Ebbs and Flows of French Capitalism

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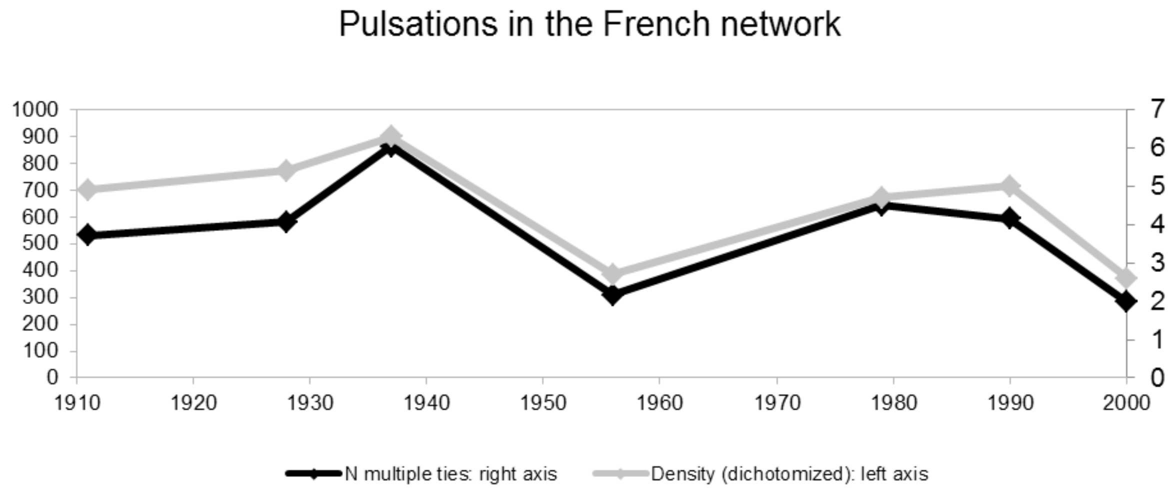
French interlocking directorates have not received much attention until recently and few studies exist which put them into an historical perspective. The prolific school of French business history has produced excellent monographs, but few syntheses and of these, few based on quantitative evidence. However, French capitalism has been thoroughly discussed in the business history and varieties of capitalism literatures. More generally, as in political history, it is often presented as the archetype of statism – beginning either with Louis the 14th, Napoleon, or the post-World War II governments. This focus on the role of the State in the economy often leads to the exclusion of France from other typologies of capitalism, especially in studies contrasting Anglo-Saxon and Rhineland varieties (Hall and Soskice 2001). French capitalism, revolving as it does around the State and family-led business groups (*groupes*), and perhaps lacking real big business in most sectors or real entrepreneurs (Landes 1949), is presumed not to have structures of its own. Its shape is seen solely as the product of external forces, those of politics and/or relationships between elite families.

The narrative that we present here is based on a study of the interlocks between the largest French firms listed on the Paris stock exchange from 1911 to 2000. It will not undermine the role of the State or that of families.[1] However, we will qualify more standard descriptions of French capitalism in two ways. First, we will discuss the usual understanding of the chronological development of French capitalism, or rather the lack thereof, and secondly, we will identify its underlying mechanisms. Our principal finding is that the general shape of the network remained remarkably stable from 1911 (or even before) to 2000. It was, however, subject to ebbs and flows, with two long periods of densification, each followed by moments of disruption. It is impossible to make sense of both this enduring shape and these ebbs and flows if one takes a simplistic view of the Napoleonic or socialist State, or the backward-looking elite families. From the second half of the 19th century to the end of the 1930s, and then from the post-WWII period to the beginning of the 1990s, the interlocking network underwent two similar phases of density growth, with the generation of many multiple interlocks between the largest French firms. Both of these periods were followed by a drastic drop in density, first around the time of World War II, and then again in the 1990s. We will see, however, that despite these impressive changes in density the generative mechanisms of the network remained the same by and large, especially with regard to the hierarchy embedded within it. Two peculiarities of our dataset allow us to assert this. Firstly, we were lucky enough to find a continuous source, which allowed us to use the same sampling and coding schemes for all dates adding weight to our longitudinal comparisons. It should be noted that we are only looking at firms listed on the Paris stock exchange and that our definition of the largest firms is based on share capital. Secondly, our source and additional research allowed us to systematically gather information on firms (their age, location, etc.), as well as elements on the trajectories of interlockers, both of which are essential for our interpretation.

[1] For our indicators, sources, and methods, including somes results that were specifically produced by our methodology (e.g. tests of significance for homophily), see the Appendix and online appendices. Since Daumas et al. (2010) provide a number of short syntheses and lists of references, we often choose to refer to this dictionary rather than to primary material in this chapter.



In this chapter, we specify the mechanisms underlying this tale of French capitalism. We believe that, in order to properly understand the roles of the State and elite families, we must see them as specific manifestations of three more general mechanisms. The first, and by far the most important, is based on *status*, with interplay between the status hierarchies of firms and that of directors. The network is organized around a core of high-status firms. Lower-status firms are in the periphery of the network, but their directors do create some interlocks with the core. In addition, the shared demand to have a small set of high-status directors on various boards creates bridges in the network. The second mechanism is one of *business group building*; interlocks forge local solidarity without resorting to mergers or cartels. The third mechanism covers *governance practices and principles*, which change over time and influence the development of interlocks. These three mechanisms affect each firm individually and also are likely to generate the emergent overall structure that we uncovered. This chapter will describe the shifts that took place between 1911 and 2000 and present hypotheses regarding their causes. We conclude by summarizing what we have learned about the mechanisms that generate the enduring shape of this network.

1. 1911-37: A stable structure that survived war and crisis

The structure of the 1911-37 network is typical of that for the whole of the 20th century. Both integrated and hierarchical, its integration relied on strong and increasing centralization. This is illustrated by the 30-40% of seats that were held by "big linkers," for example. The interlocking network looks like a ball of yarn, with a disproportionately large core that is much denser than the surrounding layers. The inertia of this structure is all the more remarkable because it is not the product of political or economic stability.

Changing actors in a stable structure

First, this stable structure was not caused by inertia in our sample of firms, and certainly not of directors. In contrast to smaller countries, Switzerland for example, we found significant turnover with 57% of our 1928 firms not appearing in the 1911 sample and 36% of our 1937 firms absent in the 1928 sample, just nine years prior. That the structure endures through such change implies that new firms took over the same structural positions occupied by their predecessors at the previous observation point. Thus many things may have changed amongst French firms and directors, but yet they interlocked in exactly the same way.

Second, this stability of the interlocking network occurred at a time of economic disruption. World War I (with battlefields covering several of the most industrial regions) followed by the economic crisis that took hold in France from 1932 onwards and which disrupted many parts of the economy including the stock exchange. In addition, World War I led to new forms of State involvement in the economy and in the collective organization of businessmen, with the creation of the peak association *Confédération générale de la production française*. Lastly, a Socialist-led administration was in power from 1936-8, which, among other things, brought the railways under the exclusive control of the State (Daumas et al. 2010, 1287-1300).

These events inevitably changed business practices in France and also impacted upon which firms and individuals are found on the lists of the largest firms and interlockers. As a direct consequence of World War I, the *Crédit national* was created by special decree in 1919 in order to handle war reparations and to lend money to industrial SMEs. This new bank, a private corporation closely linked to the State, made it into the top ten list in 1928 and was in first position in 1937, with an outstanding degree of 72. It is noticeable that a small number of newly created firms appear in the 1937 sample compared to that of 1928 or 1956 and this probably reflects the economic crisis. Finally, our lists of big linkers highlight the new role of business associations and think tanks. Two men appear in our top ten lists in both 1928 and 1937; both were political leaders among businessmen. Ernest Mercier (1878-1935, at the top of both lists) created *Redressement français*, a think tank promoting modernization through planning. Henri de Peyerimhoff (1871-1953), like Mercier, was previously a high-ranking civil servant. He never became an executive but was the key man in the most influential business association, that of mechanical industries and mining (Beltran in Daumas et al. 2010, 468-70; Chatriot *ibid*., 543-5).

