Political Connections and Allocative Distortions*

David Schoenherr†

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Abstract

This paper exploits a unique institutional setting in Korea to assess the effects of firms' political connections on the allocation of government procurement contracts. After winning the election, the new president appoints members of his networks as CEOs of state-owned firms that act as intermediaries in allocating government contracts to private firms. In turn, these state firms allocate significantly more procurement contracts to private firms with a CEO from the same network. Contracts allocated to connected private firms are executed systematically worse and exhibit more frequent cost increases through renegotiations.

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†Princeton University, 206B Julis Romo Rabinowitz Building, Princeton, NJ 08544, Email: schoenherr@princeton.edu.

1 Introduction

A growing literature documents a positive relationship between political connections and firm value for a large set of countries,[1] and provides evidence on different benefits accruing to politically connected firms.[2] However, while this relationship has been widely documented, evidence on the underlying mechanisms is scarce. Public officers that control the allocation of government resources may abuse their power to transfer rents to connected firms at the expense of allocative efficiency, or alternatively, they may be able to better allocate resources through connected firms, if connections help mitigate frictions, such as information asymmetries or moral hazard problems. Given the large amount of resources allocated by governments,[3] a thorough understanding of the underlying mechanism is important, as alternative mechanisms have different implications for economic efficiency and distinct policy implications.

In this paper, I exploit a unique institutional setting and detailed micro-level data on public procurement contract allocation in Korea, to explore an important mechanism through which firms benefit from political connections and examine its implications for allocative efficiency. In Korea, the president has the power to appoint the CEOs of state-owned firms. These state firms play an important role as intermediaries in allocating public procurement contracts to private firms. Following his election in 2007, the new president, Lee Myung Bak, appoints a large number of people from two of his networks as CEOs in many of these state firms (Korea University Business School alumni, and former executives of Hyundai Engineering & Construction, the firm he worked for before going into politics). Thus, private firms with a CEO from one of the president's networks suddenly become connected to a large number of state firms with a newly appointed CEO from the same network.

Examining changes in public procurement contract allocation around the election, I observe that private firms connected to the new president's networks experience a significant increase in their annual public procurement contract volume, by three percent of firms' assets

[1] Roberts (1990), Fisman (2001), Johnson and Mitton (2003), Jayachandran (2006), Faccio (2006), Ferguson and Voth (2008), Bunkanawanicha and Wiwattanakantang (2009), Faccio and Parsley (2009), Goldman, Rocholl, and So (2009), Cooper, Gulen, and Ovtchinnikov (2010), Amore and Bennedsen (2013), Akey (2015), Acemoglu, Johnson, Kermani, Kwak, and Mitton (2016), Acemoglu, Hassan, and Tahoun (2017).

[2] Politically connected firms have better access to finance (Khwaja and Mian 2005; Leuz and Oberholzer-Gee 2006; Claessens, Feijen, and Laeven 2008; Li, Meng, Wang, and Zhou 2008), are more likely to receive government funds, bail-outs, and contracts (Faccio, Masulis, and McConnell 2006; Duchin and Sosyura 2012; Cingano and Pinotti 2013; Goldman, Rocholl, and So 2013; Tahoun 2014; Baltrunaite 2017; Brogaard, Denes, and Duchin 2017), and avoid compliance with regulations (Fisman and Wang 2015).

[3] Public procurement contracts alone account for 10-20% of GDP in developed countries (OECD 2015).

after the election.[4] Cross-sectional variation in connectedness to different state firms allows me to compare changes in contract allocation to the same private firm at a given point in time (firm-time fixed effects). I find that the increase in contract volume is driven by those state firms in which the president appoints a CEO from the same network. This suggests that private firms benefit from the appointment of state firm CEOs from the same network.

While private firms connected to the president's networks benefit from the appointment of connected state firm CEOs, higher allocation of government contracts from state firms to private firms with a CEO from the same network is not limited to the new president's networks. Exploiting information on CEOs' educational background, I find that private firms generally experience an increase in contract volume from state firms that they become connected to through their CEO's alumni network. Additionally, private firms with a CEO from the KU network do not experience an increase in contract volume from state firms in which the new president appoints a CEO from the KU network, if that state firm already had a CEO from the KU network before the election. Together, these results suggest that private firms receive more government contracts due to their CEO's connections to state firm CEOs, regardless of connections to the president. The president's role in benefiting firms connected to his networks is to increase the number of state firm CEOs from his networks. These results document an important mechanism through which politicians benefit connected firms. Providing politicians with the power to appoint people to important positions allows them to increase the amount of government resources being allocated through their networks.

Next, I examine how connections between state firm and private firm CEOs affect the efficiency of contract allocation. An increase in procurement contracts allocated to connected firms is consistent with a benign role of connections in mitigating frictions, but also consistent with a malign role of connections in distorting resource allocation. For example, state firm CEOs may have better information about people from their network, allowing them to better allocate contracts within the network (Cohen, Frazzini, and Malloy 2008; Conley and Udry 2010), or be better able to monitor connected firms and jointly resolve problems that occur during contract execution through a social collateral channel (Kandori 1992; Guiso, Sapienza, and Zingales 2004; Ambrus, Möbius, and Szeidl 2014). Alternatively, state firm CEOs may provide connected firms with favors, allocating contracts to these firms even though they are not able to execute these contracts effectively (Banerjee and Munshi

[4]Private firms connected to the new president's networks experience 2.21 (4.45) percentage point higher returns the day (week) after Lee Myung Bak's nomination as his party's presidential candidate in a close election. This amounts to 8.51 percent of connected firms' combined market value, and 0.63 percent of total KOSPI (Korea's main stock market index) market capitalization. The *additional* contracts allocated to connected private firms explain about 20% of the increase in connected firms' market value.

2004; Hwang and Kim 2009; Haselmann, Schoenherr, and Vig 2017). Understanding which of these forces dominates in the data is important, as they have different implications for the optimality of network connections between representatives of government entities and private firms, which leads to different policy implications.

Comparing the execution of contracts allocated to the same private firm by connected and non-connected state firms allows me to assess how connections affect allocative efficiency. Data on contract amendments, including information on contract performance (delays, financial problems, construction mistakes, etc.), is available for all construction contracts. After the election, the performance of contracts allocated to connected private firms significantly deteriorates, relative to contracts allocated to non-connected firms. Contracts allocated to connected firms are about ten percentage points more likely to exhibit adverse outcomes. In addition to worse performance, construction costs increase about five percentage points more often for contracts allocated to connected private firms.[5] These differences in contract performance are entirely driven by contracts allocated by state firms whose newly appointed CEO is from the same network as the private firm's CEO, which are about forty percentage points more likely to exhibit adverse outcomes, and twenty percentage points more likely to experience ex post cost increases. The same patterns emerge for contracts allocated by state firms to private firms with a CEO from the same network for alumni networks that are not connected to the president.[6] This implies that connections between state firm and private firm CEOs lead to inefficiencies in the contract allocation process. Mitigating inefficiencies in resource allocation thus requires intervention at the contract allocation stage, for example through mechanisms that monitor network connections between buyers and sellers.

Poor execution and higher costs of contracts allocated to connected private firms may occur for several reasons. State firms may allocate additional contracts to connected private firms, which these firms are incapable of executing effectively, engage in laxer monitoring of connected private firms, or renegotiate prices more favorably for contracts allocated to connected private firms. To separate these effects, I examine contracts allocated *just before* the new president appoints a state firm CEO from the same network as the private firm CEO. These contracts are *allocated* by non-connected state firm CEOs, but are *executed* under connected state and private firm CEOs. This allows me to examine the effects of connec-

[5]Ex ante pricing shows no significant differences for contracts allocated to connected and non-connected private firms based on the wedge between the winning bid and the budget allocated to the project.

[6]Back of the envelope calculations suggest that the annual costs incurred due to the misallocation of contracts to firms connected to the new president's networks alone amount to about 0.41 percent of GDP. The total costs of contract misallocation to private firms connected to state firms through alumni networks amount to about 1.08 percent of annual GDP.

tions on ex post monitoring and renegotiations in the absence of distortions in the ex ante allocation of contracts. I find no differences in performance (delays, construction mistakes, etc.) for contracts allocated by non-connected CEOs and executed under connected CEOs. This suggests that adverse outcomes are not due to lax monitoring. However, I still observe more frequent increases in construction costs through renegotiations. This suggests that state firms adjust prices favorably for connected contracts in ex post renegotiations. Additionally, the absence of adverse outcomes for contracts allocated by non-connected CEOs suggests that adverse outcomes stem from inefficiencies in the ex ante allocation of contracts to connected firms. Altogether, the results show that inefficiencies occur at two stages of the contract allocation process. State firms allocate contracts to connected firms that are unable to execute them effectively, and agree more favorable terms with connected firms in ex post renegotiations. Hence, policies to reduce inefficiencies in the contract allocation process need to address the potentially harmful effect of connections on ex ante contract allocation and rent transfers in ex post renegotiations. Back of the envelope calculations suggest that three quarters of the costs of contract misallocation are due to ex ante contract misallocation. This implies that mechanisms to reduce the initial misallocation of contracts to connected private firms may yield the highest returns.

The interpretation of the results is validated by a large set of robustness tests that rule out alternative explanations for the results (see Section 6 for details). In particular, I present additional tests to mitigate concerns that changes in contract allocation are driven by the new president's political agenda, or by endogenous appointments of CEOs in state firms that could explain an increase in contracts allocated to connected private firms. Additionally, I show that differences in contract performance are not driven by differences in observable contract characteristics, or differences in the reporting of adverse outcomes for connected contracts.

The analysis in this paper contributes to several strands of literature. First, the paper contributes to the literature on the effects of political connections on economic outcomes. The results in the paper document an important mechanism through which politicians benefit connected firms. Providing politicians with the power to appoint people from their networks into important positions allows them to increase the amount of government resources being allocated through their networks. Given the pervasiveness of political influence over the appointment of state firm CEOs and people in important roles in the administration around the world (see Table A.2), it is likely that this channel is broadly relevant for many countries.[7]

[7]Acemoglu, Johnson, Kermani, Kwak, and Mitton (2016) conjecture that financial firms connected to Timothy Geithner benefitted from the appointment of socially connected people during the financial crisis. Similarly, Bertrand, Kramarz, Schoar, and Thesmar (2007) argue that French firms consider connections to politicians and the bureaucracy through executives with shared educational background as an asset.

Additionally, the results provide evidence on the implications of connections on allocative efficiency. While contracts allocated to politically connected firms are more likely to exhibit adverse outcomes and cost increases, this effect stems from a general underlying inefficiency in contract allocation from state firms to private firms whose CEOs are members of the same network. *Political* connections lead to a larger amount of resources being (mis-)allocated to politically connected firms through the politician's ability to appoint people from his networks to positions where they decide the allocation of government contracts. This implies that inefficiencies in contract allocation are generated by connections in the final contract allocation process. The paper also identifies the stages in the contract allocation process at which inefficiencies occur, which has important policy implications. Connections lead to distortions at the initial contract allocation stage, and through cost increases in ex post renegotiations, with a higher fraction of the costs being generated by initial contract misallocation. This suggests that mitigating inefficiencies from connections requires intervention at the contract allocation and renegotiation stages.

Second, the paper relates to the literature on the economic implications of social networks[8] by providing micro-level evidence that networks act as a conduit to transfer rents from political connections. Firms connected to a network including a powerful politician benefit from an increase in the control over resource allocation by members of their network following their appointment to important positions. Additionally, the results highlight the negative role of connections for allocative efficiency. While the results in this paper are obtained in a specific institutional setting in Korea, the role of social connections in distorting resource allocation has been documented for countries with low levels of perceived corruption, such as the U.S. (Hochberg, Ljungqvist, and Lu 2010) or Germany (Haselmann, Schoenherr, and Vig 2017), suggesting that these forces are likely to apply in different settings.

Third, the paper adds to the literature assessing the importance of CEOs for firm value, economic outcomes, and decision-making,[9] by documenting that CEOs' connections to powerful networks have a significant impact on firms' economic performance. Finally, the paper contributes to the literature on the allocation of public procurement contracts. The results show that social connections between buyers and sellers may have detrimental effects on the allocation process, execution, and costs of public procurement contracts.

[8]For example for risk-sharing (Townsend 1994), social collateral (Karlan 2007), peer effects (Sacerdote 2001; Lerner and Malmendier 2013; Shue 2013; Fracassi 2017), information (Bandiera and Rasul 2006; Conley and Udry 2010; Cohen, Frazzini, and Malloy 2010; Engelberg, Gao, and Parsons 2012; Duchin and Sosyura 2013), and taste-based discrimination (Hwang and Kim 2009; Haselmann, Schoenherr, and Vig 2017).

[9]Bertrand and Schoar (2003), Malmendier and Tate (2005), Perez-Gonzales (2006), Bertrand (2009), Hirshleifer, Low, and Teoh (2012).

2 Institutional Background

The event that provides exogenous variation in firms' political connectedness in this paper is the nomination of Lee Myung Bak as the Grand National Party (GNP)'s presidential candidate and his subsequent election as Korean president.

2.1 Presidential Election

In December 2007, South Korea elected a new president. The president is elected directly by the public, and the main political parties nominate one candidate each. The two main contenders in the presidential race both came from the GNP. Hence, the GNP's candidate nomination effectively determined the next president. Results from public opinion polls made up an important fraction of the total votes for the GNP nomination.[10] In the months before the election, Lee Myung Bak was the odds-on favorite, leading polls robustly by around ten percentage points (Figure 1).

In the run-up to the election, Lee Myung Bak's popularity was severely affected by the "Dokokdong Land Scandal". Suspicions about the true ownership of land, officially owned by his brother Lee Sang Eun, were fueled by a prosecutor's office announcement on August 13, stating that the respective land was not Lee Sang Eun's property. It seemed likely that Lee Myung Bak was involved and had participated in criminal activities as the respective land was sold to POSCO, whose CEO, a former consultant to the GNP, decided to purchase the land for more than ten times the initial purchase price, despite serious reservations on the part of POSCO's management.

The resulting speculation harmed Lee Myung Bak's popularity, causing a severe drop in polls. From August 8 to August 14, the lead over Park Geun Hae declined from 9.4% to 5.8% (Figure 1). As a consequence (Lee Myung Bak was considered the pro-economy candidate), the main stock price index, KOSPI, experienced a drop of 7.44% the next trading day (Figure 2). The dramatic events led Lee Myung Bak to hold an unscheduled press conference, assuring that the allegations against him were false. Stock prices continued to drop on August 17 as speculation continued to grow and the likelihood of his election decreased further. Eventually, Lee Myung Bak was elected as GNP candidate on Sunday, August 19 with 49.56% of the total votes (Park Geun Hae: 48.06%) leading to a 5.38% increase in the KOSPI after the election (Figure 2).

[10] Appendix A provides a detailed explanation of the election system.

2.2 Definition of Political Connections

Lee Myung Bak graduated from Korea University Business School and served as a CEO at Hyundai Engineering & Construction, before going into politics. A firm is considered politically connected if its CEO is either a Korea University Business School alumni (KU network), or a former Hyundai Engineering & Construction executive (HEC network). While the KU network is large, it should be noted that in Korea people feel responsibility to alumni of their school across different cohorts, and that alumni networks continue to be actively nurtured and expanded during graduates' professional careers, including connections across different cohorts. Many firms have one CEO over the entire sample period, typically family-controlled firms. Other firms appoint their CEOs in fixed cycles of one to three years. A firm is considered connected if one of its CEOs was a KU or HEC network member at the time of the GNP candidate nomination on August 19, 2007.[11]

To mitigate concerns about the endogeneity of CEO appointments with respect to procurement contract allocation, I define political connectedness as a sticky measure that is not updated. The 59 firms connected to one of Lee Myung Bak's networks at the time of his election are considered to be connected for the full sample period, regardless of later CEO appointments. All results are *stronger* when updating the connectedness measure. Moreover, in robustness tests, I drop firms that appointed a connected CEO during the three years before the election, to ensure that differences in procurement contract allocation are not driven by endogenous CEO appointments in anticipation of Lee Myung Bak's election.

