

Social Networks in The Boardroom*

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Abstract

This paper provides empirical evidence consistent with the facts that (1) social networks may strongly affect board composition and (2) social networks may be detrimental to corporate governance. Our empirical investigation relies on a unique dataset on executives and outside directors of corporations listed on the Paris stock exchange over the 1992-2003 period. This data source is a matched employer employee dataset providing both detailed information on directors/CEOs and information on the firm employing them.

We first find a very strong and robust correlation between the CEO's network and that of his directors. Networks of former high ranking civil servants are the most active in shaping board composition. Our identification strategy takes into account (1) differences in unobserved directors' "abilities" and (2) the unobserved propensity of firms to hire directors from particular networks, irrespective of the CEO's identity.

We then show that the governance of firms run by former civil servants is relatively worse on many dimensions. Former civil servants are less likely to leave their CEO job when their firm performs badly. Secondly, CEOs who are former bureaucrats are more likely to accumulate directorships, and the more they do, the less profitable is the firm they run. Thirdly, the value created by acquisitions made by former bureaucrats is lower. All in all, these firms are less profitable on average.

1 Introduction

That social networks affect market outcomes is a well-documented fact (see Granovetter, 1973 or Rees, 1966 for early references). The precise mechanisms through which networks operate are less well-known. To investigate such mechanisms, this paper focuses on the

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market for corporate directors, a labor market where network effects are likely to matter. First, hiring the right individual is potentially difficult: an outside director is both a part-time expert and a supervisor to the executive management. These are very specific and potentially distinct skills and a proper and transparent market for such jobs may not exist. Hence, being directly or indirectly known to the management or the firm's main owners and shareholders is likely to be a strong comparative advantage to obtain a director seat. Social networks are therefore likely to *grease the wheels* of such a market with high frictions, by providing the management with information about the right candidates. Second, because the director has supervising tasks, the use of social networks may come at a cost. Relying on executives' networks to hire their own supervisor might conflict with directors' independence and quality, being therefore detrimental to corporate governance. Hence, the resulting impact of social networks on economic efficiency is unclear. On the one hand, social networks can be used by an entrenched CEO to find an obedient supervisor or an incompetent expert; while on the other hand, they can be used by a benevolent manager to facilitate her research of a competent expert or of a tough supervisor. In this particular setting, as in many others, the economic effect of social networks is ambiguous and can only be settled through an empirical investigation.

This paper examines this exact question in the case of France. It provides direct empirical evidence that (1) CEOs' social networks strongly affect board composition and (2) firms run by CEOs belonging to active networks show many signs of bad governance.

To look at social networks in the boardroom, we use a unique dataset on CEOs and non executive directors of all corporations listed on the Paris Stock Exchange over the 1992-2003 period. France is a particularly well-suited case when studying the prevalence of social networks in the business elites because these elites are highly concentrated and (at least some of) these networks are well-known, easily identified, and easily measured. The sociological literature indeed documents that among French business elites two broad and distinct networks coexist: engineers and former high-ranking civil-servants.¹ Members of these two networks are mostly recruited within graduates of two elite institutions: Ecole Polytechnique and Ecole Nationale d'Administration. Not only alumni of these two schools are over-represented among top executives but, most importantly, entering ENA or Polytechnique constitutes the virtually unique way of entering high-level jobs in the civil service and, even more so, the "Cabinets Ministeriels", the politically-connected civil service jobs.²

¹For references in english, see Swartz [1985,1986], Kadushin [1995], Frank and Yasumoto [1998]. References in french include Bauer and Bertin-Mourot [1997], and Suleiman [1997a,b].

²As evidenced by Jacques Chirac, Valery Giscard d'Estaing, Lionel Jospin, Laurent Fabius,... most French politicians are former énarques (the second being also a former Polytechnicien), starting their career in Cabinets Ministériels and turning to politics in the sequel. In fact, the French elite comprises an incredibly

Given these specific institutional features, data on social networks are relatively easy to collect, using the French issue of the Who's Who, together with alumni directories.

More precisely, we gather background data on directors/CEOs (education, career, socio-economic background) and match them with accounting and financial information on their employing firms. In the first step of our analysis, we provide evidence of social networks in the labor market for non executive directors. To do this, we estimate, for each individual in our sample, a model of the probability of being hired in a given firm. The key regressor in this model is the interaction between the candidate's network and the network of the firm's CEO: if both are the same, the probability of hiring should be increased. This is our test of the prevalence of networks. Because we exploit the full variability given by our matched employer-employee data, we are able to account for two important dimensions of unobserved heterogeneity, that are likely to (upward) bias our estimates of network effects. The first dimension is the inherent ability of each individual to become a director. Indeed, former high ranking civil-servants might simply be good at both running and supervising firms. Therefore, they would be present within the same firms as CEOs as well as directors. The second dimension is the firm-specific propensity to recruit directors from a particular network. Indeed, former State-owned enterprises (SOE, hereafter) or firms operating in regulated industries might need to recruit former civil-servants because they possess useful skills both for CEOs positions and for directors positions. We give a formal proof that the data deliver enough variability to identify network effects, even in the cross section, while taking these two dimensions of unobserved heterogeneity into account. Thus, the identifying power of our matched employer-employee data set is surprisingly large.

We follow the sociological literature and define three main networks: (1) former civil-servants who graduated from ENA, (2) former civil-servants who graduated from Polytechnique and (3) Polytechnique graduates without any past in the civil service. We take all other CEOs (possibly belonging to other networks, or to none) as the reference. Using this breakdown, we find that the probability of being hired in a given firm is larger when the individual and the firm's CEO belong to the same network, *when this network is related to a past career in the civil service*.³ In addition, we find no evidence that Polytechnique graduates without civil-service experience tend to be employed in firms whose CEO has a similar background. We then look at hiring equations (flows), instead of employment (stock) equations. This allows us to discriminate between the effect of the CEO's network and the effect of past board composition, on each individual's probability of employment. This reinforces our previous results: civil service related networks of CEOs still affect the recruitment

high fraction of former alumni of these two schools.

³Controlling for most forms of person or firm unobserved heterogeneity.

policies of directors. The composition of the board has no significant impact on the identity of newly recruited directors. We interpret this as partial evidence that it is the CEO, not the directors, who “shapes the board”. Our result that civil service related networks are particularly active hold in front of robustness checks designed to account for changes in demand and supply of high ranking civil-servants on the labor market, although, in principle, such problems should be fully picked up by our fixed effect approach.

The second step in our analysis looks at governance in firms run by former high-ranking bureaucrats, as corporate governance is what outside directors “produce”. Such firms account for 12% of all firms traded on the Paris Stock Exchange, and 65% in asset-weighted terms. First, we look at the CEO-turnover-to-performance sensitivity. We find that former civil-servants are less likely to leave their CEO position when their firm performs badly. Second, CEOs who were bureaucrats are more likely to accumulate directorships. As it turns out, the more directorships these CEOs hold, the less profitable is the firm they run, which is consistent with being “too busy to run their own firms”. We then look at acquisitions, an important, strategic, and sometimes controversial decision where board approval is most often required. We look at market’s assessment of the value created by acquisitions, i.e. the acquiring firm’s stock returns around the announcement of the deal. We find that these returns are smaller and not statistically different from zero for corporations run by former civil-servants. Hence, on average, the market tends to think that former civil-servants add less value in their external growth operations.

When we look at performance, firms run by former civil-servants are less profitable than average, although the effect is statistically significant only for those CEOs who were “cabinet” advisor at some point in their career (which roughly corresponds to 50% of them), i.e. who are politically-connected CEOs. We provide an explanation for this result in a companion paper (Bertrand, Schoar, Kramarz and Thesmar, 2005): our contention is that labor demand from these firms is more sensitive to the political cycle, as their politically-connected CEOs “lend” jobs to incumbent politicians. We also provide evidence that such job creation helps reelection, but hampers corporate profitability. The present paper provides an explanation as to why these CEOs remain in power, even though they do not make the most efficient use of the firm’s assets: they, not the investors, are the ones who govern the company.

Beyond the French context, we believe this paper contributes to two strands of the economics literature.⁴ Clearly, the present contribution belongs to the emerging empiri-

⁴To some extent, the present paper also contributes to the sociological literature in that it analyzes a much broader sample than elite scholars generally use (for instance, Kadushin(1995) studies 28 members of the French business elite. Frank and Yasumoto (1998) look at a “broader” sample of 125 people.). Hence, our description of the French “ruling class” goes in less details but is much more representative of the French reality. Our analysis of recent changes in the French business elites is another contribution of this article.

cal economic literature on social networks in the labor market (see for example Bertrand, Luttmer and Mullainathan, 2000, Munshi, 2003). The first important difference between the existing papers and ours is the ability we have to observe networks at work in more direct or more precise fashion, because we are able to look *inside* the firm, in which we observe both the referee (the CEO) and the applicant (the director). Being able to look within the firm gives a lot of additional identifying power, which we explore in detail.⁵ In particular, we show that the estimation of network effects can account for many dimensions of unobserved heterogeneity and explain why this is the case. The identification proof, and the simple estimation technique we derive, are, we believe, innovative and useful to people interested in social networks. The second important difference between this paper and the existing economic literature on social networks is that we are in position to provide a preliminary assessment of the effect of networks on *organizational* performance, beyond their labor market effects. Most of the labor literature, in particular in relation to theories connecting job search and networks (Saloner, 1986; Montgomery, 1990), has considered networks to be a good thing for organizational performance: socially connected referees suggest new names to firms, and firms punish the referee if the newly hired is not as good as promised. Hence, in this theoretical literature, networks improve organizational performance. However, in the market for directors that we consider, the resulting outcome may well be lower organizational efficiency, as shareholders cannot always directly “punish” the referee (i.e. the CEO).

Our second contribution pertains to the literature on corporate governance, and in particular the debate on the role of “independent” directors (for a review, see Hermalin and Weisbach, 2002). Over the past 20 years, academics have repeatedly failed to find any connection between the fraction of independent directors and corporate performance or market value. And some practitioners agree with the view that independence is not key to good governance. Nevertheless, in response to the recent wave of corporate governance scandals in Europe and in the US, most regulators, as well as reports from the business community, have re-insisted on setting minimum requirements for independent directors. Our paper suggests that it is crucial to distinguish *formal*, from *real* independence. While a director may be formally independent (not a customer, not a supplier, nor an employee), she could well be tied with the CEO through a social network that prevents her from standing openly against his decisions, or prevents her from voting him out of office. Instead of raising the minimum fraction of independent directors, our research suggests that transparency in the

Somewhat paradoxically, even though the State’s retreated from economic life in the 1990s, former civil servants are more present among top executives in 2003 than ever before. We suggest that the very process of privatizations of the nineties has caused this persistence.

⁵Abowd and Kramarz (1999) who cover related technical issues never mention the potential of matched employer-employee data for network analysis.

recruitment process of directors may be more important, with a particular focus on potential conflicts of interests. Most reports have made suggestions in this direction, but elections of directors are still far from being open contests between various potential candidates.

The paper is organized as follows. Section 2 looks at the French elite from a historical and sociological perspective. This allows us to present how we gathered information on networks of outside directors and executives. Section 3 describes the dataset, providing additional descriptive information. Section 4 presents the statistical model and discusses identification. Then, Section 5 looks at the extent of networks and Section 6 at their economic costs. Section 7 concludes.

2 The French Business Elite

2.1 Historical Perspective on the French Elite

For both historical and sociological reasons, France’s economic elites have two distinctive features (Bauer and Bertin-Mouroto, 1997, Swartz, 1985): first, they tend to be drawn from a handful of *Grandes Ecoles*, which form separated networks. Second, a large part of the contemporaneous French business elite comes from the civil service, with relatively homogeneous and standardized careers. These two features are easy to observe and will guide our empirical strategy.

2.1.1 The Tyranny of the Diploma

Bauer and Bertin-Mouroto (1997) distinguish two particular features of the French business elite. The first one is “the tyranny of diploma”: college degrees, generally obtained before age 25, tend to over-determine career prospects. Those students fortunate enough to obtain the most difficult and competitive degrees have almost guaranteed access to top jobs in the administration and/or the private sector. The French post-secondary educational system splits into two parts (Suleiman, 1997): the first one is the usual university system, which is both free and whose access after high-school graduation is guaranteed by law. Most French universities have no right to select their incoming students; therefore, selection takes place along the way, inducing students to drop out after 2, 3, or 4 years. Suleiman notes that in the mid-1990s, this system comprised some 1.2 million students.