The French economy underwent major changes throughout this period, which can be observed in our results. Once again, this makes the overall stability of the whole network even more striking. The long-lasting structure emerged quite early on. Exploratory evidence on previous observation dates (1840, 1857, and 1883, based on samples of 120 firms (François and Lemercier 2012)) shows that it coalesced in the mid-19th century, even before general incorporation laws. Thus French firms started the process of interlocking directorates much earlier than others. Most studies of other countries describe this process as beginning only around 1900 (Carroll and Sapinski 2011, 181). This happened at a time when the role of boards was not well-defined and new businesses tried to attract investors by putting high-status names on their boards. The shape of the network that emerged at that time survived the loss of an industrial region to Germany, several financial crises, the legalization of business associations in 1884, the birth of new (*e.g.* automobile and electricity) industries, as well as a world war and a global economic crisis.

The logic of status

Two primary mechanisms might explain how the network developed into such an integrated, hierarchical, and stable shape. The first concerns what we call, after Podolny (2005), status logic. According to Podolny, the status of an actor relies on the links he or she has with other actors: links to prestigious and powerful actors give access to part of their prestige and power; links with more obscure actors, on the contrary, negatively affect status. In other words, in an uncertain world, the actors to whom I am linked send a signal about my worth. Taking into account such status logic makes more sense of the structure of our network than the alternative mechanisms that are typically highlighted in the interlocking directorates literature, such as the role of banks or the class-cohesion of the elite. Therefore, the French case helps to develop an under-investigated part of this literature, alluded to by Mizruchi (1996) as the "quest for legitimacy": "By appointing individuals with ties to other important organizations, the firm signals to potential investors that it is a legitimate enterprise worthy of support." (ibid: 276) In our case, the logic of status is at play both for firms (sharing a director with a legitimate firm is important) and for the directors themselves (ostensibly having a director whose personal trajectory brings them into the circle of the supposedly best and brightest is important).

With regard to firms, positions in the stable and increasingly centralized structure of the network were not randomly distributed. Inertia was also striking in this respect; in each period it is similar attributes that enable different firms to occupy similar positions in the network. Indeed, it is possible to extract a clear status hierarchy from our data. As will be seen, depending on the period, firms are seen to attain a high or low status on the basis of their sector, level of share capital, location in Paris and/or seniority as listed firms with high share capital. All of these elements apparently provide a form of legitimacy; they all denote a form of closeness to economic and/or political power. Therefore an aggregate of these criteria is an indicator of the status of each firm. This attribute is so highly correlated with positions in the interlocking network that the shape of the network can almost be predicted using the status indicator alone. In all cases, high status is correlated both with centrality in the network and homophily amongst high-status firms. While these high status firms preferred to share directors between themselves, some lower-status firms did succeed in establishing interlocks with them. In each cohort, a large number of firms have high status, as measured by at least one or two of the criteria, which is why our network has a disproportionately large core, but they were still clearly different from the lower-status firms in the periphery. This periphery was not made of isolated firms or small components, but simply of firms with fewer or weaker ties.

The status mechanism is well illustrated in the 1911-38 period. In the context of a highly skewed distribution of share capital, firms in the highest quartile had consistently higher average degrees (21 in 1938, compared to 11.1 for the lowest quartile). Firms without Parisian headquarters always had a much lower average degree, *e.g.* 11.4 in 1938, compared to 16.3 for Parisian firms. Finally, the centrality of firms already already present in the sample for the previous observation point was consistently higher than that of newcomers, be they recently established firms, recently listed firms, or firms that had recently increased their share capital. Parisian firms, large firms, and those that were large and had been listed for some time were also significantly more homophilic than chance would allow.

The economic sector in which firms operated was involved in the same logic of status. Between 1911 and 1937, three economic sectors were both highly homophilic and more central than others: finance, energy, and transportation/utilities. This was not entirely due to differences in the location, size, or seniority of firms. Rather it indicates that in the first half of the 20th century, the core of the French interlocking network was composed of a mix of financial, transportation/utilities, and energy companies, with a tendency toward homophily within each of these sectors and many ties between them. It seems that the firms in these sectors were sought after in the same way that large or Parisian firms were; as potential sources of status signals based on interlocking. The fact that these firms were sought out by lower-status companies, and that some succeeded in interlocking with them, created a very integrated network; in the interwar period, more than 90% of firms were part of the main component.

How does this picture compare to classical descriptions of French capitalism? Firstly, with the exception of *Crédit national*, these high-status, central firms had no particular ties with the State. From the firms' perspective, the State does not seem to play a central role in shaping the network prior to World War II. Secondly, the existence of this core of big, persistent, Parisian, financial and non-financial firms qualifies traditional assumptions about feeble or late French big business – along the lines of Cassis's own qualification (2008). Not only did big listed firms exist, they were recognized as the center of developing French capitalism.

Status logic was not only at work for firms themselves, but also in their choice of directors. Who connected high-status firms amongst themselves and with the periphery? The choice of these 'network specialists' – the "big linkers" who were deemed able to act as bridges between competitors or economic sectors, for example – was far from random. They were often the products of a well-known phenomenon in the sociology of the French elite; the continual reproduction of this elite through *grandes écoles* (selective higher education institutions), especially the *École Polytechnique* and, from 1945 onwards, the ENA (*École nationale d'administration*) (Bourdieu 1989; Maclean, Harvey, and Press 2006). Before the founding of the ENA, civil servants with legal-economic backgrounds who worked in specific offices and courts, primarily the *Conseil d'Etat* and the *inspection des finances,* played the same structural role. These schools were originally founded in order to train top management for public administration – especially that of the Financy ministrey, as well as mining and road and railway construction supervision. Initially, they produced a few dozen graduates each year, a dozen of which entered the top *corps* (special positions in the highest rank of administrative personnel). However, as early as the second half of the 19th century, many members of these *corps* left public administration after a few years in order to join firms. These moves from public administration to firms are called *pantouflage* (Charle 1987). The phenomenon is similar in some ways to the Japanese *amakaduri* or the British tendency to name former diplomats as board members (Colignon and Usui 2003; Maclean, Harvey, and

Press 2006, 189). Yet it is different because moves towards the French private sector are generally made early in a career, before the age of 40. Take, for example, André Benac (1858-1937) who was a former ministerial staff member and senior officer in the Finance ministry. He sat on the boards of many banks and railways and is in our top ten lists for both 1911 and 1928. His profile and career is similar to that of Gérard Mestrallet (1949-) who is in our 2000 list; a graduate of the *Polytechnique* and ENA whos also acted as chairman of the European Roundtable of Industrialists.

This connecting role of the *pantoufleurs* prompts a reassessment of the role of the State in our network. Even though high status firms had no specific connections with the State before World War II, the State did play a role in the status logic that we have outlined above; having a *pantoufleur* on a board was a source of prestige. This does not imply that public administration was implementing a deliberate policy aimed at implanting its own culture in the private sector. The moves of *pantoufleurs* were primarily due to individual and family strategies within the elite, which can be observed at the beginning of the 20th as well as in the 21st century. Of course, this does not exclude the possibility that some form of culture was indeed exported from public administration to many firms; precisely what would depend upon what was taught at elite schools and practiced in ministries. However, this culture cannot simply be characterized as 'statist'. More important for French interlocks is the general recognition of an elite of network specialists who create bridges in the network. Incidentally, these network specialists also often happen to have begun their careers in public administration, which contributed to their reputation of political influence and/or skills applicable in all types of firms and sectors.

Strong ties inside business groups

The status mechanism described above is certainly the one that most shaped the structure of the network. This mechanism does not work alone, however. It was combined with another, which created pockets of density within the network and pushed people who were not *pantoufleurs* and who performed bonding, not bridging, into our top ten lists. The overall density and the prevalence of multiple interlocks (firms sharing two or more board members) in the French network places it somewhere between the so-called Anglo-Saxon and Rhineland models of capitalism. Its core-periphery structure differs from the latter, and it is also less dense, as there were no official cartels in interwar France, even though cartels and corporatism were very much under discussion from the end of the 19th century until World War II (Barjot in Daumas et al. 2010, 958-962; Denord *ibid*., 1018-1022).

