Resource Allocation in Power-Sharing Arrangements: Evidence from Lebanon

Mounir Mahmalat, Sami Atallah and Wassim Maktabi

RESOURCE ALLOCATION IN POWER-SHARING ARRANGEMENTS: EVIDENCE FROM LEBANON[1]

Mounir Mahmalat,[2] Sami Atallah,[3] Wassim Maktabi[4]

Working Paper No. 1624

December 2022

Send correspondence to:
Mounir Mahmalat
The Policy Initiative
mounir.mahmalat@thepolicyinitiative.org

---

[2] Senior Researcher at The Policy Initiative. ORCiD: 0000-0002-8561-9632.

[3] Founding director of The Policy Initiative. Contact: sami.atallah@thepolicyinitiative.org

[4] Researcher at The Policy Initiative. Contact: wassim.maktabi@thepolicyinitiative.org

First published in 2022 by
The Economic Research Forum (ERF)
21 Al-Sad Al-Aaly Street
Dokki, Giza
Egypt
www.erf.org.eg

Abstract

Power-sharing arrangements not only allocate political power but also economic resources from valuable state functions among powerful elites. Two broad hypotheses emerge from existing literature for how elites allocate such resources. Elites would either distribute the control over valuable institutions or share the rents they generate. This article investigates which mechanism prevails by focusing on a major source of such resources: public procurement of large infrastructure projects. We analyze an original dataset of infrastructure procurement contracts in Lebanon and investigate which politically connected firms receive larger contracts than non-connected firms. We find that firms receive inflated contracts only when they are connected to elites with a "seat at the table" at the board of the implementing agency, rather than the wider set of powerful political elites. We argue that resource distribution depends on elites' access to important institutional functions, rather than other conceivable mechanisms of resource sharing. By penetrating key positions with loyal personnel, elites serve as brokers in collusive networks, or cartels, that succeed in undermining a process as complex as infrastructure procurement.

ملخص

لا يؤدي تقاسم السلطات إلى توزيع السلطات السياسية فحسب، بل أيضا إلى توزيع الموارد الاقتصادية بين النخب القوية. تبحث هذه المقالة في آليات تخصيص العوائد لمصدر رئيسيـ لهذه الموارد وهو: المشتريات العامة لمشروعات البنية التحتية الكبرى. ونقوم هنا بتحليل مجموعة بيانات أصلية لجميع عقود مشتريات البنية التحتية التي قام مجلس الإنماء والإعمار اللبناني (CDR) بترسيتها بين عامي 2008 و2018، وهو أهم مؤسسة حكومية تتولى تنفيذ مشروعات البنية التحتية الكبرى، ونحدد مدى استحواذ الشركات ذات الاتصالات السياسية القوية على العقود عالية القيمة من خلال تحديد "جودة" اتصالاتها. ووجدنا أن الشركات ذات الصلات القوية تستحوذ على المشروعات ذات القيمة الأعلى، وبالأخص الشركات ذات الصلات المباشرة بمجلس إدارة مجلس الإنماء والإعمار وخصوصاً من لها علاقات سياسية قوية به، أكثر من المجموعة الأوسع من النخب السياسية القوية. ونجادل بأن آليات تقاسم الموارد الاقتصادية تستند إلى ترتيبات غير رسمية في شكل تحالفات. وفي سياق البيروقراطيات الضعيفة، كما هو الحال في لبنان، يمكن للنخب اختراق المؤسسات ذات الموظفين الموالين لهم لتكوين شبكات متواطئة لضمان نقل المعلومات بين الشركات مقدمة العطاءات.

1. Introduction

Power-sharing arrangements (PSA) often rest on a complex set of interrelated mechanisms to share political and economic resources (Hartzell and Hoddie, 2003, 2020). 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). 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 and other OECD countries, can the 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. Numerous accounts discuss 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 among communities according to their socio-economic power (Salti and Chaaban, 2010; 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) outlines how elites leveraged a neoliberal 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 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 January 2008 to March 2018 alone, totaling $3.98 billion that involved $1.76 billion in foreign funding, thereby vastly outspending other procurement institutions (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 politician we interviewed for this research project illustrate its importance: "Over time, [CDR] 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
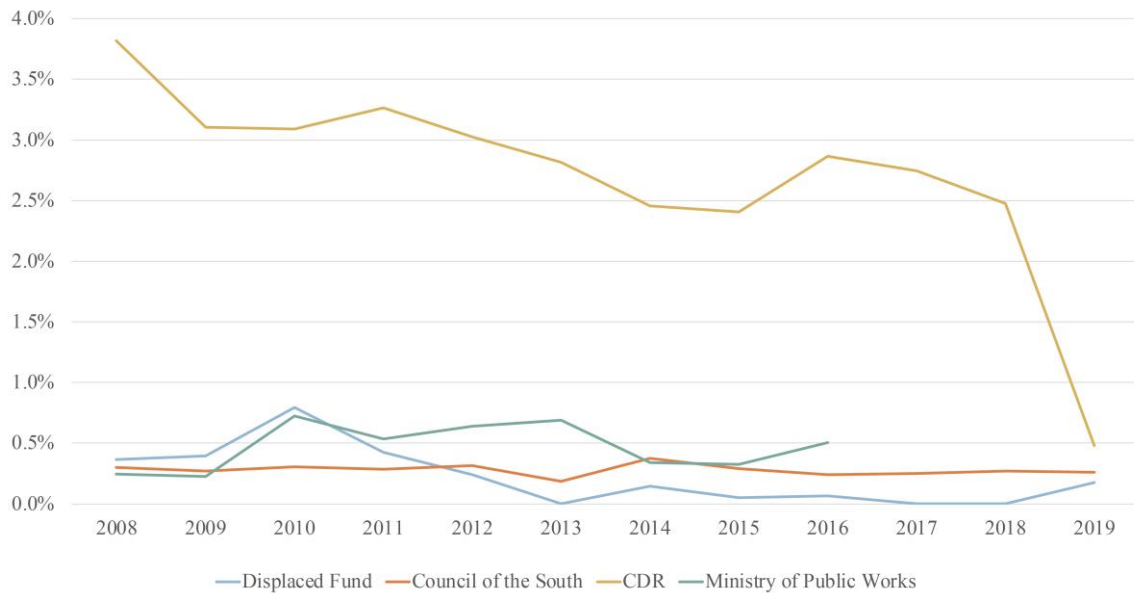
We investigate how the political connections of winning firms determine contract values by leveraging an original dataset of all contracts awarded by the CDR from 2008 to 2018, as well as a series of expert interviews. Notably, we are not interested in understanding whether politically connected firms (PCF) are *more likely to win* a contract.[5] They probably are. As a quote from 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 ask what kind of political connections allow firms to receive *larger* contracts and how. To do so, we qualify the political connections of each firm that won at least one public procurement contract from CDR between 2008 and 2018. We initially 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, by classifying the "quality" of a connection in order to better reflect the complexity of the phenomenon and distinguish the mechanisms by which connections matter. We assign 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

