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Firms' Public Administration Connections in Israel: An Overview

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קשרי חברות למינהל הציבורי בישראל: סקירה

נעם מיכלסון

תקציר

בנייר זה אני ממפה באופן מלא את חברות המקושרות למינהל הציבורי בישראל בשנים 2007-2015. בעזרת מגוון בסיסי נתונים ייחודיים, אני מזהה כל חברה ציבורית המעסיקה כמנהל או חבר דירקטוריון לפחות עובד אחד עם עבר במינהל ציבורי, ובכללם גם פוליטיקאים. אני נבדל מהספרות האקדמית בנושא על ידי הכללת קישוריות למינהל הציבורי דרך עובדים לשעבר בדרגי עבודה ועריכת ניתוח מלא של ההתאמה בין עובד מינהל ציבורי לחברה על בסיס סוג הניסיון במינהל הציבורי של העובד ומאפייני החברה. הניתוח מראה ש-60 אחוז מהחברות הציבוריות בישראל בתקופה הנסקרת מעסיקות עובד ציבור לשעבר וש-8 אחוז מכלל המנהלים הבכירים וחברי מועצת המנהלים הם בעלי עבר במינהל הציבורי. ניתוח ההתאמה בין עובדי מינהל ציבורי לשעבר לחברות ציבוריות מעלה דפוסי מעברים התלויים בניסיון התעסוקתי של עובד המינהל הציבורי וסוג הפעילות העסקית של החברה הציבורית. בפרט, מהניתוח עולה כי חברות נוטות לשכור את שירותיו של עובד מינהל ציבורי בעל ניסיון באחד מהגופים המאסדרים או המפקחים של הענף בה היא פועלת החברה. כמו כן, נמצא כי ככל שרמת הרגולציה והפיקוח המושתים על חברה גבוהה יותר, ההסתברות שחברה תשכור את שירותיו של עובד מינהל ציבורי גבוהה יותר. בעזרת כלים מתחום ניתוח הרשתות אני מוצא שעובדי המינהל הציבורי לשעבר נמצאים במקומות מרכזיים יותר ברשת, אולם ככל שהזמן שעבר מאז עזבו את המינהל הציבורי גדול יותר, המרכזיות שלהם ברשת הדירקטורים הולכת וקטנה. הממצאים בנייר זה מניחים את היסודות למחקר נוסף בתחום זה ותורמים לשיח הציבורי הנמשך אודות מעברים בין המגזר הציבורי למגזר הפרטי.

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ABSTRACT

In this paper I fully map public administration connected firms in Israel in the years 2007–2015. Using various novel and comprehensive datasets, I identify every listed firm with at least one former civil servant, including politicians, in its management. I diverge from existing literature by also observing connectedness to working-level former civil servants and conducting a full analysis of the matching between a firm and a former civil servant, conditional on his or her civil service experience and the firm's characteristics. The results show that 60 percent of Israeli publicly listed firms employ a former civil servant, and that 8 percent of all directors and executives are former civil servants. The matching analysis highlights several repeated transitions that are dependent on the civil servants' experience and the firms' activities. Specifically, I find that former regulators are prevalent in firms that used to be under their regulation, and that the level of a firm's regulatory burden is positively associated with the presence of a former civil servant in its management. Using network analysis tools, I find that former civil servants are likely to be more centrally located and powerful in the business sphere, and that their unique capital decreases as the time since they left the public administration increases. The findings in this paper lay the infrastructure for further research and public debate concerning private-public sector transitions.

1. INTRODUCTION

1.1. Business Sector-Civil Service Connections

The business sector and the government interact in many diverse ways, and nearly every aspect of business is shaped by government regulation. Government policy can affect the competitive positions of firms and influence their performance by changing the size of markets, establishing entry and exit barriers, providing special tax or subsidy treatments, and altering firm costs through legislation on employment, safety, or environmental protection standards (Lester et al., 2008). Government can also act as a large customer, affecting firms in the most direct way. Hence, participants in the business sector can extract rents from being connected and close to the government, and thereby gain an advantage that will help them to perform better.

There are different ways a firm can establish connections with government in order to perform better. First, it can be directly involved in the political system through donations to candidates or political parties. Being an important donor can give firms access to decision makers in the present or the future. Alternatively, firms can establish direct connections with ex-government officials by hiring them. This can be done either by employing ex-government officials as consultants, lobbyists, or as an integral part of the firm's working force, and in particular as part of its management.

Using their specific expertise and social capital accumulated in their years of serving the government, ex-government officials can benefit the firm in various ways: they have considerable insights into government institutions and the inner workings of the legislative and regulatory processes (Luechinger and Moser, 2014), into current and future policy matters and upcoming government decisions (i Vidal et al., 2012), and into the competitors of their future employers (Luechinger and Moser, 2014). This type of capital can be translated by the firm into value by reducing information asymmetry between government and business, thereby making inner-firm decision making more efficient and less costly. In this sense, ex-government officials serve as intermediaries that bring relevant and important

information to the firm (Austen-Smith, 1996; Shive and Forster, 2016).[1] Alternatively, they can add value by helping secure preferential treatment by the government, e.g., a more lenient approach to regulation violations, priority with regard to signing government contracts and procurements, etc. (Zhang and Turong, 2019). In this way, ex-government officials add value through the quid pro quo channel (Grossman and Helpman, 1994; Shive and Forster, 2016). Ex-government officials can also be hired as a reward for past preferential treatment. This option gives rise to the "captured regulator" problem, where acting government officials take future employment options into consideration in a way that affects their actions, sometimes clearly against the public interest.

It is notable that in contrast to a firm's temporary and nonexclusive association with an ex-government consultant or lobbyist, a firm's employment of an ex-government official in such a capacity enables the firm to utilize his social capital for a longer period, and exclusively. Therefore, hiring an ex-government consultant or lobbyist is more likely to occur when the firm's interest is specific, e.g., when he can help implement new regulations or represent the firm's interest in government decision-making discussions. Employing an ex-government official is more likely, however, when there is a long-lasting relationship between the firm and the government, as in the case of a heavily regulated industry.

The capital of ex-government officials is differential with respect to the level of their seniority in the government institution. High-ranked officials obviously have more influence on decision making and therefore are more exposed to the "captured regulator" risk. In addition, they are more connected to other higher-ranked officials both in their institution and in other government institutions. However, lower-ranked managers or even working-level ex-government officials also have a unique capital. Sometimes the lower ranks might have a more detailed knowledge of different aspects of their public institution, which they can use

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[1] Jabotinsky (2017) argues from a behavioral standpoint that former regulators are likely to retain their public sector point of view and workflow even after leaving the civil service. However, even if this is likely, it only holds for the short period of time between leaving the civil service and adopting the private sector point of view and workflow of the new employer.

outside the government. Moreover, high-ranked ex-government officials are under public scrutiny even after they leave their public position, and firms might find it harder to utilize their capital without public criticism, whether justified or not (Luechinger and Moser, 2014).

If firms misuse their connections to the government they might gain an unfair competitive advantage, a clearly undesired outcome. Moreover, if such misuse is large-scale, there is also a risk that public trust in the government as a whole will erode to the point where citizens feel that the political and professional branches of the civil service do not serve the public interest, but rather their own (Revolving Door Working Group, 2005). To mitigate these risks inherent in the employment of ex-government officials, countries have adopted several tools. The first is a cooling-off period that varies according to both the position and rank the departing ex-government official held and the type of firm he intends to move to. The second tool is the establishment of different kinds of ethics committees that examine these kinds of transitions and oppose them if it finds that the conflict of interest is too prominent. These committees can also be approached by departing ex-government officials who wish to appeal against the cooling-off period.

The rationale behind a cooling-off period is straightforward: the value of ex-government officials' unique capital declines with the time passed since they left their position, as regulations tend to change and connections tend to weaken as government officials move from their positions to other positions. Accordingly, the probability of ex-government officials misusing their social capital decreases with time (Lester et al., 2008). But due to other considerations, the cooling-off period cannot be too long. First, the right to employment is legally binding and too long a cooling-off period violates this right. Second, the value that the cooling-off period erodes cannot be limited to the non-legitimate value, but rather erodes the ex-government officials' overall value. Third, given that in most (if not all) countries salaries in the public sector are lower than in the private sector, the unique capital an ex-government official gains in the government is a complementary non-monetary compensation that acts as an incentive for good workers to join the

government (Brezis, 2017). Eroding the value of this kind of capital just because of the probability that it will be misused might lead to difficulties in recruiting good workers to the public sector.[2]

In a short international policy review of mainly European countries, Martini (2015) finds that the cooling-off period varies from zero to three years. However, the length of the cooling-off period does not tell the full story, because countries also differ in terms of its enforcement, sanctions, extent of coverage (i.e., who is obliged to cool off), , and frequency of use. Hence, policymakers are still looking for the optimal design of the cooling-off restriction that will balance the aforementioned opposing considerations, while incorporating other means to diminish the misuse of ex-government officials' capital.[3] This challenge continues to be a main concern due to ongoing changes in public sector in general: in many countries the size of government spending is diminishing and this affects career patterns within it. Reforms have introduced individual contracts and substantial changes to the security of tenure. These factors, together with other changing career patterns, especially in developed countries, have resulted in a decrease in lifetime careers in the public sector. Government officials nowadays pay much more attention to employment opportunities outside the government, and therefore the aforementioned issues will continue to be of concern to policymakers in the near future (OECD, 2010).

1.2. Main Contributions

The literature in recent years has produced an increasing amount of evidence on the scope of firms connections to the government and the implications of this connectedness. One of the main criteria of a "connected" firm is the presence of a person who is connected to the *political* system (the president, ministers, parliament

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[2] Law and Long (2011) find that public utilities commissioners in states that have restrictions on the employment of former civil servants have less expertise, serve shorter terms, and are less likely to be subsequently employed in the private sector, compared with their counterparts from states without such restrictions.

[3] For a review of cooling-off period policies, see Maskell (2010) for the U.S., the OECD (2010) for Europe, and Nave (2013) for Israel.

members, etc.), but not necessarily to the broader civil service (finance ministry, communications ministry, defense ministry, etc.). Some studies go further and include more government institutions in their definition of political connectedness; however, they concentrate only on high-ranked officials in government institutions and not on lower-ranked, working-level ones.[4] These two research gaps exist in spite of the unquestionable importance of the civil service to a firm's activity and the gains from employing not only high-ranked but also working-level ex-government officials. The fact that cooling-off periods are relevant also for working-level ex-government officials emphasizes the importance the legal system attributes to ex-government officials of all levels. However, as mentioned, the literature has little to say about the scope and implications of this group of ex-government officials in the private sector, and the main reason for this gap is the lack of available data.

In this study I fill the gap by broadening the scope of politically connected firms in two ways. First, it includes all institutions of the public administration, and not only the political system. Second, it includes *all* levels of ex-government officials, given the aforementioned rationale that working-level ex-government officials may hold even more capital than high-ranked ex-government officials. This broadening of the scope of politically connected firms is possible due to recently available data. Therefore, in this paper the definition of *public administration connected firm (PACF) is a firm with at least one director or high-ranked executive (collectively, manager) that is a former politician or civil servant (collectively, FCS).*

Using several reliable data sources, I have information on the full range of civil service experience a manager had when he started his employment as a manager in the firm, along with other attributes of his experience. Given the richness of the data, I am able to identify patterns of employment of FCSs in public firms in Israel that are dependent on the manager's experience in the civil service, the firm's

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[4] For example, Luechinger and Moser (2014) broaden the definition of political connectedness. However, they focus only on one other governmental institution (the U.S. Department of Defense) and only on appointees that needed Senate confirmation. Although this definition includes more ex-government officials than other studies in the field, it is still limited to high-ranked ex-government officials.

profile, and the firm's regulatory framework. In addition, using network theory tools, I study how FCSs' unique capital is translated to their location in the business sector eco-system, conditional on their specific expertise. Finally, I use Israeli data, and so an important by-product of this study is a systematic and comprehensive analysis of public administration connected firms in Israel. This countrywide data analysis will contribute to the ongoing debate on this issue that until now has been based on scarce and anecdotal evidence.

Israel is a young, developed, democratic country, a member of the OECD since 2010. After four decades of intensive government involvement in the the economy, in the last three decades it went through rapid privatization and government spending consolidation. Israel's share of government spending in GDP declined from 42.6% of GDP in 2007 to 38.5% of GDP in 2015, just below the OECD average. Due to significant geopolitical challenges, Israel's spending to security and defense is large. Faccio (2006) finds that the politically connected firms are more present in countries which are more democratic, have higher levels of (perceived) corruption, more restrictions on foreign financial investments, less freedom of press, and with higher secondary school enrollments. In most of these aspects, Israel's profile is close to other Western developed countries, ensuring some external validity of my results.

In my study I find that 60 percent of Israeli public firms are public administration connected, by the above definition. Out of all managers in my database, 8 percent are found to be FCSs. Compared to non-FCS directors and executives, FCSs tend to have more board interlocks and are overrepresented in the population of outside directors. The average number of years that passed between an FCS's departure from the civil service and the time he is observed in the data as a manager in the firm is 10 to 12 years. Using an industry regulatory burden index developed for the purposes of this study, I find that the match between a firm and an FCS is more likely the heavier the regulatory burden is. However, only 15 percent of FCSs employed by firms have any experience in one of the civil service institutions that regulated the firm. Moreover, less than 30 percent have any experience from their

time in the civil service that is related to the activities of the firm that hired them. Most of these FCSs bring economic, legal, or managerial experience, often together with other unobservable capital derived from civil service such as connections and knowledge. The industry distribution shows that beyond the regulatory burden, firms in specific industries are more likely to have an FCS in their management. A deeper analysis shows that some matches between FCSs with specific types of civil service experience and firms in specific industries are more likely to be observed than others. Using network analysis tools, I also find that FCSs have more power in terms of most network centrality measures. Not only do FCSs sit on more boards, compared to non-FCSs who are multi-board members, but they are also found to sit on boards that give them more access to power and information flows within the sphere of business firms.

I also find that some of the above results are sensitive to two new elements that I include in this study: the rank of the FCS in his last civil service position and the time that passed since leaving the civil service. I find that not taking into account lower-level FCSs leads to underestimation of the true scope of public administration connectedness, as one-fifth of connected firms are connected through former working-level FCSs. In addition, the power of FCSs in the business sphere is underestimated when only high-ranked FCSs are taken into account. Moreover, I find a non-monotonic deterioration of FCSs' unique capital, which is reflected both in the explanatory power of the matching between a firm and an FCS and in the power of the FCS within the business sphere. My findings lays an evidence-based infrastructure for further research and public debate concerning the issue of public-private sector transitions.

1.3. Literature Review

There is an extensive literature on firms' political connections in many countries, among them the U.S. (e.g., Roberts, 1990; Faccio et al., 2006; Lester et al., 2008; Goldman et al., 2009; Chaney et al., 2011; i Vidal et al., 2012; Goldman et al., 2013; Houston, 2014; Luechinger and Moser, 2014; Brogaard et al., 2015; Faccio and Hsu,

2017), China (Li et al., 2008; Ho et al., 2015; Hu et al., 2019; Zhang and Truong, 2019), Indonesia (Fisman, 2001), Brazil (Claessens et al., 2008), Denmark (Amore and Bennedsen, 2013), Pakistan (Khwaja and Mian, 2005), France (Bertrand et al., 2018), Chile (González and Prem, 2018), and South Korea (Schoenherr, 2019). Faccio (2006) surveyed a panel of 47 countries and found politically connected firms in 35 of them. She showed that politically connected firms control almost 8 percent of the world's equity market, and that in some countries they exercise influence over a very high share (86 percent in Russia, for example). The above list of countries indicates that it is a common phenomenon regardless of the country being a democracy or a dictatorship, developed or developing, clean or corrupt. Of course, the share of politically connected firms in a country is not random: Faccio (2006) shows that the share of politically connected firms decreases with the level of stringency of regulation of political conflicts of interest, increases with the level of perceived corruption in the country, increases in countries that impose restrictions on foreign investments by their citizens, and increases in more transparent systems.[5]

Most of these studies define a firm as connected either when it makes donations to political candidates (e.g., Classens et al., 2008; Goldman et al., 2009; Brogaard et al., 2015) or when one or more of the firm's shareholders, board members (outside or inside), or top executives is an ex-government official (e.g., Faccio, 2006; Faccio et al., 2010; Lester et al., 2008; Chaney et al., 2011; i Vidal et al., 2012; Houston, 2014; Luechinger and Moser, 2014; Faccio and Hsu, 2017; Shin et al., 2018; Hu et al., 2019; Zhang and Truong, 2019).[6] In these studies, the focus is on high-ranked officials, such as heads of state, parliament members, ministers, and senior officials of government institutions. Studies that include lower levels of ex-government officials are those that focus on officials who left specific government institutions, such as the Federal Reserve (Shive and Forster, 2016), the U.S. Department of

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[5] The simple explanation of this last somewhat counterintuitive finding is the greater access to information in such economies.

[6] Schoenherr (2018) goes a bit further and defines connected firms as those with board members that are from the South Korean President's social network.

Defense (Luechinger and Moser, 2014), or the U.S. Armed Forces (Benmelech and Frydman, 2015).

There are various outcomes that were found to be associated with the presence of political connections: firm value (Roberts, 1990; Fisman, 2001; Faccio, 2006; Goldman et al., 2009; Luechinger and Moser, 2014), performance and profitability (Khwaja and Mian, 2005; Amore and Bennedsen, 2013), lower credit spreads and lenient covenants (Li et al., 2008; Houston et al., 2014; Ho et al., 2015), easier access to capital (Khwaja and Mian, 2005; Claessens et al., 2008; Boubakri et al., 2012), higher likelihood to receive government contracts (Goldman et al., 2013; Brogaard et al., 2015; Schoenherr, 2018) or to be bailed out (Faccio et al., 2006), lower executive compensation and pay dispersion within the firm (Chizema et al., 2015), and accounting quality (Guedhami et al., 2014).

The literature also analyzes the costs of hiring ex-government officials. If they are hired for their government experience, they may not provide effective monitoring and advisory services, because they often lack industry experience and serve in multiple directorships, reducing the amount of time they can spend serving each firm (Kang and Zhang, 2018). In addition, if they still hold their political affiliation, they might extract political benefits at the expense of other stakeholders, which further increases their incentives to seek rents and expropriate firm resources (Boubakri et al., 2012). Empirically, Bertrand et al. (2018) show that politically connected CEOs alter corporate employment decisions in order to help politicians in their re-election efforts, by raising job and plant creation rates or lowering their destruction rates in election years, especially in politically contested areas. Therefore, an ex-government official will be hired if the firm's perception is that the marginal benefit is higher than the marginal cost.

Despite this extensive literature, there are still some underexplored questions in the field of politically connected firms. One such question has to do with the assumption that the sorting of ex-government officials into firms is random. More likely, it is dependent on the differences in the firms' social and human capital, characteristics, needs, and business profile. Yet, research aimed at identifying the

determinants of the sorting of ex-government officials into firms beyond financial and accounting variables (like size, growth opportunities, etc.) is scant. One exception is a study by Agrawal and Knoeber (2001) who find that firms in a more politically dependent industry tend to have more ex-government officials on the board, and that this incidence of politically experienced directors is increasing in politically important times. Another underexplored question has to do with the decaying nature of ex-government officials' capital. Lester et al. (2008) study factors that make one particular former government official more, or less, attractive as a director than another. Using survival analysis, they show that the probability of an ex-government official being hired as a director on a firm's board decreases with the time that passed since he left his political position. A third underexplored question, mentioned above, concerns the definition of political connectedness. Most studies define "ex-government official" using a narrow set of government institutions and, more importantly, a narrow set of ranks. Even Luechinger and Moser (2014), who claim to differentiate ex-government officials' effect conditional on their rank, include only positions that must be approved by the U.S. Senate. Therefore, there is no study that includes all former public administration employees, in the widest definition.[7] A fourth underexplored question has to do with the network characteristic of ex-government officials. Despite the documented important effect the network structure of directors has on a wide range of firms' outcomes, little attention has been given to the question whether ex-government officials differ in their network characteristics form non-ex-government officials. One exception is a study by González-Bailon et al. (2013) who find that former parliamentarians, ministers and high-ranked civil servants in Britain do not significantly differ from non-ex-government officials.

A paper that addresses more than one of the above concerns is that by Kang and Zhang (2018), who include all types and ranks of former civil servants and test for their effect on firm value and director's monitoring quality, conditional on the

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[7] Bertrand et al. (2018) and González-Bailon et al. (2013) claim to use just such a broad definition of civil service, but in practice they both adopt the usual narrow definitions both in the scope of the institutions and in the level of the officials studied.

presence of former civil servants on the board. They also test for the differentiation of this effect between different positions that the director had in the civil service and the extent of his experience in the firm's business. They also control for the selection bias of FCSs with respect to firms. However, their study is still incomplete in three main aspects: first, they identify regulated firms with a dummy variable for firms' industry; second, they take into account only outside directors; and third, they use only one data source for identifying directors' civil service history. In addition, they do not analyze additional civil service features that might affect the outcomes, such as time elapsed between departure from civil service and appointment to directorship.

Lastly, only one paper has examined politically connected firms in Israel. In a related study to Goldman et al. (2009), Lehrer (2017) mapped politically connected firms in Israel in 2015 and classified them by political affiliation. Using the close elections in that year, he examined whether the value of firms connected to the winning party increased more after the election results became clear, relative to non-connected firms. He found a positive effect only at the industry level and only among firms that operate in the highly regulated and government-dependent oil and gas exploration industry.

1.4. The Legal Framework of Employment of FCSs in Israel

There are very few means by which firms can gain public administration connections in Israel. Donations to political parties by private people or firms are limited, and politicians who are large shareholders is rare, and they face restrictions. Therefore, connections and influence are mostly achieved either by lobbying or by employing an FCS.

In Israel, the legal framework for the employment of FCSs after leaving the civil service is stipulated in the Civil Service Act (Restrictions after Retirement) 5729-1969, with complementary regulations from the Civil Service Standards that the Civil Service Commissioner publishes. Article 4 of the Act imposes a one-year[8]

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[8] In the ISA (Israel Securities Authority) the cooling-off period is only 3 months.

cooling-off period on a civil servant that intends to work for (or receive any other benefits from) someone that was formerly under his authority while he was in the civil service.[9] It is important to mention that neither this article nor any other article in the Act distinguishes between a high-, mid-, or low-level civil servant. During the cooling-off period, an FCS is not allowed to have any informal contact with his future employer.

The responsibility for complying is solely on the civil servant and in the case of a violation of the rule the punishment specified in the Act is 6 months in prison. A special committee, headed by a district court judge, has the mandate to shorten the cooling-off period if both parties can show that contact between them will not create a conflict of interest.[10]

However, in 2007, the State Comptroller examined[11] the extent to which the Act and supplemental regulations regarding post-civil service employment were implemented and found that in some – if not all – important civil service institutions not only is the Act disregarded, but there is even an organizational culture of ignoring it. Civil servants that left the civil service often did not comply with the law, and their managers – when they were aware of such violations – did not intervene. The report also emphasized that while senior civil servants mostly act in accordance with the law, in the middle and lower levels it was less common. Some of the latter reported that they did not comply with the law because this was the organizational culture where they worked, and others thought that the law did not apply to middle and lower-level civil servants. On the other side of the coin, managers expressed concern that insisting on full compliance would discourage good potential workers from coming and working in the civil service.

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[9] The FCS can apply for compensation during this period, and the State customarily provides him with partial compensation. The ISA, on the other hand, fully compensates its "cooling-off" former workers.

[10] For a further review of issues regarding the transition from the civil service to the private sector see the Knesset's Legal Bureau Survey by Nave (2013), available at: http://www.knesset.gov.il/LegalDept/heb/docs/Survey040413.pdf (in Hebrew, last retrieved: 24/12/2019).

[11] State Comptroller 2007 Annual Report.

The Comptroller concluded that there are many defects in the current law, both in its ambiguity and in its partial to nonexistent implementation and enforcement. The Comptroller suggested amending the law and its complementary regulations with the aim of increasing its implementation enforcement and relaxing the State's approach to compensation during the cooling-off period.

In 2012 The Committee for Examining the Relationship between Capital and Government[12] handed its report to the State Comptroller. In the report the Committee addressed the issue of future employment of former civil service officials and suggested introducing a differential cooling-off period, depending on the civil service official's position, office,[13] and work assignments during his last three year in office. It was recommended that in some cases the cooling-off period should be totally eliminated, and that in other cases this period be extended indefinitely so that the civil servant would effectively be totally forbidden to be employed in certain firms. The rationale behind this was to prevent a "tacit bribe" in the sense that the firm tempts a civil servant to act to its advantage in exchange for employing him after he leaves the civil service, either in the firm itself or in another firm that has close ties with it (e.g., a subsidiary of the firm). Regarding compensation during the cooling-off period, the Committee suggested that regulations be set to determine how much is paid, dependent on the period's length. Finally, on the Committee emphasized the need to impose all regulations on both the professional and political branches of the civil service.