At a more local level, however, we find network structures that look like those of Rhineland cartels, especially in the 1937 sample, which represents a high point in overall density. This density was mostly due to a sharp increase (+48%) in the number of multiple interlocks from 1928 to 1937; in 1937, 76% of our firms had at least one multiple interlock with another. The case of the electricity industry shows that concentration in this sector was achieved not through mergers, but rather by increasing both interlocks and ownership ties, which created business groups of varying elasticity. Such *groupes*, often deemed typical of France in the

1980s and 1990s (Swartz 1985), in fact began to thrive long before this. Compared with similar business groups in other contexts (Granovetter 1994), interlocks seem to play an important role in French *groupes*, complementary to that of ownership ties.

It was this kind of group-building logic that pushed Pierre Durand, Roger Durand, and Robert Despres onto our list of top big linkers. They were all directors in the same six companies in the hydro-electricity sector in various French regions. In most cases, Pierre was the executive director and Roger and Robert were non-executive directors. All three were engineers (graduates of minor, non-elite schools). They were also, respectively, the son of, the son of a cousin of and the son-in-law of the founder of the *groupe*. They were also very active in business associations. If we look beyond our sample, in 1935 six members of their family held 84 positions in French boards between them (Vuillermot 2000). These were bonding, not bridging, big linkers.

Such *groupes* were used by some as a substitute for forbidden cartels in the quest for a more coordinated capitalism; they created local solidarity between firms. This cannot be compared to a pure merger, as the firms remained legally distinct and ownership bonds were often weak, neither can it be compared to cartelization, since they did not create ‘coopetition’ in the entire electricity sector. *Groupes* competed with each other and were only linked via weaker, generally unique interlocks provided by network specialists.

2. 1937-90: Shocks and recovery of the network

After the war: a collapsed or weakened network?

Between our 1937 and 1956 observation points, changes in the French economy were even more significant than between 1911 and 1937. The war and the German occupation disrupted many economic sectors and many entrepreneurs were killed or expropriated. At the same time political changes affected the list of the biggest French firms and their interactions with the State. In the post-war period, State-owned monopolies of railways, Parisian public transportation, coal mining, electricity and gas production and distribution replaced many of the large old firms which played an important role at the core of the interlocking structure. Most insurance companies became State-owned at this time, as did a few large, symbolic firms such as the *Crédit national*, the central bank, the largest deposit banks, and the automobile manufacturer Renault (Chabanas and Vergeau 1996).

These events not only changed our list of firms (although not more than between 1911 and 1928), but also the density and structure of the interlocks. This change, however, did not take the form of a revolution, or of a collapse of the network. The 1956 structure looks very much like a less dense copy of the 1937 one, with multiple interlocks being the main missing element. The overall density dropped by more than half, but the main patterns remained. Very few firms were still excluded from the largest component, but many only had ties with one or two other companies. Only half of the firms still had multiple interlocks, and those that did had fewer than before; the number of multiple interlocks was almost divided by three. Most of the changes in the network were due either to the disruption of multiple interlocks or to the increased scarcity of ties between the core of high-status firms and the periphery.

Why did the network keep the same general structure? And why did it weaken? The general structure endured because the status logic continued to play a crucial role after the war. Parisian firms, as well as those with the highest share capital, those that were already in the 1937 sample, and those in the most important sectors (finance and the mechanical and heavy industries, which now played the role that the transportation/utilities and energy sectors played before the war), were still significantly more homophilic than chance would allow. On average, the largest firms, as well as those that were in the 1937 sample, were also more central. Lastly, even though the density of interlocks dropped among firms that stayed in the sample from 1937 to 1956, it dropped less than that of the overall sample. Interlocks among firms with the highest status in French capitalism remained largely in place, although even they became scarcer. We do not claim that nothing happened as regards interlocks during the war and the post-war period, but the changes that occurred produced the same kind of structure that was in place before the war – albeit a weaker version.

Prominent among the changes in the post-war period was the birth of a State-owned sector. However, this did not create a new mechanism shaping the network: State-owned firms followed on the pre-existing logics. The disappearance of private energy, transportation, and utilities firms, especially of locally dense structures such as the Durand electricity *groupe*, played a role in the loss of density of the interlocking network, specifically in the disruption of multiple interlocks. State-owned firms, however, took part in the reconstruction of a dense and centralized structure, as they exhibited a very significant homophily. Their average degree was similar to that of the sample, but with important internal differences. *Crédit national* was still the most connected French firm. Four other banks (including the Central bank) and the national railway company were interlocked to between 10 and 20 other firms, both public and private. Therefore the new State-owned sector did not give birth to a dual structure of interlocks (public firms on one side, private on the other), but arguably was part of an ongoing reconstruction of the previous shape of the network, as State-owned firms were prominent among the new cohort of high status firms.

Thus the status logic continued to play a role for firms after World War II, something also true for directors. Between 1937 and 1956, there was a clear generational change, even though few entrepreneurs were victims of political purges after 1945 (Joly in Daumas et al. 2010, 1317-21). However, even if some 1956 big linkers could be seen as new to the field, their career profiles often remained rooted in the exact same status logic that dominated before the war. Take Henri Lafond (1894-1963) as an example from our top ten list. He held no seat in our 1937 sample and was part of the board of the State-owned electrical company in 1956, nevertheless his career looks very much like that of *pantoufleurs* of the previous generations (Joly in Daumas et al. 2010, 394-6). He was considered to be "the Pope of the *corps des mines,*" one of the most prestigious *corps* of *Polytechnique* graduates. He became the president of an investment bank, *Banque de l'Union parisienne*, was in charge of energy under the Vichy government from 1940 to 1942, then active in the peak business association after the war. He was an archetypical *pantoufleur*, but was not a friend of post-war Socialist or Gaullist governments.

In this way, status logic helps us understand why the structure of the network endured. But why did it weaken, apart from the effect of State monopolies? The disruption of interlocks, especially multiple ones, can be linked to changes in governance rules and practices that took place between 1937 and 1956. A 1940 law limiting the number of board positions for the same person to 8 threatened multiple interlocks, although this law was not always enforced (Joly 2009). More generally, the accumulation of board positions had been the subject of growing criticism both within and without the business community in the 1930s. The 'two hundred families,' 'new feudal lords,' and 'trusts' came under harsh criticism, which was directed at the owners of the central bank and those who accumulated economic and political positions and connections (Dard in Daumas et al. 2010, 1250-3).

This shift in social and then legal norms might explain the drop in the percentage of positions held by big linkers and the fact that after it, our top ten big linkers then each held 6 to 9 positions and not 8 to 16 as they had done. This was also the time of the slow professionalization of the role of board members and of the *président-directeur général* (CEO), the single top executive position, which was becoming more common, whereas governance had been more collegial before the war. The time needed to adapt to these new governance schemes and to figure out how to interlock in this new context might account both for the diminished density of the network in 1956 and its new growth afterward.

1957-1990: Back to the future

After getting shallower from 1937 to 1956, the network structure entered a new phase of densification and centralization that led to features in 1979 and 1990 that are strikingly similar to those of 1928. These processes are perhaps counter-intuitive given at least two major changes that occurred during that time. First, a new economic crisis began just before 1979, which led to the near-complete disappearance of some economic sectors. Second, the share of heavy industry gradually decreased, while that of consumer goods increased. While mechanical and electrical industries consistently represent one-fifth of our sample from 1956 to 2000, the shift in this period was initially towards electronics and, later, toward consulting firms. Lastly, construction and real estate firms were especially prevalent in 1979 and 1990. In this context, the turnover of firms in our sample is as high as before – ca. 60% for 20-year intervals and 40% for 10-year intervals. Second, a new Socialist-Communist government came to power in 1981 and brought a few dozen additional banks and a handful of industrial firms under State control. Even though most of these companies were returned to the private sector after the right won the elections of 1986 and 1993, our 1990 sample still includes the most State-owned firms (ca. 25). Despite these changes, however, the network kept its structure and became denser after 1956, although our indicators never again reach the peaks of 1937. It was as if, after a period of adaptation to the new governance structure and the new State monopolies, French capitalists fully returned to their pre-war logic; purely from a network perspective, the 1979 and 1990 samples cannot be distinguished from that of 1928.

