Social Networks in The Boardroom*

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Abstract

This paper provides evidence consistent with the facts that (1) social networks strongly affect board composition and (2) social networks are detrimental to corporate governance. Our empirical investigation relies on a large dataset on executives and outside directors of French public firms. 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) firm and directors' fixed effects and (2) matching of firms and director along one observable and one unobservable characteristic. We then turn to direct effects of such network activity. We find that firms where these networks are most active pay their CEOs more; are less likely to change CEO when they underperform; and engage in less value-creating acquisitions. This suggests that social networks are active in the boardroom, and have detrimental effects on firms' governance.

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1 Introduction

That social networks affect market outcomes is a well-documented fact (see Granovetter, 1973 or Rees, 1966 for early references). This paper investigates their impact on corporate performance. To do this, we focus on the market for non-executive directors, where networks are important. There are two opposing views about how these networks affect corporate performance. On the one hand, directors have an advisory role to the management: finding the right director is difficult. By channeling information about candidates to the management, networks improve the quality of the director-management match, and hence corporate performance (Saloner, 1985). Second, because directors have a supervisory role, the use of social networks may come at a cost. Relying on executives' networks to hire their own supervisors will be detrimental to directors' independence: supervision will be ineffective. Under this second view, firms will be less well managed. Overall, on this market, the economic effect of social networks is a priori ambiguous and can only be settled through an empirical investigation.

This paper examines this question in the case of France. It provides evidence consistent with the fact that (1) CEOs' social networks strongly affect board composition and (2) that social networks in the boardrooms reduce their efficiency: i) firms where these networks are active are less likely to change CEOs when they underperform; ii) connected CEOs tend to have higher compensation, in particular stock-options; iii) connected CEOs make lower quality deals (as measured by the stock price reaction to an acquisition announcement).

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 from 1992 to 2003. France is particularly well-suited because its elites are highly concentrated and (at least some of) their networks are well-known, and easily identified as well as 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 (for engineers) and Ecole Nationale d'Administration (for administrators). Firms run by CEOs from these two networks account for 12% of all firms traded on the Paris Stock Exchange, and 65% in asset-weighted terms. Not only are alumni of these two schools over-represented among top executives but, most importantly, entering ENA or Polytech-

[1] For references in English, see Swartz [1986], Kadushin [1995], Frank and Yasumoto [1998]. References in French include Bauer and Bertin-Mourot [1997], and Suleiman [1997].

nique constitutes the virtually unique way of obtaining high-level jobs in the civil service. Given these specific institutional features, data on social networks are relatively easy to collect, using alumni directories, together with the French issue of the Who's Who. Hence, we gather background data on directors/CEOs (education, career, socioeconomic background); we then match them with accounting and financial information on their employing firms.

Our empirical investigation has two steps. First, we provide evidence that social networks distort 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 and identification power provided by our matched employer-employee data, we are able to account for two important dimensions of unobserved heterogeneity, that are likely to bias our estimates of network effects. The first dimension is the inherent ability of each individual to become a director in general, as well as to be appointed in firms that have particular observable characteristics. For instance, top-level bureaucrats may simply be more intelligent than others and therefore more apt to run or supervise large firms. Therefore, they would be present in the same firms both as CEOs and as directors. Our methodology allows to account for this. The second dimension is the firm level (unobservable) propensity to hire directors and CEOs with particular observable characteristics. For instance, firms with an authoritarian corporate culture may prefer to hire older directors and CEOs, and, say, civil-servants may be over-represented in these generations. Or firms that are about to experience difficulties may be willing to hire politically connected CEOs and directors. 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.

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. We find that the probability of being hired in a given firm is larger when the individual and the CEO belong to the same network, *but only when this network is related to a past career in the civil service*. 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 policies of directors. The composition of the board has no significant impact on the identity

of newly recruited directors. We interpret this as tentative evidence that it is the CEO, not the existing directors, who "shapes the board".

The second step in our analysis looks at governance in firms run by former high-ranking bureaucrats. In all these tests, we compare firms whose CEOs are former civil-servants to firms whose CEOs have had full private sector careers. This approach rests on the fact that CEOs who belong to civil service related networks tend to have directors from the same background. Other CEOs (in particular from engineering background in the private sector) do not appear to hire from their networks. We then look at three measures of corporate governance, and ask whether firms run by connected CEOs (hence with a connected board) tend to score lower on these measures. First, we look at CEO turnover to bad performance sensitivity. Such sensitivity has been found to be bigger in better governed firms (see Bebchuk and Weisbach, 2011, for a survey). We show that firms run by connected CEOs are less likely to change CEO following bad performance.

We then look at CEO pay, which the literature has found to be higher in badly governed firms. Disclosure on management compensation only became mandatory in France in 2003, so our data are limited to a single cross-section at the end of our sample period. We find that, controlling for size and industry, connected CEOs receive a compensation about 50% larger than non-connected CEOs. This is in large part due to the stock-options that former civil-servants are more likely to receive.

Finally, we measure the quality of acquisitions through the stock price reaction at announcement. We find that acquisitions made by connected CEOs are less value creating. For non-connected bidders, the stock price typically increases by 1.7% upon announcement; the market thus anticipates the deal to create 1.7 % of new shareholder value. Such a positive market reaction is consistent with existing literature (Bradley and Sundaram, 2004). For connected bidders, the stock price does not react at all to the announcement. The difference between the two reactions is large and statistically significant.

The paper is organized as follows. Section 2 discusses the recent literature on the impact of social networks on corporate governance, and describes our own contribution. Section 3 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 4 describes the dataset, providing additional descriptive information. Section 5 presents the statistical model and discusses identification. Then, Section 6 looks at the extent of networks and Section 7 at their economic costs. Section 8 concludes.

2 Related Literature and Our Contribution

We focus first on the recent contributions that show how social networks affect board composition and CEOs hiring. Second, we describe papers that show how social networks affect corporate governance and firms' outcomes. We explain the contributions of our paper with respect to these two classes of papers.

We first describe papers that document the existence of networks. A few papers look at CEOs and directors in general. Barnea and Guedj (2008) use data on all directors and CEOs of firms within the S&P 1,500 index between 1996 and 2004. They find that connected directors are more likely to obtain new directorships in the future. Liu (2008) also focuses her analysis on US directors but has much more detailed information on their employment history. She finds evidence that connected CEOs are more likely to move to better jobs, in particular in firms who have a related director. Because data are easily available, another strand of the literature focuses on the mutual fund industry. Kuhnen (2009) looks at the connections between US mutual funds and their subadvisors.

