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Danger on the Exchange: How Counterparty Risk Was Managed on the Paris Bourse in the Nineteenth Century

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ABSTRACT

Over the course of the nineteenth century, the struggles of Paris Bourse to manage counterparty risk revealed the awkward choices that face derivatives exchanges. Shortly after it was founded, the stock exchange, primarily a forward market, instituted a mutual guarantee fund to prevent broker failures from snowballing into a general liquidity crisis. The creation of the fund then forced the Bourse to search for mechanisms to control moral hazard. To study the determinants of broker failures, we collected new individual data on defaulting brokers and describe the evolving regulatory regime. To identify the factors behind the annual number of broker failures we use negative binominal regressions. To explain individual brokers' duration in office, we employ a proportional hazard model, while logit regressions examine the causes of individual broker failures. In addition to declines in asset prices and trading volume, the moral hazard from the mutual guarantee fund contributed to brokers' defaulting on their obligations. The Bourse faced a conundrum; when it finally imposed a tight regulatory regime that limited risk, trading began to migrate off the exchange to less regulated markets.

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In the wake of the recent financial crisis, the question that stands center stage is how should markets be re-structured to withstand shocks in the future. In this paper, we examine how the Paris Bourse, the second most important European exchange of the nineteenth century, sought to find the best architecture to manage the failures of its broker members that often sparked liquidity crises. The exchange's unique character—primarily a forward market—contrasted its contemporary rivals in London and New York. Consequently, the Bourse was particularly vulnerable to counterparty risk and gradually developed institutions and rules that anticipated those deployed by late twentieth and early twenty-first century derivatives exchanges. We identify the basic regulatory regimes under which the Bourse operated in the nineteenth century. From the archives of the Bourse, we have collected detailed data on failing brokers that permits us to evaluate the individual, regulatory, and macroeconomic factors that were responsible for brokers' failures, and the success of the evolving institutional arrangements.

From its inception, the Bourse was troubled by the high number of defaulting brokers. Brokers were confronted with the problem of ensuring that customers complete their contractual obligations in the forward market, which did not have full legal status until 1885. If there was a large fraud or general shock, enough customers might default to endanger the solvency of a broker. Given that brokers built up balances with each other that were only netted on settlement day, one broker's demise could bring down several of his colleagues—the problem of counterparty risk. When this problem overwhelmed the exchange in 1818, the Bourse created a mutual guarantee to insure against failures. To control moral hazard, the exchange sought to monitor and discipline its members, creating a unique statistical record of its brokers that rival exchanges of the period lack. However, fine-tuning the financial architecture to manage risk proved to be difficult because any reduction of risk-taking on the exchange raised the returns to those who could evade the regulation and drove business off the exchange to less formal markets. This development parallels the recent contemporary movement of the trading in derivative instruments off of the established exchanges to the largely unregulated

markets. Lacking exchange-based monitoring, traders have incurred huge losses in these markets, which are also alleged to have worsened the financial crisis of 2008.¹

In this paper, we first describe the basic characteristics of the nineteenth century Bourse and provide a detailed description of how the exchange managed defaults, ranging from quiet assistance to bankruptcy. Next, we identify the major regulatory regimes. Our econometric analysis of the annual number of broker failures and individual broker defaults reveals that the problem of moral hazard was neither easily nor quickly resolved. Tighter controls imposed in the years after the Crash of 1882 apparently succeeded; but the Curb then increased its share at the Bourse's expense. When the next financial crisis hit, brokers on the Curb not the Bourse failed, leading the government to impose a much tougher regulatory regime on the two markets, with trading migrating further away to the unregulated *Marché Libre*, or free market.

The Paris Bourse in the Nineteenth Century

The basic elements of the Paris Bourse's microstructure were set in the early nineteenth century. The Act of March 19, 1802, combined Napoleon's degree of June 16, 1802 and the Code de Commerce in 1807 gave the exchange its fundamental character. The *agents de change* or stockbrokers were given a monopoly of trade in government securities and other quotable securities, with the rest of the market left to the *Coulisse*, the Curb market.² The number of brokers was fixed at 60 in 1816, and it was only raised to 70 in 1898. To buy the *office* or seat and provide the operating funds for the business, capital was raised by establishing partnerships. The brokers formed a corporation, the *Compagnie des Agents de Change*. Although the *Compagnie* was governed by a General Assembly, both strategy and management were increasingly delegated to an elected

¹ In 2008, the rogue trader Jérôme Kerviel nearly brought down *Société Générale*. If he had operated on an exchange, he would not have been able to hide his positions so easily. See "Comment la Générale a perdu 7 milliards," *Challenges* (Janvier 31 au 6 Février 2008). Some analysts point to the role of credit default swaps in the 2008 panic and argue that they should be traded on an exchange. For a discussion and alternative view see Stulz (2009).

² The Bourse and the *Coulisse* battled over what securities belonged to the brokers' monopoly up to the 1885 Cour de Cassation's judgment that the monopoly only covered the officially listed securities.

Governing Council or *Chambre Syndicale*, headed by a *syndic*. Together, the *Chambre* and the General Assembly set the rules for trading³.

Brokers were pure agents, forbidden to trade on their own account. Minimum commissions were fixed by the *Chambre Syndicale* and maximum commissions by the government. Although there was an active cash market for securities (*marché au comptant*), most activity centered on the forward market (*marché à terme*).⁴ While the forward contracts were not given statutory legality until 1885, this did not usually hamper the operation of the market. In the forward market, buyers and sellers agreed to exchange a number of shares at a fixed price on the settlement dates (*liquidation*), either the fifteenth or last day of the month. Bullish traders would buy contracts in the forward market with intention of reselling at a higher price on the settlement date, while the bears sold contracts, hoping that prices would decline. No regulations governed margin, which was determined by the broker on the basis of the underlying securities and the client's standing (Proudhon, 1857). On settlement day, traders in the forward market decided if they wanted to liquidate their positions. If the current cash price was below the contract price, a buyer might not take the securities and could instead renew his position by means of a *report*. If he had contracted to buy at the end-of-the month, then on that date he would buy at the contract price and immediately sell the securities at the clearing price (*cours de compensation*) and enter a new forward contract to repurchase the securities at the next settlement date, borrowing funds for this operation. The *syndic* set the clearing price, which was usually the average quoted cash price on the settlement day.

Given the lag in time between the contract and delivery date, brokers were exposed to default risk from their customers when unexpected changes in a customer's wealth altered his or her ability/willingness to meet contractual obligations. If a customer were unable or unwilling to settle his or her account, the broker bought in and sold out the securities in question. If the margin were insufficient, the broker absorbed the loss. However, brokers were also exposed to default risk from their peers. This counterparty risk arose in the process of settlement. If the defaults of a broker's clients were severe,

³ See Hautcoeur-Riva (2007) for the evolution of the Paris Bourse over the nineteenth century.

⁴The forward market was estimated to be fifty times the size of the cash market See Vincens (1834) Vol. I, p. 614.

he might be unable to meet his obligations on settlement day. His default could produce losses for other brokers and a general crisis for the exchange.

The rapid operation of the Bourse required confidence that contracts would be completed, and the brokers needed to find a solution to manage counterparty risk, a critical problem for all derivatives markets. Edwards (1984) found that the contemporary markets use a mix of expulsion, monitoring, margin, price limits, and position and capital requirements, employing both rules and discretion to manage this risk. However, the integrity of the exchanges is protected by a mutual guarantee fund. This mutualization of counterparty risk through the exchange ensures market liquidity, while the exchanges adopt rules to manage the resulting problem of moral hazard. This institutional arrangement should be able to protect clients and brokers from idiosyncratic shocks. But, Bernanke (1990) and Kroszner (1999, 2006) even have argued that these mutual guarantee funds provide an adequate safety net against systemic shocks because there is no record of an American exchange failing. Examining the longer history of the Bourse, it is difficult to be so sanguine, as the exchange was bailed out more than once by the Banque de France, most dramatically in 1882 (White, 2007).

The Bourse first mutualized counterparty risk after a crisis erupted in 1818. It established a permanent Common Fund (*fonds commun*) in 1822 to provide credit to defaulting brokers and thereby maintain an orderly operation of the market. Most revenue for the common fund was raised by a stamp tax imposed on the special paper used by brokers to record their operations. Additional income was derived from brokerage fees for the trades conducted on behalf of the government, and interest from the Fund's investments in *reports*. The Compagnie set its expected revenue higher than its expenses, typically producing a large surplus. However, only a portion of the surplus was usually transferred to the Common Fund; the remainder was rebated to the members. The surplus may be considered as a refundable ex ante assessment against potential losses with the assessment being set in rough proportion to each broker's volume and consequently his exposure to risk.⁵

⁵The rebate to members was equally distributed, producing a substantial redistribution and subsidy to weaker members with a potential for increasing moral hazard.

