Resource Allocation in Post-Conflict Power Sharing Arrangements – Evidence from Lebanon

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Abstract. Post-conflict power-sharing arrangements not only allocate political power but also economic resources among powerful elites. This article investigates the mechanisms of rent allocation of a major source of such resources: Public procurement of large infrastructure projects. We analyze a new dataset of all infrastructure procurement contracts awarded between 2008 and 2018 by Lebanon's Council of Development and Reconstruction (CDR), the major state institution to implement large infrastructure projects after the country's civil war (1975-1990). We qualify the extent to which politically connected firms capture larger contract values by differentiating the "quality" of their connections. We find that connected firms capture larger project values, however, only those firms that are connected directly to the board of CDR and their political protégés, rather than the wider set of powerful political elites. We argue that the arrangements to share economic resources are based on collusive networks, upheld by norms of power-sharing behavior.

JEL: D72, D73, O17

1. Introduction

Post-conflict power-sharing arrangements (PSA) often rest on a complex set of interrelated mechanisms to share political and economic resources (Hartzell and Hoddie, 2003, 2020). Next to political, territorial, and military PSAs, provisions for sharing of economic resources are imperative for many minority groups that could otherwise lose their access to resources necessary to ensure their survival (Linder and Bächtiger, 2005). Previous research on these mechanisms has largely focused on formal provisions for sharing economic resources in terms of a country's natural resource wealth, such as the control over mines or oil fields (Binningsbø, 2013; Hartzell and Hoddie, 2014) often guaranteed by groups' ability to exert physical force (Berman *et al.*, 2017). Natural resources, however, only constitute but one source of economic rents which not all states with PSAs possess.

This article investigates how PSAs allocate rents of another major resource: Public procurement of large infrastructure projects, one of the most important sources of rents for political elites in both developed and developing countries. Elites allocate state resources to cronies and connected firms in exchange for political and financial support by leveraging their discretionary power over parts of the procurement process. Given that procurement accounts for 12.6% of gross domestic product (GDP) in high-income countries and 13.6% in upper-middle income countries on average (in 2015) (Djankov, Islam and Saliola, 2016), public procurement offers ample incentives for elites to interfere (Bosio *et al.*, 2020). Even in countries with strong legal systems, such as the United States or many OECD countries, can political connections of a firms' board members have a significant impact on the allocation of public resources (Goldman, Rocholl and So, 2013; Hessami, 2014).

We focus on the case of Lebanon, where elites agreed to share power in a sect-based consociational democracy after a prolonged civil war (1975-1990). Numerous accounts qualify how political elites use public procurement to generate and allocate rents. The general conclusion of these works is that the institutions used for these purposes are an integral mechanism of Lebanon's PSA by balancing the rents generated across communities according to their socio-economic power (Dibeh, 2005; Le Borgne, Jacobs and Barbour, 2015; Mahmalat, 2020). The ethnographic accounts of Leenders (2012), for example, uncover salient corruption examples that showcase the ease with which powerful elites circumvent public accountability mechanisms in procurement processes independent of their formal political position. Baumann (2017, 2019) outlines how elites leveraged a neo-liberal policy agenda to minimize the role of the state, including its accountability institutions, for the benefit of connected firms and individuals. Salloukh (2019) shows how sectarian considerations pervade the staffing of virtually all institutions of the public sector, including public procurement institutions, and thereby undermine their independence.

The Council for Development and Reconstruction (CDR) plays a particularly important role in financing the PSA. As a formally independent institution, the CDR enjoys special prerogatives to plan and execute large public infrastructure projects of which it has handled the vast majority after the civil war (1975-1990). The CDR has awarded 394 contracts for infrastructure projects from 2008 to 2018 alone, totaling $3.98 billion that involved $1.76 billion in foreign funding, thereby vastly outspending other procurement institutions until the 2019 public budget has cut back on capital expenditures (figure 1). In the absence of natural resources, the CDR became a central pillar of the PSA by providing a major source of rents for sectarian elites. The words of a former government official we interviewed for this project illustrate its importance: "The CDR was established to bypass the system. Over time, it became a 'state within the state', taking on additional functions to the extent that the whole state functioned through CDR. […] [That way, CDR became] critical for the survival of [elites]."

Figure 1: Share of infrastructure procurement to total government expenditures by institution
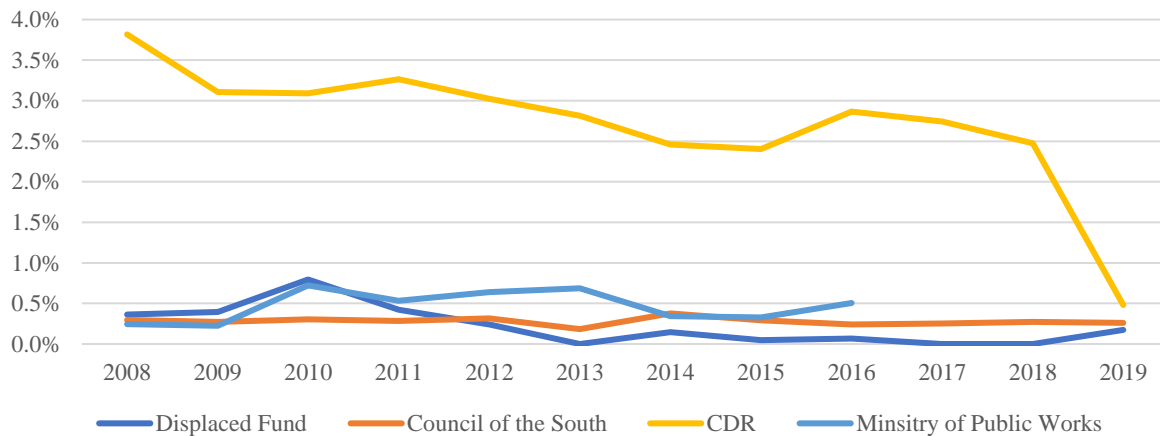
We investigate how political connections of winning firms determine contract values by leveraging a new dataset on all contracts awarded by the CDR from 2008 to 2018, as well as a series of expert interviews. Notably, we are not interested in understanding whether politically connected firms (PCF) are *more likely to win* a contract.[1] They probably are. As a quote of the chief executive officer (CEO) of a major infrastructure developer we interviewed illustrates: "Don't even think of bidding [for a CDR contract] if you are not connected." Instead, we investigate what kind of political connections receive *larger* contracts and how elites use formal institutions to share economic resources.

More specifically, we seek to verify two competing narratives on how the rents from valuable procurement contracts are distributed among elites. The first narrative upholds that the allocation of rents reflects the extent to which elites are able to penetrate formal procurement institutions with loyal personnel. In this world, the control over institutions, rather than the allocation of resources distributed by them, reflects the balance of power among elites. This account is supported by the works of Leenders (2012), Dibeh (2005), Salloukh (2019), among others, who discuss how each of the dominant sectarian elites gained control over one of the state's procurement institutions in order to balance the access to the rents so generated. The allocation would be upheld by norms of power and resource sharing in that elites generally abstain from contesting once-allocated resources with (threats of) force.