In 2013, the government formed a special committee to investigate how much former civil servants should be compensated during their cooling-off period. After a long procedure, the Civil Service Commissioner and the Supervisor of Wages and Labor Agreements within the Ministry of Finance announced (July 2018) the outline of the compensation structure: 70–85 percent of retiring civil servants

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[12] This is the literal translation of what is better known as "crony capitalism."
[13] The Committee suggested imposing a longer cooling-off period on workers from an office with a designated purpose (i.e., the Ministry of Communications) with regard to employment in the same designated field (i.e., working for an internet provider company), and a shorter cooling-off period on workers from an office that deals with broader issues (i.e., the Ministry of Finance).

would be compensated for 5 to 12 months, conditional on their position and tenure. However, the list included only high-ranked civil servants.

In 2019, the Parliamentary Committee of Inquiry into the Financial System's Conduct in Credit Agreements with Large Business Borrowers accused the Banking Supervision Division of acting as a "captive regulator" of the banks by not enforcing the regulations sufficiently and not using all of the supervisory tools at its disposal. The Committee suggested that the current legal framework for the transition of a former financial regulator to the financial industry was too lenient and that cooling-off periods should be extended. In addition, it suggested that the cooling-off periods should be shortened only for a strictly limited period of time.

The cooling-off period issue is not just a juridical question, because, as previous studies have acknowledged, it is also a question of implementation and enforcement. Shapira (2019) reviewed 268 decisions of district courts in which FCSs asked for a shortening of the cooling-off period and found that in 258 of them the court agreed to the request. The main motivation for accepting the request was that the court did not want to leave the petitioner without an income for the whole cooling-off period, while little weight was given to considerations of a possible erosion of public trust in the civil service as a reason for rejecting the request. However, to some extent, in the presence of compensation during the cooling-off period, the respective weights of arguments for and against shortening the cooling-off period should now be different.

2. DATA

2.1. Definitions

It will recalled from the Introduction that I define a public administration connected firm (PACF) as a firm with at least one manager (i.e., director or high-ranked executive) who is a former politician or civil servant. There are three important components to this definition. First, I focus on directors and executives because these are the positions where the decision making of a firm is made. Second, I include in the term "public administration" the following institutions:

the political system (ministers and Knesset members), all government offices (e.g., Ministry of Finance, Ministry of Communications), related and independent regulatory authorities (Israel Tax Authority, Israel Securities Authority, Bank of Israel, Antitrust Authority), the defense sector (IDF, General Security Services, Mossad), interior security (police, prison service, firefighting), and local authorities. Third, I collectively define a former civil servant as anyone who has some type of experience in the civil service *or* the political system. This can range from a working-level civil servant in a small government institution to the Minister of Defense. Civil service experience does not include internships in the civil service or army service of officers having a rank lower than the five highest ranks (since army service in Israel is mandatory). Unless stated otherwise, whenever I use the term "civil service" or "civil servant" hereafter, I refer to all types of public administrators, politicians and civil servants as well.

2.2. Data Sources

I focus on firms whose stocks are traded (at least) in the Tel Aviv Stock Exchange (henceforth, TASE) during the years 2007–2015.[14] For each firm I gathered the data on directors and high-ranked executives for the closest time to the last day of the calendar year. Each firm is obliged to report all of its directors and high-ranked executives, but the number of the latter varies between firms according to the firm's decision, as I shall explain presently. I included dual-listed firms (even though their reports are different) but excluded non-locally registered firms that are traded in TASE. In addition, I included private listed firms held by banks and insurance companies whose only purpose is to issue bonds to fund their holders.

The data I use is found in Regulations 26 and 26a of the annual reports. Under these regulations, firms are to report their board members (Reg. 26) and high-ranked

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[14] In terms of macroeconomic developments, in this period the Israeli economy has experienced a short recession due to the Global Financial Crisis. Other important economic and financial events are the rapid development of the corporate bonds market and the dismantling of the large business groups. Although these are significant events, they do not limit the external validity of the results in this chapter or the other chapters of the dissertation, since none of these events – as I show in the various analyses – affected or were affected by firms' public administration connections.

executives (Reg. 26a). There is a minimum set of executives that must be reported, but beyond this minimum set each firm chooses which executives to include in the report. Therefore, the number of executives reported varies between firms and years. The reports include various data about the directors and executives, such as name, position, birth date, gender, education, and more.[15] For convenience, I will refer to both directors and executives as managers.

One of the articles reported is the managers' work experience in the last 5 years. This is an important source for identifying whether the manager has any experience in the civil service. Another source of information is a unique dataset of all workers in the political system and in a vast number of civil service institutions since 1990. This detailed dataset enables me to obtain additional information on the former civil service experience of managers, in cases where the relevant article does not provide any or sufficient information. The last data source is the internet, where I find biographic information especially on high-ranked officials in the defense sector.

Other studies use other data sources, mostly open ones, to do a search of a manager's name in order to find his connections to the political system. This name-based methodology has some drawbacks that might lead to underestimation of the level of connectivity between firms and managers. An important attribute of my dataset is that it is based on ID numbers and so the identification of each manager's history is most thorough. Nevertheless, some managers who are FCS may have been missed, especially those from dual-listed firms. I assess that such cases, if any, are negligible.

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[15] As for dual companies that are reported in the U.S. Standards System, I collect managers' background information from Item 6.

2.3. Data Description[16]

2.3.1. Directors and Executives

The full dataset consists of 47,390 directors and executives (managers) in the years 2007–2015, of whom 4,261 (8.9 percent) have civil service experience. For each manager I have personal data (name, ID number, birth date, age, gender, nationality, and education), his role in the firm (chairman, director or executive, outside director, etc.), and civil service experience (if any). In addition to a dichotomous definition of civil service experience (a dummy variable that takes a value of 1 if he has civil service experience and 0 otherwise), I use a set of dummy variables to code in the details of his civil service experience: the institution served (army[17], government office, ISA, Knesset, etc.) and the highest rank achieved (working-level, senior official or head of institution). Throughout the paper I refer to senior FCS as FCS who were senior officials or stood at the head of institution. If an FCS served in more than one institution, each of his experiences is coded separately, while the coding of his rank reflects his rank in his last position. In addition, for each manager with civil service experience I look for the year he left his last position and calculate the number of years that passed between then and the year he is serving in a public firm's management.

2.3.2. Firms

Since my data consists only publicly listed firms, all accounting and market data is available for each year. This includes financial statement data and derived financial ratios (e.g., total assets, leverage, ROE, etc.) and market data (e.g., market value). Since corporate bonds are traded in the TASE, I have full information on prices, yield to maturity, bond spreads, and bond credit rating.

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[16] A detailed description of the data is to be found in Appendix A.

[17] Because army service in Israel is mandatory and therefore almost all citizens have military experience, I define ex-military officers as having civil experience only if they reached one of the five highest ranks (*Sgan Aluf* and above). This is because until the sixth rank (including), promotion is mostly dependent on tenure. Promotion to the fifth rank requires the approval of the Chief of General Staff.

2.3.3. Regulatory Burden: Constructing an Industry Regulation Index (IRI)

Reducing regulatory burden has become a crucial issue in several countries in recent years. However, quantifying the regulatory burden imposed on a firm or an industry is a great challenge, with no clear consensus on how it is to be done. For the purposes of this paper, I've developed an Industry Regulation Index (IRI) for measuring the regulatory burden imposed on an industry. I now proceed to outline this index; a full description can be found in Appendix B.

First, I assign the regulating unit in each government office to its relevant industry, using the Governmental Book of Regulators, an official document written within the framework of Government Resolution no. 708, which authorizes the General Manager of the Prime Minister's Office to map the regulators in the government. The Book provides information on all regulating units in government offices and so, based on the name and purpose of the unit, I match each regulating unit to the relevant industry that is regulated by it. Some units regulate a whole industry according to the Central Bureau of Statistics (CBS) classification of industries and some regulate only sub-industries. For example, the unit in the Ministry of Finance (MoF) that issues regulations regarding quality of construction is relevant to the whole construction industry, whereas the unit that regulates fishing licenses is not relevant to the whole agriculture industry but only to the fishing sub-industry.

After mapping each regulator to an industry, I attach the budget of each regulator, using Nevo's (2015) breakdown of the Israel's State Budget Report for 2014 and complementary sources,[18] and sum it by industry. The aggregated budget is then divided by the number of active firms in that industry. The log of this number is the final IRI, which I attach to each firm using the firm's industry classification. Alternatively, I divide the aggregated budget by the number of employees in each industry. I will refer to this alternative index as the eIRI.

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[18] If the regulator of an industry is not governmental but independent, like the banking regulator, I used other sources to estimate this regulator's budget. For details see Appendix B.

2.3.4. Defining the Relationship between FCSs' Experience and the Firm

Recognizing each industry's – and hence each firm's – regulator is the first step in quantifying the regulatory burden imposed on a firm or an industry. A by-product of this procedure is the ability to identify whether an FCS was, at some point, an ex-regulator of the firm. Using this information, I define a variable that takes a value of 1 if the FCS served in at least one of the current employing firm's regulator. Since there are additional authorities that strongly affect a firm's business boundaries – Israel Securities Authority, Antitrust Authority, and Tax Authority – I construct an additional variable that assigns a value of 1 also for former employees from these authorities. I define the first variable as the "narrow definition of former regulator and the later as the "wider definition.

A match between an employee and an employer is a result of the common interests of both sides and, generally speaking, reflects the best possible mutual contribution each side can contribute to the other. Thus, a manager in a firm brings experience and skills that are needed by the firm. From this perspective, an FCS brings capital that can be either specifically or generally related to the firm's business. By "specifically related capital" I mean an FCS's experience in (and hence knowledge of) a civil service institution that functions in the same area as the firm. The ultimate example is a former regulator of the firm, but there are also non-regulating relations, as in the case of a former Minister of Health who was hired by an insurance company: he wasn't the firm's regulator but his experience was closely related to his new employer's business.

By "generally related capital" I mean managerial experience – in cases where the FCS was a high-ranked official in his civil service – as well as legal or financial experience. By the latter I mean former experience in the ISA, Ministry of Justice, Ministry of Finance, and similar institutions. Managerial, legal or financial experience are "generally related" because they are more or less important to every firm.

Against this background, I define three more types of former experience variables as follows. The first type of experience variable takes a value of 1 if the FCS served in a civil service institution where he could have gained experience that is similar to the types of activities his firm is engaged in. For example, a former communications officer in the army that is now an executive in a communications firm gets a value of 1. The second type of experience variable takes a value of 1 if the FCS had managerial experience in the civil service, even if not in the same field as that of the new firm. All FCSs that held a senior position or stood at the head of an institution are considered to have managerial experience. The third type of experience variable takes a value of 1 if the FCS had a legal or financial role in the civil service (e.g., in the Israel Securities Authority, Bank of Israel, etc.) and a value of 0 if he had a non-legal or non-financial role (e.g., as the head of human resources in the Ministry of Finance).

3. DESCRIPTIVE STATISTICS

3.1. Manager-level Descriptive Statistics

The data includes all directors and high-ranked executives of over 400 publicly listed firms in Israel between the years 2007–2015. The cutoff for a firm to enter the data is that it had at some point of the sample period a market value of at least 100 million NIS. In total, I cover each year over 95 percent of all TASE-traded public firms' market value, and around two-thirds of the *number* of publicly listed firms (Table 1). Throughout the sample period, almost 60 percent of the firms had at least one manager who is an FCS. Since most of the FCSs had a senior role (i.e., one of the dummy variables "senior" or "head" is coded as 1), excluding FCSs that were regular employees leaves us with around 50 percent of the firms with at least one manager who is an FCS and are therefore defined as connected. As opposed to board members, which all must be included in the firm's reports, the number of executives included in the reports is a firm's decision. Therefore, identifying a firm using also the civil service experience of its executives might lead to some bias. However, this does not significantly affect the scope of the data: when looking only at firms' boards we are left with roughly the same figures (Figure 1).

Since one person can serve as a manager in more than one firm (e.g., a director on two boards), I look also at the person-level data, or, in other words, the unique observations. From this perspective I find that out of 4,103 unique observations[19] on average every year, 312 had civil service experience, i.e., 8 percent, with no clear pattern over time (Table 2).

3.1.1. Personal Characteristics

The descriptive statistics of the managers' characteristics can be found in Table 3. Gender distribution of FCS managers[20] is similar to that of non-civil servants: around 80 percent of them are men, with a declining share throughout the years of the sample period (2007-2015). FCSs are on average 4.7 years older and have more education: the share of managers with an academic education is higher by 8 percentage points and M.A. degrees (and above) are more common. Probably due to their unique capital (Zhang and Truong, 2019), there are more FCS managers than non-FCS managers who are employed by more than one firm: 30 percent and 15 percent, respectively. When restricting attention to directors and excluding executives, we find that the numbers are similar: 32 percent and 20 percent, respectively. The average length of service of FCS directors is somewhat shorter (4.6 years), compared to non-FCS directors (5.4 years).[21]

Regarding their role in the firm's management, a manager can be a board director (including chairman), an executive, or both. He can also serve in different roles in different firms; therefore, this analysis is based not on the set of unique observations but rather on the full dataset (Figure 2). The analysis shows that there are more FCS directors than non-FCS directors: 80 percent and 55 percent, respectively. Most of the directors do not hold an executive position (except for the board chairman). The most common position is that of outside director; although

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[19] This figure excludes 155 foreign managers on average every year.
[20] Unless otherwise specified, I include all managers – directors and executives – in spite of the above-mentioned bias. However, the characteristics are not significantly different when I examine only board members. I note those cases where the difference is statistically significant.
[21] The difference is statistically significant.

outside directors comprise only 15 percent of the total number of directors, 30 percent of them are FCSs.

It seems that the differences between FCSs and non-FCSs are related to the fact that FCSs join the business sector later in their career (explaining the higher age) and with more education, in line with the known differences in education between the public and private sectors.[22] In addition, since FCSs have less experience in the firm's business, they are recruited by the firm as suitable candidates for directorships, especially outside directorships.

The last finding described above regards the overrepresentation of FCSs among outside directors. The literature recognizes the important and unique role of outside directors in corporate governance: when outside directors are truly independent, they are perceived as helping align managerial and shareholder interests and having a more critical view of what firm activities may be plausibly carried out (e.g., Agrawal and Knoeber, 2001; Arora and Dharwadkar, 2011; Bebchuk and Weisbach, 2010). Against this background, it is possible that firms prefer FCSs as outside directors since they are perceived as more ethical, the more so in a small economy in which the business community is highly concentrated and therefore investors might suspect that directors do not always balance various interests in the right manner. The shorter length of service of that was found to characterize FCS directors might reflect that they are hired for a more designated purpose and leave when this is achieved. Alternatively, FCS directors' greater number of interlocks and shorter terms might reflect high demand for and low supply of FCSs (Zhang and Truong, 2019).

3.1.2. Civil Service Experience and FCSs' Unique Capital

FCSs have diverse public administration experience, with some of them having experience in more than one institution. As documented in Table 4, most FCSs in my data have government office experience, e.g., service in the Ministry of Finance,

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[22] For Israel, this is documented in Mazar (2008).

Ministry of Health, etc. In this group, former Ministry of Finance officials are by far the largest group. Former Ministry of the Economy[23] and Ministry of the Interior officials, together with local authorities, form another large group in the economic sphere that is closely related to the building and construction industry. Regarding FCSs from non-government offices, former army officers are the most common. However, it is interesting to see their declining presence in public firms across the years, which might be consistent with changing social attitudes toward army officers in business roles (Eran-Jona and Tiargan-Orr, 2015). Former Tax Authority and ISA officials constitute another large group of FCSs. As for former politicians (ministers and Knesset members), their group is the only group that increases over time.

The lower panel of Table 4 shows the frequency of FCSs' last civil service rank. Most FCSs were high-ranked, but there is still a non-negligible number of FCSs whose last position in the civil service was at the working level. In my data, this mid- and low-ranked group comprises almost 20 percent of all FCSs, and is ignored in all other studies on politically connected firms, leading to an underestimation of firms' public administration connections.

The human and social capital embedded in the FCS experience has a decaying nature (Lester et al., 2008): a civil servant who left his office 10 years ago has fewer connections and knowledge of current issues relevant to his former position than someone who left his office a year ago. Examining the number of years that passed since FCSs left their last position in the civil service reveals (Figure 3) that the average time that passed was 9.7 years in 2007 and rose steadily to 12.5 years in 2015. Looking at different percentiles reveals the same upward trend. However, there is some variance between different types of FCSs (Figure 4). For example, former politicians (ministers or Knesset members) were employed by public firms in the shortest time since their last civil service position: only 7 years for ministers and 8.6 years for Knesset members (in 2015).

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[23] This ministry went by several other names in the past, including the Ministry of Commerce and Industry, the Ministry of Industry and Trade, and more.

Another question concerns the matching between an FCS and a firm. An FCS can be either an ex-regulator of a firm, in the narrow or wide sense (the wider definition includes former ISA, Antitrust Authority and Tax Authority employees as former regulators as well, as discussed in Section 2.3.4), or not, and can bring either specific, or managerial, or legal/financial experience, or any combination thereof. I found, first, that around 15 percent of FCSs across the years are former regulators in the narrow sense (Figure 5). I also found that the share of former regulators rose to 35 percent when I used the wider definition of ex-regulator (i.e., including former Israel Securities Authority, Antitrust Authority, and Tax Authority employees as regulators). As for the other variables that reflect the relations between an FCS and a firm: only 28 percent of FCSs bring experience that is related specifically to the firm's business, while 80 percent bring managerial experience and 55 percent bring legal or financial experience.

3.2. Firm-level Descriptive Statistics

I now turn to the firm-level analysis and start with some descriptive statistics of connected firms compared to non-connected firms. As mentioned above, 60 percent of the firms in the dataset are connected. About half of these firms have only one connection (i.e., one FCS in their management) and the rest have more than one (Figure 6). For firms' boards, the numbers are similar: 55 percent of the firms are public administration connected, and the distribution of the number of FCSs on the board resembles the distribution of the number of FCSs that are managers.

In Panel A of Table 5, I present key market and financial characteristics of connected and non-connected firms. The most prominent difference is the median size (measured by total assets) of connected firms relative to non-connected firms: the former are around twice as big as the latter.[24] These two types of firms do not differ in leverage, market-to-book value, net-profit-to-book ratio, Tobin's Q, share of intangible assets, or ROE.

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[24] This result remains constant in most studies in the field, starting with Faccio (2006).

In Panel B, I focus on firms with traded bonds. Connected firms are more likely to have tradable bonds, an outcome that is correlated with their bigger size. Total bond liabilities are greater for these firms and the spreads (measured by the difference between bond yield and a government bond yield with similar duration) are lower. A final difference concerns bond rating. As can be seen in Panel C, for most of the period connected firms bonds had a higher bond rating than non-connected firms.

A further insight arises from looking at firms' industry distribution over eight TASE industries. It seems that the distribution of the two types of firms is slightly different, with connected firms being overrepresented in the Banking, Insurance, Commerce and Services, Investments and Holdings, and Oil and Gas Exploration industries, although the distribution varies slightly across the years. When looking at the distribution over the CBS classification of main industries (not presented), the results are roughly the same: connected firms are overrepresented in Financial and Insurance Activities and Wholesale and Retail Trade.

To track patterns in the industry distribution of firms in which FCSs are employed for their experience, I construct a matrix where the rows are the industries in which the FCSs are presently employed and the columns are the civil service institutions in which the FCSs were formerly employed.[25] I calculate the share of FCSs who were formerly employed in institution g and are presently employed by a firm in industry ind, where $\sum_{ind=1}^{k} \frac{FCS_{g,ind}}{FCS_g} = 1$. As a benchmark distribution, I calculate the distribution of all FCSs over all industries so that $\sum_{ind=1}^{k} \frac{FCS_{ind}}{FCS} = 1$. To highlight more common patterns, I look for a combination of g and ind in which $\frac{FCS_{g,ind}}{FCS_g} - \frac{FCS_{ind}}{FCS}$ is significant, where significance is defined to be greater than one standard deviation of all the differences in a given g:

$$(1) \quad \frac{FCS_{g,ind}}{FCS_g} - \frac{FCS_{ind}}{FCS} > std.dev.\left(\frac{FCS_{g,ind}}{FCS_g} - \frac{FCS_{ind}}{FCS}\right).$$

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[25] I examine only institutions with at least 100 observations.

The significant values are marked with crosses, where one cross is given to significant values based on $100 \leq n \leq 250$ and two crosses for $n \geq 250$. The results can be found in Table 6. The matrix points at several patterns that are more common than the others: from the Bank of Israel to the banking and financial services industries; from the Ministry of Finance to the insurance and financial services industries; from local authorities and the Ministry of the Interior to the construction and real estate industries. Ex-employees of ISA tend to be employed in the investments and holdings industry, in which – probably – their comparative advantage in corporate law and accountancy is more important. Another interesting finding is the prevalence of former employees from security agencies (the IDF in particular) and the Ministry of Defense in the manufacturing industries. This is due to the large number of manufacturers of technological and equipment related to the defense industry. As for political experience, ministers were found to be prevalent in the commerce and services industry, while former MKs exhibited no tendency to a specific industry.

Following Agrawal and Knoeber (2001) and using the IRI (Industry Regulation Index) described above, I investigate whether the distribution over industries is associated with the regulatory burden imposed on the industry. To do so, I calculate the share of FCSs in each industry by dividing the sum of FCSs over firms in an industry by the sum of all managers in those firms. Table 7 presents the average over years of the share of FCSs in an industry and the IRI, ordered from lowest to highest IRI, for six[26] CBS industries (at the section level). This is the first evidence for the connection between the regulatory burden and the presence of FCSs in this industry. Similarly, Figure 9 presents the correlation between the average share of FCSs in a firm within an industry and the IRI or eIRI. I calculate the correlation between the two measures and the share of FCSs in the industry, now at the two-digit level, year by year. For each year I have around 40 observations, which allows me to calculate a Pearson correlation coefficient. The correlations vary across the years between 0.325 and 0.56, both very high

[26] Most firms belong to these six industries. There only very few which belong to other industries and therefore the IRI for these industries is not presented. .

correlations, for both indexes. Again, these correlations point to the fact that firms with a higher regulatory burden tend to have a higher percentage of FCSs.

In this section I surveyed the extent and characteristics of public administration connected firms in Israel, and showed that the number of firms are considered to be connected is non-negligible. Comparing my findings with similar findings in other countries is challenging, since each study has its own methodology for defining political connectedness and identifying connected firms. My finding that 60 percent of firms in Israel are connected puts Israel in first place in Faccio's (2006) panel study of political connectedness in 47 countries. This is true also when I define a public administration connected firm only if there is an FCS on board. However, Faccio's identification process is questionable, as can be seen in her results for Israel in which she underestimates the amount of public administration connected firms. When focusing only on political connections (i.e., firms employing former politicians), I found that about 10 percent of firms are politically connected. I find that my figures are much closer to those of other individual countries: González-Bailon et al. (2013) found that 2 percent of board members in England are FCSs, compared to 6 percent in Israel,[27]; Bertrand et al. (2018) found that 11 percent of CEOs in France are FCSs, compared to 6 percent in Israel; Kang and Zhang (2018) found that 43 percent of a large sample of U.S. publicly listed firms have at least one FCS director, compared to 54 percent in Israel; and Shin et al. (2018) found that 30 percent of outside directors in South Korea are FCSs, compared to 16–18 percent in Israel. Although this comparison is based on anecdotal evidences, it gives the sense that political connections in Israel do not systematically differ from those in other countries.

This section presents the raw differences between connected and non-connected firms. Although these findings need further statistical support in the form of multivariable regressions, which I will conduct later, it is already clear that FCSs are not randomly assigned to firms. As was established in many previous studies,

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[27] Since González-Bailon et al. consider only former politicians and top-ranked civil service officials, I give only the share of senior FCSs for the sake of a fair comparison.

FCSs tend to be present in bigger and more public firms, but not necessarily in more profitable and growing ones. In any case, a strong association was found between the level of regulatory burden and the need for an FCS in the firm's management, a finding that was systematically documented only in Agarwal and Knoeber (2001). Another novel finding regarding common patterns of matches between FCSs and firms reveals that an FCS whose civil service experience is related to a firm's activities is more likely to be hired by the firm.

4. PUBLIC ADMINISTRATION CONNECTED FIRMS: WHO IS CONNECTED AND TO WHOM?

4.1. Baseline Results

I now combine all the partial evidence from the descriptive statistics and use regression analysis to statistically identify common patterns of matches between firms and FCSs. In the absence of a clear identification, I refer to the results not as causations but rather as correlations. Using a logit model, I estimate the following:

$$(2)\ \Pr(connected_i = 1)$$
$$= \alpha + \beta Firm\ Characteristics_i + Industry\_dummy_i + Year\ FE + \varepsilon_i.$$

$connected_i$ is a dependent variable that takes a value of 1 if at least one of firm's i managers is an FCS and 0 otherwise. In $Firm\ Characteristics$ I include the following variables: l_assets is the log of total assets; $leverage$ is calculated by the share of liabilities in total assets; ROE is the yearly return on equity, taking only positive values and winsorized at the 95 percentile; ROE_neg is a dummy variable that takes 1 if the firm has negative ROE and 0 otherwise; $is\_private$ is a dummy variable that takes 1 if the firm's equity is not traded and 0 otherwise[28]; is_dual is a dummy variable that takes 1 if the firm is dual-listed and 0 otherwise; is_bond is a dummy variable that takes 1 if the firm has traded bonds and 0 otherwise; and l_bond_debt is the log of the total traded debt of the firm. When using only public non-financial firms in the sample I also include Q as an approximation to Tobin's

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[28] As mentioned above, I've included private listed firms held by banks and insurance companies whose only purpose is to issue bonds to fund their holders.