2.3 Network Channel

The Korean president takes a dominant role in government and has the power to appoint senior public officers (e.g., ministers, political advisors, chief prosecutors, and state firm CEOs). There is overwhelming evidence of the appointment of connected people during Lee Myung Bak's presidency. After his election the number of chief prosecutors from Korea University more than doubled, from 5 to 11, the fraction of ministers from Korea University increased from 11.7% to 13.3%, the share of chief political advisors (senior secretaries in the Blue House) increased from 14.7% to 22.9%, and the number of CEOs from Korea University and Hyundai Engineering & Construction among the 42 state firms in the sample

[11] If a CEO is replaced by his son, the father's connections are also considered. Considering the connections of the chairman (family) of the large business groups in addition to the connections of the CEO for affiliated firms does not qualitatively affect the results.

firms increased from 3 to 12. Ministers, prosecutors, and state firm CEOs in turn decide about appointments and promotions of people at lower levels of the administration, leading to a trickle-down effect.

The appointment of connected people by politicians, and in particular the president, is widely acknowledged in Korea. Such appointments are often referred to as "parachutes", as the appointee enters the post from outside rather than through performance-linked promotion. This phenomenon is widely discussed in the media and typically criticized by politicians from opposition parties. Lee Myung Bak was notorious for network-linked appointments. This is mainly due to the fact that he came to office with a business background and therefore had more visible links to "outsiders", which made them easier to identify as network-linked appointments, compared to people appointed from within the political class where details about network links are more difficult to observe. Lee Myung Bak's predecessor, Roh Moo-Hyun, had a unique background as a human rights lawyer before going into politics and did not attend university. Park Geun Hae, Lee Myung Bak's competitor for the GNP nomination and his successor as president, is the daughter of former president Park Chung-Hee. She graduated from Sogang University's electrical engineering department, from which there is no CEO in the data. Rather, her connections are related to her father's political circle. In both cases, for Lee Myung Bak's predecessor and main competitor, it is difficult to identify connections to private firms in the data. Thus, it is difficult to evaluate whether connected appointments were more common under Lee Myung Bak compared to other presidents.

2.4 State Firms

Since the sample of private firms in the paper comprises only KOSPI-listed firms, the sample of state firms allocating contracts to these large private firms similarly comprises mostly large state firms. Out of the 42 state firms in the sample, 22 operate nationally, whereas 20 have a more local focus. Even state firms with a local focus may potentially interact with all of the large private firms in the sample, which are mostly headquartered in Seoul and all operate throughout the country. State firms' size ranges from 193 billion KRW in total assets for the smallest state firm in the sample to 167,762 billion KRW for the largest state firm. These state firms fulfill a wide range of roles, including infrastructure investment, implementing social programs, and providing public services. For example, the largest firm, Korea Land & Housing, constructs affordable housing units to implement residential welfare programs, develops housing land, new towns, industrial and logistics complexes, and engages in rental housing management. Other firms build new roads, ports, or train lines, for example. To

accomplish their objectives, state firms purchase goods and services from the private sector and issue construction contracts to private firms, which is the main focus of the empirical analysis in the paper. Panel B in Table 9 provides an overview of the types of construction contracts that these state firms allocate to private firms.

3 Data

The data for this paper is collected from five sources: accounting data is from Mint Korea, stock market data from Bloomberg, data on CEO appointments comes from the Commercial Registration System governed by the Supreme Court of Korea, the Annual Dictionary of Korea Business Magnate provides information on CEOs' CVs, and procurement contract data comes from the Korea online e-Procurement System website. All data is either freely available online, or can be obtained against a fee. The sample comprises the 630 companies listed in the KOSPI index on August 20, 2007, the day after the GNP candidate election. Since a new president was elected in 2012, the sample period ends in 2011. For all tests, the start of the sample is set such that there is a symmetric window around the event.

3.1 Accounting and Stock Market Data

Accounting data is summarized in Table 1, Panel A.[12] I report pre-election data (before 2007), to ensure that the comparison of connected and non-connected firms is largely unaffected by the effects of Lee Myung Bak's election. Average firm size is 3197 million KRW in book assets, mean sales are 1834 million KRW. Firms' average return on assets is 3.00%, net investment is 4.43%, and the mean bank loans to assets ratio is 3.80%. In terms of observable variables, connected and non-connected firms look very similar. None of the differences in firm characteristics in Panel A are statistically significant at the 10% level. Stock market data is from Bloomberg. The datasets are matched by ticker symbol.

3.2 Network Data

Korean companies are legally required to report information about their board members to the Commercial Registration System supervised by the Supreme Court of Korea. The register

[12] All accounting data is winsorized at the 1% level, to minimize the impact of outliers and data errors.

lists the appointment, reappointment, and end of term dates. I match CEOs appearing in the data between 2005 and 2011 with data from the 2010 Annual Dictionary of Korean Business Magnate published by Mailnet & Biz using CEOs' names and dates of birth, and the company name. The data contains information on academic degrees and professional careers. Missing information is completed using older volumes of the same source, or online research. I identify 1924 CEOs. For 1846 CEOs (95.95%), information on their university degree is available (Table 1, Panel B). The dominant university among CEOs is Seoul National University (465), followed by Yonsei University (219), and Korea University (214). Korea University graduates comprise 11.55% of all CEOs. There are 100 CEOs connected to one of the president's networks in the data: 66 connected to the KU network, and 34 to the HEC network. Firm connections are listed in Table 1, Panel C. In the full sample, 59 firms are connected (9.37%): 40 to the KU network (6.35%), and 19 to the HEC network (3.02%). For the subsample of 368 firms with procurement contracts, 40 are connected (10.87%). Of the 195 firms with procurement contracts from state firms, 31 are connected (15.90%), and among the 80 firms with construction contracts, 21 are connected (26.25%).

3.3 Procurement Contract Data

Panel D in Table 1 provides descriptive statistics on the subset of procurement contracts allocated to KOSPI firms during the sample period. Comprehensive data on procurement contracts is available from the Korea online e-Procurement Service. The data contains information on the enrolment of a project and the contract allocation procedure. After an applicant is selected, the firm's name and contract signing date are announced. For the subset of construction contracts, the system also lists future contract amendments.

I treat companies that merged during the sample period and companies that split up as one entity throughout, to make contract volumes comparable over time. Overall, 368 of the 630 companies (58.41%) signed at least one contract during the sample period. Contracts to KOSPI companies account for only 1.43% of all contracts in the database, but 27.44% of total contract volume. For the 368 firms with procurement contracts, they account for 3.24% of firms' total assets before and 6.55% after the election.The procurement contract database lists both contracting parties. This allows me to identify the subsample of contracts where state firms act as intermediaries in allocating contracts to private firms. These contracts make up 14.56% of contracts to KOSPI firms. In total, 42 state firms signed contracts with 195 KOSPI firms during the sample period. I collect data on state firm executives from the 2010 Annual Dictionary of Korean Business Magnate.

4 Empirical Strategy

This section describes the empirical strategy used to examine changes in the allocation of public procurement contracts around Lee Myung Bak's election, and to assess systematic changes in contract performance due to connections between state firm and private firm CEOs.

4.1 Contract Allocation

First, I analyze systematic changes in public procurement contract allocation after Lee Myung Bak's election. Let y_{it} be the contract volume allocated to firm i in period t, scaled by firm i's total assets in the year of the election, α_t denote time-specific effects, and A_{it} denote firm characteristics. Let D_i denote a dummy variable taking the value of one for firms connected to one of the president's networks, and zero for non-connected firms. Assuming a linear model, total contract volume can be represented as: $y_{it} = \alpha_t + \beta_t \cdot A_{it} + \mu_t \cdot D_i + \epsilon_{it}$.

I collapse the data into a pre-election period $t = 0$ from the third quarter of 2004 to the first quarter of 2008, the quarter before the new president's inauguration, and a post-election period $t = 1$ from the second quarter of 2008 to the end of 2011 by accumulating each firm's contracts after inflating/deflating contract volumes to 2007 Korean won, and computing the average annual contract volume for the pre- and post-election periods. First-differencing implies the following regression equation:

$$\Delta y_i \quad = \quad \Delta\alpha + (\beta_1 \cdot A_{i1} - \beta_0 \cdot A_{i0}) + \Delta\mu \cdot D_i + \Delta\epsilon_i \tag{1}$$

where $\Delta z = z_1 - z_0$. The parameter of interest $\Delta\mu$ measures the effect of connectedness to the president's networks on contract allocation after relative to before the election.[13]

Identifying a direct effect of connections on contract allocation is challenging. If connected firms benefit from policies implemented by the new president, or, for example, from better access to finance, they might be able to increase investment and apply for more government contracts. This would lead to an upward bias in the estimation of $\Delta\mu$. Additionally, if the

[13]Contract allocation is effectively a zero-sum game. An additional contract allocated to a connected firm means one less contract allocated to a non-connected firm. Thus, the estimates might be biased due to a double counting of contracts reallocated from non-connected to connected firms. Moreover, if connections to the previous president had a similar effect on contract allocation, the estimates could be biased further. Appendix B describes the procedure to adjust the estimates accordingly.

new government increases investment in areas that benefit connected firms, or the president allocates contracts to connected firms as he is able to control the execution of the contract, for example using more domestic inputs, the estimate of $\Delta\mu$ would be further biased upwards.

Ideally, one would like to control for changes in connected firms' ability to apply for government contracts ($A_{i1} - A_{i0} \neq 0$), or an increase in the supply of contracts that benefit connected firms ($\beta_1 - \beta_0 \neq 0$). This could be achieved by saturating equation (1) with firm fixed effects ($\Delta\alpha_i$). Note that adding firm fixed effects ($\Delta\alpha_i$) in the differenced model controls for *time-varying* changes in firm characteristics. However, including firm fixed effects not only absorbs changes in firm characteristics, but also absorbs the connectedness measure D_i.

One feature of the institutional setting in this paper generates variation in connectedness for the *same* firm at a given point in time. In Korea, CEOs of state firms are directly appointed by the president. After his inauguration, the new president appoints a large number of CEOs from his networks in state firms that previously had CEOs from other networks. Thus, private firms with a CEO from one of the president's networks become connected to state firms with a newly appointed CEO from the same network, but not to other state firms. This allows me to analyze changes in contract allocation on the private firm-state firm relationship level. This controls for time-varying changes in connected firms' ability to apply for government contracts and systematic changes in the supply of contracts that benefit connected firms without absorbing the connectedness measure:

$$\Delta y_{ij} \quad = \quad \Delta\alpha + \Delta\alpha_i + \Delta\alpha_j + \Delta\mu \cdot D_{ij} + \Delta\epsilon_{ij} \tag{2}$$

where j subscripts state firms. The variable Δy_{ij} is the change in contract volume allocated from state firm j to private firm i, D_j is one for state firms in which the new president appoints a CEO from one of his networks, and zero for other state firms, D_{ij} is one for private firm-state firm pairs in which the president appoints a CEO at state firm j, from the same network as the CEO of private firm i, and zero otherwise. The parameter $\Delta\alpha_j$ controls for the average level of changes in the volume of contracts allocated by state firm j across all private firms.

Adding firm fixed effects ($\Delta\alpha_i$) to equation (2), absorbs the average level of changes in contracts for firm i from all state firms. This controls for changes in government investment that benefit connected firms, absorbs effects from the president's control over connected firms, and controls for changes in the demand for government contracts. If connected firms benefit from general changes due to the new president's political agenda or are able to apply for more government contracts, this should lead to an increase in procurement contracts allocated to

connected firms from all state firms. In contrast, if connections to the president's networks affect contract allocation, the increase in contract volume should be stronger for state firms in which the president appoints a CEO from the same network.

The main concern with this analysis is that the president appoints CEOs from his networks in state firms that implement an agenda that benefits connected firms. This would explain a higher increase in contracts allocated to connected firms for these state firms relative to other state firms, leading to an upward bias in the estimation of $\Delta\mu$. To mitigate this concern, I saturate equation (2) with state firm-industry fixed effects ($\Delta\alpha_j * ind_i$). That is, I compare changes in investment for the same state firm to connected and non-connected firms in the same industry. To further sharpen this analysis, I examine changes in contract allocation at the state firm level within narrowly defined categories of contract types k (real estate, road constructions, etc.) and even more granular levels of contract types (road maintenance, road extension, road repair, etc.) ($\Delta\alpha_j * contract\ type_k$). Then, generating an upward bias in the estimate of $\Delta\mu$ requires a change in government investment within those contract categories that is unique to state firms in which the president appoints a CEO from one of his networks and that benefits connected firms, but not non-connected firms that execute the *same* type of contracts.

4.2 Contract Performance

Data on contract outcomes allow me to differentiate between a positive and a negative role of connections. For the subset of construction contracts, the database lists contract amendments. I define Z_c as a dummy variable that takes the value of one if contract c exhibits adverse contract outcomes (delays, financial problems of the contracting firm, construction mistakes, etc.), and zero otherwise. The empirical strategy is identical to the analysis regarding changes in procurement contract allocation, except that the estimation is on the individual contract level c:

$$\begin{aligned} Z_c &= \alpha + \gamma_1 \cdot event_t + \gamma_2 \cdot D_i + \gamma_3 \cdot D_j + \gamma_4 \cdot event_t * D_i \\ &\quad + \gamma_5 \cdot event_t * D_j + \gamma_6 \cdot D_{ij} + \gamma_7 \cdot event_t * D_{ij} + \epsilon_{ij} \end{aligned} \tag{3}$$

where $event_t$ is a dummy variable taking the value of one after, and zero before the election. All other variables are defined as before. The estimation can be saturated by firm-time fixed effects ($\alpha_i * event_t$) to control for time-varying changes in contract execution at the firm level, and state firm-time fixed effects ($\alpha_j * event_t$) to control for time-variation in contracts

allocated by a given state firm. Additionally, adding private firm-state firm relationship fixed effects (α_{ij}) ensures that the results are not affected by changes in the matching between different state and private firms by taking out any relationship-specific effects on contract performance. A positive role of connections predicts a positive value of γ_7, whereas a detrimental role predicts a negative value. The identification of the underlying mechanism hinges on implicit assumptions, for example that contracts allocated to connected and non-connected firms are ex ante equally likely to exhibit adverse outcomes. In Section 6, I discuss the assumptions underlying the interpretation of the results, and examine their validity by performing additional tests.

5 Market Value and Firm Performance

This section reports evidence from stock price reactions and changes in real firm performance of connected relative to non-connected firms, to validate the relevance of connections to Lee Myung Bak's networks as defined in the paper.

Figures 3 and 4 depict kernel density plots showing cumulated log returns of connected (black line) and non-connected (gray line) firms, after the prosecutor's office announced Lee Myung Bak's potential involvement in the Dokokdong Land scandal, and after his nomination as the GNP's candidate for the presidential election, respectively.[14] Figure 3 documents a clear leftward shift in the distribution of stock returns for connected firms both on the day (left panel) and the two days (right panel) after the prosecutor's office announcement related to Lee Myung Bak's potential involvement in criminal activities. Figure 4 shows a rightward shift in the distribution of stock returns for connected firms on the day (left panel) and in the week (right panel) after Lee Myung Bak's election as GNP candidate. The evidence from the graphical analysis suggests that the market value of firms connected to one of Lee Myung Bak's networks is positively correlated with the likelihood of his election, and that differences in returns for connected and non-connected firms are not driven by outliers.

Table 2 statistically confirms the insights from the graphical analysis in Figures 3 and 4. Panel A depicts the results for the days following the prosecutor's office's announcement regarding the Dokokgong Land scandal. On the day of the announcement, connected firms

[14]Stocks of the firms connected to Park Geun Hae (Lee Myung Bak's main rival) are excluded from the sample for the return tests. Firms considered to be connected to Park Geun Hae comprise four KOSPI listed firms where her relatives either own stocks or serve as CEO or board member. The return of those firms shows the exact opposite pattern compared with the returns of firms connected to Lee Myung Bak.

experience on average a 2.41 percentage point lower stock return (column I). Over the two days after the announcement, the negative effect is even stronger, with 2.93 percentage points (column II). The effect is somewhat weaker for the sample of firms connected to the KU network with 1.78 and 2.34 percentage points (columns III and IV), compared to firms connected to the HEC network with 3.74 and 4.17 percentage points (columns V and VI). Adding firm controls (two-digit NAICS industry codes, log of market capitalization) does not affect the results (columns VII and VIII). Dropping firms that appointed connected CEOs during the last three years before the election (columns IX and X), and adding firm controls to this reduced sample (columns XI and XII), does not affect the results either.