The mechanisms that explain this new long-lasting period of densification and centralization are very much the same as those before World War II, especially the status logic. Between 1956 and 1990, the network continued to orbit around a large, dense center, surrounded by a looser periphery. What did change slightly, however, was the exact list of attributes that defined the high status of a firm, with the changes observed in 1956 confirmed in both 1979 and 1990. State-owned firms were extremely homophilic, with an internal density of 16% to 18% in 1979 and 1990, as compared to 5% for the whole network – more than in any other high-status class of firms. They were also extremely central in the network, not disconnected in a separate component; their average degree was 17 to 19, as high as that of financial firms, compared to 12 for the whole network. Being State-owned, however, did not subject the firms to new mechanisms. This type of ownership was only one attribute of many high status firms, the others still being an enduring presence among the largest listed firms, large share capital, location in Paris, and activity in finance.

The position of financial firms is worth discussing. In previous cohorts, they could always be found in the core of the network; they were both central and homophilic. However, the 1979 and 1990 observation points are different in two respects. First, and contrary to the interwar period, no sector exhibited the same degree of homophily and centrality as the financial sector. Construction and real estate were the exception in 1979, but in fact these firms can be understood as close to the financial sector; real estate companies (with profits coming primarily from rent) were often difficult to distinguish from leasing (*crédit-bail*) firms.

The second difference was the activity of the financial sector. In the first half of the century, there were many listed banks with large share capital, which played an important role in the core of the network. This changes from 1956 onwards, however. In that year, we find only approximately 20 banks in our sample, 15 in 1990 (half of them State-owned), and 10 in 2000. Mergers and acquisitions among the biggest banks created a dual structure, with smaller investment/merchant banks playing a key role in French capitalism, and often in the careers of our interlockers, but yet not appearing in our sample. What our samples do show, however, is the part played, very early on, by institutional investors; portfolio companies, leasing firms, etc. These represent a majority of our sample of financial firms from 1956 onwards. There were only 5 to 12 of them prior to 1956, and in 1937, the 12 institutional investors had a mean degree that was only modestly above average. well below that of banks. After 1956, however, and especially in 1979 and 1990, our population includes dozens of institutional investors, with an average degree of 17.3 in 1979 and 15.7 in 1990, very close to that of finance generally. These firms have two distinct backgrounds. Some, such as *La Hénin* – founded in the 19th century – were longstanding members of the financial sector, and some were recently created real estate firms and State-controlled insurance companies. Others had moved to finance from declining economic sectors, such as Pechelbronn or the *Compagnie de navigation mixte*, or from an agricultural, commercial or industrial activity in the former colonies. The key role played by institutional investors, and finance generally, in the re-densification and re-centralization of the French interlocking network from 1956 onwards brings into question the standard narratives of financialization that describe it as an imported phenomenon occurring in the 1980s or after.

The return to the 1928 structure was based on the status logic, especially the role that State-owned and financial firms played within it. Along with companies' preferences for interlocking with high-status firms and for *pantoufleurs* as bridging big linkers, we also find local density and multiple interlocks based on the business group-building logic, just as we do in the interwar period. The right-wing government that prepared State-owned firms for their return to the private sector in the late 1980s deliberately strengthened this mechanism. It established *noyaux durs* (hard cores), i.e. complex webs of ownership ties and interlocking directorates that were supposed to protect French firms from foreign influence (Maclean, Harvey, and Press 2006, 185-8).

3. 1990-2000 and beyond: Toward a dual French capitalism?

In the 10-year interval between 1990 and 2000, the network arguably changed more than it did between 1937 and 1956. Spectacular changes in indicators, however, do not necessarily imply that entirely new mechanisms are at play, as has already been seen in 1956. In fact, some mechanisms simply seem to have become more radical. In the 1990s, the number of multiple interlocks halved once again. In 2000, more than 10% of the firms have ties with only one or two others, just like in 1956, but, unlike 1956, 20% are isolated, which is completely new. The overall density was thus halved, be it among financial firms, among non-financial firms or between financial and non-financial firms. However, unlike what happened between 1937 and 1956, this loss in density was anything but homogeneous. Many firms in the main component, and especially at its core, had more ties than before. If we focus on firms that were present in both the 1990 and the 2000 samples, we actually find a modest increase in density among them. In other words, the loss of density of the network was not a symptom of the collapse of its core-periphery, status-based structure, but of its radicalization. This loss of density engendered a dual structure with a more isolated periphery, a phenomenon that can be explained by the same status logic that played such an important role throughout the 20th century.

Changes in finance

The enduring features of the network core were exacerbated in 2000. The density of ties not only remained high; homophily even increased in the case of State-owned firms, firms that were already in the 1990 sample, and firms with the highest share capital. High-status firms reinforced ties among themselves, while densities in the periphery, *e.g.* among non-Parisian firms or firms with a low share capital, dropped to historic lows. The same was true for average degree centrality, with no less than 9.6 for the handful of State-owned firms that are still present, for example.

What changed was the precise position of finance. In 2000, financial firms lost the striking hegemony they had gained in the top centrality lists of 1979 and 1990. Accordingly, their average centrality of 8.8 in 2000 was only modestly above the 6.6 sample average (but still higher than that of any other sector). Homophily among them was still significantly higher than chance would allow, but it produced a limited internal density of 5.7%. This can be explained in part by the presence of a very peculiar structure, that of the Bolloré *groupe*, created, seemingly in the best interwar tradition, by complicated shareholding and interlocking bonds that united six firms of our sample into a quasi-clique of multiple ties. These included former colonial companies turned portfolio firms, like the *Compagnie du Cambodge* or *Caoutchoucs de Padang*.

Apart from this peculiar situation, we find few weak ties among financial firms, unlike all of the previous observation points. Moreover, while the centrality of banks was slightly above that of institutional investors, homophily was centered on the latter; ties among banks produced a density of 2.2%, compared to 6.6% among institutional investors and 4.5% between banks and institutional investors. In 1990, the density among banks was 21.9% and only 9.2% among institutional investors. It was institutional investors, therefore, that kept the classical high-status position of the finance sector, while banks did not. The changing position of banks can be linked first and foremost to a redefinition of their tasks. Until the 1980s, their primary function was to directly provide firms with cash, and the control over the firm they gained by sitting on the board was of tremendous importance. From the 1990s onwards, their financing role was more embedded in market logic, and as such was more anonymous and less direct; sitting on the board of many firms and directly controlling them was not as strategic as it used to be. Second, the position of banks also changed because of a decline in their homophily, which appears to indicate new relationships between banks, with interlocks no longer mitigating competition. Until the early 1990s, the banking sector, although not explicitly organized along the logic of a cartel, was collectively regulated in such a way that competitive dynamics were mitigated. The privatization of the banking sector and the gigantic mergers that took place in the sector in the late 1990s put an end to this internal regulation. After this, relationships between banks often turned into open warfare, such as the conflict between BNP and Société Générale in 1999. This behavior reduced, if not quashed, the homophilic logics that had prevailed until then.

A new, more isolated periphery

Despite these changes, high-status firms were generally still both homophilic and central in the network. However, lower-status firms established fewer interlocks with them, producing a more isolated periphery. To understand this shift, one has to keep in mind that the list of firms with the highest share capital changed at a much faster pace than before. 60% of firms in our 2000 sample were not in the 1990 list, a change in 10 years that we only saw previously in 20-year intervals. New firms came from the same broad sectors as before, with a slight increase in the share of consumption goods, but in fact the nature of these firms is quite different. Consulting and cleaning firms, for example, composed a significant part of our so-called mechanical sector (for want of a better category), and new activities appeared in the consumption goods sector: hotels, retailing firms, media groups, and wines and spirits.