A Taxonomy of Defaults

Defining when a broker failed is not a simple task, and the management of broker failures evolved over the course of the nineteenth century. There were changes in bankruptcy law (*le droit de faillites*) and jurisprudence regulating the Compagnie des Agents de Change (the stockbrokers association), forward contracts, and the partnerships formed to exploit the brokers' *offices*.⁶ Furthermore, the Chambre slowly increased its considerable authority to regulate and monitor the brokers; and the Minister of Finance and the Prosecutor-General (Procureur de la République) sometimes intervened directly. Complicating matters was the legal status of the different transactions executed by the brokers. The brokers' monopoly covered some (the *faits de charge*) but not all of their operations. These monopoly-controlled transactions were not fixed and changed over the course of the nineteenth century. The law obliged brokers to complete their *faits de charges*. A default, the failure to complete them, was considered to be a *banqueroute*, which was potentially punishable with a term of forced labor.⁷ It is thus not surprising that some apprehensive brokers took flight or committed suicide when faced with these penalties.

Because of this evolving institutional framework, we must carefully define the reasons for a brokers' untimely exit from the Bourse; and we identify several periods, representing significant changes in the regulatory regime. But first, we must provide a taxonomy of failure. We use the term default (*défaillance*) to indicate all cases in which a broker found himself in a situation where he could not complete his transactions with either his fellow brokers or his customers. Less commonly, a broker might fail if a customer demanded the return of funds or securities that had been deposited with the broker and he was unable to comply. We classify brokers' defaults into three categories reflecting the increasing severity of the problems faced by a broker: (1) a liquidity problem, (2) a forced resignation, and (3) a suspension of payment.

⁶ See Hautcoeur and Levratto (2010) and Lagneau and Riva (2010) for a more detailed discussion.

⁷ A *banqueroute* does not have the same meaning as bankruptcy in English, which is the equivalent of the *faillite*, the legal procedure where a broker would have been declared to be bankrupt and processed through the courts. A *banqueroute* occurred when an individual was accused of incompetence. When the bankruptcy involved fraud or a violation of the law, it was a *banqueroute frauduleuse*, which was punishable by imprisonment for life with forced labor.

We define a liquidity problem for a broker as occurring when the Chambre Syndicale decided to offer him assistance with a prospective default. If a broker quickly revealed his situation to the Chambre (usually in advance of the settlement day) and had not violated the Bourse's rules or taken excessive risk, the Chambre might provide an advance from the Common Fund. This assistance was intended to enable the broker to continue his operations and avoid a default. These loans carried interest and were usually collateralized by the broker's security bond and other assets. However, this assistance brought with it oversight and supervision by the Chambre, controlling and often placing limits upon the activities of the broker until the loan was repaid and the broker met of all his obligations. In this case, a broker's difficulties were typically not revealed to the public and his fellow brokers. Some of the brokers who experienced a liquidity crisis survived while others never recovered and later failed.

A default would result in a forced resignation (*démission forcée*) or "internal insolvency" when the Chambre decided that the broker must cease operation and leave the Compagnie. In exchange for departing, the Chambre covered the broker's position and demanded a letter of resignation. In addition to the letter, the broker usually transferred to the Chambre most of his personal wealth, as the broker had unlimited liability, with the remaining losses being absorbed by the Common Fund.⁸ A forced resignation reflected the fact that the Chambre considered the broker to have transgressed his legal or corporate obligations. The broker may also have aggravated the situation and threatened the position of his fellow brokers by attempting to conceal his problems from the Chambre. Although the Common Fund made the brokers' creditors whole, the broker and his family were often considered morally if not legally obliged to fully reimburse the fund.⁹

The most extreme outcome for a default was a suspension of payments or "external insolvency." In this case, when a broker defaulted, the Chambre refused to intervene and bail him out with the Common Fund. This event would result in a formal legal dissolution or a private negotiated settlement with the brokers' creditors. The last was usually the preferred outcome by all parties because of the substantial risks and costs

⁸ The Chambre attempted to adjust this levy in accordance with the gravity of broker's transgressions.

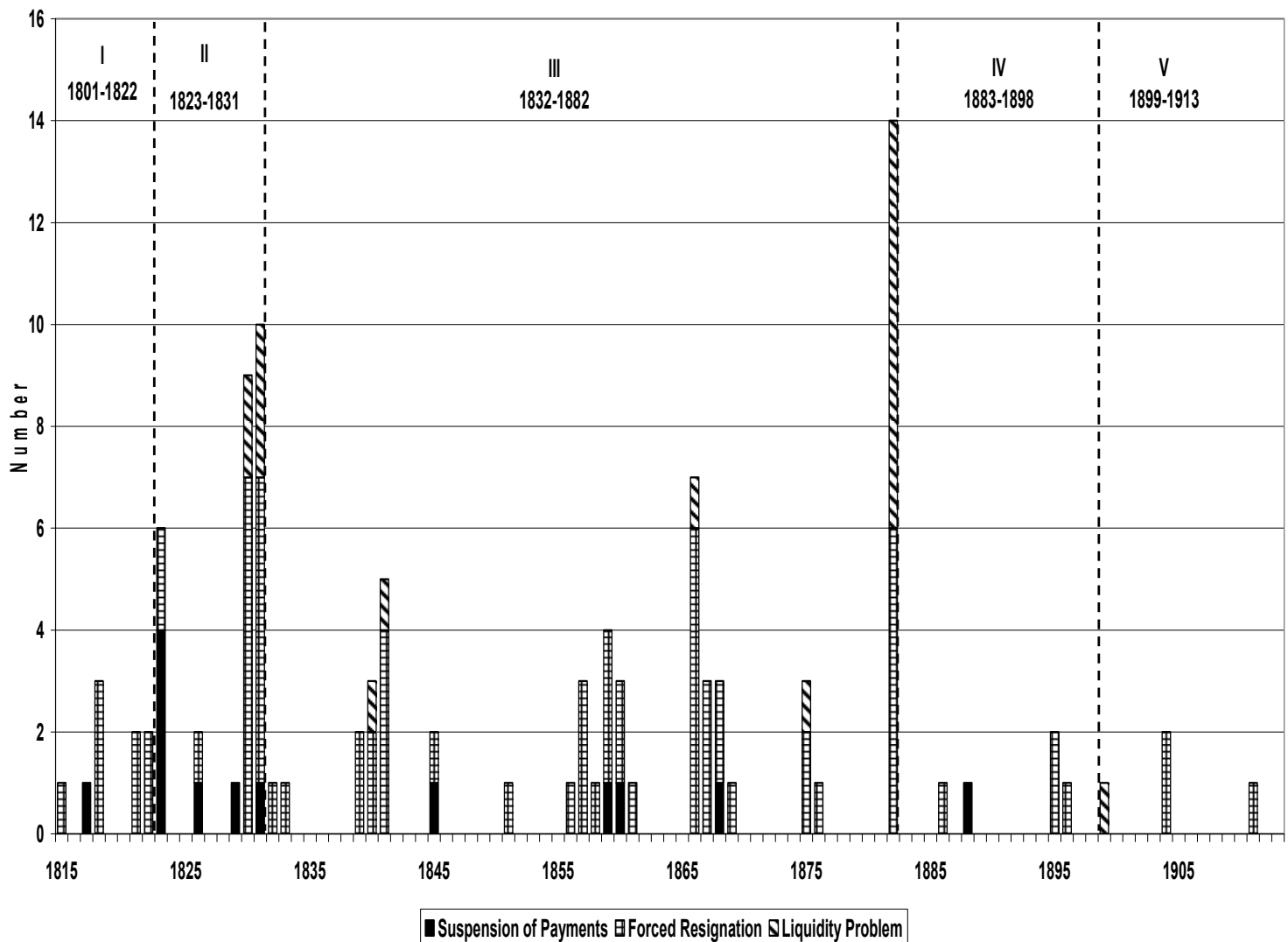
⁹ For example, depending on the details of the marriage contract, a wife's dowry would be considered as a part of a broker's wealth, and sometimes sons covered the debts of their fathers.

of the legal system. While a broker had unlimited liability that would absorb his security bond, capital and personal wealth, his partners' position was less certain. Until the Commercial Code was modified in 1862 to establish limited liability for the partners, judges had discretion whether to impose limited or unlimited liability on partners.¹⁰ Consequently, a defaulting broker's partner might wish to avoid the courts in the event of a forced resignation. Similarly, the brokers who were creditors of a defaulting broker preferred a private settlement because it was the only means for them to recover their assets as jurisprudence had determined that they did not have access to the courts. Lastly, the Chambre feared that a court case might result in an undesirable new precedent and draw the attention of Minister of Finance who might impose new regulations or lead the public to demand an end to their monopoly.

Figure 1 classifies all defaulting brokers that we found in the minutes of the Chambre Syndicale and the General Assembly from 1815 to 1913 and each of the five major regimes that we identified and are discussed in the next section. The high number of defaulting brokers in the early years and the clustering of defaults during financial crises stand out.

¹⁰ Loi de 2 Juillet 1862, Article 75, Code de Commerce. Before 1862, judges often were hostile to partnerships because they considered it a breach of the brokers' legal position as *officiers ministériels*. They could declare a partnership null and void; and if a partner had not fully paid in his share of the capital, he could refuse to contribute it upon the failure of the broker.