Panel B depicts the results for the days after Lee Myung Bak's victory in the GNP nomination election. On the day after the election, connected firms outperform non-connected firms by 2.21 percentage points (column I). In the week after the election, the difference increases to 4.45 percentage points (column II). Since the probability of Lee Myung Bak's nomination was about 50% before the election, the true value of political connections is about twice the estimated effect. Since the president in Korea can only serve for one five-year term, the estimated effect represents the value of five years of connections to the president. For firms connected to the KU network, the effect is weaker with 1.50 and 2.76 percentage points (columns III and IV), compared to firms connected to the HEC network with 3.70 and 8.01 percentage points (columns V and VI). The effect is slightly lower when controlling for industry fixed effects and firm size, with 2.04 and 4.17 percentage points (columns VII and VIII). Dropping firms that appointed a connected CEO in the three years before the election (columns IX and X), and adding controls to this reduced sample (columns XI and XII), does not affect the results. This suggests that the results are not affected by endogenous CEO appointments in anticipation of Lee Myung Bak's election. For the analysis in this paper, evidence from stock price reactions establishes the validity of the definition of connections to the new president through the KU and HEC networks. Appendix C discusses additional tests that reduce the set of alternative explanations for the observed differences in stock price reactions between connected and non-connected firms.

Table 3 shows changes in real performance for connected relative to non-connected firms in the period after the election, compared to the period before the election. Consistent with the prior literature, connected firms experience 14.11% higher growth in total assets (column I), a 16.82% higher increase in sales, a 42.11% higher increase in investment (column III), and a 2.43 percentage point increase in their bank debt to assets ratio (column IV).

6 Results

This section presents the results from the estimation of equations (1) to (3), and describes additional tests supporting the interpretation of the results.

6.1 Allocation of Procurement Contracts

Figure 5 depicts the change in the average annual contract volume, scaled by firm assets, for connected (black line) and non-connected (gray line) firms. Before the election, connected and non-connected firms exhibit very similar growth rates in contract volume. However, from 2008, the year of the new president's inauguration, connected firms show a significantly higher growth rate in contract volume than non-connected firms. The wedge between connected and non-connected firms narrows from 2010. This is mainly due to the conservative classification of firms. The connectedness measure is not updated after 2007, to prevent an estimation bias from endogenous CEO appointments at the private firm level.

Table 4 summarizes the results from estimating equation (1), statistically confirming the insights from the graphical analysis in Figure 5. The increase in connected firms' annualized contract volume to assets ratio after the election is 3.03 percentage points higher than for non-connected firms (column I). The results in Table 3, column II show that sales relatively increase by 16.82 percent for firms connected to Lee Myung Bak's networks after the election. Since the average value of sales to assets of connected firms in the sample is 45.85 percent, this corresponds to an annual increase in sales by 7.71 percent of pre-reform assets. Thus, the fraction of the increase in sales for connected firms that can be attributed to the increase in government contracts is 39.29 percent. Limiting the sample to state firm contracts and private firms that receive at least one contract from a state firm during the sample period, the increase in annual procurement contract volume is 2.39 percentage points higher for connected firms (column II). Columns III to VIII depict the results from state firm-private firm relationship level analysis in equation (2). Analysis at the state firm-private firm level allows me to control for an increase in connected firms' demand for government contracts and changes in government investment that benefit connected firms. If the increase in contract volume for connected firms stems from changes in the demand for government contracts or changes in government investment, connected firms should experience an increase in contract volume from all state firms. However, if connections to one of the president's networks affect contract allocation, the effect should be stronger for state firms in which the president

appoints a CEO from the same network as the private firm CEO.[15]

After the election, connected firms experience a 0.33 percentage point higher increase in contract volume from state firms in which the president appoints a CEO from the same network compared to other state firms (column III). The results become even stronger when saturating the estimation with firm fixed effects (0.39 percentage points, column IV), and state firm fixed effects (0.39 percentage points, column V).[16] The higher increase in contract volume from state firms with a CEO from the same network as the private firm CEO for the *same* firm suggests that connections have a direct effect on contract allocation. Private firms connected to the KU network become connected to six new state firms, private firms connected to the HEC network become connected to three new state firms. Since about two-thirds of the connected private firms are connected to the KU network, who become connected to six new state firms, and one-third of the connected private firms are connected to the HEC network, who become connected to three new state firms, and the increase per private firm-state firm connection is 0.39 percentage points, the increase in contract volume from connected state firms almost fully explains the 2.39 percentage points excess increase in total state firm contracts for connected firms in column II ([2/3 * 6 + 1/3 * 3]* 0.39 = 1.95).

In Table 5, I split the increase in contract volume into an intensive margin and an extensive margin effect. Panel A limits the sample to private firm-state firm pairs that already had a contracting relationship before the election. The results in columns I to III show that firms connected to the new president's networks receive more contracts from connected state firms that they already had a contracting relationship with, amounting to about two percent of firms' assets. In Panel B, I change the dependent variable to a variable that takes the value of one if a new relationship is established after the election, minus one if a relationship is terminated, and zero otherwise. The results in columns I to III show that firms connected to the new president's networks are about eight percent more likely to start or sustain a relationship with a state firm in which the new president appoints a CEO from the same network.

[15]Since not all private firms execute contracts of the type issued by a particular state firm, I only treat state firms that sign at least one contract with a firm from the same industry as potential contracting partners. All results are robust to treating all state firms as potential contracting partners for each private firm.

[16]All results in Table 4 are qualitatively identical with similar magnitudes when dropping firms which appoint a connected CEO in the three years before the election (see Table A.3).

6.2 Endogenous CEO Appointments

The main concern with the analysis on the state firm-private firm relationship level is that the president appoints CEOs from his networks in state firms that implement an agenda that benefits connected firms. For example, suppose that Korea University graduates acquire specific skills to implement infrastructure projects and are more likely to be employed in private firms that execute infrastructure projects. If the new president appoints CEOs from the KU network in state firms to implement infrastructure investment, this could lead to more contracts being allocated from state firms in which the president appoints a KU network CEO to private firms with a CEO from the KU network.[17]

To mitigate this concern, I control for changes in investment at the state firm level by saturating equation (2) with state firm-industry fixed effects. This allows me to compare changes in contract allocation from a given state firm to connected and non-connected private firms in the same industry. Even for this within-industry analysis, connected private firms receive more contracts from state firms in which the president appoints a CEO from the same network compared with other state firms, relative to non-connected private firms (Table 4, column VI). Detailed data on contract types (electricity, real estate, road construction, etc.) allows me to sharpen the analysis further. I find that, after controlling for contract types at the state firm level (state firm-contract type fixed effects), the results continue to hold (column VII). The results are robust to even more granular definitions of contract types, such as road construction, road maintenance, road repair, etc. (column VIII). The intensive and extensive margin results in Table 5 are also robust to including state firm-industry fixed effects (column IV), and controlling for contract types at the state firms level (columns V and VI). To explain these results, investment by state firms in which the president appoints a CEO from one of his networks would need to change *within* a given contract type, such that connected private firms receive more contracts, but non-connected private firms that execute the same type of contract do not receive more contracts from the same state firm.

It could also be that changes in state firm investment are geographically concentrated and benefit connected firms that operate in a specific geographical area. However, the sample comprises large publicly listed firms whose operations are not concentrated in a specific area in Korea, which has a territory smaller than Virginia.

To further examine the possibility of changes in state firm investment, I perform a placebo

[17]State firms in which the new president appoints CEOs from the KU and HEC networks do not allocate more contracts to private firms with a CEO from the same network before the election, and are not more likely to sign a contract with a firm that has a CEO from the same network.

test, by exploiting appointments of members of the president's networks as CEOs of state firms that do *not* change connectedness to private firms with a CEO from the same network. Some state firms in which the president appoints a CEO from the KU network already have a KU network CEO before the election. The results in Table 6 show that private firms with a KU network CEO do not experience an increase in contract volume from state firms that have a KU network CEO both before and after the election. Private firms with a CEO from the KU network receive more contracts from state firms which have a CEO from the KU network, during both the pre-election period (0.29 percent of firm assets, p-value: 0.054), and the post-election period (0.27 percent of firm assets, p-value: 0.044).

These results could be driven by the fact that state firms in which the president appoints a connected CEO and that have a CEO from the same network before the election allocate types of contracts that are not related to the new president's agenda. To rule out this possibility, I reduce the sample to the types of contracts accounting for at least ten percent of the contracts allocated by state firms that have a CEO from the KU network both before and after the election (roads, harbor, education, utilities, and other real estate).[18] Even for this set of contracts, private firms with a CEO from one of the new president's networks experience a higher increase in contract volume from state firms in which the president appoints a CEO from the same network (Table A.4). This strengthens the evidence that the increased allocation of contracts to private firms with a CEO from the same network as the state firm CEO is not driven by endogenous appointments of CEOs in state firms that implement the new president's agenda.

6.3 Other Networks

The results from the placebo test show that private firms connected to the KU network receive more contracts from state firms with a KU network CEO even before the election. This suggests that network connections between state firm and private firm CEOs affect contract allocation in general even in the absence of political connections. To verify this conjecture, I match all private firms to the pre-reform and post-reform CEOs of all state firms based on their alumni network (same university and department), and replicate the state firm-private firm relationship level analysis in equation (2), replacing the $connected\ relationship_{ij}$ variable with a variable that takes the value of one if a private firm becomes connected to

[18] Including contract types that account for less than ten percent of the contracts allocated by state firms that have a CEO from the KU network before and after the election (storage, landscape work) does not affect the results.

a state firm through their CEOs' alumni network after the election, minus one if connection to the state firm is lost, and zero otherwise.

The results are gathered in Table 7. Private firms receive more contracts from state firms that they are connected to through their CEOs' alumni network, by about 0.25 percent of firms' assets (column I). The effect is even stronger when controlling for state firm and private firm fixed effects with 0.43 percent of firms' assets (column IV). While the effect is only about half as large for the KU network (column V) compared to other alumni networks (column VI), this is most likely driven by differences in the number of new connections that emerge between state and private firms after Lee Myung Bak's election. No other alumni network experiences an increase similar to the six new connections for the Korea University Business School network. When I multiply the increase in contract volume per state firm with the net increase in new connections to state firms after the election, the aggregate increase in contract volume is much larger for the KU network than for any other network. These results strengthen the interpretation that changes in contract allocation are driven by network connections between state and private firm CEOs independent of political connections. Political connections determine which networks benefit most, as they determine which network has more power over the allocation of resources.

6.4 Contract Performance

Next, I test for differences in ex post contract performance. For the subset of construction contracts, the database records amendments. I define contract performance as a dummy variable that takes the value of one if any adverse event occurs during contract execution (delays, construction mistakes, financial problems of the contracting firm), and zero otherwise. Figure 6 displays the average probability of adverse outcomes for contracts allocated to firms connected to the new president's networks (black line) and non-connected firms (grey line). Before the election, contract performance is similar for both groups of firms. However, after the new president comes into office and appoints people from his networks as state firm CEOs, there is a significantly higher increase in negative outcomes for contracts allocated to connected firms, compared to contracts allocated to non-connected firms.

Table 8 displays the results from estimating equation (3). The first two columns include all contracts issued by state firms and other government entities. Contracts allocated to private firms connected to one of the president's networks are 11.48 percentage points more likely to perform badly relative to contracts allocated to non-connected private firms, com-

pared with the pre-election period (column I). Adding firm fixed effects slightly reduces the effect to 8.78 percentage points (column II). For the subsample of construction contracts issued by state firms, the magnitude of the effect is stronger, with 20.55 percentage points (column III), and 16.75 percentage points with firm fixed effects (column IV).

The main test compares contracts allocated to connected firms by state firms in which the president appoints a CEO from the same network, to contracts from other state firms allocated to the same firm. Contracts signed between CEOs from the same network are 52.35 percentage points more likely to perform badly than contracts from other state firms (column V). Controlling for time-series changes in the performance of contracts allocated to a given firm (firm-time fixed effects) and time-series changes in the performance of contracts allocated by the same state firm (state firm-time fixed effects), the effect is similar with 42.25 percentage points (column VI). Together, the results in Table 8 suggest that connections lead to worse contract performance.

Differences in contract performance are not explained by lower costs for contracts allocated to connected firms. Instead, construction costs are *more* likely to increase after connected contracts are signed (see Table 8, Panel B). Furthermore, the initial pricing of contracts does not appear to be different for contracts allocated to connected firms. The difference between the maximum amount allocated to a given construction project by the government and the winning bid is not statistically different for auctions won by connected and non-connected firms. This suggests that contracts allocated to connected private firms are executed poorly, and that costs for the government are higher than for contracts allocated to non-connected private firms.

6.5 Differences in Contracts

The interpretation of the results in Table 8 hinges on the assumption that contracts allocated to connected private firms are ex ante equally likely to exhibit bad performance as contracts allocated to non-connected private firms. However, differences in contract performance could be driven by the fact that state firms allocate the most complex contracts, which are ex ante more likely to exhibit bad performance, to connected private firms.

To test for the effects of connections on contract performance, we would ideally like to compare the performance of identical contracts allocated to connected and non-connected private firms. To get closer to this ideal test, I control for observable contract characteristics that are correlated with contract performance. First, I split contracts into three categories of

contract complexity (low, medium, high) based on the description of the construction project in the database, pictures/plans of the construction project, and information on landscape conditions from the database. Panel A in Table 9 shows that low complexity constructions are significantly less likely to perform badly, with 17.39 percent of contracts experiencing negative events during execution, compared to medium complexity contracts with 49.12 percent, and high complexity contracts with 62.45 percent. To avoid enforcing a linear relationship, I add category dummies to the regression. Second, I control for the type of construction project (Panel B). Third, I control for contract volume (log of contract volume), as larger constructions are more likely to be more complex (Bajari, McMillan, and Tadelis 2009). The smallest quarter of contracts is significantly less likely to exhibit negative outcomes with 28.18 percent, compared to the largest quarter of contracts with 54.76 percent (Panel C). Finally, I control for the contract allocation method, as contracts allocated through auctions (in particular limited auctions) are more complex projects compared to more standardized contracts for which a firm is directly selected (Panel D). The last column in Table 9 shows that more complex contracts, larger contracts, and contracts allocated through auctions are also more likely to experience increases in construction costs.

The results are collected in Table 10. From the outset, it is important to note that contracts allocated to connected private firms are neither significantly larger nor more likely to be allocated through auctions after the election compared with the pre-election period, and are slightly *less* complex, relative to contracts allocated to non-connected private firms (Table A.5). Accordingly, I find that controlling for observable contract features does not qualitatively affect the results. Contracts allocated to connected private firms are 5.90 percentage points more likely to perform badly after the election (column I). The effect is quantitatively almost identical, with 6.12 percentage points after adding firm fixed effect (column II). For contracts allocated by state firms, the magnitude of the effect is even larger (columns III–IV).

Most importantly, the performance of contracts allocated to private firms from connected state firms remains significantly worse than the performance of contracts allocated to the same private firm from other state firms, with similar economic magnitudes compared to their counterparts in Table 8 (columns V–VI). Additionally, the results on cost increases become slightly stronger after controlling for contract complexity (Table 10, Panel B). This strongly suggests that the poor performance of contracts allocated to connected private firms is not related to contract complexity.[19]

[19]Worse contract performance could be explained by differences in initial contract design for contracts allocated to connected private firms. State firm CEOs may draft more stringent contracts when allocating

One concern is that state firms may trade off bad contract execution with reduced screening costs when allocating contracts to connected firms. For search costs to justify worse contract execution, these costs would need to amount to 23.31 percent of contract value or 5167 million Korean won for the average construction contract allocated by state firms in the sample (see Section 7.2). Moreover, excluding the first contract allocated by a given state firm to a given private firm before and after the election does not qualitatively and quantitatively affect the results. Thus, even for contracts where search costs are arguably lower (the state firm has interacted with the private firm before), contracts allocated to connected firms perform significantly worse than contract allocated to non-connected firms.

