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Competition among Securities Markets

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Competition among Securities Markets Stock Exchange Industry Regulation in the Paris Financial Center at the Turn of the Twentieth Century

August 2018

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Understanding institutional change in Asia: a comparative perspective with Europe

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INCAS is a Marie Skłodowska-Curie Actions R.I.S.E funded project under the European Commission's H2020 Programme.

The project INCAS aims at creating a top-level research and advanced training network on institutional change in Asia, in comparative perspective with Europe.

The coordinator, Ecole des Hautes Etudes en Sciences Sociales (France), promotes this network together with Oxford University (UK), Freie Universität Berlin (Germany), and in collaboration with Waseda University (Japan). The aim of the proposed mobility scheme is to give birth to a European consortium and network of faculties and advanced graduate students specialized in the comparative analysis of institutional change in Asia and Europe. The partners have chosen Japan as a reference point because of its comparability with Europe as shown by previous studies, its historical influence on development and further institutional changes in Asia, and the expertise accumulated within our research team.

Analyzing current economic dynamics in Japan and later expanding this analysis to other Asian countries promises to generate insights that might be help to better understand challenges for Europe and to prepare relevant policy proposals. Our purpose is to compare the results obtained in the case of Japan and few other Asian countries (South Korea, Taiwan, China, and possibly Thailand, after having checked the data availability), not only to previous results on Europe but also to original results we will get on European countries (primarily France – which will be our reference country in Europe – and then the UK, Germany, and Italy) in mobilizing new historical data and applying our theoretical framework.

Competition among Securities Markets Stock Exchange Industry Regulation in the Paris Financial Center at the Turn of the Twentieth Century

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Abstract

We study the causes and the consequences of two regulatory changes affecting the competition between the transparent Parquet and the OTC-like Coullisse markets in Paris at the turn of the 20th century. First, we provide evidence supporting the interest group theory to explain regulatory changes. By using these changes as natural experiments, we show then that competition widens bid-ask spreads while monopoly makes them more narrow. These results are in line with recent literature questioning the effects of “dark” competition: a transparent monopoly could be more effective than competition if the latter involves opaque markets.

Keywords

Paris stock exchange, market microstructures, reforms, regulation, monopoly, spreads

JEL Classification

G14; G18; G24; N13; N23; N43

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1. Introduction

Implementation of recent regulations such as Reg. NMS in the United States and MiFID in Europe fostered competition among trading venues, a “perennial issue of interest to regulators and market participants” (Hagerty and Mac Donald 1996, p. 36). In this paper, we study the motives and the consequences on market quality of regulatory changes affecting the competition among securities markets. We use as natural experiments the regulatory reforms of 1893 and 1898 in the Paris financial center, the second largest European financial market after London at that time. We provide evidence supporting the interest group theory to explain regulatory changes, and show that direct competition between the two markets deteriorates market quality.

Like New York and contrary to London, Paris hosted well differentiated markets: the Parquet and the Coullisse. The Parquet was a regulated and organized market run by official brokers (*agents de change*) entitled with the legal monopoly on the securities they listed. It provided transparency and security to investors. The Coullisse was an OTC-like opaque market run by dual-capacity operators called *coullissiers*. It provided immediacy, flexibility and opaqueness mostly to professional investors. The heterogeneity between the two markets led to complementarity and competition. The Coullisse specialized in securities that did not match the listing requirements of the Parquet. Competition concerned the most liquid listed securities illegally traded on the Coullisse. Complementarity and competition contributed to the development of the Paris financial center (Hautcoeur and Riva, 2012).

In the wake of several financial crises and scandals, the structure of the Paris financial center was debated and reformed through fiscal laws first created in 1893, and amended in the 1898 Financial Transaction Tax (FTT). These two reforms determined three regimes of competition between the Parquet and the Coullisse: i) a regime of “illegal” competition before 1893, when the Coullisse traded listed securities in violation of the Parquet’s legal monopoly; ii) a regime of free competition, between 1893 and 1898, when the government recognized Coullisse’s transactions on Parquet’s listed securities by allowing the *coullissiers* to pay the newly created FTT on these trades; iii) a regime of enforced monopoly granted to the Parquet after 1898, when the government prevented the Coullisse from paying the FTT on listed securities trades and thus from trading them.

Parquet’s and Coullisse’s operators engaged in hard lobbying to capture the regulation since these changes were expected to impact the distribution of profits among operators by shifting traded volumes from one venue to another. Paradoxically, both groups claimed to be submitted to the FTT to win the competition. Thanks to a new unique database and following a large stream of literature in (historical) finance (Gehrig and Fohlin 2006; Brown et al. 2008; O’Hara and Ye 2011) we consider bid-ask spreads– the main component of transactions costs - to study the impact of regulation changes on market quality. We find that the Paris market touch - the average spread of the securities traded in the two markets - widen in the free competition, while in the enforced monopoly regime it narrows to a size significantly smaller than in the first regime. Our analysis shows that the regimes have a significant effect on the Paris market touch.

Our findings challenge the results of William O. Brown, J. Harold Mulherin and Marc D. Weidenmier (2008). These authors find that between 1885 and 1926 Consolidated Exchange’s competition over the New York Stock Exchange (NYSE) narrows the latter’s spreads. They conclude that competition improves market quality. Differently from Brown et al. (2008), we include in our analysis the spreads of the two competing markets so that we observe the overall effects of the competition on the financial center: the spreads of the Parquet narrow in the free competition regime, but even more so in the consolidation regime; the widening of the Paris market touch in the free competition regime is driven up only by the increase in the spreads of the Coullisse that then substantially narrow in enforced monopoly regime.

These results can be explained within the framework of the recent literature studying the effects of competition among transparent and opaque markets, the so-called dark fragmentation. Although there is not yet a complete consensus on the positive effects of competition among transparent markets on market quality, the evidence is much more mixed concerning dark fragmentation. Within this framework, consolidation - the monopoly regime - could be more efficient than fragmentation at least if the latter is dark. Furthermore, our results confirm the crucial role of microstructural differences in the design and transparency of the markets involved in the competition (Gomber et al. 2017).

2. Competition in theory and history

Competition among securities markets is a complex phenomenon because within the stock exchange industry the market for trading services is embedded in the market for securities. While competition could be beneficial for the trading services market, it could harm the market for securities. The NMS regulations in the USA and the Mifid directive in the European Union, both aiming at promoting competition among heterogeneous trading platforms, reopened this long-lasting debate (Petrella 2010).

An important stream of literature from George J. Stigler (1964) emphasized the benefits of a consolidated and transparent market for both investors and issuers, and considers this market as the natural consequence of competition. The benefits stem from positive externalities of liquidity, reduction in information asymmetries resulting from the consolidation of the price discovery process, enhanced competition within the market and economies of scale allowing the marketplace to amortize fixed costs over more trades. Nevertheless, if operators of a consolidated market collude, they can increase trading costs and recreate scope for challengers.

A more recent literature (since Harris 1993) emphasizes the advantages of a fragmented market if investors are heterogeneous enough in terms of information, patience, and risk aversion in spite of increased trading complexity. Differentiated microstructures disclose unequal amount of information before and after the trade. They strengthen different dimensions of market effectiveness and attract traders with different preferences. Hence, uninformed investors may opt for a transparent and less immediate market while informed investors may prefer a more immediate and opaque market where they can quickly take advantage of their information in spite of spreads being potentially higher because of adverse selection.

Risk-averse traders may opt for markets with effective counterparty risk management mechanisms (for example, operators' selection and monitoring as well as central counterparty) and high listing requirements. In turn, these devices restrict issuers' and traders' access to the market, create capacity constraints and scope for the raise of sustainable competing markets. Conversely, at least before the introduction of electronic trading the overcrowding of the floor can harm the smooth functioning of the market (Baker 1984). The coexistence of heterogeneous trading venues would attract investors and issuers whose preferences would not match the design of the unique exchange.

If there is a consensus on the waste of resources resulting from coexisting similar markets, serious arguments suggest that heterogeneous competing venues may contribute to the development of the securities market as a whole. However, it is not yet clear if fragmentation benefits issuers and investors under any circumstance. Research particularly questions the effects of "dark fragmentation". It shows that fragmentation between transparent and opaque venues may hamper several dimensions of market quality (Mendelson, 1987; Madhavan, 1995), even though empirical evidence is not conclusive (Buti et al. 2015; Degryse et al. 2014; Hatheway et al. 2016). Although the overall effect seems to be sensitive to many parameters of the market design, a differential impact of dark and transparent fragmentation on market quality is likely (Gomber et al. 2017, p. 805). As a result, whether fragmentation is beneficial for market participants remains an open empirical question.

Potential competition is also an important factor shaping participants' behavior. According to the contestable markets literature (since Baumol 1982), effective competition depends not only on the actual number of competitors but also on the ease of entry into the market, an effect shown to exist not only in the consumer goods market, but also in networks industry (Bergman and Rudholm 2003, Goolsbee and Syverson 2008). Concerning securities markets, the rent seeking behavior of a monopolistic market can be limited (and thus the spread narrowed) by the threat of another venue that could start to trade it. Potential competition on the secondary market means actual competition on the primary market (Neal 1985, Brown et al. 2008).

Historical literature on the competition among securities market is still limited. Though some researchers study the competition between central and regional markets¹, this literature does not deal directly with transaction costs and market quality trade-offs stemming from fragmentation and consolidation. While some papers deal with transaction costs on a single market², literature on competition and market quality is less

1. Arnold et al. (1999), O'Sullivan (2007), White (2013) on the United States; Thomas (1973), Michie (1985, 1999), Campbell et al. (2016) for the United Kingdom; Burhop and Lehmann-Hasemayer (2016) for Germany; Riva (2007, 2012) for Italy; Strauss (1985), Oosterlinck (2010), Oosterlinck and Riva (2010), Ducros and Riva (2017) for France.

2. Acheson et al. (2018), Chavaz and Flandreau (2017), Campbell et al. (2017), Burhop and Gelman (2011) and Gehrig and Fohlin (2006).

developed. According to Bruno Biais and Richard C. Green (2007), bond trading was active on the NYSE until the 1940s, when liquidity dried up as trading migrated to the OTC market. This migration significantly widened spreads for retail investors because of the opacity of the OTC market relative to the transparency of the NYSE. The rise of institutional investors determined the migration: large dual capacity operators earn rents when liquidity concentrates in opaque and bilateral markets. The market power of these operators explains why liquidity may not concentrate into the most efficient venues, even in the long run.

Brown et al. (2008) studied the effects of the Consolidated Exchange competition over the NYSE between 1885 and 1926. Competition narrows average NYSE spreads and improves market quality. According to Caroline Fohlin, Thomas Gehrig and Tobias Br nner (2009), securities dual-traded on the NYSE and the Consolidated display lower spreads than single-traded securities. Caroline Fohlin (2016), quoting preliminary results from a joint study with Thomas Gehrig suggests that when the NYSE took actions to limit competition from the Consolidated in 1909, not only dual-traded but also single-traded securities registered significantly lower traded volumes and wider spreads, the sign that competitive dynamics affect the entire market. According to Lance E. Davis, Larry Neal and Eugene White (2007), the NYSE's spreads in the 1920s were widened when raising traded volumes faced capacity constraints created by the operators' fixed number; competition led the NYSE to increase the number of seats that in turn made spreads less sensitive to surges in traded volumes and reinforced the NYSE's competitiveness.