---

[5] Investigating whether connected firms are more likely to win projects would be an elusive endeavor. Not only does CDR not publish the details of tenders and 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.

therefore reserved a "seat at the table". "PCF2" firms, instead, are those connected to any president, minister, member of parliament, or other party elite that held office during this period.

By differentiating the quality of a connection, we gain important insights into the mechanisms by which PSAs generate and allocate rents. More specifically, we can verify two frequently cited hypotheses for how the rents from valuable procurement contracts are distributed among elites. The first upholds that elites capture resources to the extent that they can exert discretionary influence over institutional processes. In this world, the allocation of rents would reflect the extent to which elites are able to penetrate formal procurement institutions with loyal personnel. Elites would uphold an arrangement to distribute control over valuable functions of the state, such as procurement, rather than the resources generated by them (Arriola, 2009; Bormann *et al.*, 2019). For Lebanon, this account is supported by the works of Leenders (2012), Salti and Chaaban (2010), and Salloukh (2019), among others, who discuss how each of the dominant sectarian elites gained control over valuable state institutions in order to balance the access to the rents they generate.

The second hypothesis purports that elites allocate rents according to quotas among elites or sectarian communities. In this world, elites distribute the rents generated by valuable state functions such as CDR, rather than the control over the institution itself. Larger contracts would be awarded to PCFs that are connected to the elites that exercise power over the region in which a project is implemented. This view is supported by studies that highlight the structural roots of power-sharing in which the form of the arrangement emanates from the balance of power among groups (Roessler and Ohls, 2018). Berman *et al.* (2017), for example, find that powerful actors and their militias are generally more likely to use violence to defend their access to resources when these increase in value. 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 affects their prerogatives.

Differentiating these mechanisms is important as it qualifies the phenomenon of corruption beyond qualitative analyses or case studies and thereby helps specifying policy responses. Our differentiation of the quality of political connections helps us operationalize an empirical setup to test which mechanism prevails. If hypothesis one holds true, only PCF1 firms should capture larger contract values. If hypothesis two holds, PCF2 firms should receive larger contract values in that a wider set of political elites profits from rent generation via CDR.

We find support for hypothesis one. 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 almost 33% 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). PCF2 firms, by contrast, are not more likely to win larger contracts vis-à-vis non-connected firms despite representing a much larger network of powerful elites.

We go on to discuss mechanisms and endogeneity concerns and show that it is elite-level collusion, rather than the superior skills of firm owners and managers, that drives our results. We discuss two specificities in CDR's governance and conduct additional regressions to show that elites maintain complex networks, or cartels (Adam *et al.*, 2022; Fazekas, Sberna and Vannucci, 2022). By influencing the tendering process for contracts, elites ensure that the "right" firm winning a contract can do so by overpricing a bid. Additional results of our paper corroborate this mechanism, showing that PCF1 firms received even larger contracts during election years, in line with classical theories of clientelist exchanges (Stokes *et al.*, 2013).

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 formal agreements 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 suggest that in PSAs with weak bureaucracies, the penetration with loyal personnel is the main mechanism by which elites allocate resources from institutions such as CDR. (Mahmalat and Zoughaib, 2021). Our results also contribute to emerging strands of research that highlight how corrupt networks, or cartels, determine procurement outcomes (Adam *et al.*, 2022; Fazekas, Sberna and Vannucci, 2022), as well as how norms and power-sharing behavior of elites determine the success of PSAs to sustain peace (Hartzell and Hoddie, 2014; Bormann *et al.*, 2019).

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 sectoral 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, 2016; Schoenherr, 2019; Dávid-Barrett and Fazekas, 2020). To our knowledge, Goldman, Rocholl and So (2013) provide the only study that investigates what kind of political connections matter for the value of procurement contracts. Focusing on the U.S., 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 with weak bureaucracies, the quality of political connections matters in that they provide firms with superior access to important institutional functions.

While we abstain from claiming generalizability of our results, we contend that Lebanon's procurement sector serves as an illustrative example of how PSAs distribute resources in the context of weak bureaucracies. With a long history of consociational power-sharing, the protracted civil war has weakened public bureaucracy to the extent that elites could penetrate institutions with loyal personnel (Salloukh, 2019; Parreira, 2020). As discussed below, CDR emerged from the civil war as a functional institution that became subjugated to elite-level resource-sharing, representative of many PSAs that suffer from weak bureaucracies.