Another possibility could be that state firm CEOs might accept worse contract performance on average, if they expect that connections will serve as insurance against extreme outcomes that might capture public attention and put state firm CEOs' jobs at risk. To examine this possibility, I replace the dependent variable from a dummy variable which is one if the contract exhibits adverse performance, with the number of negative events that occur during the execution of the contract. While the frequency of adverse outcomes is an imperfect proxy for extreme negative outcomes, examining differences in the frequency of adverse outcomes provides suggestive evidence on whether connected contracts are less likely to exhibit repeated problems which would be indicative of extreme outcomes. The results are gathered in Table A.6. Column I shows that contracts allocated to connected firms exhibit a higher increase in adverse contract outcomes of 0.27 per contract after the election, compared with contracts allocated to non-connected firms. Controlling for firm fixed effects, the difference is 0.21 (column II). The effect is almost identical for the sample of contracts allocated by state firms (columns III–IV). The difference is entirely driven by contracts signed between connected CEOs (columns V–VI). These results suggest that contract allocation cannot be explained by risk-aversion of state firm CEOs.[20]

As for changes in contract allocation, I find that contracts allocated to private firms with a CEO from the same alumni network perform worse for alumni networks that are not connected to the new president as well (Table 11). Excluding connections from the KU network, contracts allocated to private firms that are connected to state firms through alumni networks are 37.72 percentage points more likely to exhibit adverse outcomes (column IV),

contracts to connected firms. However, drafting more stringent contracts for connected private firms makes their performance appear worse ex post, which state firm CEOs would rather try to avoid, as differences in ex post outcomes are easier to detect. Additionally, contracts allocated through the Public Procurement Service are standardized and do not differ in their general design.

[20]Examining the contracts with the highest incidence of adverse events (the 25, 50, 100, or 200 worst performing contracts) provides a similar picture, with contracts allocated to connected private firms being disproportionally overrepresented.

and 28.96 percentage points more likely to experience cost increases in ex post renegotiations (column VIII). These results confirm that differences in contract allocation are driven by connections between state firm and private firm CEOs, regardless of political connectedness.

6.6 Ex Ante Misallocation and Ex Post Renegotiations

The performance of connected contracts could be worse because contracts are misallocated ex ante, such that firms are awarded contracts that they are incapable of executing effectively, or because connections lead to lax monitoring of connected firms ex post. Similarly, cost increases may be driven by bad contract execution or by preferential treatment of connected firms in renegotiations. Information on the appointment date of CEOs in state firms allows me to test for these different sources of inefficiencies separately for arguably identical contracts. Contracts allocated right *before* (the quarter before) the appointment of a connected CEO in the respective state firm are not subject to distortions in ex-ante contract allocation, as they are still allocated by the previous, unconnected, CEO. However, after the new CEO is appointed, they are executed under the influence of connectedness.[21] Examining the performance of these contracts isolates the effect of connections on ex post monitoring.

Interestingly, contracts executed under the new CEO, but allocated under the previous CEO, do not show significant differences in contract performance compared with contracts allocated and executed under the old CEO (Table 10, Panel A, columns VII-VIII). This suggests that adverse outcomes are driven not by lax monitoring of connected firms ex post after the contract is allocated, but by distortions in the initial allocation of contracts to connected firms that are less effective in executing the respective project. Strikingly, ex post increases in construction costs in renegotiations are present even for contracts allocated by non-connected CEOs when they are executed under connected CEOs (Panel B, columns VII–VIII). Thus, even for contracts that are not subject to poor execution, state firms grant higher payments to connected private firms through ex post renegotiations. This suggests that cost increases represent additional rent transfers to connected private firms rather than merely being a symptom of construction inefficiencies.

[21] 98.91% of all construction contracts for KOSPI firms in the public procurement system have an execution period of more than one month, 97.37% more than two months, and 94.88% more than three months.

6.7 Differences in Reporting and State Firm CEOs' Agenda

The higher incidence of adverse events during the execution of contracts allocated to connected private firms could be driven by differences in reporting. For example, CEOs may feel more comfortable about reporting mistakes that may cause delays when they are connected to the state firm CEO. This may result in a more efficient resolution of problems and be efficient overall, despite appearing less efficient based on the number of reported mistakes and delays. The results in the previous subsection suggest that this is not the case. If connections were to lead to differences in reporting for connected contracts, this should also apply to the set of contracts issued under non-connected CEOs, but executed under connected CEOs. However, for these contracts, I observe no differences in performance. Thus, differences in performance are not pertinent to contracts executed under connected state and private firm CEOs, but only apply to contracts *allocated* by connected state firm CEOs.

7 Private Rents and Social Costs from Misallocation

This section provides back of the envelope calculations that relate the rents from *additional* procurement contracts allocated to connected firms to the increase in market value in the week after Lee Myung Bak was nominated as the GNP's candidate for the presidential election.[22] Additionally, I calculate the total costs from negative externalities caused by poor execution of connected contracts. The computations are based on several simplifying assumptions and should be viewed as rough approximations only.

7.1 Rents from Changes in Contract Allocation

To compute the rents from additional procurement contracts allocated to firms connected to one of the new president's networks, I first calculate the total value of additional contracts allocated to each connected firm over Lee Myung Bak's presidency. To control for the time-series increase in contract volume allocated to all firms, I subtract the average growth rate of procurement contracts over *all* private firms from connected private firms' contract volume growth rate. Finally, I sum the increase in contract volume over all connected firms and

[22]Comparing the rents from procurement contracts over Lee Myung Bak's presidency and the change in market valuations requires that the market's expectations regarding the benefits from political connections span the same time period. This applies to the Korean case, as the president can only serve for one term.

multiply the total contract volume with the average profit margin:

$$Profits = margin \cdot \sum_i \left(\left[\left(\frac{\Delta contract\ volume}{assets} \right)_i - \overline{\frac{\Delta contract\ volume}{assets}} \right] * assets_i \right) \quad (4)$$

where $margin$ is the average profit margin, $\left(\frac{\Delta contract\ volume}{assets}\right)_i$ is firm i's contract growth rate, $\overline{\frac{\Delta contract\ volume}{assets}}$ is the average growth rate in the sample, and $assets_i$ is firm i's total assets in 2007. For the profit margin for public procurement contracts, I follow Bajari, Houghton, and Tadelis (2014), who estimate a median profit margin of 12.1 percent for winning bids in public procurement contracts in the US from 1999 to 2005.[23] Clearly, the computation is subject to several implicit assumptions, and is only approximate. For example, it abstracts from changes in profit margins for connected contracts and the possibility that changes in the allocation of contracts affect other operations in the firm.

To compute the increase in firm value due to political connections, I multiply each connected firm's cumulated return in the week after Lee Myung Bak's nomination as GNP candidate, corrected for the return of non-connected firms, with the stock market capitalization on the last trading day before the election. Since the value of political connections incorporated in stock prices is the value of political connections times the probability that firms benefit from political connections, the estimates in Table 2 underestimate the full value of political connections. Since the election was close, I assume that the market's prior expectation of the probability of Lee Myung Bak's election was 50%. Hence, I multiply the effect by two:

$$\Delta Market\ Value = 2 \cdot \sum_i \left([ret_i - \overline{ret^{nc}}\ ] * market\ cap_i \right) \quad (5)$$

where ret_i is firm i's return over the week after Lee Myung Bak's nomination as GNP candidate, $\overline{ret^{nc}}$ is the average return of non-connected firms in the week after Lee Myung Bak's nomination, and $market\ cap_i$ is firm i's market capitalization on the day before Lee Myung Bak's nomination.

The total increase in procurement contract volume *due to political connections* amounts to 8331 billion won, which multiplied by the profit margin means a cumulated profit of 1008 billion won. The increase in market value *due to political connections* amounts to 5061 billion won. This suggests that the increase in profits from procurement contracts explains about

[23]The contracts in Bajari, Houghton, and Tadelis (2014) are constructions contracts. According to Standard and Poor's, the construction industry was relatively competitive with low profit margins during this time period. This suggests that the estimate is rather conservative.

19.92% of the increase in politically connected firms' market value. When considering only firms that are active in the public procurement market, the share is about 42.18%. Thus, rents from additional public procurement contracts constitute a significant fraction of firms' benefits from political connections.

7.2 Social Costs of Contract Misallocation

The data on contract amendments allows me to estimate two dimensions of the social costs of government contract allocation to connected firms: costs arising from the ineffective execution of contracts and higher construction costs due to ex post price increases. Computing these costs requires several strong assumptions and relies on computations and descriptive statistics from other studies. Thus, the calculations should be viewed as a rough proxy of the costs generated by the misallocation of government contracts to connected private firms.

I define social costs from ineffective contract execution similar to Lewis and Bajari (2011):

$$SocialCost = \sum_{c} \Delta\ P(delay)_c \cdot Cost\ of\ Delay_c \tag{6}$$

where c subscripts contracts, $\Delta\ P(delay)_c$ is the difference in the probability of delay for the same contract being allocated to a connected compared to a non-connected private firm, and $Cost\ of\ Delay_c$ is the cost of delay for a given contract.

The estimate in column VI of Table 10, Panel A shows that contracts allocated to connected firms are 40.18 percent more likely to exhibit delays. Information on delay lengths is not available in the data and is therefore taken from other empirical studies. Since most data is available on the U.S., the main computations rely on estimates and descriptive statistics from empirical studies using U.S. data. Brogaard, Denes, and Duchin (2017) document, for a comprehensive set of government procurement contracts in the U.S., that the average deadline extension in the event of a delay is 63.82 percent of the initial contract length.[24]

To compute the *expected* delay relative to the initial contract length, I multiply the average delay of 63.82 percent of initial contract length with the 40.18 percent difference in the probability of delay for connected contracts relative to contracts allocated to non-connected

[24]For a comprehensive sample of public procurement contracts in Italy with a set of contract types and average contract size similar to the data used in this paper, D'Alpaos, Moretto, Valbonesi, and Vergali (2013) and Guccio, Pignataro, and Rizzo (2014) provide data on the length of delays. Matching their descriptive statistics to the contract types in this paper, the weighted average of delays relative to the initial contract length is 54.84 percent, similar to the estimate for the U.S.

firms. This yields an expected increase in delays for contracts allocated to connected firms of 25.64 percent of the initial contract length. Regarding the costs of delays, Lewis and Bajari (2011) estimate for a set of construction contracts in the U.S. that a 33 percent reduction in execution time reduces negative externalities by 30 percent of contract value. Assuming that negative externalities are linear in the number of construction days, a 25.64 percent increase in the execution period increases negative externalities by 23.31 percent of contract value.

In terms of cost increases, Brogaard, Denes, and Duchin (2017) document that the increase in costs conditional on renegotiation is 35.56 percent of the initial contract value. Multiplied with the 24.50 percent higher probability of cost increases for contracts allocated to connected firms (Table 10, Panel B, column VIII), this suggests that the total costs of ex post renegotiations of contracts allocated to connected firms amount to 8.72 percent of initial contract value. Taken together, negative externalities and cost increases amount to 32.03 percent of the initial contract volume, where cost increases through ex post renegotiations account for 27.22 percent of the costs of misallocation, with inefficient contract allocation accounting for the remaining 72.78 percent of the costs.

The total amount of *additional* contracts allocated to firms connected to Lee Myung Bak's networks after the election makes up 9.90 percent of total public procurement contract volume. According to the latest available data from 2013, total public procurement accounts for 12.8 percent of GDP in Korea (OECD 2015). Thus, the total value of additional contracts allocated to connected firms is equivalent to 1.27 percent of GDP. Given the estimated 32.03 percent of contract value in negative externalities and additional costs, the total costs therefore amount to about 0.41 percent of annual GDP.

Since inefficiencies in contract execution and cost increases are not limited to firms connected to the president's networks, the overall costs of contract allocation to private firms connected to state firm CEOs are even larger. To estimate the fraction of government procurement contracts allocated to private firms connected through alumni networks, I first estimate the *additional* share of a state firm's budget that goes to such connected firms:

$$Contract\ Share_{ijt} \quad = \quad \alpha_{ij} + \alpha_{it} + \alpha_{jt} + \delta \cdot alumni\ network_{ijt} + \epsilon_{ijt}$$

where $Contract\ Share_{ijt}$ is the share of state firm j's total contract volume allocated to private firm i during the pre-election and post-election periods, respectively. The dummy variable $alumni\ network_{ijt}$ is one if the CEOs of state firm j and private firm i graduated from the same department of the same school, and zero otherwise. The coefficient δ measures the difference in the share of contracts allocated to connected and non-connected firms.

The results are gathered in Table 12. In the strictest specification, the additional contract volume allocated to private firms from the same alumni network accounts for 5.83 percent of total contract volume allocated by a given state firm. Since the average state firm is connected to 4.52 private firms through alumni networks, the total share of contract volume allocated due to alumni connections is 26.35 percent. Since total procurement contract volume amounts to 12.8 percent of annual GDP, contracts with a total volume equivalent to 3.37 percent of GDP are allocated through alumni connections. Multiplied with the cost of contract allocation to connected firms of 32.03 percent, this implies total costs of contract allocation through alumni networks of 1.08 percent of GDP.

8 Conclusion

This paper exploits a unique institutional setting in Korea to document how firms benefit from being connected to a politician's network. After his election as President of Korea, Lee Myung Bak appoints people from his networks as CEOs of state firms, which play an important role as intermediaries in allocating public procurement contracts to private firms. This provides people from his networks with increased control over the allocation of government contracts. Private firms connected to the president's networks experience a higher increase in public procurement contract volume after the election relative to non-connected firms. The increase in contract volume is driven by contracts allocated through state firms in which the new president appoints a CEO from the same network as the private firm's CEO. Contracts allocated to connected private firms exhibit a higher incidence of construction mistakes and delays, and are more likely to experience cost increases in ex post renegotiations. Differences in contract performance cannot be explained by differences in observable contract characteristics. Contracts allocated to connected firms appear less complex than contracts allocated to non-connected firms. This suggests that connections lead to a misallocation of contracts. Back of the envelope calculations suggest that each dollar in contract value transferred from non-connected to connected firms leads to a cost of 32 cents to the economy, amounting to a total cost of 0.41 percent of annual GDP.

It is not only the state firm CEOs from the new president's networks that allocate more contracts to private firms with a CEO from the same network. I find that state firm CEOs allocate more contracts to private firms with a CEO from the same alumni network in general, and state firms in which the new president appoints a CEO from Korea University and that already had a CEO from the same alumni network allocate more contracts to private

firms with a CEO from Korea University, both before and after the election. This suggests that distortions in contract allocation occur at the private firm-state firm connection level and exist even in the absence of connections to the president. The role of the president in benefiting firms connected to his networks is to appoint more CEOs from his networks into state firms, which in turn allocate more government contracts to private firms with a CEO from the same network. This suggests that providing politicians with the power to appoint people to important positions, where they control the allocation of government resources, allows them to channel resources to connected firms through existing networks.

Given that social connections appear to distort contract allocation in general, the results in this paper have important implications for public procurement contract allocation. Public procurement accounts for a large part of global GDP. Understanding the effects of social connections on the allocation of these contracts therefore has important welfare implications. The detailed micro-level data in the paper allows me to pin down the mechanism through which inefficiencies in contract allocation occur. I only observe a higher incidence of adverse outcomes for contracts allocated to connected firms ex ante. In cases where contracts are executed under connected state firm and private firm CEOs, but are allocated when both firms are not connected through their CEOs, contracts are not more likely to exhibit adverse outcomes. This suggests that inefficiencies occur at the initial contract allocation stage rather than through lax monitoring. In contrast, cost increases for connected contracts through renegotiations occur regardless of whether contracts were allocated under connected or non-connected CEOs. This suggests that favorable treatment of connected firms in renegotiations provides a second source of inefficiencies. While the theory of second best cautions against making strong welfare claims (Lipsey and Lancaster 1956), the results in this paper suggest that monitoring of social connections between the government entities allocating and the private firms receiving government contracts, both when contracts are allocated and when they are renegotiated, could reduce some inefficiencies in government procurement.