The second part of the educational system is much smaller (some 50,000 students), more elitist and consists of a myriad of different schools (*Grandes Ecoles*). In most of these schools, tuition fees are negligible, but entrance takes place after the successful completion of a nationwide examination with a *numerus clausus*. Preparation to these exams is carried out in

special classes (classes préparatoires), and takes two to three years after high-school graduation. The bulk of these schools consists of engineering and business schools, though some of the most prestigious Grandes Ecoles do not fall into these categories. The French business elite is however mostly recruited within the two most prestigious Grandes Ecoles (Swartz, 1986): the Ecole Nationale d'Administration and Ecole Polytechnique. The Ecole Nationale d'Administration (henceforth ENA) was created after the second world war to supply the civil service with highly trained professionals. Ecole Polytechnique is an engineering school originally founded by Napoleon to recruit and train officers for the French military during the French Revolution, that gradually evolved into an engineering school. Nowadays, most of the class enter the private sector, but the best students during their years at Polytechnique (as measured by academic credentials, mostly in maths and physics) enter "en masse" the civil service. Other prestigious schools (Centrale, Les Mines, HEC etc.), less represented amongst top executives, have no tie with the civil service and all of their graduates join the private sector right after school.

Grandes Ecoles graduates retain some ties after college not only because they studied together and formed friendships there (see Kadushin, 1995, and Frank and Yasumoto, 1998), but also through alumni networks and events. The number of people involved is quite large so that the resulting networks are loose and uncoordinated (although some best selling books of the early 1970s went as far as calling them "mafias"). However, having studied in a Grande Ecole naturally endows a graduate with a host of weak ties within business people and, for ENA and Polytechnique graduates, within the high administration. Partly because of their ties with the civil service (more on this below), ENA and Polytechnique have historically been the most prestigious Grandes Ecoles, in spite of or perhaps because of, their small size. Together, they train some 500 new students a year. Firms appear to value their social connection (in particular with the administration, more on this below), their qualities, but also seem to rely on this elitist feature of the educational system to produce legitimacy in their organizations (see the case study in Bauer and Bertin-Mourot, 1997, and also Burt, Hogarth and Michaud, 2000). As a result, they hire top Grandes Ecoles graduates at the highest levels of the hierarchy instead of training and promoting employees over the long term. This tendency for firms to hire managers from Grandes Ecoles dates back to the XIXth century, though, at the time, most French firms were still family-owned, and family-run. As some firms became more successful and larger, professional managers were hired, and the top-level hierarchies started to fill up with engineers from Polytechnique and Ecole Centrale (see Cassis, 1997). In the mid-XXth century, firms started in addition to hire civil-servants, as we see now.

2.1.2 Civil Service and Business Elite

The second feature of the French economic system is that a large fraction of its business and political elite has spent its first years on the labor market within the civil service. This flow from top-level bureaucracy into business started after World War I. Until then, the State was small and held few levers over the economy. In those years, capitalists sought to influence regulation through directly lobbying or by bribing politicians elected to the Parliament or employed in the Government (Garrigues, 2002). During World War I, high-ranking civil-servants had progressively risen to power as the State budget grew larger. In the early 1920s, diplomats and employees of the Ministry of Colonies seemed to have been particularly sought after by firms willing to set up subsidiaries abroad. In the 1930s, the State started to intervene more heavily in the economy through nationalizations and regulation.⁶ At this point, the knowledge of the internal workings of the bureaucracy and the associated connections started to be valued more strongly by private firms, in particular in the financial industry.

However, the big shift in the relationships between business and the administrative elites occurred *after* WWII. First, in 1945 the Government, then run by the unlikely coalition of Gaullists and communists, two dirigist political forces highly involved in the Resistance, took control of most of the financial industry with the intent of channeling savings to priority industries under the tight supervision of the Treasury (Melitz, 1990). In addition, the Government took over most utilities and some large manufacturing firms (like EDF, the electricity monopoly, or Renault, a large car maker). The Treasury and the Ministry of Industry therefore became, during these reconstruction years, the real centers of power in finance and industry (Garrigues, 2002). Simultaneously, ENA was created, which dramatically increased the supply of high-ranking civil-servants certified by a prestigious and restrictive selection system explicitly based on education. The new prestige attached to civil service, along with the creation of this dedicated school, created a new elite, mostly based on scholarly achievement and sharing a meritocratic Republican ethos.

In a given class at ENA or Polytechnique, the best students have systematically joined one of the five most prestigious bureaucratic careers, or “Corps d’Etat” (Suleiman, 1997 and also Kadushin, 1995), training altogether some 50 people a year. The best Polytechnique graduates were entitled to join industry-related “Corps d’Etat”, the famous corps des Mines or the corps des Ponts et Chaussées. These career paths were designed to train future experts

⁶Most French airlines were nationalized in 1933 and consolidated into what is now Air France. The national railways were created in a similar way in 1937. In 1936, a left wing coalition (Le Front Populaire) came into power, got a firmer hand on the Bank of France (then the private property of France’s top financiers), enacted the “congés payés” (two weeks of paid vacations) and the 40 hours workweek (Asselain, 1984).

in the manufacturing industries, to serve both as political advisors and top-level managers. The best ENA graduates were entitled to enter the Inspection des Finances, the Conseil d'Etat or the Cour des Comptes (again "Corps d'Etat"). These careers paths were designed to produce experts in public finance and law (particularly important in a country where the State has its own jurisdiction). The typical successful high-ranking civil-servant career in the postwar years involved a few years in the Treasury (for ENA graduates) or at the Ministry of Industry (for Polytechnique graduates who joined the civil service), then as a "cabinet" advisor to the minister of industry, finance, or the Prime Minister. With this experience, they could then join the top management of a large private or a State-owned company. To private firms, part of their value came from their "carnet d'adresses" (address book), built during their years at the top levels of the State, a very valuable asset in a country where State presence pervaded all industries, be it through regulation, subsidies, finance or mere influence (for an example of direct government intervention in a purely private firm, see the example of the Schneider empire in Cohen, 1989).

By the early 1980s, ENA and Polytechnique graduates' involvement in the top management of French firms was pretty strong (see Swartz, 1986). It was even strengthened by the 1981 mass nationalizations undertaken by the then newly elected socialist Government. In 1986, a strong policy reversal was implemented by the center right coalition led by Jacques Chirac: most of the State assets were privatized, with a temporary halt during the 1988-1993 period. The State progressively lost its direct grip over manufacturing industries, the financial industry; it deregulated the goods and credit markets and reduced dramatically its subsidies (for a description of this financial liberalization episode, see Bertrand, Schoar and Thesmar, 2004).

In the past 15 years, the State's loss of power did not, apparently, change the way French business elites were recruited. Half of the firms listed on the French stockmarket have no controlling shareholder (Sraer and Thesmar, 2005). Top-ranking bureaucrats put in place in the 1980s could remain at the head of their companies. With a congruent board of directors, it was not be difficult for them to choose a successor with similar background and education in the 1990s. Furthermore, the Treasury set up a network of cross-shareholding and cross-directorships ("the noyaux durs", or hard cores) between private and privatized firms (Garrigues, 2002). The official goal of this network was to protect French champions from an hostile (i.e. foreign) takeover. All these factors, along with further privatizations in the 1990s, contributed to strengthen the grip of former civil-servants over the country's largest firms. This grip is still visible in 2006.

With these two features of the French elite in mind, we turn to a statistical analysis (next Sections), but first, we briefly review recent sociological work based on contemporaneous data

sources.

2.2 Contemporary Sociological Evidence

As evidenced above, personal and business relations between members of the French elite have naturally developed from the bonds created during their post-secondary education (see Burt, Hogarth and Michaud, 2001) and through common careers in the civil service (Swart, 1986; Kadushin, 1995). This sociological literature has shown that these relations have two prominent features. First, even though they most often resemble “weak ties” between fairly competitive people, these bonds can also be very tight and described by their members as true “friendship”.⁷ Second, the French elite can be broken down into different cohesive subgroups, within which friendship bonds prevail, but between which competition and weaker ties are the norm. These two aspects will provide us with a simple way of collecting hard information on social networks within the French business elite.

As it turns out, sharing common educational, social or occupational background is a good proxy for “friendship relations”. Charles Kadushin (1995) studied the friendship relations among 28 members of the “inner circle” of the French financial elite (people whose influence was the largest among 125 most influent Frenchmen in business and economics). Consistently with the above discussion on the relation between bureaucratic and business elites, he shows that a past career in the French Treasury is highly correlated with being part of this “inner circle”, other things being equal.⁸ Moving on to friendship, he finds that two people of this circle are more likely to define themselves as “friends” when (1) both are ENA graduates and, most often (in his target sample), members of the Grands Corps, (2) both were connected to the same political party (often because they worked as advisers when the party was in government) and (3) when their past career included a few years at the Treasury. Also, within his target sample, Kadushin finds that friends were more likely to seat on the same board of directors. Hence, objective measures of elite cohesiveness so far used by sociologists interested in elites networks, such as similar education, similar professional experience, or board interlocks (on this literature see the review by Mizruchi, 1995) seem to be perfectly applicable in our French context. While not entirely surprising - especially to French insiders - this will serve our purpose well, given that our data does not provide direct information on

⁷Leslie Mitchell De Quillacq (1992), an american-born journalist, conducted in the early 1990s some 67 interviews among influential members of the business elite. In the words of one of them “Dinners, Luncheons, breakfasts, tête à tête... It’s always the same who talk, always the same ones who are there. It doesn’t stop. We meet all the time.” (quoted from Kadushin, 1995, p 210).

⁸As it turns out, membership to very exclusive clubs like Le Siècle, AFEP, Entreprise et Cité,... is also strongly correlated with being a member of the business elite. We do not, however, have access to this (very) private information and this clearly is a limitation of our study.

the family or friendship relations between individuals, but only information on education, socioeconomic background and past career. To some extent, Kadushin’s study legitimates our empirical strategy, which relies on assuming that people with share strong features and a common background within a restricted world will be either willing to reciprocate favors (accumulating social capital through “reciprocity transaction”) or willing to maintain their reputation vis à vis the same network.

A second useful aspect of the French elite is that its members tend to cluster into different subgroups within which social cohesion is very high and between which there is some level of weak cooperation and competition (Frank and Yasumoto, 1998). Within subgroups (the “Corps d’Etat” for example), a high degree of cooperation is the norm, and members seek to accumulate social capital by building their reputation vis-à-vis the network as a whole, and not towards particular individuals (what Frank and Yasumoto call “enforceable trust”). With potentially competing subgroups, individuals tend to build ties based on interpersonal reciprocity (“reciprocity transactions”) rather than construct a reputation with respect to the entire (alien) subgroup. Using a somewhat different methodology than Kadushin – but the same dataset – Frank and Yasumoto break the French elite into three groups: right-wing ENA graduates, left-wing ENA graduates and non-ENA graduates. Consistently with their hypothesis on between/within subgroup interaction, Frank and Yasumoto find that people are more likely to engage in hostile actions towards members of other subgroups than toward members of their own subgroups. In addition, they find that two people are more likely to engage in reciprocity transaction (help one another) when they do not belong to the same subgroup. These results are useful when constructing our empirical strategy in that they guarantee that various social networks actually do cluster the elite in several distinct and observable groups.

3 The Data

3.1 Data Sources

Our data set matches information on the employee – the CEO and the directors – with data on the employing firms. To construct it, we used three main data sources: (1) the DAFSA yearbook of French listed firms provides us with firm-level variables (including the names of the CEO and of the members of the board), (2) the French edition of the Who’s Who gives us socioeconomic, career and educational information on CEOs and directors. The Who’s Who is however not exhaustive, hence, (3) for ENA and Polytechnique graduates, Alumni Directories were used to obtain education and partial information on careers for those individuals not listed in the Who’s Who.

All French firms listed on the stock market are required to issue an annual report including accounting information. Using the annual reports, the DAFSA yearbook compiles listed companies accounts in a yearly publication. Available yearbooks go back to the 1950s, but unfortunately, detailed balance sheet and profit account information is only available from the 1984 issue on. Given that French firm often take the form of business groups with myriads of subsidiaries, corporate account are always consolidated at the group-level – although the group leader is most often the only entity listed. We extracted this information from the 1988-1993 paper issues of the yearbook, and from its 1994-2003 electronic issues. We restricted ourselves to firms listed on the “premier marché” or on the “second marché”, excluding those firms traded over the counter (“hors cote”) or firms listed on the “nouveau marché” (a market for young, innovative firms which was created in 1995). The “premier marché” consists of all firms whose market capitalization and volume traded are large enough. The “second marché” is a market for smaller, in general fairly mature, firms who are listed but whose trading volume is too low to enter the premier marché. Both markets have on average some 300 firms listed each year.

Along with accounting information, the DAFSA yearbook provides us with the names of the CEO (directeur général or président du directoire), the chairman (président du conseil d’administration or président du conseil de surveillance) and the non-executive directors (administrateurs or membre du conseil de surveillance). Henceforth, we will use the words “non executive directors” and “directors” interchangeably, since their meanings are identical in the French context. As it turns out however, most CEOs (directeur général) also hold the title of chairman of the board (président du conseil d’administration). Only when the firm is a “société à directoire” (a special legal form imported from German law), is the CEO prevented from holding the chairman seat.