Pierre-Cyrille Hautcoeur and Angelo Riva (2012) studied institutional complementarities and competition between the Parquet and the Coullisse. Since the early nineteenth century, the Paris financial center was organized around these two heterogeneous markets. The Parquet was a regulated market organized by a guild-like body (*Compagnie*) of 60 pure brokers, with unlimited liability vis-à-vis their clients and the legal monopoly on the securities they listed. These brokers gained access to the ownership of a seat after a strict screening by their peers based on social and wealth criteria and were appointed by the Ministry of finance. Their personal wealth, the capital of their securities houses and the Parquet's common fund provided high guarantees to the investors and made losses unlikely in the case of the default of an *agent*. Overtime, the Parquet's committee strictly monitored its members to mitigate moral hazard and counterparty risk. The Parquet was a highly transparent market where trading was based on open outcry around pits. Moreover, the Parquet enforced strict listing requirements and provided an efficient settlement and payment system in cooperation with the Bank of France (Riva and White, 2011, Hautcoeur and Riva, 2012; Lagneau-Ymonet and Riva, 2018; Verley 2007).

By contrast, the Coullisse was a loosely organized OTC-like market. The *coullissiers* acted both as brokers and jobbers. Unlike the *agents de change*, many *coullissiers* and partners of their securities houses were foreigners. These securities houses were usually smaller than the official brokers' ones and transactions were only guaranteed by their capital because of the limited liability (Verley 2007). Additionally, there were no listing requirements or formal membership so that the number of *coullissiers* changed according to business opportunities. Transactions were bilateral and private, but the *coullissiers'* dual capacity conferred to the market high immediacy, particularly for block trading; transaction prices were unsystematically registered and published by a few newspapers. Consequently, the Coullisse can be considered a very opaque market.

The differences between the two markets naturally led to a kind of specialization. While individual investors mostly sent their orders to the Parquet, institutional investors split the orders of their own accounts and the ones received by their clients between the two markets to benefit from their relative advantages. The Coullisse mostly traded securities issued by (foreign) issuers that could not meet the listing requirements of the Parquet. Competition between the two markets concerned the most liquid securities. From 1892 on, competition also involved a number of small and medium French businesses. In 1890, the government passed a decree on securities trading previously only regulated by the internal rules of the Parquet. While this decree increased the regulatory burden of the Parquet, it allowed the *agents de change* to create a junior unofficial market to trade securities that did not match the listing requirements. The Parquet opened this market segment in 1892 and explicitly targeted small and medium businesses traded at the Coullisse (Ducros and Riva 2017).

Complementarity and competition between Parquet and the Coullisse contributed to the development of the Paris financial center. Because of the monopoly of the *agents de change*, *coullissiers'* trading on listed securities was illegal but tolerated and sometimes protected by the government because it was considered crucial for liquidity, particularly in the public bonds market. Nevertheless, encroaching on the *agents'* monopoly entailed legal risk for the *coullissiers* trading listed securities. According to jurisprudence, courts did not

enforce contracts on listed securities between a *coulissier* and a bad faith client. As a consequence, the latter could refuse to pay the amount owed to the former on listed securities. This risk amplified counterparty risk (Lagneau-Ymonet and Riva 2018).

3. The Political Economy of the regulatory reforms

In the 1890s, the architecture of the Paris financial center was the object of fierce debates and dramatically reformed twice through fiscal laws, first in 1893 and then in 1898. In the wake of the financial crisis and scandals at the turn of the 1880s such as the Panama affair and the default of the Comptoir d'Escompte (Bouvier 1964, Hautcoeur et al. 2014), the French regulators developed the project of a FTT. After having shortly fought against this project, the *agents de change* and the *coulissiers* claimed to be submitted to the FTT to win the competition.

The government had two options. On one hand, if the government had imposed the FTT on the transactions of both markets, the *coulissiers'* trades on listed securities would have become legal and the inherent legal risk disappeared, but the *agents de change* would have faced heavier regulatory burden without the benefit of a superior legal position. On the other hand, if the government had taxed only the *agents'* transactions, the monopoly of the Parquet on listed securities would be enforced and the fiscal administration would systematically sue the *coulissiers* who were trading listed securities for fiscal evasion.

In 1893, the government imposed the FTT on the listed securities transactions of both markets and dismantled the legal monopoly of the Parquet. This decision marked the transition from the first regime of “illegal” competition to the second regime of free competition between the two markets. In 1898, a new law made the *agents de change* the only operators entitled to pay the FTT on listed securities, hence restoring and enforcing the official brokers' monopoly. It marked the transition to a regime of consolidation, where each asset could be traded in only one market.

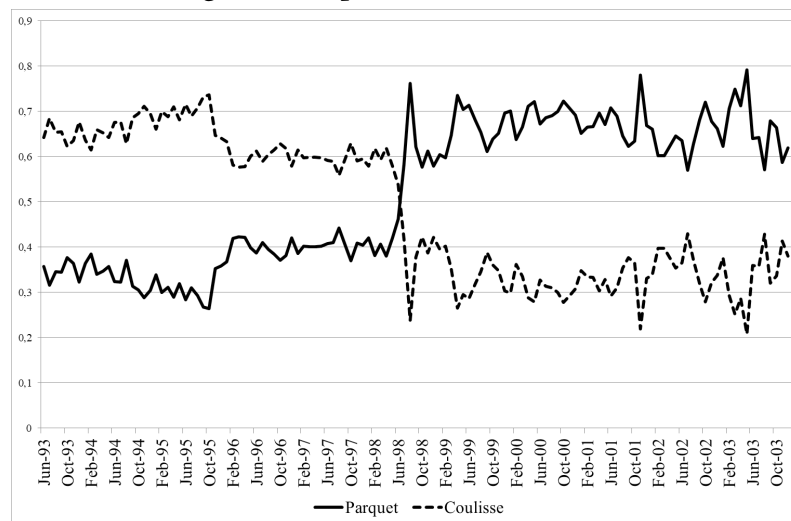
Before the introduction of the FTT, neither the exchanges nor other institutions published traded volumes data. Archival sources reveal that in 1892 trades on the Paris financial center amounted to 110 billions of francs (counted on both sides), or roughly 4.8 times the French GDP³: the Parquet traded for 35 billion (32 percent) and the Coullisse - by far, the main French market at that time - for 75 billion (68 percent). In 1882, during the most violent financial crisis in French financial history (Le Bris, 2018), while the Coullisse collapsed the Parquet was rescued by a loan from the Bank of France. The *agents de change* quickly paid back their debt, but the need to mitigate moral hazard stemming from their mutual guarantee fund pushed the Parquet's Committee to put in place effective measures to reduce risk taking. Because of these measures, volumes moved off of the Parquet. Thus, in the late 1880s, the Coullisse started to grow rapidly (Riva and White 2011).

Figure 1 plots the market shares of the Parquet and the Coullisse over the Paris financial center based on the FTT. The market share of the Coullisse in 1894, the first year the FTT was fully paid, was around 66 percent. The 1893 law did not change the structure of the financial center but reinforced the domination of the *Coullisse* that reached a market share of almost 70 percent in 1895. On the contrary, the 1898 reform dramatically changed the direction of the order flow and the Coullisse's share dropped from 60 to 30 percent. According to the Parquet, 5/7th of the volumes traded at the *Coullisse* concerned listed securities⁴. The design of the FTT affected the distribution of profits among operators by heavily shifting traded volumes: the *coulissiers* and the *agents de change* massively mobilized resources to lobby regulators and gain the support of banks and bankers.

3. For traded volumes, *Lettre rectificative* sent to Mr. Ernest. Boulanger, Senator, by the Chambre syndicale des agents de change de Paris, 21 March 1893, Centre des Archives Economiques et Financières (CAEF), box 64,877. For French GDP data, Levy-Leboyer and Bourguignon (1990).

4. Ibid. *Lettre* to Boulanger.

Figure 1: Parquet and Coulisse Market Share



Notes: Market share of Parquet and Coulisse over the total transactions in Paris based on stamp duties (in percentage).
Source: Authors' calculations on data published on the *Bulletin de statistique et législation comparée*, various issues.

3.1 The 1893 reform

In the middle of the Panama affaire, the *Chambre des Députés* (*Chambre*) adopted the principle of the FTT proposed by the socialist Antoine Jourde as a sanction for the financial crises and scandals of the previous decade and to balance the budget⁵. The Coulisse and the Parquet fought against the FTT that they considered harmful to Paris as an international financial center. Nevertheless, under the pressure of public opinion⁶, the regulators stayed on course. Each group rapidly turned to consider the tax as an opportunity to win the competition.

In January 1893, the Minister of Finance Pierre Tirard presented a bill entitling only the *agents de change* to pay the FTT on listed securities. The bill enforced the Parquet monopoly, but also imposed the transactions on unlisted securities of the Coulisse to enable the government to monitor this opaque market and, particularly, the activity of foreign bankers and *coulissiers*⁷. Indeed, the *agents de change* rapidly mobilized their social networks⁸, started lobbying the public authorities and hired influential lobbyists⁹: in 1893, 1,8 million francs (45 percent of its overall expenses) were spent mainly in lobbying the press to influence the public opinion¹⁰. The Parquet also tried to take advantage of nationalistic and anti-Semitic stances developing at that time in France: it passed to *La Réforme Economique* the list of the foreign *coulissiers* and partners¹¹.

In the debates, the *agents de change* argued that the Parquet protected individual investors thanks to its guarantees even in crisis as in 1882, when clients of bankrupted agents were completely paid back. On the contrary, investors were frequently victims of *coulissiers'* insolvencies and conflicts of interests stemming from their dual capacity. The *agents de change* also argued that the transparency of the Parquet ensured fair valuation to issuers, as also recognized by the main French business association¹². Moreover, the redirection of the order flow on listed securities to the Parquet would have provided better immediacy. The *agents* acknowledged a role for the Coulisse because of its complementarities, but only as subsidiary to the Parquet. In that vein, the *agents* publicly offered to the *coulissiers* high rebates on their commissions for the business on listed securities the latter would have brought to the former.

5. Sessions of 15 and 16 November, 12 December, *Journal officiel de la République française. Débats parlementaires. Chambre des députés*, 16 and 17 November, 13 December, 1892.