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Table 1: **Descriptive Statistics**

Panel A: Balance Sheet Data	Obs.	Mean	Std.
Total Assets (billion Korean Won)			
Full Sample	1605	3197	11636
Connected Firms	156	3712	13279
Non-connected Firms	1449	3141	11449
Sales (billion Korean Won)			
Full Sample	1597	1834	5379
Connected Firms	153	1702	3629
Non-connected Firms	1444	1848	5533
ROA			
Full Sample	1601	0.0300	0.0622
Connected Firms	156	0.0323	0.0507
Non-connected Firms	1445	0.0298	0.0634
Net Investment			
Full Sample	1444	0.0443	0.0658
Connected Firms	137	0.0585	0.0666
Non-connected Firms	1307	0.0428	0.0656
Loans/Assets			
Full Sample	1302	0.0380	0.0482
Connected Firms	122	0.0379	0.0379
Non-connected Firms	1180	0.0380	0.0492

Panel B: CEO Data (1924 CEOs)	
Seoul National University	465
Yonsei University	219
Korea University	214
Hanyang University	144
Sungkyunkwan University	97
Chung-Ang University	52
Connected CEOS (at event date):	100 (61)
Korea University	66 (41)
Hyundai Engineering & Construction	34 (20)

Panel C: Firm Connections				
Sample	Full	Contracts	State Firm Contracts	Construction Contracts
Firms	630	368	195	80
Non-connected	571	328	164	59
Connected	59	40	31	21
Korea University (KU)	40	25	19	11
Hyundai Engineering & Construction (HEC)	19	15	12	10

Panel D: Procurement Contracts (million Korean won)	Obs.	Mean	Std.
Total Contracts	43454	6316	61917
from state firms	3519	11354	34553
Construction Contracts	10781	10031	31601
from state firms	1729	22171	46746
Goods Contracts	19941	8001	88059
from state firms	1269	865	4023
Service Contracts	12476	509	6728
from state firms	510	1021	3349
Commodities Contracts	207	1903	2869
from state firms	0	-	-
Lease Contracts	49	311	523
from state firms	11	92	185

Panel A of this table provides descriptive statistics on important accounting variables for the pre-election period (2004-2006), separately for the full sample, the sample of firms connected to one of Lee Myung Bak's networks, and the sample of non-connected firms. Panel B provides information on the number of CEOs in the sample, the number of graduates from universities that have at least 50 graduates among the CEOs in the sample, and the number of CEOs connected to one of Lee Myung Bak's networks (Korea University Business Administration alumni, former Hyundai Engineering & Construction executives). Panel C contains an overview of the number of sample firms, and the number of firms connected to Lee Mung Bak's networks for the different subsamples: the sample of firms with procurement contract data, the sample of firms that sign contracts with state firms, and the sample of firms signing construction-related contracts. Panel D lists data on public procurement contracts allocated to KOSPI firms during the sample period.

Table 2: **Stock Returns Around the Dokokdong Land Scandal and the GNP Candidate Nomination**

Panel A:	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
	Full Sample		KU		HEC		Full Sample		Long Connected			
Dep.Var.: ret_i	(0)	(0,1)	(0)	(0,1)	(0)	(0,1)	(0)	(0,1)	(0)	(0,1)	(0)	(0,1)
$connected_i$	-0.0241***	-0.0293***	-0.0178**	-0.0234**	-0.0374***	-0.0417***	-0.0259***	-0.0287***	-0.0237***	-0.0311***	-0.0261***	-0.0316***
	(0.0065)	(0.0080)	(0.0078)	(0.0096)	(0.0111)	(0.0137)	(0.0064)	(0.0081)	(0.0084)	(0.0104)	(0.0083)	(0.0104)
Controls	no	no	no	no	no	no	yes	yes	no	no	yes	yes
Observations	626	626	607	607	586	586	626	626	601	601	601	601
R-squared	0.022	0.021	0.009	0.010	0.019	0.016	0.137	0.096	0.013	0.015	0.126	0.095
Panel B:	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
	Full Sample		KU		HEC		Full Sample		Long Connected			
Dep. Var.: ret_i	(0)	(0,4)	(0)	(0,4)	(0)	(0,4)	(0)	(0,4)	(0)	(0,4)	(0)	(0,4)
$connected_i$	0.0221***	0.0445***	0.0150**	0.0276**	0.0370***	0.0801***	0.0204***	0.0417***	0.0202**	0.0466***	0.0200***	0.0418***
	(0.0061)	(0.0106)	(0.0073)	(0.0124)	(0.0104)	(0.0181)	(0.0060)	(0.0107)	(0.0079)	(0.0136)	(0.0076)	(0.0137)
Controls	no	no	no	no	no	no	yes	yes	no	no	yes	yes
Observations	626	626	607	611	586	586	626	626	601	601	601	601
R-squared	0.021	0.028	0.007	0.008	0.021	0.033	0.158	0.104	0.011	0.019	0.154	0.096

This table reports cumulated log returns for KOSPI firms, excluding firms connected to Park Geun Hae. Panel A reports returns on the day after the prosecutor's office's announcement related to Lee Myung Bak's potential involvement in the Dokokdong Land Scandal in columns marked (0), and the two days after the announcement in columns marked (0,1). Panel B reports returns on the day after the Grand National Party's nomination of its presidential candidate in columns marked (0), and the week after the nomination in columns marked (0,4). The dummy variable $connected_i$ indicates whether a firm's CEO is connected to one of Lee Myung Bak's networks. Columns I, II, VII, and VIII show the results for the full sample. In columns III and IV, the set of connected firms is reduced to the firms connected to the KU network, and in columns V and VI to firms connected to the HEC network. Columns IX to XII drop firms that appoint a CEO connected to either of Lee Myung Bak's networks within the three years before the election. Columns VII, VIII, XI, and XII control for industry fixed effects and the log of firms' market capitalization. Standard errors are reported in parentheses. ***, and ** indicate statistical difference from zero at the 1% and the 5% levels respectively.

Table 3: **Real Effects**

	I	II	III	IV
Dep. Var.:	$log(assets)_{it}$	$log(sales)_{it}$	$log(investment)_{it}$	$\left(\frac{loans}{assets}\right)_{it}$
$connected_i * event_t$	0.1411***	0.1682***	0.4211*	0.0243***
	(0.0530)	(0.0594)	(0.2384)	(0.0085)
Firm FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Observations	3302	3286	2970	2685
R-squared	0.980	0.972	0.867	0.498

This table reports changes in firm characteristics around Lee Myung Bak's election. The dummy variable $connected_i$ takes the value of one for firms connected to one of Lee Myung Bak's networks through their CEO, and zero for other firms. The variable $event_t$ is zero for the pre-election period (2005-2007), and one for the post-election period (2009-2011). Standard errors are clustered at the firm level and reported in parentheses. ***, and * denote statistical significance at the 1%, and 10% confidence levels, respectively.

Table 4: **Procurement Contract Allocation**

	I	II	III	IV	V	VI	VII	VIII
	All Firms		Firms with State Firm Contracts					
Dep. Var.:	$\left(\frac{\Delta\ contract\ volume}{assets}\right)_i$		$\left(\frac{\Delta\ contract\ volume}{assets}\right)_{ij}$				$\left(\frac{\Delta\ contract\ volume}{assets}\right)_{ijk}$	
$connected_i$	0.0303***	0.0239***	0.0012***					
	(0.0071)	(0.0050)	(0.0004)					
$connected\ state_j$			0.0003	0.0002				
			(0.0003)	(0.0003)				
$connected\ relationship_{ij}$			0.0033***	0.0039**	0.0039**	0.0036***	0.0014**	0.0013***
			(0.0012)	(0.0015)	(0.0017)	(0.0014)	(0.0006)	(0.0005)
Firm FE	-	-	no	yes	yes	yes	yes	yes
State Firm FE	-	-	no	no	yes	-	-	-
State Firm*Industry FE	-	-	no	no	no	yes	no	no
State Firm*Contract Type FE	-	-	no	no	no	no	coarse	granular
Observations	630	195	3935	3935	3935	3935	5147	4670
R-squared	0.028	0.105	0.023	0.096	0.145	0.264	0.246	0.269

This table reports the results on the estimation of changes in procurement contract volume from equations (1) and (2). In columns I and II, the dependent variable is the annualized difference between firm i's total procurement contract volume in the post-election period (2008 Q2-2011 Q4) and its total contract volume in the pre-election period (2004 Q3-2008 Q1), scaled by firm assets in the year of Lee Myung Bak's election. In columns III to VI, the dependent variable is the change in total contract value allocated from state firm j to private firm i. In columns VII to VIII, the dependent variable is the change in contract volume for contract type k allocated from state firm j to private firm i. The variable $connected_i$ takes the value of one if firm i is connected to one of Lee Myung Bak's networks, and zero otherwise, $connected\ state_j$ takes the value of one if Lee Myung Bak appoints a CEO from one of his networks at state firm j after his election, and zero otherwise. The variable $connected\ relationship_{ij}$ is one if the CEO of firm i and the newly appointed CEO of state firm j are from the same one of Lee Myung Bak's networks. In columns II to VIII the sample is limited to firms that sign at least one contract with a state firm. Standard errors are reported in parentheses, and clustered at the private firm level in columns I and II, and at the private and state firm level in columns III to VIII. *** and ** denote statistical significance at the 1% and 5% confidence levels, respectively.

Table 5: **Procurement Contract Allocation - Intensive and Extensive Margin**

Panel A: Intensive Margin	I	II	III	IV	V	VI
Dep. Var:	$\left(\frac{\Delta \text{ contract volume}}{assets}\right)_{ij}$				$\left(\frac{\Delta \text{ contract volume}}{assets}\right)_{ijk}$	
$connected_i$	0.0059***					
	(0.0012)					
$connected\ state_j$	-0.0006	-0.0014				
	(0.0017)	(0.0021)				
$connected\ relationship_{ij}$	0.0090*	0.0225**	0.0203**	0.0185*	0.0094**	0.0089**
	(0.0047)	(0.0114)	(0.0095)	(0.0104)	(0.0039)	(0.0042)
Firm FE	no	yes	yes	yes	yes	yes
State Firm FE	no	no	yes	-	-	-
State Firm*Industry FE	no	no	no	yes	no	no
State Firm*Contract Type FE	no	no	no	no	coarse	granular
Observations	538	538	538	538	703	759
R-squared	0.070	0.450	0.564	0.672	0.693	0.733
Panel B:Extensive Margin	I	II	III	IV	V	VI
Dep. Var:	Δ *contracting relationship*$_{ij}$				Δ *contracting relationship*$_{ijk}$	
$connected_i$	0.0220					
	(0.0259)					
$connected\ state_j$	0.0133	0.0102				
	(0.0277)	(0.0272)				
$connected\ relationship_{ij}$	0.0630***	0.0863***	0.0861***	0.0739***	0.0433***	0.0361*
	(0.0165)	(0.0146)	(0.0191)	(0.0104)	(0.0152)	(0.0203)
Firm FE	no	yes	yes	yes	yes	yes
State Firm FE	no	no	yes	-	-	-
State Firm*Industry FE	no	no	no	yes	no	no
State Firm*Contract Type FE	no	no	no	no	coarse	granular
Observations	3935	3935	3935	3935	5147	4670
R-squared	0.087	0.108	0.155	0.233	0.195	0.259

This table reports results on the estimation of changes in procurement contract volume from equation (2) for state firm-private firm relationships with a least one contract signed between the respective state and private firms. In Panel A, columns I to IV, the dependent variable is the change in annualized contract volume allocated from state firm j to private firm i from the pre-election period (2004 Q3-2008 Q1) to the post-election period (2008 Q2-2011 Q4), scaled by firm i's assets. In columns V to VI, the dependent variable is the change in annualized contract volume for contract type k allocated from state firm j to private firm i. In Panel B, the dependent variable is replaced with Δ *contract relationship*$_{ij}$, which takes the value of one, if firm i receives at least one contract from state firm j during the post-election period only (2008 Q2-2011 Q4), minus one if firm i receives at least one contract during the pre-election period only (2004 Q3-2008 Q1), and zero if firm i receives at least one contract from state firm j both before and after the election, or neither before and after the election. In columns V to VI, the dependent variable requires for at least one contract of contract type k to be signed between a given state firm and a given private firm. The variable $connected_i$ takes the value of one if firm i is connected to one of Lee Myung Bak's networks, and zero otherwise. The variable $connected\ state_j$ takes the value of one if Lee Myung Bak appoints a CEO from one of his networks at state firm j after his election, and zero otherwise. The variable $connected\ relationship_{ij}$ is one if the CEO of firm i and the newly appointed CEO of state firm j are from the same one of Lee Myung Bak's networks. Standard errors are clustered at the private and state firm levels and reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% confidence levels, respectively.

Table 6: **Procurement Contract Allocation - Placebo Test**

	I	II	III
Dep. Var.:	$\left(\frac{\Delta \ contract \ volume}{assets}\right)_{ij}$		
$connected_i$	-0.0000		
	(0.0002)		
$pre\ connected\ state_j$	-0.0002	-0.0005**	
	(0.0002)	(0.0005)	
$pre\ connected\ relationship_{ij}$	-0.0002	-0.0002	-0.0003
	(0.0002)	(0.0003)	(0.0004)
Firm FE	no	yes	yes
State Firm FE	no	no	yes
Observations	2839	2839	2839
R-squared	0.000	0.070	0.115

This table reports results on the estimation of changes in procurement contract volume for the subsample of contracts issued by state firms. The dependent variable is the annualized difference between firm i's total procurement contract volume from state firm j in the post-election period (2008 Q2-2011 Q4) and the pre-election period (2004 Q3-2008 Q1), scaled by firm assets. The variable $connected_i$ takes the value of one if firm i is connected to the KU network, and zero otherwise. The variable $pre\ connected\ state_j$ takes the value of one if Lee Myung Bak appoints a CEO from the KU network at state firm j after his election and that state firm also had a CEO from the KU network before his election, and zero otherwise. The variable $pre\ connected\ relationship_{ij}$ is one if the CEO of firm i is from the KU network and state firm j has a CEO from the KU network before and after the election. Contracts from state firms where the president appoints a CEO from one of his networks and that had no CEO from the respective network before the election are dropped from the sample. Standard errors are clustered at the private and state firm levels and reported in parentheses. ** denotes statistical significance at the 5% confidence level.

Table 7: **Procurement Contract Allocation - All Alumni Networks**

	I	II	III	IV	V	VI
Dep. Var.: $\left(\frac{\Delta \ contract \ volume}{assets}\right)_{ij}$	All Networks				Only KU	Excl. KU
$connected\ relationship_{ij}$	0.0025**	0.0021**	0.0043***	0.0038***	0.0028*	0.0056**
	(0.0011)	(0.0011)	(0.0013)	(0.0011)	(0.0015)	(0.0023)
Firm FE	no	yes	yes	yes	yes	yes
State Firm FE	no	no	yes	-	yes	yes
State Firm*Industry FE	no	no	no	yes	no	no
Observations	3935	3935	3935	3935	3935	3935
R-squared	0.033	0.136	0.223	0.360	0.138	0.196

This table reports results from the estimation of changes in procurement contract volume. The dependent variable is the annualized change in total contract volume allocated from state firm j to private firm i in the post-election period (2008 Q2-2011 Q4) compared to the pre-election period (2004 Q3-2008 Q1), scaled by firm i's assets in the year of Lee Myung Bak's election. The variable $connected\ relationship_{ij}$ is one if the CEO of firm i is from the same network as the newly appointed CEO of state firm j, minus one if the CEO of firm i is from the same network as the replaced CEO of state firm j, and zero if the CEO of firm i is connected to neither CEO of state firm j, or both. Standard errors are clustered at the private and state firm levels and reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% confidence levels, respectively.

