	18.73*** (3.468)
Observations	6,708	6,708	6,708	6,292	5,876	5,564
Week FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Post-crisis interactions	NO	YES	NO	NO	NO	NO
Weekly interactions	NO	NO	YES	YES	YES	YES

Standard errors clustered at the bank level in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Notes:* Data are weekly. Estimated using a zero-inflation Poisson model. Column (1) estimates the model with bank and time fixed-effects. Column (2) adds time-varying controls where the log of assets and the capital-asset ratio of the bank in 1929 are interacted with the dummy set equal to a value of one in the crisis period. Columns (3), (4) and (5) use time varying controls where the log of assets and the capital-asset ratio of the bank in 1929 are interacted with time-fixed effects. In column (4), the sample is restricted to banks that are not “systemic”, that is they did not have a nationwide network of branches. Column 5 drops those banks that failed in 1930-31 from the analysis.

Table E.3. Estimating Differences in BdF Lending during the Crisis using Weekly Data (Alternative Time-Varying Control: ROA)

VARIABLES	(1) All	(2) All	(3) All	(4) Excl. SIFIs	(5) Excl. bankrupt	(6) Excl. SIFIs & bankrupt
Connected*Panic	0.411* (0.214)	0.399* (0.224)	0.403** (0.204)	0.665*** (0.145)	0.659*** (0.107)	0.610*** (0.137)
Constant	15.28*** (0.172)	15.14*** (0.339)	13.84*** (2.633)	17.31*** (3.122)	11.56*** (3.762)	17.02*** (3.773)
Observations	6,708	6,032	6,032	5,616	5,304	4,992
Week FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Post-crisis interactions	NO	YES	NO	NO	NO	NO
Weekly interactions	NO	NO	YES	YES	YES	YES

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

*Notes:* Data are weekly. Estimated using a zero-inflation Poisson model. Column (1) estimates the model with bank and time fixed-effects. Column (2) adds time-varying controls where the log of assets and the ROA of the bank in 1929 are interacted with the dummy set equal to a value of one in the crisis period. Columns (3), (4) and (5) use time varying controls where the log of assets and the ROA of the bank in 1929 are interacted with time-fixed effects. In column (4), the sample is restricted to banks that are not “systemic”, that is they did not have a nationwide network of branches. Column 5 drops those banks that failed in 1930-31 from the analysis.

Table E.4. Estimating Differences in BdF Lending during the Crisis using Weekly Data (alternative time-varying control: ROE)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	All	All	All	Excl. SIFIs	Excl. bankrupt	Excl. SIFIs & bankrupt
Connected*Panic	0.411* (0.214)	0.434** (0.204)	0.438** (0.184)	0.688*** (0.135)	0.668*** (0.0693)	0.613*** (0.104)
Constant	15.28*** (0.172)	16.07*** (0.782)	22.92*** (5.672)	25.02*** (3.932)	20.82*** (5.498)	25.51*** (3.801)
Observations	6,708	6,032	6,032	5,616	5,304	4,992
Week FE	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES
Post-crisis interactions	NO	YES	NO	NO	NO	NO
Weekly interactions	NO	NO	YES	YES	YES	YES

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Notes: Data are weekly. Estimated using a zero-inflation Poisson model. Column (1) estimates the model with bank and time fixed-effects. Column (2) adds time-varying controls where the log of assets and the ROE of the bank in 1929 are interacted with the dummy set equal to a value of one in the crisis period. Columns (3), (4) and (5) use time varying controls where the log of assets and the ROE of the bank in 1929 are interacted with time-fixed effects. In column (4), the sample is restricted to banks that are not “systemic”, that is they did not have a nationwide network of branches. Column 5 drops those banks that failed in 1930-31 from the analysis.

Table E.5 supplements Table 1 in the paper by using slightly different definitions of connectedness.

*Table E.5. Weekly-data Estimates using Alternative Definitions of Bank Connections to the BdF*

	(1)	(2)	(3)	(4)
VARIABLES	Shareholders (bank and individuals)	Shareholders (individuals)	Shareholders (individuals)	Shareholders (individuals)
Connected*Panic	0.319* (0.166)	0.283* (0.148)	0.295* (0.169)	0.264* (0.148)
Constant	14.55*** (0.509)	12.79*** (2.426)	14.53*** (0.539)	12.78*** (2.496)
Observations	6,708	6,708	6,708	6,708
Day FE	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Post-crisis interactions	YES	NO	YES	NO
Weekly interactions	NO	YES	NO	YES

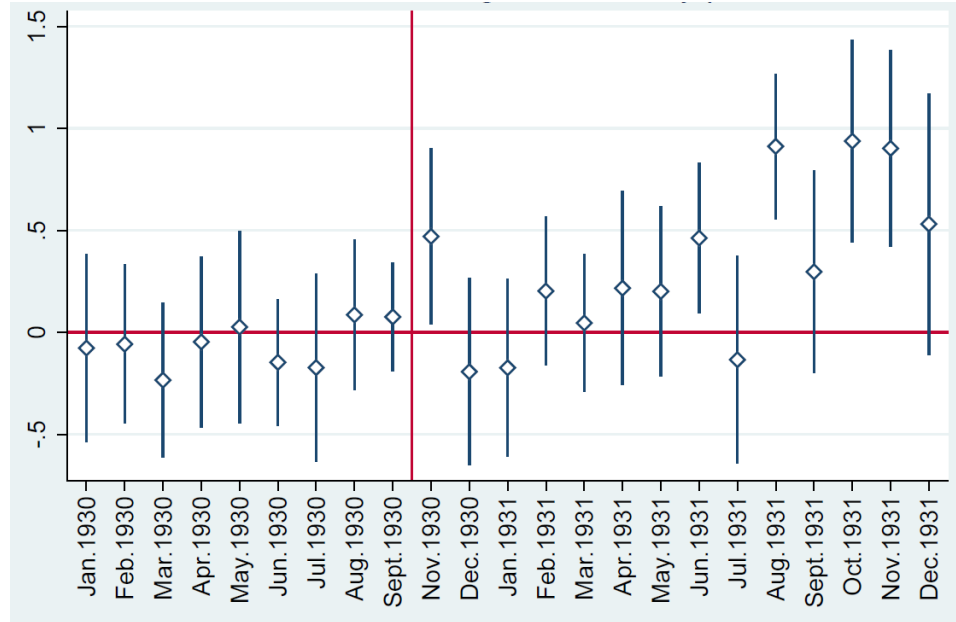
Standard errors clustered at the bank level in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Notes: The models are estimated using zero-inflated Poisson model. Standard errors are clustered at the bank level. . Columns (1) and (3) add time-varying controls where the log of assets and the liquidity ratio of the bank in 1929 are interacted with the dummy taking the value =1 in the crisis period. Columns (2) and (4) use time varying controls where the log of assets and the liquidity ratio of the bank in 1929 are interacted with time-fixed effects.

Figure E.1 reproduces Figure 3 in the paper by using a different definition of connectedness (excluding family linkages).

Figure E.1. Monthly Results in an Event-Study Design (alternative definition of connectedness)



Note: This figure reproduces Figure 3, but excludes family links from the definition of connectedness. It plots the coefficients  $\beta_t$  and  $\delta_t$  of equation (2). The equation is estimated with monthly data ( $t$  is a month). October 1930 is denoted by a vertical red line on the figure. The crisis started in November 1930. On the y-axis, a value of 1.0 means that BdF lending to connected banks was 100% higher than lending to unconnected banks in a given month. Each coefficient is plotted with its 90% confidence interval.