Within this line of research, our main contribution lies in our measure of social networks. Most of the above literature leverages the use of director data to identify personal connections more accurately, for instance by assuming that two individuals sitting on the board "know" each other. We (as well as Braggion, forthcoming, Hwang and Kim, 2009, and Nguyen, 2009) differ from this approach by using results from the sociological literature to directly identify the contours of social networks: we will assume for instance that two former civil-servants are likely to know each other. In doing so, we also relate to the earlier empirical literature on economic outcomes of social networks (see among others Bertrand, Luttmer and Mullainathan, 2000, Munshi, 2003, Bayer, Ross, and Topa, 2005). This literature generally relies on indirect identifying assumptions: our network identification is more precise and direct since we are able to observe both the referee and the applicant. Being able to observe networks within the firm allows us to conceive a more refined statistical model, whose identification and estimation we study in detail in this paper.[2] Our econometric model is a standard matched employer-employee model, and in this respect differs from techniques imported from graph theory, that are popular in finance at this stage. An important advantage of our approach is that the underlying identifying assumptions are quite transparent, and allow us to control for a lot of unobserved heterogeneity in a situation for which there is no clear instrument.

Second, we describe papers that seek to assess the welfare impact of networks. In finance,

[2]See Kramarz and Skans (2010) for an extensive use of this framework in the context of family networks, where firms and classrooms are the two dimensions of heterogeneity.

there is evidence that social networks can be beneficial because they are the channel through which information flows. Hochberg, Ljundqvist, and Lu (2005) find that venture capital funds with parent firms that enjoy stronger network relations (measured using graph theory, as in Barnea and Guedj) have better performance. Cohen, Frazzini, and Malloy (2009) find that mutual fund managers trade more on stocks who have a director they are connected with, and that these trades are profitable. Thus, social networks contribute to make markets efficient: because of their trades, information is progressively impounded into market prices. In the corporate governance literature, existing work finds that social networks hurt corporate governance and performance. Barnea and Guedj (2008) also show that connected firms pay their CEOs better. Liu (2008) also finds that better-connected CEOs receive higher compensation (see also Larcker, Richardson, Seary, and Tuna, 2005, on a smaller sample). Focusing on the end of the 19th century, Braggion (forthcoming) finds that firms connected with the Freemasonry are more levered, and are slightly less profitable. Hwang and Kim (2009) examine social ties created by a common regional origin, alma mater university, military service, or industry. They show that firms with socially independent boards award lower compensation levels, exhibit stronger pay-performance sensitivity, and stronger turnover-performance sensitivity. In a paper very close to ours, and written independently, Nguyen (2009) looks at the same French business elite networks as ours. His data differ slightly from ours: our sample period is longer, and covers about 600 publicly listed firms per year (not just the top 250 as in his paper). As we do, he finds that CEO turnover is less sensitive to bad performance when the CEO belongs to elite civil service related networks. He also finds that connections help to find better jobs (in larger firms). Finally, and more specific to the French context, he demonstrates that connected CEOs tend to lose their jobs after political events, such as the arrival of a new government. Key differences with us are that he does not look at CEO compensation nor acquisitions, and that he does not develop a framework to identify and test for the presence of network effects.

Overall, our paper provides a broader assessment of the negative effects of social networks on corporate governance. Like most papers, we look at CEO turnover to performance sensitivity, and finds a similar impact of social networks. Our paper is the only one to have French evidence on compensation, which is consistent with what US studies have found (Barnea and Guedj, 2008, Liu, 2008). It is the first and, so far, the only one to provide evidence that firms' connections deteriorate the quality of acquisitions.

3 The French Business Elite

For historical and sociological reasons, France's economic elites have two distinctive features (Bauer and Bertin-Mourot, 1997, Swartz, 1986, see also Bourdieu, 1989): 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 (a fuller description is given in the working paper version Appendix).

The "tyranny of diploma" is a distinguishing feature of the French business elite (Bauer and Bertin-Mourot, 1997). College degrees obtained before age 25 tend to over-determine career prospects. The French post-secondary educational system splits into two parts (Suleiman, 1997). The first one is the usual university system, which is free, to which access after high-school graduation is guaranteed by law, hence with no selection (in the mid-1990s, this system comprised some 1.2 million students). The second part of the educational system consists of many small and elitist schools (together: some 50,000 students). Within this subset, the two most prestigious schools produce a large fraction of the business elite (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, which gradually evolved into an engineering school. Nowadays, most of the class enters the private sector, but the best students generally opt for the civil service.

A second characteristic of the French business elite is the prevalence of former civil-servants. These tight relationships between business and the administrative world mostly started after WWII, a reconstruction period largely supervised by the government. From 1945 on, in a given class at ENA or Polytechnique, the best students have systematically joined one of the five most prestigious bureaucratic careers, the Grands Corps d'Etat (Kadushin, 1995, Suleiman, 1997), training altogether some 50 people a year. The best Polytechnique graduates entered industry/engineering-related top-level bureaucratic careers. These career paths were designed to train future experts for manufacturing industries to serve both as political advisors and top-level managers. The best ENA graduates entered top-level administrative careers. Such positions were essentially not accessible to those outside these Grands Corps. Such careers typically involved a few years as an administrator, then some time as a direct advisor to the Minister, and finally access to the top management of a large private or state-owned company.

4 The Data

With the above two features of the French elite in mind, we build our data sources.

4.1 Data Sources

Our dataset matches information on the employees – the CEO and the directors – with data on the employing firms. To construct it, we used two 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) and (2) ENA and Polytechnique alumni directories is used to obtain education and partial information on careers for the graduates of these two schools. We supplement this information with the French edition of the Who's Who, which is not exhaustive (it does not cover all directors and CEOs) but allows us to extend our coverage beyond ENA and Polytechnique graduates.

The DAFSA yearbook compiles listed companies consolidated 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 onwards. 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 two main segments of the stock exchange ("premier marché" and "second marché"). Both segments have on average some 300 firms listed each year, the first one listing stocks that are larger and more liquid.

Along with accounting information, the DAFSA yearbook provides us with the names of the CEO, the chairman and the directors. Henceforth, we will use the words "non-executive directors" and "directors" interchangeably, since their meanings are identical in the French context. Many CEOs are also chairmen.

We retrieved personal information on the CEOs and the directors mostly using the ENA and Polytechnique alumni directories. These directories provide standard information about education, but no information about the socio-economic background and very little information about career (bureaucratic career - Corps d'Etat - if any). We match directories with DAFSA data on CEOs and directors of public firms, using both first and last names. Given that these directories are exhaustive, we are confident that we capture nearly 100% of ENA and Polytechnique graduates in the sample of CEOs and directors, except for individuals with very common names and surnames.

To identify other former civil-servants and political advisors (other than Polytechnique and ENA graduates), we supplement the information with the 1994 and 2000 issues of the Who's Who, 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. We use it to construct a "former civil-servant" dummy, which we use in Section 7. Who's Who information on each individual listed in the DAFSA database as directors or CEO between 1992 and 2003 was hand-coded using first and last names. On average, some 51% of all CEOs of all listed corporations were found 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 (who are less likely to be in the Who's Who), with approximately 36% of them being listed in the Who's Who. Again, this percentage goes down from 40% to 27% over the period.

Relying on the historical and sociological evidence reviewed above we identify three networks in our sample: (1) ENA graduates, practically all of whom had an early career as civil-servants, (2) Polytechnique graduates who started their careers as "civil service" engineers and (3) Polytechnique graduates who started 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.

4.2 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 Table 1]

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 political advisors: they run 6% of the firms, but 52% of the assets.