6. On the role of the public opinion in the approval of the FTT, see Elsa Massoc (2017).

7. Compare *Exposé des motifs, Impôt sur les opérations de bourse*, January 1893, CAEF, box B 64.877.

8. CAC, CS, 6 January 1893.

9. Before the definitive adoption of the principle of a FTT by the *Chambre* on December 12, a project of bill prepared by the Parquet Committee circulated among the members of the Parliament (*Journal officiel de la République française. Débats parlementaires. Chambre des députés*, session of 12 December 1892; *Compagnie des Agents de Change* (CAC), Minutes of the *Assemblées Générales* (AG), 12 December 1892, CAC, Minutes of the *Chambre Syndicale* (CS), 20 January 1893).

10. CAC, AG, 18 December 1893; CAC, Box SG 331, file A.212.03.

11. *La Réforme Economique, supplément*, 23 February 1893; CAC, box SG 331 A.

12. *Impôt sur les opérations de bourse, Dépôts devant la Commission du Budget, Audition du Président de l'Association de l'Industrie Française*, CAEF, box B 34.010.

The *coulissiers* refused this proposal, likely because – as the Parquet and the Paris Chamber of Commerce argued – most of their business came from market making on listed securities and the rebates would have not compensate the loss¹³. The main *coulissiers* started their lobbying campaign and themselves hired influential lobbyists. They insisted on their complementary role in the financial center particularly important for both the French public bonds and the international business precisely because of their foreign operators. The Coulisse proposed an alternative bill inspired by the London model: the profession of *agents de change* would have been suppressed and a unique market established where membership would have been open to everyone meeting some requirements¹⁴. Banks supported the Coulisse because they were very interested in preserving the complementarity between the two markets. Following the Parquet committee, “bankers and banks, generally well-informed, find it advantageous to quickly buy or sell a blocks of securities at the Coulisse.”¹⁵

Moreover, banks and bankers had common interests with the Coulisse. First, they cooperated on the primary market, in particular for foreign as well as small-medium business issues: the *coulissiers* could buy on their own account (large) blocks in primary market and then progressively trade them on the market. Second, the deposit banks were earning substantial profits by providing *coulissiers* with large amounts of short-term credit required by the forward trading. Third, legalization of the *coulissiers*’ trades in listed securities would allow banks to send their clients’ orders to the Coulisse without legal risk. Lastly, because of a change in the guarantee policy of the Parquet after the 1882 crisis, professional investors distrusted reimbursement in case the *agent* did not fully respect the rules of the Parquet. After the 1882 crash, the Parquet paid for all the debts vis-à-vis investors of the insolvent *agents de change* as its internal rules stated, but then reconsidered this policy because the full mutual guarantee proved to be very costly. The Parquet then imposed some losses on irregular operations to professional investors when two *agents de change* defaulted respectively in 1886 and 1888. *Coulissiers* and banks highlighted these losses in their lobbying.

The budget commission of the *Chambre* auditioned the stakeholders and took a position hostile to the bill proposed by Tirard. The commission argued that the government should not take the risk of disrupting the financial center with a FTT elaborated in a very short time. It then formed a special sub-commission to prepare a new bill that would not destabilize the market. This attempt was short lived since Tirard threatened to resign and bring the then fragile government down before the approval of the finance bill. The FTT bill was then passed on 24 February 1893, at the *Chambre* (by 436 to 41 votes).

The discussion resumed at the Senate where the Budget commission, chaired by Ernest Boulanger¹⁶, supported the Coulisse. In its view, Tirard’s bill would heavily affect the Coulisse and jeopardize its international role, so much so that the trading would move to foreign markets. In order to lobby the Senate, the Parquet appointed additional lobbyists. In spite of that, the Senate then separated the FTT bill from the finance bill. A debate between the government, *Chambre* and Senate followed¹⁷.

The interest of public authorities had indeed various dimensions. The fiscal issue was certainly not negligible. According to the *coulissiers*, the taxation of their trades on listed and unlisted securities would have brought revenues for 15 million. However, opacity of the market did not let to check for this claim which was contested by the *agents de change*. Since most of French public bonds trading was on the Coulisse, the impact of a blow to the Coulisse on this market was a more serious preoccupation: a conversion of these bonds was planned by the government for January 1894. Banks and *coulissiers* pretended that the conversion would fail if the *Coulisse* was weakened¹⁸.

The diplomatic dimension was also underscored: Coulisse was the main market for various foreign government bonds listed at the Parquet. The listing and trading of these bonds in Paris was an important tool of French foreign policy. The Russian Minister of Finance Sergei Witte expressed concerns for Russian bonds. In the same vein, bankers and *coulissiers* pointed out that without an active Coulisse, German financiers would take

13. *Lettre rectificative* sent to M. E. Boulanger, Senator, by the *Chambre syndicale des Agents de Change de Paris*, 21 March 1893, CAEF, box 64,877; *Rapport présenté au nom de la commission n° 3 de la Chambre de commerce de Paris par M Hugot. Adopté et converti en délibération de la Chambre de commerce*, session 11 May 1898, CAEF, box B.64895.

14. *Projet de loi portant suppression avec indemnité du monopole des agents de change et réglementation de la profession de courtier en valeurs mobilières*, April 1893, CAEF, box. B 64877.

15. *Lettre rectificative* sent to M. E. Boulanger, Senator, by the *Chambre syndicale des Agents de Change de Paris*, 21 March 1893, CAEF, box 64,877

16. In 1893 he was also administrator of the *Compagnie Général des Omnibus*, whose securities were traded on the Coulisse.

17. “*Rapport de M. le Président du Tribunal de Commerce de Paris à MM. les Présidents et Juges des tribunaux de commerce de la Seine*”, 14 May 1898, CAEF, box 64.895.

18. *Journal Officiel de la République française, Documents parlementaires, Sénat*, 29 March 1893, session 28 March 1893.

the place of French ones in Eastern European countries, whose sovereign debts were traded mainly in the *Coulisse*.

The debate ended because the government fell. The new Minister of Finance, Paul Peytral, took a position favorable to the *Coulisse* and proposed a bill based on the Senate Budget Commission proposal. This bill allowed any market operator to pay the FTT on any security. Therefore, it legalized the *Coulisse* trading in listed securities. The bill passed without further debates. The alliance between the *Coulisse* and the banks, the fears for the French public bonds market, and the international outreach of Paris, as well as the need of a balanced budget, paved the way for the free competition between the *Parquet* and the *Coulisse*.

3.2 The 1898 reform

In 1898, the finance bill reversed the 1893 decision. It included the amendment by Deputy Henry Fleury-Ravarin, stating that only the *agents de change* were entitled to pay the FTT on listed securities. Investors had to then exhibit the *agents'* pay-in slips to demonstrate the FTT was regularly paid. Trading in listed securities without *agents'* intermediation was then sanctioned with heavy fines by the fiscal administration on the same ground as fiscal evasion. This design of the FTT, similar to the 1893 Tirard project, enforced the monopoly of the *Parquet* on the listing securities and led to market consolidation¹⁹.

The *Parquet* never accepted the 1893 reform as definitive²⁰. The months around the turn of 1895 held an opportune window that *Parquet* seized upon and led to reform. Indeed, the South-African “gold mines crash” on the *Coulisse* coincided with the election of Maurice Verneuil²¹ as president of the *Parquet* (*Syndic*), while the resignation of pro-*Coulisse* Alexandre Ribot’s government and the appointment in April 1896 of the nationalist and protectionist Jules Méline as prime minister changed the political background.

The South-African gold mines crash heavily affected the *Coulisse*, while the *Parquet* remained unharmed. Indeed, most of the shares of these gold-mines did not comply with French corporate regulations and the *Parquet*’s listing requirements so that they were traded at the *Coulisse*. The information on the issuers was very limited and the *coulissiers* often acted as bankers issuing the shares in Paris raising potential conflicts of interest. In cooperation with the banks, the *coulissiers* developed the market for gold mines aggressively. Thanks to large advertising campaigns, these securities were sold to French investors. Prices skyrocketed driven by forward trading sustained by large amounts of short-term credit from Parisian banks.

The opacity of the market prevented outsiders from measuring the magnitude of both credit and risk-taking. When the first signals of downturn appeared, banks refused to renew the credit needed to support the market, the bubble burst and many *coulissiers* failed. Losses for investors were large and, in 1896, the *Parquet* transmitted to the Minister of Finance a file detailing them. The Ministry of Finance conferred the management of the crisis to Verneuil and later publicly rewarded his action. Verneuil understood immediately that the crisis was a unique opportunity for starting a campaign to restore the monopoly amid the new Prime Minister Mélines’ “great sympathy” for the *Parquet*²².

In the aftermath of the crisis, Verneuil started negotiations with banks that supported the *Coulisse* in 1893. He also immediately restored the full common guarantee for all the trades on the *Parquet*. From November 1896, he held technical meetings with banks and officers of the Ministry of Finance to discuss and prepare the reorganization of the market that would have assigned a central role to the *Parquet*, without compromising the survival of the *Coulisse*²³. He granted new facilities to the banks²⁴. Verneuil also tried to reassure the government concerned about the French public bonds: he proposed to exempt these securities from the FTT, a measure that would have granted to *coulissiers* the right to trade them. Verneuil then breached the front of

19. *Instruction de la Direction générale de l'Enregistrement relative à l'exécution des articles 14 et 15 de la loi du 13 avril 1898 sur les opérations de Bourse*, 20 June 1898. Chambre Syndicale des Agents de Change, 1902, p. 69 and following.

20. CAC, CS, 6 July 1894 and 19 October 1894.

21. Verneuil belonged to one of the most important lineage of *agents de change* and was well connected to the French upper bourgeoisie.

22. See CAC Box SG 329, file, A.211.51; Journal officiel de la République française. Débats parlementaires. Chambre des députés, 8 July 1896, session 7 July 1896 ; CAC, AG, 16 December 1895 ; CAC, CS, 10 September 1896.

23. CAC, CS 23 and 27 November 1896, 11 December 1896, 1 February 1897.

24. Among others, Verneuil granted the “*par contre*”, a scheme allowing banks and bankers to pay their brokerage fees only once for an intraday roundtrip security. He accepted to exempt from the agents’ monopoly, the operations through which the *coulissiers* bought blocks of newly issued listed securities from the underwriters (CAC, CS 23 November 1896, 27 November 1896, 11 November 1896).

banks and bankers so that the hostility to the reform expressed further by some bankers was of limited impact²⁵.

The Parquet promoted a campaign against the *Coulisse* in the press. The *Coulisse* was accused of allowing speculative practices that favored enemy countries, as in the case of the bull market on the Italian government bonds of 1894. The press campaign took even more aggressive, nationalistic and anti-Semitic stance within the context of the Dreyfus affair. In line with the views of Mélines's government, the Parquet took advantage of this context to stigmatize the *coulissiers* as foreigners, mostly Germans and Jews, pointing out the risks for the financial center in case of war and leaking again detailed information on nationality of the *coulissiers*²⁶. The Parquet also made public some glowing cases of *coulissiers*' FFT evasion. In 1897, a *coulissier* was fined 2.79 million francs because he did not pay the FFT on 2,575 operations for 44 million francs. The case provoked a scandal at the *Chambre*, especially because the *coulissier* escaped the fine thanks to a bankruptcy (apparently not a unique case²⁷). The Parquet again spent considerable sums in lobbying the press and regulators (up to 2.8 million francs in 1898, around 45 percent of its overall expenses).