Changes in the list of firms also exacerbated a tendency that had already been present since 1979: the inequalities in terms of share capital became huge. Between 1979 and 2000, the minimum share capital in our sample dropped by 37%, while the maximum was multiplied by 7.8; the Gini index rose from 0.48 to 0.79. While mergers and acquisitions created huge firms, companies with a different profile made their way into our sample and had an impact on the structure of the network.

Two categories with little overlap are worth mentioning here: family firms and non-Parisian firms. The former includes 33 family firms (13% of the sample), if we use a rough categorization whereby family firms are those that name an individual or (more frequently) a family as their primary shareholder, whatever the percentage of shares held. Only one quarter of them were present in the 1990 sample, more than half produced consumer goods, their median share capital was well below average, and their average degree was only 3.6, compared to 6.6 for the whole network; they were part of the sparsely linked periphery of lower-status firms. A good example is Grand Marnier, the famous producer of spirits, with 92% of its sales abroad. Three families each owned approx. 14% of the shares, with two members of the main shareholding family on the board, one being its chairman; no interlock with a firm in our sample was visible. The second category includes 46 firms in 2000 (18% of the sample): their headquarters were not located in Paris and they were not in the 1990 sample. Only 6 were also family firms as defined above. More than half of these firms produced consumer goods, their median share capital was below even that of family firms, and so was their average degree (2.7). A good example is Skis Rossignol, the world leader in ski equipment, created in 1907, with headquarters in the Alps and no interlock in our sample.

Firms with the same profiles existed in the 1990 population, but they were much less numerous. If we use the same definitions, there were 11 family firms and 17 newly sampled non-Parisian firms. Even then, they tended already to have marginal positions in the network, with average degrees of 10.5 and 7.4, as compared to 12.5 for the whole sample, but few were completely isolated.

Something completely new happened in the 1990s, such family and/or non-Parisian firms, often producing consumption goods and which had often existed for decades, suddenly entered the stock exchange and/or dramatically increased their share capital, probably upon turning to export markets and/or buying foreign firms. They did not try, or more plausibly did not succeed, in choosing board members that would have allowed them to interlock with higher-status firms; the status logic excluded them from being connected to the center of the network. In 2000, their collective arrival produced a dual structure. It makes observations of French interlocks all the more sensitive to sample size. Studies that focus on the 40 firms listed in the top stock exchange index, which is often the case, necessarily exclude the disconnected periphery. With a sample even larger than our own, Windolf (2002, 35-7) identified the dual structure already present in 1997. However, he interpreted this as comprising two separate classes of firms: an integrated public sector and isolated, family-led private firms criticizing State intervention. Our research provides a different account of this dualization. While State-owned firms generally had a high status, most of the firms in the core of the network were not under State control, and their directors generally did not advocate for State intervention.

Similar big linkers

The status logic can better explain the emergence of a dual structure. It also helps us gain a sound understanding of how this new structure could be accompanied by inertia in the profile of big linkers. In spite of the alleged internationalization of economic elites and changes in governance principles, *pantoufleurs* continue to be the most rewarded directors in the symbolic exchanges performed by interlocks. The status hierarchy was not upset by evolving practices of governance, which predated the 2001 law forbidding the accumulation of more than 5 board positions for one individual. Just as in the 1937-56 period, we observe a decrease in average board size between 1990 (when it had returned to its interwar level of 12) and 2000 (10.4). This is partly due to the presence of more family firms with smaller boards (8 members on average) but it is, first and foremost, consistent with discussions in business associations and think tanks criticizing traditional governance, *e.g.* 'reciprocal' (multiple) interlocks, and praising the model of the 'independent director' (Maclean, Harvey, and Press 2006, 76-80). Triggered by international comparisons and by reports presenting new governance guidelines, *e.g.* the Viénot report in 1999, French firms nonetheless insisted on the necessity to adapt without strictly following UK or US models. Our results indicate a measure of success in this respect.

New governance guidelines probably played a role in the decrease in multiple interlocks. The big linkers, however, while they accumulated fewer positions than before still had very similar profiles. Unlike what happened in smaller European countries (see the chapters on the Netherlands and Switzerland in this book), France did not see a massive arrival of foreign directors. An exploratory study of interlockers in the 120 French firms with the highest market capitalization in 2009 shows that they very much resembled those of 1957 and 1979; if anything, *pantoufleurs* fared even better among them (François 2010). The status logic did not involve new (or foreign) profiles. Three names appear both in the 1990 and in the 2000 top list, including that of Ernest-Antoine Seillière, who was the heir of one of the oldest French industrial families, a graduate of the ENA, had worked in several ministerial staffs, and was president of the French peak business association from 1997 to 2005. As French elite schools aim precisely to produce graduates who are considered and, moreover, consider themselves to be excellent generalists floating above all interests and specialties (Bourdieu and Boltanski 1976), it is no wonder that changes in governance preferences that promoted the notion of 'independent' directors only reinforced their power as network specialists. While big linkers were less numerous and held fewer positions than before, their careers seem to have become even more standardized. Since these high-status directors tended to be associated with high-status firms, they could survive the dualization of the network structure.

Conclusion

We have recounted here a very French tale, which seems little influenced by external changes. The low point in density in 1956 is not to be found elsewhere and seems to be related to specifically French events (the creation of State monopolies) and processes (a change in views on governance). Foreign institutional investors did not drive the French financialization of 1957-90. As for more recent changes, admittedly they were influenced by international discussions on governance, but they still did not break the status logic we identify as central to the French network. Although the French interlocking network has become less dense and more dual, many of its distinctive characteristics still hold. These idiosyncrasies can be seen as both symptoms and consequences of a structure that, in spite of the shocks of World War II and the 1990s, has remained in place for more than 150 years.

This core-periphery structure, with its specific mix of density and hierarchy, has emerged from the coexistence of distinct mechanisms. The *governance logic* is certainly the most intuitive; when one changes the way boards are composed, the interlocking networks evolve mechanically. Still, this logic seems to have had little long-lasting influence on the structure. In retrospect, it only played an important role in the 1937-56 period, where it can explain the weakening of the network. The *logic of business group building* had a more continual effect on the network, even though we exemplified it for only two specific moments: 1937 and 1990. This logic, which could either be set up by families or the government, has its roots in the creation of local solidarity networks based on interlocks rather than ownership. However, the most important logic explaining the development of the French interlocking network from the mid-19th century onwards is *status logic*. It has played a role in each and every period in several ways. High-status firms (as defined by different dimensions of status) tended to interlock with each other, lower-status firms tried to interlock with them, and firms tried to put high-status directors on their board, a practice that created bridging network specialists who were often *pantoufleurs*. These three mechanisms prevailed throughout the 20th Century. Even the dramatic changes that occurred in the network in the 1940s and'50s, and then again in the 1990s, were not caused by a weakening of these mechanisms, on the contrary, they can be explained by their continuing activation in a changing context. The two moments of disruption of the network did not, however, have the same causes. In the 1940s and 1950s, this disruption was mainly brought about by the new role of the State and changes in governance principles, while in the 1990s, the growth of firms was the responsible for the radicalization of its core-periphery structure. At that time, the firms at the center of the network became bigger and bigger and therefore increasingly isolated from the smaller firms standing at the periphery. At the same time this periphery was reshuffled by the arrival of firms that were previously much smaller, but which had gone public in order to sustain their spectacular growth.

It is only possible to tackle the peculiarities of French capitalism if we bring these three mechanisms together. In particular, the role of the State in forging this form of capitalism should be understood as only one part, among others, of the more general status logic. State-owned firms often were part of the high-status class, and high-status directors often were former civil servants. With this interpretation, French capitalism is not so much State capitalism as it is Status capitalism – the State is not the cornerstone of French specific characteristics, but one version among others of a broader mechanism. Moreover, it is only through the combination of these three mechanisms that a proper understanding of the development of the network can be reached. The *pantoufleurs*, in the status logic, provide bridges between denser quasi-cliques that are created, in different sectors and at different times, by attempts at concentration by means other than ownership. Ties forged by business groups and status acting together, produce a large and dense core. Shifting logics of governance only change the strength and density of these two kinds of ties, such that the network evolves, while its structure and underlying mechanisms endure.