The second narrative purports that the allocation of procurement contracts is balanced within the institution itself, rather than predetermined by who presides over it. In this world, contracts are awarded to PCFs irrespective of the specific composition of the prevailing governments or the members of the board of directors of the CDR itself. This view is supported by previous evidence and numerous accounts that emphasize the influence elites can exert on procurement and construction processes via (the threat of) physical force in their specific region of influence.[2] Powerful actors and their militias are generally more likely to use violence to defend their access to resources when these increase in value (Berman *et al.*, 2017). In Lebanon, Rizkallah (2017) shows how elites can quickly mobilize supporters, including militias, to defend their regions and interests. Mahmalat and Curran (2020) discuss how elites leverage veto powers to impede decision-making on legislation that affect their prerogatives. Without

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[1] Investigating whether connected firms are more likely to win projects would be an elusive endeavor. Not only does CDR conceal the details of tenders the individual quotes of firms. In non-competitive environments, non-connected firms are less likely to bid in this first place. Moreover, price collusion distorts the value of bids. Finally, the allocation of projects itself might not be exogenous but a function of elite-level influence itself in that elites place projects where their firms have higher chances to win.

[2] The influence of local elites increased especially after the withdrawal of Syrian troops in 2005. New elites emerged, some of which are from dedicated parties, making decision making processes more complex (Mahmalat and Curran, 2020).

the consent of elites, it is argued, elites would threaten to use physical force to defend their interests and make sure their connected firms win. Public works would be prone to sabotage and are therefore distributed among elites from their inception.

In other words, is the value of infrastructure project contracts driven by the extent to which elites can use the formal procurement process in their favor, or the threat of physical force in their region of influence?

While not claiming to be mutually exclusive, we investigate which mechanism prevails by qualifying the political connections of each firm that won at least one public procurement contract from CDR between 2008 and 2018. We follow previous studies in defining a firm to be politically connected if at least one of its board members or the CEO is a politician her/himself, a close relative, or a publicly known friend (Faccio, 2006; Rijkers *et al.*, 2014; World Bank, 2015; Diwan and Haidar, 2020). We depart from this literature, however, in classifying the "quality" of connections and allocate each firm to either of two groups of politicians. "PCF1" firms are those connected to the members of the CDR board or the small group of elites that have instated the board members and therefore reserved a "seat at the table". "PCF2" firms, instead, are those connected to any minister, member of parliament, or other party elite that held office during this period. That way, we distinguish the influence these groups can exert on the procurement process. If argument one above holds true, PCF1 firms should capture the majority of contract values. If argument two holds, a wider set of political elites should be able to influence the procurement process.

We show that mechanism one prevails. Firms with connections to elites that were able to secure a seat at the table at the board of CDR receive significantly larger contracts of about 40% vis-à-vis the average contract. This effect is by an order of magnitude larger than what other studies find (for example Goldman, Rocholl and So, 2013; Baránek and Titl, 2020) and is robust to numerous controls, including firm characteristics and various fixed effects. PCF2 firms, by contrast, are not more likely to win larger contracts despite their larger networks to powerful political elites.

We argue that it is elite-level influence, rather than the superior skills of firm owners and managers, that drives this result. We discuss two specificities in CDR's governance and conduct additional regressions to show that elite-level collusion occurs during the project implementation stage. Supporting the exchange of information and guarantees among CDR and firms, elites maintain complex networks to ensure that the "right" firm wins a contract. Among others, we show that PCF1 firms received even lager contracts during election years, in line with classical theories of clientelist exchanges (Hicken, 2011; Stokes *et al.*, 2013; Cammett, 2014; Corstange, 2016).

We make two notable contributions to existing literature. First, we contribute to the literature on PSAs and the ongoing debate about the mechanisms by which they sustain (see Binningsbø, 2013, for a review). This literature has largely focused on the political mechanisms of power sharing and the way PSAs distribute different state functions among groups, such as the military or executive power. However, it has largely remained silent on the mechanisms by which PSAs allocate economic resources other than natural ones, apart from having established that PSAs generally facilitate corrupt behavior (Haass and Ottmann, 2017). Our results follow an emerging strand of research that highlights how norms, behavior and attitudes of elites determine the success of PSAs to sustain peace (Hartzell and Hoddie, 2014; Bunte and Vinson, 2016; Bormann *et al.*, 2018). CDR provides a salient example of how formal institutions can provide elites with the framework and assurances necessary to abide by norms of bargaining and mutual consensus for resource allocation, rather than contesting it by (threats of) force.

Second, we contribute to the literature that investigates the effects of politically connected firms on economic outcomes. Previous studies show how political connections of board members boost a firm's corporate value (Fisman, 2001; Faccio, 2006; Goldman, Rocholl and So, 2009) while the presence of PCFs hinders job creation and competitiveness of affected sectors (Rijkers *et al.*, 2014; World Bank, 2015). Evidence from Lebanon is available on the effects of political connections on job creation (Diwan and Haidar, 2020), the concentration of procurement contracts (Atallah *et al.*, 2020), and political outcomes (Chaaban, 2019; Mahmalat and Atallah, 2019). Recent contributions have moreover qualified the extent to which PCFs are able to receive more or higher value public procurement contracts, both in developed and developing countries (Goldman, Rocholl and So, 2013; Hessami, 2014; Hudon and Garzón, 2017; Baltrunaite, 2020; Dávid-Barrett and Fazekas, 2020). To our knowledge, Goldman, Rocholl and So (2013) provide the only study trying to indicate what kind of political connections matter in the value of procurement contracts. Focusing on the US, the authors differentiate board members as to having had previous experience in the sector or having been a former senator or congressman, among others. While their results indicate that the kind of connection is not significant in explaining contract values, our results show that in countries in which elites can easily penetrate weak bureaucracies, such as many post-conflict PSAs, the quality of political connections matters.

Our study has a high contemporary relevance. Governments worldwide consider large infrastructure programs as a central component of recovery from the economic fallout induced by the COVID-19 pandemic. Mobilizing unprecedented sums makes continuous improvements in project implementation and monitoring a top priority. For Lebanon specifically, significant amounts of international development assistance are required to recover the damage of the Beirut port explosion of 4 August, 2020 (World Bank, 2020) and to implement a large Capital Investment Plan pledged to be largely funded by foreign donors (Atallah, Dagher and Mahmalat, 2019). To improve project implementations, we will present policy recommendations to enhance the competitiveness of tenders and, more generally, of how to prevent elite-level collusion in the design of institutions.

Section 2 provides a brief review over the governance of CDR. Section 3 describes the data and methods used in the empirical section. Section 4 and 5 provide univariate and multivariate analyses. Section 6 discusses the results. Section 7 concludes.

2. "Island of Efficiency": The Role of CDR in Lebanon's Public Procurement

Public procurement refers to the process by which governments and state-owned enterprises purchase goods, services, and public works.[3] A procurement contract, then, refers to the legal documents that define the scope and terms and conditions of the interaction, including the goods and services provided and their monetary compensation. As public procurement generally accounts for a substantial proportion of total government expenditures, procurement processes tend to be highly standardized to ensure high quality works and service delivery, minimize potential for corruption, and provide the best value for money for citizens.

In Lebanon, public procurement is highly decentralized and leaves its management to each individual institution. This includes the CDR. Established in 1977 through Legislative Decree No. 5,[4] the CDR was supposed to lead the reconstruction process after the first two years of the civil war (1975-1990) led to large-scale destruction. As the Ministry of Planning had ceased to exist at the time and public

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[3] Official definition of the Organization for Economic Co-operation and Development. Available at: http://www.oecd.org/governance/public-procurement/ [Accessed: January 28 2021]

[4] Legislative Decree No. 5 is available on the CDR webpage at: https://www.cdr.gov.lb/CDR/media/CDR/About/decree5e.pdf [Accessed: January 28 2021]

institutions were divided and suffered from an acute shortcoming of human resources, the CDR was mandated to be a reliable interlocutor with international donors. As Salim El-Hoss, prime minister at the time, later commented:

> "The public administration was inefficient, divided by the war, and riddled with corruption. Obviously, if the entire state had participated in the [reconstruction] process, it would have been necessary to launch an enormous campaign entailing far-reaching administrative reforms. But at the time we didn't want to make the reconstruction plan dependent on the initiation of reforms for which we knew that we didn't have the means to make it happen. [Hence] that **"island of efficiency"** [the CDR] at the heart of an administration that was everything but efficient." (cited in Leenders 2012, p.101).