Figure 1
Defaulting Brokers by Type and Regulatory Regime
1815-1913



Source: Chambre syndicale de la compagnie des agents de change, Séances and Comptes Rendus Annuels and the Compagnie des agents de change, Assemblée Générale, Rapports.

ComNote: See the test for the definitions of the different types of broker defaults and the characteristics of the regulatory regime.

The Evolving Management of Failure and Risk

Over the course of the nineteenth century, the management of client and counterparty risk evolved significantly. To correctly assess the determinants of brokers' failures, we need to identify the major regulatory regimes. In our historical narrative, we consider the liability features of each regime and how they affected the likelihood of a default: (1) the liability of clients vis-à-vis their brokers to complete their contracts, (2) the liability of the brokers vis-à-vis their clients to complete their transactions, (3) the liability of partners vis-à-vis the partnership, (4) the liability of counterparty brokers vis-à-vis brokers and their clients, and (5) the liability of the Compagnie as a whole, that is the "solidarity" or mutualization of risk. Three additional factors were also important: (6) the selection criteria for members. (7) the Common Fund's size, pay out rules and its monitoring and discipline of members, and (8) the willingness of the Banque de France and the French Treasury to act as a lenders of last resort.

I. 1801-1822

The first regime began with the re-founding of the Bourse in 1801. Before 1805, forward contracts were not legal. The courts changed their interpretation in this year, giving legal status to almost all types of forward contracts, a position they would retain until 1823. In these first two decades, there was no mutualization of risk; and each broker was essentially at the mercy of his creditors and the courts. For the clients, the first line of protection from a defaulting broker was his security bond. Initially this was set in 1801 at 60,000 francs, then raised in 1806 to 100,000 francs. It was capped at a maximum of 125,000 francs in 1816, at which it became fixed in 1818 (White, 2007). While a broker had unlimited liability, the liabilities of his partners were legally uncertain. The Ministry of Finance and the Chambre tried to contain counterparty risk by enforcing an interpretation of the Code de Commerce's Article 86 whereby a broker could avoid liability to his customer if his counterparty defaulted by delivering to the name of the counterparty to the customer so that the client became the creditor of counterparty broker.

Nevertheless, it was common for brokers to give their personal guarantee to customers, as they competed with other brokers on and off the exchange.¹¹

In spite of these seemingly strong controls, there were a surprisingly large number of failures under this first regulatory regime. For the years 1801-1814, when there is no detailed data in the archives of the Bourse, the Compagnie reported that 46 out of a total of 115 brokers lost their *offices* under less than honorable circumstances. Eighteen were officially bankrupt (*faillite*), 12 had large losses and negotiated a settlement with their creditors, 12 were removed by the government because they had broken the law, and 4 were driven to suicide by the disastrous state of their affairs.¹² Between 1815 and 1817, there were two defaults.

The crisis of 1818 was a turning point, forcing the Bourse to consider the mutualization of risk. The crisis originated in the problem of managing the payment of reparations to victorious Allies after Waterloo. Totalling 1.8 billion francs, 1.5 billion francs were raised sale of *rentes*, perpetual bonds (White, 2001). During the final negotiations of the peace settlement, the Banque de France bolstered the demand for the *rentes* by offering discounts of 100 million francs. As the money supply expanded and its gold reserves declined precipitously, the Banque tightened credit in September 1818; the price of the *rentes* tumbled and investors defaulted on their forward contracts. The Chambre was worried that some brokers would be unable to complete the October end-of-month settlement and obtained a 5 million franc loan from the Banque de France. The Compagnie also secured the government's approval to manipulate the clearing price to ensure that the end-of-month settlement was completed.

But, on the eve of the settlement, the broker Aimé-Jean-Louis Sahut announced that he was insolvent and would default. In the absence of a formal structure to handle this event, the Chambre arranged for a bailout of Sahut, although it was a "measure contrary to the fundamental principles of our institution." Sahut raised 770,908 francs of the 1,454,980 francs that he needed to settle and each of the remaining brokers

¹¹ After the crisis and scandals of 1823-1824, the authorities interpretation of the law shifted to allow the brokers to shoulder the liability.

¹² Mémoire sur la Compagnie des Agents de Change, présenté par le Comité au directeur general du Commerce, Procès-verbaux, Chambre syndicale, June 20, 1814.

contributed 12,000 francs for a total of 684,000 francs.¹³ But at the next settlement date, he required more funds and two more brokers emerged as insolvent. The remaining 58 brokers raised 1.1 million francs, but the Chambre was forced to seek a 2.4 million franc loan from the Minister of Finance. The brokers rejected joint liability for this credit that was originally demanded by the Minister and instead each one accepted individual liability for 41,380 francs. Although the brokers had eschewed joint liability, they repaid the internal loan in 1822 by creating a temporary Common Fund in 1819 to collect a stamp tax on the paper that they used to record their transactions.

In the midst of this crisis, the Chambre Syndicale gained the full legal authority it had been granted by an Ordonnance in 1816. This event was triggered by the nomination of the sixtieth and final broker to his office. The Chambre legal position vis-à-vis individual brokers was now strengthened considerably.

II. 1823-1831

After more failures in 1821-1822 provoked a political storm, the Compagnie created a permanent Common Fund of 3 million francs in 1822 in response to the government's threat to compel them to do so by legislation. This permanent fund began operation on July 16, 1822. Revenues were raised from the stamp taxes until the Common Fund reached 3 million francs, the equivalent of 50,000 per broker.

In addition, the Minister of Finance compelled the Chambre to resign, and the courts reapportioned the liability for forward contracts. The civil courts determined that brokers could not enforce payment of forward contracts because they were "gambling debts" (Article 1965, Civil Code). Although the commercial courts (*tribunaux de commerce*) usually continued to enforce forward contracts, the courts denied brokers' access to the courts as creditors to defaulting counterparty brokers. In general, the refusal of the commercial courts to recognize the broker-creditors created an incentive for them to avoid the courts and settle with the Chambre serving as a mediator.¹⁴

Yet, the brokers resisted using the Common Fund to guarantee the solvency of their fellow brokers and reserved it for a general liquidity crisis. The General Assembly

¹³ Assemblée Générale, *Séances* (December 4, 1818).

¹⁴ Typically, when a broker defaulted, the broker-creditors would nominate one or more of their number to negotiate with the defaulter and/or client-creditors' legal representatives, with the Chambre protecting the general interest of the Compagnie in its role as mediator. The Chambre often pressured the broker-creditors to relinquish part of their claims to avoid the case moving to court.

would give permission for use of the fund only if 55 out of the 60 brokers voted to approve. Typically, when a broker failed, the Compagnie refused any credits from the Common Fund and opened a voluntary subscription to assist him. Nevertheless, the Chambre made efforts to limit risk-taking. Common accounting rules were set to facilitate monitoring and the management of defaults. The Chambre was given the power to compel brokers to deposit money or securities with the Common Fund if it was determined that they were taking an excessively large position in the market. However, this control was abandoned after the courts determined that these deposits could not be used to protect counterparty brokers but would be used to compensate other creditors.

Capital requirements on new brokers were imposed, setting a minimum level of wealth. The additional funds needed to operate the business made a partnership almost a necessity.¹⁵ Partnership agreements (*actes de sociétés*) were regulated and subject to approval of the Chambre. The defaults of 1821 and 1822 caused numerous problems between brokers and their partners, leading the Chambre to increase its monitoring of the partnerships. While the brokers had unlimited liability, their partners were officially limited in liability to their paid-in capital. Wanting to provide greater protection, the Chambre tried to ensure that partners would be “honorable” persons who would pay all the debts of defaulting brokers. In addition to capital requirements, there were disclosure rules for monitoring, requiring brokers to report income, expenses and position from their trading activity. From the later 1840s onward, these took the form of twice yearly reports to the Common Fund.

III. 1832-1882

The Revolution of 1830 was accompanied by a financial crisis. In the tumultuous years 1830-1831, nineteen brokers defaulted, one of whom was bankrupt and 13 of whom were forced to resign. Faced with this crisis and the need to establish credibility with the new political regime, the Compagnie employed the Common Fund, but its 3 million francs were soon exhausted. Having poorly responded to the crisis, the General Assembly delegated more discretion to the Chambre to manage a broker’s default.¹⁶ Henceforth,

¹⁵ The brokers were officially officers of the state (*officiers-ministeriels*), and only they legally owned the *office* and could carry out its functions on the Bourse.

¹⁶ Discretion enabled the Chambre Syndicale to act more quickly discretely. If action required a vote of the General Assembly, the procedure would take time and any problem would immediately become public.

the Chambre could provide an advance to a defaulting broker equal to the value of his security bond plus a maximum of 100,000 francs collateralized by his *office*. Beyond this, the Chambre syndicale could request authority from the General Assembly to use of the Common Fund, if two-thirds of the General Assembly approved.