References

Bourdieu, Pierre. *La noblesse d'État. Grandes écoles et esprit de corps.* Paris: Éditions de Minuit, 1989.

Boltanski, Luc, and Pierre Bourdieu. "La production de l'idéologie dominante," *Actes de la recherche en sciences sociales* 2-2 (1976): 3-73.

Carroll, William K., and Jean-Philippe Sapinski. "Corporate Elites and Intercorporate Networks." In *The SAGE Handbook of Social Network Analysis*, edited by John Scott and Peter J. Carrington, 180-194. London-Thousand Oaks: SAGE, 2011.

Cassis, Youssef. "Big business." In *The Oxford Handbook of Business* History, edited by Geoffrey Jones and Jonathan Zeitlin, 171-193. Oxford: Oxford University Press, 2008.

Chabanas, Nicole, and Éric Vergeau. "Nationalisations et privatisations depuis 50 ans," *Insee première* 440 (1996): 1-4.

Charle, Christophe. "Le pantouflage en France (vers 1880-vers 1980)," *Annales. Économies, Sociétés, Civilisations* 42-5 (1987): 1115-1137.

Colignon, Richard A., and Chikako Usui. *Amakudari. The Hidden Fabric of Japan's Economy.* Ithaca: Cornell University Press, 2003.

Daumas, Jean-Claude, and Alain Chatriot, Danièle Fraboulet, Patrick Fridenson, Hervé Joly, eds. *Dictionnaire du patronat français*. Paris: Flammarion, 2010.

François, Pierre, "Les guépards du capitalisme français ? Structure de l'élite patronale et modes d'accès aux positions dominantes" (paper presented at the workshop "Les élites économiques en France", Université Paris Dauphine, November 4-5, 2010).

François, Pierre and Claire Lemercier, "The emerging structure of French capitalism. Interlocking directorates among the French largest firms, 1840-1979" (paper presented at the European Social Science History Conference, Glasgow, April 11-14, 2012).

Granovetter, Mark. "Business groups." In *The Handbook of Economic Sociology*, edited by Neil J. Smelser and Richard Swedberg, 453-476. Princeton: Princeton University Press, New York: Russel Sage Foundation, 1994.

Hall, Peter A., and David Soskice. *Varieties of Capitalism. The Institutional Foundations of Comparative Advantage*. Oxford-New York: Oxford University Press, 2001.

Joly, Hervé. "La direction des sociétés anonymes en France depuis le XIX^{e} siècle : le droit entretient la confusion des pratiques," *Entreprises & Histoire* 57 (2009): 111-125.

Landes, David S. "French Entrepreneurship and Industrial Growth in the 19th century," *Journal of Economic History* 9-1 (1949): 45-61.

Maclean, Mairi, Charles Harvey, and Jon Press. *Business Elites and Corporate Governance in France and the UK.* New York: Palgrave, 2006.

Mizruchi, Mark S. "What Do Interlocks Do? An Analysis, Critique, and Assessment of Research on Interlocking Directorates," *Annual Review of Sociology* 22 (1996): 271-298.

Podolny, Joel. *Status Signals: A Sociological Study of Market Competition*. Princeton: Princeton University Press, 2005.
Swartz, David, "French Interlocking Directorships: Financial and Industrial Groups." In *Networks of Corporate Power: A Comparative Analysis of Ten Countries*, edited by Frans N. Stokman, Rolf Ziegler and John Scott, 184-197. Cambridge: Polity Press, 1985.
Vuillermot, Catherine. "Pierre-Marie Durand, avoué lyonnais, roi de l'électricité," *Vingtième Siècle* 65-1 (2000): 71-79.
Windolf, Paul. *Corporate Networks in Europe and the United States*. Oxford: Oxford University Press, 2002.

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France – Sources & Methods

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We present here the data used for the study of the French case. We first present the way we defined our sample of firms (1.), then the way we defined directors and executives (2.). We then explain the coding of the main variables that we used in our chapter (3.) and give alll our precise results (4.), except overall network indicators (those also computed for other countries), that are stored in a separate file.

1. Firms

According to the general principles defined by Thomas David and Gerharda Westerhuis in order to insure comparability between countries, we have selected the ca. 50 biggest French financial and the ca. 200 biggest French non-financial firms for each benchmark date. Due to constraints in our sources, we however departed from studies on other countries by always choosing share capital as our sampling criterion. Other minor peculiarities of our sampling scheme are explained below.

Sources. We used homogeneous sources to gather our data for our seven cohorts, namely directories used by investors in order to get systematic informations about firms they could invest in. These directories generally do not give any precise date for information on board members; however, dates are given for information on results and stock prices. We considered that the date for information on board members was likely to be the same as the last date for information on results and prices. The sources and benchmark years used in our dataset is listed in Table 1. While the exact title of the source and name of the publisher changed, it is actually the same publication that we followed throughout its history, thus insuring better comparability, although the exact data published changed between benchmark years. Exact dates were chosen according to the availability of the source or of already partly coded datasets.

Table 1 – Benchmark years and sources

Benchmark year	Source
1911	*Annuaire Desfossés.* Paris: E. Desfossés et Fabre frères, 1913.
1928	*Annuaire Desfossés.* Paris: E. Desfossés et Fabre frères, 1929.
1937	*Annuaire Desfossés.* Paris: E. Desfossés et Fabre frères, 1936.
1956	*Annuaire Desfossés.* Paris: Société d'éditions économiques et financières, 1957.
1979	*Annuaire Desfossés.* Paris: Société d'éditions économiques et financières, 1980.
1990	*Annuaire des sociétés et des administrateurs.* Paris: Documentation analyse financière société anonyme, 1991
2000	*Annuaire DAFSA des sociétés.* Paris: COFISEM, 2001

- *Size criterion*. We chose share capital (*capital social*) as our threshold to identify the biggest firms. Share capital differs from market capitalization. It is simply the number of shares multiplied by the nominal price of shares (not their actual price on the market at a given date). It of course is not necessarily correlated with the number of employees or the amount of sales or assets. We chose it because it was the only indicator that was available in our sources for all dates and allow to build a 200+50 sample – and even failed to find a source allowing to do this for a date around 2010.

- *Listed firms*. We chose to focus on listed firms only, and on those firms which were list on the Paris stock exchange. Listed firms do not include some important corporations that chose not to get public (arguably few, however, contrary to what is commonly said); they however include firms that were not in the corporate form (mostly *sociétés en commandite*, *i.e.* limited partnerships). We only included firms listed in the Paris stock exchange for their shares (not for bonds only, not in regional stock exchanges only). However, a handful of additional firms were included in the 1937-2000 samples while not being listed and, in some cases, without any indication of their share capital, in order to reflect the importance of some State-owned firms, *e.g.* SNCF (railways) or EDF (electricity). Note that these firms were still present in our sources, with lists of their board members and information on most of our other variables.

- *Foreign firms*. Our general principle is that we focused on the French firms, and we excluded foreign firms. We included firms that had their headquarters in French colonies for 1911, 1928 and 1937, but not for 1956 (Indochina, Algeria and Tunisia already being independent or well in the process of independence). Apart from these limit cases (and that of two firms located in Monaco), we did not include firms that were incorporated under foreign law and/or had their headquarters in foreign countries, be they listed in Paris or not. We included a few subsidiaries of foreign firms (*e.g.* Ford SAF) when they had a clearly separate corporate identity under the French law and were listed separately.

- *Financial and non-financial firms*. We did not exclude any economic sector from our analysis. The distinction between financial and non-financial firms was of a crucial importance in order to define our population. It has proved difficult to draw this boundary. We decided on holding companies on a case by case basis. The other problematic choice had to do with real estate firms. We considered that those that mostly made profit out of rents were non-financial, while when their profits mostly relied on financial leasing (*crédit-bail*), they were financial. Our financial sector thus includes, in addition to banks of all sorts, insurance companies, financial leasing companies and portfolio companies (investment funds). This assessment of the financial character of each firm, as well as our sector classification, is based on the detailed purpose of the firms as given by our source, which, for 1990 and 2000, generally include shares of sales or profits by type of activity, but gave less details for other dates. We however used the explicit statement of the purpose of the firm, not the sector definitions that the source itself put forward.