Q, calculated as the market value of equity and the book value of liabilities divided by the book value of equity and book value of liabilities (only for public firms); and *intangible_assets*, the share of intangible assets in total assets. The firm's industry is reflected in a set of dummy variables for each TASE industry, and in addition I add the firm's *IRI*.[29],[30] ε is the error term, clustered within firm. A descriptive statistics of the variables can be found in Table 9. I estimate the above model on four samples: the full sample with all firms, only public firms, public firms with traded bonds, and public non-financial firms. The results can be found in Table 8.

Some of the results stay stable in most of the subsamples: connected firms are larger, with more leverage, and tend to be public and not dual-listed. The ROE's effect is found to be negative but not significant, and growth expectations (*Q*) are positive but significant only when limiting the sample to include firms with tradable bonds. Most interestingly, the IRI is found to positively and significantly affect the probability of the presence of an FCS in a public firm's management. This confirms the above findings on the positive relations between the regulatory burden and the need for an FCS in a firm's management.

A firm's industry can affect the extent of its connections to the civil service, beyond its regulatory burden. Therefore, I present the industry dummies estimated in the specifications that include them because they have an important role in demonstrating the distribution of FCSs over firms. The results in Column 1 show no significant difference in the tendency of financial firms (especially banks and insurance companies) to employ an FCS, relative to non-financial firms. When including the specific (TASE) industry (Column 2) one can see that firms in the biomed, commerce and services, and oil and gas explorations industries are more likely to employ an FCS, while real estate companies are less likely (the benchmark is the manufacturing industry). I will later come back to these findings.

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[29] Since the mapping between the TASE and the CBS industry classification is not injective, and since the IRI is based on the CBS classification, using the IRI alongside TASE industry dummies is valid.

[30] Throughout the paper, all results hold when I use the eIRI instead of the IRI. Therefore, to ease exposition, I do not show or discuss the results I obtained when I replaced the measure.

Another interesting result is the consistent negative effect of the dual-listed dummy variable. My interpretation of this result is that FCSs are assumed to bring some local value to firms, and this value is less important for a firm that operates abroad.

Having pointing out the common findings across all subsamples, I now turn to the differences between them. First, the pseudo R-square is the highest in the subsample of public firms with tradable bonds (Column 4). In this specification I also include the log of the total traded debt, which is found to be positively but not significantly correlated with the probability of employing an FCS, while growth expectations (Q) are positively and significantly correlated with this probability. In this subsample, which does not include firms from all industries, firms from the insurance industry are found to have more FCSs. In Column 5, I use only non-financial public firms and add the share of intangible assets, which is found to have no significant effect.[31]

The conclusions that can be drawn from the results on the dummy variables for the corresponding TASE industries are as follows. Out of all the industries, only the gas and oil explorations industry effect is consistent across the different subsamples. This result is in line with the common perception that this industry is heavily tied to the political system and therefore firms tend to employ FCSs. In line with in my results, Lehrer (2018) notes the strong ties the gas and oil explorations industry has with the political system and finds positive abnormal returns for this industry following the 2015 Israeli elections.

The technology industry dummy has a negative, yet not significant, effect on the likelihood of the presence of an FCS, probably because these firms tend more to operate abroad, and hence they have less need for connections with the local public administration. Therefore, even after controlling for dual-listing, I find that their

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[31] Guedhami et al. (2014) show that politically connected firms tend to choose auditors with better reputations in order to mitigate investors' concerns about misconduct associated with political connections. Their theory predicts a lower share of intangible assets in politically connected firms, since intangibles are considered to be lower-quality assets. My result does not support their prediction.

tendency toward operating abroad and less reliance on the local markets remains constant as reflected in the industry dummy variable.

The commerce and services industry is also found to be correlated with the presence of FCSs, especially when I use for estimation only non-financial firms. In order to shed some light on this finding I estimate the same model as in Column 3 but only for firms from this industry, and include a dummy variable for each sub-industry.[32] The results (not reported) show that the "commerce" sub-industry and "services" industry is the driver of the whole effect, while the hotels and tourism sub-industry is negatively correlated. Unfortunately, these results do not add more information about the nature of the PACFs in these industries. As for the real estate industry, its effect is negative, but as we will see later, this effect disguises the differential likelihood of a firm employing an FCS whose civil service experience is specifically related to the firm's business.

In Table 10, I again estimate Model 2, except that now the dependent variable takes a value of 1 only if the firm employs a *senior*-level FCS. The results remain the same with a higher level of significance for most effects. However, there are some differences that are worth mentioning. First, the effect of dual-listing is not significant. The finding suggests that dual-listed firms can utilize the unique capital of a high-ranked FCS, at least to the same extent as non-dual-listed firms. The fact that dual-listed firms are less likely to employ a working-level FCS suggests the different capital low- and high-ranked FCSs bring and the different needs of firms. In general, senior FCS are more familiar with strategic processes in the civil service and have more connections to other high-ranked FCSs, while working-level FCSs' expertise is limited to the practical aspects of their job. While the expertise of working-level FCSs is more local in nature – for example, regulations in Israel are not the same as regulations in other countries – the connections and strategic abilities and knowledge of high-ranked FCSs could be

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[32] The sub-industries are "commerce", "services", "hotels and tourism", "computer services", and "communications and media". The latter is the benchmark.

much more relevant for firms that operate also outside the local market, as dual-listed firms do.

Another important insight is the higher pseudo R-square and the fact that the effect of most industries on the probability of employing an FCS is higher. The conclusion that can be drawn from these findings is that the model is somewhat better at explaining connectedness when we define firms to be public administration connected only if they employ a senior-level FCS and not just any kind of FCS.

4.2. Is There Erosion in FCSs' Capital?

An FCS brings as capital his connections with acting officials and knowledge of civil service processes. Each of these types of capital has a deteriorating nature: while in the civil service, a civil service official develops and maintains an extensive network of officials and other contacts (Kotter, 1982). However, over time, those other powerful individuals retire, are replaced, or simply feel less obligated to respond to the former official. This process greatly depreciates the social capital that the ex-government official accumulated while in the civil service (Lester et al., 2008). In the same manner, the knowledge of civil service processes also slowly becomes less relevant as key issues change, old policies are dropped, new ones are adopted, regulations change, and so forth. Therefore, generally speaking, if firms are looking for an FCS with no other type of capital than civil service experience, then we should observe a higher fit of the model by taking into consideration the time that passed since an FCS left the civil service.

I test this hypothesis in the following way. While in the above analysis the samples included all FCSs, regardless of the time that passed since they left the civil service, here I limit the sample to include only firms with no FCS or with at least one FCS manager that left the civil service no longer than 5, 10, or 20 years ago and estimate the model again. If my hypothesis is correct, a more homogeneous FCS population in terms of years since leaving the civil service should result in better explanatory power of the model. The results are presented in Table 11. Most of the findings indeed confirm, with a greater level of significance, previous results. This is true

for the effects of the financial variables, industry dummies, and the IRI. The declining pseudo R-square conditional on the years since leaving the civil service confirms my assumption that using a more homogeneous population results in a better fit of the model.

I further establish this result by estimating the model for a continuous number of years, ranging from 1 to 20, and keeping the two measures of pseudo R-square. To better account for the changing sample size, I estimate the model using OLS and keeping the adjusted R-square. The different goodness-of-fit measures are presented in Figure 10. When taking into account all FCSs, the highest goodness of fit is found when the number of years does not exceed 6 years, and then it slowly declines, approaching the baseline goodness of fit estimation only toward 20 years. When firm is defined as connected only if it employs a *senior*-level FCS, not only is the goodness of fit higher, but its decline is much more gradual. This could imply not only that the presence of higher-ranked civil servants better defines firms as connected, but that their capital is kept for more years.[33]

Another interesting insight is that the function is not monotonic. Allegedly, the capital should be at its maximum value right after the FCS leaves the civil service. However, the results show an increase in explanatory power as I move the limit from 1 to 5 or 6 years (depending on the measure) and then a decrease. I offer two explanations for this finding. First, most FCSs, especially those with higher ranks, are obliged to have some cooling-off period; therefore, there is a greater supply of FCSs that better fit firms' needs as the years – but not too many years – pass. Second, every year that passes since leaving the civil service can be translated to experience in other fields, in the private sector in particular. Therefore, the increasing fit of the model over the first several years implies that either cooling-

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[33] In another, unreported test, I estimate a multinomial logit in which the dependent variable takes a value of 0 for non-connected firms, 1 for connected firms with at least one FCS who left the civil service not more than 5 years ago, and 2 for connected firms with at least one FCS who left the civil service more than 5 years ago. The results, available upon request, show that the main variables that were found to be correlated with connectedness are significant only for the group with less than 5 years but not for the group with more than 5 years. This implies, again, that the fewer the years that passed since the FCS left the civil service, the higher the explanatory power of the model.

off FCSs are not yet available for hire or relatively "fresh" FCSs but with some additional experience in other fields are a better fit for a firm.

4.3.   Which Firm Is Connected to Which FCS?

The matching between a firm and an FCS with specific experience in the civil service was described in Table 6. In this section I try to reinforce the findings with the regression model I used in the last few sections. To this end, I estimate the above model with one change: instead of using the *connected* dummy variable as the dependent variable, I use different dummy variables for different experiences in the civil service: Members of Knesset, Security Service officers (Army, GSS, and Mossad), ministers, financial officials (Bank of Israel, Ministry of Finance, Tax Authority, Israel Securities Authority, Antitrust Authority), and local authorities. In addition, I use the dummy variable for whether the manager is a former regulator of a firm as a dependent variable. This enables me to identify whether there is a unique pattern for these firms that employ a former regulator as a manager. Alternatively, I also use the dummy variable for specific experience as a dependent variable.

The results are presented in Table 12. By breaking down the general definition of FCS to types of experience, I reveal with more accuracy firm characteristics that are correlated with different types of FCSs. The results show that the association between size and connectedness is driven by former ministers and former security and financial officials, while former MKs' and local authorities employees' presence is not associated with firm size. As for leverage, this is correlated only with former financial civil servants, probably because their experience helps firms to deal with higher levels of leverage. Dual-listed firms are less likely to have former financial and local authorities civil servants, since, in line with the explanation given for the findings about the rank of FCSs, these FCSs tend to have more localized capital, which is less important for dual-listed firms. The IRI is found to have an effect on the likelihood of the presence of a former security civil servant only. This result implies that the observed relationship between regulatory

burden and connectedness is driven by former security civil servants. Drilling down to the industries in which former security civil servants are more common shows that the results are derived from the overrepresentation of these FCSs in the air transportation and the electronic equipment industry, two industries that are relatively highly regulated and in which former security officials do have some comparative advantage over the common director or executive. Besides the technical explanation I provide two other explanations for this result: Benmelech and Frydman (2015) survey multidisciplinary literature on military veterans and summarize that military veterans tend to be aggressive and overconfident, as well as ethical and loyal. Against this background, it may be that firms with a higher regulatory burden, which interact closely with the government and might be perceived as less transparent, hire former security service officials[34] in order to gain a more positive opinion from the public and investors.[35] Alternatively, these former officials might be hired for their managerial experience or personal connections.

The industry dummies show that financial services firms and biomed firms tend to employ former financial civil servants, commerce and services firms tend to employ former politicians (ministers and MKs), while real estate and holdings firms tend to employ former civil servants from local authorities. Given that real estate firms are tightly connected to local authorities and since holding companies in Israel are heavily involved in real estate-related firms, these results are intuitive. The presence of MKs in holding companies might be explained by the extensive public debate since 2008 over the high market share of the largest business groups in Israel.[36] At the top of each business group there was a holding company and the

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[34] I use the documented characteristics of military veterans for all types of security services because these are all very similar organizations. Nevertheless, since military veterans comprise the vast majority of former security service civil servants, the results do not change even if we consider military veterans as a separate group.

[35] Although Eran-Jona and Tiargan-Orr (2015) document increased criticism of the army from within Israeli society, the authors emphasize that this criticism is aimed at the army as a system, whereas individual officers are still perceived as heroes.

[36] The debate dates back to the publication of Kosenko (2008).

presence of former MKs in these companies may be a result of their concern that the debate will lead to legislative measures that might be taken against them.[37]

I next focus on Column 6, which shows the probability of a firm to have an ex-regulator in its management. The correlation between the IRI and the presence of an ex-regulator shows that the larger the regulatory burden, the larger the probability firms will employ an FCS that has experience in one of its regulating civil service institutions. As for the industry variables, the technology, insurance, commerce and services, and real estate industries are more likely to employ a former regulator.

As mentioned, the IRI was found to be correlated with both former security service civil servants and former regulators of a firm. Calculating the marginal effect of the IRI shows that the probability that a former regulator will be present in a firm's management is twice as high as that of a former security service civil servant, given a unit change in the IRI. In other words, a higher regulatory burden will more likely lead to the presence of a former regulator than a former security service civil servant.

In Column 7, I use as the dependent variable a dummy that takes a value of 1 if a firm employs an FCS whose specific experience in the civil service is related to the firm's activities and 0 otherwise. Since I have this definition only for FCS managers, the sample used for estimation consists only of connected firms. The results show that firms across most industries that have an FCS in their management have one with experience specific to the firm's activities. The only firms that employ an FCS that does not necessarily have specific experience are firms from the biomed, commerce and services, and oil and gas explorations industries. When combining these results with those in Table 9, which shows that firms in the commerce and services and oil and gas explorations industries tend to employ FCSs, we may infer that these firms are interested in employing an FCS but not because his civil service

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[37] The concern was ex-post justified: in 2010 the Knesset appointed a committee to deal with these business groups, which led to their dismantling.

experience is related to their business, but rather because of the other capital he brings with him from the civil service.[38]

4.4.   Robustness Test: Focusing on New Managers

In the above analysis I analyzed which firms' characteristics are associated with public administration connectedness from a multi-year cross-sectional perspective. However, this type of analysis shows the ex-post realized equilibrium, but not the characteristics of a firm that chooses to hire an FCS. Essentially, this is a two-sided matching question because a firm chooses a manager from a pool of available individuals and at the same time an individual chooses a firm from a pool of firms that are interested in hiring him. The choice reflects the best match for both sides under the two sides' preferences. However, for the sake of simplicity I use a simple logit model for the analysis.[39] For this analysis I take only newly hired managers at time t and ask what characterizes a firm at time t-1 that chooses to hire an FCS as its new manager. Formally, using a sample of newly hired managers I estimate:

$$(2a)\,\Pr\bigl(FCS_{i,t} = 1\bigr) = \alpha + \beta Firm\,Characteristics_{i,t-1} + Industry\_dummy_{i,t-1} +$$
$$Year\,FE + \varepsilon_{i,t},$$

where the dependent variable takes a value of 1 if the newly hired manager is an FCS and 0 otherwise. The independent variables are the same as in the previous estimations. As before, I estimate the same model using different FCS definitions: all types of FCSs, only senior-level FCSs, and FCSs with different types of experience, where FCSs may be security service officials, financial officials, MKs, ministers, local authorities officials, former regulators, and FCSs with experience specific to the hiring firm's activities. The results can be found in Table 12a.

Comparing the results to those presented in Tables 10 to 12 reveals very similar patterns, especially regarding the industry effect and the effect of the IRI. In an

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[38] It is possible that the "specific experience" is not well measured since an FCS might gain specific experience in the years after he leaves the civil service. However, this possibility is diminished by the fact that the results hold when I limit the sample to FCSs who did not leave the civil service more than 3 years ago.

[39] [dear advisors, if you see the importance of modeling it using a matching model please mention it in your comments]

unreported analysis I included also the number of FCSs on the board at time *t*-1 as an independent variable; this variable is found to positively and significantly affect the probability of hiring an FCS. This result suggests that firms are not satisfied with having a single FCS director on the board, but rather create a cluster of FCS directors on the board.

5. THE DIRECTORS WEB: A NETWORK ANALYSIS APPROACH

5.1. Introduction and Definitions

Previous literature has found that directors with larger networks improve firm performance (Geletkanycz and Boyd, 2011; Larcker et al., 2013), lead to better decisions regarding acquisitions (Schonlau and Singh, 2009) and CEO replacement and appointment (Coles et al., 2015), lower interest rates charged by banks (Engelberg et al., 2012) and improve credit ratings (Benson et al., 2018). This is because they are better monitors due to their information and professional advantages (Coles et al., 2015). Other studies, however, find that since directors with larger networks are associated with more firms it makes them worse monitors or advisors, due to time constraints (Fich and Shivdasani, 2006; Ferris et al., 2003). These studies find that more boards with larger networks are associated with poor firm performance (Ahn et al., 2010; Andres et al., 2013; Fich and Shivdasani, 2006; Jiraporn et al., 2008).

In the descriptive analysis section I showed that, consistent with findings in the literature, FCSs tend to have more board interlocks. However, the number of boards on which they sit is only one centrality measure and does not reflect the exact network location of a director. For example, an individual can sit on the boards of two firms that are in the periphery of the network. In this case, this director and his employing firms will not enjoy all the advantages of centrality, like flow of information, etc. Therefore, the number of boards is not a sufficient measure of centrality and thus not a sufficient indicator for understanding whether FCSs' locations in the network is different from those of non-FCSs.

González-Bailon et al. (2013) raise the hypothesis that FCSs tend to have more board interlocks due to their pre-existing reputation and connections. This hypothesis is based on the claim that one of the main contributions that FCSs bring to the firm is their connections and status, and it is therefore expected that this group will tend to hold interlocking directorships more than other directors, making them more connected (see also Zhang and Truong, 2019). However, González-Bailon et al. (2013) do not find any significant difference in network location between FCSs and non-FCSs.

To test this hypothesis, I create for each year the network of directors of all types (chairman, outside director, regular director, either holding an executive position or not) and CEOs.[40] Each node in the network is a director or a CEO and an edge between two nodes is created if they are employed by the same firm in the same year. Hence, by definition, all directors in a specific firm are connected to each other and the minimum number of edges one director has is the number of directors in his firm's board minus one (himself).[41]

The first level of the analysis is to determine the structure of the network. Graph theory uses the term "islands" to analyze network structure. The definition of an island is a group of connected nodes, in which every node can be reached by every other node through at least one directed on undirected path. In analyzing the connectivity of directors, we need to ask whether the network is comprised of a large number of small islands or a small number of large islands. In the world of directors, this analysis will show us to what extent directors and firms are connected to each other.

After finding the basic structure of the system, I move to the second level of the analysis, the director level, and calculate a number of formal network centrality

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[40] As opposed to board members, which all must be included in the firm's reports, the number of executives included in the reports is a firm's decision. Therefore, defining a network using the executives might lead to some bias. In order to avoid it, I exclude executives from the network analysis.

[41] Another approach is to look at the firm level: each firm is a node and if a director sits in the boards of firms A and B, there is an edge between them. This type of analysis is conducted in Appendix C and yields the same results.

measures that reflect how centralized is each node in the network and how centralized is the network as a whole. Using these measures I document changes over time in the network as a whole but, more importantly, I analyze whether FCS directors differ from non-FCS directors in terms of their position in the network, and how it changes over time.

For the network of directors in each year, I calculate the following centrality measures:

Degree centrality: The number of direct connections of each node, normalized by the maximum possible number in an N-node network, i.e., N-1.

Closeness centrality: The inverse of the sum of steps in the **shortest path** from each node to any other node in the network, normalized by multiplying it by N-1. The larger this number is, the more central the node is.

Betweenness centrality: The number of times each node is visited on the shortest path between any pair of nodes in the network. This is normalized by dividing it by the number of unique bilateral connections, i.e., (N-1)*(N-2)/2.

Eigenvector centrality: The eigenvalue solves $\lambda \mathbf{x} = \mathbf{Ax}$, where $\mathbf{A}$ is the adjacency matrix, i.e., an n-by-n matrix in which *a(i,j)* takes a value of 1 if node *i* is connected to node *j* and 0 otherwise (**x** is the eigenvector). This measure takes into account not only the number of connections of a node but also the number of connections of the nodes to which it is connected. Hence, nodes connected to a central node are more central in the network and receive a higher eigenvector centrality value.

Bonacich centrality: Similar to eigenvector centrality, this measure takes into account not only the direct connections of a node, but also its connections' connections. However, it adds an attenuation parameter that weights the connection with a decaying factor. Hence, connections to more distant nodes can be taken with less weight than closer nodes, depending on the chosen attenuation parameter. Setting the attenuation parameter to 1 gives weights to all possible connections, whereas setting it to 0 gives no weights to non-direct connections. I

set the parameter to 1, so that the weights – although decreasing – are given to all possible connections.

Finally, I move to the third level of the analysis, the network level, for which there are two measures that define the density of the network as a whole.

Density: The number of edges in a network divided by the number of unique bilateral connections possible in the network.

Clustering coefficient: A *triplet* is a set of three connected nodes and a *closed triplet* is a set of three connected nodes where each one is connected to the other two. The clustering coefficient is defined as the number of closed triplets divided by the number of triplets.

5.2. Network Characteristics

The network structure for 2007 and 2015 is illustrated in Figure 11. Due to the size of the network, not much information can be derived from the figure. However, what is clear is the presence of a big island that comprises most of the firms, and some peripheral, isolated, small islands. The orange nodes are FCS directors and most of them are part of the big island. A numerical analysis supports the visual one and is summarized in Figure 12: the big island comprises around 90 percent of all directors and firms (Panel A) and almost all of the FCS directors (Panel B). This implies that the universe of public firms in Israel is well connected, with the level of connectedness increasing slightly over time. Another measure of connectedness points to the same conclusion: the number of connections within the big island out of all possible connections increased from 0.51 percent in 2007 to 0.58 percent in 2015 (Panel C). The density measure and the clustering coefficient upward trend also confirm the conclusion (Panels E and F).

Moving to the director-level data, I calculate the above-mentioned centrality measures for each director. These are presented in Figure 13. From the very first glance, regardless of the measure itself, it is apparent that, on average, FCSs are more central than non-FCSs, with the differences of most measures in most years

tested being significant. The only measure for which the differences are not significant for most of the sample period is the Bonacich centrality measure.

I establish the above findings using a regression analysis of the following form:

$$(3) \; centrality \; measure_{c,i}$$
$$= \alpha + \beta_1(FCS_i) + \beta_2(age_i) + \beta_3(age\_sq_i) + \beta_4(woman_i)$$
$$+ \beta_5(foreign_i) + \beta_6(number \; of \; boards_i) + \beta_7(board \; size_i)$$
$$+ \sum_{k=1}^{3} \theta_k education_{k,i} + \sum_{y=2008}^{2015} \tau_y year_y + \varepsilon_i$$

where *centrality measure* denotes the degree, closeness, betweenness, eigenvector, and Bonacich centrality of each director, *FCS* is a dummy variable that takes a value of 1 if the director is an FCS, *age* and *age_sq* are the age of the director and its squared term, *woman* takes a value of 1 if the director is female, *foreign* takes a value of 1 if the director is a foreign citizen, *education$_k$* is a set of dummy variable that take a value of 0–3 corresponding to no academic degree, B.A., M.A., and Ph.D.), respectively, and *year* is a set of dummy variables for each year of the sample period. Since all centrality measures are dependent on the immediate connections one node has, i.e. on a node's degree, one can claim that the other two measures simply reflect the notion that FCSs sit on more boards and hence are more central. To control for number of board each director sit on, in specifications in which the dependent variable is not *degree* I also include as controls *number of boards*, i.e., the number of boards a directors sits on, and *board size*, i.e., the number of directors on the board. To test for the results' sensitivity to the scope of the definition of FCS, I alternatively limit the independent variable *FCS* to take a value of 1 if the FCS was a senior-level civil servant in any civil service institution. Errors are clustered at the director level. Since a director can appear in the data more than once in each year – because he sits on more than one board – I collapse my data to

the unique level by keeping one observation for each director.[42] The results are presented in Table 13.

In the left panel of the table (i.e., where I include all levels of FCSs), all measures except the eigenvector are found to be positively and significantly higher for FCSs. The magnitude of the effect varies greatly in terms of the measure's standard deviation: it increases the director's degree by 55.8 percent of the degree's standard deviation in the full sample, closeness by 15.7 percent of the standard deviation in the full sample, betweenness by 11.5 percent of the standard deviation in the full sample, and Bonacich centrality by 7.9 percent of the standard deviation in the full sample. By contrast, in the right panel it is apparent that when I limit the definition of FCS to high-ranked FCSs, the results are weaker and not positively significant.

The conclusions are that FCSs are significantly more central in the network of directors. This is true when we look at their immediate connections (degree) but, more importantly, when we look at their location in the network (closeness and betweenness): FCSs can be reached more easily from every point in the network and stand in important junctions, leading to greater influence capabilities. The higher Bonacich centrality value also implies that they not only stand in more important junctions, but they are also connected to more powerful directors in the network (in terms of centrality), which increases their own importance. These results support my prior assumption on FCSs' unique capital and its utility for firms.