CDR was endowed with an ambitious mandate in three main tasks: The formulation of a basic framework for reconstruction, attracting and managing loans from international donors to finance the projects identified, and supervising the execution and implementation of those projects.[5] In practice, CDR has been managing virtually all internationally funded infrastructure projects since the civil war (roughly 37% of capital expenditures were foreign financed and outside the state budget in 2011[6]) and was in charge of planning and implementing a large share of those that were domestically financed.

To pursue these tasks, CDR was endowed with extraordinary prerogatives. It was set up as an autonomous institution directly accountable to the council of ministers in order to circumvent "the administrative routine matters […] to accelerate the reconstruction process."[7] This notably includes accountability mechanisms and staffing. The 1977 Legislative Decree No. 5, for example, exempted CDR from controls of the Central Inspection Board and from advance auditing by the Court of Accounts.[8] Moreover, the Civil Service Board (CSB), the government's agency to oversee the staffing in public administration, has no say in CDR's hiring decisions. With hiring decisions left to the management and the prime minister, major politicians could impose "their" candidates to the board of CDR and its management (see Section 6) and establish networks through dependencies (Mahmalat and Zoughaib, 2021). While proponents argue that these authorities made CDR superior vis-à-vis other public institutions as a body of technocrats—an "island of efficiency"—, its institutional setup eventually reproduced many of the problems it aimed to avoid.

3. Data and Methods

We leverage a dataset of all procurement contracts awarded by CDR between 11 January 2008 and 12 March 2018. The dataset contains the name of the contract and winning firm, the initially awarded contract value, the sources of funding, the location(s) concerned, the contract ID, the sector, and several other identifying information about each contract. We obtained the data from CDR with a formal request pursuing the access to information law as CDR stopped publicly identifying rewarded companies after its March 2000 progress report. It is only in the second half of 2020 that CDR revamped its website and made all contracts, names of winning firms, and *actualized* expenditures per contract publicly accessible. We hence observe deviations of the final expenditures from the initial contract value.

The dependent variable: Contract values

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[5] See section "About CDR" in CDR's official webpage, available at https://www.cdr.gov.lb/en-US/About-CDR.aspx [Accessed: January 28, 2021]

[6] See the "Action Plan for Sustainable Public Procurement in Lebanon" (2012), available at: https://www.oneplanetnetwork.org/sites/default/files/national_action_plan_lebanon.pdf [Accessed: January 28 2021]

[7] See section "About CDR" in CDR's official webpage, available at https://www.cdr.gov.lb/en-US/About-CDR.aspx [Accessed: January 28, 2021]

[8] The Court of Accounts is only authorized to carry out deferred audits of CDR's expenditures but never reported on results. For more in CDRs governance, see Leenders (2012), pp.100.

We take the value of all awarded contracts in construction works (not consultancies or design projects) as a dependent variable. We chose contracts—rather than projects—since bargaining takes place over contracts. In cases of contracts that encompass multiple projects, these projects are all implemented by the same firm(s) under the same contract ID. Table 1 shows the allocation of projects and their values over time and across sectors. CDR awarded a maximum of 51 construction works in a single year in 2009 and 2017, while it only issued 19 in 2016. Water and transportation works get allocated the highest shares in a given year—up to 87% of total investments in 2014—while solid waste becomes significant only in 2016 and 2017 after the trash crisis in summer 2015. In total, CDR awarded 394 construction related contracts between January 2008 and March 2018 with a total project value of almost $4 billion.

Table 1: Timeline of contracts, contract values, and sector shares

| Year | Value of Contracts (in USD) | Number of Contracts | Share of contract value by sector | | | | | |
			Water Works [i]	Transport [ii]	Education [iii]	Solid Waste	Irrigation [iv]	Other [v]
2008	159,245,105	48	32.0%	34.0%	18.2%	0.0%	0.0%	15.8%
2009	703,838,934	51	27.3%	58.1%	10.6%	0.0%	0.0%	3.9%
2010	318,972,416	43	20.3%	22.8%	9.2%	0.4%	1.1%	46.2%
2011	171,241,773	27	23.1%	62.5%	5.3%	0.0%	0.0%	9.0%
2012	613,012,202	42	7.8%	13.9%	9.0%	0.0%	66.8%	2.5%
2013	285,643,207	33	51.8%	10.3%	23.3%	0.0%	0.0%	14.5%
2014	191,952,761	26	61.0%	25.6%	5.0%	0.0%	0.0%	8.4%
2015	530,166,261	50	59.5%	25.0%	3.6%	2.1%	0.0%	9.8%
2016	496,239,515	19	4.2%	14.1%	4.8%	74.3%	0.0%	2.6%
2017	507,398,401	51	37.9%	29.7%	0.9%	24.9%	0.1%	6.5%
2018*	8,268,559	4	0.0%	27.6%	0.0%	0.0%	0.0%	72.4%
Total	3,985,979,134	394	29.8%	29.2%	8.1%	12.7%	10.4%	9.8%

*Note: * projects available until March 2018; [i] includes projects for drinking water and wastewater; [ii] includes land, maritime, and air transport; [iii] includes projects on public, higher, and vocational education; [iv] includes projects on irrigation and agriculture; [v] includes projects on media, youth and sports, wholesale markets, electricity, land and environment arrangement, and others. Note that most electricity projects in Lebanon are implemented via the Ministry of Energy and Water.*

While CDR was created to manage projects that are funded by foreign donors, not all projects involve foreign funding (table 2). As will be discussed below, differentiating the source of funding is important as donors attach different requirements to the procurement process. Foreign donors include both Arab and Western countries, which fund 41.4% and 23.3% of total contract values, while 35% of funding comes from domestic sources. Foreign funded projects are also larger on average. While the average contract size funded by an Arab and Western donor is $4.02 million and $3.25 million, it is only $2.29 million for domestically funded ones.

Table 2: Contract values by origin of funds

Origin of Funds	Mean	Median	Total Amount	N	Percentage of Total Funding
Domestic	2.29	2.04	1,403.71	170	35.2%
Arab Donor	4.02	4.07	1,650.36	137	41.4%
Western Donor	3.25	2.94	927.87	76	23.3%
Total	3.00	2.64	3,981.94	383	100%

*Note: All numbers in million US dollars.*

Independent variables: Definition of political connections

Our key independent variable of interest is the political connectivity of each firm. We follow Diwan and Haidar (2020), Faccio (2006), and others and code a firm as politically connected when it has at least one board member or CEO that is itself a politician, a close relative of one, or a publicly known friend. For that purpose, we leverage online business directories and Lebanon's commercial registry to look up the name of each firm's board members in addition to collecting data on their size, age, and paid-in capital.