The *Coulisse* reacted to the Parquet's actions and mobilized its connections. In June 1897, the senators Ernest Boulanger and Ludovic Trarieux, members of the Finances Commission of the Senate, presented a bill similar to the one elaborated by the same commission in 1893 and based on the London model. However, within the new political and social context, the Budget Commission of the *Chambre* refused even to hear the *coulissiers*²⁸. The government included then the reform of the FFT into the budget bill in March 1898. During the discussions at the *Chambre*, the socialists René Viviani and Jean Jaurès insisted to put into legislation the Parquet's common guarantee as compensation for the enforcement of the monopoly²⁹.

In the Senate, the bill was strongly disputed³⁰. However, the convincing hearing of Verneuil at the Budget Commission was widely appreciated. He emphasized the financial instability stemming from the predominance of an opaque *Coulisse*, while he recognized its complementary but necessarily subsidiary role³¹. At the Senate, the Minister of finance Cochery had to underline the public interest dimension of the Parquet. Finally, the reform passed without opposition on 14 April 1898.

The 1898 reform didn't bring the financial center back to its pre-1893 organization. First, the enforcement of the monopoly was ensured by the fiscal administration. Second, the microstructures of the two markets were deeply adapted to the new regulatory regime and its principles. Concerning the Parquet, the changes in its microstructure progressively took shape during the discussion leading to the reform with the purpose of overcoming capacity constraints to ensure the smooth handling of the order flow on listed securities. In a separate decree of 29 June 1898, the government put into the legislation the central counterparty function of the Parquet for trades covered by monopoly. Also the *Coulisse* accepted to change its microstructure to increase its transparency and strengthen its organization. The Government was interested in making this market more transparent and regulated, while the leading *coulissiers* attributed the defeat to both the weak coordination within the group due to the free entry into the market and the opportunistic behavior of some new entrants. Moreover, foreign *coulissiers* were left out unless naturalization (Courtois 1904).

Since the *coulissiers*' operations were largely concentrated on securities listed at the Parquet, the reform put the survival of the market at stake. Some *coulissiers* did not accept the new regulations or the constraints of naturalization. They moved their headquarters to Brussels where they resumed trading in the main Parquet-listed securities. The prices of this Brussels market were published in French financial newspapers. To pacify the financial center and ensure the survival of the *Coulisse*, under the auspices of the Ministry of Finance, the Parquet started negotiations with the *coulissiers* concluding in a private agreement in 1901. On one hand, the Parquet committed to pay back to the *Coulisse* large rebates on commissions (up to 80%) for the business the latter provided to the former on listed securities. On the other hand, the *coulissiers* specialized in French

25. CAC, CS, 18 December 1897.

26. See CAC, CS, 28 January 1898; CAC, box SG 331, file A.212.02 and box JZ 29; *La Réforme Economique*, 13 February 1898

27. *Rapport de M. le Président du Tribunal de commerce de la Paris à MM. Les Présidents et Juges des Tribunaux de commerce de la Seine*, 14 May 1898, CAEF, box 64.895.

28. CAC, CS, 9 April 1897, CS, 15 May 1897; *Mémoire à MM les membres de la Commission des Finances du Sénat sur l'amendement Fleury-Ravarin et la suppression du marché libre*, CAC, box SG 329, file A.211.

29. *Journal officiel de la République française. Débats parlementaires. Chambre des députés*, 8, 9, 10 March and 7 April 1898, session 7, 8, 9 March and 6 April 1898.

30. CAC, Box SG 329, file A.211 Minutes on the sessions of the Finance Commission of the Senate, 17, 18, 22 and 23 March 1898.

31. Verneuil, hearings in front of the Finance Commission, Minutes on the sessions of the Finance Commission of the Senate, 18 March 1898. CAC, Box SG 329, file A.211.

public bonds were allowed to continue their forward and option trading: only the transactions requiring the actual delivery and payment of the securities were to be directed to the Parquet.

The 1898 reform was then achieved in 1902 with the extension works of the stock exchange building. The 1898 competitive regime between Coulisse and Parquet lasted till 1961 when the government drove the acquisition of the Coulisse by the Parquet to pool the low liquidity of that time and revive market activity.

4. Empirical analysis of competition

4.1 Bid-Ask Spread Estimation

We assess the effects on market quality of the regulatory changes affecting the regime of competition in the Paris financial market. Following an important stream of literature in (historical) finance, we focus on spreads, the implicit component of transaction costs as a proxy for market quality. Although transaction costs are a multidimensional concept also composed of explicit costs such as commissions, the spreads are their main component and highly informative about the market quality (Pagano and Roëll 1990; Bessembinder and Venkataraman 2010). During the period under study, the Parquet was organized as an order-driven market with no explicit bid-ask spreads. In spite of the *coulissiers'* market making practices, newspapers published Coulisse's prices as transaction prices. As a consequence, we must estimate bid-ask spreads for each asset that we include in our sample.

For the Parquet, we collect prices from its lists, the *Cours authentique et officiel*. The rules of the Parquet imply the registration of every transaction price by dedicated clerks (*coteurs*). These prices were then published in chronological order on the list of the day. For the Coulisse, there was no such comprehensive source. Among newspapers publishing prices, the *Cote de la Banque et de la Bourse* was the most reputed and comprehensive. To our knowledge it did not disclose how the prices were collected. Given the actual structure of the Coulisse, it may have neglected some transactions. However, we assume that the very success of that newspaper reflected the quality and representativeness of its prices. Although from 1899 on the Coulisse published a list, we still rely on the *Cote de la Banque et de la Bourse* to avoid disruptions in the data sources. To estimate spreads, we collect the first spot price of each Friday for the assets included in our sample. We choose the first price of the day because of its informativeness: it contains the aggregated information since the last closing of the market.

To build our prices database, we have selected one year for each regulatory regimes: 1892 for the illegal competition regime, 1894 for the free competition regime and 1903 for the enforced monopoly regime. We chose 1892 in order to observe the competitive dynamics just before the reform of 1893 and as much as possible after the approval of the 1890 securities trading regulations. We selected 1894 to study competition after the implementation of the 1893 reform and before the gold mines boom and bust of 1895-1896. Additionally, since the adjustments of the 1898 law were not completely implemented until 1902, we chose 1903.

While the single-traded securities inform us about potential competition among markets, dual-traded securities give notice about the effect of legal changes on the direct competition. Dual-traded securities supposedly should have not existed before 1893 and should have disappeared after 1898 but *de facto* existed in both cases. By 1892, Coulisse enjoyed the tolerance of government. After 1898, some *coulissiers* who had established their headquarters in Brussels kept publishing the prices of securities listed at the Parquet on the *Cote de la Banque et de la Bourse* in a specific table under the label "*Marché de Bruxelles (Brussels Market)*". We selected then dual- and single-traded securities for the chosen years. We took all the dual-listed securities and build similar portfolios of single-traded securities for both markets.

Since the competitive advantage of each venue differs from a market segment to another, we completed the

sing-traded portfolios with liquid securities to take into account these differences. As such, the portfolio is built on the asset class (bonds or shares), the origin and nature of the issuer (French or foreign, public or private), and the type of different operations on the securities (spot only or also forward). In order to facilitate the diachronic comparison among years, we attempt to maintain as much as possible from the same securities throughout the years. Thus, we were able to maintain our portfolios composed of up to 72 percent of identical securities over time and more than 95 percent over two consecutive years. Overall, we collected roughly 9,400 prices. Table 1 details the sample composition.

	1892	1894	1903
Parquet	36	32	26
Coulisse	33	36	17
Total	69	68	43
Single traded	78%	76%	74%
Forward	30%	31%	35%
Foreign	74%	71%	79%
Shares	57%	63%	56%
Corporate	72%	76%	70%

Note: Composition of the sample used for regression model
Sources: See the text

To estimate spreads, we employed a variant of Richard Roll's (1984) seminal measure elaborated by Thomas J. George, Gautam Kaul and Mahendrarajah Nimalendran (1991) (henceforth GKN). GKN estimator is our preferred measure for four reasons. First, it corrects the downward bias in Roll's method. Second, it takes into account not only the order processing costs as in Roll (1984), but also the adverse selection component of spreads. Third, it overcomes Roll's restrictive hypothesis of constant expected returns over time. Finally, it is a robust spread estimator with weekly data. However, we compute also Roll estimates as a robustness check.

In a perfectly competitive and transparent market where all agents have access to the same information, spreads must correspond only to agents' non-informational order processing transaction costs. Roll measure estimates realized spreads based on the autocovariance of past returns. In other words, Roll's method of effective spread is based on the serial covariance of the change in efficient price m as

$$m_t = m_{t-1} + u_t \quad (1)$$

Where:

$$u_t \sim N(0, \sigma_u^2)$$

Hence the observed trade price P is determined as

$$P_t = m_t + cq_t \quad (2)$$

Where, $qt \in \{-1, +1\}$ is a buy/sell indicator and c is the effective half spread. Following Roll the serial covariance of the first difference of equation (2) gives the effective half spread

$$c = \sqrt{-Cov(\Delta p_t, \Delta p_{t-1})} \quad (3)$$

Or equivalently if $R_t = (P_t - P_{t-1}) / P_{t-1}$ is the return in period t , the effective spread is³²:

$$S = 2\sqrt{-Cov(R_t, R_{t-1})} \quad (4)$$

(5)

$$\text{Effective Spread} = 2^*c$$

George et al. (1991) show that the Roll measure is downward biased precisely because it is based on transaction returns which contain positively auto-correlated components. Roll (1984) model estimates order-processing component of spreads which compensates only the operators' service provision. George et al. (1991) propose an improved spread estimator which also takes into account the adverse selection component. This component is highly important because we study two markets with very different levels of transparency. Additionally, in order to purge realized returns from their time-varying expected return component, it uses portfolio expected returns to extract the expected returns of individual securities. By doing so, George et al. (1991) assume that the bid-ask error component of securities is cross-sectionally uncorrelated. Concerning data frequency, both Roll (1984) and George et al. (1991) find that the percentage of positive covariance (negative spreads) is lower for weekly data than for daily data: at weekly frequency prices can adjust to new information and the inefficiency in price formation affects less spreads estimates (Pagano and Röell 1990)³³.

In concrete terms GKN method, is based on the following regression:

$$r_{it} = \hat{\alpha}_i + \hat{\beta}_j R_{mt} + \varepsilon_{it} \quad (6)$$

Where r_{it} is the transaction return of stock i and R_{mt} is the expected return of the equal-weighted portfolio to which security i belongs.