We retrieved personal information on the CEOs and the directors using two data sources. The first one is the Who’s Who in France, a list of prominent people in politics, business and entertainment. For each individual, the available information is well standardized and includes self-reported measures of parent’s occupation, place and date of birth, marital status, number of children, education, current occupation and past career (with positions in firms, firms’ names, and dates of entry or accessions to the positions). Each individual listed in the DAFSA database was coded using his or her first and last names. The matching process has been done by hand for all CEOs, Chairmen and Outside Directors from 1992 until 2003, using the 1994 and 2000 issues of the Who’s Who. On average, some 51% of all CEOs of all listed corporations were retrieved in the Who’s Who. Given that we look at the 1994 and 2000 issues of the Who’s Who, this percentage shows a steady decline over the period under study, from some 60% in the beginning to 45% in 2003. This figure is somewhat lower

for directors, with approximately 36% of them being listed in the Who's Who. Again, this percentage goes down from 40 to 27% over the period.

The second source of data on directors and CEOs are the directories of both Polytechnique and ENA graduates, which are exhaustive, in contrast to the Who's Who. These directories provide the obvious information about education, but no information about the socio-economic background and very little information about career (bureaucratic career - Corps d'Etat - if any). All CEO and director names present in the DAFSA database over the 1992 until 2003 were cross-checked using these directories. Given that we are looking at directories of graduates, almost 100% of ENA and Polytechnique graduates who were CEOs, chairmen, or board members of our listed firms can be assumed to have been included in our analysis file.⁹

Relying on the historical and sociological evidence reviewed above we identify three networks¹⁰ in our sample: (1) ENA graduates, all former high ranking civil-servants, (2) Polytechnique graduates who had a career as "civil service" engineers and (3) Polytechnique graduates who spent their whole career in the private sector. We now turn to a descriptive investigation of our data to see how these three networks are prevalent among the directors and CEOs of large listed corporations.

3.2 The French Business Elite in the 1990s

A raw inspection of our data confirms and updates the findings of sociologists on a much larger sample. First, Polytechnique and ENA graduates dominate the French business elite, as do civil-servants. Second, this pattern has become even more pronounced over the recent period for which we have data (1992-2003).

[Insert Tables 1,2]

Indeed, the data are fully consistent with the sociological and historical evidence outlined above. Over the 1992-2003 period, (1) ENA and Polytechnique graduates run the lion's share of French firms, and (2) former civil-servants, in particular those actively involved in politics also run a large share of the firms. As can be seen from Table 1, ENA and Polytechnique graduates run, on average, some 20% of the firms; while this may appear small, their firms are on average very large, since they correspond to some 70% of all assets traded on the Stock Exchange (at book value). This pattern can still be found if we restrict our focus to civil-servants that were "cabinet" advisors, who run 6% of the firms, but 52% of the assets.

⁹Apart from ambiguity in a name and surname, as, for instance, when both are very common.

¹⁰In a previous version of this paper, available from the authors upon request, we used a finer breakdown, based on "Corps d'Etat" or political affiliation. Results were essentially similar to those presented here.

[Insert Figures 1,2]

Second, in spite of a vigorous process of privatization accompanied by the deregulation of many sectors of the economy during the nineties, civil-servants remain prevalent amongst top executives of French corporations as late as the early 2000s. Figure 1 shows the change in the asset-weighted share of CEOs from various backgrounds. During the 1990s, civil-servants with pure administrative background - ENA graduates - became more and more prevalent. In addition, Polytechnique “engineers”, either from the civil service or from the private sector declined sharply after 1999. Last, this movement started with the resumption of privatizations under the right-wing government, elected in 1993. SOEs run by former civil-servants started to be sold to the public starting from that date on.

Figure 2 looks at the trend in board composition: it shows the change in the (asset-weighted) share of directorships held by ENA graduates, Polytechnique graduates with a career in the civil service and Polytechnique graduates with a pure private sector background. These shares are both very high and show a strong upward trend in the early 1990s, right when privatizations resume (1993). In asset weighted terms, between 40 and 50% of all director seats were filled with members of one of these three networks. Strikingly, without even mentioning this particular feature of French business elites, two reports on “best corporate governance practices”, issued in 1995 and 1999 (Viénot I and II), focused on the appointment of “independent directors” to solve governance problems.

Figures 1 and 2 display similar evolutions: over the the 1990s ENA graduates became more and more prevalent both as directors and CEOs, while polytechnique graduates, in particular those linked with the civil service, lost ground. This, along with sociological evidence on French elites, suggests a relation between board composition and the CEO’s identity: ENA graduate CEOs may be more likely to appoint ENA graduates as non executive directors.

A preliminary investigation indeed supports this claim: CEO’s identity matters for shaping board composition. As Table 3 shows, the fraction of ENA graduates seating on the board of corporations run by ENA graduates is much higher than in other corporations. The same result holds for Polytechnique graduates when they have a civil service background but not for those “polytechniciens” with an entire career in the private sector.¹¹

[Insert Table 3]

This first direct look at the data indeed suggests that social networks shape the composition of corporate boards. It is still unclear, though, which structural parameters is identified

¹¹Similar tables, using various distinctions such as political affiliation, are also compelling. We omitted them to save space.

by this simple inspection of Table 3. Do we simply measure that ENA graduates are better directors, and hence more sought-after? Do we simply measure the fact that some firms naturally attract ENA graduates as directors and CEOs - potentially because they operate in regulated industries, or because the business requires a good knowledge of the bureaucracy? Or do we capture the fact that ENA CEOs run larger firms, that have larger boards and are thus more likely to appoint ENA directors? To circumvent these difficulties, before looking at the networks *per se*, we briefly describe the empirical model we use in our exploration of the data, and then derive simple, easy to estimate reduced-form equations that will allow us to recover the parameters we want to identify. And, of course, this will help us interpret the results presented in Table 3.

4 Empirical Strategy

Appointment of a director depends on each potential applicant's skills, in particular her own social networks and whether it overlaps with that (those) of the CEOs. This simple statement generates a model which is difficult to estimate in general, even with the data at hand. However, this model can be transformed through various aggregations and elimination of nuisance parameters into relations that can be estimated. These transformations from the structural (economic) model to these aggregated and estimable forms are not straightforward. Therefore, this Section carefully spells out how the structural model translates into various estimable models.

4.1 The “Economic” Model

Consider the (matched employer - employee) panel where individuals are indexed by i , firms by j , and time by t . We assume the existence of several (possibly overlapping) networks, which we index by k . As in Munshi (2003), we try to identify whether belonging to the same network as that of the firm's CEOs increases the chance for individual i to be appointed at firm j 's board. We thus start by formulating the following linear¹² probability employment model:

$$E_{ijt} = \alpha_i + \beta_j + \sum_k \left[\beta_j^k A_i^k + C_{jt}^k \left(\gamma + \sum_l \lambda_{kl} \cdot A_i^l \right) \right] + \varepsilon_{ijt} \quad (1)$$

where $E_{ijt} = 1$ if individual i works as a director of firm j at date t , and $E_{ijt} = 0$ otherwise. k is an index for the network. $A_i^k = 1$ when individual i belongs to network k , and zero

¹²Given that the probability for a given - even if well connected - individual to be hired at a given firm's board are small, a linear probability model seems to be a correct approximation.

otherwise. C_{jt}^k is equal to 1 when the CEO of firm j at t belongs to network k , and zero otherwise.

We introduce three kinds of (fixed) effects. The α_i coefficient is a fixed effect standing for the general propensity of person i to become director of a listed firm. This effect can be correlated with A_i^k , the network to which i belongs. β_j stands for the general propensity of firm j to hire directors (thus have a large board). It may be correlated with C_{jt}^k , the CEO's networks (some CEOs belonging to particular networks may prefer to hire larger boards), or uncorrelated to it (some firms simply tend to have larger boards, because they are large). β_j^k stands for the fixed tendency of certain firms to hire people from certain networks, independently of the CEO's identity.

We present now the parameters linked to the effect specific to the CEO's identity. First, some types of CEOs may tend to hire more directors than others, which increases a given individual's chances to be appointed: this is captured by the γ parameter. Second, when a CEO belongs to network k , it may affect different categories of individuals according to their network l : λ_{kl} captures the impact on the probability for an individual belonging to network l of being hired by a CEO belonging to network k .¹³

How do we test for the presence of social networks in this model? If network effects are really present, and if we correctly measure network membership with our categories k , then we should observe that being appointed as a director in firm j occurs more frequently when the individual and the CEO share the same network (conditional on the various effects described just above). Hence,

$$H_0: \lambda_{kk} > \lambda_{kl} \text{ for all } l \neq k$$

corresponds to evidence of network effects in the patterns of nomination.

Model (1) cannot be estimated as such. Indeed, the original data is restricted to observations for which $E_{ijt} = 1$. Furthermore, it is virtually impossible to generate all observations for which $E_{ijt} = 0$. For instance, we do not know who applied as a director to any given firm j and was not considered or even rejected. One solution could be to assume that all

¹³Our model encompasses Munshi (2003)'s specification. In Munshi, the probability of being employed for an immigrant of community l is an increasing function of community's employment in the city (C_{jt}^l in our context where city is being replaced by firm). Hence, Munshi's equation simply rewrites as:

$$E_{ijt} = \alpha_i + \beta_j + \sum_k \beta_j^k A_i^k + \lambda \cdot \sum_k A_i^k \cdot C_{jt}^k + \varepsilon_{ijt}$$

which amounts to assuming that the λ matrix is diagonal and that $\gamma = 0$. Our broader specification allows for networks overlap - as is more likely to be the case in our context than in Munshi's. In addition, it allows to control for heterogeneity in network strengths, a possibility our detailed dataset is probably more suited to explore than Munshi's.

individuals applied to all firms. However, all individuals not included in the data are potential applicants. Another problem with this approach is computational as there are, a priori, some 600 firms and 5,000 directors every year. Over 10 years, the sample of all (i, j, t) would therefore feature some 30 million observations ! Hence, in the next subsections we restrict attention to the “ $E_{ijt} = 1$ ” observations and derive estimable models that *only require* such observations.

4.2 The Firm-Level Model

This section shows how model (1), expressed as a match between individuals and firms, may be aggregated as a firm-level model and which parameters of (1) can be identified. Let us introduce a few more notations. First, let:

$$n_{jt}^k = \sum_i E_{ijt} \cdot A_i^k$$

be the total number of directors sitting at firm j 's board, who belong to network k . $n_{jt} > n_{jt}^k$ is the total number of directors of j . n_t^k is the total number of members of network k and finally n is the total labor force (total number of directors in the data source).

After a few manipulations, which basically amount to computing n_{jt}^k and n_{jt} using model (1), we show in Appendix that:

$$Y_{jt}^k = \left(\frac{n_{jt}^k}{n_t^k} - \frac{n_{jt}}{n_t} \right) = a_j^k + \sum_m b_t^{mk} \cdot C_{jt}^m + u_{jt}^k \quad (2)$$

with $b_t^{mk} = \lambda_{mk} - \sum_l \lambda_{ml} \frac{n_t^l}{n_t}$

where Y_j^k is the proportion of members of network k ending at the board of j in excess of the natural population proportion of people ending at the board of j . The fixed effect a_j^k stands for the fact that firm j may naturally (apart from its CEO's identity) have a propensity to hire members of k that is larger than the average propensity to hire from any other network. The b_t^{mk} coefficient measures the relation between a CEO's identity and the board composition, controlling for the above fixed effects. These coefficients are not exactly equal to the λ 's, because any network can be present at a given firm's board, as the mere result of its size in the natural population. The expected fraction of m , even in the absence of network effects, would be n^m/n . As a result, the specific effect on k will be *underestimated* in the “firm level” specification if we do not correct for this bias.

By comparing b_t^{kk} and b_t^{kl} , we are able to restate hypothesis H_0 in terms of the parameters, as estimated in (2):

$$H_0: b_t^{kk} > b_t^{kl} \text{ for all } l \neq k$$

thus, by looking at the difference between the coefficients of C_{jt}^k in the regressions explaining (1) the proportion of members of k ending in j and (2) the proportion of members of l ending in j .

4.3 The Individual-Level Model

Starting from the initial equation (1) in which employees and employers are matched, let

$$\mu_{it}^k = \sum_j E_{ijt} C_{jt}^k$$

be the number of firms in which, simultaneously, i is a director and the CEO belongs to network k . We denote μ^k , the sample number of members of network k , μ_i , the number of board seats held by individual i and μ the overall number of board seats in the sample.