[Insert Figure 1]

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, both movements started with the resumption of privatizations under the right-wing government elected in 1993, whereby State enterprises run by former civil-servants were floated on the stock market.

Looking at the trend in board composition 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 (see also Table A.1 in online Appendix). These shares are both very high and show a strong upward trend in the early 1990s, 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.

At the firm-level, CEO's identity seems to matter for shaping board composition. As Table 2 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.

[Insert Table 2]

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 parameter is identified by this simple inspection of Table 2. Do we simply measure that ENA graduates are better directors, and hence more sought-after? Are we measuring 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 directors in general, in particular from ENA? To circumvent these difficulties, we derive an empirical model from first principles in the next Section. It will allow us to interpret the descriptive results of Table 2.

5 Empirical Strategy

In this Section, we first lay out a model where the impact of networks is clearly identifiable. Such a model is defined for each individual and each firm in the sample, which makes

its estimation computationally intensive. In a second step, we thus propose aggregation techniques that simplify estimation, and discuss their identifying power.

5.1 The Networks 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 the firm's CEO increases the chance for individual i to sit at firm j's board:

$$E_{ijt} = \alpha_i.Z_{jt} + \beta_j.X_{it} + Z'_{jt}.M.X_{it} + \sum_{k,l} \lambda_{kl}.\left(C^k_{jt}.A^l_i\right) + \varepsilon_{ijt} \quad (1)$$

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. $A^k_i = 1$ when individual i belongs to network k, and zero otherwise. C^k_{jt} is equal to 1 when the CEO of firm j at t belongs to network k, and zero otherwise. Z_{jt} is a vector of firm level observables. X_{it} is a vector of individual level observables. α_i (resp. β_j) is a vector of coefficients that differ across individuals (resp. firms).[3] M is a matrix of coefficients that stand for the various interaction terms between variables of X_{it} and variables of Z_{jt}.

In equation (1), we measure the strength of social networks by looking at the λ_{kl} coefficients. If network effects are really present, 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. Hence,

$$\text{H}_0\text{: } \lambda_{kk} > \lambda_{kl} \text{ for all } l \neq k$$

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

Obviously, finding directors and CEOs from the same network in the same company is *not* always evidence of networks. For instance, former civil-servants tend to join, both as CEOs and directors, larger firms, firms that operate in regulated industries, or firms that are dependent on procurement contracts. Under an alternative interpretation, former civil-servants have higher ability, and large firms prefer to hire people with higher abilities, both, as CEOs and directors. This is why equation (1) adds three types of controls. First, the term $\alpha_i.Z_{jt}$ stands for the unobserved propensity of people α_i to serve as directors of companies with observables Z_{jt} - for instance, high IQ workers may obtain seats at the boards of large firms. Second, $\beta_j.X_{it}$ measures the unobserved firm propensity β_j to hire directors with observables X_{it} - for instance, firms with an authoritarian corporate culture may prefer to

[3] Because intercepts are always present in vectors X_{it} and Z_{jt}, model (1) always includes "pure" person and "pure" firm effects.

hire older directors. Taken together, these two terms control for the sorting of directors and firms along one dimension that is observable, and another that is not.

The third control $Z'_{jt}.M.X_{it}$ stands for matching of directors and firms along purely observable dimensions. For instance, former civil-servants may tend to join the boards of former state-owned enterprises, engineers may sort in more technology-intensive industries, or educated directors may be more often found in larger firms. The elements of the M matrix control for the strength of sorting along observables in the data.

Model (1) cannot be estimated as such. Indeed, the original data, by construction, only includes observations for which $E_{ijt} = 1$. However, it is virtually impossible to generate all observations for which $E_{ijt} = 0$. Since there are, a priori, some 600 firms and 5,000 directors every year over a ten-year period, the sample of all (i, j, t) would therefore have some 30 millions observations. Hence, in the next subsection we derive estimable models that *only require* the knowledge of the "$E_{ijt} = 1$" observations.

5.2 The Firm-Level Model

This section shows how model (1), expressed as a match between an individual and a firm, 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:

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

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.

In the following derivation, we will assume for simplicity that $X_{it} = 1$, i.e. that directors do not differ according to observable characteristics. While this is admittedly a strong assumption, this is one that we will be able to dispense with in the "individual level model" Section (in the online Appendix). The objective of this hypothesis is thus mostly for clarifying purposes (but detailed calculations, without this assumption, are reported in the Appendix). After a few manipulations, which amount to computing n_{jt}^k and n_{jt} using model (1), we show in the online Appendix that:

$$\begin{aligned} Y_{jt}^k &= \left(\frac{n_{jt}^k}{n_t^k} - \frac{n_{jt}}{n_t}\right) = a_t^k.Z_{jt} + \sum_m b_t^{mk}.C_{jt}^m + u_{jt}^k \qquad (2) \\ \text{with } b_t^{mk} &= \lambda_{mk} - \sum_l \lambda_{ml}\frac{n_t^l}{n_t} \end{aligned}$$

where Y_{jt}^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 $a^k.Z_{jt}$ term in equation (2) allows to control for firm - director matching along firm observables and director unobserved characteristics. This control is performed by simply including the Z_{jt} firm-level controls in the linear regression of Y_{jt}^k on the CEO's network C_{jt}^m. 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 overall 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.

Finally, testing for the presence of networks is fairly straightforward. By comparing b_t^{kk} and b_t^{kl}, we are able to restate hypothesis H_0 in terms of the estimated parameters from (2):

$$\text{H}_0\text{: } b_t^{kk} > b_t^{kl} \text{ for all } l \neq k$$

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

Obviously, because our data sources have two dimensions, firm and individual, an equivalent strategy can be derived using the individual dimension. The advantage of aggregating equation (1) at the individual level is that we can dispense with the assumption that directors are identical with respect to observables ($X_{it} = 1$). Symmetrically, it is convenient to assume that firms are identical ($Z_{jt} = 1$). Thus, as we make different assumptions on the matching process of directors to firms in the derivation of the individual and firm-level models, we view their results as complementary. This strategy is described in the online Appendix.

5.3 Sources of Identification

It is crucial to understand why our transformations, both the person-level and the firm-level models, are able to get rid of the pure person and firm effects, even in the cross-section. The intuition is that our identification strategy is similar to the so-called "within"transformation used in panel data analysis. To see how, let us focus on a version of equation (1) with fixed-effects only ($Z_{jt} = X_{it} = 1$). For each individual i, we know in which firms this individual is a director and in which firms she is *not* a director. This differs from typical wage models with pure person and firm effects in employer-employee datasets (see Abowd and Kramarz (1999)) because the wage paid to individual i is only known in those firms where she is

employed. In our setting, all the "$E_{ij} = 0$" observations bring information on the person effect. Because there are many such observations, the data has enough identifying power to eliminate the pure person effect, as described in the individual-level model Appendix subsection. Similarly, for any firm j, all those persons who do not belong to j's board bring information about firm j's propensity to hire directors in general. Because there are many such observations, it is relatively easy to eliminate the pure firm effect using an appropriate transformation, as described above in the firm-level model subsection.