Concerned about the division of liability between a broker and his partners, the Chambre required that all new partnerships take a standard, legally sanctioned-form as *sociétés en commandite*.¹⁷ This change enhanced the capacity of the exchange to manage counterparty risk because it improved both the guarantee provided by each agent and the likelihood that loans granted by the Common Fund would be repaid as they were made not to just the brokers but to the partnership, which now had legal standing and had to approve of any loans. Nevertheless, forward contracts had no legal status, in spite of efforts by the Compagnie to persuade the courts. The potentially easy default by customers left brokers facing an uncertain liability.¹⁸ Although they tempered clients' losses, the changes after 1830 do not appear to have diminished the number or frequency of failures on the exchange, as seen in Figure 1.

In this period's crises, the Common Fund appears to have been insufficient, and the Banque de France provided regular credits to the Bourse. Yet, this action by the lender of last resort may have induced morally hazardous behavior by the brokers. The first severe crisis, where ten brokers defaulted, would have exhausted the Common Fund; a collapse was averted by the Banque's loan in October 1840 of 25 million francs. The Revolution of 1848 produced perhaps the largest drop in the stock market in the nineteenth century, accompanied by falling prices for corporate and government bonds; yet no broker defaults were recorded. These were avoided because the Bourse closed between February 23 and March 6, the end-of-month settlement was managed by a manipulation of the clearing price, and a settlement was forced on all outstanding forward contracts regardless of their term. Yet, when the Chambre received a loan of 2.4 million francs from the Banque, it resisted the idea of mutualized liability and discounted bonds

¹⁷ These partnerships were recorded with the Tribunal de Commerce, in accordance with Article 42 of the Code de Commerce.

¹⁸ Report of Chamber of Commerce of Paris on the application of the art. 1965 Civil Code to forward contracts, 1877.

with the Banque de France not in its own name but on behalf of the brokers needing assistance.

This extraordinary action helped to avoid brokers' defaults, but it obviously did not solve the underlying political crisis. When the exchange reopened, security prices continued to tumble. As its reserves fell, the Banque de France suspended convertibility of its banknotes on March 15. At the same time, the Treasury decreed a six month extension in the maturity of its floating debt. Fearful that banks would not provide credit for investors in the forward market to carry over their positions, the Compagnie asked the Banque de France for a loan to help complete settlement. However, the loan was not used as news of the loan calmed the bankers. After this experience, the Banque became apprehensive of its effect on the Bourse. When the syndic approached the Banque for a 2 million franc discount on December 22, 1852 to prevent a crisis at the upcoming settlement, the Conseil Général of the Banque granted the loan but questioned whether frequent loans were engendering moral hazard.¹⁹ The Banque ensured that the collateral was endorsed by the members of the Chambre in their role as administrators not individual brokers, signaling a shift towards the mutualization of risk. Coupled with rising volume on the exchange and signs of resistance from the Banque, the Compagnie raised the Common Fund from 3 million to 4.5 million in 1852 and 6 million francs in 1854. After the crisis of 1866-1867 when ten brokers defaulted, the General Assembly increased the discretionary lending authority of the Chambre to 450,000 francs—the equivalent of a broker's 250,000 franc security bond, his 100,000 franc contribution to the Common Fund, and 100,000 francs collateralized by his *office*, but otherwise it did not change the management of risk that had been in place before 1830.

IV. 1883-1898

The stock market crash of 1882 was a watershed for the Bourse. After a prolonged boom, equities prices plummeted in January of 1882 in the wake of the collapse of the investment bank, the Société de l'Union Générale. Not only was the Common Fund wiped out by the need to cover the defaults of imperiled brokers, but the Banque de France had to provide a huge loan, acting as “insurer of last resort,” to guarantee the liquidity of the Bourse. Although the brokers' were not directly held

¹⁹Procès-verbal of the Conseil général of the Banque de France December 22, 1852, p. 342-3.

responsible for the boom and bust, they may have taken on additional risk. The volume of trades increased rapidly while the Common Fund did not, and these problems may have been amplified by the leveraging of speculation in the forward market by the reports, partly facilitated by the brokers. Many customers and brokers were not able or willing to honor their commitments, upsetting an orderly end-of-month settlement. The Compagnie estimated that 140 million francs were needed to complete the settlement, yet it only had 60 million francs available.

To head off the crisis, the General Assembly quickly assumed mutual responsibility for the January and February settlements and gave the syndic authority to contract an 80 million franc loan from the Banque, intermediated by a syndicate of banks. After the liquidity crisis subsided, all but 30 million francs were repaid; and eight of the brokers remained in debt—six of whom were forced to resign. To cover the remaining debt, the brokers each raised 300,000 francs for 18 million. Adding the 8.7 million in the Common Fund plus incoming revenues covered the balance. It took until 1889 for the revenues of the Common Fund to repay this internal loan and recapitalize the Common fund at 9.5 million francs (White, 2007).

Legislation giving legal status to forward contracts had been stalled for decades, but as a result of the crash they became enforceable with the passage of the Law of June 28, 1885.²⁰ Now brokers could legally pursue defaulting customers on the forward market, but this implied that forward contracts were now part of the *faits de charge* with severe penalties for default. This exposure was limited quickly by the Cour de Cassation to officially listed securities. Moreover, the crisis changed the Compagnie's policy vis-à-vis clients' losses from a defaulting broker. Before 1882 the Compagnie generously repaid clients, thereby attracting business. Now it forced institutional investors to absorb the losses, reducing its comparative edge vis-à-vis the Coulisse until it restored its previous position in 1895.²¹ In 1890, the brokers gained addition protection when they were allowed to proceed against defaulting customers and were given the legal right to demand margin. In exchange for these protections, new legislation in 1890 imposed new constraints, including explicit liability on a broker to complete a client's transaction if his

²⁰ According to estimates of the Chambre Syndicale, the courts did not enforce forward contracts valued at 117 million francs in the aftermath of the crisis.

²¹ It is the case for the Vuaflard's and Bex's defaults, respectively in 1886 and 1888.

counterparty failed. Combined with the lowered levels of activity on the market, these controls on risk seem to have limited failures, as seen in Figure 1.

V. 1899-1913

No widespread crisis afflicted the Bourse in the last fifteen years before the First World War. The Common Fund was fully replenished by 1889 and was maintained at a relatively high ratio relative to volume in the years before World War I. There was thus an ample cushion for the failures that did occur; but having accepted a mutualization of the risk, the Compagnie exerted considerable efforts to limit risk-taking from the moral hazard. New brokers were more carefully screened; and the Chambre Syndicale sought to ensure that only brokers from wealthy, “grand bourgeois” families could acquire an *office*. Higher wealth meant that the brokers had more capital to cover losses from defaults, but the agents de change also appear to have come from a more homogeneous social group, perhaps ensuring that there they could monitor one another more closely and exercise greater moral suasion (Verley, 2007).

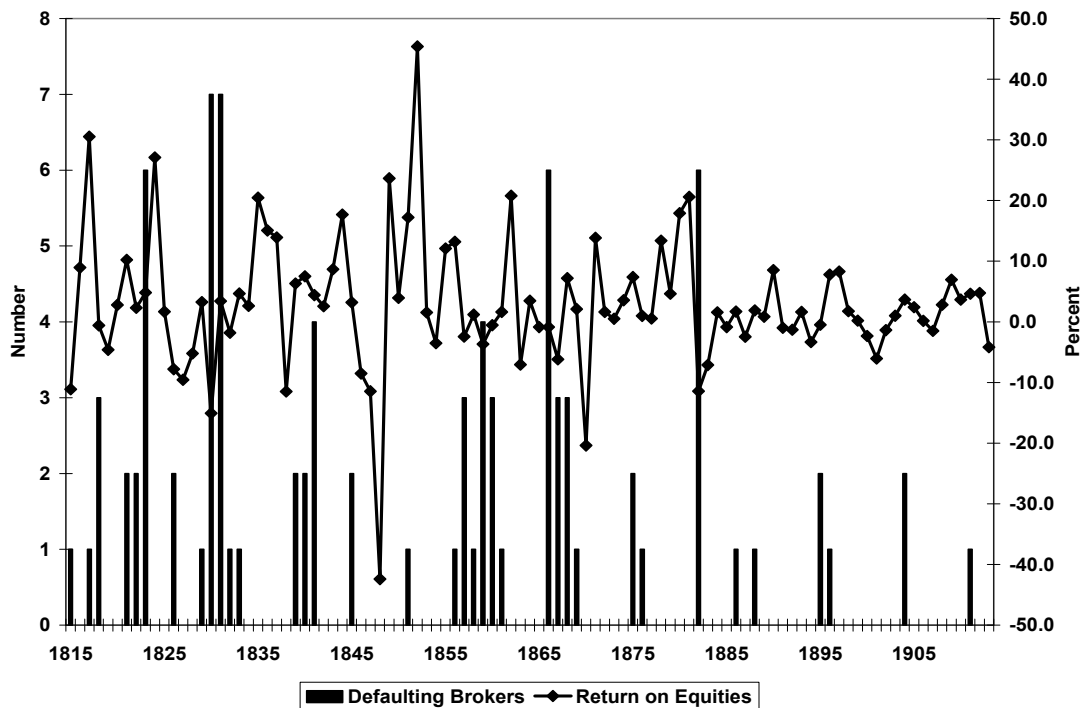
After trades off the Bourse were fully legalized in 1893 a boom began in South African gold mining stocks, focused on the Coulisse. When this market crashed in October 1895, many brokers on the Coulisse failed.²² The Bourse’s monopoly was reinforced by Government, which again made trading in listed securities off the exchange illegal. In return, the Bourse agreed to increase its capacity by raising the number of agents from 60 to 70 and the maximum number of clerks per broker from four to six. In addition, the exchange reinforced its own rules and monitoring. It accepted the government’s demand for the imposition of “solidarity” or joint liability of the brokers for all trades in listed securities, which became law on April 13, 1898. As the government clamped down on the Coulisse and the Chambre Syndicale sought to limit risk-taking, trading in riskier securities migrated to the Marché Libre, the unregulated “third” or “free market.”