Again, after straightforward manipulations described in Appendix, we can show that model (1) rewrites as the following equation, estimated with *individual* level data:

$$Z_{it}^k = \frac{\mu_{it}^k}{\mu_t^k} - \frac{\mu_{it}}{\mu_t} = c_t^k + \sum_m d_t^{km} \cdot A_i^m + v_{it}^k \quad (3)$$

with $d_t^{km} = \left(\lambda_{km} - \left(\sum_l \lambda_{lm} \cdot \frac{\mu_t^l}{\mu_t} \right) \right)$

Therefore, equation (3) tries to explain, given individual i 's network, the excess share Z_i^k of boards in which i is sitting and where the CEO belongs to network k . Again, it is possible to test the hypothesis of networks H_0 by comparing d_t^{kk} with d_t^{lk} : if CEOs from network k have more impact on the employment of directors of network k (compared to network l), we have evidence of networks.

The major *strength* of this individual approach is, in contrast to the firm method, that it allows the analyst to control for all three kinds of fixed effects from the main model (1) *without introducing firm fixed effects*. Its cost is that identification of the effects rely on those individuals sitting on at least two boards with different CEOs. Indeed, for all individuals who sit at only one board, $Z_{it}^k = 0$ for their own network, and $Z_{it}^k = -1/\mu_t$ for other networks. Thus, for all “mono-directors”, $d_t^{kk} - d_t^{mk}$ is always mechanically equal to $1/\mu_t$. There is not enough variability to identify network effects: this shows that individual who accumulate board seats are key to identify model (3). Fortunately, these individuals are far from being rare in our data, as we will see in section 6.2 (in particular, see Table 8).

4.4 Possible Biases

There are multiple sources of estimation biases; this section makes it clear which ones our empirical strategy will be able to deal with. Obviously, measurement error – aside from hand-

typing errors – does not appear to be an issue, whereas it could be in Munshi, because we directly measure the network each CEO belongs to. Of course, measurement error could arise if our categorization of the various networks was inappropriate. Yet, unbiased mistakes in measuring networks would a priori attenuate the magnitude and significance of our estimates.

Second, remember that we could not recover the socio-economic background of all directors and CEOs, but only for those who happened to be present in the Who’s Who.¹⁴ It could very well be that those individuals included in the Who’s Who are also those with high “director” ability. Independently of being an ENA or a Polytechnique graduate, sheer charisma, skills, or intensive networking are likely to be correlated with someone’s probability of becoming a director. Our model includes a specific person effect α_i that controls for this tendency. And because both our firm-level and our individual-level models, by aggregating and differencing, eliminate α_i , these two techniques control for such potential biases.

Third, it might be that the matching process between directors and CEOs uses other variables than networks. Our model controls for fixed tendencies of firms to recruit *anyone*, and for fixed individual propensity to be recruited as a director of *any firm*. But it may well be that some individuals are more likely to be hired in particular firms. On the individual side, age, gender, or even IQ or charisma might matter more for some firms than others. On the firm side, size, industry or growth prospects might also matter more for some individuals than others. Therefore, directors will sort into firms according to (firm and individual) characteristics that are both observable and unobservable.

So far, our model (1) takes into account one particular aspect of sorting: some firms tend to hire members of each given network more than others. But, as described above, sorting could be along many other observable and unobservable dimensions. To see how far we can go given the data, it is useful to look at the following version of our model (1):

$$E_{ijt} = \theta \cdot Z_{jt} \cdot X_{it} + \alpha_i \cdot Z_{jt} + \beta_j \cdot X_{it} + \eta_i \cdot \kappa_j + \sum_k \left[\beta_j^k A_i^k + C_{jt}^k \left(\gamma + \sum_l \lambda_{kl} \cdot A_i^l \right) \right] + \varepsilon_{ijt} \quad (4)$$

where Z_{jt} is a set of firm level observables (size, former SOE, etc.), and X_i is a set of individual level observables (age, gender etc). θ measures the propensity of directors and firms to match according to fully observable characteristics, other than networks. α_i can be interpreted as an individual level unobserved tendency to be employed in firms with observables Z_{jt} ; similarly, β_j is the firm’s propensity to hire people with observables X_{it} . $\eta_i \cdot \kappa_j$ represents the potentially natural matching on unobservables: firms with clever CEOs

¹⁴Polytechnique and ENA graduates were all included, however, given that we had access to the directory of all former students of these two schools.

(high κ_j) may for example tend to hire clever directors (high η_i). Model (1) is nested in the more general equation (4), with $X_{it} = \{1, (A_i^k)_k\}$, $Z_{jt} = 1$, and $\eta_i = \kappa_j = 0$.

Aggregating over j leads to the following firm-level equation, analogous to (2):

$$\left(\frac{n_{jt}^k}{n_t^k} - \frac{n_{jt}}{n_t}\right) = \theta \cdot Z_{jt} \cdot \widehat{X}_t^k + \widehat{\alpha}_t^k \cdot Z_{jt} + b_j \cdot \widehat{X}_t^k + \mu_j \cdot \widehat{\eta}_t^k + \sum_m d_t^{mk} \cdot C_{jt}^m + u_j^k \quad (5)$$

$$\text{with } \widehat{X}_t^k = \frac{1}{\sum_i A_i^k} \cdot \sum_i X_{it} A_i^k - \frac{1}{\sum_i 1} \cdot \sum_i X_{it}$$

where \widehat{X}_t^k can be interpreted as the the average X within members of network k , compared to the population of directors. Similarly, $\widehat{\eta}_t^k$ is the excess mean η for members of network. Similarly, it feasible to aggregate (4) at the individual level to obtain the following modified version of equation (3):

$$\left(\frac{\mu_{it}^k}{\mu_t^k} - \frac{\mu_{it}}{\mu_t}\right) = \theta \cdot \overline{Z}_t^k \cdot X_{it} + \alpha_i \cdot \overline{Z}_t^k + \overline{\beta}_t^k \cdot X_{it} + \eta_i \cdot \overline{\mu}_t^k + \sum_m d_t^{km} \cdot A_i^m + v_{it}^k \quad (6)$$

where \overline{Z}_t^k is the average Z of firms run by CEOs of network k , compared to other firms.

A careful look at transformations (5) and (6) reveals the strengths and limits of our identifying strategy. First, it is always possible to control for sorting according to observed characteristic, by including the terms in θ . Second, it is theoretically feasible to control for sorting according to observed characteristics *on one side*, and unobserved characteristics on the other. For example, by including firm level observables in the firm-level equation (5), it is simple to control for the unobserved propensities of individuals to join firms with given characteristics (size, industry etc.). It is, however, more difficult in this transformation, to control for heterogeneity in the tastes of firms for directors of particular characteristics (age, gender). Luckily, the converse is true for the individual level transformation (6), so it is always feasible to check whether any dimension of such sorting matters.

Finally, both aggregations show that it is impossible to control for sorting along unobservable characteristics *on both sides* (pure unobservable matching). If directors with high IQ tend to join firms with high IQ CEOs, and IQ is correlated with Grandes Ecoles graduation, our estimates will be upward biased: for example, $\eta_i \cdot \overline{\mu}_t^k$ will be correlated with A_i^k in equation (6). This concern is difficult to address. Fortunately, our networks are not only related to elite school attendance, but also to a career in the civil service. Hence, our data will allow us to compare (1) former civil-servants from different top schools and (2) civil and non civil-servant that graduated from the exact same school.

5 Evidence of Networks

This section looks at network effects using model (1) discussed just above; we estimate the λ_{kl} parameters, which stand for the marginal probability, for a member of network l , to be a director in a firm run by a CEO belonging to network k . As we just saw, two natural empirical strategies emerge.

5.1 Estimating the Probability of Employment

First, we estimate the following, slightly modified version of (2):

$$\frac{n_{jt}^k}{n_t^k} - \frac{n_{jt}^0}{n_t^0} = a_t^k + b_{jt}^k + \sum_m \underbrace{(\lambda_{mk} - \lambda_{m0})}_{c_{km}} C_{jt}^m + u_{jt}^k \quad (7)$$

where j indexes the firm and t indexes time. k stands for the network under scrutiny (ENA, Polytechnique with civil service, Polytechnique without civil service). Equation (7) is obtained by subtracting equation (2) for network k from equation (2) for network 0. Thus, the difference with the previous firm level equation is that we take one network as the reference. Now, the left-hand side variable is the fraction of members of network k that are employed in firm j *minus* the fraction of members of reference network that are employed in firm j . We define the reference category to be members of neither ENA nor Polytechnique networks. u_{jt}^k is an error term and the indicator C_{jt}^m is equal to 1 whenever firm's j CEO belongs to network k . We are interested in the coefficients of these indicator variables $(\lambda_{mk} - \lambda_{m0})$, which have a very simple structural interpretation, since they measure the probability for a member of a given network k to be a director of a firm run by a member of network m , *minus* the probability that a member of k is a director in a firm run by a CEO that does not belong to any of the networks.

In the Tables, we report the results of (7) without the firm fixed effects b_{jt}^k for the following reasons. Most importantly, there is a very low turnover of ENA CEOs and, most often, when they leave, their replacement CEO turns out to be another former ENA graduate. Clearly, introduction of firm fixed effects would not generate any serious estimate in this case. This fact therefore makes separate identification of (1) a fixed tendency for a given firm to hire, say, ENA graduates from (2) the additional tendency due to the fact that currently the CEO is an ENA graduate, virtually impossible *using the firm-level* specification.

This is why we estimate the individual level model (3), since this model makes better use of the variability available in the data to account for such fixed effects. Therefore, we also estimate the following individual-level equation, derived directly from (3):

$$\frac{\mu_{it}^k}{\mu_t^k} - \frac{\mu_{it}^0}{\mu_t^0} = d_t^k + \sum_m \underbrace{(\lambda_{km} - \lambda_{0m})}_{f_{km}} \cdot A_i^m + v_{it}^k \quad (8)$$

In equation (8), i stands for the director’s index. The dependent variable is the fraction of director seats held by individual i among those belonging to a firm run by a CEO who is member of network k *minus* the overall fraction of “non connected seats” held by i . A_m^i is a dummy variable equal to 1 when i belongs to network k and its coefficient can be interpreted as the (marginal) probability for a member of m to be a director in a firm run by a member of k .¹⁵

[Insert Table 4]

Table 4 presents regression results of (7) and (8). Columns 1-3 present estimates of (7) for all three networks of interest (ENA, Polytechnique with civil service, Polytechnique without civil service). These regressions are jointly estimated using the SURE method, that permits error terms of the three equations to be correlated with each others for a given firm. Indeed, for example, if a given firm has many ENA directors, it is less likely that it has many Polytechnique graduates, so the two equations are not totally independent. We also allow the error terms to be correlated across observations of a same firm using the White correction method for standard errors. Columns 4-6 present estimates of the individual model (3), for all three networks, using both the SURE methodology and the White correction (clustering error terms at the individual level). The bottom panel of table 4 provide tests of the null hypothesis of equality of coefficients on CEO across equations.

First, both approaches yield similar estimates. Taking into account the specific propensity of some firms to hire members of particular networks (the β_j^k in model (1)) does not affect the results: firm-level estimates (where these effects are not controlled for) and individual-level estimates (where these effects are controlled for) are essentially similar. Second, for civil-servants, the coefficient on CEO’s identity is always very strong, and economically significant; the probability of of being director in a firm is increased on average by some 0.5-1 percentage points when the CEO belongs to one of the two civil service related networks (graduates from ENA or Polytechnique). This is sizeable, given that, with 600 firms, the probability of being employed in given specific firm is on average some 0.2%.

¹⁵In fact, the consistency of both models with the initial structural model (1) can be tested by checking that:

$$c_{km} - f_{km} = c_{km'} - f_{km'} \text{ for all } m, m'$$

which turns out to be true, as will be apparent in the Tables.

Third, these results do not necessarily constitute very strong evidence of network importance per se, since we are only comparing members of three networks to “mostly unconnected” directors. We thus test our H_0 hypotheses more directly by looking if, for a given director, the probability of being employed in a firm run by a CEO of the *same* network is significantly higher. In other words we ask in the “firm level” model whether $c_{kk} > c_{km}$, for all m , and in the “individual level” model whether $d_{kk} > d_{km}$, for all m . These tests are reported in the bottom rows of Table 4. Our results therefore show that the most important networks are former ENA graduates, former Polytechnique graduates with civil service career, but not Polytechnique graduates who went directly to the private sector. These results are strong evidence that the intuitions of Kadushin (1995) and Franck and Yasumoto (1998) were right: it is networks of former civil-servants, not networks of engineers, that matter the most.