Perhaps more importantly, the results emphasize the importance of including not only high-ranked FCSs in the analysis of the scope and implications of connectedness. At least for the centrality measures, lower-ranked FCSs are found to be more important than high-ranked FCSs, who do not differ from non-FCSs in terms of network location. This result might also explain why González-Bailon et al. (2013), who included in their analysis only high-ranked FCSs, found no positive

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[42] While centrality measures and personal characteristics are the same for a specific director regardless of the firm whose board he sits on, the size of the board changes between firms. Therefore I take the average size of the boards the director sits on when collapsing the data to the unique level.

and significant difference between FCSs and non-FCSs in terms of network centrality.

5.3.   Civil Service Experience and Network Location

5.3.1. Deterioration Effect

Centrality and its implications is thus a benefit from having an FCS on the board. Using a detailed dataset of the former civil service experience of managers, I first test whether the centrality of FCSs deteriorates over time, conditional on the time that passed since they left the civil service. Then, I test whether FCSs' centrality is conditional on their civil service experience. Since the number of years that passed since civil service and civil service experience are relevant only for FCSs, I use only FCSs in this analysis.

I begin by testing whether the centrality of an FCS deteriorates by adding to Model 3 both the variable *years since CS$_i$*, i.e., the number of years that passed since the FCS left the civil service, and its square term, *years since CS sq$_i$*. In addition, I include also the dummy variables *senior-level FCS*, i.e., to control for high-ranked FCSs , *number of boards*, i.e., the number of boards each FCS sits on, and *board size*, i.e., the number of FCSs on the board. To avoid problems arising from a very long right tail of the independent variable, I exclude 5 percent of the observations with the highest number of years since the FCS left the civil service. The cutoff is 25 years. The results are presented in Table 14.

The results show no deteriorating effect on any centrality measures, except for the Bonacich centrality measure. This measure is negatively affected by the *years passed since civil service* variable in a non-linear manner, with the minimum effect achieved after 12 years. Combining these results with those of the previous analysis implies that in terms of immediate connections and location in the network, regardless of the characteristics of the directors with whom they are connected, FCSs are more central in the network, unconditional on the number of years that passed since they left the civil service. However, in terms of the characteristics of the directors with

whom they are connected, FCSs' best location in the network is in the years right after leaving the FCS, and then it decreases gradually.

5.3.2. Civil Service Experience

Analyzing all FCSs together might blur the differential centrality measures conditional on their specific and unique experience in the civil service. In this section I test whether there is a differential effect of civil service experience on location in the network. To do so, I augment Model 3 to obtain a regression analysis of the following form:

$$
\begin{aligned}
(4) \; centrality \; measure_{c,i} \\
&= \alpha + B(CS \; experience_i) + \beta_2(age_i) + \beta_3\left(age_{sq_i}\right) + \beta_4(woman_i) \\
&+ \beta_5(senior \; level \; FCS_i) + \beta_6(number \; of \; boards_i) + \beta_7(board \; size_i) \\
&+ \sum_{k=1}^{3} \theta_k education_{k,i} + \sum_{y=2008}^{2015} \tau_y year_y + \varepsilon_i
\end{aligned}
$$

where I use the same centrality measures and controls as above. The new independent variable that replaces *FCS* is a vector of dummies that control for the civil service institution or role the FCS served in. I divide these institutions into 6 different groups: security institutions (IDF, GSS, Mossad, Police, and Ministry of Defense), financial institutions (Bank of Israel, ISA, Antitrust, Tax Authority, Ministry of Finance, and Ministry of Economy), government institutions (Ministry of Communications, Ministry of Interior, etc.), politicians (ministers or MKs), local authorities, and diplomats. Alternatively, I define experience not by civil service institutions but by the type of experience the FCS brings from the civil service to the firm: specific, economic/legal, managerial, or regulatory. I do not include both civil service institution experience and type of experience in the same estimation because of high collinearity.

In the left panel of Table 15, I show the results for using only the institution dummies (and controls). The two groups of civil service institutions that are associated with higher centrality measures are "financial institutions" and "other government offices". Political figures were found to be more central but only in

their immediate connections, as reflected in the degree centrality measure. Diplomats and local authorities FCSs were found to be less central, for some of the measures. As in previous estimations, senior-level FCSs are not systematically more central in the network than working-level FCSs.

In the right panel, I replace civil service institutions experience with dummies for the type of experience FCSs brings to the firm. The results show that the only type of experience that is associated with a higher level of centrality is general economic or legal experience, while specific experience is even associated with a weaker location in the network, at least as measured by the betweenness measure.

From the above analysis I draw the following picture of the network of directors in Israel. Throughout the whole sample period FCSs were significantly more central in the network, but this is true not for high-level FCSs but rather for the working-level FCSs. Their central location does not deteriorate with the time that passed since they left the civil service, but the power of their connections, i.e., the directors with whom they are connected, does deteriorate. As with the deterioration effect, centrality measures are partly conditional on civil service experience. It turns out that FCSs with economic or legal experience and/or service in financial institutions are likely to be more central in the network.

6. DISCUSSION AND CONCLUSIONS

At the heart of the debate on public administration connected firms lies the question of the balance between public trust, market freedom and efficiency, and the individual's freedom to engage in any occupation. A society can gain full public trust in the public sector by banning all transitions of FCSs to the business sector, but that would impose a heavy cost in terms of limitations on market freedom and efficiency, as the set of choices from which firms choose managers would be smaller. The freedom to engage in any occupation would also be limited and, beyond the moral question, such a limitation might lead to a negative selection of civil servants, as higher-quality people would be demotivated to join the civil service because of the constrained career path ahead of them. This, in turn, would

lead to a deterioration of the civil servants' quality, which would lead to an erosion of public trust in the civil service. In contrast, having no constraints on the public-private transition is clearly not desired, as conflicts of interest would arise. It is hard to measure the overall social welfare arising from public-private transition, since it is hard to measure the cost and benefits of public-private transitions.

Public trust can be gained by proving that FCSs do not misuse their unique capital to give the firm employing them an unfair advantage. However, not only is there literature that rejects this claim, there is no clear way to comprehensively measure such misuse. To mitigate the risk of misuse of connections by former civil servants and erosion of public trust in the civil service, many jurisdictions imposed restrictions on these transitions. Israeli law banned transitions of FCSs to firms that were directly under their supervision or on which they had any direct effect, unless they served a cooling-off period of one year. At the same time, ethics committees have the right to shorten the period if it is proven that more than two years have passed since the FCS had any effect on the potential employing firm. To the extent that the law represents social choice, these restrictions are a compromise between the alleged cost and benefits associated with public-private transitions.

In this paper I do not provide clear-cut answers to this ongoing debate. The main contribution of the paper is the comprehensive mapping of public-private transitions, allowing the debate to be more evidence-based. By characterizing firms that are more likely to hire former public administration officials and the background of these officials, I establish solid ground for further research and public discussion, which might evolve in several directions, such as why are some transitions more likely to occur than others? And does it say something about the legitimacy of the transitions?

My findings suggest two additional focal points for the public debate. The first is the scope of the transitions that are restricted. By limiting only transitions of FCSs who directly affected the potential employing firm, the law ignores the value of civil servants in a regulating institution that indirectly affected the firm. The capital brought to the firm by these FCSs can also be misused, and so it is not something

that can be ignored by the law. Furthermore, the law is vague as to the rank of the FCS whose transition it limits: should a working-level civil servant who did not have decision-making power but was part of a team that monitored a specific firm be allowed to work for this firm?

The second aspect is repeated transitions. As I show, public administration connectedness of firms is not a random phenomenon. As the supply of FCSs is naturally limited, the match between a firm and an FCS is, rationally, the one that out of the possible alternatives provides the best utility to the firm, in terms of the FCS's own human capital and the capital related to civil service (social connections, knowledge, etc.), and the best utility to the FCS, in terms of compensation, future career opportunities, power, etc. Evidently, this match is not random and there are clear patterns for these matches. High-frequency repeated transitions can also erode public trust, as popular phrases like "revolving door" suggest. The notion that there are clear career paths in terms of the public-private transition that are known to both sides and that shape expectations, might undermine the public's trust in the alleged impartial behavior of civil servants.

Table 1. <u>Firms in the database: number and market value</u>

This table shows the number and market value of firms included in the database and their share of the number and market value of all public companies in the Tel Aviv Stock Exchange (TASE).

		2007	2008	2009	2010	2011	2012	2013	2014	2015	Average
	Number of Firms										
(1)	number of public firms in TASE	657	635	613	623	592	550	523	495	486	575
(2)	from which: foreign	14	13	13	17	16	13	13	14	17	14
(3)	number of firms in the database	441	429	412	418	403	379	370	356	344	395
(4)	from which: private reporting firms	23	22	21	22	30	31	34	28	30	27
((3)-(4))/(1)	public firms in database out of total public firms	63.6%	64.1%	63.8%	63.6%	63.0%	63.3%	64.2%	66.3%	64.6%	64.0%
((3)-(4))/((1)-(2))	local public firms in database out of total public firms	65.0%	65.4%	65.2%	65.3%	64.8%	64.8%	65.9%	68.2%	67.0%	65.6%
	Market Value (Billion NIS)										
(5)	total public firms in TASE	714.9	586.3	564.1	751.1	694.4	603.6	668.9	752.0	943.0	697.6
(6)	from which: foreign	35.2	21.4	18.7	35.3	38.7	49.0	91.6	95.3	234.6	68.9
(7)	public firms in the database	667.6	557.4	529.5	683.9	622.7	519.7	537.6	611.7	663.8	599.3
(7)/(5)	public firms in database out of total public firms	93.4%	95.1%	93.9%	91.0%	89.7%	86.1%	80.4%	81.3%	70.4%	85.9%
(7)/((5)-(6))	local public firms in database out of total public firms	98.2%	98.7%	97.1%	95.5%	95.0%	93.7%	93.1%	93.1%	93.7%	95.3%

Table 2. Former civil servant: firms, observations and unique people

This table shows the distribution of former civil servants in the database in three dimensions: firms with at least one former civil servant in its management, observations of former civil servants and unique people who are former civil servants. The last is because some people serve in more than one firm hence the number of observations is bigger than the number of unique people.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average
number of firms	**441**	**429**	**412**	**418**	**403**	**379**	**370**	**356**	**344**	**395**
number of firms with no former civil servant	178	175	173	167	156	151	149	141	132	158
number of firms with at least one former civil servant	263	254	239	251	247	228	221	215	212	237
from which: number of firms with at least one senior former civil servant	233	220	207	217	212	197	192	178	173	203
number of firms with at least one former civil servant on board	239	228	217	226	222	206	198	189	185	212
from which: number of firms with at least one senior former civil servant on board	218	207	194	201	199	182	178	163	157	189
number of observations	**5,521**	**5,655**	**5,378**	**5,591**	**5,542**	**5,191**	**5,051**	**4,839**	**4,622**	**5,266**
foreign	168	169	152	177	165	157	151	162	171	164
not former civil servants	4,856	4,984	4,737	4,893	4,872	4,568	4,442	4,248	4,057	4,629
former civil servants	497	502	489	521	505	466	458	429	394	473
from which: senior former civil servants	429	425	412	431	420	389	384	345	319	395
number of unique people	**4,184**	**4,312**	**4,111**	**4,314**	**4,281**	**4,110**	**4,005**	**3,863**	**3,745**	**4,103**
foreign	155	156	142	171	159	152	147	155	160	155
not former civil servants	3,722	3,843	3,654	3,812	3,800	3,639	3,544	3,409	3,295	3,635
former civil servants	307	313	315	331	322	319	314	299	290	312
from which: senior former civil servants	251	252	254	260	257	258	255	236	235	251

Figure 1. **Firms with former civil service**

This figure shows the share of firms with former civil servant in its management, by his level of seniority in the civil service and by the role he plays in the firm – board member (who might also be an executive) or only an executive.
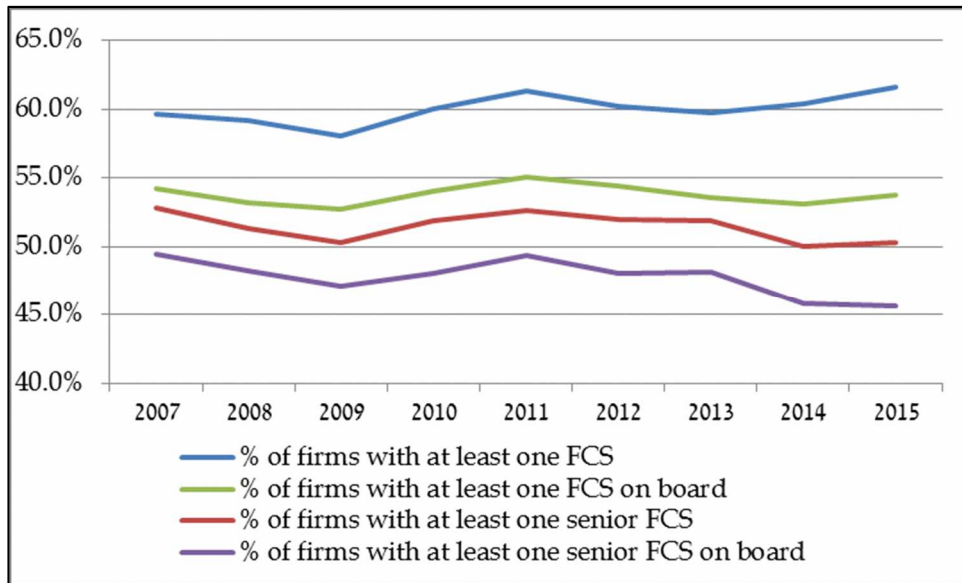
Table 3. <u>Managers' traits, by former civil service</u>

This table shows the basic descriptive statistics of the manager-level personal traits, by him being a former civil servant or not. Asterisks indicate the level of characteristics mean difference between former and non-former civil servants, obtained from a t-test. *** indicates 1% significance, ** indicates 5% significance and * indicates 10% significance.

		2007	2008	2009	2010	2011	2012	2013	2014	2015	Average
number	all unique managers	4,184	4,312	4,111	4,314	4,281	4,110	4,005	3,863	3,745	4,103
	men	3,453	3,539	3,364	3,521	3,470	3,313	3,205	3,070	2,954	3,321
	(% men)	82.5%	82.1%	81.8%	81.6%	81.1%	80.6%	80.0%	79.5%	78.9%	80.9%
	no former civil servants	3,877	3,999	3,796	3,983	3,959	3,791	3,691	3,564	3,455	3,791
	men	3,191	3,265	3,088	3,239	3,194	3,045	2,943	2,824	2,717	3,056
	(% men)	82.3%	81.6%	81.3%	81.3%	80.7%	80.3%	79.7%	79.2%	78.6%	80.6%
	former civil servants	307	313	315	331	322	319	314	299	290	312
	men	262	274	276	282	276	268	262	246	237	265
	(% men)	85.3%	87.5%	87.6%	85.2%*	85.7%**	84%*	83.4%*	82.3%	81.7%	84.8%
age	all unique managers	51.4	51.5	51.8	52.0	52.2	52.7	53.1	53.4	53.8	52.4
	non former civil servants	51.1	51.2	51.5	51.6	51.8	52.3	52.7	53.0	53.4	52.1
	former civil servants	55.5***	55.6***	55.8***	56***	56.5***	57.2***	57.8***	58.3***	58.4***	56.8
academic degree (%)	all unique managers	84.9%	87.0%	87.7%	88.0%	88.3%	89.1%	89.4%	89.7%	89.7%	88.2%
	no former civil servants	84.4%	86.5%	87.1%	87.4%	87.7%	88.4%	88.8%	89.1%	89.0%	87.6%
	former civil servants	91.5%	93%	94.9%***	95.2%***	96.3%***	96.9%***	96.8%***	97.3%***	97.9%***	95.5%
% of managers employed by more than one firm	all unique managers	17.4%	16.8%	17.6%	16.7%	16.6%	15.7%	15.7%	16.1%	15.2%	16.4%
	no former civil servants	16.3%	15.7%	16.5%	15.4%	15.3%	14.5%	14.5%	14.8%	14.1%	15.2%
	former civil servants	30.6%***	31%***	30.8%***	31.7%***	32.9%***	29.5%***	29.3%***	31.8%***	27.6%***	30.6%
years of service in firm (only directors)	all unique managers										5.3
	no former civil servants										5.4
	former civil servants										4.6

t-value (H0: equal mean): 3.12

Figure 2. <u>Role in firm distribution, by former civil service</u>

This figure shows the distribution of roles within former and non-former civil servants. The data is for 2015 but the distribution is roughly the same over years.
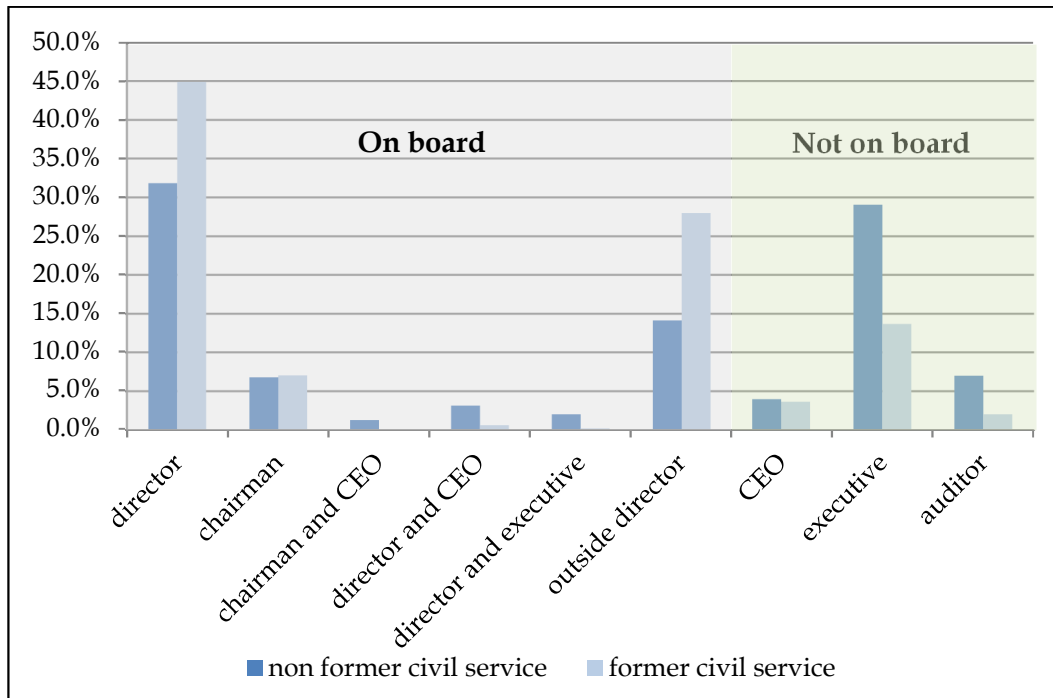
Table 4. Former civil servants experience in the civil service

The upper panel of the table shows the distribution of experience former civil servants have. Since a former civil servant can have experience in more than one civil service institution, the number in the table do not sum to the first line. The middle panel of the table shows the distribution of the roles former civil servants played in their last position in any civil service institution they served. The lower panel of the table shows the share of main experience groups from the upper panel.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average
All Former Civil Servants	**307**	**313**	**315**	**331**	**322**	**320**	**314**	**299**	**290**	**312**
IDF (Army)	63	56	52	49	49	47	48	43	42	50
Police	9	9	6	6	7	8	8	5	5	7
GSS	1	1	1	1	1	1	0	2	2	1
Mossad	3	3	2	2	2	2	2	2	2	2
Security Agencies	**76**	**69**	**61**	**58**	**59**	**58**	**58**	**52**	**51**	**60**
Minister	11	12	12	12	13	11	15	14	14	13
MK	27	29	27	29	30	30	33	33	32	30
Diplomat	7	6	7	5	7	9	8	7	7	7
Political System	**45**	**47**	**46**	**46**	**50**	**50**	**56**	**54**	**53**	**50**
ISA	22	26	26	25	23	25	27	25	24	25
Antitrust Authority	3	3	4	7	5	6	6	5	5	5
Bank of Israel	11	13	12	11	9	9	9	8	5	10
Economic Authorities	**36**	**42**	**42**	**43**	**37**	**40**	**42**	**38**	**34**	**39**
Ministry of Finance	64	74	74	84	87	83	77	76	74	77
of which:										
Tax Authority	27	25	25	28	24	22	25	28	24	25
The Budget Department	7	9	9	9	8	9	11	10	10	9
The Capital Market, Insurance and Savings Department	14	17	17	20	22	19	15	14	16	17
Ministry of Prime Minister	19	19	22	21	18	17	15	15	17	18
Ministry of Economy	18	16	16	15	12	12	14	13	11	14
Ministry of Interior	28	27	27	29	28	30	27	25	25	27
Ministry of Transport	6	6	6	6	6	4	4	5	4	5
Ministry of Communications	9	7	9	10	9	7	7	6	6	8
Environmental Protection Ministry	2	2	4	4	3	3	5	5	6	4
Ministry of Religious Services	1	1	1	1	0	0	0	0	0	0
Ministry of Defense	16	18	17	21	20	19	15	18	15	18
Ministry of Construction and Housing	4	3	4	4	1	1	1	1	0	2
Ministry of Health	7	9	9	8	7	6	6	5	5	7
Ministry of Agriculture and Rural Development	5	6	6	6	6	6	6	7	7	6
Ministry of Justice	5	3	3	4	6	7	6	6	4	5
Ministry of National Infrastructures	8	7	7	7	6	6	6	4	4	6
Other Government Offices	12	11	12	16	13	11	19	20	19	15
All Government Offices	**204**	**209**	**217**	**236**	**222**	**212**	**208**	**206**	**197**	**212**
Local Authorities	25	23	24	24	24	26	23	22	22	24
share of all former civil servants										
Security Agencies	24.8%	22.5%	19.9%	18.9%	19.2%	18.9%	18.9%	16.9%	16.6%	19.6%
Political System	14.7%	15.3%	15.0%	15.0%	16.3%	16.3%	18.2%	17.6%	17.3%	16.2%
Economic Authorities (ISA, Antitrust, BoI)	11.7%	13.7%	13.7%	14.0%	12.1%	13.0%	13.7%	12.4%	11.1%	12.8%
All Government Offices	66.4%	68.1%	70.7%	76.9%	72.3%	69.1%	67.8%	67.1%	64.2%	69.2%
Ministry of Finance	20.8%	24.1%	24.1%	27.4%	28.3%	27.0%	25.1%	24.8%	24.1%	25.1%
Local Authorities	8.1%	7.3%	7.6%	7.3%	7.5%	8.1%	7.3%	7.4%	7.6%	7.6%
roles in the civil service										
Head of agency	117	114	111	114	111	108	103	97	91	117
Senior executive	100	105	110	112	108	110	108	94	102	100
Advisor	26	24	24	24	24	24	24	26	26	26
Working level	57	63	63	73	66	62	60	64	56	57

Figure 3. <u>Years passed since last civil service position</u>

The figure shows the the mean and 25th, 50th and 75th percentile of the number of years that've passed since civil servants in the database left their last civil service position. Managers who still hold a civil service position in parallel to their firm's management position were excluded.
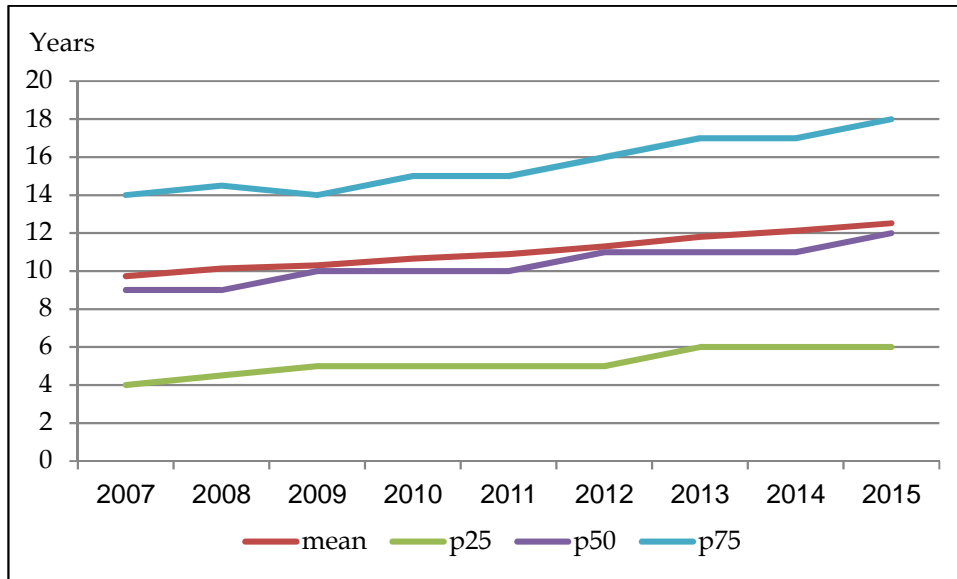
Figure 4. <u>Years passed since last civil service position, by civil service institutions experience</u>