Our study is of 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 resources makes continuous improvements in project implementation and monitoring a top priority. For Lebanon, significant amounts of international development assistance are required to recover from a severe economic crisis 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 present policy recommendations to undermine elite-level collusion.

Section 2 provides a brief review of how CDR became subjugated to elite-level resource-sharing. Section 3 describes the data and methods used in the empirical section. Section 4 and 5 provide univariate and multivariate analyses. Section 6 addresses endogeneity and discusses mechanisms. Section 7 concludes.

2. The "state within the state": The Role of CDR in Lebanon's Public Procurement

In Lebanon, public procurement is highly decentralized and leaves its management to each individual institution. This includes the CDR. Established in 1977 (Legislative Decree No. 5, 1977), the CDR was supposed to lead the reconstruction process after the first two years of the civil war led to large-scale destruction (CDR, 2020). As the Ministry of Planning had ceased to exist at the time and public 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 with 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 implementation of those projects (CDR, 2020). In practice, CDR has been managing almost all internationally funded infrastructure

projects since the civil war 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" (CDR, 2020). 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.[6] Moreover, the Civil Service Board, 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[7] and establish lasting networks through dependencies. Entrenching these networks, the government issued a decree in 2009 by which it extended the mandate of the current board "until the appointment of a new board" (Rizk, 2019).

That way, CDR was virtually exempted from public oversight. While these powers were initially meant to be of temporary nature, they were even augmented over time (Leenders, 2012). To address some of the conflicts of interest this setup created, parliament issued Law 247 in 2000 which would have reformed CDR's governance and addressed some of the issues noted above. However, it was never fully applied. Instead, Law 295, issued on 5 April 2001, abrogated the framework laid out in Law 247, reinstated CDR's special institutional features, and merged it with two smaller institutions.

While proponents argue that these authorities made CDR superior vis-à-vis other public institutions as a body of technocrats—an "island of efficiency"—, the successive amendments in its governance structure eventually subjugated it to elite-level influence.

3. Data and Methods

We leverage a dataset of all infrastructure 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

---

[6] 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.

[7] 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); Deputy 2: Alain Kordahi (deceased); Secretary General: Ghazi Haddad, close to President Michel Aoun; Board Member: Malek Ayyas, 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.

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

We take the value of all awarded infrastructure contracts (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 the summer of 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 from 2008 to 2018

| 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. These contributions commonly rely on name matching of a company's shareholders or top officials with lists of political actors while information about publicly known friends is retrieved from international newspapers, such as *Forbes* and *The Economist*, and is 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 (see section 2). These elites are usually leaders of political parties and tend to retain high-ranking political positions, such as the speakership of the parliament or the premiership. The second list, called "PCF2", contains all presidents, prime ministers, ministers, party leaders, and members of parliament with no connection to the board of CDR that served between 2008 and 2018.

Figure 2: Decision tree for classifying politically connected firms
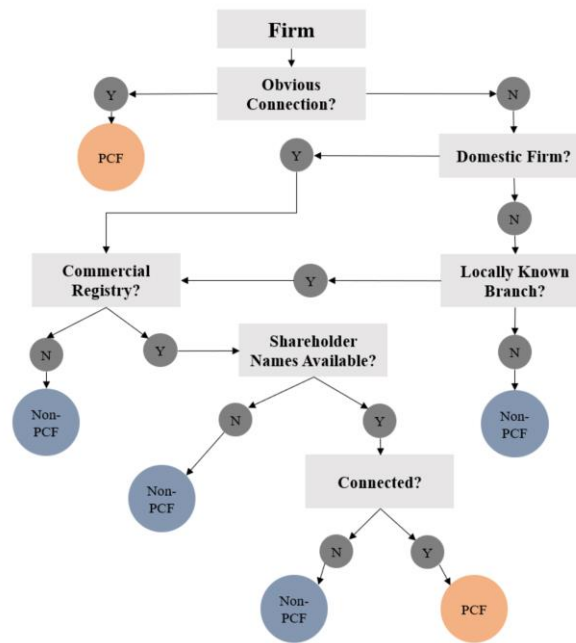
To reflect the "quality" of a connection, we apply a multi-layered approach using Google search engines. We first look for obvious connections that appear when we search for a firm's name in combination with any name of a prominent political party. We establish the vast majority of connections already at this stage as newspaper articles generally mention the party affiliation of a politician.

If the first stage search yields no result, we leverage 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 underestimating our results.

If shareholder names are available, we conduct two sets of Google searches for every shareholder name together with the name of each politician on our two lists of names. If matches occur in any reputable newspaper outlet, we review the connection and cross-check it with interviews to allocate each connected firm into either of two categories, PCF1 or PCF2.

We start with the list for PCF1. 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 to have been a loyal public friend of Saad Hariri, former prime minister and leader of the political party "Future Movement". "Danash Contracting and Trading" is another case of a PCF1, with

connections to the speaker of parliament and leader of the party "Amal Movement" Nabih Berri (ZNN, 2018). Both Berri and Hariri positioned close aides in the board of CDR and are therefore on our PCF1 list.

If no connections for PCF1 occur, we go on to the list for PCF2, a list that is much longer than for PCF1. 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 one of the very few borderline cases. On the occasion of the death of the mother of Samir Geagea, leader of the party "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 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).

The dataset included 26 contracts that were won by partnerships of two firms. In these cases, we code connectivity according to the dominant firm, 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 connection (PCF1 > PCF2 > Non-PCF). We omitted 11 contracts from our econometric analyses for which we cannot observe the winning firm but included them in our descriptive statistics.

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, and paid-in capital (table 3). We use multiple imputations 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.[8]

---

[8] 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.