5.2 Estimating the Probability of Appointment

An important question raised by the previous regression results is whether CEO’s identity matters, or whether it is simply a proxy for the board’s identity. Imagine for instance that the CEO holds no real power in appointments, and that all the power in these matters rests with the board of directors. In this case, the board is going to appoint CEOs that are similar to the set of directors, implying that the causal relation is reversed. Though this is still evidence of social networks interfering with the labor market, the direction of the relation matters for corporate governance. Indeed, if the board turns out to be chosen by the firm’s CEO - Shivdasani and Yermack (1999) suggest that this situation might very well hold in the US -, the directors’ ability to monitor the management on behalf of the shareholders might be severely impaired.¹⁶

To look at this issue, we do two things. First, we reestimate model (1), by looking at *appointments* rather than employment. Hence, $E_{ijt} = 1$ when i is appointed by firm j at date t . We use the firm level aggregation and thus correlate the CEO’s identity with the firm’s hiring policy, thus providing, we think, a more stringent test of social interactions.¹⁷ We then ask whether the CEO’s identity in these appointment regressions is a proxy for initial board composition by including in the regression the past number of directors in the

¹⁶Claude Bébéar, the former CEO of AXA, a large French insurance company, and a prominent figure in French business, argues that “board members are in general reluctant to fire the president. One general assembly after the other, a CEO has “his” men appointed on the board of directors. They owe him their seats. After a few years, the CEO seats with a board composed through personal ties, various free masoneries, student friendship and so forth.” (Bébéar, 2003).

¹⁷We also ran - results non reported - individual level regressions using appointments instead of employment, with pretty much the same estimates and success.

board of either networks. This amounts to running the following modified version of (7):

$$\frac{n_{jt}^k}{n_t^k} - \frac{n_{jt}^0}{n_t^0} = a_t^k + b_{jt}^k + \sum_m c_{km} \cdot C_{jt}^m + \sum_m c'_{km} \#A_{jt}^m + u_{jt}^k$$

where the left-hand side variable is now the share of newly hired members of network k hired by firm j minus the share of newly hired directors by j . $\#A_{jt}^m$ is now the number of members of network m *already* sitting on the board of firm j . Note that such a regression could *not* be estimated using employment instead of appointment - as in the specifications shown above - since faces the well-known reflection problem (Manski, 1993): if A and B are similar and sitting on the same board, then it is difficult to know whether A sits because of B or the reverse. By introducing some dynamics, this methodology makes some kind of “Granger causality” argument: it is A who matters if A was on the board *before* B .

[Insert Table 5]

The results of these firm-level regressions for our three selected networks are presented in Table 5. Estimation of all three equations is made jointly using the SURE methodology, and allowing for flexible correlation across observations of a same firm using the White correction. As above, industry and year indicators are included. To avoid spurious correlations, explanatory variables are lagged one year. In the Table, columns 1 to 3 look at the equivalent of (7), that is assuming $c'_{km} = 0$. Columns 4 to 6 add the past board composition controls.

The regression results from columns 1 to 3 confirm previous findings; education (ENA and Polytechnique vs the rest) and career (civil service vs private sector) networks affect the allocation of directors to firms, even when analyzing nominations. Results from columns 4 to 6 support the idea that CEO’s identity, not board composition, explain the selective directors’ appointments. First, even though inclusion of the board composition variables reduces slightly the difference between coefficients on CEO’s identity (compare tests values for the first regression with those for the second)., all c'_{km} coefficients for board composition are significant and strongly positive. All tests give results virtually identical to those presented in Table 4. In addition, we now have similar results for boards: boards dominated by former civil servants tend to recruit new directors from the networks (Polytechnique or ENA) they belong to.

5.3 When Directors and CEOs Sort on Other Dimensions

Last, we assess the biases arising from the fact that directors may sort with firms according to observable or unobservable characteristics. As suggested in section 4.4, we run firm level regressions including average individual characteristics and individual level regressions including firm level characteristics, and see if our results still hold.

[Insert Table 6]

We start by reestimating firm level regressions including observable firm characteristics, as in equation (5): a dummy equal to one for former SOEs, industry dummies as well as the firm’s past profitability (as measured by ROA lagged by one year). This approach allows us to take into account the fact that these observables matter for directors endowed with particular, unobservable, characteristics that might be correlated with networks. This is done in the first three columns of table 6, for each of the three networks we focus on. We then reestimate the individual level regressions as in (4), including individual level characteristics. As shown in section 4.4, this allows us to control for heterogeneity in the tastes of firms for observable characteristics of directors. As individual variables, we include age and education - measured in number of years. The results of these individual regressions are reported in columns 4-6 of table 6.

As it turns out, these controls do not affect our estimates very much. The only change is that now firms run by ENA graduates are as likely to hire former civil servants from ENA than from Polytechnique. This does not affect our general conclusion that civil-servants networks are active, while those related to a Grande Ecole (Polytechnique) without bureaucratic career are not. Accounting for other possible sorting processes, that could be overlapping with network effect, does not affect our results neither quantitatively nor qualitatively.

6 How Do Social Networks Affect Corporate Governance ?

The above results suggest that networks of former high ranking civil-servants seem to be particularly active in shaping board composition. When the CEO is a former civil-servant (whether a graduate from Ecole Polytechnique or ENA), the fraction of directors from the same background is larger.

The existing literature in labor economics suggests that such arrangements might be optimal: CEOs use their own social networks to “grease the wheels” to find more appropriate directors. One obvious cost here is nepotism, i.e. CEOs using their networks to hire friends rather than appropriate directors. The conflict of interest is particularly strong in the present case, as directors are supposed to monitor the CEO, and friends are obviously less likely to be “tough” supervisors. Theoretical models in labor economics assume that shareholders can design an optimal contract with the referee (here, the CEO). In this case, perverse effects such as nepotism, are dominated by beneficial effects in equilibrium. This assumption is, however, unlikely to hold in the context of large, publicly traded corporations such as the ones we study here.

To evaluate the net effect of social networks, this section focuses on what directors actually produce, i.e. corporate governance. Our approach is to compare firms whose CEO is a former civil-servant - and thus likely to have other former civil-servants on his board - to firms whose CEO has done all his career in the private sector. We then measure the quality of corporate governance in three different ways, that have been extensively studied in the literature: (1) the sensitivity of CEO turnover to corporate performance, (2) the sensitivity of the CEO's number of other director seats to his own performance and (3) the market's assesment of the firm's acquisitions. We conclude the paper by looking at the profitability of firms run by such CEOs.

6.1 Connected CEOs Are Less Likely to Get Fired

As argued above, an important function of the board of directors in a corporation is to discipline the management in order to make it act in the firm's shareholders interests. In some extreme cases, when it becomes clear that a change in strategy is needed and cannot be implemented by the current management, this might force the CEO to resign. This is, however, likely to occur too late if some directors and the CEO belong to the same social network and are tied by social connections. Then, the CEO might be able to retaliate on any hostile action undertaken by his directors, even if he loses his job, or in contrast might be able to bribe - because of their common relations - his directors more efficiently.

Hence, we ask if well connected CEOs are less likely to be forced out when their firm performs badly. There is a long tradition in the corporate governance literature to related various aspects of corporate governance with CEO turnover to performance sensitivity. For example, Dahya, Mc Connell and Travlos (2003) find evidence that such turnover is more likely to happen for UK who complied with the Cadbury code of good governance issued in 1992. More connected to the present paper, Weisbach (1988) shows that, in the US, badly performing firms are more likely to lose their CEO when the board is dominated by outside directors.

In the spirit of this literature, we run, on firm level data, the following logistic regression:

$$T_{jt} = \alpha + \beta PERF_{jt} + \delta controls_{jt} + \varepsilon_{jt} \quad (9)$$

where T_{jt} is a dummy variable equal to 1 when the CEO loses her job over the next year. $PERF_{jt}$ is an industry adjusted measure of corporate performance (we use return on assets, return on equity, or annual stock returns). This equation is estimated separately for firms whose CEO is a former civil-servant, and for firms whose CEO is not. If former civil-servants use their networks to pick loyal directors, then β should be smaller (in absolute value). If on

the contrary, these CEOs use their networks to find adequate and tough directors, β should be similar or larger.

[Insert Table 7]

We restrict ourselves to the sample of CEOs aged less than 65, in order to reduce the chances that turnover be due to retirement.¹⁸ Table 7 reports the estimates of equation (9) for all three measures of (industry-adjusted) corporate performance. Each triplet (estimate of β , standard error, number of observations) corresponds to a different regression. Column 1 looks at all firms together. Column 2 focuses on firms run by former civil-servants. Column 3 looks at all other firms. The first panel presents results without controls whereas the second panel presents results with multiple controls, in particular an interaction term between performance and the firm being a former SOE.¹⁹

First, on average, the sensitivity of turnover to performance is strongly negative and significant. Hence, when performance is bad, CEOs of less than 65 are more likely to depart from the firm. The effect is sizeable economically, albeit not huge. When, for example, the adjusted ROA decreases by 6 percentage points - one sample standard deviation - the probability of leaving office increases by 4 percentage points. The implied elasticity has an order of magnitude similar to what Jensen and Murphy (1990) found for their 1969-1983 US sample.

When we focus on connected CEOs, depending on the measure of performance we use, the effect is divided to two or three, and becomes statistically insignificant. Because the number of observation drops sharply, the difference between connected and unconnected CEOs is, however, very often statistically insignificant.

6.2 Connected CEOs Are Too Busy

Most well-connected CEOs tend to accumulate directorships. Table 8 computes the fraction of CEOs that have, in addition to their executive job, 1, 2, 3 or 4 non executive director seats in other listed companies. It presents this distribution for all CEOs who are also directors, and then separately for former civil-servants and CEOs whose whole career was in the private sector. Overall, 70% of all CEOs hold no director seat in another listed firm. This figure goes up to 75% for “pure private sector” CEOs, and down to only 36% for former high ranking bureaucrats ! Hence, former bureaucrats are twice more likely to have at least one

¹⁸The distribution of CEO age at turnover date indeed has a spike around 65.

¹⁹The controls are the fraction of equity held by the dominant block holder, logarithms of assets, an indicator for having been privatized, industry and year indicators, and an indicator for being a société à directoire (when the CEO is also chairman of the board).

directorship than other CEOs. Conditionnally on holding at least one seat, they also tend to hold many more of them: 20% have at least 4 seats, while this figure drops to 3% for those who never worked for the French government.

[Insert Table 8]

Can CEOs who accumulate director seats still do a good job at running their own firm ? On the one hand, the time that a CEO spends sitting at the board of another company is obviously lost for the company she runs. But on the other hand, by sitting at other companies' boards, the CEO can learn about her competitors or other businesses and accumulate information that may be useful for the firm she runs. Which effect does dominate is an open empirical question. A small literature on US executives has tried to adress it by looking at the correlation between the number of seats held by each CEO and its own firm performance (see for example, Kaplan and Reishus, 1990, Booth and Deli, 1996, Ferris, Janagathan and Pritchard, 2003). Using Tobin's q as a measure of performance, Booth and Deli find a negative correlation, which they interpret as the fact that firms with little growth opportunities can send their CEOs to other firms, without much cost. Using ROA as firm's performance, Ferris et al. find a very strong positive correlation. Both papers conclude that multidirectorship might not be a bad thing after all. These conclusions are slightly nuanced in a recent paper by Perry and Peyer (2004), who show that own firm stock price reactions to CEO appointment as the director of another corporation are positive when the receiver firm is in a related industry, and negative in other circumstances.

Using our sample of French CEOs, we follow Ferris et al. and look at the correlation between the number of director seats held and own firm's profitability (ROA). We expect this correlation to be positive if good CEOs are often hired as directors. It can be negative if CEOs who tend to spend a lot of time networking instead of working tend to be the ones who accumulate board seats.

In Table 9, we present estimates of the following *individual level*, regression:

$$n_{it} = \alpha + \beta ROA_{it} + controls + \varepsilon_{it} \tag{10}$$

where n_{it} is the number of board the CEO i sits on at date t . The upper panel of Table 9 provides estimates with year dummies as only controls. The lower panel provides estimates of β with the CEO's firm's log assets, board size and industry as additional controls. Column 1 reports estimates of β for all CEOs, column 2 focuses on the sample of former civil-servants, and column 3 restricts the sample to CEOs with a pure private sector background. The regression model is, as in Ferris et al, an ordered logit, where the last category comprises

all CEOs holding 4 and more board seats outside their own company. All residuals ε_{it} are clustered at the individual i level.

[Insert Table 9]

The overall correlation between own firm performance and seat accumulation is strongly negative in France, in stark contrast with the US results. One interpretation is that the market for directors is more competitive in the US, or conversely, that the market for directors in France is far from being competitive. Yet, such a statement has to be moderated by the fact that the order of magnitude of the exhibited effect, although statistically significant, is not very large. Taking the parameter from a purely linear model (estimated with OLS), a 0.07 increase in adjusted ROA (one sample standard deviation) is associated with a *reduction* of 0.2 director seats. This reduction is to be compared with an average number of director seats held by CEOs of 0.7.