The figure shows the the mean number of years that've passed since civil servants in the database left their last civil service position, by different civil service experience, only for the year 2015. Only civil service institutions with more than 20 observations in 2015 were included.
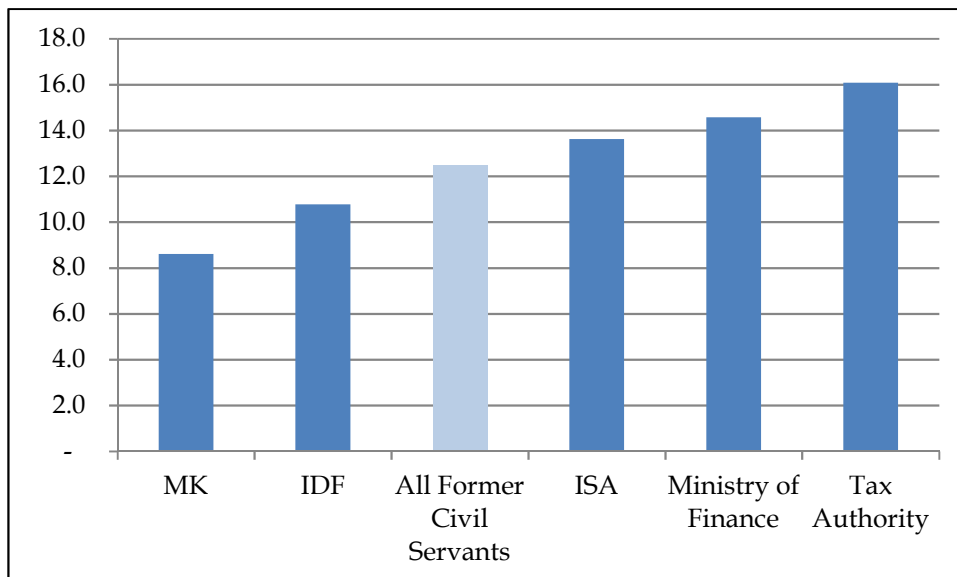
Figure 5. <u>Civil servants capital brought to the firm</u>

The figure shows the share of civil servants bringing a certain capital to the firm: managerial experience (if the civil servant was in a managing position), specific experience (if the civil servant served in a civil service position related to his current firm's business) or economic/legal experience (if he served in a position or institution with financial or legal orientation). Also included is the share of civil servants who served in their current firm's regulator. the dashed red line includes also ISA, Antitrust and Tax Authority as regulators of all firms.
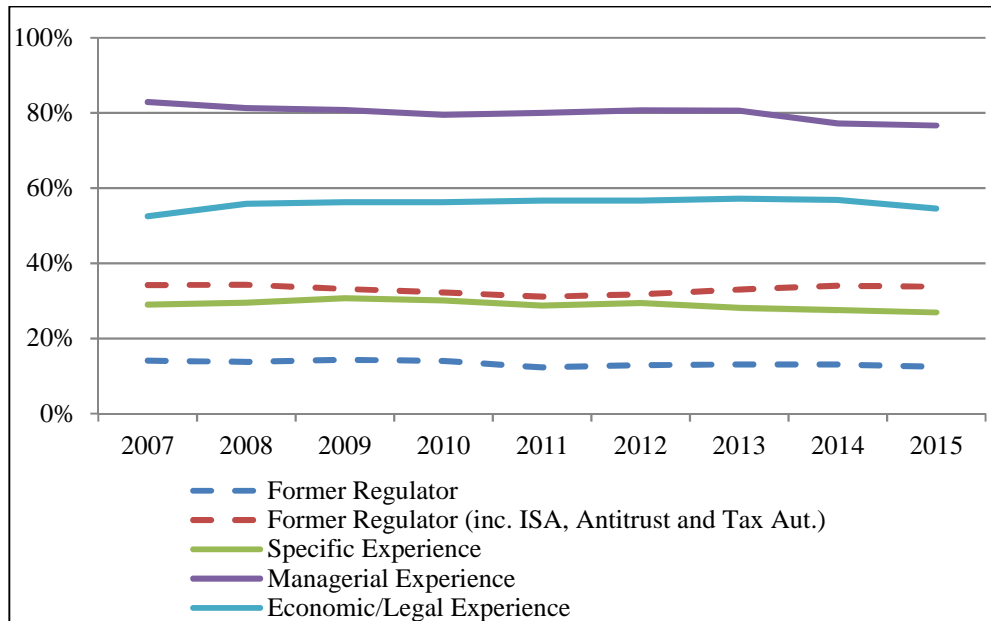
Figure 6. Distribution of firms by the number of FCS

The figure shows the share of public administration connected firms and the distribution by the number of FCSs in their management. The upper panel includes all types of managers (directors and executives); the lower panel includes only directors.

directors and executives
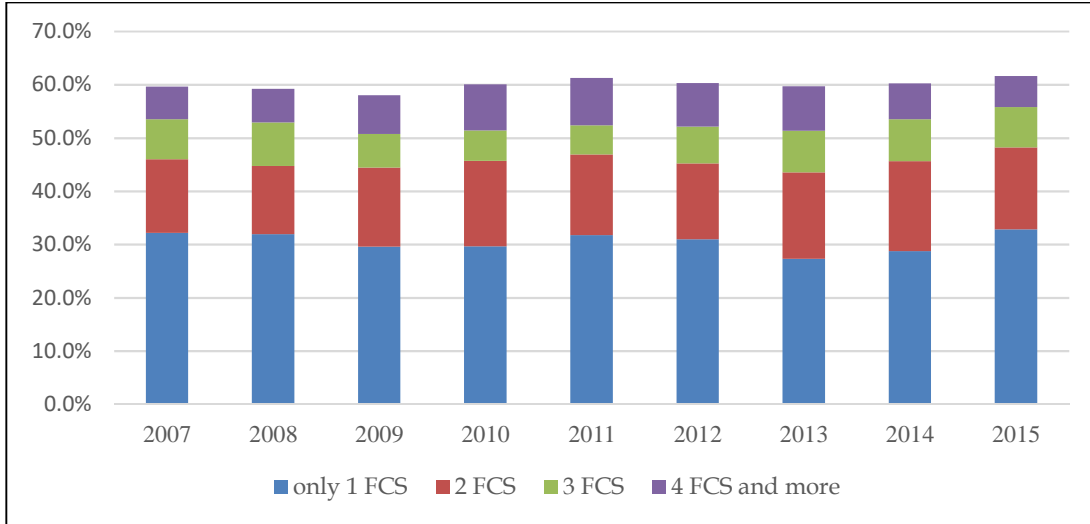
only directors

Table 5. **Firms descriptive statistics, by former civil servant presence in firm's management**

This table shows a descriptive statistics of some main firm's characteristics by year and by the presence of a former civil servant in their management.

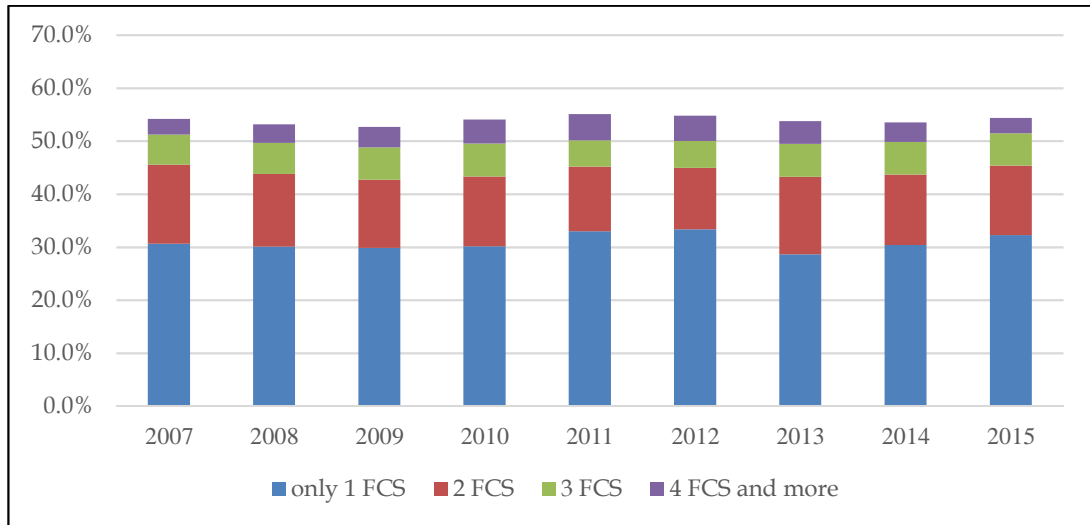|	2007	2008	2009	2010	2011	2012	2013	2014	2015
Panel A: all firms									
number of firms	441	429	412	418	403	379	370	356	344
no former civil service	178	175	173	167	156	151	149	141	132
with former civil service	263	254	239	251	247	228	221	215	212
total assets (median, Million NIS)	546.7	568.4	597.1	617.7	691.0	660.1	691.6	813.5	838.4
no former civil service	360.7	353.6	371.7	408.4	452.0	403.8	482.3	511.5	629.4
with former civil service	886.0	928.7	880.6	968.5	1,010.4	1,054.4	1,127.8	1,067.8	1,035.3
leverage (median)	64.9	68.0	66.3	66.5	68.4	67.6	66.7	64.2	63.1
no former civil service	64.5	65.9	67.2	66.5	69.7	66.4	66.9	65.7	65.9
with former civil service	65.5	69.9	65.0	66.4	68.3	68.7	66.3	63.8	61.2
Net Income multiplier (average)	27.73	12.72	22.70	23.77	16.78	24.48	208.71	42.95	71.70
no former civil service	17.54	18.44	13.31	19.53	18.36	17.04	16.99	85.51	16.66
with former civil service	33.30	9.61	28.16	26.25	15.95	29.06	321.40	19.31	99.02
Equity multiplier (average)	2.81	1.64	1.95	2.68	2.22	2.24	3.19	1.97	2.25
no former civil service	2.41	2.48	2.07	2.99	2.96	2.33	4.66	2.08	3.01
with former civil service	3.04	1.11	1.87	2.50	1.82	2.19	2.23	1.91	1.82
Net Income multiplier (median)	11.19	5.56	9.98	10.98	8.59	9.43	11.36	11.38	11.39
no former civil service	11.19	5.93	9.21	11.63	6.82	8.53	10.07	11.95	10.46
with former civil service	11.20	5.27	10.21	10.71	9.19	9.67	11.67	11.14	12.04
Equity multiplier (median)	1.64	0.69	1.18	1.31	0.92	0.87	1.12	1.07	1.13
no former civil service	1.48	0.70	1.11	1.26	1.00	0.89	1.23	1.10	1.29
with former civil service	1.72	0.67	1.23	1.32	0.91	0.87	1.07	1.06	1.07
ROE (median)	11.2	5.6	10.0	11.0	8.6	9.4	11.4	11.4	11.4
no former civil service	11.2	5.9	9.2	11.6	6.8	8.5	10.1	12.0	10.5
with former civil service	11.2	5.3	10.2	10.7	9.2	9.7	11.7	11.1	12.0
Tobin's Q (median)	1.18	1.04	0.98	1.05	1.00	0.97	1.00	1.03	1.03
no former civil service	1.20	1.04	0.98	1.08	0.98	0.98	1.01	1.05	1.10
with former civil service	1.17	1.05	0.98	1.04	1.01	0.97	1.00	1.01	1.01
Intangible assets / total assets (median, %)	2.64	3.43	3.87	4.05	3.84	3.24	3.08	2.94	4.03
no former civil service	2.85	2.74	2.21	4.52	4.96	4.28	3.30	3.18	4.06
with former civil service	2.55	4.22	4.57	3.83	3.29	2.87	3.03	2.93	4.03
Panel B: firms with traded bonds									
number of firms	177	187	183	196	188	185	176	166	160
no former civil service	65	72	70	71	66	65	62	55	52
with former civil service	112	115	113	125	122	120	114	111	108
total outstanding debt in traded bonds (median, Million NIS)	968.8	1,125.4	1,336.6	1,400.6	1,598.5	1,546.6	1,877.3	2,324.4	2,678.7
no former civil service	543.9	592.9	696.5	617.9	654.8	649.7	841.3	1,036.0	1,386.5
with former civil service	1,983.3	2,275.3	2,602.6	2,845.3	3,504.7	3,043.4	3,590.1	3,438.4	3,675.1
spread (median)	2.2	15.6	4.8	2.9	5.8	5.5	2.4	2.9	2.4
no former civil service	4.4	21.0	8.2	3.9	7.7	6.4	3.4	3.7	2.9
with former civil service	1.8	9.1	3.6	2.4	4.3	4.5	2.1	2.4	2.2
% of firms with high spread (over 8%)	5.2	28.9	15.5	7.2	17.1	15.6	5.9	4.5	3.8
no former civil service	6.2	35.4	20.8	10.2	20.5	14.6	6.7	6.4	3.0
with former civil service	4.6	24.4	11.7	5.2	15.0	16.2	5.4	3.3	4.2
Panel C: firms with traded and rated bonds									
number of firms	100	120	143	128	129	127	122	120	120
no former civil service	24	36	49	33	31	35	34	34	38
with former civil service	76	84	94	95	98	92	88	86	82
rating (weighted average, 1 = the highest rating)	1.88	1.04	1.90	2.02	1.39	1.17	1.33	1.21	1.28
no former civil service	1.53	0.59	1.31	1.23	1.00	0.99	1.32	1.08	1.19
with former civil service	1.98	1.22	2.19	2.25	1.51	1.23	1.34	1.26	1.31

Figure 7. <u>Firms distribution over TASE industries, by former civil servant presence in firm's management</u>

This figure shows the distribution of firms in years 2007 and 2015 over TASE industries, with and without a former civil servant in their management.
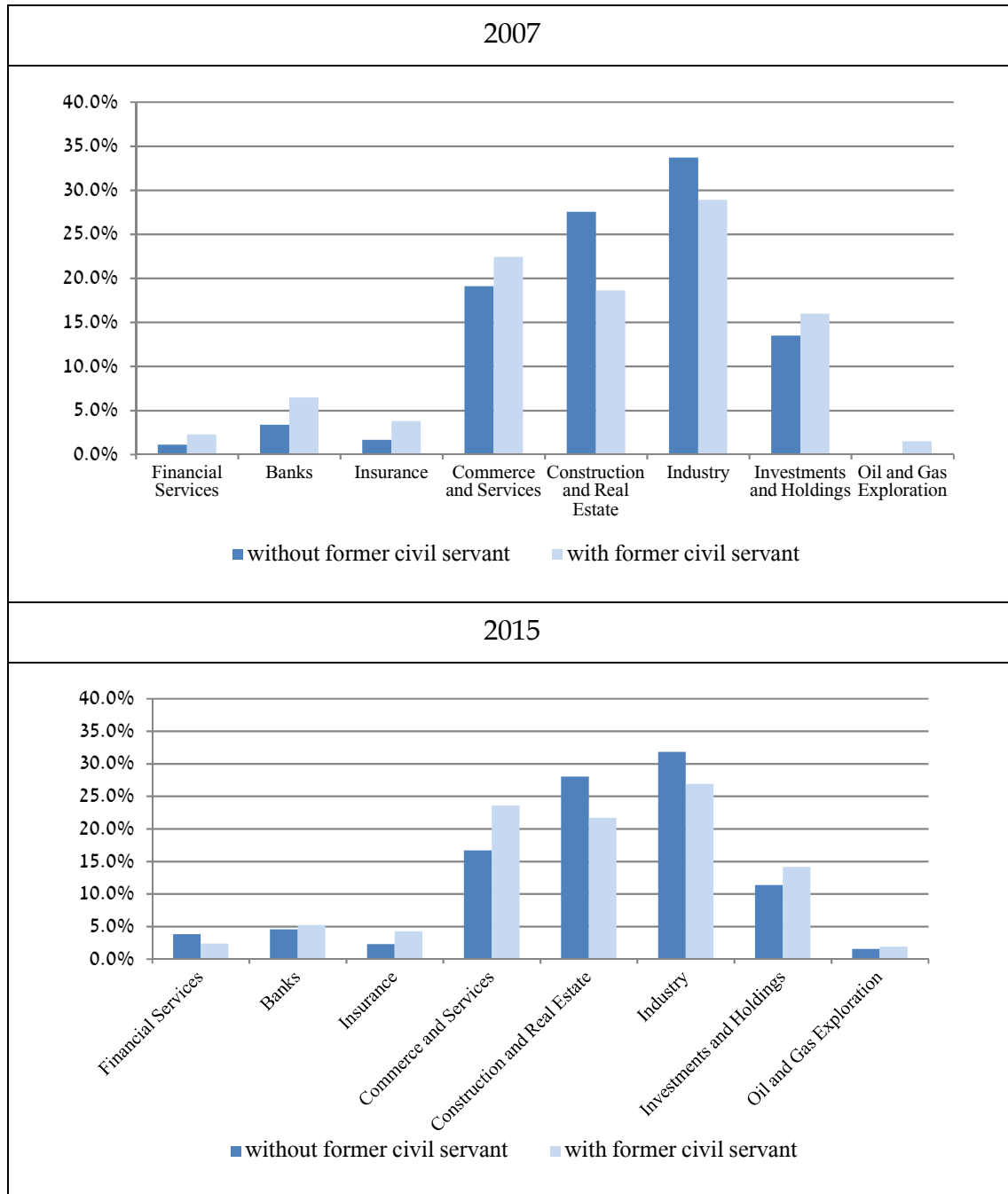
Table 6. <u>Distribution of FCSs over TASE industries</u>

This table shows the distribution of FCSs over different TASE industries conditional on their civil service experience. If the figure in the cell is higher than one standard deviation above the benchmark figure in the upper line (the unconditional distribution of FCSs over industries) and the number of observations is higher than 250, the figure is marked with two crosses (++). If the number of observations is higher than the 100 it is marked with one cross (+). Numbers in the first column do not sum to the total number of FCS because of multiple civil service experience for some FCS.

	n	Financial Services	Banks	Insurance	Commerce and Services	Construction and Real Estate	Manufacturing	Investments and Holdings	Oil and Gas Exploration
all FCS (benchmark distribution)	4,262	2.7	11.3	5.6	19.7	17.4	25.4	16.5	1.5
All Security Agencies (IDF, police, GSS Mossad)	807	0.4	5.0	2.7	26.5	13.4	35.9++	13.4	2.7
IDF (Army)	591	0.5	3.2	2.5	27.4	12.7	37.4++	15.9	0.3
Police	113	0.0	6.2	0.9	32.7+	20.4	8.8	14.2	16.8+
Ministers	234	0.0	3.0	3.8	36.8+	20.9	17.9	17.5	0.0
MKs	457	0.0	12.0	2.0	28.2	17.3	18.8	20.4	1.3
Bank of Israel	144	9.7+	29.2+	6.9	4.2	16.0	28.5	5.6	0.0
ISA	430	3.7	12.3	7.0	11.6	14.0	25.8	23.3++	2.3
Tax Authority	337	0.0	6.5	5.9	30.3++	14.5	27.6	14.5	0.6
Local authorities	278	0.0	16.5	0.0	20.9	27++	16.5	18.3	0.7
Ministry of Finance	1,124	6.5++	15.4	10.8++	15.7	17.8	18.0	14.7	1.2
Ministry of Economy	232	3.4	8.6	6.9	9.5	14.7	34.1	21.6	1.3
Ministry of Prime Minister	259	0.0	4.6	9.7++	12.0	17.8	32.4	22.0	1.5
Ministry of Interior	324	0.0	14.2	0.0	23.5	25.3++	19.4	17.0	0.6
Ministry of Defense	219	0.0	10.0	2.7	22.8	8.2	43.8+	11.0	1.4
Ministry of Health	112	0.0	8.9	8.9	24.1	11.6	33.0	13.4	0.0

Table 7. IRI and share of FCSs, by CBS industry

This table shows the IRI (Industry Regulation Index) and the share of FCSs out of all managers by industry, ordered by descending IRI. Higher values of IRI imply higher regulatory burden.

CBS industry	Number of firms (2007-2015 average)	Share of FCS out of total managers (2007-2015 average)	IRI
Manufacturing (mining and quarrying)	74.9	0.54	10.71
Construction	29.9	0.56	3.44
Wholesale and retail trade; repair of motor vehicles and motorcycles	37.4	0.73	7.21
Transportation and storage, communication, postal and courier activities	15.2	0.70	8.35
Banking, financial and insurance activities	141.6	0.66	8.23
Real estate activities and business services	88.4	0.51	1.67

Figure 9. Correlation between IRI (and eIRI) and the share of former civil servants

This figure shows the correlation between the 2-digit level IRI and the share of former civil servants in a firm (green line) or their share in the board (blue line). It also displays the eIRI, which is the IRI adjusted by the number of employees in each industry.
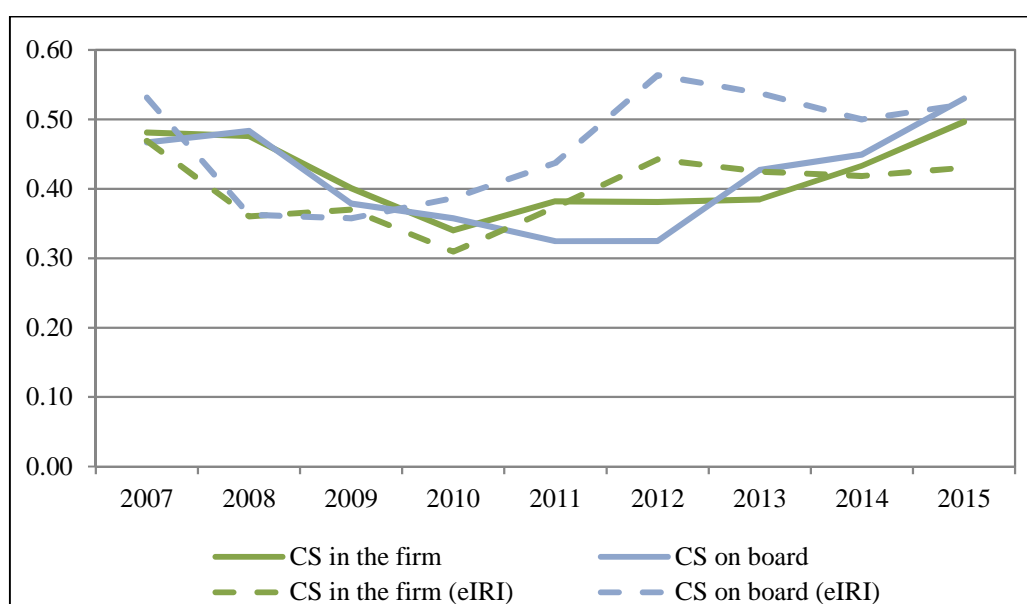
Table 8. <u>Descriptive statistics of the independent variables</u>

This table shows descriptive statistics of the independent variables used to explain the probability for a firm to be public administration connected. i.e. to have an FCS on its management or not. *l_assets* is the log of total assets; *leverage* is calculated by the share of liabilities in total assets; *ROE* is the yearly return on equity, taking only positive values and winsorized in its 95% percentile; *ROE_neg* is a dummy variable that takes 1 if the firm has negative ROE and 0 otherwise; *is_private* is a dummy variable takes 1 if the firm's equity is not traded and 0 otherwise; *is_dual* is a dummy variable takes 1 if the firm is dual-listed and 0 otherwise; *is_bond* is a dummy variable takes 1 if the firm has traded bonds and 0 otherwise; and *l_bond_debt* is the log of the total traded debt of the firm; *Q* is an approximation for Tobin's Q, calculated as the the market value of equity and book value of liabilities divided by the book value of equity and liabilities; and *intangible_assets*, the share of intangible assets in total assets. IRI is the industry regulation index. Firm's industry is reflected either by *is_finance,* a dummy variable takes 1 if the firm is a financial firm and 0 otherwise, or by a set of dummy variables for each TASE industry.

	Mean		prob. T-test	Std. Err.	
	without former civil servant	with former civil servant	(H0: equal means)	without former civil servant	with former civil servant
l_assets	12.987	14.057	-16.38	1.75	2.10
leverage	0.793	0.879	-0.68	1.81	5.36
roe	9.497	10.088	-1.40	12.58	12.24
roe_negative	0.423	0.341	4.97	0.49	0.47
is_private	0.089	0.054	3.85	0.28	0.23
is_dual	0.105	0.091	1.45	0.31	0.29
is_bond	0.406	0.488	-4.81	0.49	0.50
l_bond_debt	5.690	7.372	-6.51	7.25	7.97
Q	1.335	1.246	3.70	0.72	0.62
intangible_assets	0.060	0.059	0.38	0.12	0.11
is_finance	0.079	0.122	-5.73	0.27	0.33
IRI	2.312	2.653	-4.49	2.14	2.32
manufacturing	0.274	0.233	2.77	0.45	0.42
financial services	0.021	0.025	-0.74	0.14	0.16
biomed	0.034	0.025	1.62	0.18	0.16
technology	0.068	0.040	3.57	0.25	0.20
banks	0.037	0.059	-3.16	0.19	0.24
insurance	0.021	0.038	-3.01	0.14	0.19
commerce	0.155	0.217	-4.74	0.36	0.41
real estate	0.277	0.200	5.28	0.45	0.40
holdings	0.108	0.145	-3.34	0.31	0.35
gas and oil	0.005	0.019	-3.98	0.07	0.14
2007	0.125	0.123	0.15	0.33	0.33
2008	0.123	0.119	0.34	0.33	0.32
2009	0.122	0.112	0.86	0.33	0.32
2010	0.117	0.118	-0.04	0.32	0.32
2011	0.110	0.116	-0.58	0.31	0.32
2012	0.106	0.107	-0.1	0.31	0.31
2013	0.105	0.104	0.10	0.31	0.31
2014	0.099	0.101	-0.17	0.30	0.30
2015	0.093	0.100	-0.66	0.29	0.30

Table 9. <u>Probability to be a connected firm: regression results</u>

This table shows the results of a logit regression estimating the probability of a firm to be a connected firm. The dependent variable takes 1 if the firm has at least one FCS manager (i.e. high-ranked executive or director). *l_assets* is the log of total assets; *leverage* is calculated by the share of liabilities in total assets; *ROE* is the yearly return on equity, taking only positive values and winsorized in its 95% percentile; *ROE_neg* is a dummy variable that takes 1 if the firm has negative ROE and 0 otherwise; *is_private* is a dummy variable takes 1 if the firm's equity is not traded and 0 otherwise; *is_dual* is a dummy variable takes 1 if the firm is dual-listed and 0 otherwise; *is_bond* is a dummy variable takes 1 if the firm has traded bonds and 0 otherwise; and *l_bond_debt* is the log of the total traded debt of the firm; *Q* is an approximation for Tobin's Q, calculated as the the market value of equity and book value of liabilities divided by the book value of equity and liabilities; and *intangible_assets*, the share of intangible assets in total assets. IRI is the industry regulation index. Firm's industry is reflected either by *is_finance*, a dummy variable takes 1 if the firm is a financial firm and 0 otherwise, or by a set of dummy variables for each TASE industry. Errors are clustered within firm. Standard deviation are in parenthesis. *** indicates 1% significance, ** indicates 5% significance and * indicates 10% significance.