²² During this crisis, to prevent any spillover risk from brokers on the Coulisse, the Chambre limited relationships between its *agents de change* and these *coulissiers*.

Why Brokers Failed

To explain why brokers failed, we first examined the number of annual defaults. For these time series regressions, the dependent variable is the number of defaults per year, measured by the number of brokers who suspended payments or were forced to resign. By excluding the brokers who had liquidity problems, it identifies the brokers who the Chambre believed were clearly insolvent and did not merit a loan.

Figure 2
Defaulting Brokers and Annual Stock Returns
1815-1913

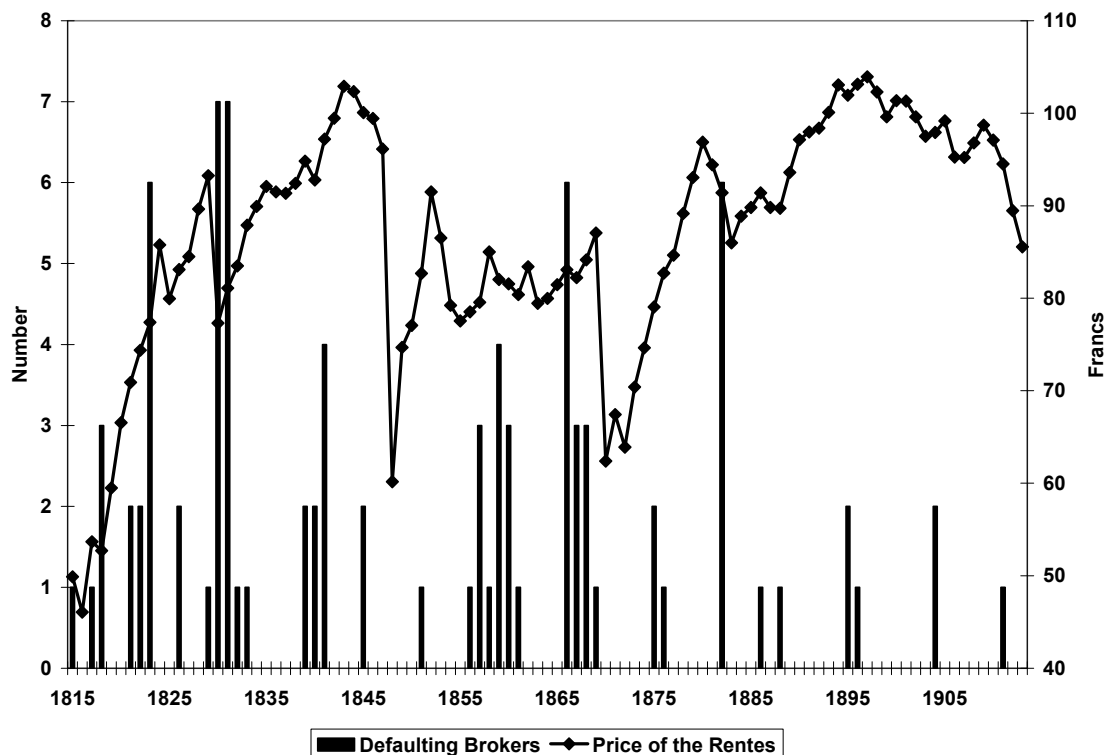


Major changes in equity or bond prices would have induced brokers' clients to default, and there are several indices for the Paris market in the nineteenth century. For the whole of the nineteenth century, Arbulu (1998) constructed the broadest measure for equities, an index of equities listed on the Bourse, weighted by sector. Using this index, we calculated yearly returns (EQUITIES). We show these returns with the number of defaulting brokers in Figure 2, where some but not all large negative returns correspond

to a high number of defaulting brokers. The most notable exception is 1848 when, as previously described, the Bourse intervened to redistribute the losses.

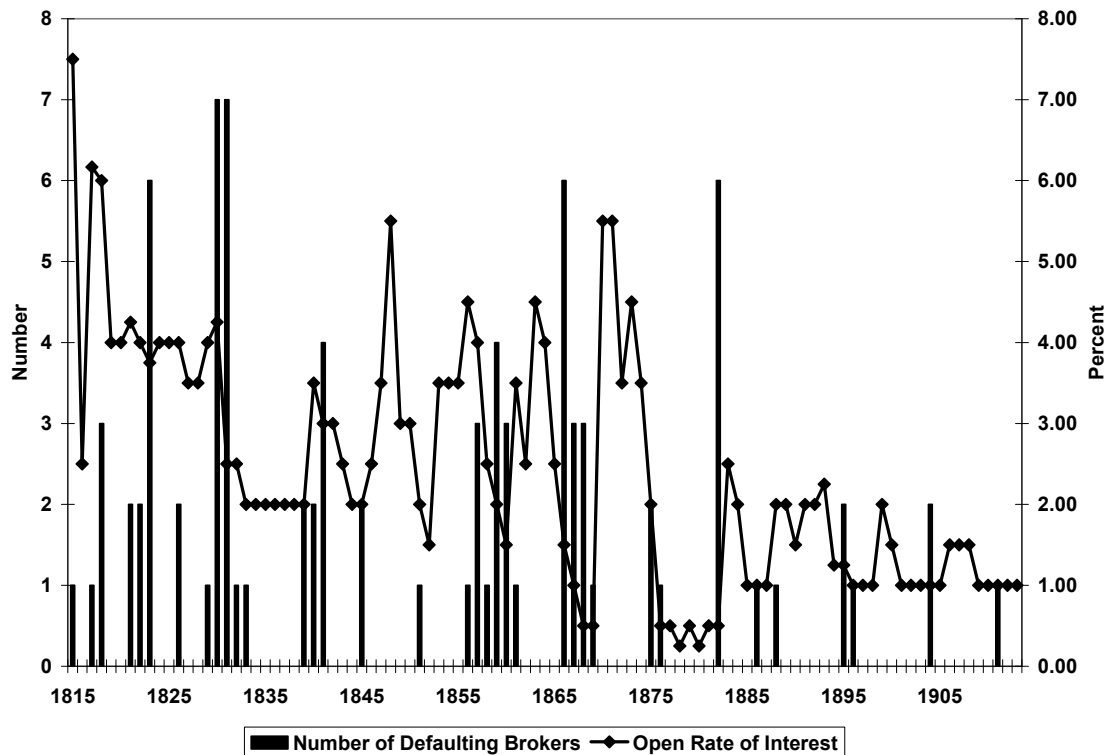
To take into account the effect of the bond market on defaults, we use the annual return on the French government's perpetuals, the *rentes* (RENTES). At the beginning of the nineteenth century, French government securities dominated the market; by mid-century there were large issues of foreign and domestic corporate bonds and finally equities. While speculation had centered on the *rentes* early in the century, they became the safest long-term security. Thus, in a crisis there might be a flight to quality; a major reversal in their role. Figure 3 reports the number of defaults and the price of the *rentes*. Some defaults are coincident with price declines, with the notable exception again of 1848.

Figure 3
Defaulting Brokers and the Price of the Rentes
1815-1913



Clients' propensity to default would also have been sensitive to the rate at which they could borrow for their *report*. Unfortunately, we only have a measure of the interest rate on the *reports* for the years 1875-1914 (Flandreau and Sicsic, 2003). Instead, we use another short-term market, the open rate of interest (Arbulu, 2007), which is available for the whole century. It is shown in Figure 4 with brokers' defaults. Obviously, this variable (INTRATE) does not capture the risk premium embedded in the interest rate on the *report*. However, the open rate did move sharply during financial crises.