5.4 Possible Biases

There are multiple sources of estimation biases. Obviously, 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, our model controls for observable tendencies of firms to hire directors from particular networks, for instance as firms in regulated industries may have a propensity to hire former civil-servants (the $Z'_{jt}.M.X_{it}$) term in equation (1). But our approach does not control for unobservable firm "tastes" for some networks, as for example, when some firms, because of their corporate culture, have a tradition of promoting and hiring engineers rather than top-level bureaucrats. This limitation of our approach is easy to see in the individual level model (online Appendix, A.3) where we allowed director observables to vary ($X_{it} \neq 1$). Let us look at the propensity of firms to hire from particular networks; in the language of model (1), this means $X_{it} = (A_i^m)$ for some m. As appears from equation (A.3, online Appendix), a linear regression will not be able to identify this effect ($c_t^k.X_{it}$) separately from network effects ($d_t^{km}.A_i^m$). Theoretically, it would be possible to account for this by including a firm fixed effect in equation (2) - see the derivation in the online Appendix. Unfortunately, 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, the introduction of firm fixed effects in equation (2) would make parameters hard to identify. This fact therefore makes the practical identification of (1) a fixed tendency for a given firm to hire, say, ENA graduates separately from (2) the additional tendency due to the fact that currently the CEO is an ENA graduate, virtually impossible *using the firm-level* specification (again, not in theory but in practice).

Third, 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. This concern is difficult to address.

6 Evidence of Networks

6.1 Estimating the Probability of Employment

In a first step, let us assume away matching considerations and simply posit that $X_{it} = Z_{jt} = 1$, which means that some firms have in general a higher tendency to appoint, and some individual have a general tendency to be appointed. We will deviate from these assumptions in Section 6.2. We focus in most of this Section on firm-level aggregations of equation (1). We show in online Appendix Table A2 that results are similar when using the individual level aggregation, which rests on slightly different assumptions about heterogeneity.

We start by estimating the following version of (2):

$$\frac{n_{jt}^k}{n_t^k} - \frac{n_{jt}^0}{n_t^0} = a_t^k + \sum_m \underbrace{(\lambda_{mk} - \lambda_{m0})}_{c_{km}} C_{jt}^m + u_{jt}^k \tag{3}$$

where j indexes the firm, t indexes time, and k stands for the network under scrutiny (ENA, Polytechnique with civil service, Polytechnique without civil service). Equation (3) is obtained by substracting equation (2) for network k from equation (2) for network 0. Thus, the difference to 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 receive 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.

[Insert Table 3]

Table 3 reports estimates of (3) for all three networks of interest (ENA, Polytechnique with civil service, Polytechnique without civil service). The left panel presents estimates with year dummies, whereas the right panel presents estimates with further economic controls. These regressions are jointly estimated using the SURE method, which 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. The bottom panel of Table 3 provides tests of the null hypothesis of equality of coefficients on CEO across equations.

We first comment on the left panel results, with only year indicators. For civil-servants, the coefficient on CEO's identity is always very strong and economically significant; the probability 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%.

Second, 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 studying 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 equation (3) whether $c_{kk} > c_{km}$, for all m. These tests are reported in the bottom rows of Table 3. 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 private sector engineers, that matter the most in this context.

To confirm the results obtained in Table 3, we used the individual-level model to run similar regressions, and report the results in online Appendix Table A.2. Table A.2 has the same structure as Table 3. Given our assumptions that $X_{it} = Z_{jt} = 1$, results should be identical to the firm-level model (3), assuming model (1) is not misspecified. There, the dependent variable is the fraction of seats held by individual i (at date t) that correspond to firms run by CEOs of network k. As it turns out, the same orders of magnitude and the same test statistics are obtained with this alternative way of collapsing the data. The only difference that emerges using this model is that ENA directors are as likely to sit on boards of firms run by ENA CEOs as they are to sit on boards of firms run by Polytechnique civil-servants. This suggests that different civil service related networks have links with each other, a pattern that we will find again in subsequent analyses.[4]

[4]We also looked at the difference between the largest firms, within the premier marché, and the smallest, within the second marché. We find that premier marché firms are those where most of the action takes place, but some civil service related networks appear to be operating on the second marché.

6.2 When Directors and CEOs Sort on Other Dimensions

Now, we assess the biases arising from the fact that directors may sort with firms according to observable or unobservable characteristics. We start by reestimating our firm-level regressions including observable firm characteristics, as in equation (2): 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 last three columns of Table 3, for each of the three networks we focus on. 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 as 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 careers are not. Thus, accounting for other possible sorting processes, which could be overlapping with network effects, does not affect our results neither quantitatively nor qualitatively.

In online Appendix Table A.2, in the last three columns, we use individual level regressions to control for director characteristics (age and years of education), instead of firm-level characteristics as was done in Table 3 for the firm-level model. The results obtained are similar to what was reported above with only year indicators.

6.3 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, the directors' ability to monitor the management on behalf of the shareholders might be severely impaired.

To look at this issue, we do two things. First, we reestimate model (1), by looking at *appointments* rather than employment. Under this new interpretation, $E_{ijt} = 1$ 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 a more stringent test of social

interactions.[5] 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 board of either networks. This amounts to running the following modified version of (3):

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

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 fraction 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 it 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 seats 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 4]

The results of these firm-level regressions for our three selected networks are presented in Table 4. 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 (3), 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 test 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 3. 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] We also ran - results non reported - individual level regressions using appointments instead of employment and obtained very similar results.

7 Networks and 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 (both in stock and in flow) is larger.

In principle, such arrangements may arise for two distinct reasons. In well governed firms, CEOs may use their own social networks to find directors whose advice and monitoring will be more effective. When corporate governance is poor, CEOs may use their networks to hire friendly, or even just passive, directors that will rubberstamp their decisions. Hence, the presence of social networks in the board room may be a sign of good, or bad, governance.

To shed light on this issue, we look in this Section at the quality of corporate governance of firms run by former high-ranking civil-servants. We do this using three indicators that the literature has found to be correlated with, or indicators of, governance: CEO turnover-to-performance sensitivity, CEO compensation, and M&A quality.

7.1 Turnover to Performance Sensitivity

We first use turnover to performance sensitivity as a measure of corporate governance. Weisbach (1988) shows that, when firms underperform, their CEO is more likely to leave when the board of directors is independent. His interpretation is that independent directors are less reluctant to fire the CEO in this case. In this spirit, we run, separately for connected (i.e. with an early career in the civil service) and non-connected (i.e. with pure private sector careers) CEOs, the following logistic regression:

$$T_{jt+1} = \alpha + \beta.PERF_{jt} + \delta.\text{controls}_{jt} + \varepsilon_{jt} \tag{4}$$

where T_{jt+1} is a dummy variable equal to 1 when the CEO loses her job over the next year (between t and $t+1$). We then compare the turnover-to-performance sensitivity coefficient β for both categories of CEOs, and test equality. If social networks impair governance, we expect β to be less negative for connected CEOs. Like prior papers in this literature, we do not observe dismissals so we must look at all types of turnover; in an attempt to remove voluntary retirement and reduce measurement error, we restrict ourselves to the sample of CEOs aged less than 65. $PERF_{jt}$ is an industry adjusted measure of corporate performance (we use here returns on assets and cumulative stock returns, both being industry adjusted). As the dependent variable is binomial, we run logistic regressions and allow error terms ε_{jt} to be correlated in a flexible fashion across observations of a same firm.