Table 3: Description of missing values for firm characteristics

Variable	Complete	Incomplete	Total	Percent missing
Size	295	88	383	23.0
Age	363	20	383	5.2
Paid-in Capital	282	101	383	26.4

To contextualize our findings, we conducted a total of six expert interviews with high-ranking officials of CDR, members of parliament, as well as CEOs of leading infrastructure development firms. The interviews were held between August and December 2020 and followed an open ended, semi-structured interview guideline. The number of interviews was 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.

4. Univariate Analyses: Allocation of CDR Infrastructure Projects

Of the 383 contracts we include in our analysis, 135 firms won at least one contract of which we code 31 (23%) as PCF1, 20 (15%) as PCF2, and 84 (63%) as not connected (figure 3). 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. While PCF2 firms won contract values roughly commensurate to their share (15%), non-connected firms won only a third of their share of all firms.

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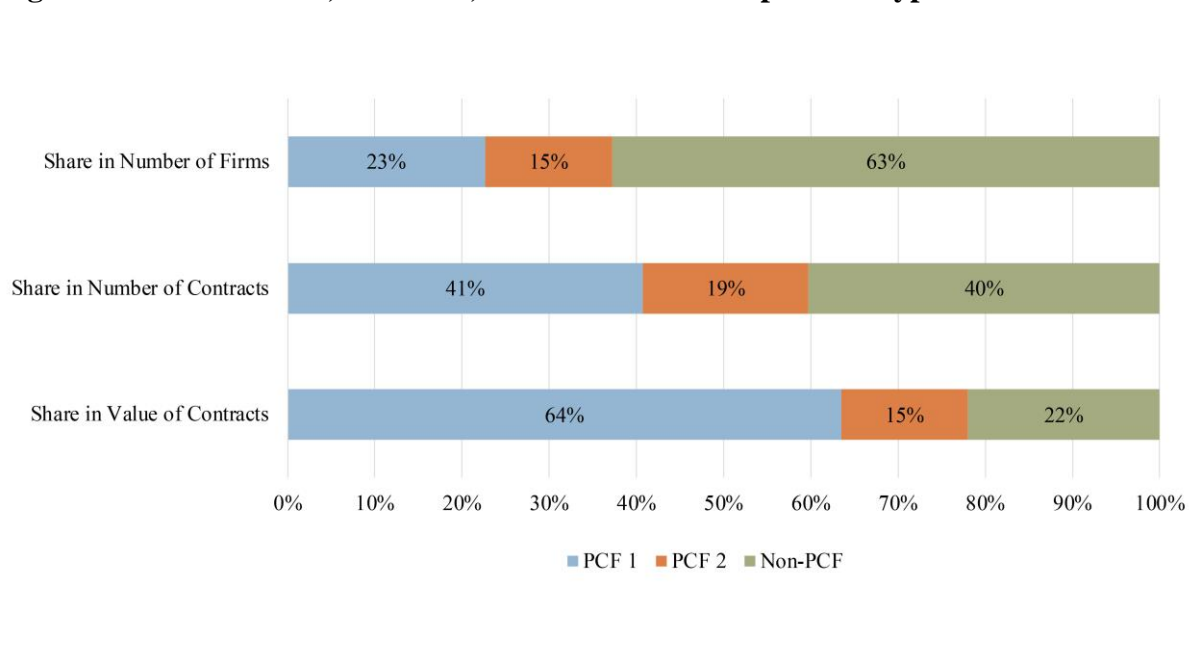
The extent to which PCFs won contracts varied over time (figure 4). However, there is no trend discernable in that one group of firms systematically wins a larger share of contracts. PCF1 firms captured fewest contract value in 2015—about 40%—while they captured almost 90% just one year later, which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

Figure 4: Time trend of contract value allocated to PCFs
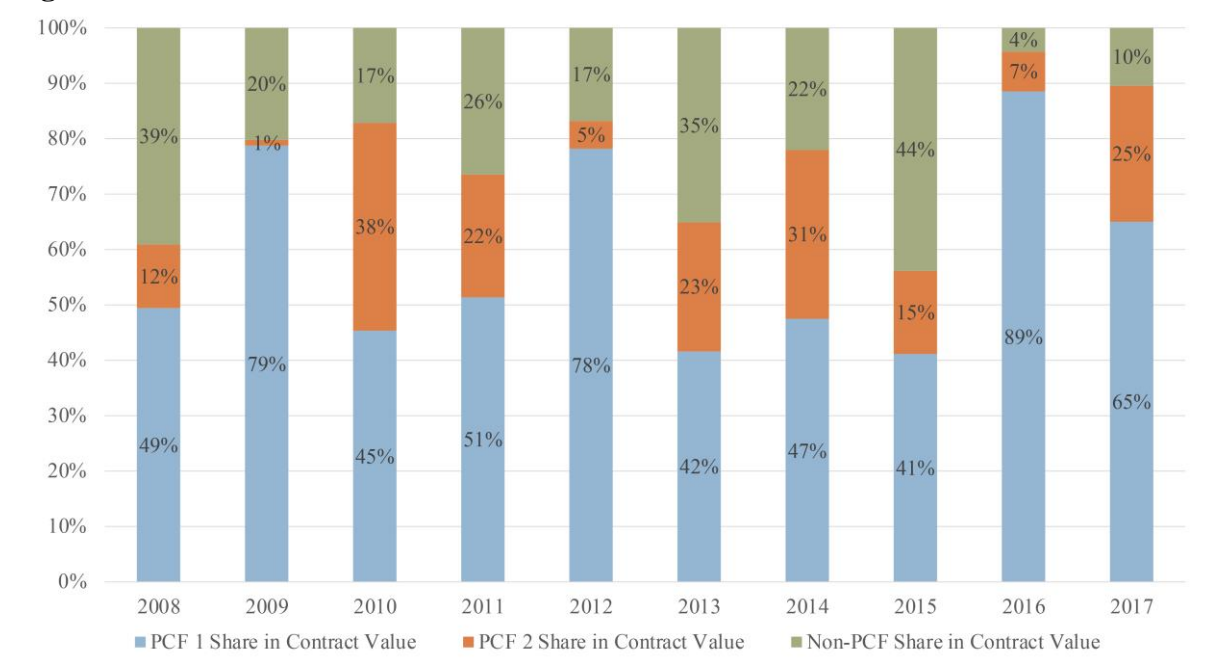
The contract values PCFs capture also vary among sectors (table 4). While the solid waste and irrigation sectors are almost completely captured by PCFs, it is only 33% in the education sector and 53% for water works. At the same time, the measures for industry concentration—the extent to which a small 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 industry competitiveness,[9] 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.