Our approach to identify political connections takes into account that political connections can come in various forms. The ethnographic accounts of Leenders (2012) and others show how complex the relationships between politicians and the private sector in Lebanon can be. We therefore go beyond approaches of previous studies which aim at establishing objective criteria for the identification of connections and mostly rely on name matching of a company's shareholders or top officials with lists of political actors. A shareholder that has the same last name as a politician would be cross-checked as to whether an actual familiar connection between the two exists. Information of publicly known friends are commonly taken from international newspapers, such as *Forbes* and *The Economist*, and are therefore sparse for less-covered countries. This approach has, at times, tended to significantly underestimate the extent to which firms are connected. The widely-cited work of Faccio (2006), for example, uses a dataset of firms worldwide and finds no politically connected firms in Zimbabwe and Venezuela—two countries with an arguably weak record for the control of corruption. Even for the United States, where the author's dataset includes more than 7,000 firms, her approach only identifies 14 connected firms (p. 374), a number that other works have found to be much higher (Goldman, Rocholl and So, 2009).

Our procedure to investigate each firm's political connections is illustrated in figure 2. As a first step, we established two long lists of political actors. The first list, called "PCF1", contains all board members of CDR as well as all party elites that are publicly known to be their protégés. These elites are usually leaders of political parties and often retain formal high-ranking political positions, such as the speakership of the parliament or the premiership. The second list, called "PCF2", contains all members of parliament and ministers that served between 2008 and 2018, as well as elites of other political parties with no direct connection to the board of CDR.

Figure 2: Decision tree for classifying politically connected firms
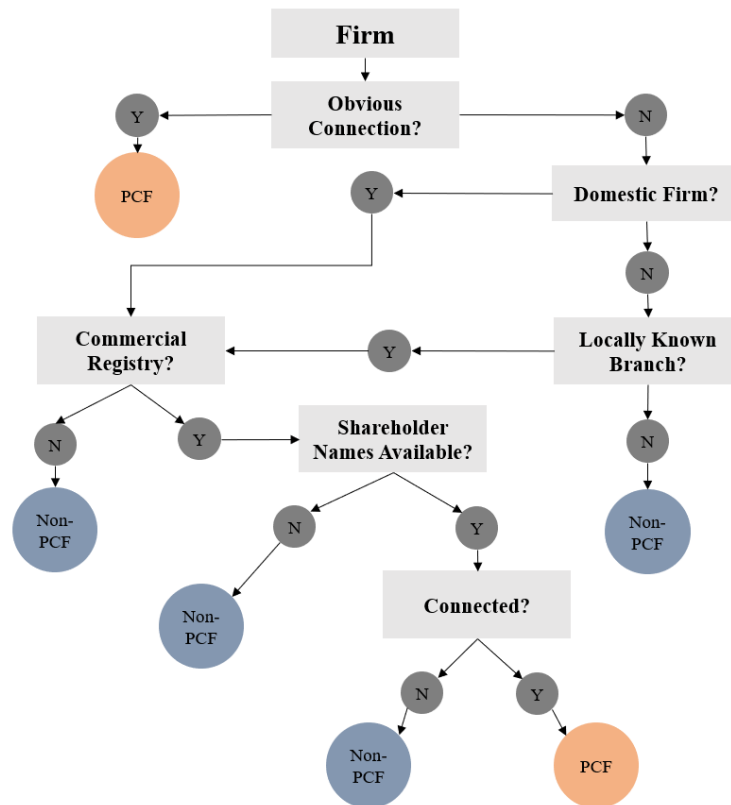
We then match the names of shareholders and CEOs with these lists in a multi-layered approach using Google search engines. We first look for obvious connections that appear when we search for a firm's name in combination with any name of a prominent political party. We establish the vast majority of connections already at this stage as newspapers generally mention the party affiliation of a politician in the articles. The type of connection can then be inferred from the party or from the name of the politician covered in the article.

If the first stage search yields no result, we take the information provided in the commercial registry, depending on whether the firm is national or foreign. If the firm is domestic and no information on shareholders is neither available in the registry nor on their webpages, we code a company as not connected. If the firm is foreign, we first search for names of shareholders and executives in the commercial registry and the firm's websites. If no information is available, we search for a known local branch of the company in Lebanon. If no local branch is known, we code a firm as not connected. If a local branch is available and has no shareholder names available, we again code it as not connected. As a potential source of false negatives, this contributes to underestimate our results.

If shareholder names are available, we undertake two sets of searches for the two lists. For PCF1, we separately search every shareholder name together with the name of each politician on the PCF1 list. If matches occur in any newspaper outlet, we qualify the connection and cross-check it with interviews. This approach illustrates the variation of connections. Perhaps the most prominent case of a PCF1 firm is that of "Al-Jihad Group for Commerce and Contracting", where the majority shareholder is known for years to have been a loyal public friend of Saad Hariri, former prime minister and leader of the Future Movement. The CEO's brother happened to be the chief of Hariri's security apparatus, while his uncle served as Rafic Hariri's personal bodyguard (Al-Akhbar, 2015). "Danash Contracting and Trading" is another case of PCF1, with connections to speaker of parliament and leader of the Amal Movement Nabih Berri (ZNN, 2018).

For PCF2, a list that is much longer than for PCF1, we conduct name-matching of all executives and shareholders as well as qualify borderline cases in interviews with other infrastructure developers. For each case, we carefully considered the "quality" of the connection. Obvious PCF2 firms are those similar to the case of "Middle East Airport Services", where a member of the board served as a Future Movement parliamentarian between 2009 and 2017 (Ibrahim and Saoud, 2016). We also coded as PCF2 instances where we could establish a firm's connectivity to a political party but not to a particular politician. Newspapers usually refer to such cases by way of reporting: "Company A, known to be close to/loyal to/ Party X". For example, we coded "Yamen for General Trading and Contracting" as PCF2 as we could verify its connection to the Amal Movement but not to the party leader Nabih Berri himself, constituting another source to underestimate our results. "EMCO Engineering" is an example of some very few borderline cases. On occasion of the death of the mother of Samir Geagea, leader of the Lebanese Forces, a major media outlet published a list of names that sent a letter of personal condolences (National News Agency, 2017) on which a major shareholder of EMCO was listed. As he was the only person in our dataset having done so, this strongly suggests a personal relationship to Geagea that goes beyond the connections of other firms, which is why we code this firm as PCF2 (Samir Geagea has no direct connection to the board of CDR).

In cases of contracts where there were no companies named in our dataset, we cross-checked the CDR webpage to identify the names of the companies. We omitted 11 contracts from our econometric analyses for which we cannot observe the winning firm but included them in our descriptive statistics.[9] Moreover, the dataset included 26 contracts that were won by partnerships of two firms. In these cases, we allocate the contract according to the dominant firm in the partnership, as partnerships often involve firms of very different sizes (as discussed below, partnerships are a frequent mechanism for smaller firms to meet the eligibility criteria of bidding). In cases where there is no dominant firm, we code the superior political connection (PCF1 > PCF2 > Non-PCF).

Lastly, for some of the listed firms the commercial registry and online directories fail to report some of the company characteristics, that is, their age in years of existence, size in terms of number of employees, or paid-in capital (table 3). We use the method of multiple imputation to estimate the missing values for these observations. The goal of using multiple imputations is to maximize the use of available information, minimize estimation bias, and obtain appropriate standard errors (Enders, 2010). We use multiple imputation, rather than other available techniques such as stochastic or deterministic imputation, to minimize the bias of standard errors in our regression analyses. We leverage the *mi estimate* command in Stata using a multivariate normal distribution with 10 imputations and take the contract value as an auxiliary variable.[10]

Table 3: Description of missing values for firm characteristics

Variable	Complete	Incomplete	Total	Percent missing
Size	290	93	383	24.3
Age	352	31	383	8.1
Paid-in Capital	278	105	383	27.4

[9] Of the 11 contracts that were omitted, 10 were awarded to municipalities without indicating who implemented the bid while one missed to report the contractor.