Table 8: **Contract Performance**

	I	II	III	IV	V	VI
Panel A: Dep. Var.: $performance_c$	All Contracts		State Firm Contracts			
$event_t$	0.0992**	0.1178***	-0.0634	-0.0476	-0.2834	
	(0.0457)	(0.0262)	(0.0626)	(0.0582)	(0.1893)	
$connected_i$	-0.0233		0.0196			
	(0.0520)		(0.1169)			
$event_t * connected_i$	0.1148**	0.0878**	0.2055*	0.1675	0.0521	
	(0.0547)	(0.0395)	(0.1085)	(0.1173)	(0.0961)	
$event_t * connected\ state_j$					0.3107	
					(0.1888)	
$event_t * connected\ relationship_{ij}$					0.5235***	0.4225***
					(0.1471)	(0.0513)
Firm FE	no	yes	no	yes	-	-
Firm*State Firm FE	-	-	-	-	yes	yes
Firm*Event FE	no	no	no	no	no	yes
State Firm*Event FE	-	-	-	-	no	yes
Observations	10754	10754	1728	1728	1728	1728
R-squared	0.024	0.137	0.041	0.176	0.548	0.601
	I	II	III	IV	V	VI
Panel B: Dep. Var.: $cost\ increase_c$	All Contracts		State Firm Contracts			
$event_t$	-0.0009	0.0257**	-0.0847	-0.1187**	0.0789	
	(0.0111)	(0.0119)	(0.0538)	(0.0575)	(0.0878)	
$connected_i$	0.0027		-0.0668			
	(0.0162)		(0.0927)			
$event_t * connected_i$	0.0519***	0.0330*	0.1912**	0.1742*	0.0987**	
	(0.0169)	(0.0176)	(0.0878)	(0.1043)	(0.0490)	
$event_t * connected\ state_j$					-0.0599	
					(0.0722)	
$event_t * connected\ relationship_{ij}$					0.1577**	0.2012**
					(0.0708)	(0.0996)
Firm FE	no	yes	no	yes	-	-
Firm*State Firm FE	-	-	-	-	yes	yes
Firm*Event FE	no	no	no	no	no	yes
State Firm*Event FE	-	-	-	-	no	yes
Observations	10754	10754	1728	1728	1728	1728
R-squared	0.009	0.059	0.022	0.125	0.261	0.331

This table reports the results concerning contract performance from equation (3). In Panel A, the dependent variable $performance_c$ takes the value of one if contract c exhibits bad performance, and zero otherwise. In Panel B, the dependent variable $cost\ increase_c$ takes the value of one if contract c experiences a cost increase ex post, and zero otherwise. The variable $event_t$ takes the value of one for the post-election period (2008 Q2-2011 Q4), and zero for the pre-election period (2004 Q3-2008 Q1). The variable $connected_i$ takes the value of one for firms connected to one of Lee Myung Bak's networks, and zero otherwise. The variable $connected\ state_j$ takes on the value of one if Lee Myung Bak appoints a member of one of his networks as the CEO of state firm j, and zero otherwise. The variable $connected\ relationship_{ij}$ takes the value of one if the CEO of firm i and the newly appointed CEO of state firm j are from the same one of Lee Myung Bak's networks, and zero otherwise. In columns III to VI the sample is reduced to contracts allocated by state firms. Standard errors are clustered at the private and state firm levels and reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 9: **Observable Contract Characteristics and Performance**

State Firm Contracts		Obs.	Bad Performance	Cost Increase
Panel A: *Construction Complexity*	Low	696	0.1739	0.0675
	Medium	566	0.4912	0.2191
	High	466	0.6245	0.3047
Panel B: *Construction Type*	Road	418	0.1148	0.0335
	Site Work	320	0.5844	0.2688
	Landscape Work	283	0.5780	0.2403
	Utilities	226	0.3717	0.2434
	Other Real Estate	156	0.4487	0.2756
	Harbor	76	0.6974	0.2632
	Electricity	63	0.3175	0.0794
	Other	40	0.3250	0.0000
	Railway	35	0.0571	0.0000
	IT & Communication	28	0.3929	0.2500
	Education	16	0.9375	0.5000
	Small Appliances	15	0.0000	0.0000
	Bridge	13	0.3846	0.1538
	Wall Construction	11	0.7273	0.4545
	Health Care	7	0.8571	0.0000
	Storage	7	0.4286	0.0000
	Airport	6	0.0000	0.0000
	Demolition & Disposal	6	0.3333	0.0000
	Transportation	2	0.0000	0.0000
Panel C: *Contract Size*	Bottom Quartile	433	0.2818	0.0277
	Second Quartile	431	0.3643	0.1647
	Third Quartile	433	0.4042	0.2032
	Top Quartile	431	0.5476	0.3295
Panel D: *Contract Allocation Method*	No Auction	454	0.2137	0.0154
	Regular Auction	392	0.2959	0.2015
	Limited Auction	852	0.5599	0.2664
	Pre-Selected Auction	30	0.0000	0.0000

This table provides information about the likelihood of negative contract outcomes and cost increases for all state firm contracts at different levels of complexity. In Panel A, contracts are split into three categories of contract complexity based on the description of the project in the contract. In Panel B, contracts are categorized based on the type of construction. In Panel C, contracts are split into four quartiles of contract size. In Panel D, contracts are split into four categories based on the contract allocation method.

Table 10: **Contract Performance - Differences in Contracts**

	I	II	III	IV	V	VI	VII	VIII
Dep. Var.: $performance_c$	All Contracts		State Firm Contracts					
$connected_i$	-0.0087		-0.0420				-0.0356	
	(0.0318)		(0.1049)				(0.0989)	
$event_t * connected_i$	0.0590**	0.0612**	0.1719*	0.1442	0.0662		0.2986	0.7935***
	(0.0276)	(0.0300)	(0.1037)	(0.1192)	(0.0638)		(0.1997)	(0.2085)
$event_t * connected\ state_j$					0.2255			
					(0.1720)			
$event_t * connected\ relationship_{ij}$					0.4333***	0.4018***	0.0036	0.0221
					(0.1079)	(0.0622)	(0.3185)	(0.2409)
Firm FE	no	yes	no	yes	-	-	no	yes
Firm*State Firm FE	-	-	-	-	yes	yes	no	no
Firm*Event FE	no	no	no	no	no	yes	no	no
State Firm*Event FE	-	-	-	-	no	yes	no	no
State Firm FE	-	-	-	-	-	-	yes	yes
Controls	yes	yes	yes	yes	yes	yes	yes	yes
Observations	10754	10754	1728	1728	1728	1728	330	330
R-squared	0.164	0.231	0.350	0.432	0.633	0.635	0.424	0.642

	I	II	III	IV	V	VI	VII	VIII
Dep. Var.: $cost\ increase_c$	All Contracts		State Firm Contracts					
$connected_i$	-0.0004		-0.0996				0.0531**	
	(0.0127)		(0.0682)				(0.0240)	
$event_t * connected_i$	0.0302*	0.0245	0.1778**	0.1431	0.0824**		-0.0168	-0.1540*
	(0.0172)	(0.0200)	(0.0712)	(0.0887)	(0.0320)		(0.0522)	(0.0917)
$event_t * connected\ state_j$					-0.0844			
					(0.0564)			
$event_t * connected\ relationship_{ij}$					0.1983***	0.2316**	0.1531***	0.2450**
					(0.0523)	(0.1032)	(0.0337)	(0.1122)
Firm FE	no	yes	no	yes	-	-	no	yes
Firm*State Firm FE	-	-	-	-	yes	yes	no	no
Firm*Event FE	no	no	no	no	no	yes	no	no
State Firm*Event FE	-	-	-	-	no	yes	no	no
State Firm FE	-	-	-	-	-	-	yes	yes
Controls	yes	yes	yes	yes	yes	yes	yes	yes
Observations	10754	10754	1728	1728	1728	1728	330	330
R-squared	0.084	0.111	0.185	0.242	0.297	0.351	0.273	0.430

This table reports results concerning contract performance from equation (3). In Panel A, the dependent variable $performance_c$ takes the value of one if contract c exhibits bad performance, and zero otherwise. In Panel B, the dependent variable *cost increase*$_c$ takes the value of one if contract c experiences a cost increase ex post, and zero otherwise. The variable $event_t$ takes the value of one for the post-election period (2008 Q2-2011 Q4), and zero for the pre-election period (2004 Q3-2008 Q1). The variable $connected_i$ takes the value of one if firm i is connected to one of Lee Myung Bak's networks, and zero otherwise. The variable *connected state*$_j$ takes the value of one if Lee Myung Bak appoints a member of one of his networks as the CEO of state firm j, and zero otherwise. The variable *connected relationship*$_{ij}$ takes the value of one if the CEO of firm i and the newly appointed CEO of state firm j are from the same one of Lee Myung Bak's networks, and zero otherwise. Controls comprise the log of contract value, dummies for the contract allocation method, for the type of construction, and for different categories of construction complexity. In columns III to VIII, the sample is reduced to contracts issued by state firms. In columns VII and VIII the sample is reduced to contracts allocated before the appointment of a state firm CEO and to contracts of state firms in which Lee Myung Bak appoints a CEO from the KU or HEC network. Here, the $event_t$ dummy takes the value of one for contracts allocated in the quarter before the appointment of the KU or HEC network CEO in the state firm, and zero for contracts allocated more than one quarter before the appointment. Standard errors are clustered at the private and state firm levels and reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 11: **Contract Performance - All Alumni Networks**

	I	II	III	IV	V	VI	VII	VIII
Dep. Var.:	$performance_c$				$cost\ increase_c$			
	All Networks		Only KU	Excl. KU	All Networks		Only KU	Excl. KU
$event_t * connected\ relationship_{ijt}$	0.4047***	0.3501***	0.4367***	0.3772***	0.2917***	0.3137***	0.3994***	0.2896***
	(0.0731)	(0.0436)	(0.0933)	(0.0426)	(0.0526)	(0.0385)	(0.0528)	(0.0461)
Firm*State Firm FE	yes	yes	yes	yes	yes	yes	yes	yes
Firm*Event FE	no	yes	yes	yes	no	yes	yes	yes
State Firm*Event FE	no	yes	yes	yes	no	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes	yes	yes
Observations	1728	1728	1728	1728	1728	1728	1728	1728
R-squared	0.164	0.616	0.613	0.615	0.375	0.381	0.380	0.380

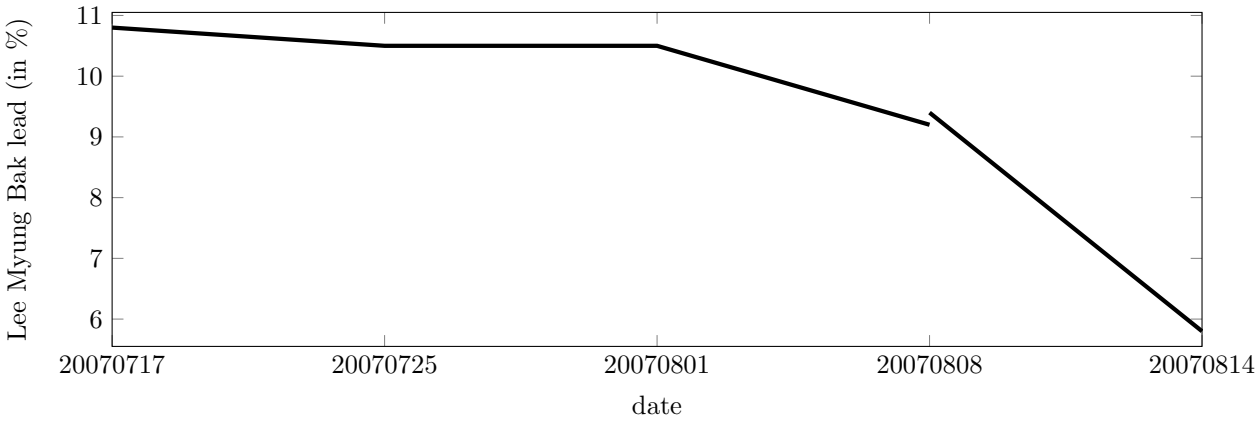
This table reports results concerning changes in contract performance. In columns I to IV, the dependent variable $performance_c$ takes the value of one if contract c exhibits bad performance, and zero otherwise. In columns V-VIII, the dependent variable $cost\ increase_c$ takes the value of one if contract c experiences a cost increase ex post, and zero otherwise. The variable $event_t$ takes the value of one for the post-election period (2008 Q2-2011 Q4), and zero for the pre-election period (2004 Q3-2008 Q1). The variable $connected\ relationship_{ijt}$ takes the value of one if the CEO of firm i and the CEO of state firm j are from the same alumni network, and zero otherwise. Controls comprise the log of contract value, dummies for the contract allocation method, for the type of construction, and for different categories of construction complexity. Standard errors are clustered at the private and state firm levels and reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 12: **Procurement Contract Allocation - Contract Shares**

	I	II	III
Dep. Var.: $\left(\frac{Contract\ Volume_{ijt}}{Contract\ Volume_{jt}}\right)_{ij}$			
$alumni\ network_{ijt}$	0.0301**	0.0371**	0.0583***
	(0.0154)	(0.0172)	(0.0203)
Firm*State Firm FE	yes	yes	yes
Firm FE	no	yes	-
State Firm FE	no	yes	-
Firm*Event FE	no	no	yes
State Firm*Event FE	no	no	yes
Observations	7870	7870	7870
R-squared	0.956	0.956	0.957

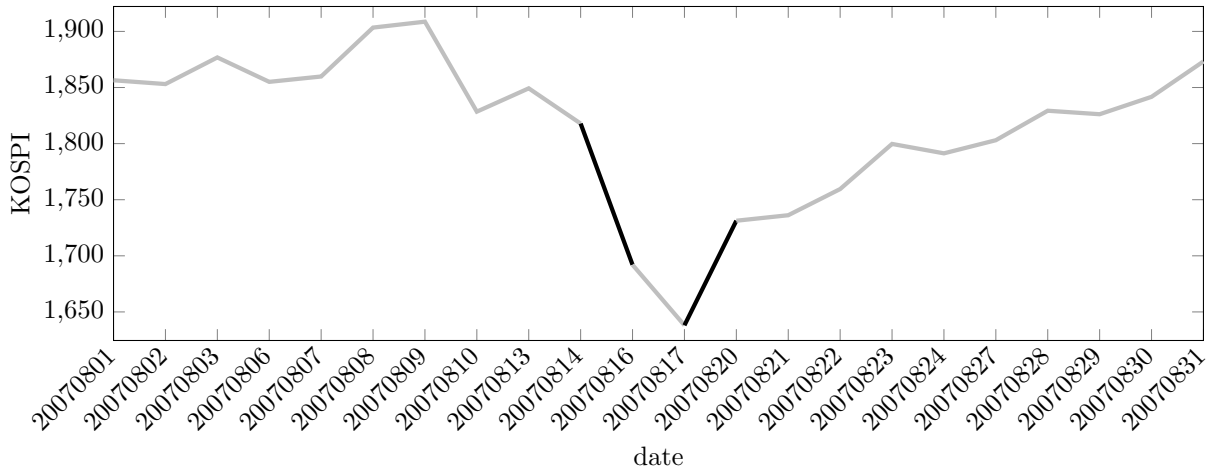
This table reports results from the estimation of changes in procurement contract volume. The dependent variable is the share of state firm j's total contract volume allocated to private firm i during the post-election period (2008 Q2-2011 Q4) and the pre-election period (2004 Q3-2008 Q1), respectively. The variable $alumni\ network_{ij}$ is one if the CEO of firm i is from the same alumni network as the CEO of state firm j, and zero otherwise. Standard errors are clustered at the private and state firm levels and reported in parentheses. ***, and ** denote statistical significance at the 1%, and the 5% confidence levels, respectively.

Figure 1: **GNP Candidate Election Poll Results**



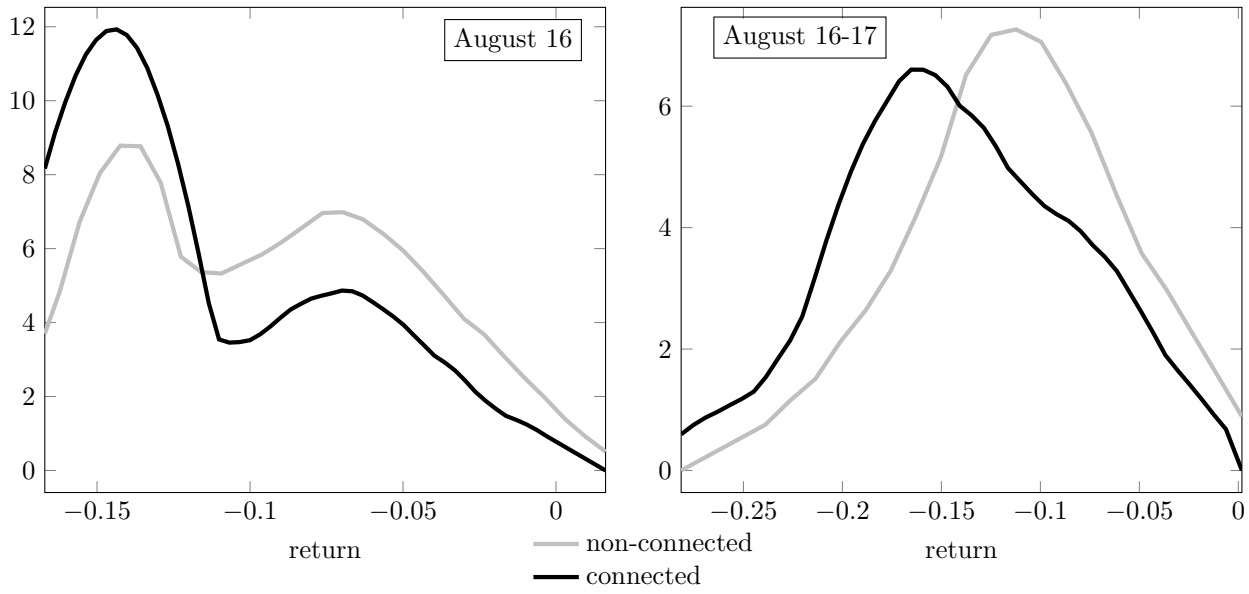
This figure shows data from weekly polls conducted by the Christian Broadcasting Service. Until August 8, 2007 the graph represents the difference between the share of people that named Lee Myung Bak as the person they would vote for in a direct presidential election and those who would vote for Park Geun Hae. On August 8 and August 14, 2007 the survey asked people which candidate they would vote for in the GNP candidate election. The short line from August 8 to August 14 represents the gap between the fractions of votes for Lee Myung Bak and Park Geun Hae for this slightly different question.