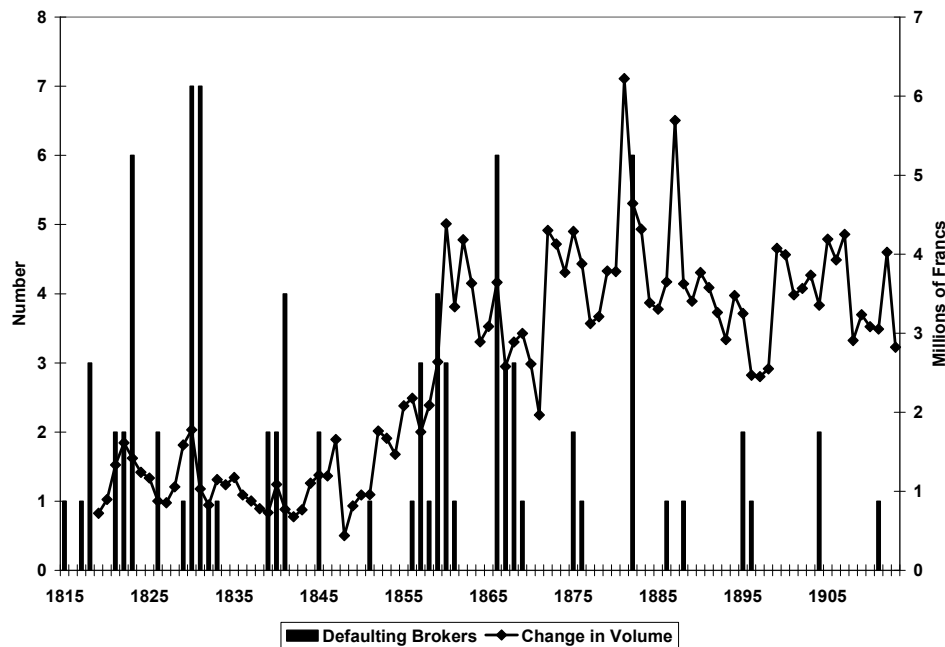
Figure 4
Defaulting Brokers and Open Rate of Interest
1815-1913



Brokers were also exposed to shifts in income from the volume of trading that moved sharply with booms and crashes. There is no volume index for the Bourse, but there is the revenue from the stamp taxes (*timbres*), which were levied to fund the

Common Fund from 1819 to 1913.²³ This measure is used as a proxy for volume on the exchange and the percentage change in annual volume (VOLUME) is used as a contributing factor. The yearly innovation in volume is graphed in Figure 5, where large declines in some years correlate with numerous defaults.

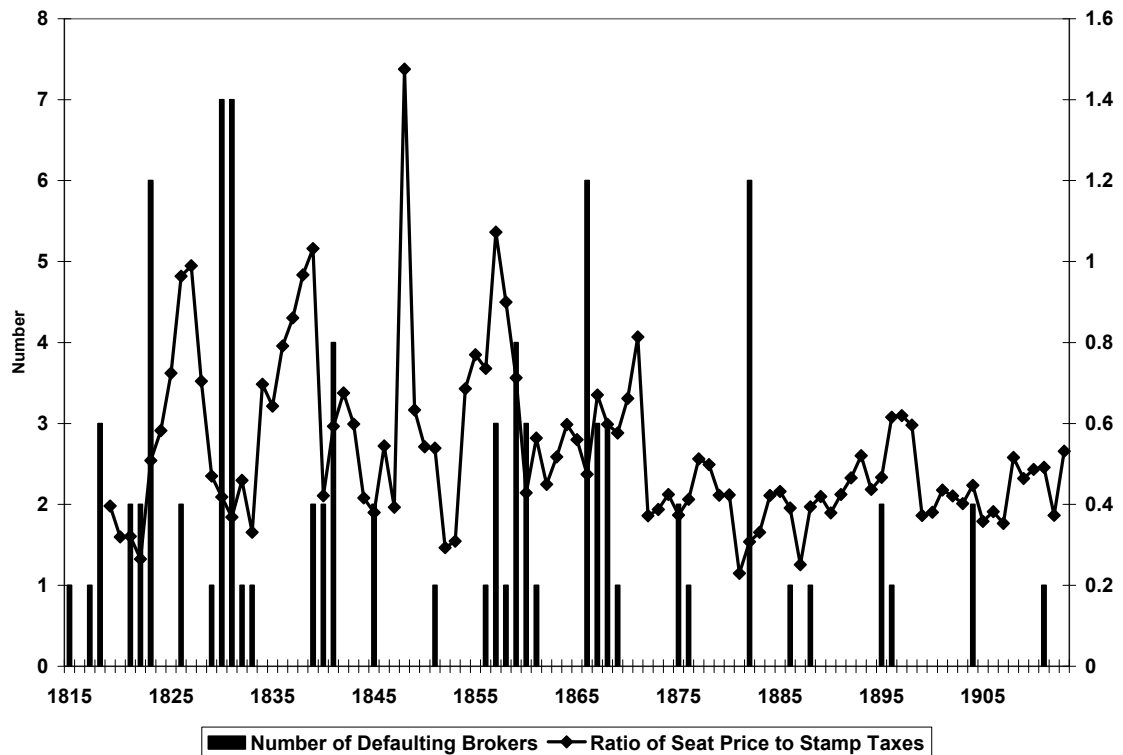
Figure 5
Defaulting Brokers and Volume
1815-1913



Brokers could control risk by increasing their capital. Unfortunately we do not have a measure of individual brokers' capital that they and their partners raised. The only proxy we have is the price of the *office* that reflects not the capital but the value of the seat. Furthermore, for much of the period, the Chambre regulated the price of the seat. Until 1898, there were only 60 seats and prices for the *offices* changed infrequently. As a rough proxy to measure the risk to which a broker would be exposed we use the ratio of a seat price to our measure of volume (SP/VOLUME). Figure 6 displays this variable and the number of defaulting brokers. If this ratio falls, it would imply that brokers are more exposed to risk as volume is increasing relative to capital.

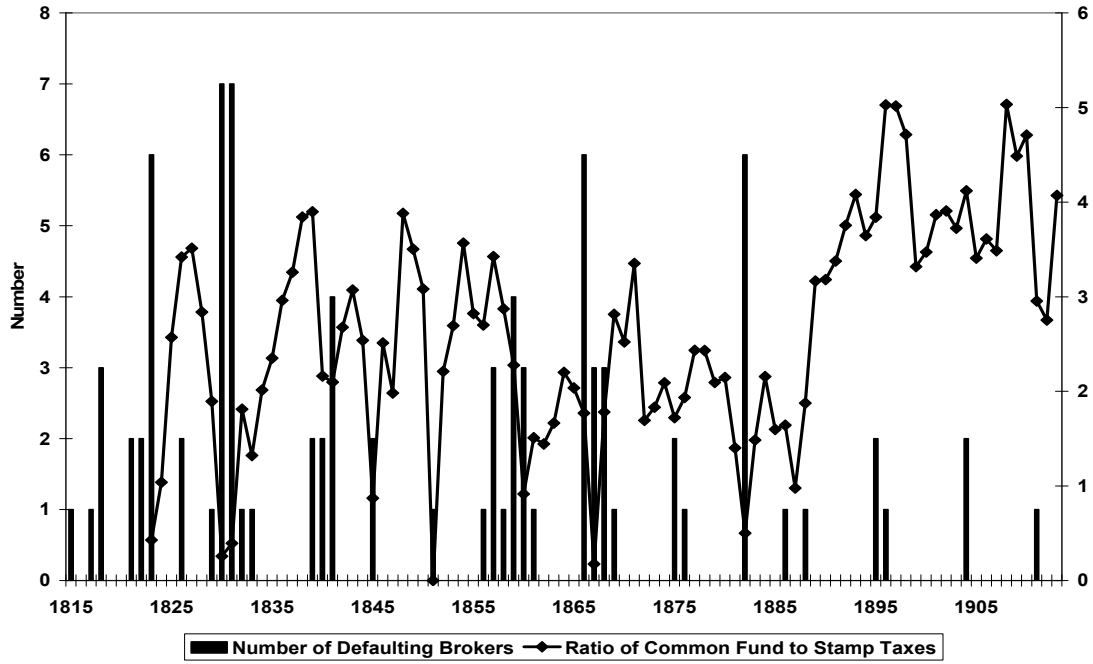
²³ Rapports annuels de la Commission de Comptabilité de la Caisse Commune à l'Assemblée générale de la Compagnie des agents de change.

Figure 6
Defaulting Brokers and Capital
1815-1913



Moral hazard might also have contributed to the default of a broker if risk taking was not adequately controlled by the Chambre. Although the Chambre's efforts to limit risk-taking are hard to measure, the size of the Common Fund was regularly reported. Failing to keep the fund proportionate to volume may be considered as one sign that the Bourse was ignoring the growth of risk. The size of the fund relative to volume, as measured by stamp taxes ($CF/VOLUME$) is then a proxy for this problem. If volume rose and the fund did not rise, this would be an indication of increased risk/risk-taking. Figure 7 graphs this ratio and the number of defaulting brokers. Large declines in the ratio are associated with increases in defaults. While the fund frequently did not keep up with volume increases in the first three quarters of the century, it appears that in the aftermath of the crash of 1882, there was a major change and the fund was adjusted as volume rose.