[10] Multiple imputation, however, requires that the mechanism that produces missing values is at least missing at random (MAR) in that the missing values are not completely random but that other observed variables can be used to predict the value of the missing ones. MAR moreover requires the ignorability assumption in that the probability of missing data does not depend on the value of the missing information itself. In our case, missing observations are distributed in a non-systematic way among both small and big firms winning both small and big contracts, as well as those that have other information reported.

To contextualize our findings, we conducted a series of expert interviews during which we also identify or cross-validated some identified political connections. Under the condition of anonymity, we have conducted six interviews with high-ranking officials of CDR, members of parliament, as well as CEOs of leading infrastructure development firms. The interviews were conducted between August and December 2020 and followed an open ended, semi-structured interview guideline. The number of interviews were determined by the responses we got. The interviews were replete with the same arguments and core messages so that additional interviews were found to be of limited added value (Rubin and Rubin, 2005).

## 4. Univariate Analyses: Allocation of CDR Infrastructure Projects

Of the 383 contracts we observe, 135 firms won at least one contract, 31 (or 23%) of which were politically connected to a board member of CDR or their protégés (PCF1); 20 (or 15%) were connected to the wider set of elites or a politician in office (PCF2), while 84 (or 63%) were not connected (figure 3). Of the total of firms, 37 had their headquarters outside Lebanon, four of which were PCF1 and two PCF2. While constituting less than a quarter of firms, PCF1 firms won more than 40% of contracts and captured 63.5% of the total value of contracts. In contrast, non-connected firms won only 22% of total contract value. For PCF2 firms, 15% of firms captured 19% of contracts and 14.5% of total contract value.

Figure 3: Share of firms, contracts, and contract values per firm type
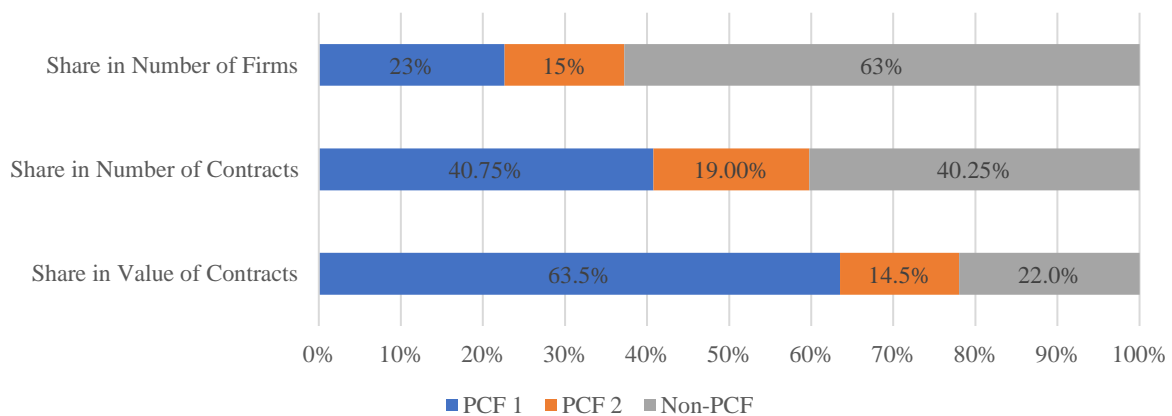
The degree to which PCFs won contracts varied over time (figure 4). However, there is no trend discernable in that one group of firms systematically wins a larger share of contracts over time. PCF1 firms captured fewest contract value in 2015—about 40%—while they captured almost 90% just one year later, which mostly involved contracts related to solid waste management.

Figure 4: Time trend of contract value allocated to PCFs
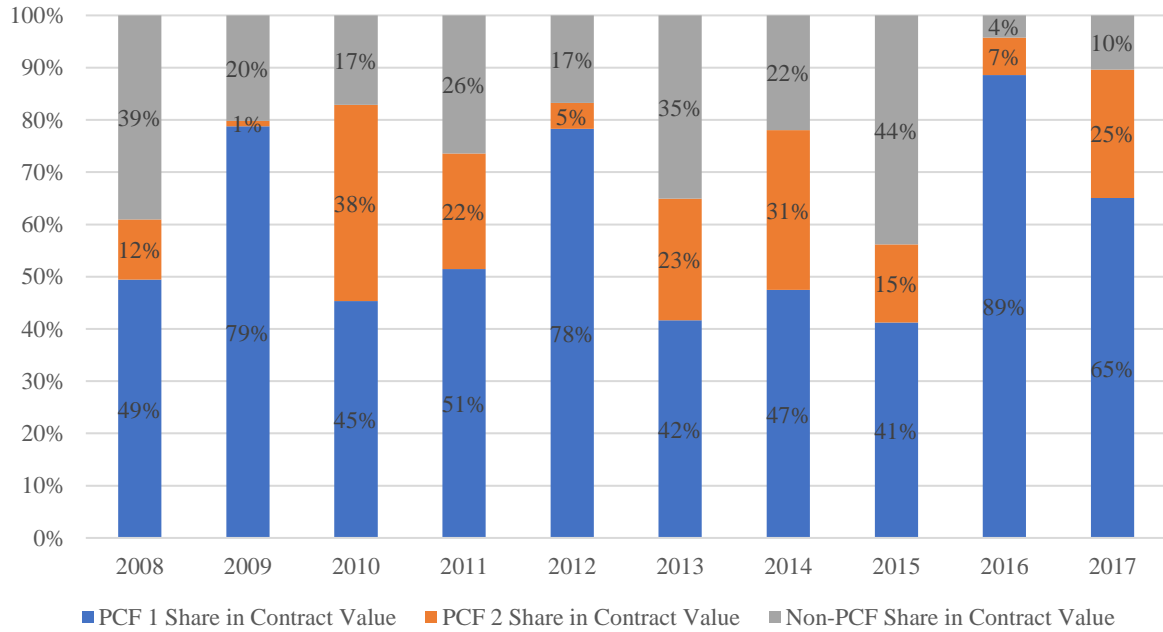
The contract values PCFs capture also varies among sectors (table 4). While the solid waste and irrigation sectors are almost completely captured by PCFs, it is only 33% in the education sector and 53% for water works. At the same time, the measures for industry concentration—the extent to which a small number of firms is able to capture the majority of production in a market—can be low regardless of the high percentage of funds captured by connected firms. The Herfindahl-Hirschmann Index (HHI), a widely used indicator for the industry competitiveness,[11] indicates that the transport, water works, and education sectors would be competitive marketplaces, despite that 56%, 45%, and 61% of projects are captured by connected firms. The solid waste and irrigation sectors, however, are highly concentrated and largely captured by a very few PCFs.

Table 4: Sectoral analysis of market competition

	Transport	Water Works	Solid Waste	Irrigation	Education	Other
HHI	973	674	2,475	9,091	949	NA
Number of Contracts	78	106	12	11	73	103
Number of Contractors	32	53	8	19	37	NA
Number of PCF 1 Firms	15	21	6	11	9	NA
Number of PCF 2 Firms	7	11	1	2	4	NA
PCF 1 Share in Value	63%	53%	99%	96%	33%	NA
PCF 2 Share in Value	28%	12%	0.20%	1%	5%	NA
PCF Share in Value	91%	65%	99%	97%	38%	NA
Non-PCF Share in Value	9%	35%	1%	3%	62%	NA
Top 5 Firms Share in Value	56%	45%	99%	98%	61%	NA

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[11] The HHI index is calculated as the sum of squares of the percentage share of each competing firm competing in a sector, $HHI = \sum_1^n s_n^2$, and ranges between 10,000 for a perfect monopoly and approaches 0 for many firms with equal market shares. An HHI of up to 1,500 is generally considered a competitive market, while scores above 2,500 indicate a highly concentrated market.