GKN method consists of replacing, in the Roll method, the autocovariance of the return series by the autocovariance of the residual series of regression (6):

$$GKN = 2\sqrt{-Cov(\varepsilon_t, \varepsilon_{t-1})} \quad (7)$$

Based on the continuously compounded weekly return series, we calculated a spread per method (Roll and GKN) and per year for each security³⁴. On this basis we compute the Paris market touch, which is the arithmetic mean of spreads of all the securities included in our sample (Figure 2). This measure gives an overview of transaction costs in the Paris financial market for the selected years in the three regimes. Whatever the measure, spreads widen dramatically in the legal competition regime, and they narrow in the enforced monopoly regime to a level much lower than in illegal competition regime³⁵.

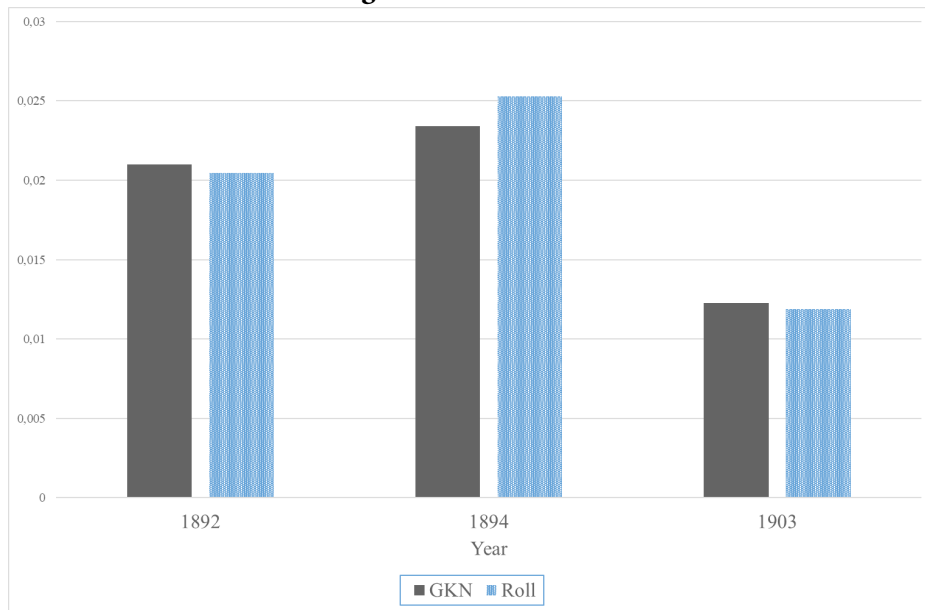
32. If the covariance is positive, the root becomes undefined. To handle this issue, the literature uses three techniques: first, when the covariances are positive, some authors take the minus out of the root (Amihud and al. 2003, Ferguson and Mann 2001); when spreads are negative, others replace them by zero (Goyenko et al. 2009); finally, some other authors simply omit them from the calculations (Lesmond et al. 2004, Schultz 2000). Because the first two solutions lead to the economic nonsense of either negative spreads or spreads equal to zero, we choose the third approach.

33. Following the application of the model to a portfolio of daily returns Roll (1984) found that almost 50 percent of covariances are positive thus spreads are negative while this percentage decreases to 35 percent with weekly data. This is in line with the findings of Harris (1990) and George et al. (1991) in that the percentage of weekly positive covariances (about one third) is lower than the percentage of daily positive covariance (about the half). In our sample based on weekly returns, roughly 30 percent of the covariances are positive.

34. In the calculation of individual spreads, we exclude from the sample securities with less than 21 returns in a given year according to Roll (1984) recommendation about the "sufficient number of observations".

35. The results of Mann-Whitney U-test we have implemented confirm that the changes from a year to another for both methods are statistically significant at 1 percent level.

Figure 2: Paris Market Touch



Notes: Average Paris markets spreads calculated through GKN and Roll methodologies.

Source: see the text

4.2 Model

In order to study the effect of these regulatory changes on the behavior of bid-ask spreads we estimate the following OLS regression model where GKN bid-ask spreads are used as dependent variable (equation 8). We follow the base model of Brown and al. (2008)³⁶:

$$\text{SPREAD}_{it} = \mu_0 + \mu_1 \text{YEAR92} + \mu_2 \text{YEAR03} + \mu_3 \text{SING}_{it} + \mu_4 \text{FORW}_{it} + \mu_5 \text{FORG}_i + \mu_6 \text{SHARE}_i + \mu_7 \text{CORP}_i + \mu_8 \text{MINT}_{it} + \mu_9 \text{CAPI}_{it} + \mu_{10} \text{MINT/ALL}_{it} + \mu_{11} \text{CAPI/ALL}_{it} + \mu_{12} \text{OPEN}_{it} + \mu_{13} \text{VOLAT}_{it} + \mu_{14} \text{VOL}_t + \mu_{15} \text{MINT_CONC}_t + \mu_{16} \text{CAPI_CONC}_t + \varepsilon_{it} \quad (8)$$

SPREAD_{it} is the natural log of the bid-ask spread for security i on year t . To estimate the impact of regulatory changes on spreads, we use two dummy variables: YEAR92 (illegal competition regime) and YEAR03 (enforced monopoly regime). They take the value of 1 on year 1892 and year 1903, respectively. By doing so, we assess the differences between spreads of these two years compared to those of year 1894 (legal competition regime).

We also control for the impact of securities characteristics on spreads through five other dummies: FORW_{it} takes the value of 1 for securities traded on both spot and forward market, the value of 0 for securities traded only on the spot market. Securities traded also on the forward market are expected to show smaller spreads since forward trading should increase the number of transactions on the spot market. FORG_i takes the value of 1 for foreign securities. In this case, the foreign character of securities could make them either less traded, thus with wider spreads because of home bias or, in the opposite, more liquid because subjected to international arbitrage with narrower spreads. SHARE_i takes the value of 1 for shares, which are likely to be riskier than bonds and hence have wider spreads. Finally, CORP_i takes the value of 1 for securities issued by corporations: these securities are expected to be riskier than public issues and consequently should show wider spreads. SING_{it} takes the value of 1 for single-traded. These securities can display narrower or wider spreads than dually-traded ones following the competitive dynamics between the markets.

We include other control variables at both security- and market-level. Security-level control variables are the followings: MINT_{it} is the sum of the number of each Friday prices for security i per market and per year; since there is no information on volume of transactions at security level in the studied period, this is our proxy for security-level liquidity; it measures the minimum number of transactions on the security i in a given

36. All variables but dummies are in natural logarithm.

year³⁷. CAP_{it} is the end-of-the-year market capitalization of security i for year t : it controls for the inverse relation between capitalization and spreads; we compute the capitalization of each security by multiplying the price of the last Friday of the year to the number of issued securities at the end of the year as from financial yearbooks³⁸. $MINT/ALL_{it}$ is the ratio of the minimum number of transaction (MINT) for security i on year t , and the minimum number of transactions for all the securities included in our sample (ALL). This is to control for the liquidity of a given security relative to the liquidity of the sample. In the same vein, CAP/ALL_{it} is the ratio of capitalization of each security (CAPI) and whole sample capitalization. We use this variable in order to control for the effect of the relative market capitalization of a given security. $OPEN_{it}$ is the average weekly opening price of security i for year t : securities with higher prices should have been less affordable for the retail investors. Hence, this could entail lower liquidity and so wider spreads for the security. Finally, $VOLAT_{it}$ stands for the standard deviation of weekly prices of security i for year t : it enables us to control for direct relation between volatility and spread.

To control for overall market conditions, we also employ additional market-level variables. VOL_t is total market trade volume on year t for each market; it measures the traded volumes on all the traded securities included or not in our sample; the higher are traded volumes, the smaller should be the average spread. Traded volumes for both markets in 1892 come from archives; to estimate data for 1894, we use the same method as Paul Lagneau-Ymonet and Angelo Riva (2018) applied to 1895 archival data; data for 1903 come from Lagneau-Ymonet and Riva (2018)³⁹. $MINT_CONC_t$ represents, for year t , the share of three most liquid securities (in the term of minimum number of transactions) relative to whole sample. Finally, CAP_CONC_t is the share of three biggest market capitalizations, for year t , to whole sample. Following Brown et al. (2008), we consider the latter two variables here to control for a potential dominance of securities with high turnover and capitalization relatively to all the securities included in the sample. Indeed, high concentration of volume and capitalization on a few securities involves necessarily lower average volumes and capitalization for the rest of securities that, in turn, potentially increases their spreads. In the end, the error terms is presented by ϵ_{it} . Table 2 reports descriptive statistics for value variables.

Table 3 shows estimations of the regression model for six specifications⁴⁰. In all the specifications, the dummies for the illegal competition (Year1892) and the enforced monopoly regimes (Year1903) are significant and show the impact of the reforms on spreads: spreads in 1892 and 1903 are significantly lower than in 1894 because of the regulatory regimes; conversely, the legal competition between Parquet and Coullisse has increased the spreads.

In all the specifications, the coefficients of forward market dummy are significantly negative: as expected, forward trading adds substantial liquidity to the securities and consequently narrows their spreads; in line with Brown et al. (2008) and our expectations, securities with higher average prices show wider bid-ask spreads, higher market volumes decrease spreads, while higher volatility increase them. Finally, higher liquidity concentration ratios widen spreads.

37. In the case of the Parquet this number is truthful since the microstructure was organized to keep record of every traded price according to a legal requirement. Concerning the Coullisse, this number is the lower bound of the variable because we cannot exclude that some transactions on the security i took place at prices left undocumented by the source.

38. For the Parquet-listed securities, *Chambre syndicale des agents de change près de la Bourse de Paris, Annuaire des valeurs admises à la cote officielle de la Bourse de Paris* 1893, 1895, 1904. For the securities traded only at the Coullisse, Decourdemanche's yearbooks for 1893 and 1895 (second edition) published by E. Desfossé & C., the same publisher of *Cote de la Banque et de la Bourse*, the newspaper we use for the prices of these securities (it is not surprising that the first edition of this yearbook dates 1894). For the securities traded only at the Coullisse in 1903, *Annuaire Desfossés* 1907.

39. For 1892, see *Lettre rectificative* sent to Mr. Ernest. Boulanger, Senator, by the *Chambre syndicale des agents de change de Paris*, 21 March 1893, CAEF, box 64,877; for 1895 archival data interpolated with FTT data to estimate 1894 traded volumes, see *Note pour le Ministre*, 18 February 1897, CAEF, box B 34,010.

40. Since MINT and CAPI are respectively and mutually exclusive with MINT/ALL and CAPI/ALL, we have tested various regressions with and without them in order to avoid multicollinearity.