---

[9] 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.

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	67
Number of PCF 1 Firms	15	21	6	11	9	17
Number of PCF 2 Firms	7	11	1	2	4	11
PCF 1 Share in Value	63%	53%	99%	96%	33%	46%
PCF 2 Share in Value	28%	12%	0.20%	1%	5%	23%
PCF Share in Value	91%	65%	99%	97%	38%	69%
Top 5 Firms Share in Value	56%	45%	99%	98%	61%	48%

Note: "NA" refers to "not applicable."

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 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 in terms of the number of employees. All three groups of firms have almost the same age of between 35 and 41 years.

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)	388	59	37	640	50	28	565	160	15	508	70	79
Age (years)	41	35	65	37.5	37	31	35	31.5	18	39	37	114
Capital (in million USD)	5.5	0.1	35	0.63	0.2	27	1.62	0.13	14	3.1	0.13	76

These figures provide the first piece of evidence that PCF1 firms capture larger contract values than non-connected and PCF2 firms. However, PCFs might win larger contracts because they sort into more complex projects or higher-value sectors. We now turn to multivariate analysis to determine which kind of connections allow firms to receive larger 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 and the value of 1, in separate specifications, if the firm is a PCF1 or PCF2. The variables *logage*, *logsize,* and *logcapital* specify firm characteristics in terms of the winning firm's age, number of employees, and the value of a firm's paid-in capital in US dollar. The

variable *foreigndonor* specifies whether a contract is predominantly financed by foreign donors or international organizations. Controlling for the origin of the funds captures whether different accountability mechanisms attached as a precondition to contracts affect contract values.

We include various fixed effects *j* (FE). Sector FE 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. Governorate FE capture whether geographical areas require more complex works and whether elites allocate higher-value contacts to specific regions. Year FE account for other time-invariant heterogeneity as well as the effects of inflation. 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:

$$logvalue_i = \alpha + \beta_1 PCF\_x_i + \beta_2 logage_i + \beta_3 logsize_i + \beta_4 logcapital_i + \beta_5 foreigndonor_i + \beta_6 FE_{ij} + \varepsilon$$

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 firms have little to no impact on contract values once we account for firm and sector-specific effects. While the effect lost significance, the coefficient even turned negative. Model 6 again takes both PCF1 and PCF2 firms into account, showing that only PCF1 firms are significantly associated with contract values. PCF2 firms do not receive a statistically significant higher amount of contract values than the average firm. Model 7 re-estimates model 6 without multiple imputations, showing that the results are not sensitive to missing values.

Table 6: Regression results

Model	1	2	3	4	5	6	7
PCF			0.448**				
			[3.03]				
PCF1	0.984***	0.628***		0.567***		0.582***	0.661**
	[5.81]	[3.53]		[3.73]		[3.62]	[2.88]
PCF2	0.473*	0.160			-0.247	0.0820	0.175
	[2.26]	[0.76]			[-1.32]	[0.41]	[0.67]
logsize			0.255***	0.279***	0.287***	0.276***	0.116
			[3.57]	[3.88]	[3.90]	[3.89]	[1.16]
logage			0.083	0.000	-0.001	0.013	0.480
			[0.48]	[0.00]	[-0.01]	[0.07]	[1.82]
logcapital			-0.026	-0.029	-0.034	-0.026	-0.034
			[-0.67]	[-0.75]	[-0.82]	[-0.66]	[-0.70]
foreigndonor			0.793***	0.792***	0.787***	0.846***	0.425*
			[5.18]	[5.19]	[5.10]	[5.47]	[1.98]
Sector FE	NO	YES	YES	YES	YES	YES	YES
Governorate FE	NO	YES	YES	YES	YES	YES	YES
Year FE	NO	NO	NO	NO	NO	YES	YES
Constant	14.41***	13.40***	12.20***	12.43***	12.63***	12.09***	11.65***
	[124.78]	[29.19]	[13.09]	[13.40]	[13.33]	[12.99]	[8.51]
Observations	383	383	383	383	383	383	243

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 brackets; Significance levels: * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

While there is no standard approach to estimate the economic significance of our results, we use a method presented in 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 then use model 6 to estimate the marginal impact of being a PCF after having added all controls. 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 68% of its univariate estimated value. This leaves an increase of $3.4 million, or almost 33%, for a PCF1 firm contract relative to the average contract.[10]

We investigate additional hypotheses of what can drive contract values (table 7) and focus on the effect of PCF1 connections vis-à-vis PCF2 and non-connected firms (model 4 of table 6). 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

---

[10] 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^{0.59}/e^{0.98} = 0.68$ or 68%) to obtain the value of $3.4 million.

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 contract values are lower during election years, the interaction term with PCF1 is highly significant and positive. PCF1 firms receive even larger contracts during election years, strongly suggesting a clientelist nature of exchange.