While PCFs have captured a large number of contracts, these contracts are, on average, more valuable. PCF1 firms have won 160 contracts with an average contract value of $15.9 million. This amount is almost three times as high as for non-connected firms ($5.75 million) and twice as much as for PCF2 firms ($7.85 million) (table 5). PCF1 firms, however, are on average larger firms—at least in terms of the number of employees—while their paid-in capital is lower than the average for both not connected and PCF2 firms. All three groups of firms have almost the same age of between 30 and 40 years and have therefore mostly been established in the last phases of or after the civil war.

Table 5: Comparison of contract values among firm types

	None			PCF 1			PCF 2			Total		
	Mean	Median	N	Mean	Median	N	Mean	Median	N	Mean	Median	N
Contract Value (in million USD)	5.75	1.7	149	15.90	5.01	160	7.85	2.34	74	10.4	2.64	383
Size (number of employees)	309.2	50	74	403.48	80	150	290.38	215	66	353.68	80	290
Age (years)	40.75	38	124	37.87	37	158	30.87	31	70	37.49	34	352
Capital (in million USD)	11,101	200	74	1,025	200	138	2,327	300	66	4,016	201	278

These figures provide the first piece of evidence that PCF1 firms are more likely to capture larger contact values. However, PCF1 firms are on average larger firms and it is conceivable that PCFs win larger contracts because they bring the necessary expertise to execute more complex projects. We now turn to multivariate analysis to determine which kind of connections influence the allocation of procurement contracts.

5. Who Profits? Multivariate Analyses

We conduct cross-sectional regression analyses in which our dependent variable, *logvalue,* is the natural log value of procurement contract *i*. The key independent variable of interest is the kind of connection *PCF_x* of a firm that won the contract. It takes the value of 0 if the firm is not connected as per our definition above. In two further specifications, it first takes the value of 1 if the firm is a PCF1 firm. In a second specification, it takes the value of 1 if a firm is found to be PCF2. The variables *age*, *size,* and *logcapital* specify firm characteristics in terms of the winning firm's age, number of employees, and the natural log value of a firm's paid-in capital. The variable *foreigndonor* specifies whether a contract is predominantly financed by foreign donors and international organizations. Controlling for the origin of the funds captures whether higher accountability mechanisms attached as a precondition to contracts change the likelihood of PCFs winning higher contract bids. We include sector fixed effects to account for specificities of each sector, such as their varying degree of competitiveness, the possibility that PCFs sort into higher-value sectors, as well as any natural alignment of a PCF to the political priorities of a party in a specific sector. All regressions are run by using the White-Huber sandwich estimator to calculate robust standard errors to account for model misspecifications.

More formally, we estimate the following model in which ε denotes the error term:

$$logvalue_i = \alpha + \beta_1 PCF\_x_i + \beta_2 age_i + \beta_3 size_i + \beta_4 logcapital_i + \beta_5 foreigndonor_i + \beta_6 sector_i + \varepsilon$$

The results are displayed in table 6. Model 1 includes only our dummies for *PCF_x* which are both positively and significantly associated with the value of procurement contracts. Model 3 includes a dummy that takes the value of 1 for all firms that are politically connected, which is also positive and significantly related to the dependent variable and robust to the inclusion of our controls. Models 4 to 6 differentiate between PCF1 and PCF2 firms. In model 4, our variable for PCF1 firms turns out highly significant while it is only the size of a firm, not its paid-in capital or its age, that matters. Model 5 shows that PCF2 have little to no impact on contract values once we account for firm and sector specific effects. While the effect lost significance, the beta coefficient even turned negative. Model 6 again takes both PCF1 and PCF2 firms into account, showing that only PCF1 firms are significantly related to contract values. PCF2 firms do not receive a statistically significant higher amount of contract values than the average firm. The variable for whether a contract involves foreign funding is highly significant, suggesting foreign funded projects are larger on average.

Table 6: Regression results

Model	1	2	3	4	5	6
PCF			0.48***			
			[3.36]			
PCF1	0.98***	0.62***		0.54***		0.61***
	[5.81]	[3.56]		[3.68]		[3.88]
PCF2	0.47**	0.11			-0.15	0.19
	[2.26]	[0.57]			[-0.80]	[0.98]
size			0.00***	0.00***	0.00***	0.00**
			[2.92]	[2.96]	[2.94]	[2.94]
age			0.01	0.00	0.00	0.00
			[1.17]	[0.77]	[0.67]	[0.91]
logcapital			0.02	0.03	0.03	0.03
			[0.57]	[0.79]	[0.71]	[0.78]
foreigndonor			0.78***	0.78***	0. 87***	0.78***
			[5.25]	[5.27]	[5.15]	[5.28]
Sector FE	NO	YES	YES	YES	YES	YES
Constant	14.41***	13.92***	12.79***	12.73***	12.97***	12.71***
	[124.78]	[75.82]	[18.35]	[18.63]	[18.24]	[18.54]
Observations	383	383	383	383	383	383

*Notes: Dependent variable is the log value of CDR procurement contracts. PCF is a dummy variable for all connected firms. PCF1 captures firms connected to the inner circle of elites that controls the CDR board. PCF2 includes firms of all political elites. Regression model uses robust standard errors; The table shows beta coefficients and t-statistics in parentheses; Significance levels: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.*

While there is no standard approach to estimate the economic significance of our results, we use a method presented by Goldman, Rocholl, and So (2013). We first take the estimated coefficients from model 1 (no control variables) as our benchmark for estimating the average univariate increase in contract value between PCF1 firms relative to non-connected firms. We focus only on PCF1 since PCF2 firms turn out to be insignificant for the allocation of contract values once control variables are included. We then use model 6 to estimate the marginal impact of being a PCF after having added all control variables. We calculate the reduction of the effect size by dividing the coefficients of model 6 by those of model 1 and find that the increase in contract value to PCF1 firms goes down to 69% of its univariate

estimated value. This leaves an increase of $3.8 million, or almost 37%, for a PCF1 firm contract relative to the average contract.[12]

These results suggest that PCF1 firms capture higher contract values. Next, we investigate *how* political connections influence the allocation of contract values. We augment the empirical analysis and test several possible explanations (table 7). Model 1 includes two variables to account for the effect of two parliamentary elections that took place in 2009 and 2018. Several recent contributions show that elections have a significant effect on the extent to which political elites leverage clientelist networks for political gains (Cammett, 2014; Corstange, 2016). Of particular relevance in this context are the results of Diwan and Haidar (2020) who show that politically connected firms overhire during election years. We therefore include an interaction term for the effect of elections to see whether PCFs are used by elites to activate clientelist networks. Our results show that while, on average, contracts have lower values during election years, the interaction term with PCF1 is highly significant and positive. Elites allocate even higher than average contract values to PCF1 firms during election years, which strongly suggests a clientelist nature of exchange between PCFs and elites.