Strikingly, the correlation is much more negative, twice as large, when CEOs are former civil-servants. Here, a 0.07 increase in ROA is associated with a reduction of the number of director seats by 0.4. This figure is largely significant, and has to be compared with an average number of director seats of 1.8 for CEOs with a civil service background. It is possible to test for the difference in β for both types of CEOs by including in the regression (10) ROA interacted with an indicator equal to 1 when the CEO is a former civil-servant. Such tests, available from the authors upon request, show that the difference is statistically significant, especially for the model with controls.

6.3 Connected CEOs Make Worse Acquisitions

This section looks at two measures of agency costs that are traditional in the corporate finance literature. The first one is the sensitivity of investment to cash flows. In the neoclassical theory of investment, the only determinant of investment should be the Tobin's q . This measure captures the expected future returns of investment. Since at least Fazzari, Hubbard and Petersen (1988), it has become customary among empiricists to add the investing firm's current cash flows as a second key determinant of investment. In a pure neoclassical world, investment should not depend on current profits, so the investment to cash flow sensitivity is taken as evidence of agency costs. The intuition is that managers have a tendency to overinvest their available cash flows, which is expected by external capital markets. As a result, internal funds are less expensive than external ones, and they tend to be used first to finance investment projects. This wedge between internal and external funds is driven to zero for firms with no agency costs, and their investment should not be sensitive to current cash

flows.²⁰ Following this literature, we thus compare the investment to cash flow sensitivity of firms run by former civil-servants and others.

[Insert Table 10]

To do this, we estimate, separately for both groups, the following equation:

$$\frac{FA_{it+1} - FA_{it}}{A_{it}} = \alpha_i + \beta \cdot \frac{CF_{it}}{A_{it}} + \gamma \cdot \frac{Mkt_{it}}{A_{it}} + \varepsilon_{it}$$

where FA_{it} stands for fixed assets of firm i at date t . A_{it} stands for total assets (a normalization). CF_{it} is cash flows and Mkt_{it} is the market value of equity plus book value of debt (we do not use market value of debt because of data availability, in part since many French listed firms, although large, rarely issue bonds). Note that this equation includes a firm fixed effect, so that β is identified on the response of changes in net investment to changes in cash flows, holding changes in market value constant. The error terms are clustered at the firm level. Results presented in Table 10 show that, indeed, former civil-servants exhibit a higher β , which is evidence of larger agency costs, or equivalently, a larger propensity to spend the cash on new investment projects. The difference with pure private sector CEOs is, however, small and statistically insignificant. It may as well be due to imprecision of the civil-servants' estimate.

Other evidence of agency costs is to be found in the returns to acquisitions, which are large investment projects where the board of directors is most likely to be involved. Until recently, the (US based) corporate finance literature had produced mixed results regarding the profitability of acquisitions. Recent contributions (Bradley and Sundaram, 2004; Mitchell and Stafford, 2000; Moeller, Schlingemann and Stulz, 2005) have allowed scholars to make sense of the results accumulated so far. While many large acquisitions are clearly value-destroying, the bulk of small and medium sized acquisitions actually create value, as is evidenced by short run stock price reactions when firms announce an acquisition. While some of these acquisitions are clearly the product of undisciplined managerial hubris (the big ones), the majority of them results from well-thought external growth strategies (the small ones).

[Insert Figure 3]

²⁰There is, however, a debate as to whether such coefficients should really be interpreted as evidence of agency costs. Recent evidence relying on clean, exogenous variations of cash flows unrelated to the profitability of investment, however suggests that there actually is an investment to cash sensitivity that is not consistent with neoclassical theory (see for instance Lamont [1997], and Rauh [2005]).

Following on this literature, we look at the short run stock returns of acquiring firms around the announcement date. We compute such returns using daily stock price data from Euronext - the firm operating the French stock exchange, along with acquisition announcement dates from SDC - Platinum. The data are then merged with our dataset on CEOs. In Figure 3, we report the cumulative returns starting 10 days before the announcement, up until 10 days after the announcement. These average cumulative returns are computed separately for firms run by former high ranking civil-servants and for firms run by pure private sector CEOs. For “normal” acquiring firms, there is a clear, positive, stock price reaction to announcements. The order of magnitude hovers around 1-1.5%, which is consistent with, albeit slightly smaller than, what Andrade, Mitchell and Stafford (2001) report for their US data (their results hover around 2-2.5%). The market provides, however, a different judgement on acquisitions made by former top ranking civil-servants: on average, the stock price reaction looks much smaller.

[Insert Table 11]

To obtain a sense of statistical significance, we then compute cumulative returns from x days before the announcement date until x days after the announcement, for different time windows ($x = 1, 3, 5, 7$ and 10). For each of these windows, we then compute separately average cumulative returns for acquisitions made by former civil-servants, and acquisitions made by other CEOs. Average short-run stock returns, along with standard errors and number of observations, are reported in table 11. Whatever the window chosen, it is clear that the short-run market reaction to acquisition announcement by former civil-servants is half that for private sector CEOs. In addition, it does not differ statistically from zero for most windows, while the short-run price increase for private sector CEOs is statistically significant. Unfortunately, however, this difference between the two groups is not significant, except for the $(-7 \text{ days}, +7 \text{ days})$ window. One possible explanation is that we do not distinguish here between large and small acquisitions (in the acquisition data, the target size is not frequently reported). One other possibility is that we do not use the correct asset pricing model here (we do not use any): different firms may have different exposure to risk factors, which may explain part of the cross sectional difference in their returns. While we do not see an a priori reason why this should bias our estimates in a direction or the other, this surely adds noise to our estimates of stock price reactions to acquisition announcements.

7 Conclusion: Connected CEOs Run Less Profitable Firms

Bad governance would not be too much of a concern if firms run by connected CEOs were over-performing their industries on average. One possibility, often mentioned in the French public debate is that investors are short termists, and that entrenchement creates value because it helps to insulate CEOs from pressure to make short-run profits. CEOs trained in the public service learnt the value of long-run, profitable projects. To be able to create value in such a fashion, while keeping their jobs, they need to appoint like-minded directors.

To examine the profitability of firms managed by connected CEOs, we estimate the following model using firm level data:

$$ROA_{jt} = \beta.C_{jt} + controls_{jt} + \varepsilon_{jt} \quad (11)$$

where ROA_{jt} denotes firm's j returns on assets, where the indicator C_{jt} is equal to 1 whenever the CEO of firm is a former civil-servant. Controls are firm size, industry, year dummies, and a dummy equal to one when the firm is a former SOE. ε_{jt} error terms are assumed to be correlated across observations of a same firm.

[Insert Table 12]

Table 12 reports the regression results of (11) for real industries (non-financial, non-real estate; in columns 1-2) and for manufacturing (columns 3-4). For each sample, we look at two specifications. First, we simply compare civil-servants to non civil-servants (as in (11), in columns 1 and 3). Secondly, we split the C_{jt} indicator into an indicator equal to 1 if the CEO is a politically connected civil-servant (a former “cabinet” advisor), and an indicator equal to 1 if the CEO is a non politically connected civil-servant (a former high ranking bureaucrat, yet never a cabinet advisor).

First, in contrast to the “short termist investors view”, firms run by former civil-servants do not overperform their industries. On average, these firms are slightly less profitable than firms run by CEOs with a pure private sector background, but the difference is not very significant. Taking all non financial firms, the difference in ROA is at 0.5 percentage point (not significant); excluding service industries, the difference in ROA increases to 1.6 percentage point (significant at 10%).

Second, the underperformance of civil-servant-run firms becomes both economically larger and statistically significant when we focus on firms run by *politically-connected* CEOs. In this case, for non-financial firms the difference is 1 percentage point, and for manufacturing firms, it is as high as 3 percentage points (for a sample standard deviation of 6 percentage

points). In a companion paper (Bertrand, Kramarz, Schoar and Thesmar, 2005), we provide an explanation of this difference in performance. We provide evidence consistent with the fact that politically-connected CEOs distort the labor demand of their firms to favor incumbents in upcoming political elections. The gains of this practice is better access to subsidies as well as lower local taxes, but it seems that the costs of this management style outweigh its benefits. The present paper explains why this behavior persists: former civil-servants – in particular politically-connected ones – appoint friendly directors; in doing so, they are able to insulate themselves from shareholders pressure. As a result, even when they do not run their firms in the most efficient way, they are still able to remain in power.

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9 Appendix

9.1 Identifying Power of the Firm-Level Model

In terms of the above notations, these four sets of variable write:

$$n_{jt}^k = \sum_i A_i^k E_{ijt}, \quad n_{jt} = \sum_i E_{ijt}, \quad n_t^k = \sum_i A_i^k, \quad n_t = \sum_i 1$$

hence by using model (1) to get an expression of E_{ijt} , we can compute n_{jt}^k explicitly:

$$\begin{aligned} n_{jt}^k &= \sum_i A_i^k \cdot \left\{ \alpha_i + \beta_j + \sum_m \left[\beta_j^m A_i^m + C_{jt}^m \left(\gamma + \sum_l \lambda_{ml} \cdot A_i^l \right) \right] + \varepsilon_{ijt} \right\} \\ &= \sum_i \alpha_i \cdot A_i^k + \beta_j \sum_i A_i^k + \beta_j^k \sum_i A_i^k \\ &\quad + \sum_m C_{jt}^m \left(\gamma \sum_i A_i^k + \lambda_{mk} \cdot \sum_i A_i^k \right) + \sum_i A_i^k \varepsilon_{ijt} \end{aligned}$$

which leads to:

$$\frac{n_{jt}^k}{n_t^k} = \widehat{\alpha}_t^k + \beta_j + \beta_j^k + \sum_m (\gamma + \lambda_{mk}) C_{jt}^m + \widehat{\varepsilon}_{jt}^k \quad (12)$$

where:

$$\widehat{\alpha}_t^k = \frac{\sum_i \alpha_i \cdot A_i^k}{\sum_i A_i^k}, \quad \widehat{\varepsilon}_{ijt}^k = \frac{\sum_i A_i^k \cdot \varepsilon_{ijt}}{\sum_i A_i^k}$$

so that $\widehat{\alpha}_t^k$ is the average fixed effect (ability to find any kind of directorship) of all members of network k .

At this stage, we need a benchmark to get rid of β_j . We thus compute board size n_{jt} :

$$\begin{aligned} n_{jt} &= \sum_i \left\{ \alpha_i + \beta_j + \sum_m \left[\beta_j^m A_i^m + C_{jt}^m \left(\gamma + \sum_l \lambda_{ml} \cdot A_i^l \right) \right] + \varepsilon_{ijt} \right\} \\ &= \sum_i \alpha_i + \beta_j \cdot \sum_i 1 + \sum_m \beta_j^m \cdot \sum_i A_i^m \\ &\quad + \sum_m \gamma C_{jt}^m \cdot \sum_i 1 + \sum_{m,l} \lambda_{ml} \cdot C_{jt}^m \cdot \sum_i A_i^l + \sum_i \varepsilon_{ijt} \end{aligned}$$

which rewrites:

$$\frac{n_{jt}}{n_t} = \widehat{\alpha}_t + \beta_j + \sum_m \left\{ \beta_j^m \cdot \frac{n_t^m}{n_t} + C_{jt}^m \cdot \left[\gamma + \sum_l \lambda_{ml} \frac{n_t^l}{n_t} \right] \right\} + \widehat{\varepsilon}_{jt} \quad (13)$$

where:

$$\widehat{\alpha}_t^k = \frac{\sum_i \alpha_i}{\sum_i 1}, \quad \widehat{\varepsilon}_{ijt}^k = \frac{\sum_i \varepsilon_{ijt}}{\sum_i 1}$$

so that $\widehat{\alpha}_t^k$ is the average fixed effect (ability to find any kind of directorship) of all the labor force.