Figure 2: **KOSPI in August 2007**



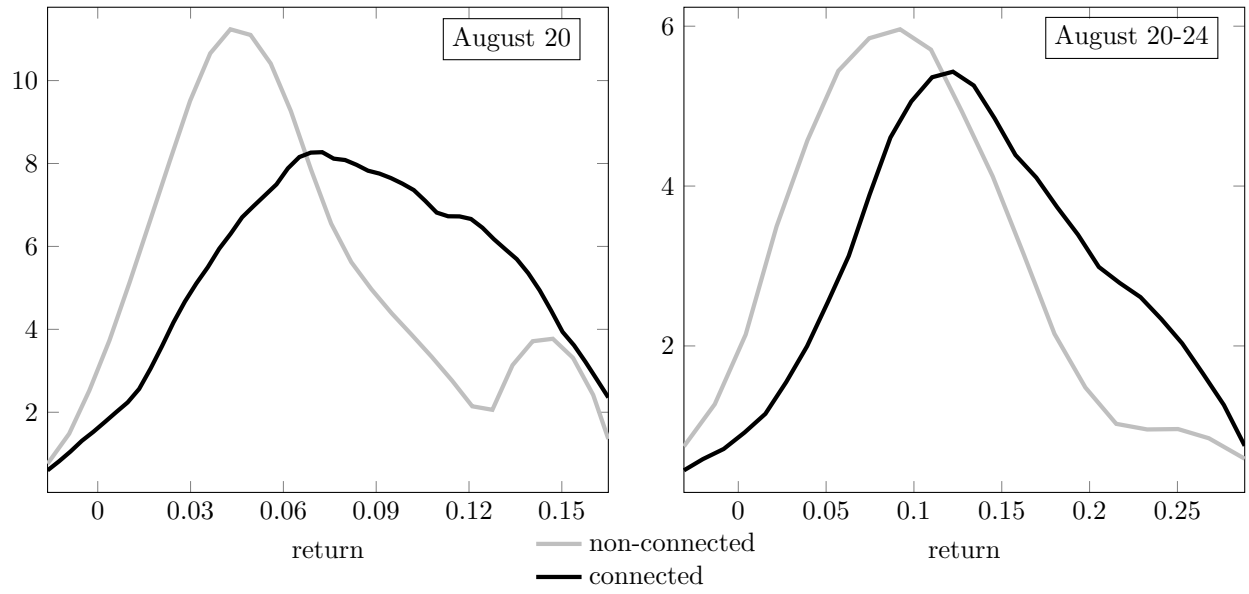
This figure shows the value of the KOSPI in August 2007 on the y-axis. The black downward-sloping line marks the change in KOSPI value the day after the publication of the drop in polls for Lee Myung Bak following the prosecutor's office's announcement related to the Dokokdong Land scandal (August 16, 2007). The black, upward-sloping line marks the change in the KOSPI the day after the election of Lee Myung Bak as presidential candidate for the GNP (August 20, 2007).

Figure 3: **Return Distribution Around Dokokdong Land Scandal**



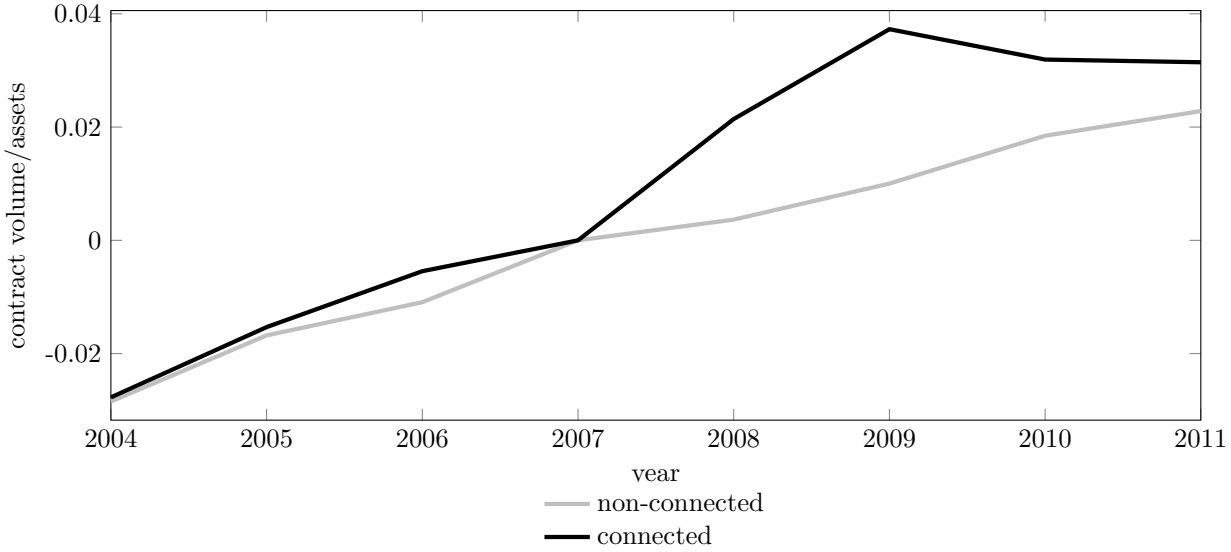
This figure shows kernel density plots of cumulated log stock returns around the Dokokdong Land scandal for firms connected to one of Lee Myung Bak's networks (black line), and for non-connected firms (gray line). The left panel shows density plots for the day after Lee Myung Bak's drop in polls was published (August 16, 2007), the right panel shows density plots for the two days after the drop in polls was published (August 16 - 17, 2007).

Figure 4: **Return Distribution Around Nomination Election**



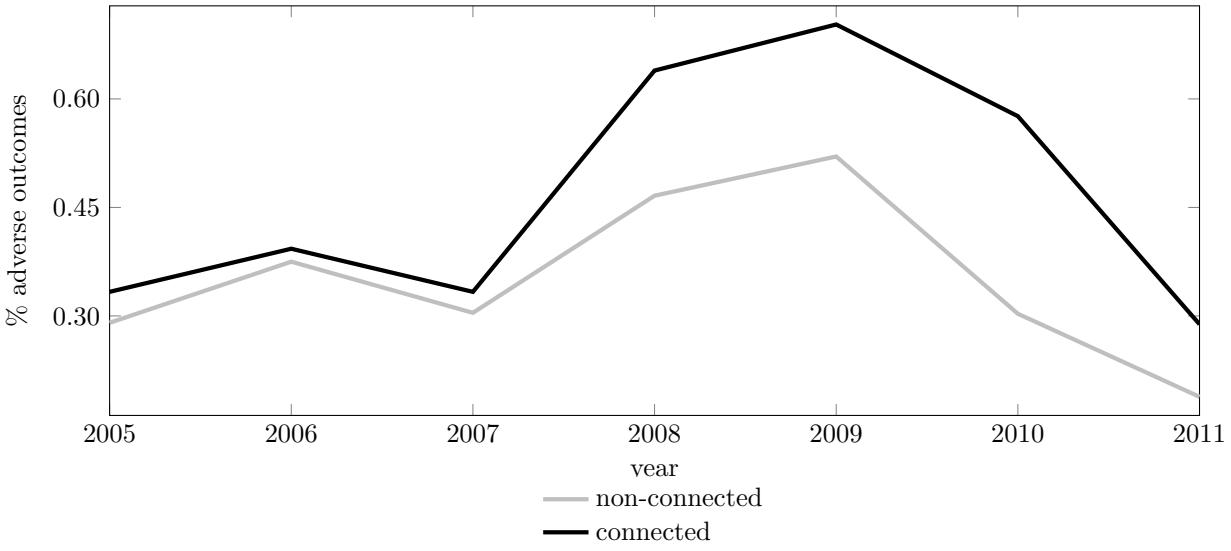
This figure shows kernel density plots of cumulated log stock returns around Lee Myung Bak's nomination as the GNP's candidate for firms connected to one of Lee Myung Bak's networks (black line), and for non-connected firms (gray line). The left panel shows density plots for the day after the nomination (August 20, 2007), the right panel shows density plots for the week after the nomination (August 20 - August 24, 2007).

Figure 5: **Change in Procurement Contract Allocation**



This figure depicts the average annual procurement contract volume as a fraction of firms' assets for connected (black line) and non-connected firms (gray line) on the y-axis. The values are normalized to be zero in 2007, the year of Lee Myung Bak's election.

Figure 6: **Change in Contract Performance**



This figure depicts the probability of adverse contract outcomes for contracts allocated to firms connected to the new president's networks (black line) and for non-connected firms (gray line) on the y-axis for the period from 2005 to 2011.

Appendix A. GNP Primary

The GNP elected its candidate for the 2007 presidential election on August 19, 2007. The votes for the candidates are composed of a committee that accounts for 80% of the total votes and public opinion polls that account for the remaining 20% of total votes. The committee has three components. One quarter of the committee consists of party members who hold an official post within the party and party members who are suggested by those party members with an official post. These members are selected taking into account the regional share of the population that the members represent. Three eighths of the committee comprise additional party members who are not yet elected for the first component, 50% of whom must have been members of the party for at least 18 months during which they have paid their membership fees. In accordance with the regional share of the population, the members are randomly selected from the respective provinces. The third component, three eighths of the committee, is composed of citizens who are not members of the GNP, randomly selected from the telephone directory taking into account representativeness in terms of gender, age and location. Finally, opinion research centers randomly select citizens who account for the remaining 20% of total votes in the candidate election.

Appendix B. Estimator Correction

This section outlines the correction for potential biases in the estimation of the $\Delta\mu$ in equations (1) and (2). The estimate $\Delta\mu$ in equation (1) is the difference in the average change in contract volume, scaled by assets, between connected and non-connected firms:

$$\Delta\mu \quad = \quad \frac{1}{N^c} \cdot \sum_{i=1}^{N^c} \Delta y_i - \frac{1}{N^{nc}} \cdot \sum_{i=1}^{N^{nc}} \Delta y_i \tag{B1}$$

where c indexes connected firms and nc indexes non-connected firms. N^c and N^{nc} are the number of connected and unconnected firms, respectively. Δy_i is the change in firm i's contract volume to assets ratio.

There are two potential sources of estimation bias. First, the allocation of contracts is essentially a zero-sum game - an additional contract allocated to one firm leads to one less contract allocated to another firm. This gives rise to a double-counting effect, as one contract reallocated from a non-connected to a connected firm simultaneously leads to an increase in

$\frac{1}{N^c} \cdot \sum_{i=1}^{N^c} \Delta y_i^c$ and a decrease in $\frac{1}{N^{nc}} \cdot \sum_{i=1}^{N^{nc}} \Delta y_i^{nc}$.[25] The true effect of connections on contract allocation to connected firms, however, is fully captured by the increase in $\frac{1}{N^c} \cdot \sum_{i=1}^{N^c} \Delta y_i^c$. The decrease in $\sum_{i=1}^{N^{nc}} \Delta y_i$ constitutes an estimation bias.

Suppose that firm size and the value of one contract are normalized to one for all firms.[26] Then, if a total of n contracts are reallocated from non-connected to connected firms after the reform, the estimate of $\Delta\mu$ is:

$$\Delta\mu \quad = \quad \frac{n}{N^c} + \frac{n}{N^{nc}} = \Delta\mu^{true} \underbrace{+ \frac{n}{N^{nc}}}_{\text{bias}} \tag{B2}$$

The second source of potential estimation bias stems from the fact that before the reform, some firms may have been connected to the previous president. Then, if political connections have the same effect under the previous president, contract volume of firms connected to the previous president is inflated and contract volume of firms not connected to the previous president is deflated. If the fraction of firms connected to the previous president is equal across the groups of firms connected and not connected to the new president, this would not have an effect on the estimate of $\Delta\mu$. In the extreme case that all the firms connected to the previous president are not connected to the new president, the estimation bias for $\Delta\mu$ is the highest.

If under the previous president the same number of contracts (n) were being reallocated from non-connected to connected firms, contract volume is inflated for firms not connected to the current president by:

$$\frac{n - \frac{n \cdot (N^{nc} - N^c)}{N^{nc}}}{N^{nc}} \quad = \quad \frac{n \cdot (\frac{N^c}{N^{nc}})}{N^{nc}} \tag{B3}$$

where the second term in the numerator of the first expression is the fraction of contracts reallocated to firms connected to the previous president, from firms connected neither to the previous nor the current president.

Accordingly, contract volume for firms connected to the current president is deflated

[25] If contracts allocated to connected firms constituted additional contracts generated by state firms rather than a redistribution of contracts from non-connected firms, the estimation bias would be lower.

[26] Since firm size is not identical in the data, the relative effect of a contract reallocation from non-connected to connected firms on Δy_i is not symmetric. However, for the subset of firms that receive contracts during the sample period, the average value of total assets is *lower* for connected firms. Thus, the correction is rather conservative.

before the reform by:

$$\frac{n \cdot \frac{N^c}{N^{nc}}}{N^c} = \frac{n}{N^{nc}} \tag{B4}$$

Then, the estimate of $\Delta\mu$ equals the sum of equations (B2) to (B4):

$$\Delta\mu = = \Delta\mu^{true} \underbrace{+\frac{n}{N^{nc}} + \frac{n(\frac{N^c}{N^{nc}})}{N^{nc}} + \frac{n}{N^{nc}}}_{\text{bias}} = \Delta\mu^{true} \underbrace{+\frac{2n + n(\frac{N^c}{N^{nc}})}{N^{nc}}}_{\text{bias}} \tag{B5}$$

The bias can be corrected by multiplying $\Delta\mu$ by $\frac{1}{1+(N^c/N^{nc})(2+N^c/N^{nc})}$. By the delta method, if $\rho = \Delta\mu \cdot \frac{1}{1+(N^c/N^{nc})(2+N^c/N^{nc})}$, then the standard errors of the adjusted estimate $SE_\rho = SE_{\Delta\mu} \cdot \frac{\partial\rho}{\partial\Delta\mu}(\Delta\mu \cdot \frac{1}{1+(N^c/N^{nc})(2+N^c/N^{nc})}) = SE_{\Delta\mu} \cdot \frac{1}{1+(N^c/N^{nc})(2+N^c/N^{nc})}$.

Appendix C. Stock Price Reactions

This section presents tests to mitigate the concern that higher stock returns of connected firms are driven by differences in firm characteristics that are standard in the literature.

Appendix C.1. Empirical Strategy

Let p_{it} be firm i's stock price at time t. Modelling stock prices as a linear combination of firm characteristics A_{it} and macro-economic shocks α_t, a firm's stock price can be represented as: $p_{it} = \alpha_t + \beta_t \cdot A_{it} + \delta_t \cdot D_i + \epsilon_{it}$. Here, D_i is a dummy variable taking the value of one if firms are connected to one of Lee Myung Bak's networks through their CEO and zero otherwise, ϵ_{it} denotes an error term. Suppose t to be the day before and $t+\lambda$ the day after Lee Myung Bak's election as GNP candidate. Assuming that $A_{it} = A_{it+\lambda}$, as firm characteristics, do not change significantly during the one day event window, and normalizing stock prices by p_{it}, the difference between stock prices before and after the election becomes:

$$r_{it+\lambda} = (\alpha_{t+\lambda} - \alpha_t) + (\beta_{t+\lambda} - \beta_t) \cdot A_{it} + (\delta_{t+\lambda} - \delta_t) \cdot D_i + (\epsilon_{it+\lambda} - \epsilon_{it}) \tag{C6}$$

where $r_{it+\lambda}$ is firm i's return on the day after the election.[27] From equation (C6) it is apparent that the identification builds on a *change* in the value of connectedness to one of

[27]The normalization by $p_i t$ on the right-hand side is suppressed for notational convenience.