Next, we turn to the potential effect of a particular government in office. Between 2008 and 2018 a total of six governments took office with four different prime ministers, each of which had a different set of elites taking over ministerial and other key executive positions. These governments could potentially exert discretionary influence over the allocation of procurement contracts by using their formal political power to replace bureaucrats or change procedures. Model 2 therefore includes a fixed effects estimator for the government that signed a particular contract. The variable for PCF1 firms remains highly significant while none of the fixed effects variables turns out to be significant.

Lastly, we consider the effect of geographical distribution of political power. While we have, by now, ruled out the hypothesis that contract values are allocated to all elites exerting physical power over a certain territory, it might still be that some areas are more prone to political influence than others. In other words, PCFs should have an advantage operating in governorates in which the firms' connected elite has a discretionary influence. To account for this mechanism, model 3 includes a dummy variable for the governorate in which the dominant project of a contract is located. The results are unaffected and none of the dummies turn out to be significant. Model 4 combines all variables in which the results remain unchanged. As in all other model specifications, only the sector dummies for solid waste, transportation, and water works remain significant.

Table 7: Regression results

Model	1	2	3	4
PCF1	0.39**	0.56***	0.53***	0.40**
	[2.51]	[3.76]	[3.60]	[2.42]
size	0.00***	0.00***	0.00***	0.00***
	[3.01]	[3.10]	[2.77]	[2.93]
age	0.01	0.00	0.00	0.01
	[0.53]	[0.91]	[0.82]	[0.62]
logcapital	0.03	0.03	0.02	0.02
	[0.86]	[0.71]	[0.52]	[0.46]
foreigndonor	0.77***	0.86***	0.81***	0.87***

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[12] The calculation is as follows. Table 5 shows the mean values of contracts by political connection. We subtract the mean contract value of PCF1 connected firms ($15.9 million) from the mean value of all contracts ($10.4 million). We multiply the resulting difference of the univariate results ($5.5 million) with the fraction of the marginal effects ($e^{0.61}/e^{0.98} = 0.69$ or 69%) to obtain the value of $3.8 million.

	[5.26]	[5.72]	[5.23]	[5.65]
electionyear	-0.47			-0.45*
	[-2.04]			[-1.66]
Election x PCF1	1.02***			1.04***
	[2.86]			[2.85]
Sector FE	YES	YES	YES	YES
PM FE	NO	YES	NO	YES
Governorate FE	NO	NO	YES	YES
Constant	12.76***	12.40***	12.49***	12.29***
	[18.63]	[17.64]	[15.56]	[14.69]
Observations	383	383	383	383

Notes: Dependent variable is the log value of CDR procurement contracts. Regression model uses robust standard errors. Table shows beta coefficients and t-statistics in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

6. Discussion: Firm performance or networks?

Our results show that only PCF1 firms matter for the allocation of procurement contracts. We can think of two stories of how to interpret this correlation between firm connectivity and contract values. First, politicians leverage their discretionary power in the procurement process to "preallocate" contracts in informal bargaining to friends and family members that offer favors in return. Firms become successful because of their connections, while elites implement the outcomes of informal bargaining via their personnel within CDR.

A second possible explanation would be that PCF1 firms are simply better firms that capture more value because of the superior skills of their managers and owners. In this world, firms obtain more valuable connections to powerful elites once they start winning more valuable contracts and become important nationally. It is only after they appear on a national screen for infrastructure procurement as a successful company that they receive special privileges.

We cannot formally address this classic endogeneity problem as this would require data on the history of firm performances and more extensive fieldwork with a wider set of firms. However, based on additional tests, a review of the governance structure of CDR, the formal CDR bidding regulations as well as our interviews, we argue that story two is implausible. In line with story one, we infer that elites give preferential treatments to connected firms via collusive networks by keeping the board of CDR closed and the pool of bidding firms small.

First, the board of the CDR is closed and remained almost unchanged since 2004, which hampers the entry of firms connected to other elites. According to its establishment decree, the CDR board is supposed to be composed of seven to 12 members with a legal mandate of five years.[13] Today, however, the CDR board stands at only five members as the government issued a decree in 2009 by which it extended the mandate of the current board "until the appointment of a new board" (Al-Akhbar, 2019). Yet, quorum and voting rules for decisions on awards still apply as if the board was fully staffed. A majority of the board must vote in favor of an award, which is half of the number of initial members

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[13] These members are the President: Nabil El-Jisr, brother of Samir El-Jisr (MP from the Future Movement), appointed president by Rafic Hariri in 1995 and again by Fouad Siniora in 2006. Deputy 1: Yasser Berri, brother of Nabih Berri (Amal Movement), appointed by Omar Karami in 2004; Deputy 2: Alain Kordahi (deceased); Secretary General: Ghazi Haddad, initially pro-Michel Murr and Michel Sleiman but now close to President Michel Aoun, appointed by Omar Karami in 2004; Board Member: Malek Ayyas, initially pro-Wiam Wahhab but today close to Walid Jumblatt; Board Member: Yahya El-Sangari, brother-in-law of Omar Karami; and Deputy to the Government: Walid Safi, close to Walid Jumblatt.

plus one. In effect, for CDR board meetings to be binding, all five board members must attend the meeting, and for decisions to pass, all five board members must agree.

That way, the access of firms to larger contracts is blocked by way of competing for connections. As neither the board nor their protégés have changed during the period investigated in this article, firms' performance cannot explain their ascendance to superior connections. In line with theoretical work (Huck, Normann and Oechssler, 2004), a small number of players with a necessity for unanimous decisions is an important precondition for elites to be able to synchronize the distribution of contracts in repeated interaction.

Second, elite keep the pool of bidding companies small. Before being able to place a bid, CDR requires firms to apply for being listed on "lists of eligible bidders". The requirements to be listed, however, are so high that new firms need "buy-in" from established (often connected) firms to be able to work as a sub-contractor until they fulfill CDRs requirements. In other words, the only way for incoming firms to win larger contracts exposes them to some form of collusion. Firm performance is secondary.

That way, the circle of companies able to bid for contracts remains small and impermeable, preventing unconnected or incoming firms to grow and bid for larger contracts. Here again, a small number of eligible companies helps sustaining collusive networks by making intertemporal promises credible.

We find indirect proof for our network hypothesis by testing whether these networks break down once the pool of eligible firms is opened up. We leverage the fact the World Bank, a major implementing partner of CDR, explicitly requires CDR not to avail of these lists for any project it finances. We conduct additional regressions by looking at PCF1 firm contract sizes for each donor group and find that PCF1 firms do not win larger contracts for World Bank financed projects (table 8). Once the number of players increases and more companies are allowed to bid, it appears to be impossible to maintain collusive networks.

Table 8: Effects of political connections of PCF1 firms on contract value by donor

Model	1	2	3	4
PCF1xWB	-0.07			
	[-0.15]			
PCF1xWestern		0.7*		
		[1.94]		
PCF1xArab			0.59***	
			[3.00]	
PCFxDomestic				0.6***
				[2.74]
size	0.00***	0.00***	0.00***	0.00***
	[2.76]	[2.73]	[3.23]	[2.77]
age	0.01*	0.01*	0.00	0.00
	[1.93]	[1.96]	[0.81]	[0.92]
logcapital	0.02	0.02	0.02	0.03
	[0.42]	[0.49]	[0.45]	[0.78]
Donor: WB	0.12			
	[0.37]			
Donor: Western		-0.00		
		[-0.01]		
Donor: Arab			0.46***	

			[2.71]	
Domestic Fund				-1.04***
				[-5.88]
Sector FE	YES	YES	YES	YES
Constant	13.47***	13.42***	13.24***	13.65***
	[17.87]	[18.09]	[18.43]	[19.91]
Observations	383	383	383	383

Notes: Dependent variable is the log value of CDR procurement contracts. "Western" donors includes World Bank. Regression model uses robust standard errors. Table shows beta coefficients and t-statistics in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Lastly, note that our results do not necessarily rule out arguments related to physical threats. In fact, our interviews suggest that developers occasionally face such challenges during construction phases. Groups attempt to sabotage works of companies that are not connected to elites that control a respective area. Notably, these threats generally appear not to be of a magnitude critical to the success of the project. Developers adopt alternative strategies to minimize sabotage. In areas in which sabotage can be expected, firms tend to sub-contract visible on-site works to firms connected to the constituencies or elites in the region of a project to ensure that locals execute the visible work.