	(1) All firms	(2) All firms	(3) all public firms	(4) all public firms, with tradable bond firms	(5) all public non-financial firms
Intercept	-3.9572***	-4.2835***	-5.2023***	-7.0263***	-5.5608***
	(0.686)	(0.72)	(0.863)	(1.345)	(0.897)
l_assets	0.3274***	0.3473***	0.3889***	0.3710***	0.4139***
	(0.052)	(0.053)	(0.058)	(0.123)	(0.061)
leverage	0.0465**	0.0402*	0.0336*	0.0176	0.0382*
	(0.023)	(0.021)	(0.02)	(0.022)	(0.021)
ROE	-0.0023	-0.0073	-0.009	-0.0061	-0.0049
	(0.006)	(0.006)	(0.006)	(0.008)	(0.006)
ROE_negative	0.013	-0.044	-0.0191	-0.2856	0.0848
	(0.163)	(0.166)	(0.171)	(0.248)	(0.174)
is_private	-1.1184***	-1.0273***			
	(0.336)	(0.33)			
is_dual	-0.3461	-0.4735	-0.5933*	-1.2662*	-0.5318*
	(0.299)	(0.314)	(0.317)	(0.712)	(0.313)
is_bond	-0.1851	-0.0128	-0.1383		-0.2142
	(0.171)	(0.181)	(0.187)		(0.194)
l_bond_debt				0.1391	
				(0.12)	
Q			0.2188	0.6004*	0.2168
			(0.14)	(0.314)	(0.144)
intangible_assets					-1.1147
					(0.8)
IRI	0.0353	0.0615	0.0890*	0.1229	0.0924*
	(0.04)	(0.046)	(0.049)	(0.087)	(0.052)
is_finance	0.1567				
	(0.31)				
financial services		0.2758	0.3134	0.4314	
		(0.576)	(0.579)	(0.831)	
biomed		0.6672*	0.5557		0.5844
		(0.404)	(0.413)		(0.433)
technology		-0.2326	-0.1951	-0.0552	-0.1185
		(0.333)	(0.337)	(0.681)	(0.342)
banks		-0.1546	0.8612	0.3189	
		(0.512)	(0.91)	(1.24)	
insurance		0.2547	0.6895	1.9706*	
		(0.48)	(0.661)	(1.127)	

(Table 9 continued)

	all firms	All firms	all public firms	all public firms, with tradable bond firms	all public non-financial firms
commerce		0.4874*	0.5632**	0.4739	0.6090**
		(0.249)	(0.251)	(0.49)	(0.252)
real estate		-0.4743*	-0.316	-0.5955	-0.3552
		(0.252)	(0.255)	(0.427)	(0.263)
holdings		0.204	0.2761	0.124	0.2553
		(0.254)	(0.256)	(0.466)	(0.258)
gas and oil		1.8048***	1.7709***		1.6856***
		(0.383)	(0.466)		(0.469)
year dummies	yes	yes	yes	yes	yes
Observations	3,518	3,518	3,307	1,512	3,060
McFadden's R-square	0.066	0.088	0.096	0.145	0.079
Cox and Snell's R-square	0.085	0.112	0.120	0.172	0.102

Table 10. <u>Probability to be a connected firm: regression results, using only senior FCSs</u>

This table shows the results of a logit regression estimating the probability of a firm to be a connected firm. The dependent variable takes 1 if the firm has at least one senior FCS manager (i.e. high-ranked executive or director). *l_assets* is the log of total assets; *leverage* is calculated by the share of liabilities in total assets; *ROE* is the yearly return on equity, taking only positive values and winsorized in its 95% percentile; *ROE_neg* is a dummy variable that takes 1 if the firm has negative ROE and 0 otherwise; *is_private* is a dummy variable takes 1 if the firm's equity is not traded and 0 otherwise; *is_dual* is a dummy variable takes 1 if the firm is dual-listed and 0 otherwise; *is_bond* is a dummy variable takes 1 if the firm has traded bonds and 0 otherwise; and *l_bond_debt* is the log of the total traded debt of the firm; *Q* is an approximation for Tobin's Q, calculated as the the market value of equity and book value of liabilities divided by the book value of equity and liabilities; and *intangible_assets*, the share of intangible assets in total assets. IRI is the industry regulation index. Firm's industry is reflected either by *is_finance,* a dummy variable takes 1 if the firm is a financial firm and 0 otherwise, or by a set of dummy variables for each TASE industry. Errors are clustered within firm. Standard deviation are in parenthesis. *** indicates 1% significance, ** indicates 5% significance and * indicates 10% significance.

	(1)	(2)	(3)	(4)	(5)
	All firms	all firms	all public firms	all public firms, with tradable bond firms	all public non-financial firms
Intercept	-5.4233***	-5.8430***	-7.0671***	-8.8418***	-7.5188***
	(0.752)	(0.797)	(0.937)	(1.378)	(0.977)
l_assets	0.4127***	0.4281***	0.4798***	0.4806***	0.5120***
	(0.056)	(0.059)	(0.064)	(0.127)	(0.067)
leverage	0.0795***	0.0691**	0.0528*	0.0276	0.0599*
	(0.029)	(0.033)	(0.029)	(0.02)	(0.032)
ROE	-0.0031	-0.0082	-0.0101*	-0.012	-0.0058
	(0.006)	(0.006)	(0.006)	(0.009)	(0.006)
ROE_negative	-0.0315	-0.1215	-0.0865	-0.3688	0.0271
	(0.166)	(0.166)	(0.172)	(0.245)	(0.174)
is_private	-1.2639***	-1.1846***			
	(0.381)	(0.388)			
is_dual	-0.2374	-0.3028	-0.4651	-0.7837	-0.416
	(0.313)	(0.33)	(0.335)	(0.758)	(0.332)
is_bond	-0.0953	-0.0281	-0.1713		-0.2263
	(0.171)	(0.177)	(0.185)		(0.192)
l_bond_debt				0.1453	
				(0.121)	
Q			0.3344**	0.7135**	0.3351**
			(0.153)	(0.322)	(0.156)
intangible_assets					-1.0548
					(0.863)
IRI	0.0382	0.0773	0.1089**	0.1071	0.1123**
	(0.042)	(0.051)	(0.052)	(0.081)	(0.054)
is_finance	0.0047				
	(0.305)				
financial services		0.3721	0.4111	-0.2218	
		(0.523)	(0.513)	(0.586)	
biomed		0.9351**	0.7212*		0.7725*
		(0.422)	(0.427)		(0.445)
technology		-0.0733	-0.022	-1.0471	0.0712
		(0.349)	(0.35)	(0.65)	(0.352)
banks		-0.139	0.9497	0.3162	
		(0.596)	(1.053)	(1.239)	
insurance		0.198	1.0136	1.9426*	
		(0.434)	(0.659)	(1.146)	

(Table 10 continued))

	all firms	all firms	all public firms	all public firms, with tradable bond firms	all public non-financial firms
commerce		0.6003**	0.6833***	0.2571	0.7207***
		(0.254)	(0.257)	(0.461)	(0.259)
real estate		-0.057	0.1338	-0.4373	0.0822
		(0.261)	(0.261)	(0.411)	(0.271)
holdings		0.3678	0.4718*	-0.029	0.4412
		(0.271)	(0.272)	(0.442)	(0.275)
gas and oil		2.5257***	2.3746***		2.3035***
		(0.386)	(0.47)		(0.473)
year dummies	yes	yes	yes	yes	yes
Observations	3,518	3,518	3,307	1,512	3,060
McFadden's R-square	0.099	0.118	0.131	0.182	0.110
Cox and Snell's R-square	0.129	0.151	0.166	0.218	0.141

Table 11. <u>Probability to be a connected firm: regression results, limiting the sample</u>

This table shows the results of a logit regression estimating the probability of a firm to be a connected firm. The dependent variable takes 1 if the firm has at least one FCS manager (i.e. high-ranked executive or director) or senior FCS manager. The sample is limited to FCS or senior FCS with no more than 5, 10 or 15 years since leaving the civil service. *l_assets* is the log of total assets; *leverage* is calculated by the share of liabilities in total assets; *ROE* is the yearly return on equity, taking only positive values and winsorized in its 95% percentile; *ROE_neg* is a dummy variable that takes 1 if the firm has negative ROE and 0 otherwise; *is_private* is a dummy variable takes 1 if the firm's equity is not traded and 0 otherwise; *is_dual* is a dummy variable takes 1 if the firm is dual-listed and 0 otherwise; *is_bond* is a dummy variable takes 1 if the firm has traded bonds and 0 otherwise; and *l_bond_debt* is the log of the total traded debt of the firm; *Q* is an approximation for Tobin's Q, calculated as the the market value of equity and book value of liabilities divided by the book value of equity and liabilities; and *intangible_assets*, the share of intangible assets in total assets. IRI is the industry regulation index. Firm's industry is reflected either by *is_finance,* a dummy variable takes 1 if the firm is a financial firm and 0 otherwise, or by a set of dummy variables for each TASE industry. Errors are clustered within firm. Standard deviation are in parenthesis. *** indicates 1% significance, ** indicates 5% significance and * indicates 10% significance.

	(1)	(2)	(3)	(4)	(5)	(6)
	all FCS	all FCS	all FCS	senior FCS	senior FCS	senior FCS
	<=5 years	<=10 years	<=20 years	<=5 years	<=10 years	<=20 years
Intercept	-7.1208***	-6.8377***	-5.2980***	-7.4592***	-7.3352***	-7.0355***
	(1.104)	(0.999)	(0.871)	(1.143)	(1.036)	(0.942)
l_assets	0.4532***	0.4631***	0.3944***	0.4601***	0.4780***	0.4763***
	(0.074)	(0.068)	(0.059)	(0.075)	(0.069)	(0.064)
leverage	0.0338*	0.0422*	0.0360*	0.0370**	0.0438*	0.0519*
	(0.019)	(0.023)	(0.02)	(0.018)	(0.024)	(0.028)
ROE	-0.0097	-0.0088	-0.0084	-0.0096	-0.0078	-0.0103*
	(0.007)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)
ROE_negative	-0.0848	-0.0185	-0.0075	-0.1198	0.0062	-0.0615
	(0.203)	(0.19)	(0.172)	(0.205)	(0.191)	(0.174)
Q	0.3770**	0.3113*	0.2103	0.4136**	0.3409*	0.3239**
	(0.19)	(0.169)	(0.142)	(0.2)	(0.176)	(0.155)
is_dual	-1.0450**	-0.7869**	-0.7149**	-1.1717**	-0.7892**	-0.5447
	(0.459)	(0.379)	(0.326)	(0.5)	(0.399)	(0.35)
is_bond	-0.0965	-0.106	-0.1176	0.0125	-0.0283	-0.1086
	(0.219)	(0.2)	(0.189)	(0.216)	(0.198)	(0.189)
IRI	0.1143*	0.1233**	0.0928*	0.1390**	0.1352**	0.1175**
	(0.059)	(0.056)	(0.05)	(0.06)	(0.057)	(0.053)
financial services	0.5115	0.608	0.3354	0.2497	0.2173	0.3667
	(0.567)	(0.589)	(0.591)	(0.528)	(0.495)	(0.529)
biomed	-0.1028	0.358	0.5865	-0.0014	0.4037	0.7811*
	(0.705)	(0.532)	(0.417)	(0.718)	(0.588)	(0.434)
technology	0.0047	-0.0972	-0.1448	0.0739	0.0833	-0.0233
	(0.479)	(0.416)	(0.345)	(0.487)	(0.427)	(0.358)
banks	1.3506	1.0009	0.8714	1.3499	1.1343	0.9106
	(1.137)	(1.043)	(0.921)	(1.216)	(1.097)	(1.074)
insurance	0.9943	0.9304	0.6955	1.0432	1.0661	0.9944
	(0.714)	(0.672)	(0.659)	(0.714)	(0.667)	(0.657)
commerce	0.8517***	0.7618***	0.5877**	0.8133**	0.7358**	0.6983***
	(0.309)	(0.28)	(0.254)	(0.317)	(0.287)	(0.261)
real estate	0.0227	-0.1853	-0.333	-0.0382	-0.1325	0.0539
	(0.308)	(0.279)	(0.259)	(0.313)	(0.288)	(0.263)

(Table 11 continued)

	all FCS	all FCS	all FCS	senior FCS	senior FCS	senior FCS
	<=5 years	<=10 years	<=20 years	<=5 years	<=10 years	<=20 years
holdings	0.5118	0.4303	0.2769	0.3944	0.4647	0.4836*
	(0.317)	(0.288)	(0.257)	(0.314)	(0.287)	(0.271)
gas and oil	2.0462***	2.2446***	1.8386***	2.1105***	2.4188***	2.3893***
	(0.452)	(0.476)	(0.464)	(0.454)	(0.479)	(0.465)
year dummies	yes	yes	yes	yes	yes	
Observations	2,164	2,670	3,223	2,164	2,670	3,223
McFadden's R-square	0.144	0.137	0.0996	0.152	0.148	0.132
Cox and Snell's R-square	0.176	0.173	0.125	0.183	0.185	0.168

Figure 10. <u>Goodness-of-fit measures by number of years since leaving the civil service</u>

This figure shows multiple goodness-of-fit measures of the model used to estimate the probability of a firm to be a connected firm, when limiting the sample to include non-connected firms or firms with at least one FCS with a limited number of years that've passed since leaving the civil service. In the upper panel I define connectedness using senior and non-senior FCS and in the lower panel I define it using only senior level FCS.

all FCS
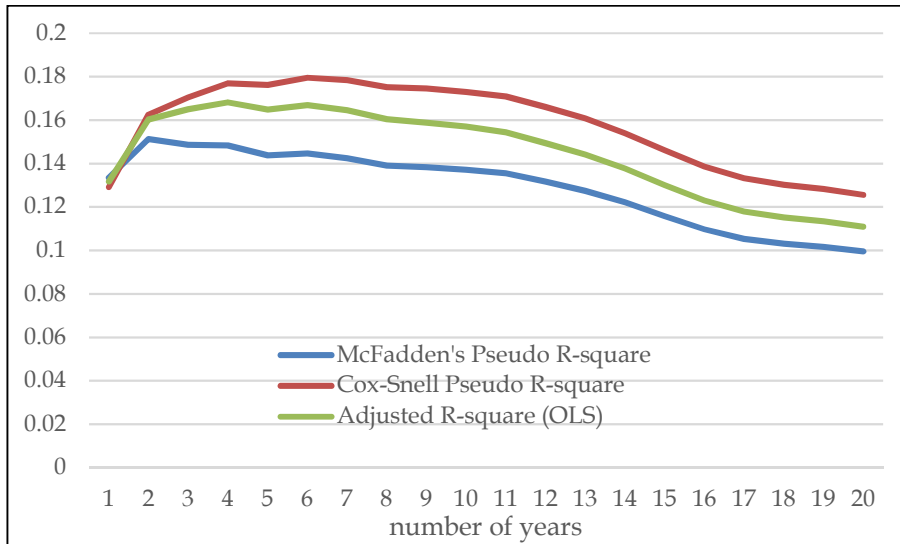
only senior level FCS
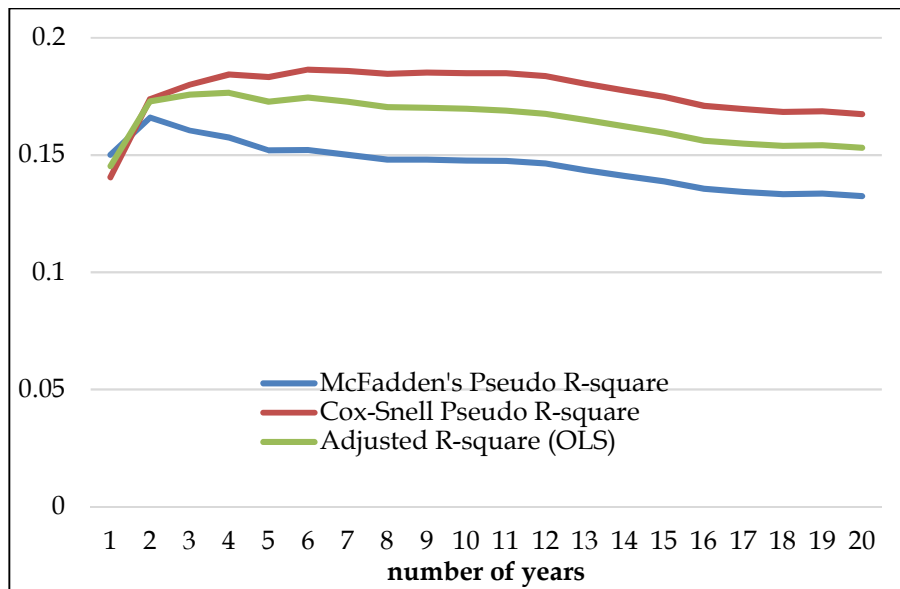
Table 12. **Probability to be a connected firm: by civil service experience**

This table shows the results of a logit regression estimating the probability of a firm to be have an FCS with a specific experience. The dependent variable takes 1 if the firm has at least one FCS manager (i.e. high-ranked executive or director) with experience from the type in the title of the column. *l_assets* is the log of total assets; *leverage* is calculated by the share of liabilities in total assets; *ROE* is the yearly return on equity, taking only positive values and winsorized in its 95% percentile; *ROE_neg* is a dummy variable that takes 1 if the firm has negative ROE and 0 otherwise; *is_dual* is a dummy variable takes 1 if the firm is dual-listed and 0 otherwise; *is_bond* is a dummy variable takes 1 if the firm has traded bonds and 0 otherwise; *Q* is an approximation for Tobin's Q, calculated as the the market value of equity and book value of liabilities divided by the book value of equity and liabilities. IRI is the industry regulation index. Firm's industry is reflected either by *is_finance,* a dummy variable takes 1 if the firm is a financial firm and 0 otherwise, or by a set of dummy variables for each TASE industry. Errors are clustered within firm. Standard deviation are in parenthesis. *** indicates 1% significance, ** indicates 5% significance and * indicates 10% significance.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Security Forces (IDF, police, Mossad, GSS)	Finance (MoF, ISA, BoI, Tax Authority, Antitrust)	Knesset	Minister	Local Authority	Former Regulator	Specific Experience
Intercept	-6.6478***	-6.4453***	-4.0778***	-5.9617***	-4.1769**	-8.2140***	-3.0542**
	(1.089)	(0.883)	(1.368)	(1.67)	(1.77)	(1.496)	(1.228)
l_assets	0.3264***	0.4024***	0.1504	0.2263**	0.0861	0.2497**	0.0683
	(0.071)	(0.06)	(0.093)	(0.1)	(0.106)	(0.099)	(0.084)
leverage	0.0075	0.0621**	-0.305	-0.0098	-0.7788	0.0113	-0.6943
	(0.011)	(0.026)	(0.592)	(0.058)	(0.649)	(0.012)	(0.451)
ROE	0.0063	-0.0077	-0.0087	0.0034	0.002	0.0056	0.0073
	(0.008)	(0.007)	(0.008)	(0.01)	(0.01)	(0.01)	(0.009)
ROE_negative	0.2749	0.0488	-0.3477	0.1738	-0.013	-0.0947	0.3018
	(0.216)	(0.18)	(0.246)	(0.297)	(0.352)	(0.267)	(0.247)
is_dual	0.3121	-0.8707**	-0.8109	-0.7371	-1.7559***	-0.2191	1.1674***
	(0.357)	(0.346)	(0.6)	(0.765)	(0.654)	(0.566)	(0.421)
is_bond	-0.1631	0.252	-0.3186	-0.8734***	0.0926	0.0399	0.0693
	(0.231)	(0.202)	(0.259)	(0.314)	(0.367)	(0.359)	(0.266)
Q	0.2328	0.2139	-0.1839	-0.2289	0.0411	-0.0002	0.2413
	(0.175)	(0.155)	(0.308)	(0.454)	(0.367)	(0.266)	(0.219)
IRI	0.1556***	0.0306	0.0535	0.0339	0.0821	0.5952***	0.1897***
	(0.056)	(0.05)	(0.069)	(0.079)	(0.082)	(0.088)	(0.067)
financial services	-1.8874*	1.0874*					3.1065***
	(1.143)	(0.643)					(0.697)
biomed	-0.6362	0.8287**	0.1606	-0.9426		0.3566	0.6996
	(0.833)	(0.404)	(0.94)	(0.935)		(1.159)	(0.637)

(Table 12 continued)

	Security Forces (IDF, police, Mossad, GSS)	Finance (MoF, ISA, BoI, Tax Authority, Antitrust)	Knesset	Minister	Local Authority	Former Regulator	Specific Experience
technology	-0.0165	-0.1666	0.2535	-0.2374	0.0962	0.9313**	0.8629*
	(0.389)	(0.379)	(0.587)	(0.903)	(0.925)	(0.424)	(0.451)
banks	-0.7326	0.4578	1.1971	-0.0952	1.4881	-1.4699	3.4539***
	(0.753)	(0.786)	(0.861)	(1.033)	(0.978)	(1.004)	(0.859)
insurance	-0.2458	0.8733	-0.0036	0.46		3.9514***	2.6880***
	(0.627)	(0.833)	(0.736)	(0.777)		(0.833)	(0.679)
commerce	0.435	0.213	1.0866***	1.3950***	0.7739	1.3312***	0.2871
	(0.298)	(0.261)	(0.402)	(0.462)	(0.552)	(0.469)	(0.372)
real estate	-0.3457	-0.7507**	0.3705	0.6734	1.0888*	1.6915***	1.0990***
	(0.353)	(0.299)	(0.44)	(0.547)	(0.587)	(0.459)	(0.385)
holdings	0.0552	-0.2531	0.9605**	0.5356	0.9903*	-0.7251	0.7226*
	(0.359)	(0.286)	(0.423)	(0.557)	(0.552)	(0.875)	(0.43)
gas and oil	1.4902**	0.383	0.9782		0.2839	-1.1085	-1.1351
	(0.751)	(0.635)	(1.237)		(1.073)	(1.398)	(0.761)
year dummies	yes	yes	yes	yes	yes	yes	yes
Observations	3,307	3,307	3,307	3,307	3,307	3,307	2,012
McFadden's R-square	0.096	0.123	0.069	0.069	0.061	0.273	0.166
Cox and Snell's R-square	0.088	0.149	0.050	0.033	0.029	0.187	0.068