[Insert Table 5]

Results (t-stats in parentheses) are reported in Table 5 and support the hypothesis that social networks in the board room deteriorate governance. In panel A, we include no control; in panel B we control for firm size (log of book assets), industry and year fixed effects. Column 1 reports the estimate of β in the sample of firms run by former civil-servants, and column 2 does the same on the (smaller) sample of firms run by CEOs with the alternative background. Overall, turnover appears less sensitive to bad performance for former civil-servants: β is smaller in absolute value. This is true whether or not we include the controls, and for both performance measures. The difference is economically very large: when performance is measured through ROA, the sensitivity goes from 2 (former civil-servants) to 8 (private sector). Moreover, the coefficient is statistically insignificant for former civil-servants, while it is strongly significant for private sector CEOs, but this might be due to the fact that the sample of firms run by former civil-servants is smaller.

In column 3, we perform a statistical test: we reestimate model (4) on the whole sample, interacting all right hand side variables with the civil-servant dummy, and report the coefficient on profit interacted with this dummy, which is exactly equal to the difference between the estimated βs in columns 1 and 2. The difference in turnover to performance sensitivities is statistically significant at 5% when performance is measured through ROA, but the difference is insignificant when we use stock returns. Overall, we find evidence that connected CEOs are less likely to depart when the company they run underperforms. This is in line with results from Nguyen (2009), who uses the largest 120 firms of our sample.[6]

7.2 CEO compensation

In the cross-section of US firms, the level of CEO compensation has been found to correlate strongly with poor corporate governance (Bebchuk and Weisbach (2010) and the references therein). A priori, a high level of compensation may mean that shareholders have a strong need to provide incentives to the CEO; under this "optimal contracting" view, a high level of compensation simply reflects agency rents appropriated by CEOs, but willingly granted by shareholders. Under the "CEO power"view, shareholders are too weak to fight the CEO's demands. The existing literature finds evidence consistent with this second view: compensation is higher when there is no large shareholder, when directors are "busy" (in the sense that they accumulate many board seats in other companies), and when the firm's charter has anti-takeover provisions.

In our French setting, if civil service related social networks are detrimental to the quality of firm governance, we would expect pay of former civil-servants to be higher. In this

[6]Indeed, in regressions suggested by a referee (not reported), we find that a large fraction of the action is in the premier marché.

subsection, we test this using hand-collected data on CEO compensation, which we use to regress the log of CEO compensation on a "former civil-servant" dummy, controlling for firm size and industry.

Data collection imposed severe limitation on our research design. First, through most of our sample period, French listed firms were not forced to disclose CEO compensation in their annual reports. In 2002, less than 5% of them willingly chose to do so. But starting in 2003, the "New Economic Regulation" act passed in 2001 made it mandatory for listed firms to disclose, in their annual report, CEO compensation, both in term of salary and bonus, and also stock option grants (number, date of grant, strike price, as well as maturity and vesting period). We therefore focus our analysis on 2003 and retrieved annual reports from the Securities Regulator's website.[7] Out of a sample of 555 firms present in our sample, we found annual reports for 224 firms only, but all of them included the value of CEO pay. Out of these 224, 178 provided a breakdown of total cash compensation into bonus and fixed salary. 75 of these firms reported any stock option grant to the CEO, but we were only able to compute the Black and Scholes value for 52, because in many cases stock returns data were missing.[8] Hence, the variable "total compensation", which includes all three types of payments, is missing for firms that report option grants but for which we could not compute the Black-Scholes value.

[Insert Table 6 here]

We provide regression results for compensation and its components in Table 6. There are two salient features. First, former civil-servants receive much higher levels of compensation. In columns 1, 4, 7, and 10, we make a raw comparison between the two types of CEOs (no controls in the regressions). For former civil-servants, the salary is twice larger ($e^{0.7}$), the bonus is two and half times larger ($e^{0.9}$). Their average option grant is about 100 times as large as grants to non-former bureaucrats. This is in large part due to the fact that they are much more likely to be granted options at all: about 30% of former civil-servants receive this form of compensation, while only 9% of other CEOs do. All these differences are strongly statistically significant, so that, overall, the total compensation of a former civil-servant is 4.5 times ($e^{1.5}$) as large as that of top executives from alternative backgrounds.

Second, this compensation discrepancy is in part, but not entirely, explained by the fact that connected CEOs run larger firms. In columns 2, 5, 8, and 11, we control for size (log of book assets) and industry dummies. This shrinks the excess salary of connected

[7] Autorité des Marchés Financiers: http://www.amf-france.org/

[8] To value these options, we computed the annual volatility using daily returns over the 12 months prior to the grant, and took the stock price in the last day of the last month prior to the grant. We assumed a risk free rate of 4%.

CEOs to almost zero. The difference in bonuses remains large (150% difference) but is rendered insignificant by the size control. The stock options grant differential is larger ($e^{2.2} - 1 = 800\%$), and is significant at the 10% level. As noted above, this is in large part due to the fact that former civil-servants are more likely to receive stock options at all. When we add all the components, we find that even though larger firms pay better, controlling for size, connected CEOs receive overall compensation about 50% ($e^{0.4} - 1$) larger than non-connected CEOs. The strong explanatory power of controls raises the concern that our remaining results (columns 8 and 11) are fragile. To strengthen our analysis, we further add controls for governance, known to be correlated with CEO compensation, in columns 3,6,9 and 12 (age of the firm since creation and fraction of stocks held by the largest shareholder). Our results remain: former civil-servants tend to receive larger compensation, in particular in the form of stock options.

One possible interpretation for our results is that former civil-servants receive more performance-related compensation, and that they enjoy lower agency rents (Jensen and Murphy, 1990). As it turns out, there is evidence in the compensation literature that agency rents would have to be implausibly large to justify the observed amount of stock-options granted in the data (Hall and Liebman, 1998, Bertrand and Mullainathan, 2001). Hence, stock-options seem more consistent with the CEO power hypothesis than with shareholders designing optimal contracts (Bebchuk and Weisbach, 2011).

7.3 M&A Activity

In this last Subsection, we use the quality of acquisitions as an indirect measure of firm governance. Following the finance literature, we proxy the quality of acquisitions with the stock price reaction of the acquiring firm to the announcement of the transaction. Under the efficient market hypothesis, this measures the present value, net of acquisition costs, of the deal to the acquirer's shareholders. Low quality acquisitions tend to be considered as evidence of waste of the free cash flows of the acquiring firms (Lang, Stulz and Walking, 1990). Acquirers whose stock price reacts badly to a deal announcement tend to score low on standard corporate governance indices (Masulis, Wang and Xie, 2007).