We now subtract (13) from (12) and get:

$$\frac{n_{jt}^k}{n_t^k} - \frac{n_{jt}}{n_t} = \left(\widehat{\alpha}_t^k - \widehat{\alpha}_t \right) + \left(\beta_j^k - \sum_m \beta_j^m \cdot \frac{n_t^m}{n_t} \right) + \sum_m \left(\lambda_{mk} - \sum_l \lambda_{ml} \frac{n_t^l}{n_t} \right) C_{jt}^m + \left(\widehat{\varepsilon}_{jt}^k - \widehat{\varepsilon}_{jt} \right)$$

which more compactly rewrites as:

$$Y_{jt}^k = a_j^k + \sum_m b_t^{mk} \cdot C_{jt}^m + u_{jt}^k$$

9.2 Identifying Power of the Individual Level Model

Let

$$\mu_{it}^k = \sum_j E_{ijt} C_{jt}^k$$

be the number of firm in which i is a director, whose CEO belongs to network k . Again, we use model (1) to compute this number:

$$\begin{aligned} \mu_{it}^k &= \sum_j C_{jt}^k \left\{ \alpha_i + \beta_j + \sum_m \left[\beta_j^m A_i^m + C_{jt}^m \left(\gamma + \sum_l \lambda_{ml} \cdot A_i^l \right) \right] + \varepsilon_{ijt} \right\} \\ &= \alpha_i \sum_j C_{jt}^k + \sum_j \beta_j \cdot C_{jt}^k + \sum_m \left(\sum_j \beta_j^m C_{jt}^k \right) A_i^m \\ &\quad + \gamma \sum_j C_{jt}^k + \left(\sum_l \lambda_{kl} \cdot A_i^l \right) \cdot \sum_j C_{jt}^k + \sum_j C_{jt}^k \cdot \varepsilon_{ijt} \end{aligned}$$

let

$$\mu_t^k = \sum_j C_{jt}^k$$

be the overall number of firms headed by a CEO of network k :

$$\frac{\mu_{it}^k}{\mu_t^k} = \alpha_i + \bar{\beta}_t^k + \gamma + \sum_m \left(\bar{\beta}_t^m + \lambda_{km} \right) \cdot A_i^m + \bar{\varepsilon}_{it}^k \quad (14)$$

We now need to find a reference in order to remove the individual fixed effect. We now

compute the number of directorship held by a single individual i a date t :

$$\begin{aligned}
\mu_{it} &= \sum_j E_{ijt} \\
&= \sum_j \left\{ \alpha_i + \beta_j + \sum_m \left[\beta_j^m A_i^m + C_{jt}^m \left(\gamma + \sum_l \lambda_{ml} \cdot A_i^l \right) \right] + \varepsilon_{ijt} \right\} \\
&= \alpha_i \cdot \sum_j 1 + \sum_j \beta_j + \sum_m \left(\sum_j \beta_j^m \right) A_i^m + \gamma \sum_m \left(\sum_j C_{jt}^m \right) \\
&\quad + \sum_m \left(\sum_j C_{jt}^m \right) \left(\sum_l \lambda_{ml} \cdot A_i^l \right) + \sum_j \varepsilon_{ijt}
\end{aligned}$$

again, we divide by μ_t , the overall number of firms at date t :

$$\frac{\mu_{it}}{\mu_t} = \alpha_i + \bar{\beta}_t + \gamma + \sum_m \left(\bar{\beta}^m + \sum_l \lambda_{ml} \cdot \frac{\mu_t^l}{\mu_t} \right) A_i^m + \bar{\varepsilon}_{it} \quad (15)$$

We are now set to subtract (15) from (14) and obtain in the process:

$$\frac{\mu_{it}^k}{\mu_t^k} - \frac{\mu_{it}}{\mu_t} = \left(\bar{\beta}_t^k - \bar{\beta}_t \right) + \sum_m \left(\lambda_{km} - \left(\sum_l \lambda_{lm} \cdot \frac{\mu_t^l}{\mu_t} \right) \right) \cdot A_i^m + \left(\bar{\varepsilon}_{it}^k - \bar{\varepsilon}_{it} \right)$$

or:

$$Z_{it}^k = c_t^k + \sum_m d_t^{km} \cdot A_i^m + v_{it}^k$$

10 Figures

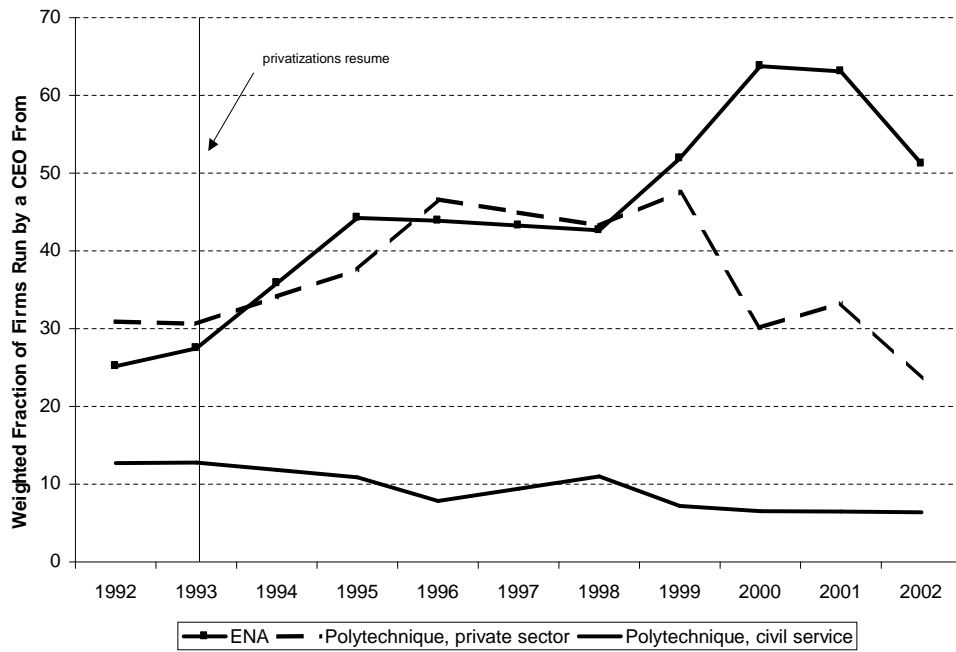


Figure 1: Characteristics of the CEOs of France's Listed Corporations : 1992-2003

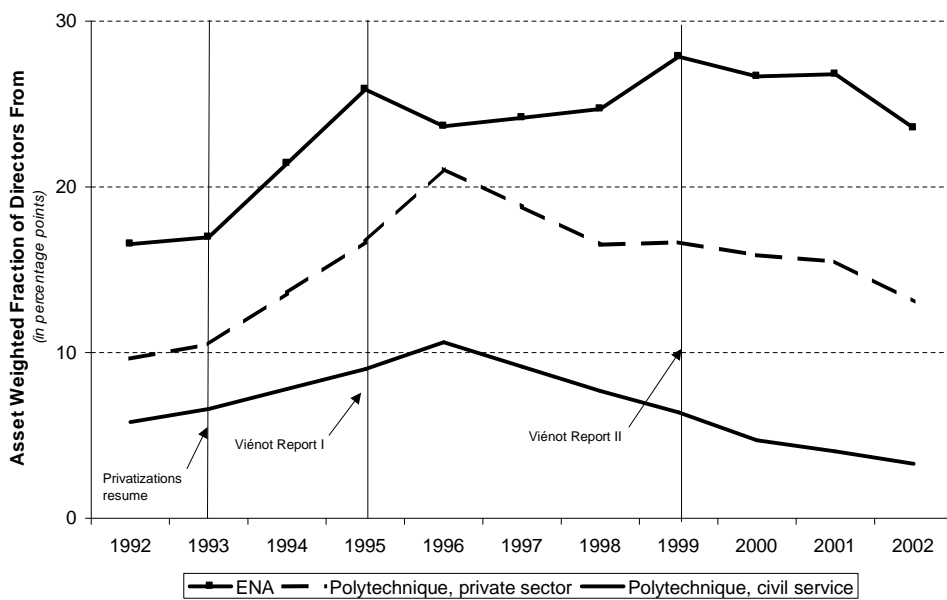


Figure 2: Board Composition of French Listed Corporations : 1992 - 2003

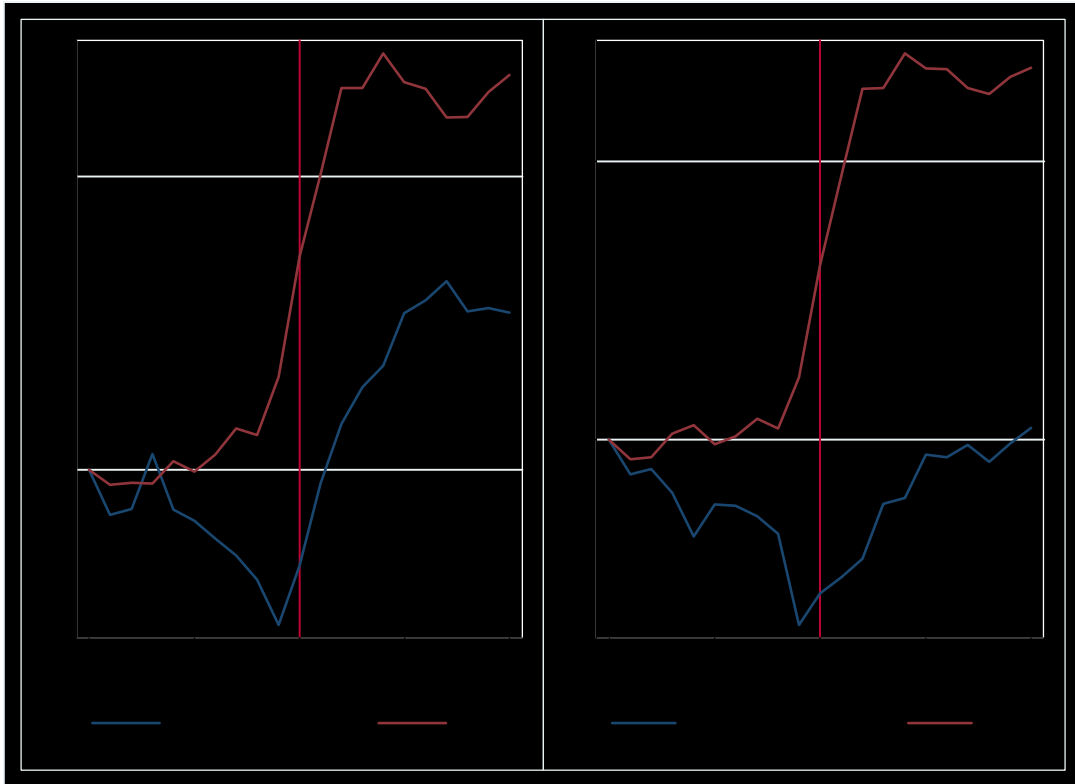


Figure 3: Mean Cumulative Returns Around Acquisition Announcement

11 Tables

Table 1: Firm Level Summary Statistics

	Mean	Std Dev.	Min	Max	Asset Weighted Mean
CEO Background					
ENA graduate	0.07	0.26	0	1	0.54
Polytechnique, former civil servant	0.04	0.20	0	1	0.08
Polytechnique, always private sector	0.08	0.27	0	1	0.33
In Who's Who	0.51	0.50	0	1	0.88
Former civil servant	0.12	0.32	0	1	0.65
Former "cabinet" advisor	0.06	0.24	0	1	0.52
Outside Directors					
Total Number	6.9	3.8	1	26	-
At least one ENA	0.30	0.46	0	1	0.90
At least one polytechnique, CS	0.18	0.38	0	1	0.59
At least one polytechnique, PS	0.36	0.48	0	1	0.81
Firm Characteristics					
Former SOE	0.13	0.34	0	1	0.64
Currently SOE	0.04	0.20	0	1	0.13
Pct shares held by major block holder	50.8	25.1	0	100	27.0
Firm Performance					
Assets (bn Euros)	5.5	45,7			-
Return on Assets	0.06	0.06	-0.13	0.27	-
Return on Equity	0.16	0.19	-0.79	0.88	-
Tobin's Q	1.3	0.8	0.3	6.6	-
Age (years)	62	48	0	327	-

Note: French public firms over the 1994-2001 period. Source: DAFSA diary of public firms for the names of the directors. Who's Who and School Diaries

Table 2: Director Level Summary Statistics

	Mean	Std Dev.	Asset weighted mean
Positions			
# of CEO seats	0.1	0.4	0.3
# of director seats held	1.9	1.7	3.0
Past Career and Education			
ENA graduate	0.08	0.27	0.26
Polytechnique, once civil servant	0.04	0.19	0.07
Polytechnique, always private sector	0.10	0.30	0.17
Is in Who's Who	0.37	0.48	0.57
Former civil servant	0.12	0.32	0.33
Former "cabinet" advisor	0.06	0.24	0.20
Age	60	10	-

Note: French public firms over the 1994-2001 period. Source: DAFSA diary of public firms for the names of the directors. Who's Who and School Diaries

Table 3: Preliminary Evidence on Networks
Board Composition as a Function of the CEO's Background

	CEO Education/career				
	All	ENA	Poly., C.S.	Poly., P.S.	Other
Non weighted averages					
% of ENA graduates	0.06	0.16	0.13	0.08	0.05
% of Poly. graduates, civil servants	0.03	0.06	0.12	0.04	0.02
% of Poly. graduates, private sector	0.07	0.09	0.12	0.12	0.06
% of other	0.84	0.69	0.63	0.76	0.87
Asset weighted averages					
% of ENA graduates	0.25	0.31	0.23	0.22	0.11
% of Poly. graduates, civil servants	0.07	0.08	0.13	0.07	0.02
% of Poly. graduates, private sector	0.12	0.14	0.13	0.10	0.09
% of other	0.56	0.47	0.51	0.61	0.77