Table 12a. <u>Probability of hiring an FCS</u>

This table shows the results of a logit regression estimating the probability of a firm to hire an FCS manager (i.e. high-ranked executive or director) with experience from the type in the title of the column. *l_assets* is the log of total assets; *leverage* is calculated by the share of liabilities in total assets; *ROE* is the yearly return on equity, taking only positive values and winsorized in its 95% percentile; *ROE_neg* is a dummy variable that takes 1 if the firm has negative ROE and 0 otherwise; *is_dual* is a dummy variable takes 1 if the firm is dual-listed and 0 otherwise; *Q* is an approximation for Tobin's Q, calculated as the the market value of equity and book value of liabilities divided by the book value of equity and liabilities. IRI is the industry regulation index. Firm's industry is reflected by a set of dummy variables for each TASE industry. All firm variables are taken in one year lag. Errors are clustered within manager. Standard deviation are in parenthesis. *** indicates 1% significance, ** indicates 5% significance and * indicates 10% significance.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All FCS	Senior level FCS only	Security Forces (IDF, police, Mossad, GSS)	Finance (MoF, ISA, BoI, Tax Authority, Antitrust)	Knesset	Minister	Local Authority	Former Regulator	Specific Experience
Intercept	-4.8870***	-5.9391***	-5.8051***	-6.9765***	-8.0331***	-11.9567***	-9.6096***	-7.6401***	-6.0032***
	(0.546)	(0.653)	(1.149)	(0.783)	(1.751)	(2.603)	(2.558)	(1.518)	(1.055)
l_assets	0.1375***	0.1828***	0.0879	0.2258***	0.1326	0.2133	0.0817	0.044	0.0504
	(0.035)	(0.043)	(0.08)	(0.05)	(0.114)	(0.156)	(0.157)	(0.078)	(0.066)
leverage	0.0304	0.0476**	0.0362	0.0668**	-0.2378	-0.0166	-0.0904	-0.006	0.011
	(0.024)	(0.022)	(0.031)	(0.026)	(0.715)	(0.057)	(0.18)	(0.052)	(0.032)
ROE	0.0085*	0.0092*	0.0112	0.0046	0.0304**	0.0241	-0.0096	0.0293**	0.0067
	(0.005)	(0.005)	(0.011)	(0.008)	(0.012)	(0.016)	(0.019)	(0.012)	(0.01)
ROE_negative	0.0466	0.0141	-0.0721	0.0952	0.7953*	0.6361	-0.5665	0.1443	-0.11
	(0.143)	(0.161)	(0.35)	(0.209)	(0.415)	(0.459)	(0.606)	(0.417)	(0.293)
Q	-0.0862	-0.0697	-0.3254	-0.0376	0.1078	0.5796	-0.0865	-0.2598	-0.0112
	(0.11)	(0.124)	(0.222)	(0.174)	(0.276)	(0.358)	(0.546)	(0.283)	(0.222)
is_dual	-0.3096	-0.4733**	0.1943	-0.4088	-1.1086	-1.4538	-0.8618	0.6627	0.4842
	(0.198)	(0.232)	(0.413)	(0.289)	(0.781)	(1.006)	(1.186)	(0.588)	(0.386)
IRI	0.0468*	0.0608**	0.1413***	0.0522	-0.0933	0.0142	-0.0367	0.3059***	0.1726***
	(0.027)	(0.03)	(0.052)	(0.038)	(0.088)	(0.067)	(0.085)	(0.037)	(0.043)
financial services	-0.0152	0.1089		0.7862**					1.7122***
	(0.293)	(0.318)		(0.321)					(0.4)
biomed	0.3582	0.8048	0.1652	0.2713				1.576	0.1925
	(0.491)	(0.545)	(1.093)	(0.823)				(1.127)	(1.047)

(Table 12a continued)

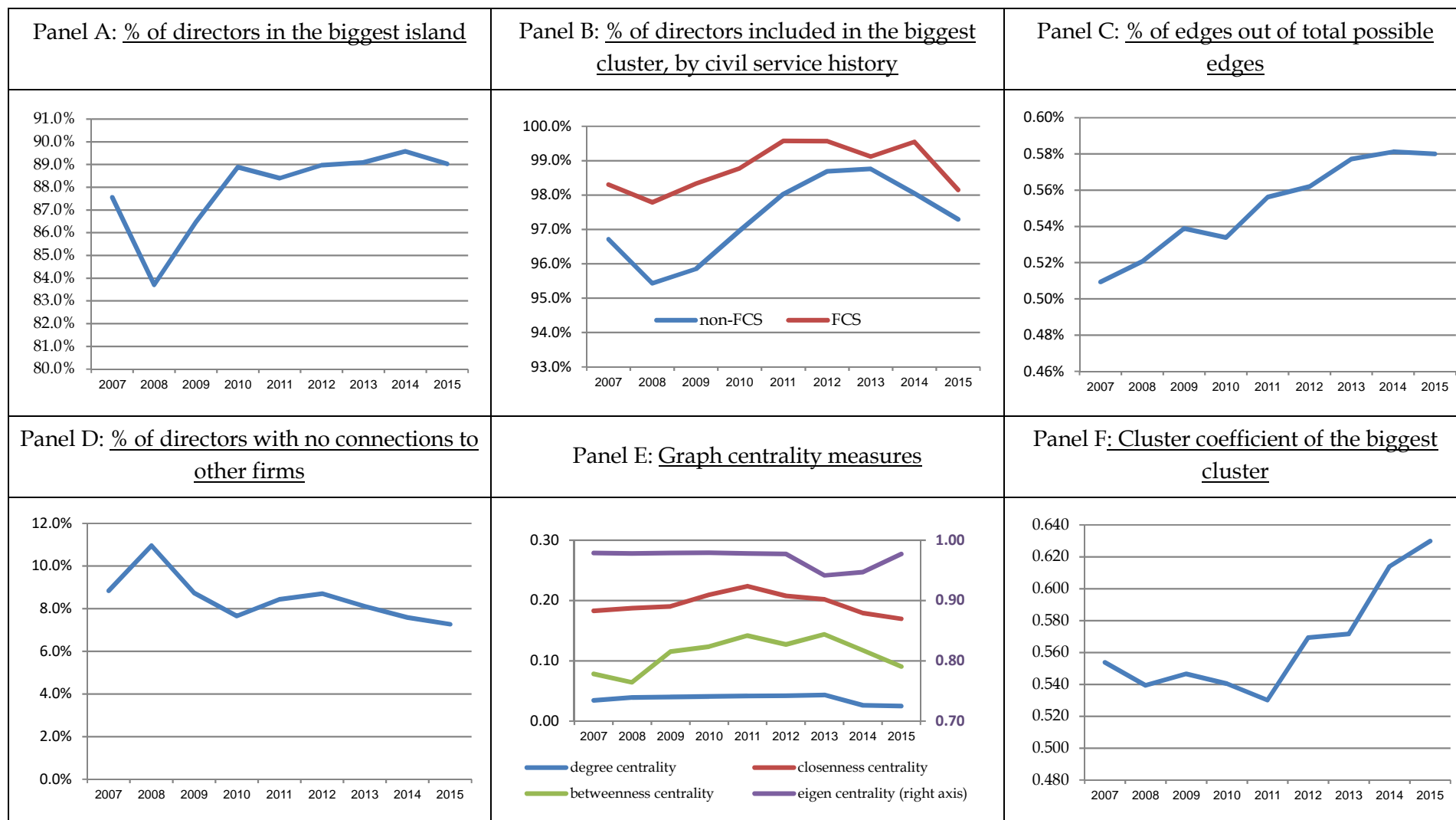|	All FCS	Senior level FCS only	Security Forces (IDF, police, Mossad, GSS)	Finance (MoF, ISA, BoI, Tax Authority, Antitrust)	Knesset	Minister	Local Authority	Former Regulator	Specific Experience
technology	-0.3997	-0.0321	-0.4825	-0.5581	0.0693	1.1099		0.6108	-0.2085
	(0.415)	(0.447)	(0.754)	(0.775)	(1.011)	(1.107)		(0.949)	(0.807)
banks	0.4843	0.366	-0.7468	0.1485	1.9605*		2.8563*		1.5502***
	(0.297)	(0.346)	(0.759)	(0.378)	(1.021)		(1.488)		(0.472)
insurance	0.3434	0.3591	-0.0581	0.3239	0.6926	1.5463***		0.5451	1.7426***
	(0.275)	(0.308)	(0.71)	(0.361)	(0.688)	(0.569)		(1.048)	(0.465)
commerce	0.3771**	0.3808**	0.5033	0.4329*	0.7288	1.0986	2.3616**	0.3205	0.4984
	(0.163)	(0.188)	(0.328)	(0.23)	(0.571)	(0.894)	(0.952)	(0.636)	(0.359)
real estate	0.2636	0.3572*	-0.0339	0.4216*	0.6307	1.1035	1.3047	1.9837***	0.8520**
	(0.169)	(0.194)	(0.347)	(0.243)	(0.488)	(0.746)	(1.096)	(0.4)	(0.335)
holdings	0.5866***	0.6181***	0.0983	0.6232**	0.5595	0.6972	2.3017**	0.7852	0.9527***
	(0.177)	(0.202)	(0.401)	(0.251)	(0.633)	(1.002)	(1.05)	(0.562)	(0.338)
gas and oil	1.0177**	1.4840***	1.4555*	1.4778***			2.9149		
	(0.398)	(0.388)	(0.747)	(0.467)			(1.86)		
year dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	5,787	5,787	5,787	5,787	5,787	5,787	5,787	5,787	5,787
McFadden's R-square	0.0376	0.0482	0.0521	0.0485	0.084	0.127	0.093	0.0835	0.0878
Cox and Snell's R-square	0.022	0.023	0.018	0.005	0.005	0.008	0.009	0.017	0.018

Figure 11. <u>Director's web structure: 2007 and 2015</u>

This figure illustrates the director's network structure. Nodes are directors and edges imply sitting in the same board. Orange nodes are FCS and white are other directors.

2007	2015
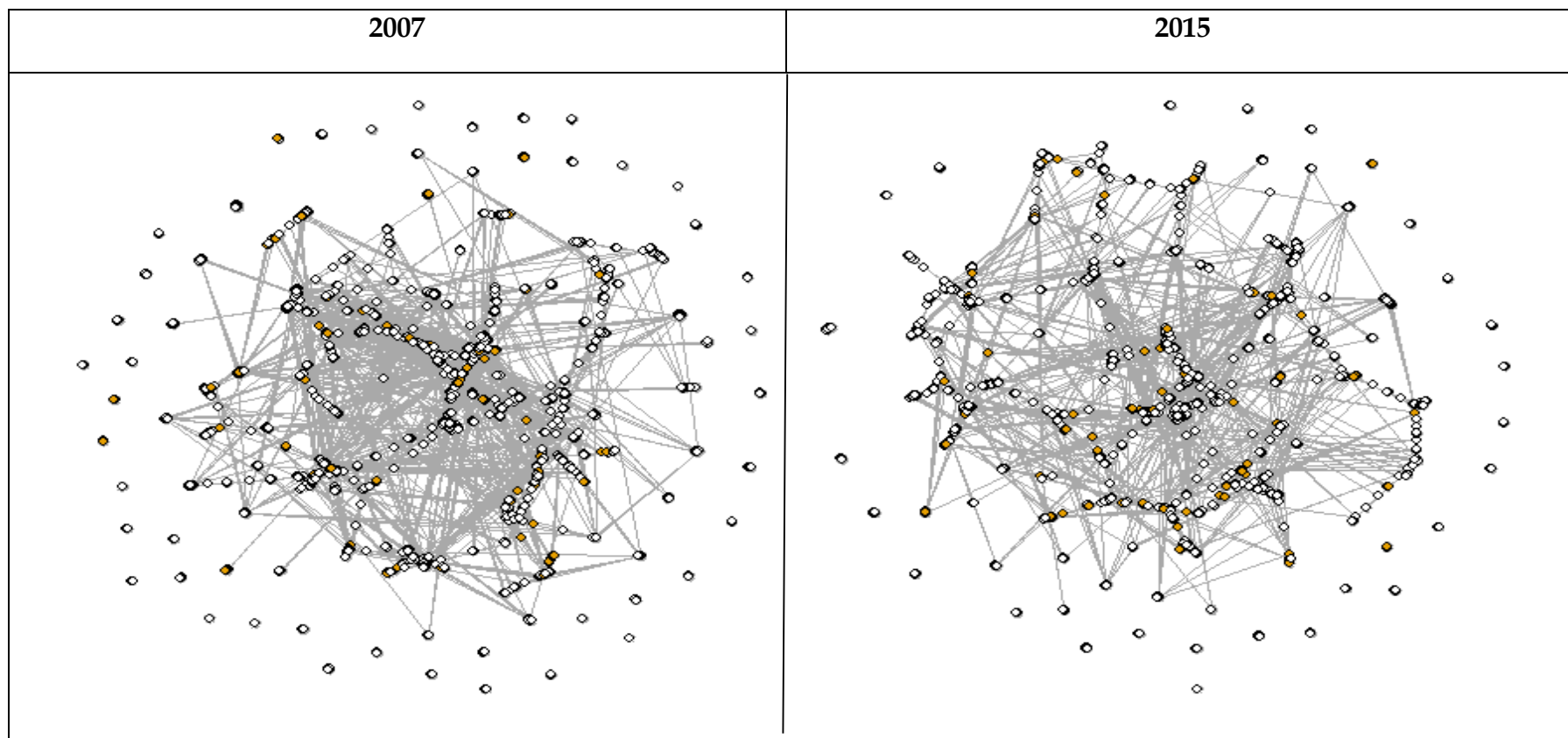
Figure 12. Directors' network attributes

This figure show various centrality and density measures of each year's directors' network.

Panel A: % of directors in the biggest island	Panel B: % of directors included in the biggest cluster, by civil service history	Panel C: % of edges out of total possible edges

Panel D: % of directors with no connections to other firms	Panel E: Graph centrality measures	Panel F: Cluster coefficient of the biggest cluster

Figure 13. **Mean centrality measures of directors, by civil service history**

These figures show the mean of various director-level centrality measures of each group: directors with no former civil service ("non-FCS") and those with ("FCS").

Table 13. Director's centrality measures regression analysis results

This table shows the results from a regression in which the dependent variable is one of the centrality measures of each director in the biggest island of the directors' network in the years 2007-2015. In the left panel, *FCS* is a dummy variable that takes 1 if the director is an FCS, and in the right panel it takes one only if he is a senior level FCS. *age* and *age_sq* are the age of the director and its squared term, *woman* takes 1 for a female director and *foreign* takes 1 for a foreign director, B.A., M.A. and Ph.D are three dummy variables for each degree level and *year* are dummy variables for year. *number of boards* is the number of boards the director sits on and *board size* is the number of directors on firm's board. Errors are clustered within director. Standard deviation are in parenthesis. *** indicates 1% significance, ** indicates 5% significance and * indicates 10% significance.

	all FCS					senior FCS				
	degree	closeness	betweenness	eigenvector	Bonacich	degree	closeness	betweenness	eigenvector	Bonacich
FCS	0.22342***	0.47784***	0.07336**	-0.25327	4.92096***	0.00393	0.25507	-0.13359	0.25662	-4.47721*
	(0.031)	(0.115)	(0.035)	(0.58)	(1.694)	(0)	(0)	(0)	(0)	(0)
number of boards		1.38624***	0.46736***	3.57780***	4.74934***		1.40835***	0.47084***	3.56589***	4.98042***
		(0.051)	(0.037)	(0.445)	(0.464)		(0.051)	(0.037)	(0.445)	(0.464)
boards size		0.37874***	0.02363	0.31472	0.52823		0.29078***	0.00073	0.85917***	-2.04590***
		(0.116)	(0.015)	(0.276)	(1.516)		(0.013)	(0.002)	(0.054)	(0.196)
B.A.	0.07753***	0.37874***	0.02363	0.31472	0.52823	0.09414***	0.41025***	0.02723*	0.30083	0.80177
	(0.017)	(0.116)	(0.015)	(0.276)	(1.516)	(0.017)	(0.116)	(0.015)	(0.276)	(1.516)
M.A.	0.13491***	0.41171***	0.03034*	0.57124**	0.30485	0.16798***	0.47653***	0.03729**	0.54369*	0.84907
	(0.019)	(0.119)	(0.016)	(0.291)	(1.513)	(0.019)	(0.119)	(0.016)	(0.291)	(1.513)
Ph.d	0.11308***	0.09201***	0.01007***	0.02602	-0.23417	0.14492***	0.60556***	0.08907***	0.60065	-0.21845
	(0.029)	(0.024)	(0.004)	(0.079)	(0.268)	(0.029)	(0.159)	(0.025)	(0.439)	(1.835)
age	0.00534	0.09201***	0.01007***	0.02602	-0.23417	0.00672*	0.09444***	0.01067***	0.02421	-0.19981
	(0.004)	(0.024)	(0.004)	(0.079)	(0.268)	(0.004)	(0.024)	(0.004)	(0.079)	(0.268)
age^2	-0.00002	-0.00068***	-0.00006**	-0.00004	0.00241	-0.00002	-0.00069***	-0.00007**	-0.00004	0.00229
	(0)	(0)	(0)	(0.001)	(0.002)	(0)	(0)	(0)	(0.001)	(0.002)
woman	-0.01679	0.25015	0.00117	0.50993	-2.50403*	-0.0178	0.04991	0.04098**	0.04393	3.64927**
	(0.017)	(0.166)	(0.014)	(0.417)	(1.441)	(0.017)	(0.087)	(0.017)	(0.253)	(1.832)
foreign	-0.09129***	0.25015	0.00117	0.50993	-2.50403*	-0.12119***	0.18927	-0.00548	0.53609	-3.02023**
	(0.015)	(0.166)	(0.014)	(0.417)	(1.441)	(0.015)	(0.166)	(0.014)	(0.417)	(1.441)
Intercept	0.19826*	13.69409***	-0.91647***	-13.04397***	65.69573***	0.14146	13.28417***	-0.81815***	-13.19246***	68.10576***
	(0.102)	(0.666)	(0.117)	(2.171)	(8.342)	(0.102)	(0.666)	(0.117)	(2.171)	(8.342)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,182	19,182	19,182	19,182	19,182	19,182	19,182	19,182	19,182	19,182
Adjusted R-squared	0.06781	0.38902	0.58194	0.29638	0.0972	0.03338	0.38649	0.58121	0.2963	0.09661

Table 14. <u>Director's centrality measures regression analysis results:</u>
<u>the deterioration effect</u>

This table shows the results from a regression in which the dependent variable is one of the centrality measures of each director in the biggest island of the directors' network in the years 2007-2015. Sample is limited to FCS with time since leaving the civil service lower than or equals 25 years. *years since CS* is the number of years since leaving the civil service, *years since CS* sq is its square term, *senior level FCS* is a dummy variable that takes 1 if the director was a high-ranked civil servant. *age* and *age_sq* are the age of the director and its squared term, *woman* takes 1 for a female director, B.A., M.A. and Ph.D are three dummy variables for each degree level and *year* are dummy variables for year. *number of boards* is the number of boards the director sits on and *board size* is the number of directors on firm's board. Errors are clustered within director. Standard deviation are in parenthesis. *** indicates 1% significance, ** indicates 5% significance and * indicates 10% significance.

	degree	closenness	betweenness	eigenvector	Bonacich
years since CS	0.03937***	0.07659	0.00017	-0.01137	-1.54776**
	(0.012)	(0.051)	(0.01)	(0.209)	(0.716)
years since CS sq	-0.00138**	-0.00192	-0.00014	0.00767	0.06465*
	(0.001)	(0.002)	(0)	(0.01)	(0.035)
Senior level FCS	0.27320***	0.64988	-0.24467*	1.23011	-1.25855
	(0.104)	(0.454)	(0.128)	(1.586)	(6.762)
number of boards		1.37337***	0.54072***	3.46713***	4.83800***
		(0.131)	(0.074)	(1.036)	(1.054)
boards size		0.23779***	0.00577	0.88144***	-1.43635***
		(0.026)	(0.008)	(0.173)	(0.427)
B.A.	0.15879	0.10647	-0.08641	1.56638	7.91956
	(0.107)	(0.557)	(0.061)	(1.238)	(7.23)
M.A.	0.22908**	0.10928	-0.13268**	-0.45141	2.87442
	(0.104)	(0.545)	(0.058)	(1.004)	(6.892)
Ph.d	0.29036**	0.10161	-0.039	0.45412	4.57311
	(0.14)	(0.57)	(0.099)	(1.648)	(7.338)
age	0.00103	0.37242***	0.08572***	0.07994	0.05257
	(0.023)	(0.082)	(0.028)	(0.504)	(1.718)
age^2	0	-0.00300***	-0.00067***	-0.00145	-0.00054
	(0)	(0.001)	(0)	(0.004)	(0.013)
woman	0.01705	0.31361	0.07946	-1.82881**	3.97569
	(0.074)	(0.265)	(0.079)	(0.773)	(6.567)
Intercept	0.08342	5.94676**	-2.98502***	-13.42305	58.42188
	(0.64)	(2.381)	(0.773)	(12.921)	(50.645)
Year dummies	Yes	Yes	Yes	Yes	Yes
Observations	2,335	2,335	2,335	2,335	2,335
Adjusted R-squared	0.076	0.48568	0.63111	0.27012	0.08806

Table 15. Director's centrality measures regression analysis results: civil service experience effect

This table shows the results from a regression in which the dependent variable is one of the centrality measures of each director in the biggest island of the directors' network in the years 2007-2015. Sample is limited to FCS. The independent variables include civil service experience, either in terms of their civil service institution they served (left panel) or the type of experience they bring to the firm. Control variables are the same as in Table 13. Errors are clustered within director. Standard deviation are in parenthesis. *** indicates 1% significance, ** indicates 5% significance and * indicates 10% significance.

	degree	closenness	betweenness	eigenvector	Bonacich	degree	closenness	betweenness	eigenvector	Bonacich
senior level FCS	0.22835**	0.58157	-0.23101**	0.50525	0.54934	0.36062**	0.69545	-0.23885	2.54479	-3.34876
	(0.094)	(0.393)	(0.115)	(1.441)	(6.155)	(0.149)	(0.45)	(0.145)	(2.77)	(5.116)
Security forces (IDF, GSS, Mossad, Police and Ministry of Defense)	0.0194	0.10936	-0.13389*	1.20431	-0.6486					
	(0.076)	(0.336)	(0.079)	(1.553)	(5.87)					
Financial offices (BoI, ISA, Antitrust, Tax authority, Ministry of Finance and Ministry of Economy)	0.30829***	1.00959***	-0.01835	2.91136**	-1.63547					
	(0.067)	(0.28)	(0.082)	(1.261)	(6.314)					
political figures (ministers or MKs)	0.12058*	-0.14518	-0.03244	-1.66807	0.99622					
	(0.071)	(0.316)	(0.06)	(1.47)	(5.146)					
government offices	0.14982**	1.08301***	0.03031	2.73944	8.50972					
	(0.066)	(0.259)	(0.078)	(1.7)	(7.736)					
Local Authorities	-0.12849*	-1.16342***	0.04735	0.19129	-9.46118					
	(0.074)	(0.444)	(0.076)	(1.423)	(6.072)					
Diplomat	-0.11708*	0.43253	-0.05415	3.2373	3.44071					
	(0.071)	(0.742)	(0.07)	(2.349)	(12.175)					
Specific Experience						-0.0009	-0.13181	-0.05360*	0.00994	-2.0377
						(0.037)	(0.2)	(0.032)	(0.661)	(2.652)
Managerial Experience						-0.2054	-0.18216	0.04095	-3.48013	4.91477
						(0.15)	(0.292)	(0.127)	(3.014)	(6.176)
Economic/Legal Experience						0.18957***	0.88666***	0.03559	0.71318	-2.09193
						(0.061)	(0.246)	(0.062)	(0.836)	(3.116)
former regulator						0.0797	0.34259	-0.01234	0.35678	2.58649
						(0.053)	(0.227)	(0.05)	(0.899)	(3.205)
Intercept	-0.2907	6.30498***	-3.16982***	-14.01884	64.81796	-0.4681	4.60386**	-2.95839***	-20.38683*	66.87966
	(0.625)	(2.207)	(0.815)	(13.084)	(49.987)	(0.542)	(2.261)	(0.727)	(10.484)	(56.926)
controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,550	2,550	2,550	2,550	2,550	2,335	2,335	2,335	2,335	2,335
Adjusted R-squared	0.1301	0.52807	0.63816	0.26772	0.10052	0.0950	0.49745	0.63169	0.26856	0.08608

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APPENDIX A. DETAILED DATA DESCRIPTION

Manager data	Description	Notes
Year		
Firm	Name and company ID	
Manager's name		
Role in firm's management	A set of dummy variables for director, chairman of board, outside director, CEO, and other type of executive	Manager can have more than one role (e.g., CEO and director)
Date of appointment	When manager has more than one role and data is available, each role's date of appointment is taken	
Birth date		
Gender	0=female, 1=male	
Foreign citizen	Dummy variable (1=yes, 0=no)	
Academic degree	0=no academic degree, 1=B.A., 2=M.A., 3=Ph.D.	
Has civil service experience?	Dummy variable (1=yes, 0=no)	
Civil service experience	A dummy variables for each civil service experience in one or more of the following institutions or roles: Israel Defense Force, Police, Secret Services (GSS and Mossad), Knesset member, minister, Diplomatic service, Bank of Israel, Israel Securities Authority, Antitrust, Tax Authority, Local Authorities, advisor to a civil servant and specific government offices (see table below)	Manager can have more than one civil service experience (e.g., Knesset member and IDF Chief of Staff)
Rank in his last civil service role	Three levels: head of institution, senior official and working-level official.	The last rank in civil service. "Senior FCS" includes senior officials and head of institutions.
Type of experience former civil servant brings to the firm	A set of dummy variables for managerial experience (if he was a manager), specific experience (if he served in a related civil service institution) or economic/legal experience (if he served in an economic, financial, or legal civil service institution).	Manager can bring more than one type of experience to the firm

Examples of each type: head of the Office of Construction brings managerial and specific experience to a construction firm, while former Tax Authority worker brings only economic/legal experience to this firm |

Did he serve in a regulating institution?	Dummy variable (1=yes, 0=no)	A wider definition includes Antitrust and ISA as regulating institutions
Firm data	**Description**	**Notes**
Board size		
Market value		
Total balance		
Capital book value		
Total liabilities		
Total revenue		
Leverage	Total liabilities / Total balance	
Return on equity (ROE)		
Equity multiplier		
Dual-listed firm	Dummy variable (1=yes, 0=no)	
Private firm	Dummy variable (1=yes, 0=no)	
Controlling person	Dummy variable (1=yes, 0=no)	
TASE industry classification	Financial Services, Banks, Biomed, Technology, Insurance, Commerce and Services, Construction and Real Estate, Manufacturing, Investments and Holdings, Oil and Gas Exploration	
TASE sub-industry classification		
CBS industry classification	1 to 4 digits	
Total face value of traded bonds		
Average yield of traded bonds		
Average spread of traded bonds		
Average duration of traded bonds		
Average rating of traded bonds	In a numerical rank, from 1 (highest quality) to 10	Weighted average by bond market value

Civil service institutions in the database

Civil service institution	Notes	Definition of ranks within institution
IDF (Army)	Only officers from the level of Lieutenant Colonel (*Sgan Aluf*) are considered.	Head – Chief of General Staff (*Rav Aluf*) and Major General (*Aluf*), Senior – Brigadier General (*Tat Aluf*), Colonel (*Aluf Mishne*) and Lieutenant Colonel (*Sgan Aluf*)
Police	Only officers from the level of Chief Superintendent (*Sgan Nitzav*) are considered. Also included are the top 2 ranks in the Israel Prison Service and the Israel Fire and Rescue Services	Head – Commissioner (*Rav Nitzav*) and Deputy Commissioner (*Nitzav*), Senior – Assistant Commissioner (*Tat Nitzav*), Commander (*Nitzav Mishne*) and Chief Superintendent (*Sgan Nitzav*).
GSS		Head – the head of the GSS and its Departments.
Mossad		Head – the head of the Mossad and its Departments.
Minister	A member of the government	Head.
Member of Knesset (MK)		Head.
Diplomat	An ambassador or council	Senior.
Israel Security Authority (ISA)		Head – the head of the ISA and its Departments. Senior – deputies or heads of second-layer units. Workers – other.
Antitrust Authority (today known as Israel Competition Authority)		Head – the head of the Authority and its Departments. Senior – deputies or heads of second-layer units. Workers – other.
Bank of Israel (BoI)	Banking supervision is done by the Bank of Israel	Head – the head of the BoI and its Departments. Senior – deputies or heads of second-layer units. Workers – other.
Ministry of Finance		Head – the general manager of the Ministry and its Departments. Senior – deputies or heads of second-layer units. Workers – other.
Tax Authority	A unit of the Ministry of Finance	Head – the head of the Authority and its Departments. Senior – deputies or heads of second-layer units. Workers – other.
The Budget Department	A unit of the Ministry of Finance	Head – the head of the Department. Senior – deputies or heads of second-layer units. Workers – other.