We obtain acquisition data from SDC. We retrieve from the database all "completed" acquisitions initiated between 1992 and 2003 by French firms, who were either directly listed or listed through their ultimate parent. We then further restrict the sample to acquisitions whose transaction value in million USD was non-missing in the data, and for which the fraction of shares held by the acquirer after transaction is at least 50%. We end up with 1,469 deals. We then manually merge the resulting transaction data with our main dataset, using company names: this process leaves us with 1,103 acquisitions, for which we have the

transaction value, the target and acquirer's 4-digit SIC codes (from SDC), and the acquirer's accounting information, and CEO background. Finally, we match the resulting dataset with stock returns data, and end up with 961 deals, for which we can compute the acquirer's announcement returns.

[Insert Figure 2]

Using this metric, we find that acquisitions made by connected CEOs are less value creating. We calculate cumulative market adjusted returns, starting 5 days before the announcement, up to 5 days following the announcement. We first report these announcement reactions in Figure 2. Upon announcement, the stock price of acquirers run by non-connected CEOs goes up by 1.5%. Such a positive reaction is consistent with the evidence from US data.[9] When the firm is run by a former civil-servant, we find, however no announcement return. Hence, the market views acquisitions made by former civil-servants as less value-creating.

[Insert Table 7]

We report formal statistical tests in Table 7. Panel A just looks at cumulative excess returns regressed on the civil-servant dummy (simple mean return comparison); Panel B controls for 18 industry indicators, as well as acquirer and target sizes, which have been shown to affect the quality of acquisitions. Columns 1,2,3,4 look at the cumulative price change over different windows around the acquisition. Looking at columns 1 and 2, we find that pre-announcement price movements do not differ significantly across CEO background, until one day before announcement. Put differently, there is no evidence of more insider trading among civil service-CEO run firms. The difference becomes equal to 1 percentage point or more one day after announcement, this difference is persistent, and remains statistically significant even when we control for acquirer size, deal size, and industry. These numbers and tests confirm the intuition obtained from Figure 2: connected CEOs seem to make acquisitions of significantly lower quality, since they create less shareholder value than non-connected CEOs. This is consistent with connected firms being less well governed.

[Insert Table 8]

There is weaker evidence that connected CEOs do more of these "non value-creating" acquisitions. In Table 8, we look at the frequency and amount of these acquisitions. In the

[9] Using a sample similar to ours (SDC, both public and private targets), Bradley and Sundaram (2006) also find a positive announcement return of 1.5%.

first two columns, the dependent variable is the number of acquisitions (so we run Poisson regressions). The coefficient means that the average annual number of acquisitions is 15% higher in firms run by connected CEOs. When we control for the fact that these firms are larger, as well as year and industry dummies, the effect, however, vanishes. Columns 3 and 4 of Table 8 focus on the overall cost of these acquisitions. Controlling for differences in composition by size, year and industry, we find that the overall annual cost of acquisitions in connected firms is higher by about 26%. This number is statistically significant at the 5% level.

8 Conclusion: Social Networks and Corporate Performance

This paper has shown that social networks do indeed appear to shape board composition. We used French data because the history and sociology of the French business elite make it fairly easy to measure if a given CEO or director belongs to a given network. The paper has used new data and new techniques to identify the existence of networks. As it turns out, network of former bureaucrats are the most active in determining board composition, controlling for both directors and firm characteristics. This phenomenon seems to have direct implications for the sociology of the French elite, for the economics of networks, as well as for corporate governance. For the sociology of French elite and the role of social capital, we see that networks are far from being eliminated by "the market". For the economics of networks, the econometric techniques that we develop are particularly well-suited for the study of a variety of questions that are of economic interest (impact of networks within firms etc.). For corporate governance, we learn that firms with directors and CEOs with a past career in the civil service are less likely to change CEOs when performance is bad; that connected CEOs are better paid than their non-connected equivalent; and that connected CEOs make bigger and worse acquisitions, as rated by the market. This suggests that social networks have multiple effects, in this case mostly detrimental to good governance.

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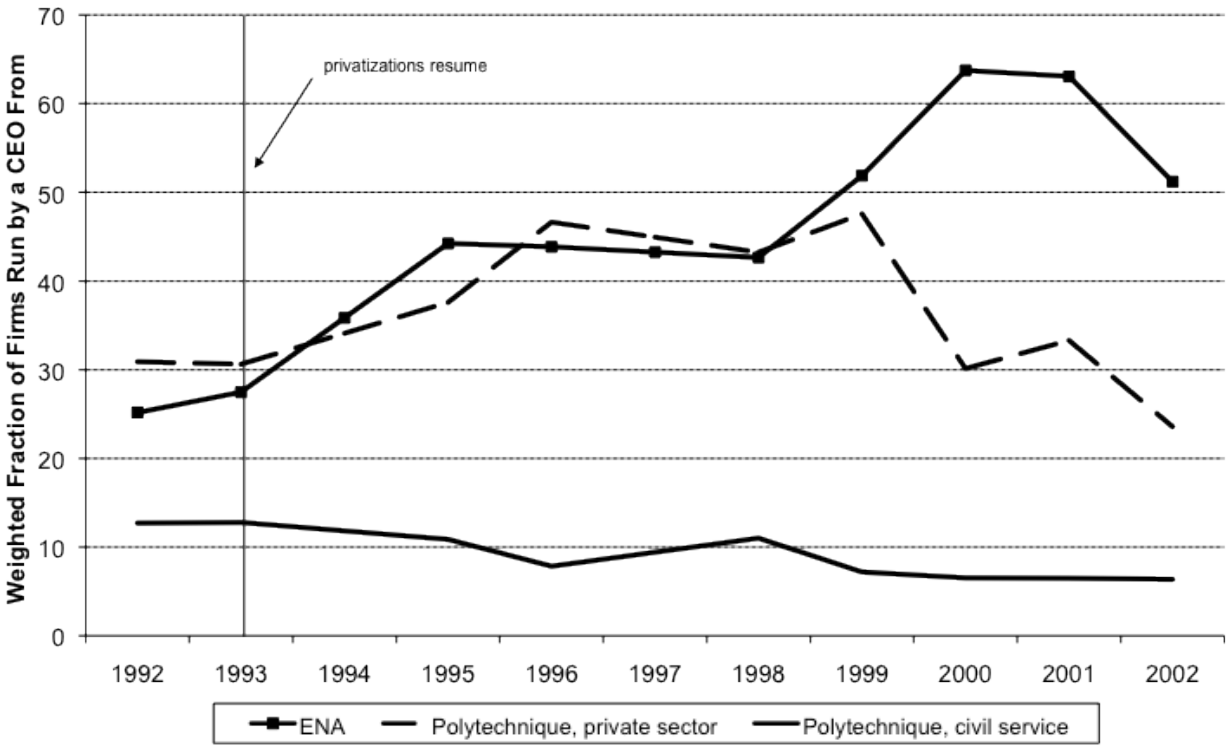