Model 2 turns 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 politicians taking over ministerial and other key executive positions. These governments could 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 FEs for the government, rather than years, that signed a particular contract in which the variable for PCF1 firms remains highly significant. Model 3 combines all variables, leaving the results for the PCF1 variable unchanged vis-à-vis model 1.

Table 7: Regression results

Model	1	2	3
PCF1	0.422*	0.597***	0.454**
	[2.56]	[3.91]	[2.74]
logsize	0.283***	0.285***	0.290***
	[3.90]	[4.06]	[4.10]
logage	-0.034	-0.001	-0.045
	[-0.19]	[-0.03]	[-0.25]
logcapital	-0.029	-0.033	-0.034
	[-0.73]	[-0.83]	[-0.84]
foreigndonor	0.786***	0.854***	0.840***
	[5.16]	[5.55]	[5.49]

Table 7: Regression results (contd.)

electionyear	-0.481*		-0.367
	[-2.05]		[-1.36]
Election x PCF1	1.039**		1.014**
	[2.98]		[2.85]
Sector FE	YES	YES	YES
PM FE	NO	YES	YES
Governorate FE	YES	YES	YES
Constant	12.57***	12.22***	12.38***
	[13.40]	[13.03]	[13.03]
Observations	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 brackets. Significance levels: * p<0.05, ** p<0.01, *** p<0.001.

6. Discussion: Networks or firm performance?

Our results show that the quality of connections matters. Speaking to hypothesis 1, only PCF1 firms receive inflated contracts. Yet, we can think of two stories of how to interpret this correlation. The first story would be related to hypothesis 1 in that politicians leverage their discretionary power to "preallocate" contracts in informal bargaining to connected firms that offer favors in return. Firms receive larger contracts because of their connections, as elites "guarantee" the implementation of informal bargaining via their loyal personnel within CDR that enables them to place higher bids. Note that the *quantity* of connections (i.e., a firm being connected to multiple PCF1 or PCF2 elites) would add little vis-à-vis a connection of superior quality as the underlying mechanism would not change. As soon as *at least* one PCF1 connection is established, firms would receive preferential treatment.

A second possible explanation would be that PCF1 firms are simply better firms that capture larger contracts because of the superior skills of their managers and owners. Firms would obtain superior 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 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 tendering regulations as well as our interviews, we argue that story two is implausible.

First, the board of the CDR is closed and remained almost unchanged since 2006, 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. During the period of investigation, however, the CDR board consisted of only five members (see section 2). 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 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 actors 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, elites 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 generally need "buy-in" from established (often connected) firms to be able to work as a sub-contractor until they fulfill CDR's 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 from bidding for larger contracts. Here again, a small number of eligible companies helps sustaining collusive networks by making inter-temporal 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 most Western donors, notably international organizations such as the World Bank, require CDR not to avail of these lists for any project they finance. 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 Western donor financed projects (table 8). Once the number of actors increases and more companies are allowed to bid, it appears to be more difficult to maintain collusive networks.

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

Model	1	2	3
PCF1xWestern	0.520		
	[1.39]		
PCF1xArab		0.567**	
		[2.86]	
PCF1xDomestic			0.676**
			[2.90]
logsize	0.278***	0.288***	0.274***
	[3.68]	[4.10]	[3.79]
logage	0.188	-0.006	0.044
	[1.04]	[-0.03]	[0.26]
logcapital	-0.032	-0.035	-0.032
	[-0.74]	[-0.86]	[-0.79]
Donor: Western	-0.008		
	[-0.04]		
Donor: Arab		0.489**	
		[2.84]	
Domestic Fund			-1.085***
			[-6.03]
Sector FE	YES	YES	YES
Governorate FE	YES	YES	YES
Constant	12.56***	12.74***	13.35***
	[12.32]	[13.41]	[14.03]
Observations	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 brackets. Significance levels: * $p<0.05$, ** $p<0.01$ *** $p<0.001$.

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, Lebanon's elites have captured stage 1 by subjugating CDR to elite-level influence. 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 unlikely 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 the form of complex networks to enable collusion at the implementation stage (Hudon and Garzón, 2016; Fazekas, Sberna and Vannucci, 2022). These networks perform interrelated tasks with the aim of ensuring that connected firms win larger contracts. Organizing such networks is a complex task that requires coordinated action of various actors. Collusion in stage 2, therefore, goes beyond simple dyadic exchanges of favors, as actors must standardize their actions and define their roles (ibid.).

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.

We test whether PCF1 firms are more likely to overspend their contracts. If they do, PCF1s 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 PCF1s are more likely to overspend their contracts. 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). 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	0.93	0.77	-0.44
	[-0.25]	[-0.85]	[-1.48]
logsize	1.17	1.0703	0.92
	[1.18]	[0.46]	[-0.35]
logage	0.75	1.33	0.55
	[-0.90]	[0.83]	[-0.96]
logcapital	-0.93	0.97	1.04
	[-1.22]	[-0.30]	[0.33]
logvalue	1.95***	1.20	1.03
	[6.12]	[1.70]	[0.16]
foreignfirm	2.19*	1.40	1.67
	[2.17]	[0.90]	[0.92]
Arab donor	1.83	1.53	1.61
	[1.95]	[1.25]	[0.82]
Western donor	1.23	0.01	0.74
	[0.55]	[-0.23]	[-0.39]
Sector FE	YES	YES	YES
Governorate FE	YES	YES	YES
Constant	0.00***	0.00*	0.02
	[-4.01]	[-2.55]	[-0.99]
Observations	382	382	382

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 brackets; Significance levels: * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Our results show that PCF1s are not more likely to overspend, suggesting that collusion happens at the implementation stage in that firms, CDR board members, and elites collude over the access to and the pricing of 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 serve as brokers by ensuring that each side honors the commitments of such deals. In return, elites appear to somehow participate in the rents so generated. Due to the small and closed circle of eligible companies as well as the long-time horizon of elites with a "seat at the table", repeated interaction makes commitments credible over time. As former member of parliament closely acquainted with CDR's work we interviewed highlights: "The practice has boomed to redistribute differences in project values to other firms so as to take out the 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 or the poorer design of larger contracts. Moreover, foreign firms are 2.1 times more likely to overspend, presumably due to a lack of mechanisms to hold firms accountable in repeated interaction within future work. Lastly, contracts funded by Arab donors are 1.8 times more likely to be overspent, barely missing significance at the 5% level. No significance is reported for contracts that are overspent by more than 30%.