The Capital, Insurance and Savings Department	A unit of the Ministry of Finance. In November 2016 it became an independent authority.	Head – the head of the Department. Senior – deputies or heads of second-layer units. Workers – other.
Ministry of Prime Minister		Head – the general manager of the Ministry and its departments. Senior – deputies or heads of second-layer units. Workers – other.
Ministry of Economy		ditto.
Ministry of Interior		ditto.
Ministry of Transport		ditto.
Ministry of Communications		ditto.
Environmental Protection Ministry		ditto.
Ministry of Religious Services		ditto.
Ministry of Defense		ditto.
Ministry of Construction and Housing	Including the Israel Land Administration	ditto.
Ministry of Health		ditto.
Ministry of Agriculture and Rural Development		ditto.
Ministry of Justice		ditto.
Ministry of Energy		ditto.
Ministry of Foreign Affairs	Excluding diplomatic staff	ditto.
Ministry of Tourism		ditto.
Local Authorities	Including city councils, regional councils, local councils	Head – the head of the Local Authority and its Departments. Senior – deputies or heads of second-layer units. Workers – other.
Advisor	An official advisor of a high-level civil servant (e.g., Prime Minister, Minister, Head of Department, etc.)	

APPENDIX B. CONSTRUCTING AN INDUSTRY REGULATION INDEX (IRI)

Purpose

The contribution of regulation to business conduct and consumer protection is indisputable. In recent years, the right quantity of regulation has been a theme of many discussions in many countries, and reducing regulatory burden has emerged as a crucial issue. However, quantifying the regulatory burden imposed on a firm is a great challenge, with no clear consensus on how it is to be done.

The most popular method constructed for the U.S. economy uses the number of pages in the Code of Federal Regulations devoted to each industry (Dawson and Seater, 2013) or the sizes of digitized versions of state-level statutes as a proxy for real state-level regulation (Mulligan and Shleifer, 2005). Coffey et al. (2012) proxy the total number of pages published annually and quarterly in the Federal Register, the United States government's daily journal of bureaucratic activity, including proposed and final regulations. Crews (2011) counts both the annual number of final regulations published in the Federal Register and the annual number of Federal Register pages devoted to final regulations. An important recent work is Al-Ubaydli and McLaughlin (2017), who use text analysis to count binding constraints in the wording of regulations, as codified in the Code of Federal Regulations, and to measure the applicability of regulatory text to different industries. The database, called RegData, quantifies the regulatory burden imposed on every industry in the U.S., and spans from 1997 to 2012.

In the absence in Israel of a report similar to the Code of Federal Regulations, I adopt an alternative method for quantifying the level of regulation in each industry.

My first source is the Governmental Book of Regulators. This is an official document written within the framework of Government Resolution no. 708, which authorizes the General Manager of the Prime Minister's Office to map the regulators in the government to their relevant industries. The Book was published in June 2015 and identifies the regulating unit in each government office and its function. For example, within the Ministry of Economy there is a unit supervising hazardous toys. According to the description, its function is to publicly announce toys it deems hazardous and to set regulations for their use.

In the first step I manually find which regulators regulate each industry, using the 1993 CBS industry classification, which classify firms by 1-, 2-, 3- and 4-digit level classification. Some of the regulators regulate a 2-digit industry, some a 3-digit industry, and some only a 4-digit industry. For example, the supervisor of diamonds is a relevant regulator for all firms whose 2-digit industry classification is 12 (diamond mining) or 37 (diamond industry) and for firms whose 4-digit industry classification is 5135 (wholesale trading in diamonds) or 5136 (diamond brokerage). An industry might be regulated by more than one regulator. For example, manufacturing of medical, scientific, or industrial equipment for control and supervision (2-digit industry classification 34) has five relevant regulators: two within the Ministry of Economy: Supervisor of Weights, Measurements, and Standards, Supervisor of the Export of Dual-Purpose (i.e., civilian and military) Equipment; two within the Ministry of Health: Directorate of Medical Technologies, Medical Device Division; and one within the Ministry of Defense: Defense Export Controls Agency.

Some of the regulators are relevant for all industries. For example, the Equal Employment Opportunity Commission, which enforces the Employment (Equal Opportunities) Law 1988-5748, does not focus on one or a few industries but rather on every industry that employs people. Another example is the Antitrust Authority. In addition, there are regulators who act as an independent authority and not a government office, such as the Bank of Israel as the banking supervisor. I include these authorities as well.

This mapping enables me to count the number of units that regulate each firm within a given industry. However, not all regulators are equal: there is only one banking regulator while there are a few regulators for small agricultural industries. Ignoring the scope of regulation can be misleading when it comes to rating the regulatory burden that is imposed on a firm. Therefore, I take the following steps in order to get some quantifiable measure of the scope of regulation of each unit.

Nevo (2015) develops a methodology for assessing the size and scope of the Israeli regulatory budget. Using Israel's State Budget Report for 2014, Nevo identifies the exact budget of each regulatory unit in each government office. To this direct regulatory cost

he adds the relative cost of each unit (based on the number of workers in the unit) that serves the entire office, e.g., the cost of the technical support unit, human resources, etc. Aggregating the budget for each regulatory unit over the office and dividing it by the total office budget yields the regulatory budget of each office.

I utilize Nevo's calculation of each office's regulatory budget to assign each regulatory unit its own budget. In some cases, the regulatory unit explicitly appears in Budget Report and so its total budget is directly known. However, this is not usually the case. Therefore, I calculate the budget in the following way: using the Governmental Book of Regulators, I find for each office the number of regulating units and then divide the total regulatory budget, as calculated by Nevo, by the number of regulating units. In this way I roughly know the budget of each unit, since the total regulatory budget belongs only to these regulating units. Then, using the matching between regulatory units and industries, I calculate the sum of budget invested in all regulatory units relevant to an industry. Since industries differ from each other in size, I divide the total budget by the number of businesses in each industry. As an alternative, I divide the total budget by the number of employees in each industry instead of the number of businesses.

Some exceptions are dealt with separately, using other sources of information. For example, the Banking Supervision Division of the Bank of Israel is the banking regulator, and so I take the share of employees working in the Division and multiply it by the sum of the expenses for salaries and related functions (IT, HR, etc.). Dividing the sum by the number of regulated entities (bank and credit card companies) yields the amount of regulation imposed on firms in this industry.

The above calculations result in two regulation measures for fifty-four 2-digit industries, two 3-digit industries, and seven 4-digit industries. I match between firms and regulation measures using the most detailed level of industry. Therefore, if a firm belongs to one of the seven 4-digit industries for which I have regulation measures, these measures are attached. If not, I check whether the firm belongs to a 3-digit industry and attach these regulation measures. If not, I attach the 2-digit industry regulation measures. The natural log of the attached regulation measure is the Industry Regulation

Index (IRI), while the index that divides the regulation cost by the number of employees in each industry is the employee-adjusted Industry Regulation Index (eIRI).

The advantage of these measures, as opposed to word- or page-counting, is that they are based not on the number of regulations but rather on the resources invested in regulation. Words and pages are almost free, while resources are costly. Using the budget the state allocates to produce regulation is more accurate and better reflects the real regulatory burden imposed on firms. However, since some of the regulating units not only create regulations but also monitor compliance, the index is a biased measure of regulation and is more precisely both a regulation, monitoring and compliance index. I see this alleged bias as an advantage for the purposes of my research since firms might be motivated to employ former civil servants to help them cope not only with regulations that limit in some way their conduct of business but also with the work entailed by compliance. For example, banks may employ a former banking regulator to help them better understand capital requirements, but also to help them more efficiently prepare for the on-site inspections regularly conducted by regulators.

While the IRI can be related to the regulatory burden imposed on different industries, it might also be a consequence of firms' behavior in that industry. Under this view, the index might also measure the level of corruption or misbehavior in the industry.

These measures have two shortcomings. First, the implementation of the methodology is time-consuming and so a time series of this index is hard to produce. Second, there are economies of scale in regulation and inspection: the budget needed for regulating and inspecting 100 entities is not twice as much as the budget needed for 50 entities. In the same sense, regulation can be very inexpensive for the regulatory unit to produce but very expensive for the regulated firm to bear.

The IRI of 54 industries is presented in Figure B.1 (dashed lines represent industries in which the number of businesses is very small) and the eIRI is presented in Figure B.2. In the absence of a clear benchmark by which the index results can be examined, the only measure is the common perception of the extent of regulation each industry is under. According to the IRI, the most regulated industry is the mining of ores and diamonds. However, as indicated by the dashed line, this industry includes very few

firms and therefore the results can be misleading. The same goes for the next most regulated industry, the extraction of crude petroleum and natural gas. The banking industry is in third place, in line with the common perception that this industry is heavily regulated. Surprisingly, the insurance and social insurance funds industry is in the lower part of the distribution. The explanation is that although the regulatory budget is relatively high, the number of businesses is very large and so the quotient is small. In addition, every individual fund is legally listed as an independent business, while in fact most of the funds are subsidiaries of 40 big firms. Dividing the total regulatory budget by this figure instead of the official number of businesses yields a much higher index that reaches tenth place in the index, which better accords with the common perception of the extent of regulation for this industry. All the results included in the paper are not sensitive to this variation. They are also not sensitive to the replacement of the IRI with the eIRI, partly because of the high correlation between these two measures (0.74).

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Figure B.1. The Industry Regulation Index (IRI)

This figure shows the Industry Regulation Index (IRI) of fifty-four 2-digit level CBS industries. The index is based on the regulatory units that regulate each industry, the budget allocated to these units, and the number of firms in the industry. From the total cost I take the natural log. Dashed lines indicate industries with a very small number of firms.

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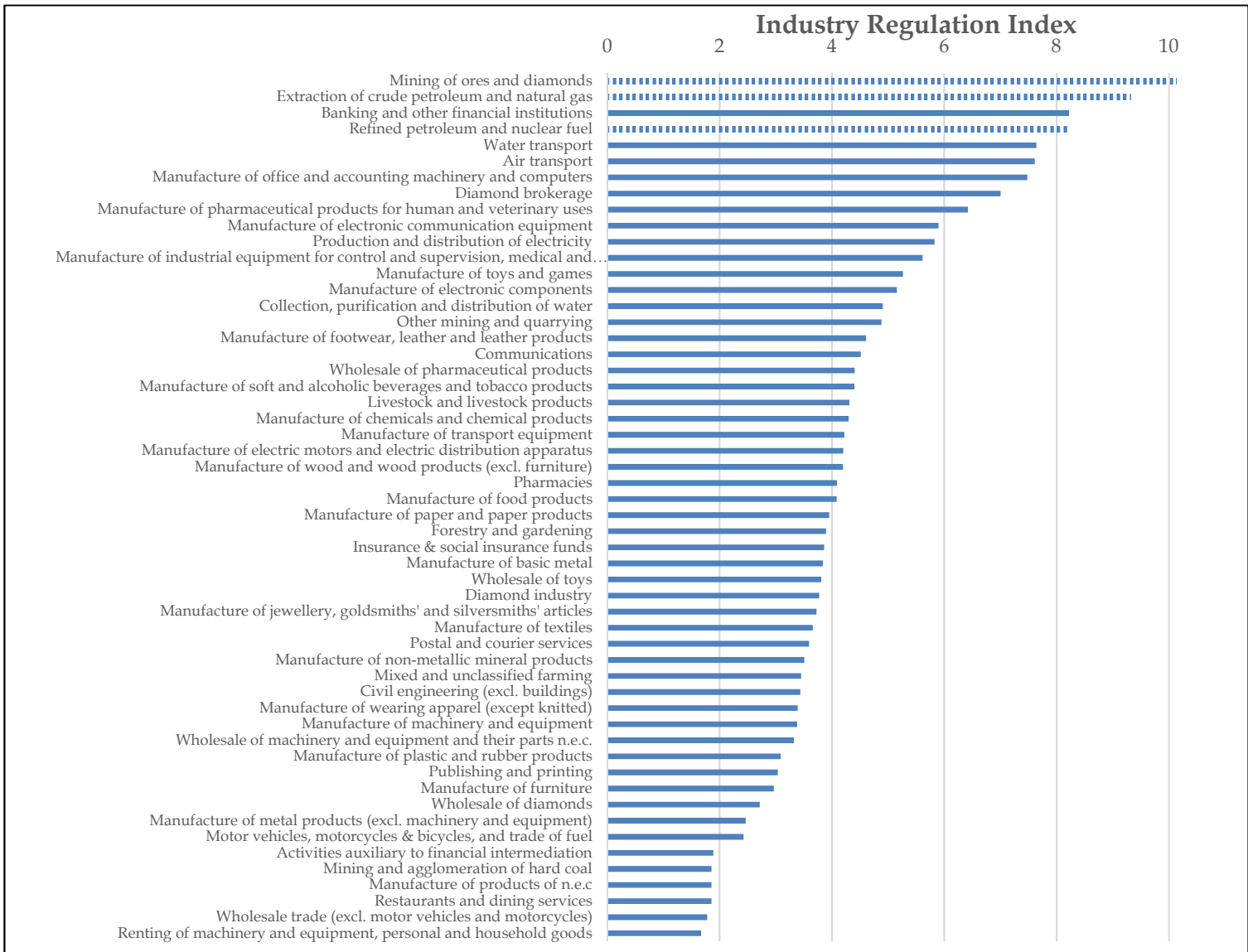
Figure B.2. The Employee-adjusted Industry Regulation Index (eIRI)

This figure shows the employee-adjusted Industry Regulation Index (eIRI) of fifty-four 2-digit level CBS industries. The index is based on the regulatory units that regulate each industry, the budget allocated to these units, and the number of employees in the industry. From the total cost I take the natural log.
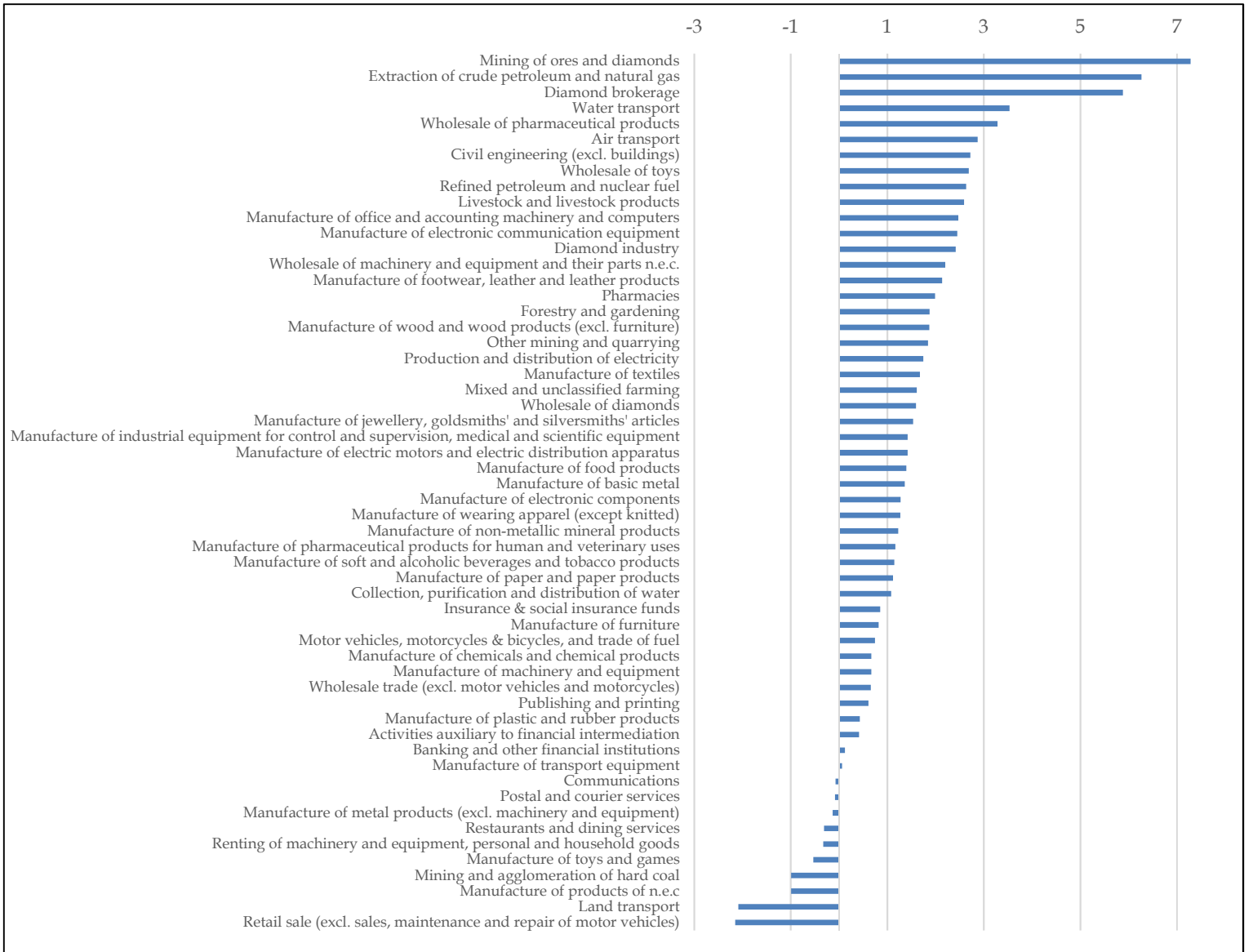
## APPENDIX C. A SHORT NETWORK ANALYSIS OF A FIRM'S NETWORK

I run the same tests as in my analysis of the network of directors, except that now the network consists of firms. The basic difference between firms is whether they are connected or not.

Not surprisingly, at the aggregate level I obtain similar results to those for the network of directors: the network becomes more connected, with the biggest island becoming bigger over the years and the number of isolated firms declining. However, the two networks differ in their overall characteristics. While the directors' network becomes denser over time, the firms' network – as reflected in the density measure and the clustering coefficient – is steady. This difference might imply that the higher number of connections within the directors' network is not due to new connections between firms, but rather to new connections between directors in firms that were already connected. In other words, the number of new connections between firms did not increase (from an aggregate point of view), but rather the number of connections between already connected directors increased.

Moving to the firm-level centrality measures, public administration connected firms are found to be more central in some measures, compared to non- public administration connected firms. This is true for the betweenness and closeness measures, while in other measures (degree, eigenvector, and Bonacich centrality) the difference is not significant in most years. The interpretation of this result is that public administration connected firms occupy more central positions in the network, even though they are not directly connected to more firms (as reflected in the *degree centrality* measure). In addition, and in line with the findings about the directors' network, public administration connected firms are not found to be more connected to more central firms (as reflected in the *eigenvector* and *Bonacich centrality* measures). Figures C.1 and C.2 summarize the results.

Figure C.1. <u>Firms' Network Characteristics</u>

These figures show various centrality and density measures of each year's firms' network.
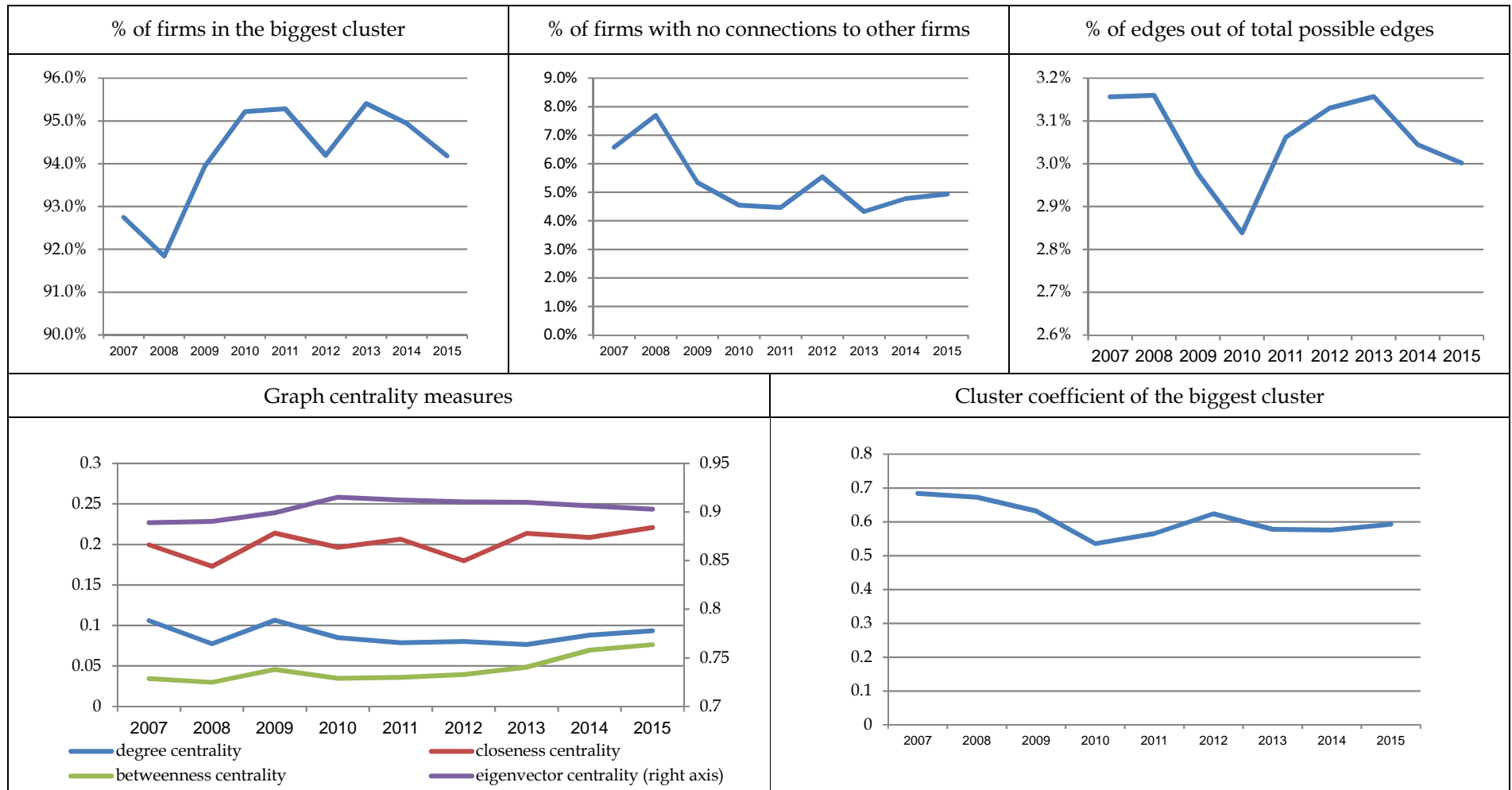
Figure C.2. <u>Mean Centrality Measures of Firms, by Presence of Former Civil Servant</u>

These figures show the mean of various firm-level centrality measures of each group: Firms with no former civil servants ("Not CS") and those with ("CS").