For most of the cohorts (with the exception of 1928 and 1937), the threshold for share capital of financial firms was at least as high as that of non financial firms.

- *Subsidiaries*. One of the problems we had to deal with in order to define our samples of firms had to do with the identification of corporate groups, *i.e.* firms that were listed separately in the stock exchange, but which belonged to the same group, with strong ownership ties. Until the 1990 cohort, almost no information was available about the shareholders of firms. For the earlier cohorts (1911 to 1979), we thus considered that, unless explicit information about their belonging to the same group was given, listed firms were independent firms. When we had more information, i.e. for 1990 and 2000, we decided that firm A and firm B were the same firms (hence only one of them should be sampled, the other being a subsidiary) if 1) A owned more than 50% of B and 2) The activity of the B represented more than 70% of that of A. In this case, we kept the that was most directly involved in the productive process (e.g., for 2000, we kept Axa and left Finaxa).

This choice is likely to have led us to include de facto subsidiaries in our sample, especially for 2000, when corporate borders became more and more blurry. It should be pointed out that as we measure a drop in network density from 1990 to 2000, this choice is conservative. Should less subsidiaries be included, the drop would probably be even sharper.

- *The total number of sample firms* is given in Table 2. Exact numbers are not always 50 and 200 since, for some cohorts, a large number number firms had the exact same share capital. For 1928, for example, if we had decided to select the next non-financial firm, we would have had to include 30 additional firms.

Table 2 – Number of firms in our samples

	1911	**1928**	**1937**	**1956**	**1979**	**1990**	**2000**
Total	245	236	241	255	247	252	250
Financial	45	51	52	56	53	52	50
Non Financial	200	185	189	199	194	200	200

2. Directors

- *Positions included in our dataset*. While the exact names of positions varied a lot between firms, especially before World War II, we generally included all board members (members of the *conseil d'administration*, that had a quite flexible role, more or less executive or control-like, depending on firms), plus the two or three top executives, even when the source did not clearly include them in the board. These were mostly CEOs (*présidents-directeurs généraux*) and managing directors (*directeurs généraux*), plus a handful of *gérants* in limited partnerships and the like. In the few cases when we found them, we included *censeurs*, but we excluded pure functions of control like those of government officers (*commissaires du gouvermenent*) and external auditors (*commissaires aux comptes*) – even though, among the latter, prominent interlockers were to be found in the interwar period, along with professional accountants. We also excluded secretaries of the board (*secretaries généraux*), although that function also mixed professional female secretaries and young ambitious executives.

- *Executive positions*. As government practices changed during our period, our coding schemes were modified accordingly, especially following Joly 2009. For 1911 and 1937, we included the following in executive positions: president or vice-president of the board, *administrateur délégué*, *directeur*, *directeur général*, *sous-directeur*, *sous-gouverneur, gérant, associé*. For 1928, we had no data on exact positions. For 1956, a transition period between two types of governance, we included: *président-directeur général*, *vice-président directeur général*, *administrateur délégué*, *directeur*, *directeur général*, *directeur général adjoint*, *sous-gouverneur*, *gérant, associé* and, only for those firms that had neither *président-directeur général* nor *directeur général*, we added presidents and vice-presidents of boards. For 1979, 1990 and 2000, we only included: *président-directeur général, vice-président directeur général, directeur, directeur général, directeur général adjoint, président du directoire, gouverneur, sous-gouverneur, gérant, associé.*

In Table 4 below, we give numbers of unique persons for categories such as "non executive directors in finance". As the same individual could both be e.g. an executive in a financial firm and a non-executive director in a non-financial firm, we had to use priority rules. We considered that any person who was an exective in a financial firm should be classified as such; among the others, those with executive positions are classified as "executive, non finance"; among the others, those with non executive positions in financial firms are classified as "non executive, finance"; the residual category therefore include directors who only had non executive positions in non-financial firms.

- *Identification of interlockers.* An under-discussed aspect of interlocking directorates research is the fact that it is based on an identification of people from lists. How do we know that it was the same Pierre Durand who sat on two different boards? Such problems with onomastics are enhanced when the source only gives initials instead of first names, which was the case of ours for the 1911 to 1979 benchmark dates. For later cohorts, the inclusion of first names minimized the problem. For 1937, 1956 and 1979, our source also included an annex where directors, with their first names and their positions, were listed in alphabetical order. We used it to identify interlockers, which leads to almost 100% accuracy. We however did not have such information for the 1911 and 1928 benchmark dates, and, in many cases, we only had the names of directors, not even an initial. We therefore gave each individual two different identification numbers. The first one, that we used in our calculations, is likely to over-estimate interlocking: we considered that any people with the same name and initials/first names that were compatible were in fact the same person (e.g. "P. Durand" and two "Durand" without initial were in fact one person). The second one was slightly more conservative. We considered that two people with the same name and initial were the same person, but, when we only had a name, we created a different identification numbers for each position (e.g. "P. Durand" and two "Durand" without initial were three different persons). A still more conservative coding scheme would have considered e.g. that three "P. Durand" were three different persons, but we considered it very likely.

It is therefore possible that we over-estimated interlocks for 1911 and 1928. A test with our second coding strategy lead to a density of 4.3 in 1911 and 4.6 in 1928: quite lower than that based on the first coding scheme, but with the same trend between the two periods and between 1928 and 1937. The same is true for average degree, with 10.4 and 10.6. Degree centralization would be 12.6% and 15.7%, which would change the trend from 1928 to 1937, that we therefore did not interpret. We do not think that our coding choices had an impact on the lists of firms and persons with a high degree, on homophily statistics or correlations between degrees and attributes of firms.

3. Variables

We systematically gathered and coded data on many attributes of firms. Those that we used in our chapter attributes are the following:

- *Sector*. As we have explained before, the assessment of the sector of each firm is based on the detailed purpose of the firms as given by our sources, which, for 1990 and 2000, generally include shares of sales or profit by type of activity, but are less detailed for other dates. For the financial sector, we were not able, on the basis of our source, to differentiate universal banks from commercial banks and investment banks. We have defined two levels of coding, listed in Table 3. Every firm is coded in one and only one sector. Most of our chapter relies on wide sectors, but we defined institutional investors as everything in the financial sector that was not a bank, and we give precise sectors in the online list of firms.

Table 3: Economic sectors

Finance	Insurance Bank Real estate investment fund Investment fund Other
Energy	Oil and Gas Petrochemical industry Coal Electricity Electrochemistry Other
Transportation and utilities	Urban facilities Railroads Shipping Canals/transportation on rivers Aircraft – Transportation Other

Mechanical industries and eletronics	Automotive industry Aircraft – construction Weaponry Electric facilities Other mechanical industries Electronics and computers Consulting
Building and public works	Building and public works Real estate
Other consumer goods	Pharmaceutical Luxury Hotels Food Retail Media Other
Heavy Industry	Mines (except coal) Steel and Iron Textile Paper Chemical industry (other than pharmaceutical) Other

- *Level of share capital*. For each cohort, we split the population in three categories: the lowest quartile of the distribution of the share capital of the cohort; the highest quartile and the medium quartiles. In order to translate levels of share capital into 2003 euros, we used online data provided by the French Institute of Statistics at http://www.insee.fr/fr/themes/calcul-pouvoir-achat.asp? (valid URL, February 14, 2013).

- *Location*. As for the location of headquarters, Paris was defined as including the whole former Seine department, i.e. the departments of Paris, Hauts-de-Seine, Seine-Saint-Denis and Val-de-Marne.

- *Age*. We computed the age of the firm based on the date of creation reported in the source (not that of the transformation into a corporation, last merger, change of name, etc.).