Figure 7
Defaulting Brokers and the Common Fund
1815-1913



Our model in equation 1 posits that the annual number of brokers' defaults were a function of the variables discussed above and the regulatory regimes, whose effects are measured by a series of dummy variables D_{it} , with the first regime, 1801-1822 being the omitted regime. We use annual data from 1819 to 1913, picking our starting point as it was the opening year of the Common Fund.

$$(1) \text{ DEFAULTS}_t = \beta_0 + \beta_1 \text{EQUITIES}_t + \beta_2 \text{RENTES}_t + \beta_3 \text{INTRATE}_t + \beta_4 \text{VOLUME}_t + \beta_5 \text{SP/VOLUME}_t + \beta_6 \text{CP/VOLUME}_t + \beta_7 D_{1823-1830} + \beta_8 D_{1831-1882} + \beta_9 D_{1883-1897} + \beta_{10} D_{1898-1913} + e_t$$

The variables measured as percentage changes were all stationary. Using Augmented Dickey-Fuller tests we rejected the hypothesis that there were unit roots in the time series. However the SP/VOLUME and CF/VOLUME variables required first differencing to achieve stationarity.

The number of defaulting brokers that we seek to explain is count data. For this type of regression, a Poisson distribution assumes that the (conditional) mean is equal to the (conditional) variance (Cameron and Trivedi,1998). In our annual data, the mean number of broker failures per year for 1815-1913 is 0.88 while the variance is 2.61, showing evidence of overdispersion. In this case a negative binominal regression is typically used as it has a Poisson model nested within it. The results are reported in Table 1, where the likelihood ratio tests for the parameter α rejects the Poisson distribution.

Although they are not significant at conventional levels, the negative sign on returns for equities and the *rentes* suggest that falling asset prices increased the number of broker failures.²⁴ An increase in the interest rate signaled a decline in broker failures perhaps because it increased the cost of speculating. Higher volume, which would have buoyed broker's incomes, also reduced the number of defaults. The capital relative to volume is a relatively weak variable, although it has the correct sign, probably because it is a poor measure of capital for brokers. However, broker defaults were quite sensitive to the size of the Common Fund relative to volume. Increases in the fund relative to volume lowered defaults. The dummy variables for the several regulatory regimes tell a story that is consistent with our narrative. In the first years of the Common Fund, there was little effort to control broker risk. It appears that after the crisis of 1830-1831 and the change in regulations, there was a modest reduction in broker failures. However it was not until after the crash of 1882 that the Bourse imposed rules that reduced risk-taking and forward contracts were legalized. The post-1898 regime appears to have had even a greater effect in reducing defaults.

²⁴ The correlation (0.642) between the returns to the equities index and the *rentes* is fairly high. Given the relatively modest time span of the data and the potential for multicollinearity, regressions with both variables and these variables separately are reported.

Table 1
Broker Defaults, 1819-1913
Negative Binominal Regressions

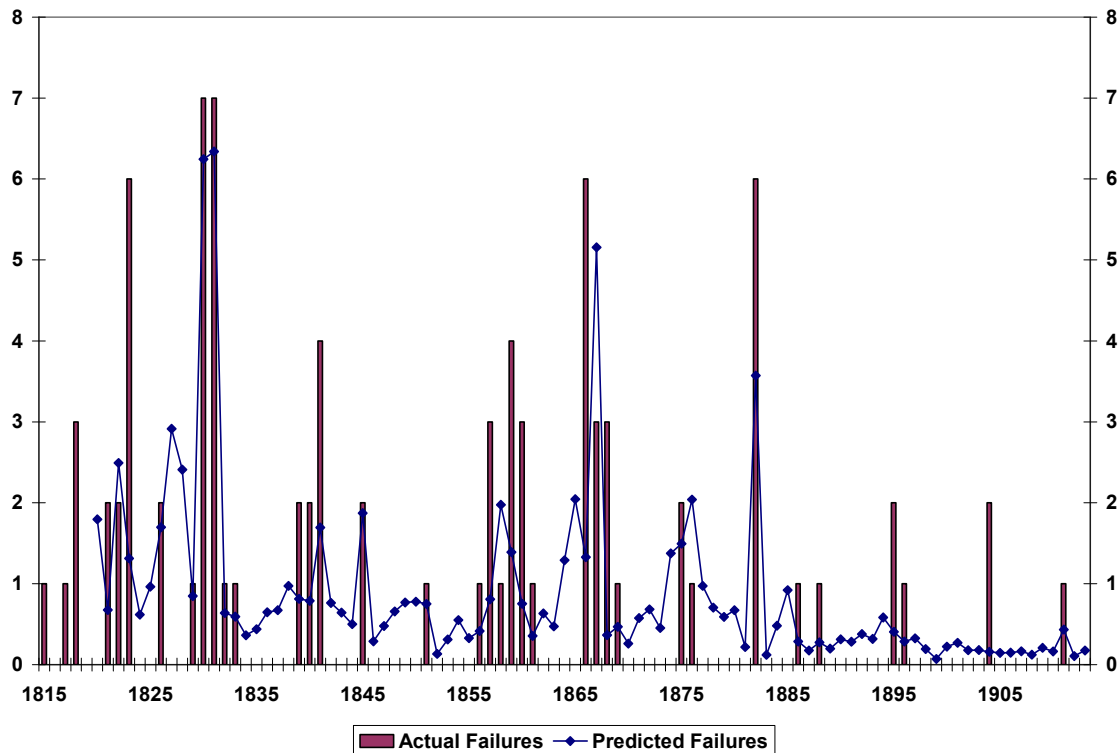
Variable			
Constant	1.389 (0.909)	1.263 (0.864)	1.485 (0.984)+
EQUITIES	-2.105 (2.788)	-2.879 (2.225)	
RENTES	-2.090 (4.686)		-4.309 (3.740)
INTRATE	-0.533* (0.244)	-0.477* (0.208)	-0.572* (0.243)
VOLUME	-2.646* (1.054)	-2.526* (1.018)	-2.856** (1.027)
SP/VOLUME	-1.778 (1.596)	-1.556 (1.522)	-1.818 (1.601)
CF/VOLUME	-0.526+ (0.276)	-0.560* (0.267)	-0.542* (0.275)
DUM 1823-1830	-0.727 (0.984)	-0.620 (0.958)	-0.802 (1.601)
DUM 1831-1882	-1.431 (0.928)	-1.299 (0.881)	-1.560+ (0.917)
DUM 1883-1897	-2.342* (1.052)	-2.211* (1.012)	-2.454* (1.047)
DUM 1898-1913	-3.126** (0.909)	-2.972** (0.865)	-3.286** (0.904)
R-2	0.120	0.119	0.118
No. of Obs.	94	94	94
α (Likelihood Ratio Test Probability)	.962 (0.462) Prob> χ^2 = 0.00	.981 (0.464) Prob> χ^2 = 0.00	.981 (0.471) Prob> χ^2 = 0.00

The standard errors are reported in parentheses, where + indicates significance at the 10 percent level, * significance at the 5 percent level, and **significance at the one percent level

Figure 8 displays the actual broker failures and the failures predicted by the negative binominal model. The model explains much of the variation in the observed broker defaults, picking up most of the crises in spite of the limitations of the data. Perhaps, the most prominent exceptions are in 1895, 1896 and 1904. Some of these defaults, especially those in 1895 and 1896 were the consequence of brokers from the

Bourse becoming involved in the *Coulisse* after regulations were tightened by the *Compagnie*. The controls imposed after the crash of 1882 appear thus to have controlled the moral hazard from the mutual guarantee of the Common Fund.

Figure 8
Actual and Predicted Annual Failures, 1819-1913



Naturally, the time series data only capture some of the determinants of why brokers failed. To more carefully identify the causes of default we have collected data on all brokers between 1815 and 1913. The names of the 526 brokers for the 60 and later 70 *offices* they held, the date of their nomination to the *office*, and the date of their official departure, as well as the names of the syndics, were obtained from the *Compagnie's Filiation des charges* (1961). Which brokers defaulted and the circumstances of the default were found in the minutes of the *Chambre Syndicale* and the *General Assembly*. We were also better able to pinpoint the date of default, which often differed from the official date of departure from office. Using this information we were able to compute the time a broker was in office, or duration, measured in days (*DURATION*). The minutes revealed that brokers who took over the *office* of a defaulting broker faced considerably difficulties. Apparently, there were continuing problems with the book of

the broker that were not resolved upon his dismissal. It was widely believed that these *offices* became *charges maudites* or “cursed seats” as they raised the probability of the next broker failing. To test for this problem we included a dummy variable (PREDECESSOR) for the preceding broker failing. We use the same series of dummy variables for the regulatory regimes, previously described, both for the time when a broker took office and the time when he departed. Similarly we employ the variables used in the time series on equity and bond prices, the proxy variable for volume, interest rates, seat prices, and the Common Fund for the beginning and end of a broker’s time in office, depending whether we are using the hazard model or logit model described below. We include a dummy variable if the broker was a syndic—the chief officer—of the Compagnie (SYNDIC). Although only one syndic failed, we presume that being a syndic should reduce the probability of default as more trustworthy, sound brokers would be elected to this position.