How does collusion work?

We are left with the question of how collusion actually works. Previous work distinguishes between three stages in which elites can influence the procurement process to their advantage (Dávid-Barrett and Fazekas, 2020). Stage 1 is the *formation* of procurement regulation. Stage 2 concerns the *implementation* of procurement by the bureaucracy, while stage 3 concerns the *monitoring* of contract execution, including conducting audits.

As discussed in section 2 above, Lebanon's elites have captured stage 1 by maintaining public procurement legislation that endows the CDR with extraordinary legislative authority to take and execute decisions on tenders. Our analysis, however, provides limited insights into whether the mechanisms responsible for preferential treatment of PCFs can be found in stage 2 or 3. While certainly not exclusionary, we can think of two competing narratives to identify the dominant mechanism.

In the first narrative, in line with the results above, elites use cartels in terms of complex network structures to enable collusion at the implementation stage (Hudon and Garzón, 2017). These networks perform interrelated tasks with the aim of relaying information to ensure that connected firms give the bid necessary to win a contract. Organizing such networks is a complex task that requires coordinated action of multiple actors at different levels of administration. Collusion in stage 2 therefore goes beyond simple dyadic exchanges of favors, as actors must standardize their actions and define their roles (ibid.). As a result, firms know in advance who will win which contract.

Alternatively, in a second narrative firms could benefit from a frail monitoring and supervision system in stage 3. PCFs could give unreasonably low offers or include excessive provisions for errors as they could be sure that they can overspend once they won a bid and inflate prices (Amaral, Saussier and Yvrande-Billion, 2013). Elites do not necessarily facilitate the tendering process but the contract amendment thereafter. Amid a lack of oversight, the winning firms might also not necessarily be the ones with the lowest prices in a competitive bid.

We can test the way collusion works by leveraging a specificity of our dataset. While our dataset reports the initial values of a contract with a winning firm, the CDR website reports what has eventually been spent. That way, we can test whether connected firms are more likely to overspend their contracts. If

they do, PCFs know that they can underprice valuable bids. If they do not, collusion must have happened at the tendering stage for firms to know which prices to give.

Table 9 shows regression results. We use a logistic regression model in three specifications to understand whether PCFs are more likely to overspend their contracts.[14] In model 1, the dependent variable takes the value of 1 whenever a contract is generally overspent (151 of all 383 contracts). In models 2 and 3, the dependent variable is 1 when a contract is overspent by 10% and 30% (75 and 27 of all 383 contracts). We leverage additional controls, including whether a firm is a foreign firm and whether a contract is funded by international donors—both Arab and Western—to account for differences in auditing requirements.

Table 9: Regression results

Model	1 (>0)	2 (>10%)	3 (>30%)
PCF1	0.95	0.82	0.72
	[-0.19]	[-0.65]	[-0.65]
size	1.00	1.00	1.00
	[0.50]	[0.30]	[-0.12]
age	0.99	1.00	0.97
	[-1.13]	[0.14]	[-1.82]
logcapital	0.90	0.97	0.94
	[-1.43]	[-0.40]	[-0.53]
logvalue	1.94***	1.24**	1.12
	[6.33]	[2.06]	[0.66]
foreignfirm	2.18**	1.50	2.27
	[2.19]	[1.12]	[1.53]
Arab donor	2.13**	1.53	1.26
	[2.19]	[1.30]	[0.42]
Western donor	1.45	0.88	0.66
	[1.05]	[-0.31]	[-0.60]
Sector FE	YES	YES	YES
Constant	0.00***	0.01**	0.11
	[-4.87]	[-2.25]	[-0.72]
Observations	383	383	383

*Notes: Dependent variable is a dummy variable for whether a contract is overspent (model 1), overspent by 10% (model 2), or overspent by 30% (model 3). Regression model is logistic regression showing odds ratios and t-statistics in parentheses; Significance levels: * p<0.10, ** p<0.05, *** p<0.01.*

Our results show that PCFs are not more likely to overspend, suggesting that collusion happens at the implementation stage. Firms, CDR board members, and elites collude over the prices set in their respective bids. Much in line with our interviews, the interaction among actors appears to be reciprocal. Company A would overprice a specific bid in favor of company B if A is promised to be returned the favor for a later contract. As B is sure to win the contract, it prices its bid below the one of A but above what a competitive market would yield. Elites guard these networks by ensuring the implementation of the outcomes of the informal negotiations over contracts. In return, elites participate in the rents so generated. This is in line with our earlier result on election years which suggests a clientelist nature of exchange. Due to the small and closed circle of eligible companies, repeated interaction makes

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[14] We use a logistic regression in three specifications, rather than an ordered logistic regression specification, for ease of interpretation of results.

commitments credible over time. A former long-time member of parliament closely acquainted with CDRs work we interviewed illustrates this mechanism: "The practice has boomed to redistribute differences in project values to other firms so as to take out competitiveness of bids."

Other results are equally interesting to note. Larger contracts have a 1.9 times higher likelihood to be overspent, indicating either the inability to enforce more complex contracts on the side of CDR or a widespread imprecision of larger tender documents that firms can exploit. Moreover, foreign firms are 2.1 times more likely to overspend, presumably due to lack of mechanisms to hold firms accountable in repeated interaction within future work. Lastly, contracts funded by foreign donors also have twice the likelihood to be overspent, however, only when the funder is of Arab origin. Higher standards in the oversight of projects funded by Western donors appear to prevent regular overspending of contracts. No significance is reported for contracts that are overspent by more than 30%.

7. Conclusion

In power-sharing arrangements, in particular in countries with weak bureaucracies such as many post-conflict states, the design of valuable public institutions is not left to chance. They come to life to solve a problem of resource allocation. Norms of power-sharing behavior ensure their sustainability in that elites accept the allocation of resources and power once instated.

Without claims for generalizability, Lebanon's CDR serves as an illustrative example of how elite-level collusion can impact on the workings of an otherwise well-functioning institution. As a notable limitation, our analysis had to leave out the question whether connected firms also get away with inferior quality work (Baránek and Titl, 2020). We hope that additional data can enable future research on this question.

Instead of reciting the results of this paper, we outline two policy recommendations by which elite level collusion can be minimized or prevented. First, it is important to guarantee the competitiveness of tenders by carefully reviewing or abrogating measures that constrain the number of bidding companies, such as lists of eligible bidders in the case of CDR. Second, for infrastructure programs that are subject to conditions of international donors, such as the funding for Lebanon's Capital Investment Plan (Atallah, Dagher and Mahmalat, 2019), conditionalities can target the design of implementing institutions. Periodic changes in the composition of a board, coupled with enhanced auditing requirements, can be effective means to avoid that collusive networks become entrenched.

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