7. Conclusion

In PSAs with weak bureaucracies, such as many post-conflict states, valuable public institutions solve a problem of resource allocation. In this article, we analyze contracts of Lebanon's largest infrastructure procurement agency CDR to understand how this is done. We show that only those PCFs with connections to elites with a "seat at the table" at the board of CDR receive contracts that are inflated by almost 33% vis-à-vis the average contract. As other PCFs do not receive larger contracts, we argue that the main mechanism of resource allocation is elites' access to important institutional functions, rather than other conceivable mechanisms such as quotas. In what is an otherwise well-functioning institution, elites penetrate key positions with loyal personnel, notably the board, to retain a "seat at the table" and thereby discretionary influence to collude at the tendering stage and ensure that PCFs know how to (over)price a bid. As many PSAs suffer from weak bureaucracies prone to elite-level influence, our results can provide insights into mechanisms of rent allocation in other country contexts.

While this paper provides results that can only be explained with the presence of cartels, future research should inquire in more detail how these cartels function. Future work can investigate the role of other actors involved in the procurement process, such as supervisory and design consultants, and inquire into the conditions under which elites can serve as brokers for corrupt deals. Future work can also address the question of whether PCFs get away with inferior quality work (Baránek and Titl, 2020). With more recent data, further work can moreover provide evidence on how the PSA adapted to the significant decline in capital expenditures after 2018 and the onset of a severe economic and financial crisis.

Distinguishing the mechanisms of resource distribution enables us to identify two key policy recommendations to minimize collusion. 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. Second, for infrastructure programs that are subject to conditions of international donors, such as the funding for Lebanon's Capital Investment Plan, conditionalities can target the design of implementing institutions. Periodic changes in the composition of a board that is sufficiently large can be effective means to avoid collusive networks from becoming entrenched.

References

Al-Akhbar (2020) ٣,٥ مليارات دولار لـ١٤ شركة› 'مجلس الإنماء والإعمار: Available at: https://al-akhbar.com/Issues/285303. Published: 9 March 2020. [Accessed 14 March 2020].

Adam, I. *et al.* (2022) *Public procurement cartels: A systematic testing of old and new screens*. GTI-WP/2022:01. Budapest.

Amaral, M., Saussier, S. and Yvrande-Billion, A. (2013) 'Expected Number of Bidders and Winning Bids: Evidence from the London Bus Tendering Model', *Journal of Transport and Economic Policy*, 47(1), pp. 17–34.

Arriola, L. R. (2009) 'Patronage and Political Stability in Africa', *Comparative Political Studies*, 42(10), pp. 1339–1362.

Atallah, S. *et al.* (2020) 'Public Resource Allocation in Lebanon: How Uncompetitive is CDR's Procurement Process?', *Lebanese Center for Policy Studies*. Available at: https://api.lcps-lebanon.org/content/uploads/files//public allocation.pdf.

Atallah, S., Dagher, G. and Mahmalat, M. (2019) 'CEDRE Capital Investment Plan: Scrutinizing the Allocation of Projects and Funds Across Regions', *Lebanese Center for Policy Studies*, 46.

Baránek, B. and Titl, V. (2020) *The Cost of Favoritism in Public Procurement*. DPS20.07. Leuven. Available at: https://www.idnes.cz/zpravy/domaci/firma-kterou-vlastnil-ministr-rebicek-ziskala-zakazky.

Baumann, H. (2017) *Citizen Hariri: Lebanon's Neo-Liberal Reconstruction*. Oxford: Oxford University Press.

Berman, N. *et al.* (2017) 'This mine is mine! How minerals fuel conflicts in Africa', *American Economic Review*, 107(6), pp. 1564–1610.

Binningsbø, H. M. (2013) 'Power sharing, peace and democracy: Any obvious relationships?', *International Area Studies Review*, 16(1), pp. 89–112.

Le Borgne, E., Jacobs, T. and Barbour, P. (2015) *Lebanon: A Systematic Country Diagnosis*. 97498. Beirut. Available at: http://documents.worldbank.org/curated/en/698161468179049613/pdf/97498-CAS-P151430-SecM2015-0202-IFC-SecM2015-0073-MIGA-SecM2015-0047-Box391476B-OUO-9.pdf.

Bormann, N.-C. *et al.* (2019) 'Power-sharing: Institutions, Behavior, and Peace', *American Journal of Political Science*, 63(1), pp. 84–100.

Bosio, E. *et al.* (2020) *Public Procurement in Law and Practice*. 20–14.

Cammett, M. (2014) *Compassionate Communalism - Welfare and Sectarianism in Lebanon*. Ithaca and London: Cornell University Press.

Chaaban, J. (2019) 'I've got the power: Mapping connections between Lebanon's banking sector and the ruling class', in Diwan, I., Malik, A., and Atiyas, I. (eds) *Crony Capitalism in the Middle East – Business and Politics from Liberalization to the Arab Spring*. Oxford: Oxford University Press.

Corstange, D. (2016) *The price of a vote in the Middle East: Clientelism and communal politics in Lebanon and Yemen*. Cambridge: Cambridge University Press.