We first estimate the determinants of the i th broker’s duration in office using a proportional hazard model with equation 2 and secondly the causes of his default using a logit regression with equation 3.

$$(2) \text{ DURATION}_i = \beta_0 + \beta_1 \text{EQUITIES}_t + \beta_2 \text{RENTES}_t + \beta_3 \text{INTRATE}_t + \beta_4 \text{VOLUME}_t + \beta_5 \text{SP/VOLUME}_t + \beta_6 \text{CP/VOLUME}_t + \beta_7 \text{D1823-1830} + \beta_8 \text{D1831-1882} + \beta_9 \text{D1883-1897} + \beta_{10} \text{D1898-1913} + \beta_{11} \text{SYNDIC}_i + \beta_{12} \text{PREDECESSOR}_i + e_i$$

$$(3) \text{ DEFAULT}_i = \beta_0 + \beta_1 \text{EQUITIES}_t + \beta_2 \text{RENTES}_t + \beta_3 \text{INTRATE}_t + \beta_4 \text{VOLUME}_t + \beta_5 \text{SP/VOLUME}_t + \beta_6 \text{CP/VOLUME}_t + \beta_7 \text{D1823-1830} + \beta_8 \text{D1831-1882} + \beta_9 \text{D1883-1897} + \beta_{10} \text{D1898-1913} + \beta_{11} \text{SYNDIC}_i + \beta_{12} \text{PREDECESSOR}_i + \beta_{13} \text{DURATION}_i + e_i$$

By using the hazard model we can examine what effect the initial conditions had on the length of time that a broker would stay in his *office* (Kiefer, 1988). For the hazard model, a default represents “censoring,” that is an abnormal termination of the time in office. In our analysis we must restrict ourselves to the years 1819 and later as that is the first year when there is information on the stamp taxes that we use to estimate volume. In contrast, the logit focuses on the conditions that prevailed in the year leading up to the

closure of the broker's office. For our logit and proportional hazard models, a default is assigned a value of one; otherwise if the broker simply exited from the Bourse, he is assigned a value of zero. An issue arises for the logit regressions because some 61 of the 526 brokers continued in office well past 1913. Our study terminates in 1913 because conditions changed drastically during World War I. We have treated this issue in two ways. First, we exclude those brokers who continued their operations past 1913 and secondly, we include them, using the data for 1913. These two approaches yielded similar results and we report only the results when all brokers are included.

For the proportional hazard model we assumed a Weibull distribution, as this specification is appropriate for data that contain observations with both short and long durations. It also permits us to test for duration dependence, that is, whether there was any increased likelihood of survival over time. The results for the proportional hazard model are presented in Table 2. As might be expected most of the variables at the outset—the growth of volume, and the changes in the interest rate, seat price to volume, and Common Fund to volume—have little effect on how long the broker will survive. However, positive equity and *rentes* returns seem to have given a broker a modest fillip, as the coefficient on the hazard ratio is significantly less than one, indicating a lower hazard and longer survival time. While becoming the syndic did not affect survival time, taking over an *office* from a defaulting broker was disastrous. The coefficient on the hazard ratio for the preceding broker defaulting is far larger than one, decreasing survival time.

Table 2
Individual Broker Defaults, 1819-1913
Proportional Hazard Model Regressions (Weibull Distribution)
(Hazard Ratios and Standard Errors)

Variable			
EQUITIES	0.442 (0.709)	0.106+ (0.134)	
RENTES	0.012 (0.037)		0.005* (0.011)
INTRATE	0.877 (0.148)	0.980 (0.153)	0.856 (0.138)
VOLUME	1.401 (0.921)	2.018 (1.262)	1.239 (0.755)
SP/VOLUME	0.763 (0.795)	1.442 (1.384)	0.732 (0.760)
CF/VOLUME	1.216 (0.223)	1.147 (0.206)	1.206 (0.222)
DUM 1823-1831	0.496 (0.268)	0.701 (0.333)	0.451 (0.231)
DUM 1832-1882	0.308* (0.146)	0.453* (0.178)	0.283** (0.126)
DUM 1883-1898	0.071** (0.053)	0.102** (0.071)	0.066** (0.049)
DUM 1899-1913	0.033** (0.037)	0.050** (0.054)	0.032** (0.035)
SYNDIC	0.369 (0.375)	0.384 (0.391)	0.355 (0.359)
PREDECESSOR	9.512** (2.738)	9.565** (2.737)	9.463 (2.738)
P	0.789 (0.079)	0.781 (0.078)	0.789 (0.079)
LR Chi-2 (12)	85.41**	83.33**	85.15**
No. of Obs.	439	439	439

The standard errors are reported in parentheses, where + indicates significance at the 10 percent level, * significance at the 5 percent level, and **significance at the one percent level

Starting out as a broker before the advent of the Common Fund reduced survival time and even the period 1823-1831 caused no significant increase or decrease in survival time. Only after the reforms of the 1830s is there a coefficient significantly smaller than one for the period 1832-1882. Changes in the regulatory regimes for 1883-1898 and 1899-1913 greatly increased the chances of survival, as indicated by their very small

coefficients. The estimated coefficient p in the proportional hazard model is significantly less than one implying that as more time spent as a broker, the lower likelihood of failure, suggesting that experience was an important factor in lowering defaults.

Table 3
Individual Broker Defaults, 1819-1913
Logit Regressions

Variable			
Constant	0.971 (0.756)	0.591 (0.680)	1.090 (0.743)
EQUITIES	-1.951 (2.417)	-3.589 (2.029)+	
RENTES	-4.689 (3.936)		-6.550* (3.238)
INTRATE	-0.548* (0.227)	-0.402* (0.188)	-0.593** (0.222)
VOLUME	-3.918** (1.035)	-3.698** (1.006)	-4.076** (1.017)
SP/VOLUME	-3.795** (1.446)	--3.394* (1.399)	-3.757** (1.446)
CF/VOLUME	-0.480* (2.330)	-0.548* (0.229)	-0.519* (0.227)
DUM 1823-1831	-1.285 (0.815)	-0.869 (0.722)	-1.428+ (0.799)
DUM 1832-1882	-1.529* (0.737)	-1.149+ ((0.656)	-1.695* (-0.711)
DUM 1883-1898	-1.559+ (0.934)	-1.184 (0.872)	-1.693+ (0.925)
DUM 1899-1913	-2.136* (0.997)	-1.647+ (0.903)	-2.342* (0.966)
SYNDIC	1.483 (1.206)	1.232 (1.215)	1.596 (1.191)
PREDECESSOR	4.860** (1.119)	4.783** (1.121)	4.935** (1.119)
DURATION	-0.0004** (.00001)	-0.0004** (0.0001)	-0004** (0.0001)
Pseudo- -2	0.346	0.342	0.344
No. of Obs.	498	498	498

The standard errors are reported in parentheses, where + indicates significance at the 10 percent level, * significance at the 5 percent level, and **significance at the one percent level

The logit regressions in Table 3 confirm the time series results. In the year before a failure, negative returns on equities and the *rentes* contributed to broker defaults.

Even more significantly, a decline in our measure of volume increased the probability of a broker defaulting. As in the times series, a rise in the open rate of interest from the previous year reduced the likelihood that a broker would default. If volume rose relative to our measures for brokers' capital and the Common Fund, there was an increased probability of brokers defaulting. If a broker was a syndic of the Compagnie, it does not appear to have influenced the likelihood that he would default. However, the *charges maudites* were clearly a problem. Experience was an important factor, decreasing the likelihood that a broker would fail, as the longer the duration, the less his chance of defaulting. The results for the regime dummies again corroborate those for the hazard model and the time series regressions. Operating under the more restrictive later regimes, 1883-1898 and 1899-1913 significantly reduced the likelihood broker default. There are weaker effects for earlier regimes. But, it is important to note that duration is strongly and positively correlated with the last regime (0.59), and when duration is dropped from the regression, the effects of this regime are even stronger. Obviously, the regulatory regime in place at the time strongly influenced the time a broker was in office.

Lessons for Today?

To lower counterparty risk so that a broker's failure did not endanger his brethren on the Bourse and provoke a more general liquidity crisis required a tight regulatory regime. For much of the nineteenth century, brokers resisted strong controls and rules that would have disciplined risk-taking. Consequently, the Common Fund was sometimes inadequate for covering the losses experienced by brokers. To avert a general crisis, the Chambre Syndicale was often forced to ask for assistance from the Banque de France or even resort to extraordinary measures such as manipulating the clearing price in the forward market. In setting its regulations, the exchange was forced to reckon with competition from the Coullisse, as imposing tough risk controls would lower the returns for its brokers relative to their largely unregulated rivals on the curb market. With a mutual guarantee fund and appropriate monitoring, the benefit from controlling counterparty risk was that investors should have been able to trust the brokers on the Bourse more than the brokers off the exchange who were not monitored by their peers.

But the tightening regulatory regime and the change in policy vis-à-vis institutional investors' losses after 1882 led business to move off of the exchange. In the late 1880s, the Coullisse grew rapidly, taking on more risk. When it was felled by a financial crisis and multiple broker failures in 1895-1896, the Bourse secured government intervention and legislation that reinforced its monopoly and increased control of the curb market. Unfortunately, World War I ended this experiment; but the experience of the Paris Bourse is a cautionary tale of the difficulties faced when attempting to manage risk on an exchange.

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