TABLE 2
DESCRIPTIVE STATISTICS

	Mean	Standard Deviation	Min	Max
Firm-specific variables:				
GKN spreads	0.018	0.015	0.0004	0.156
Number of prices (per year)	114	117	3	683
Capitalization (in million Francs)	241.415	1,165.760	0.133	15,204.500
Share of total portfolio's number of prices (%)	2.086	2.096	0.050	14.455
Share of total portfolio's capitalization of the relevant market (%)	0.1062	0.5483	0.001	7.21
Opening price average (per year in Francs)	357.351	318.251	5.374	2,141.855
Weekly return volatility (%)	2.443	2.028	0.349	11.494
Market-specific variables:				
Total market traded volume (in million Francs)	78,350.6	33,623.2	35,000.1	132,010.1
Portfolio's number of prices concentration ratio (%)	30.143	4.609	25.386	38.495
Portfolio's capitalization concentration ratio (%)	81.889	0.922	81.068	83.581
Notes: This table presents the descriptive statistics of firm-specific and market-specific variables used in OLS regression model.				
Sources: See the text				

TABLE 3
 BID-ASK SPREADS OLS REGRESSIONS

Independent variables	Dependent Variable: GKN spreads					
	(1)	(2)	(3)	(4)	(5)	(6)
Year 1892 (D)	-0.935 *** (0.27)	-0.917 *** (0.27)	-0.365 * (0.21)	-0.922 *** (0.27)	-0.923 *** (0.27)	-0.912 *** (0.27)
Year 1903 (D)	-3.002 *** (0.88)	-2.969 *** (0.88)	-0.694 * (0.39)	-2.963 *** (0.88)	-2.806 *** (0.79)	-2.785 *** (0.78)
Single traded (D)	0.018 (0.11)	0.018 (0.11)	0.007 (0.11)	0.016 (0.11)	0.016 (0.11)	0.015 (0.11)
Forward market (D)	-0.282 ** (0.13)	-0.283 ** (0.13)	-0.306 ** (0.13)	-0.258 * (0.13)	-0.285 * (0.13)	-0.258 ** (0.12)
Foreign (D)	0.104 (0.14)	0.104 (0.14)	0.129 (0.14)	0.116 (0.14)	0.109 (0.13)	0.123 (0.13)
Shares (D)	-0.121 (0.15)	-0.121 (0.15)	-0.099 (0.15)	-0.124 (0.15)	-0.118 (0.15)	-0.120 (0.14)
Corporate (D)	-0.149 (0.16)	-0.149 (0.16)	-0.143 (0.16)	-0.114 (0.16)	-0.149 (0.16)	-0.118 (0.14)
Securities number of prices	0.066 (0.05)		0.061 (0.05)		0.066 (0.05)	
Security's capitalization	-0.015 (0.03)		-0.011 (0.03)	0.002 (0.03)	-0.015 (0.03)	
Security's share of total portfolio's number of prices		0.068 (0.05)				
Security's share of total portfolio's capitalization		-0.015 (0.03)				
Security's open price average	0.126 ** (0.05)	0.126 ** (0.05)	0.112 ** (0.05)	0.114 ** (0.05)	0.126 ** (0.05)	0.115 ** (0.04)
Total market volume	-1.347 *** (0.46)	-1.301 *** (0.46)		-1.321 *** (0.46)	-1.178 *** (0.31)	-1.165 *** (0.31)
Security's weekly return volatility	1.097 *** (0.07)	1.097 *** (0.07)	1.111 *** (0.07)	1.113 *** (0.07)	1.098 *** (0.07)	1.113 *** (0.06)
Potfolio's number of prices concentration ratio	8.261 *** (2.51)	8.201 *** (2.51)	1.569 (1.02)	8.143 *** (2.51)	7.639 *** (2.17)	7.576 *** (2.15)
Portfolio's capitalization concentration ratio	-5.596 (11.11)	-4.912 (11.10)	17.881 ** (7.82)	-5.227 (11.12)		
Constant	24.649 (76.15)	19.104 (76.16)	-129.084 ** (56.15)	22.274 (76.27)	-13.604 ** (5.54)	-13.476 ** (5.53)
Observations	180	180	180	180	180	180
Adjusted R-squared	0.69	0.69	0.67	0.69	0.69	0.69
F-statistic	29.69	29.71	29.97	31.74	32.11	37.89

Notes: Dummy variables are presented with (D) and all the rest variables are in natural logarithm. Standard errors are given in brackets. Asterisks show that the variables are significant at 10 percent level (*), 5 percent level (**) and 1 percent level (***).

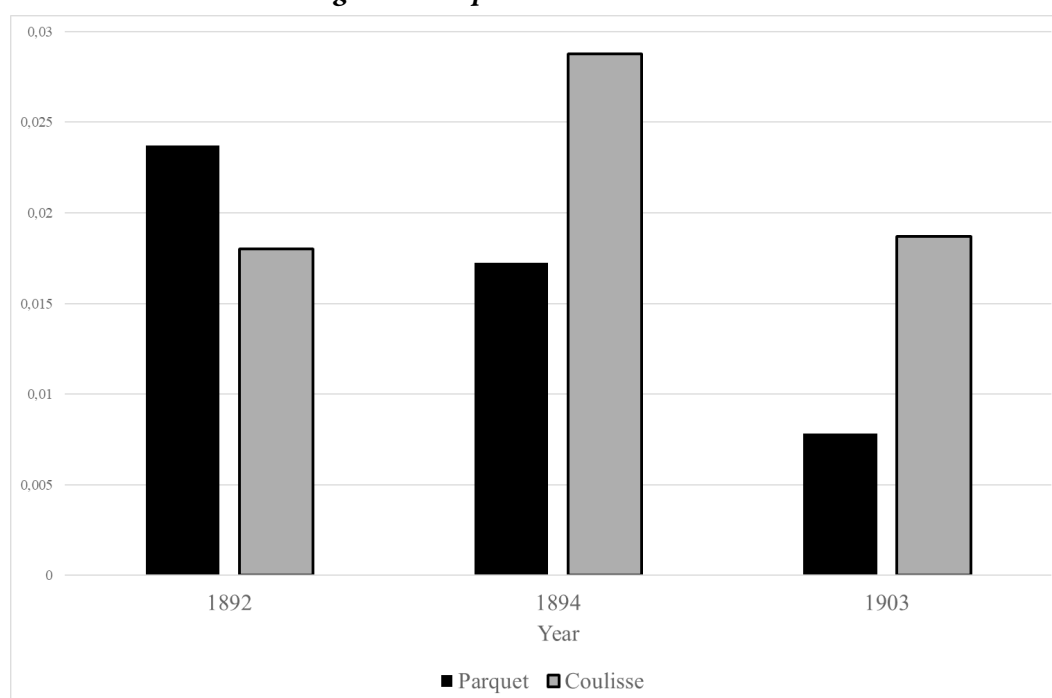
Sources: See the text

5. The twists and turns of competition

Our regression analysis shows the significant effect on spreads of the 1893 and 1898 reforms. However, these results hide complex and differentiated dynamics depending on changes in both the microstructures of and the potential competition between the Parquet and the Coulisse, within each regulatory regime. These changes were implemented by the two markets either by themselves to adapt to the new competitive landscape or following negotiations with banks and regulators.

Figure 3 shows the differentiated dynamics of the market touches for both the Parquet and the Coulisse: while the spreads on Parquet are narrowing over time, the spreads of the Coulisse widen in the legal competition regime and narrow afterwards, but remain significantly wider than the Parquet's spreads. The widening of the overall Paris market touch in the regime of legal competition is then driven by the large increase in the spreads of the Coulisse. However, the disappearance of the legal risk on the *coulissiers'* transactions on listed securities should have worked in the opposite direction. After the 1898 reform, the spreads on both markets strongly narrowed down: the spreads of the Parquet fall at one third of their size in the first regime, while the spreads of the Coulisse fall down to their former level.

Figure 3: Parquet and Coulisse Market Touch



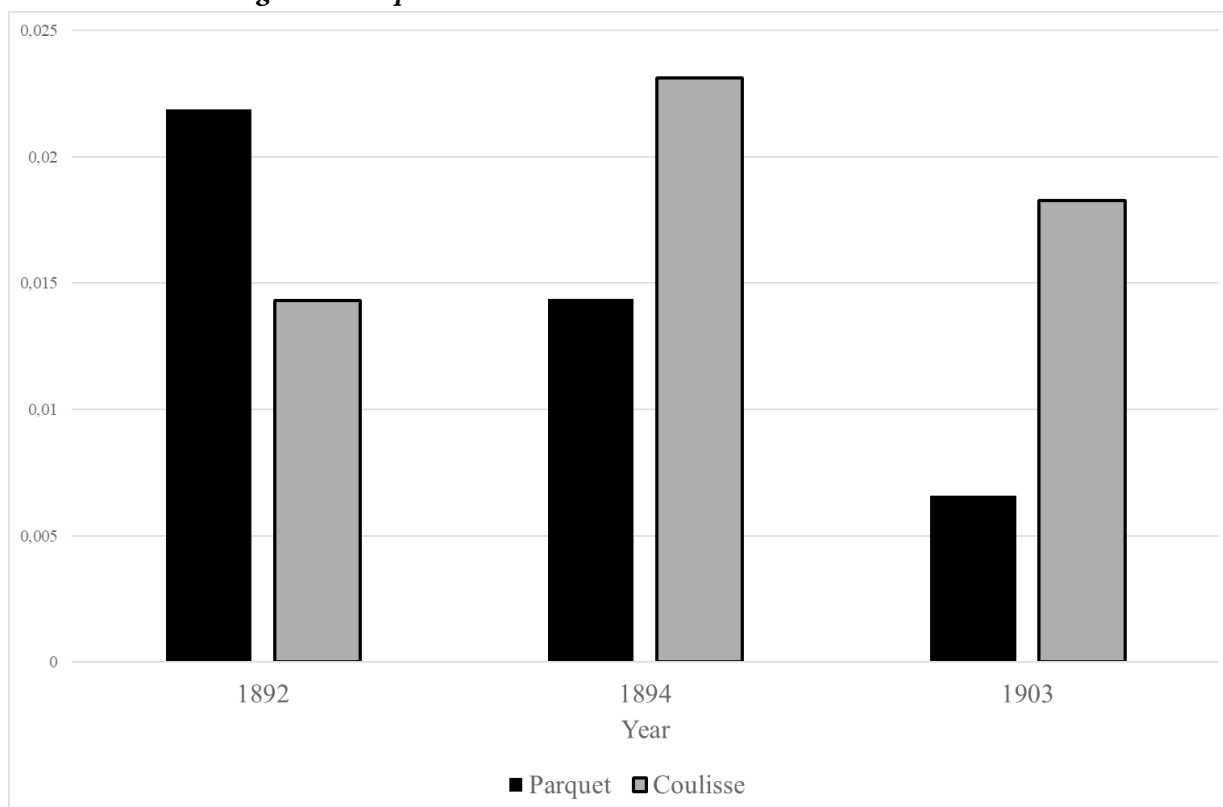
Notes: Average Parquet and Coulisse spreads calculated by GKN methodology.
Source: see the text

To understand these dynamics, we first analyze the spreads on dual-traded securities, then on single-traded securities: the former was concerned by effective competition, the latter by potential competition. Potential competition is crucial in shaping participants' behavior. Potential competition on trading means competition on listings. Competition on listing depends on both the regulatory regimes and the listing policy of the Parquet under the constraints of the French commercial and fiscal laws.