Lee Myung Bak's networks: $(\delta_{t+\lambda} - \delta_t)$. It is important to note that, provided effects of political connections are no different between Lee Myung Bak and his rival Park Geun Hae, non-connected firms serve as a valid control group, since their stock price is not affected by the outcome of the election with respect to political connections. This is because for these firms, it is irrelevant whether firms connected to Lee Myung Bak or Park Geun Hae become politically connected.

Equation (C6) highlights the potential estimation bias in $\widehat{(\delta_{t+\lambda} - \delta_t)}$ from unobserved firm characteristics: $(\beta_{t+\lambda} - \beta_t) \cdot \frac{Cov(A_{it}, D_i)}{Var(D_i)}$. For firm characteristics for which $(\beta_{t+\lambda} - \beta_t) = 0$, the bias is zero. The main concern is that D_i may be positively correlated with unobserved firm characteristics A_{it} for which $(\beta_{t+\lambda} - \beta_t) > 0$ (or negatively correlated with firm characteristics for which $(\beta_{t+\lambda} - \beta_t) < 0$), generating an upward bias in $\widehat{(\delta_{t+\lambda} - \delta_t)}$. Intuitively, this means that Lee Myung Bak's election systematically benefits firms with characteristics that are disproportionally highly represented in the group of connected firms. While descriptive statistics suggest that observable firm characteristics are very similar for both groups (see Section 3.1), one cannot rule out systematic differences between the groups of connected and non-connected firms.

Appendix C.2. Differences in Firm Characteristics

Another concern could be that KU business school graduates and HEC executives might share ideologies or personality traits, or follow business strategies that cause their firms' stock prices to react positively to Lee Myung Bak's election. In terms of observable firm characteristics, firms with CEOs from the KU or HEC network show no significant differences compared to other firms. An indirect way to test for similarities in characteristics of firms with a KU or HEC network CEO is to study the co-movement of these firms' stock returns in the time-series.[28]

One way to indirectly control for unobservable firm characteristics that lead to comovements in stock prices is to match each connected firm with the combination of non-connected firms that most closely tracks the return path before the event (Abadie, Diamond, and Hainmueller 2010). The construction of the matching estimator follows the procedure in Ace-

[28]From 2004 to 2011, connected stocks never outperform non-connected stocks by a higher magnitude than the day after the election. Thus, differences in firm characteristics would have to be such that they do not: i) affect observable firm characteristics, ii) affect firms' sensitivity to economic shocks, iii) cause stock returns of connected firms to co-move in general, but be more sensitive to news about Lee Myung Bak's election only.

moglu, Hassan, and Tahoun (2017). In the context of equation (C6), where stock returns are driven by firm characteristics, matching based on observed returns implicitly generates the closest match based on (observable and unobservable) firm characteristics. The synthetic match for a connected firm is constructed by minimizing the squared difference of the connected firm's daily returns and the convex combination of non-connected firms in 2006:

$$w_j^* = \underset{w_j}{\operatorname{argmin}} \sum_t \left[R_{it} - \sum_j w_j R_{jt} \right]^2$$

subject to

$$\sum_j w_j = 1 \text{ and } w_j \geq 0 \ \forall j$$

where R_{it} is the return of firm i on day t, R_{jt} is the return of non-connected firm j on day t, and w_{jt} is the weight for non-connected firm j. The rationale for using 2006 returns is that returns closer to the election might co-move due to changes in the probability of Lee Myung Bak's election.

The return for connected firm i's matched combination of non-connected firms during the event window is:

$$\hat{R}_{it} = \sum_j w_j R_{jt}$$

The effect of the event is computed as:

$$\hat{\psi} = \frac{\sum_i \frac{\sum_t R_{it} - \hat{R}_{it}}{\hat{\sigma}_i}}{\sum_i \hat{\sigma}_i^{-1}}$$

where $\hat{\sigma}_i^{-1}$ is a measure of the goodness of fit in the estimation period:

$$\hat{\sigma}_i^{-1} = \sqrt{\frac{\sum_t \left[R_{it} - \hat{R}_{it} \right]^2}{T}}$$

where T is the number of trading days during the estimation period. The computation of the event's effect on connected firms is essentially a weighted average giving greater weight to firms for which the synthetic match more closely replicates the daily returns during the estimation period. To statistically evaluate the effect, I draw 1000 random samples of con-

Table A.1: **Differences in Firm Characteristics - Synthetic Matching Estimator**

	I	II	III	IV
	Scandal		Election	
Dep.Var.: ret_i	(0)	(0,1)	(0)	(0,4)
$connected_i$	-0.0270***	-0.0327***	0.0240***	0.0607***
	[-0.0208,0.0158]	[-0.0288,0.0203]	[-0.0165,0.0182]	[-0.0282,0.0320]

This table shows results from a synthetic matching estimator calculated by comparing the return of the 59 connected firms to the 566 non-connected firms that are listed in the KOSPI in 2006. Column I refers to the day of the prosecutor's office announcement on the Dokokdong Land Scandal. Column II refers to the two days after the announcement. Column III refers to the day after the GNP's presidential candidate nomination. Column IV refers to the week after the nomination. The dummy variable $connected_i$ indicates whether a firm's CEO is connected to one of Lee Myung Bak's networks. 99% confidence intervals are reported in brackets. *** indicates statistical difference from zero at the 1% level.

nected firms from the set of non-connected firms, to construct confidence intervals, where each random sample is equal in size to the number of connected firms in the sample.

Table A.1 shows the results from the synthetic matching estimator for the 625 firms that are listed in 2006. The estimates are even slightly higher than the estimates in Table 2 and statistically significant at the 1% level throughout. This suggests that the results are not driven by commonalities in unobserved firm characteristics among connected firms that affect stock returns.

Appendix D. Additional Tables and Figures

Table A.2: **CEO Appointments in State Firms**

Country	I Board	II Approval	III Government
Australia		1	
Austria	1		
Belgium			1
Canada		1	
Chile	1		
Czech Republic		1	
Denmark	1		
Estonia		1	
Finland	1		
France			1
Germany	1		
Greece			1
Hungary			1
Israel		1	
Italy		1	
Japan		1	
Korea			1
Mexico			1
Netherlands	1		
New Zealand	1		
Norway	1		
Poland	1		
Slovak Republic	1		
Slovenia*			1
Spain		1	
Sweden	1		
Switzerland	1		
Turkey			1
UK			1

This table provides an overview of CEO appointment rules in state firms in OECD countries. The countries are split into three categories: countries where state firms' boards appoint the CEO independently (column I), countries where boards appoint CEOs, but require political approval (column II), and countries in which CEOs are appointed directly by the government (column III).
*In Slovenia, the supervisory board may independently appoint CEOs in non-listed state firms.
Source: OECD (2005, 2011): Corporate Governance of State-Owned Enterprises

Table A.3: **Procurement Contract Allocation - Long-Connected CEOs**

	I	II	III	IV	V	VI	VII
	All Firms	Firms with State Firm Contracts					
Dep. Var.:	$\left(\frac{\Delta \text{ contract volume}}{\text{assets}}\right)_i$	$\left(\frac{\Delta \text{ contract volume}}{\text{assets}}\right)_{ij}$				$\left(\frac{\Delta \text{ contract volume}}{\text{assets}}\right)_{ijk}$	
$connected_i$	0.0347***	0.0015**					
	(0.0098)	(0.0007)					
$connected\ state_j$		0.0003	0.0002				
		(0.0004)	(0.0004)				
$connected\ relationship_{ij}$		0.0041*	0.0046**	0.0045*	0.0046*	0.0019**	0.0018**
		(0.0022)	(0.0023)	(0.0026)	(0.0027)	(0.0009)	(0.0009)
Firm FE	-	no	yes	yes	yes	yes	yes
State Firm FE	-	no	no	yes	-	-	-
State Firm*Industry FE	-	no	no	no	yes	no	no
State Firm*Contract Type FE	-	no	no	no	no	coarse	granular
Observations	605	3690	3690	3690	3690	4670	4199
R-squared	0.021	0.019	0.086	0.130	0.242	0.250	0.283

This table reports the results on the estimation of changes in procurement contract volume from equations (1) and (2). In column I, the dependent variable is the annualized difference between firm i's total procurement contract volume in the post-election period (2008 Q2-2011 Q4) and its total contract volume in the pre-election period (2004 Q3-2008 Q1), scaled by firm assets in the year of Lee Myung Bak's election. In columns II to V, the dependent variable is the change in total contract value allocated from state firm j to private firm i. In columns VI to VII, the dependent variable is the change in contract volume for contract type k allocated from state firm j to private firm i. The variable $connected_i$ takes the value of one if firm i is connected to one of Lee Myung Bak's networks for more than three years before the election, and zero otherwise. Private firms that appoint a connected CEO within the three years before the election are dropped from the sample. The variable $connected\ state_j$ takes the value of one if Lee Myung Bak appoints a CEO from one of his networks at state firm j after his election, and zero otherwise. The variable $connected\ relationship_{ij}$ is one if the CEO of firm i and the newly appointed CEO of state firm j are from the same one of Lee Myung Bak's networks. In columns II to VII the sample is limited to firms that sign at least one contract with a state firm during the sample period. Standard errors are reported in parentheses, and clustered at the private firm level in column I, and at the private firm and state firm levels in columns II to VII. ***, **, and * denote statistical significance at the 1%, 5%, and 10% confidence levels, respectively.

Table A.4: **Procurement Contract Allocation - Overlapping Contract Types**

	I	II	III	IV
	All Firms	Firms with State Firm Contracts		
Dep. Var.:	$\left(\frac{\Delta \text{ contract volume}}{assets}\right)_i$	$\left(\frac{\Delta \text{ contract volume}}{assets}\right)_{ij}$		
$connected_i$	0.0126***	0.0007		
	(0.0024)	(0.0008)		
$connected\ state_j$		-0.0009	-0.0011	
		(0.0009)	(0.0010)	
$connected\ relationship_{ij}$		0.0020**	0.0027**	0.0024**
		(0.0008)	(0.0012)	(0.0012)
Firm FE	-	no	yes	yes
State Firm FE	-	no	no	yes
Observations	630	1013	1013	1013
R-squared	0.041	0.006	0.057	0.127

This table reports the results on the estimation of changes in procurement contract volume from equations (1) and (2), for the type of contracts allocated by state firms that had a KU network CEO before and after Lee Myung Bak's election. In column I, the dependent variable is the difference between a firm's annualized procurement contract volume in the post-election period (2008 Q2-2011 Q4) and its annualized contract volume in the pre-election period (2004 Q3-2008 Q1), scaled by firm i's assets. In columns II to IV, the dependent variable is the change in contract value allocated from state firm j to private firm i. The variable $connected_i$ takes the value of one if firm i is connected to one of Lee Myung Bak's networks, and zero otherwise. The variable $connected\ state_j$ takes the value of one if Lee Myung Bak appoints a CEO from one of his networks at state firm j after his election, and zero otherwise. The variable $connected\ relationship_{ij}$ is one if the CEO of firm i and the newly appointed CEO of state firm j are from the same one of Lee Myung Bak's networks. In columns II to IV the sample is limited to firms that sign at least one contract with a state firm during the sample period. Standard errors are reported in parentheses, and clustered at the private firm level in column I, and at the private firm and state firm levels in columns II to IV. *** and ** denote statistical significance at the 1% and 5% confidence levels, respectively.

Table A.5: **Political Connections and Contract Characteristics**

	I	II	III	IV
Dep. Var.:	$log(Contract\ Volume)_c$		$Contract\ Complexity_c$	
$event_t$	0.0741	0.9131	-1.1190***	-0.0829
	(0.5565)	(0.8204)	(0.3466)	(0.2876)
$connected\ state_j$	-1.4053**		-0.2622	
	(0.5608)		(0.3289)	
$connected\ relationship_{ij}$	0.9007	0.3963	0.3797	0.4047
	(1.5020)	(1.0452)	(0.4284)	(0.3684)
$event_t * connected_i$	0.6623	0.3946	0.5466**	0.5333**
	(0.4799)	(0.4522)	(0.2339)	(0.2199)
$event_t * connected\ state_j$	0.8785	-0.5661	1.1489***	0.1531
	(0.6101)	(0.8247)	(0.3483)	(0.2841)
$event_t * connected\ relationship_{ij}$	-0.1993	-0.3579	-0.9875*	-1.0084**
	(1.5131)	(1.2551)	(0.5004)	(0.4252)
Firm FE	yes	yes	yes	yes
State Firm FE	no	yes	no	yes
Clustered SE	firm	firm	firm	firm
Observations	1728	1728	1728	1728
R-squared	0.599	0.756	0.343	0.536

This table reports changes in contract characteristics for contracts being allocated to connected and non-connected firms after the election of Lee Myung Bak as President of Korea. The dependent variable $log(Contract\ Volume)_c$ in columns I and II is the log of contract size of a given contract c, the dependent variable $Contract\ Complexity_c$ is a variable that measures the complexity of the project in contract c, ranging from one for the simplest to three for the most complex projects. The variable $event_t$ takes the value of one for the post-election period (2008 Q2-2011 Q4), and zero for the pre-election period (2004 Q3-2008 Q1), $connected_i$ takes the value of one if firm i is connected to one of Lee Myung Bak's networks, and zero otherwise. The variable $connected\ state_j$ takes the value of one if Lee Myung Bak appoints a member of one of his networks as the CEO of state firm j, and zero otherwise. The variable $connected\ relationship_{ij}$ takes the value of one if the CEO of firm i and the newly appointed CEO of state firm j are from the same one of Lee Myung Bak's networks, and zero otherwise. Information on fixed effects is provided at the bottom of the table. Standard errors are clustered at the private and state firm levels and reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table A.6: **Contract Performance - Multiple Negative Events**

	I	II	III	IV	V	VI
Dep. Var.: $performance\ counter_c$	All Contracts		State Firm Contracts			
$event_t$	0.2037**	0.2793***	-0.0094	-0.0071	-0.4680	
	(0.0895)	(0.0610)	(0.1499)	(0.1220)	(0.3066)	
$connected_i$	-0.0111		0.1421			
	(0.0695)		(0.3703)			
$event_t * connected_i$	0.2659**	0.2111**	0.5337	0.2899	-0.0091	
	(0.1121)	(0.0918)	(0.3530)	(0.3903)	(0.1262)	
$event_t * connected\ state_j$					0.5978*	
					(0.3087)	
$event_t * connected\ relationship_{ij}$					0.7943***	0.7040***
					(0.1811)	(0.1673)
Firm FE	no	yes	no	yes	-	-
Firm*State Firm FE	no	no	no	no	yes	yes
Firm*Event FE	no	no	no	no	no	yes
State Firm*Event FE	no	no	no	no	no	yes
Clustered SE	firm	firm	firm	firm	firm	firm
Observations	10754	10754	1728	1728	1728	1728
R-squared	0.032	0.130	0.066	0.233	0.732	0.771

This table reports results concerning procurement contract performance from equation (3). The dependent variable $performance\ counter_c$ takes on the number of adverse events that occur during the execution of contract c. The variable $event_t$ takes the value of one for the post-election period (2008 Q2-2011 Q4), and zero for the pre-election period (2004 Q3-2008 Q1), $connected_i$ takes the value of one if firm i is connected to one of Lee Myung Bak's networks, and zero otherwise. The variable $connected\ state_j$ takes the value of one if Lee Myung Bak appoints a member of one of his networks as the CEO of state firm j, and zero otherwise. The variable $connected\ relationship_{ij}$ takes the value of one if the CEO of firm i and the newly appointed CEO of state firm j are from the same one of Lee Myung Bak's networks, and zero otherwise. In columns III to VI the sample is reduced to contracts issued by state firms. Information on fixed effects is provided at the bottom of the table. Standard errors are clustered at the private and state firm levels and reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.