Figure 1: Characteristics of French CEOs, asset weighted

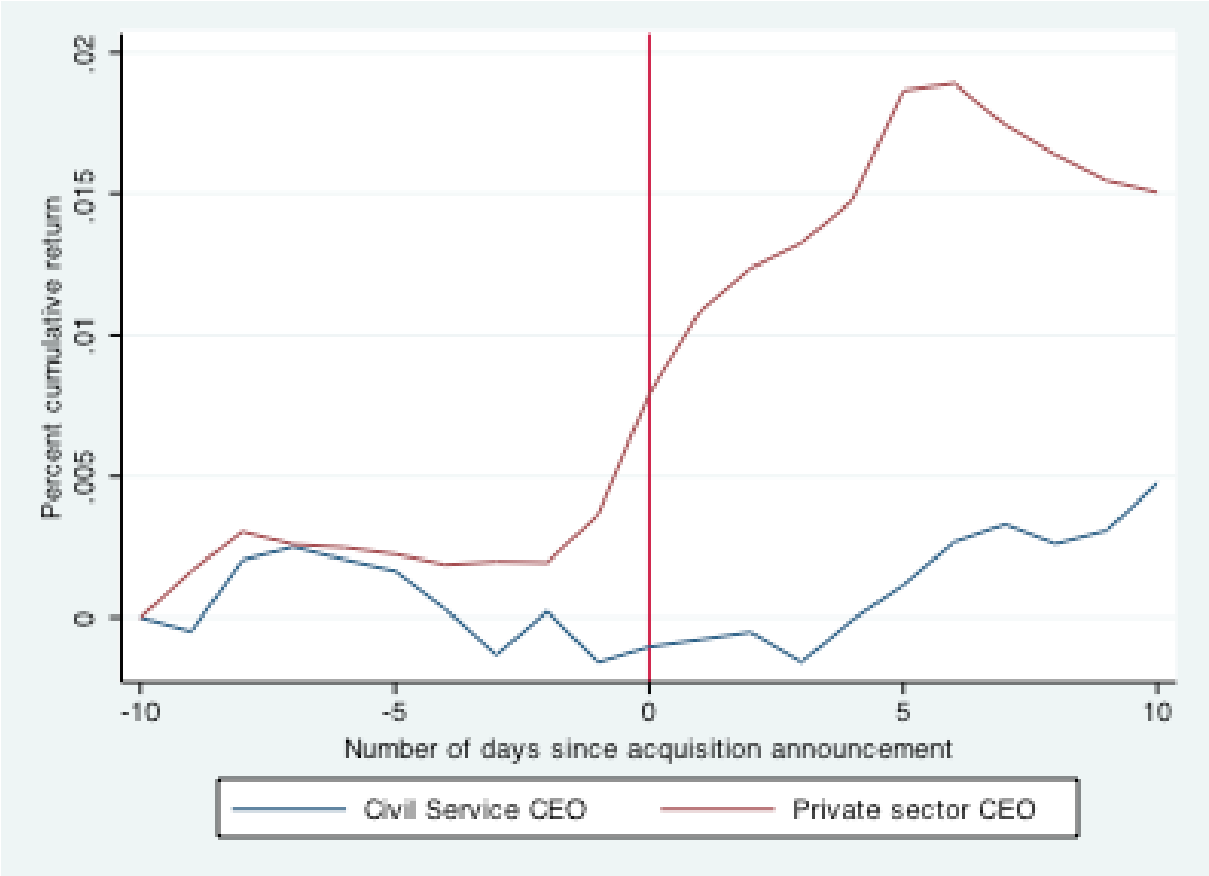

Figure 2: Stock Price Reaction to Acquisition Announcement, by Acquiror Type

Table 1: Firm Level Summary Statistics

	Mean	Std Dev.	Asset Wgtd Mean	Mean (CEO = former CS)	Mean (CEO = priv. sector)
CEO Background					
ENA graduate	0.07	0.26	0.54	0.54	0.01
Polytechnique, former civil servant	0.04	0.20	0.08	0.23	0.01
Polytechnique, always private sector	0.08	0.27	0.33	0.15	0.07
Former civil servant	0.12	0.32	0.65	1.00	1.00
Outside Directors					
Total Number	6.91	3.82	-	10.03	6.53
At least one ENA	0.3	0.46	0.9	0.64	0.25
At least one polytechnique, CS	0.18	0.38	0.59	0.43	0.14
At least one polytechnique, PS	0.36	0.48	0.81	0.6	0.33
Firm Characteristics					
Assets (bn Euros)	5.5	45.7	-	4.4	3.3
ROA				0.05	0.06
Former SOE	0.13	0.34	0.64	0.36	0.1

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. 8,014 observations for CEOs; 5,948 observations for asset weighted statistics and firm-level statistics; 55,409 observations for outside directors.

Table 2: Preliminary Evidence on Networks

Board Composition as a Function of the CEO's Background

		CEO Education/career			
	All	ENA	Polytechnique Civil Service	Polytechnique Private Sector	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. 8,014 observations in non-weighted statistics and 5,948 in assets-weighted statistics.

Table 3: Econometric Evidence on Networks
Effect of the CEO's Background on Director *Current* Employment

			Firm level model			
Among currently employed directors, fraction of:	(1) ENA	(2) Polytechnique Civil Service	(3) Polytechnique Private Sector	(1) ENA	(2) Polytechnique Civil Service	(3) Polytechnique Private Sector
CEO is ENA	0.62***	0.33***	0.13***	0.48***	0.35***	0.12*
	(0.08)	(0.08)	(0.04)	(0.10)	(0.11)	(0.06)
CEO is Polytechnique	0.50***	0.97***	0.25***	0.42***	0.95***	0.19***
& former civil servant	(0.11)	(0.15)	(0.05)	(0.12)	(0.18)	(0.06)
CEO is Polytechnique	0.21***	0.16**	0.16***	0.10*	0.09	0.17***
& always private sector	(0.06)	(0.06)	(0.03)	(0.06)	(0.06)	(0.04)
Year dummies	yes	yes	yes	yes	yes	yes
Former SOE dummy	no	no	no	yes	yes	yes
Past year firm ROA	no	no	no	yes	yes	yes
Industry dummies	no	no	no	yes	yes	yes
Observations		8,035			5,219	
Test ENA(1)=ENA(2)		0.00***			0.35	
Test ENA(1)=ENA(3)		0.00***			0.00***	
Test Poly, CS(2)=Poly, CS(1)		0.00***			0.01***	
Test Poly, CS(2)=Poly, CS(3)		0.00***			0.00***	
Test Poly, PS(3)=Poly, PS(1)		0.50			0.35	
Test Poly, PS(3)=Poly, PS(2)		0.97			0.36	

Note: SURE estimates - Standard errors between brackets. Residuals are allowed to be correlated across equations and 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. *** means statistically significant at 1%, ** at 5% and * at 10%.