Figure 4 depicts the spreads on dual-traded securities. As expected and in line with studies on New York (Fohlin et al. 2009, Brown et al., 2008), average spreads of dual-traded securities are narrower than single traded securities⁴¹. They follow the pattern of the Paris market touch (Fig. 2) and that in both markets. Under the illegal competition regime, spreads of the Parquet are wider than the ones of the Coulisse, in spite of the legal risks that hover on the trades of the latter. However, the spreads of the Parquet show a downward trend over time, while the Coulisse's spreads almost doubled during the period of free competition and become largely wider than the Parquet's ones. In the third regime, while the spreads of the Parquet are halved, the spreads on securities traded on the Brussels market narrow to a level higher than in the first regime.

41. The market touch on single traded securities averages to 2.20 percent in 1892, 2.53 percent in 1894 and 1.27 percent in 1903, while the market touch on dually traded securities is respectively 1.85 percent, 1.95 percent and 1.08 percent.

Figure 4: Parquet and Coulisse Market Touch on Dual-Traded Securities



Notes: Average Parquet and Coulisse dual-listed securities spreads calculated by GKN methodology.

Source: see the text

In the illegal competition regime, the spreads of the Coulisse are narrower than the spreads of the Parquet for three main reasons. Firstly, the overcrowding of the trading pits on the Parquet' floor. According to empirical analysis of Baker (1984), the overcrowding of the pits in open outcry trading hampers the smooth functioning of the market and increases price volatility, which in turn widens spreads, particularly when inexperienced operators enter the market. In the vein of Davis et al. (2007), at the turn of the 1880s, it was common wisdom that the dominance of the Coulisse was at least partially explained by the capacity constraints of the Parquet (Courtois 1904). The fixed number of *agents de change* (and related clerks) was deemed to limit (the speed of) transactions. This is why at the end of 1891, the Parquet Committee allowed each *agent* to raise the number of senior clerks (*commis principaux*) from two to four in order to trade and manage trading clerks who were not fully empowered as proxy-holders. Nevertheless, as soon as April 1892, the Committee had to limit the number of (senior) clerks who could trade in a pit to two per *agent* because of overcrowding that curbed the smooth execution of the trades. If this change released some pressures, it did not solve the matter: between December 1892 and January 1893, the Committee opened new trading pits and furthermore limited the access to the pits to one (senior) clerk per *agent de change*. Consequently, the lower number of traders and traded securities per pit ensured a smoother execution of the orders⁴².

Secondly, the 1890 regulation on securities trading increased the regulatory burden of the Parquet and subsequently decreased its competitiveness. The new legal obligations required a radical reorganization of the order processing in the central services of the Parquet as well as in the securities houses of the *agents de change*. In 1891, the Committee had to rent new buildings to expand the central services and cope with the increased workload. The new legal obligations and organization of the office work might have widened the order processing component of the spreads⁴³. Finally, while the trading at the Parquet around open outcry pits ensured pre-trade transparency, the low-voice bilateral transactions at the Coulisse prevented information disclosure. According to Madhavan (1995), if some market participants are required to disclose and others not, the non-disclosing dealers can undermine disclosing operators and profit from information accumulated on their past trades. Similarly, while the *coulissiers* were trading under the peristyle of the stock exchange building and could observe the *agents de change* price discovery, the opposite was not true.

42. CAC, AG, 21 December 1891, 19 December 1892, 18 December 1893; CAC, CS, 2 January 1892, 11 March 1892, 22 April 1892, 20 April 1893.

43. CAC, AG, 23 February 1891, 21 December 1891.

In the competition regime, the market touch of the Parquet narrowed and became significantly lower than the Coulisse's. The competition from the Coulisse visibly reduced the rent seeking behavior of the *agents de change*. Moreover, the Parquet further increased the number of pits in December 1893 after a study highlighting the adverse consequences of the remaining overcrowding. After this decision, the overcrowding issue disappeared from the discussions of the Parquet Committee. Finally, the *agents de change* and the central services of the Parquet had tweaked and improved the new organization of the office work⁴⁴.

The spreads of the Coulisse widen while the disappearance of the legal risk should have worked in the opposite direction. Three reasons explain the spreads' widening. First, there was a change in the composition and frequency of the trading at the Coulisse. According to our estimates, between 1892 and 1894, the turnover in value on Paris bounced by almost 80 percent, from 110 billion to 199 billion francs (counting on both sides; 4.8 and 8.9 times the French GDP). Traded volumes increased on both markets, but Coulisse maintained two third of market share. These all-the-market estimates do not inform us on the relative liquidity of the dual-traded securities. We use the number of prices published on the lists of the two markets to measure liquidity at security level. The yearly average number of prices per dual-traded security decreased from 154 to 76 at the Parquet while it increases from 121 to 186 at the Coulisse. According to this proxy, the increase in the Parquet's traded volumes did not concern the dual-traded securities, while the opposite is true for the Coulisse.

Archival material suggests that during the second regime, banks traded more at the Coulisse. Banks could bring to the market both informed orders on their own accounts and the retail clients' (un)informed orders. In April 1894, the Parquet Committee stated that the banks were their "worst enemies"⁴⁵ because they supported the Coulisse in the political arena. Hence, it seems reasonable to assume that this political support coincided with the (partial) redirection of banks' informed order flow from the Parquet to the Coulisse. This redirection would widen (narrow) the spreads on the Coulisse (Parquet) because market operators would be more (less) exposed to adverse selection. As in Biais and Green (2005), traded volumes concentrate on the widen-spread market because informed investors prefer trading in opaque markets where they can extract informational rents, particularly if investors expect this market attracts most of the orders. Moreover, after 1893, banks could send clients' orders on listed securities to the Coulisse without fearing legal risk.

The second reason concerns the number of *coulistiers* that increased by 64 percent from 212 in 1892 to 348 in 1894 because of the 1893 reform and the expected boost of the Coulisse's traded volumes⁴⁶. This flow of new operators could have hampered the smooth functioning of the market (Baker 1984). The lack of a central organization restrained the Coulisse from keeping opportunistic operators outside the market and mitigating the effect of overcrowding. Moreover, the increased number of *coulistiers* likely made the back-office work more complicated, particularly in the absence of a central settlement and payment system. This more complex and time consuming work widened the order processing component of the spreads. Finally, at the end of 1893, because of its poor results, the Parquet closed down a pit devoted to the trading of the more liquid dual-traded public bonds opened in June 1892. With this group, the Parquet had aimed to face the competition from the Coulisse by specializing traders: the experience was deemed crucial. Nevertheless, the end of this "direct" competition could have enabled the *coulistiers* to widen spreads and extract higher rents from (uninformed) clients⁴⁷.

The 1898 consolidation and the changes in microstructures dramatically narrowed the spreads at the Parquet. The consolidation directed the order flow on listed securities to the Parquet. Indeed, the positive externalities of liquidity and the reduction in information asymmetries resulting from the centralization of the price discovery process had a direct impact on the spreads. According to our estimates for 1903, the overall Paris traded volumes amounted to 150 billion francs (counted on both sides), corresponding to 5.75 times the French GDP. The Parquet traded between 60 and 70 percent of the Paris volumes (see Fig. 1).

The changes in the organization brought about by the reform enabled the Parquet to successfully handle this huge increase in traded volumes. The number of *agents de change* passed from 60 to 70 and the number of the clerks followed. The significant enlargement of the trading floor completed in 1902 allowed for a further

44. CAC, AG, 18 December 1893, 17 December 1894; CAC, CS, 7 October 1893, 13 October 1893.

45. CAC, AG, 9 April 1894.

46. See Neu's *Annuaire de la finance* 1893 and 1895 that report data on, respectively, 1892 and 1894.

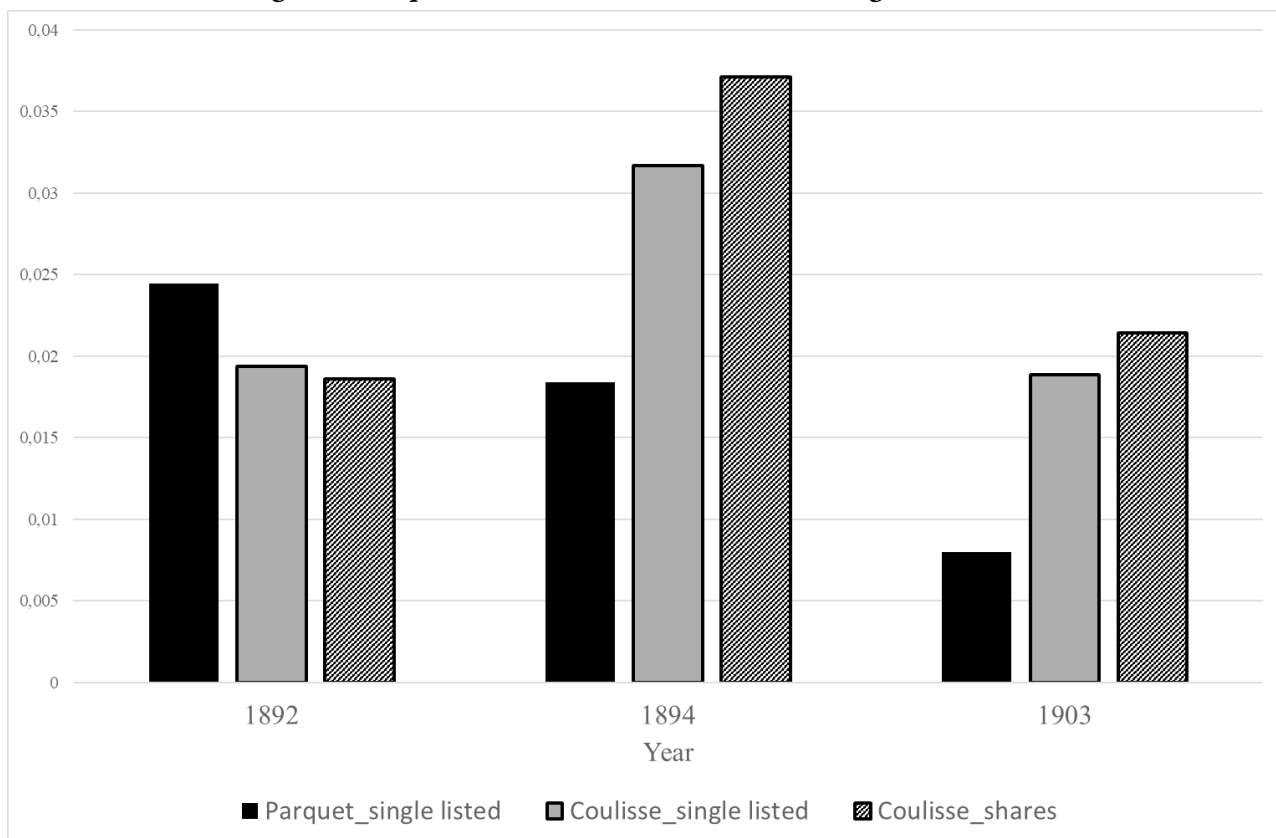
47. CAC, AG, 29 April 1892, 4 May 1892, 23 June 1893, 9 October 1893; CAC, CS, 5 May 1892, 27 May 1892.

increase in the number of trading pits and in more space for each pit⁴⁸. Moreover, the procedures for payment and settlement were accelerated. These changes enhanced competition within the market, released capacity constraints, ensured better immediacy and narrowed the order processing component of the spreads.