- *Presence in other cohorts*. We took the time needed to identify firms that changed names, were merged, etc. as the same firm, based on creation dates, activities, and various sources, included business history literature, Wikipedia, websites of the firms, websites of share collectors, etc. Because of such heterogeneous sources and of complex cases of mergers, identifications cannot be 100% accurate, but we are confident that they are of a very good quality.

- *State-owned firms*. We mostly used lists of firms that became State-owned through laws after 1944 and 1981, then were returned to the private sector after 1986; most of the relevant information is presented in Chabanas and Vergeau 1996. Our source also often explicitly mentioned State-ownership. For 1990 and 2000, the source also gave us information on the main shareholders. We considered that firms were State-owned when the first shareholder was the State *and* it held at least one third of the shares.

4. Results

Table 4: Description of the samples of firms

		1911	1928	1937	1956	1979	1990	2000
	N	245	236	241	255	247	252	250
	Created 0-5 years before - %	14	12	3	6	0	4	NA
	Created +20 years before - %	52	61	71	86	81	84	NA
	Corporation - %	94	98	98	93	94	NA	NA
	State-owned firms - %	0	0	0	9	7	10	3
	Present in the previous cohort - %	NA	43	64	38	42	59	40
	Present in the next cohort - %	41	65	40	41	60	40	NA
	Headquarters in Paris - %	85	79	77	83	84	83	78
Number of firms	Finance	45	51	52	56	53	52	50
	Energy	28	52	71	21	10	11	6
	Transportation & Utilities	73	38	34	19	18	15	12
	Mechanical	17	19	16	53	41	45	49
	Building	8	4	3	7	41	42	22
	Consumer goods	23	24	19	30	43	59	88
	Heavy industries	51	46	46	10	41	28	23
% in the total nb of firms	Finance	18	22	22	22	21	21	20
	Energy	11	22	30	8	4	4	2
	Transportation & Utilities	30	16	14	7	7	6	5
	Mechanical	7	8	7	21	17	18	20
	Building	3	2	1	3	17	17	9
	Consumer goods	9	10	8	12	17	23	35
	Heavy industries	21	20	19	27	17	11	9
Mini Capital (M€)	Sample	20.4	15.6	14.4	12.2	22.0	20.3	13.9
Maxi Capital (M€)	Sample	1417.3	259.3	301.9	404.8	1383.3	2281.7	10741.3
Gini Index Capital	Sample	0.55	0.34	0.38	0.45	0.48	0.65	0.79
Median Share Capital (M€,2003)	Finance	70.8	52.0	28.8	27.5	103.3	148.6	63.7
	Energy	37.5	52.0	57.6	39.0	79.6	346.6	127.9
	Transportation & Utilities	50.9	37.7	48.0	46.6	33.1	44.6	52.9
	Mechanical	34.0	31.2	54.0	35.2	45.9	40.9	59.0
	Building	56.6	27.0	48.0	25.6	68.0	50.2	125.8
	Consumer goods	34.0	36.1	43.2	30.8	47.0	61.0	45.7
	Heavy industries	42.5	39.0	48.0	46.5	93.3	45.0	38.7
	Sample	48.1	39.0	48	34.4	70.0	71.8	61.1
Number of positions in boards	Sample	2444	2756	2980	2538	2975	3010	2590
	Sample – executives	413	NA	607	348	370	470	260
	Sample – non-executives	2031	NA	2373	2190	2605	2540	2330
	Financial firms	544	678	730	605	722	666	603
	Financial firms – executives	76	NA	136	76	75	97	45
	Financial firms – non-executives	468	NA	594	529	647	569	558
	Non-financial firms	1900	2078	2250	1933	2253	2344	1987
	Non-financial firms – executives	337	NA	471	272	295	373	215
	Non-financial firms – non-executives	1563	NA	1779	1661	1958	1971	1772
Number of unique persons	Sample	1578	1809	1816	1846	2050	2087	2005
	Sample – executives	325	NA	448	320	352	449	249
	Sample – non-executives	1253	NA	1368	1526	1698	1638	1755
	Financial firms	408	555	512	484	507	493	495
	Financial firms – executives	67	NA	124	72	72	96	41
	Financial firms – non-executives	341	NA	388	412	435	397	454
	Non-financial firms	1170	1254	1304	1362	1543	1594	1509
	Non-financial firms – executives	258	NA	324	248	280	353	208
	Non-financial firms – non-executives	912	NA	980	1114	1263	1241	1301
Average board	Average size, incl. executives and non-executives	10.0	11.8	12.4	10.0	12.0	11.9	10.4

Table 5: Homophily statistics

Internal density of subnetworks (dichotomized). Stars indicate that the density is significantly higher (* and bold number) or lower (* and number in italics) than that of a sub-network of the same size, sampled in the complete network – p<0.05.

	1911	1928	1937	1956	1979	1990	2000
Complete network	4.9	5.4	6.3	2.7	4.7	5.0	2.6
Finance	**9.3***	**8.9***	**11.8***	**5***	**12.9***	**11.5***	**5.7***
Non-Finance	4.5	5.1	6.1	2.5	*3.4**	*4**	*2.3**
Energy	4.8	**8.7***	**10.3***	**9.5***	**13.3***	5.5	**13.3***
Transportation/Utilities	**8.4***	**12.9***	**11.2***	2.3	**9.2***	8.6	4.5
Mechanics/Elec	5.1	4.7	**12.5***	**4***	4	3.3	2.6
Building/Real Estate	7.1	0	0	0	**9.8***	**7.9***	**5.6***
Consumption Goods	*0.8**	2.5	5.3	*1.2**	3.5	6.1	2.5
Heavy Industries	6.1	6.1	7.4	**4.2***	**8.2***	6.9	3.6
State-owned	NA	NA	NA	**10***	**18.4***	**16.3***	**23.8***
Present before	NA	**8.9***	**7.3***	**5.1***	**7.1***	**6***	**7.8***
High Share Capital	**13.5***	**10.9***	**13.6***	**5.2***	**13.1***	**13.1***	**14.5***
Low Share Capital	*2.3**	*3.1**	*3.6**	1.9	*2.3**	*2.6**	*0.4**
Paris	**5.5***	**6.5***	**7.5***	**3***	**5.4***	**5.6***	**3.5***
Outside Paris	3.4	3.8	6.8	2.9	*1.9**	3.2	*1.2**

Table 6: Centrality statistics

Average centrality degree (Freeman index), dichotomized networks.

	1911	1928	1937	1956	1979	1990	2000
Complete network	12	12.6	15.1	7.0	11.6	12.4	6.6
Finance	15.0	14.5	17.1	8.3	18.6	17.6	8.8
Non-Finance	11.3	12.1	14.5	6.7	9.7	11.1	6.0
Energy	12.2	13.4	16.6	7.6	12.9	10.4	8.3
Transportation/Utilities	14.9	17.5	20.0	6.3	12.4	12.7	7.1
Mechanics/Elec	9.6	12.6	12.6	7.0	7.3	7.4	5.1
Building/Real Estate	6.6	4.2	11.7	5.7	23.0	11.6	7.5
Consumption Goods	2.9	5.7	4.8	3.5	5.9	12.7	5.6
Heavy Industries	10.7	10.0	12.2	7.5	12.0	12.4	6.7
State-owned	NA	NA	NA	7.7	9.9	15.5	9.6
Present Before	NA	15.3	17.2	9.5	13.2	13.7	11.0
High Share Capital	18.6	16.7	21.0	9.1	16.9	19.0	14.1
Low Share Capital	7.3	8.8	11.1	5.1	6.1	8.7	2.1
Paris	12.6	13.7	16.3	7.3	12.5	13.3	7.5
Outside Paris	8.1	7.7	11.4	5.5	7.2	9.1	3.4

Table 7: Density among firms that stay in our sample

Internal density of subnetworks (dichotomized). For each couple of dates, the only firms that are taken into account are those that were present in the sample at both dates.

1911	7.4
1928	8.9
1928	7.6
1937	7.3
1937	7.1
1956	5.1
1956	3.6
1979	7.1
1979	5.4
1990	6
1990	7.5
2000	7.8