Table 4: Econometric Evidence on Networks

Effect of the CEO's Background on Directors *Appointment*

	Firm level regressions					
Among newly appointed directors, fraction of:	(1) ENA	(2) Polytechnique Civil Service	(3) Polytechnique Private Sector	(1) ENA	(2) Polytechnique Civil Service	(3) Polytechnique Private Sector
CEO is ENA	0.13***	0.06***	0.03***	0.09***	0.04***	0.02**
	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)
CEO is Polytechnique	0.10***	0.23***	0.03***	0.05**	0.18***	0.02
& former civil servant	(0.02)	(0.04)	(0.01)	(0.02)	(0.04)	(0.01)
CEO is Polytechnique	0.04***	0.05***	0.05***	0.02	0.03**	0.04***
& always private sector	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)
% of ENA directors (-1)	-	-	-	0.35***	0.12***	0.10***
				(0.04)	(0.04)	(0.03)
% of Poly. former C.S.	-	-	-	0.17***	0.36***	0.02
directors (-1)				(0.05)	(0.11)	(0.03)
% of Poly.. always P.S.	-	-	-	0.09***	0.03	0.07***
directors (-1)				(0.03)	(0.03)	(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: SURE estimates - Standard errors between brackets. Residual are allowed to be correlated across equations and 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. *** means statistically significant at 1%, ** at 5% and * at 10%.

Table 5: Turnover to Performance Sensitivity of Connected CEOs

	Losing CEO position in forthcoming year		
	Former Civil Servants	Private Sector	Difference
Panel A: no controls			
Industry Adjusted ROA	-2.61	-8.18***	5.56**
	(2.51)	(1.45)	(2.87)
Observations	498	1,793	
Ind. Adj. Stock Return	-1.21	-2.17***	0.96
	(0.86)	(0.51)	(1.02)
Observations	346	860	
Panel B: With controls			
Industry Adjusted ROA	-1.22	-8.91***	7.69**
	(3.22)	(1.58)	(3.59)
Observations	461	1,768	
Ind. Adj. Stock Return	-0.90	-2.34***	1.44
	(0.96)	(0.56)	(1.12)
Observations	302	774	

Note: Logit estimates. Standard errors between brackets. Sample of all firms run by a CEO aged less than 65, for all years after 1991. This table displays the CEO rnover to corporate performance sensitivity. The first panel simply regresses the fact that the CEO will not run the firm in the next year, on industry adjusted measures of annual corporate performance (Return on assets and annual stock return). For stock returns the number of observations is lower due to matching between accounting and returns data. The second panel adds controls in this regression: log(assets), industry and year dummies. The first column estimates the model on the subsample of former civil servants. The second column restricts the sample to CEOs who never were civil servants. The third column tests the equality of coefficients reported in columns 1 and 2; to do so, we regress future turnover on all RHS variables interacted with a civil servant dummy; we report the coefficient on the interaction term of civil servant dummy and performance measure. In all regressions, error terms are clustered at the firm level. *** means statistically significant at 1%, ** at 5% and * at 10%.

Table 6: Compensation of Connected CEOs

	Log(1+salary)		Log(1+bonus)		Log(1+stock opt.)		Log (total comp.)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Former	0.72***	0.14	5.44***	0.99	4.76***	2.32*	1.45***	0.38*
Civil servant	(0.18)	(0.16)	(1.19)	(1.39)	(1.16)	(1.35)	(0.26)	(0.21)
log(assets)	-	0.24***	-	1.55***	-	1.08***	-	0.38***
		(0.03)		(0.28)		(0.26)		(0.04)
Fraction held by	-	-0.01**	-	0.00	-	-0.02	-	-0.01***
largest shareholder (pct)		(0.00)		(0.02)		(0.02)		(0.00)
log(1+age of firm)	-	0.09	-	0.55	-	0.60	-	0.16*
		(0.07)		(0.96)		(0.60)		(0.09)
Industry FE	No	Yes	No	Yes	No	Yes	No	Yes
Observations	180	147	178	145	201	164	200	163

Note: OLS regressions. Standard errors between brackets. The LHS is the log of CEO compensation as reported in the 2003 annual reports available from the securities regulator's (AMF) website. Columns 1-2 use the log of fixed compensation. Columns 3-4 use the log of bonus. Columns 5-6 use the log of (1+stock options): as 149 firms report some compensation in the form of bonus or salary, but no option grant, we set stock option grant for these firms to zero (this is a reasonnable assumption since the law mandates disclosure on stock option grants). Columns 7-8 use the log of total compensation (salary + bonus + stock option grants) as the LHS variable. Columns 1,3,5,7 show regression results without controls; Columns 2,4,6,8 include firm size, industry fixed effects, the % held by the dominant shareholder and the age of the firm since creation. Stock options are valued using the Black and Scholes formula with the strike price reported in the annual report, the stock price at the end of the last month preceeding the grant, and the annualized stock price volatility of daily returns over 12 months preceeding the grant. ***, ** and * mean statistically significant at the 1, 5 and 10% levels respectively.

Table 7: The quality of acquisitions made by Connected CEOs

	R(-10,-5)	R(-5,-1)	R(-1,1)	R(0,5)
Panel A: No control				
Former civil servant	-0.04	-0.46	-0.66***	-0.76**
	(0.30)	(0.38)	(0.24)	(0.32)
Observations	939	939	936	926
Panel B: With controls				
Former civil servant	0.45	-0.48	-0.82**	-1.14***
	(0.48)	(0.47)	(0.37)	(0.41)
log(deal size)	0.02	0.10	0.10	0.09
	(0.10)	(0.11)	(0.10)	(0.12)
log(acquiror size)	-0.01	0.19	0.06	0.33**
	(0.10)	(0.17)	(0.11)	(0.16)
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Observations	716	716	715	709

Note: In all regressions, the dependent variable is a cumulative market adjusted return around the announcement of an acquisition. Column 1 uses the cumulative adjusted return between 10 and 5 days before the announcement. Column 2 uses the cumulative return between 5 and 1 day prior to announcement. In column 3, the return is between 1 day before, and 1 day after announcement. In column 4, we go from announcement day to 5 days after. We restrict the sample to acquisitions whose amount was disclosed and reported in SDC. Panel A reports OLS regression results of cumulative return on the public service dummy and no other control. Panel B includes several controls: log of deal size (in million euros), year-of-deal dummy, 18 industry dummies and the log of the acquiror's total assets (in million euros). In all regressions, error terms are clustered at the firm level. Figures in parentheses are t-statistics. ***, ** and * correspond to statistical significance at 1, 5 and 10% respectively.

Table 8: Acquisitions by Connected CEOs

	# acquisitions at t+1		Log(1+value all acq.) at t+1	
	(1)	(2)	(3)	(4)
Former	1.45***	-0.06	0.82***	0.25**
Civil servant	(0.18)	(0.15)	(0.15)	(0.12)
log(assets)	-	0.60***	-	0.27***
		(0.03)		(0.03)
Year FE	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes
Observations	7,291	6,094	7,291	6,094

Note: Poisson regressions (columns 1 and 3), OLS regressions (columns 2 and 4). Standard errors in parentheses. In all regressions, the LHS measures M&A activity, using SDC. We only include deals of SDC for which the deal value ("value of transactions") is reported. Columns 1-2 use a dummy variable equal to 1 if the firm makes an acquisition in year t+1, as reported by SDC.Columns 3-4 use the log of the sum of deal values as recorded by SDC. Columns 1,3 show regression results without controls, except year FE; columns 2,4 further include industry fixed effect and firm size as measured by log of total assets. In all regressions, error terms are clustered at the firm level. ***, ** and * mean statistically significant at the 1, 5 and 10% levels respectively.