The *coulissiers* having moved to Brussels continued trading Parquet-listed securities. Even if the spreads of the Brussels market narrowed in the consolidation regime relative to the competition regime, they remained wider than in the illegal competition regime and were about three times as large as the spreads of the Parquet. Two main reasons explain these wide spreads. On one hand, according to the Parquet committee, Brussels financiers did not welcome the *coulissiers* perceived as competitors. Consequently, the *coulissiers* in Brussels developed a limited activity⁴⁹. On the other hand, some *coulissiers* were sued for fiscal evasion because of trades in Paris endorsed by the houses in Brussels, and lost the trials⁵⁰.

Figure 5 displays the spreads for both markets on single-traded securities. These securities were submitted to potential competition. Effective competition depends not only on the actual competitors but also on the ease of entry into the market. Potential competition on trades depended on direct competition on listings. Potential competition could be limited by the regulations on competition and by the listing policy of the Parquet under the constraints of the French laws, the Coullisse having no rules in this domain till 1899.

Figure 5: Parquet and Coullisse Market Touch on Single-Traded Securities



Notes: Average Parquet and Coullisse spreads on single-traded securities and on shares traded at the Coullisse. Spreads are calculated by GKN methodology.

Source: see the text

Spreads on single-traded securities show trends similar to the dual-traded ones, but they are on average wider. Moreover, potential competition does not affect all the securities in the same way. The Coullisse's touch is largely driven by the spreads on shares, particularly affected by changes in the listing policy of the Parquet. In the illegal competition regime, the Coullisse can trade any security listed on the Parquet. The Parquet cannot list securities traded in the Coullisse that do not satisfy its listing requirements under the constraint of the French commercial and fiscal law. From the 1867 liberalization of the corporation law, the Parquet Committee, after checking for the legal requirements, was fully empowered to grant or refuse the listing

48. In this case, the increase in the number of traders made trading smoother because of the concomitant increase in the number of pits and dedicated space (Davis et al. 2007).

49. CAC, AG, 2 December 1898.

50. CAC, AG, 22 December 1902, 18 December 1905.

according to the liquidity of the securities and the “seriousness” of the issuer appreciated on discretionary basis. The exam of the legal requirements is severe because the Parquet, unlike the Coulisse, is liable of the securities’ compliance and must reimburse investors in case of noncompliance as it happened in 1876 in the case of the Memphis, el Paso and Pacific (called Transcontinental) railways bonds.

Foreign issuers face additional though less formal constraints. The Parquet Committee must obtain the authorization of the Ministry of Finance after consultation with the Ministry of Foreign Affairs. While the Ministry of Finance takes into account the market for government bonds, the Ministry of Foreign Affairs considers the diplomatic relations. For example, in March 1894, the Ministry of Finance refused the official listing of the Ottoman Railways Thessaloniki - Monastir (*Chemins de fer Ottomans Salonique - Monastir*), already traded on the Coulisse, because of the involvement of German investors in the company. Beyond these requirements, the only additional rule on listing concerns the liquidity of the securities. The listing being considered of public interest in the French legal system, the securities must be liquid enough to produce fair prices and of interest for a broad public.

In the practices of the Parquet, the Committee tries to assess the “seriousness” of the issuer. It can then require to see whatever additional documents and information are needed. Among other things, it regularly asks for balance sheets, lists of securities holders, the engagements of transmitting the minutes of every general assembly and to inform about every corporate or security events as soon as it is decided. Over time, the legal requirements and the liability vis-à-vis investors, combined with the capacity constraints of the Parquet in terms of space and number of traders, led the Parquet to focus on the most liquid and safest securities. Nevertheless, the rapid expansion of the Coulisse pushed the Parquet to revise its listing policy.

The Parquet opened on May 5th, 1892 a “junior market”, called “Second part of the list”. This market explicitly targeted small and medium businesses traded on the Coulisse and regional exchanges previously excluded from the official listing because they were too small and/or too young, even if their securities were issued in compliance with French law. Within this market, the Parquet’s operators could trade any legally issued security without listing process: the *agent de change* who traded was liable for the compliance with the French laws. From May 1892 on, the Second part of the list increased the potential competition of the Parquet over the Coulisse on small-mid caps: more than 200 securities were traded in 1892 on this market segment⁵¹.

However, the Second part of the list did not make the threat symmetrical. The listing requirements for the official list and foreign policy kept preventing the Parquet from listing several securities traded on the Coulisse (including small-mid caps shares), when the Coulisse exerted higher pressures on the Parquet. While facing these pressures the Parquet should have displayed tighter spreads, it had wider spreads in the illegal competition regime for two reasons. First, the overcrowding of the Parquet’s pits also concerned the securities of the Second part of the list. Second, the novelty of the Second part of the list: trading these securities required experience and information.

The Parquet’s operators indeed struggled to get the information because of distance. Often the headquarters of these corporations and then the legal documents on their activity were located in the provinces. The Parquet Committee entrusted its “Intelligence Office” to collect systematic information on the small businesses traded on the Coulisse and regional exchanges. However, suspicious shares started to be traded on this market. The Intelligence Office faced difficulties in collecting legal information on the companies and even more on the reality of the business. The Parquet Committee then decided in January 1893 to submit the corporations of the Second part of the list to the same procedures for the official listing (Ducros and Riva, 2017).

This decision significantly reduced the potential competition from the Parquet over small-mid businesses in the legal competition regime; at the same time, the Coulisse could freely trade any security listed at the Parquet. With the increase in the number of (new opportunistic) operators on the Coulisse and the redirection of banks’ order flow, this decrease in the potential competition explains why the spreads of the Coulisse, and particularly those of the shares, widened. The consolidation regime and the changes in the microstructure of both the Coulisse and the Parquet dramatically tightened the spreads on the two markets. During the third regime, the Government obtained a radical reorganization of the Coulisse around the creation of a professional union, the *Syndicat des banquiers en valeurs mobilières*. Criteria for membership were set up as minimum capital and a deposit, as a guarantee. The number of *coulissiers*’ houses decreased from 348 in 1894 to 215 at the end of 1903⁵².

51. DFIH (Data for Financial History) Database, Paris School of Economics. Hautcoeur and Riva (2016).

52. *Cote du syndicat des banquiers en valeurs mobilières*, 31 December 1903.

While the dual capacity of the *coulissiers* was maintained, trading rules and groups were established and a daily list was published to develop ex-ante and ex-post transparency. Moreover, a centralized settlement and payment process was put in place. Some formal listing requirements (like the deposit of the statutes, balance sheets and a report on the financial situation) were established to exclude the most dubious and risky securities. These reforms made the Coullisse more transparent and organized: the higher transparency narrowed the informational component of the spreads, while the stronger organization tightened their order processing dimension. Potential competition still played a role: while the Coullisse could not list securities already listed on the Parquet, the latter could cherry pick from the Coullisse's securities. This potential competition of the Parquet over the Coullisse contributed to tightening the latter's spreads. The consolidation and the fundamental changes in the market organization explain the narrowing of the spreads at the Parquet. In the case of the Paris financial center, consolidation proved to be superior to free competition.

6. Conclusion

The recent implementation of the NSM Reg. and MiFID directive in the USA and Europe aim at fostering competition to decrease transaction costs, increase liquidity, and lower the cost of capital. However, competition among securities markets is a complex phenomenon since the market for trading services is embedded in the market for securities. Changes in the competitive regime determine sizeable redistribution of the profits from trading among market operators by shifting traded volumes from one venue to another. This suggests to adopt a political economy approach to explain changes in the competitive regimes. While competition could be beneficial for the trading services market and decrease explicit transaction costs such as commissions, it could harm the market for securities because of informational issues and then increase implicit transaction costs like spreads. Research particularly questions the effects of dark fragmentation

The French regulatory reforms of 1893 and 1898 contribute to understanding these issues. They represent a unique natural experiment because they took place within a short period and affected markets located in the same financial center. We identified three regimes of competition between the transparent Parquet and the dark OTC-like Coullisse: i) a regime of "illegal" competition before 1893, when the Coullisse traded listed securities in violation of the Parquet's legal monopoly; ii) a regime of free competition, between 1893 and 1898, when the government recognized Coullisse's transactions on Parquet's listed securities through a fiscal law; iii) a regime of strict monopoly granted to the Parquet after 1898, when a new fiscal law prevented the Coullisse from trading listed securities.

These reforms were the subject of fierce debates. The analysis of these debates supports interest group theory. Paradoxically, Coullisse and Parquet's operators claimed to be submitted to the FTT to win the competition. Beyond the mobilization of welfare arguments to support their positions, the two groups attempted to build coalitions with banks, strongly lobbied regulators and aligned their arguments with their priorities, even if xenophobic and anti-Semitic.

By using the changes of regime as natural experiments, we assessed their impact on market quality. Our empirical results support literature showing that dark fragmentation might hamper market quality. If dual-traded securities display narrower spreads than single-traded ones, we show that free competition regime widens the overall Paris market touch while the monopoly regime narrows it to a size significantly smaller than in the illegal competition regime. Consolidation could be more efficient than fragmentation if the latter is dark.

Our findings challenge the conclusions of Brown et al. (2008). These authors find that in New York, the Consolidated's competition over the NYSE between 1885 and 1926 narrows the latter's spreads. Similarly, the spreads of the Parquet narrow in the free competition regime, but even more so in the consolidation regime; on the contrary, the spreads of the Coullisse widen in the free competition regime and drive up the Paris market touch; they then substantially narrow in enforced monopoly regime.

As in Biais and Green (2005), we find that dark fragmentation curb market quality and that traded volumes can concentrate on the widen-spread market without market forces correcting this failure: informed investors do prefer trading in opaque markets where they can extract informational rents, particularly if investors expect this market attracts most of the orders. In spite of wider spreads, the Coullisse handles higher traded volumes in the free competition regime. Thus, our results also underscore the crucial role of the microstructures and

transparency in explaining the twists and turns of competition.

The study and comparison of the effects of competition in New York and Paris can significantly contribute to the debate on the relative virtues of fragmentation and consolidation. An accurate comparison would require an in-depth analysis of the changes in the microstructures of all the markets involved in the competition, harmonized data semantics and collections, and homogeneous methodologies for spreads computations and analysis. History is an endless laboratory for real-scale experiments that empirical research must exploit to shed light on competition among securities markets.

7. Archives

Centre des Archives Economiques et Financières (CAEF). Savigny-le-Temple, France

Compagnie des Agents de Change de Paris (CAC), Centre des Archives Economiques et Financières (CAEF). Savigny-le-Temple, France

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