Note: French public firms over the 1992-2001 period. Source: DAFSA diary of public firms for the names of the directors. Who's Who and School Diaries

Table 4: Econometric Evidence on Networks
 Effect of the CEO's Background on Director *Current Employment*

Among currently employed directors, fraction of:	Firm level regressions			Individual level regressions		
	(1) ENA	(2) Poly, C.S.	(3) Poly, P.S.	(1) ENA	(2) Poly, C.S.	(3) Poly, P.S.
CEO is ENA	0.6*** (0.1)	0.3*** (0.1)	0.1*** (0.0)	0.6*** (0.1)	0.5*** (0.1)	0.2*** (0.0)
CEO is Polytechnique & former civil servant	0.5*** (0.1)	1.0*** (0.1)	0.3*** (0.1)	0.3*** (0.1)	1.0*** (0.1)	0.1** (0.1)
CEO is Polytechnique & always private sector	0.2*** (0.1)	0.1** (0.1)	0.2*** (0.0)	0.1*** (0.0)	0.2*** (0.1)	0.1*** (0.0)
Year dummies	yes	yes	yes	yes	yes	yes
Observations		8,035			43,858	
Test ENA(1)=ENA(2)		0.00***			0.43	
Test ENA(1)=ENA(3)		0.00***			0.00***	
Test Poly, CS(2)=Poly, CS(1)		0.00***			0.00***	
Test Poly, CS(2)=Poly, CS(3)		0.00***			0.00***	
Test Poly, PS(3)=Poly, PS(1)		0.50			0.48	
Test Poly, PS(3)=Poly, PS(2)		0.97			0.25	

Note: OLS estimates - Standard errors between brackets. Residual are allowed to be correlated across observations of the same firm. All explanatory variables are lagged by one year. Source: DAFSA yearbook of listed companies for accounting variables and Who's Who in France (1994 and 2000 issues) for directors' education. Polytechnique and ENA graduates directories for CEOs.

Table 5: Econometric Evidence on Networks
Effect of the CEO's Background on Director *Appointment*

Among newly appointed directors, fraction of:	Firm level regressions					
	(1) ENA	(2) Poly, C.S.	(3) Poly, P.S.	(1) ENA	(2) Poly, C.S.	(3) Poly, P.S.
CEO is ENA	0.13*** (0.02)	0.06*** (0.02)	0.03*** (0.01)	0.09*** (0.02)	0.04** (0.02)	0.02** (0.01)
CEO is Polytechnique & former civil servant	0.10*** (0.02)	0.23*** (0.04)	0.03** (0.01)	0.05*** (0.02)	0.18*** (0.04)	0.02 (0.01)
CEO is Polytechnique & always private sector	0.04*** (0.02)	0.05** (0.02)	0.05*** (0.01)	0.02 (0.01)	0.03** (0.02)	0.04*** (0.01)
% of ENA directors (-1)	-	-	-	0.35*** (0.04)	0.12*** (0.04)	0.10*** (0.03)
% of Poly, former C.S. directors (-1)	-	-	-	0.17*** (0.05)	0.36*** (0.11)	0.02 (0.03)
% of Poly., always P.S. directors (-1)	-	-	-	0.09*** (0.03)	0.03 (0.03)	0.07*** (0.02)
Year dummies	yes	yes	yes	yes	yes	yes
Observations		6,759			6,757	
Test ENA(1)=ENA(2)		0.01***			0.00***	
Test ENA(1)=ENA(3)		0.01***			0.00***	
Test Poly, CS(2)=Poly, CS(1)		0.00***			0.00***	
Test Poly, CS(2)=Poly, CS(3)		0.00***			0.00***	
Test Poly, PS(3)=Poly, PS(1)		0.72			0.18	
Test Poly, PS(3)=Poly, PS(2)		0.99			0.87	

Note: OLS estimates - Standard errors between brackets. Residual are allowed to be correlated across observations of the same firm. All explanatory variables are lagged by one year. Source: DAFSA yearbook of listed companies for accounting variables and Who's Who in France (1994 and 2000 issues) for directors' education. Polytechnique and ENA graduates directories for CEOs.

Table 6: Econometric Evidence on Networks
Robustness to Additional Sorting Variables

Among currently employed directors, fraction of:	Firm level model			Individual level model		
	(1) ENA	(2) Poly, C.S.	(3) Poly, P.S.	(1) ENA	(2) Poly, C.S.	(3) Poly, P.S.
CEO is ENA	0.5*** (0.1)	0.4*** (0.1)	0.1* (0.1)	0.5*** (0.1)	0.4*** (0.1)	0.1** (0.1)
CEO is Polytechnique & former civil servant	0.4*** (0.1)	1.0*** (0.2)	0.2*** (0.1)	0.2*** (0.1)	1.1*** (0.2)	0.1 (0.1)
CEO is Polytechnique & always private sector	0.1* (0.1)	0.1 (0.1)	0.2*** (0.0)	0.1 (0.1)	0.4*** (0.1)	0.1** (0.1)
Former SOE dummy	yes	yes	yes	no	no	no
Past year firm ROA	yes	yes	yes	no	no	no
Industry dummies	yes	yes	yes	no	no	no
Director's age	no	no	no	yes	yes	yes
Director's education	no	no	no	yes	yes	yes
Observations		5,219			12,232	
Test ENA(1)=ENA(2)		0.35			0.52	
Test ENA(1)=ENA(3)		0.00***			0.00***	
Test Poly, CS(2)=Poly, CS(1)		0.01***			0.01***	
Test Poly, CS(2)=Poly, CS(3)		0.00***			0.00***	
Test Poly, PS(3)=Poly, PS(1)		0.35			0.67	
Test Poly, PS(3)=Poly, PS(2)		0.36			0.07*	

Note: OLS estimates - Standard errors between brackets. Residual are allowed to be correlated across observations of the same firm. All explanatory variables are lagged by one year. Source: DAFSA yearbook of listed companies for accounting variables and Who's Who in France (1994 and 2000 issues) for directors' education. Polytechnique and ENA graduates directories for CEOs.

Table 7: CEO Turnover: Do Networks Matter ?

	Losing CEO Position in the Forthcoming Year		
	All	Former civil servants	Always in Private sector
Panel A: No Controls			
Industry Adj. ROA	-7.1*** (1.3)	-2.7 (2.6)	-7.9*** (1.5)
Observations	2,283	495	1,764
Industry Adj. ROE	-1.8*** (0.4)	-1.2* (0.7)	-2.1*** (0.6)
Observations	2,193	475	1,695
I.A. Stock Return	-0.8*** (0.2)	-0.3 (0.4)	-0.9*** 0.3
Observations	2,547	639	1,869
Panel B: With Controls			
Industry Adj. ROA	-5.5*** (1.9)	-0.2 (3.5)	-7.8*** (2.2)
Observations	1,561	343	1,141
Industry Adj. ROE	-2.0 (0.6)	-1.2 (1.2)	-2.4*** (0.7)
Observations	1,524	336	1,112
I.A. Stock Return	-1.2*** (0.3)	-0.5 (0.7)	-1.5*** (0.3)
Observations	1,723	437	1,214

Note: Logit estimates - Standard errors between brackets. Sample of all firms run by a CEO aged less than 65. This table displays the CEO turnover to corporate performance sensitivity. The first panel simply regresses the fact that the CEO will lose (or quit) his job in the next year on industry adjusted measures of annual corporate performance (Return on assets, return on equity and annual stock return). The second panel adds many controls in this regression: the fraction of equity held by the dominant block holder, whether the firm has been privatized or not, industry and year dummies, $\log(\text{assets})$ and a dummy equal to zero if the CEO is also the chairman of the board (*société à directoire*). The first column looks at the whole sample, the second column reestimate the model on the subsample of ENA and polytechnique graduates. Columns 4 and 5 estimate the model separately for Polytechnique and ENA graduates. Columns 6 and 7 break the sample down into firms run by former civil servants and others. In all regressions, residuals are allowed to be correlated across observations of the same firm.

Table 8: Connected CEOs Are Busy Directors ?

	All	Former civil servants	Never civil servant
No Seat	70	36	75
One Seats	14	22	13
Two Seats	7	13	6
Three Seats	3	9	3
Four Seats or More	5	20	3
	100	100	100

Note: The data is the 1992 - 2003 panel of CEOs of listed firms. The dependant variable is number of non executive director seats held in other listed companies: for all CEOs holding more than 4 seats, it is coded as 4.

Table 9: Connected CEOs:
Managerial Performance and Number of Outside Directorships

	# of director seats held		
	All	Former civil servants	Always private sector
Panel A: No Controls			
Own Firm ROA	-5.3*** (0.7)	-9.4*** (2.1)	-4.1*** (1.1)
Observations	5,286	601	2,222
Panel B: With Controls			
Own Firm ROA	-5.5*** (1.2)	-11.0*** (2.0)	-4.0*** (1.4)
Observations	2,855	601	2,222

Note: Ordered logit estimates - Standard errors between brackets. The data is the 1992 - 2003 panel of CEOs of listed firms. The dependant variable is number of non executive director seats held in other listed companies: for all CEOs holding more than 4 seats, it is coded as 4. The main explanatory variable is the CEO's firm ROA: this table provides the estimate, its standard error and the number of observations used in the regression. Panel A reports the results of regressions with year dummies as only controls. Panel B further includes CEO's industry, own firm size and the board size of the CEO's firm as controls. Column 1 runs regression on the whole sample of CEOs. Column 2 focuses on former civil servant, while column 3 looks at pure private sector managers. In all regressions, residuals are allowed to be correlated across observations of the same individual.

Table 10: Investment to Cash-Flow Sensitivity of Connected CEOs

	Next Year's growth of fixed assets		
	All	Former civil servants	Always Private Sector
Cash flows	0.63***	0.82***	0.64***
/ assets	(0.17)	(0.50)	(0.17)
Market / book	0.04***	0.05*	0.04**
	(0.02)	(0.03)	(0.02)
Year Controls	yes	yes	yes
Firm FE	yes	yes	yes
Observations	3,576	419	3,157

Note: OLS estimates - Standard errors between brackets. Residual are allowed to be correlated across observations of the same firm. All explanatory variables are lagged by one year. Source: DAFSA yearbook of listed companies for accounting variables and Who's Who in France (1994 and 2000 issues) for directors' education. Polytechnique and ENA graduates directories for CEOs.

Table 11: Market's Assessment of Acquisitions by Connected CEOs

	Mean Cumulative Stock Returns		
	Former civil servants	Always Private Sector	p-value equality
# of days before till # of days after announcement:			
(-1,+1)	0.5 (0.1)	0.7 (0.2)	0.45
(-3,+3)	0.6 (0.3)	1.2 (0.2)	0.12
(-5,+5)	0.7 (0.3)	1.3 (0.3)	0.14
(-7,+7)	0.6 (0.4)	1.2 (0.3)	0.08
(-10,+10)	0.5 (0.5)	1.3 (0.3)	0.12
Observations	379	931	-

Note: Mean cumulative (unadjusted) stock returns around the day of acquisition announcement. All acquisitions reported in SDC Platinum, from 1991 till 2001, for which stock returns and CEO background could be retrieved. Sources: DAFSA yearbook of listed companies for accounting variables and Who's Who in France (1994 and 2000 issues) for CEO background. SDC Platinum for acquisition dates. Stock returns data are provided by Euronext. Standard errors are between brackets.

Table 12: Do Connected CEOs Perform Any Better ?

	Return on Assets			
	Real		Manuf.	
	(1)	(2)	(1)	(2)
CEO is former S.C.	-0.5 (0.5)	-	-1.6* (0.8)	-
CEO is former "cabinet" advisor	-	-1.1** (0.5)	-	-3.0*** (0.8)
CEO is other former S.C.	-	-0.1 (0.7)	-	-0.8 (1.0)
log(assets)	0.0 (0.1)	0.1 (0.1)	0.2* (0.2)	0.3 (0.2)
Cotation on "premier marché"	2.3*** (0.4)	2.3*** (0.4)	2.6*** (0.5)	2.6*** (0.5)
Former SOE	-0.7 (0.5)	-0.7 (0.6)	0.2 (0.9)	0.2 (0.9)
Year Controls	yes	yes	yes	yes
Industry Controls	yes	yes	yes	yes
Observations	5,362	5,362	2,324	2,324

Note: OLS estimates - Standard errors between brackets. Residual are allowed to be correlated across observations of the same firm. All explanatory variables are lagged by one year. Source: DAFSA yearbook of listed companies for accounting variables and Who's Who in France (1994 and 2000 issues) for directors' education. Polytechnique and ENA graduates directories for CEOs.