Dávid-Barrett, E. and Fazekas, M. (2020) 'Grand corruption and government change: an analysis of partisan favoritism in public procurement', *European Journal on Criminal*

Policy and Research, 26, pp. 411–430.

Diwan, I. and Haidar, J. I. (2020) 'Do Political Connections Reduce Job Creation? Evidence from Lebanon', *The Journal of Development Studies*, 31, pp. 1–24.

Djankov, S., Islam, A. and Saliola, F. (2016) *How Large Is Public Procurement in Developing Countries?*, *Peterson Institute for International Economics*. Available at: https://www.piie.com/blogs/realtime-economic-issues-watch/how-large-public-procurement-developing-countries (Accessed: 8 March 2021).

Enders, C. K. (2010) *Applied Missing Data Analysis*. New York: The Guilford Press.

Faccio, M. (2006) 'Politically Connected Firms', *American Economic Review*, 96(1), pp. 369–386.

Fazekas, M., Sberna, S. and Vannucci, A. (2022) 'The extra-legal governance of corruption: Tracing the organization of corruption in public procurement', *Governance*, pp. 1–23.

Fisman, R. (2001) 'Estimating the Value of Political Connections', *American Economic Review*, 91(4), pp. 1095–1102.

Goldman, E., Rocholl, J. and So, J. (2009) 'Do politically connected boards affect firm value?', *The Review of Financial Studies*, 22(6), pp. 2331–2360.

Goldman, E., Rocholl, J. and So, J. (2013) 'Politically Connected Boards of Directors and The Allocation of Procurement Contracts', *Review of Finance*, 17, pp. 1617–1648.

Haass, F. and Ottmann, M. (2017) 'Profits from Peace: The Political Economy of Power-Sharing and Corruption', *World Development*, 99, pp. 60–74.

Hartzell, C. A. and Hoddie, M. (2003) 'Institutionalizing Peace: Power Sharing and Post-Civil War Conflict Management', *American Journal of Political Science*, 47(2), pp. 318–332.

Hartzell, C. A. and Hoddie, M. (2014) 'The art of the possible: Power sharing and post-civil war democracy', *World Politics*, 67(1), pp. 37–71.

Hartzell, C. A. and Hoddie, M. (2020) *Power Sharing and Democracy in Post-Civil War States: The Art of the Possible*. Cambridge: Cambridge University Press.

Hessami, Z. (2014) 'Political corruption, public procurement, and budget composition: Theory and evidence from OECD countries', *European Journal of Political Economy*, 34, pp. 372–389.

Huck, S., Normann, H.-T. and Oechssler, J. (2004) 'Two are few and four are many: number effects in experimental oligopolies', *Journal of Economic Behavior & Organization*, 53(4), pp. 435–446.

Hudon, P. and Garzón, C. (2016) 'Corruption in public procurement: entrepreneurial coalition building', *Crime, Law and Social Change*. Crime, Law and Social Change, 66, pp. 291–311.

Leenders, R. (2012) *Spoils of Truce: Corruption and State-Building in Postwar Lebanon*. Ithaca: Cornell University Press.

Mahmalat, M. (2020) 'Balancing Access to the State: How Lebanon's System of Sectarian Governance Became too Costly to Sustain', *Lebanese Center for Policy Studies*, (49).

Mahmalat, M. and Atallah, S. (2019) 'Recession without impact: why Lebanese elites delay reform', *Economic Research Forum*, 8 October. Available at:

https://theforum.erf.org.eg/2019/10/07/recession-without-impact-lebanese-elites-delay-reform/.

Mahmalat, M. and Curran, D. (2020) 'Fractionalization and Reform: A Framework of Political Collaboration on Reform with Application to Lebanon', *Economics of Governance*, 21(2), pp. 187–214.

Mahmalat, M. and Zoughaib, S. (2021) 'Breaking the Mold? Ministerial rotations, legislative production, and political strategies in Lebanon', *Governance*, (forthcoming).

Parreira, C. (2020) *'The City Receives What She is Worth': Local Governance in Lebanon's Urban Periphery*. Stanford University.

Rijkers, B. *et al.* (2014) 'Which firms create the most jobs in developing countries? Evidence from Tunisia', *Labour Economics*, 31, pp. 840–102.

Rizk, M. (2019) 'الإنماء والإعمار: إدارة لا شرعية لم تحقّق المعجزة', *El-Nashra*. Available at: https://www.elnashra.com/news/show/1275175/.

Rizkallah, A. (2017) 'The paradox of power-sharing: stability and fragility in postwar Lebanon', *Ethnic and Racial Studies*. Taylor & Francis, 40(12), pp. 2058–2076.

Roessler, P. and Ohls, D. (2018) 'Self-Enforcing Power Sharing in Weak States', *International Organization*, 72(2), pp. 423–454.

Salloukh, B. F. (2019) 'Taif and the Lebanese State: The Political Economy of a Very Sectarian Public Sector', *Nationalism and Ethnic Politics*. Routledge, 25(1), pp. 43–60.

Salti, N. and Chaaban, J. (2010) 'The Role of Sectarianism in the Allocation of Public Expenditure in Postwar Lebanon', *International Journal of Middle East Studies*, 42, pp. 637–655.

Schoenherr, D. (2019) 'Political Connections and Allocative Distortions', *Journal of Finance*, 74(2), pp. 543–586.

Stokes, S. C. *et al.* (2013) *Brokers, Voters, and Clientelism: The Puzzle Of Distributive Politics*. Cambridge: Cambridge University Press.

World Bank (2015) *Jobs or Privileges - Unleashing the Employment Potential of the Middle East and North Africa*. Washington, DC: World Bank.