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Do Politically Connected Firms Innovate, Contributing to Long-Term Economic Growth?

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Abstract

This paper presents new evidence that cronyism reduces long-term economic growth by discouraging firms' innovation activities. The analysis is based on novel establishment survey data from The Arab Republic of Egypt which provides information on establishments' political connections, their innovation activities, and their access to policy privileges. The analysis finds that the probability that firms invest in products new to the firm increases from under 1 percent for politically connected firms to over 7 percent for unconnected firms. The results are robust across different innovation measures. Despite innovating less, politically connected firms are more capital intensive, as they face lower marginal cost of capital due to the generous policy privileges they receive, including exclusive access to input subsidies, public procurement contracts, favorable exchange rates, and financing from politically connected banks. These privileges are largest when compared with their direct competitors operating in the same 4-digit sectors. The findings suggest that connected firms out-rival their competitors by lobbying for privileges instead of innovating. In the aggregate, these policy privileges reduce Egypt's long-term growth potential by diverting resources away from innovation to the inefficient capital accumulation of a few large, connected firms. A wide array of supporting evidence suggests that this effect is causal and not due to selection.

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Do Politically Connected Firms Innovate, Contributing to Long-Term Economic Growth?

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1. Introduction

The value and profitability of politically connected firms have been well documented. But to which extent cronyism affects aggregate economic growth or only has distributional consequences is not clear. Existing research compares the profitability or productivity of connected and unconnected firms. Such comparison, however, cannot address whether connected firms promote or retard economic growth generally. For example, connected firms' higher productivity might be explained by specific government support such as subsidies, guarantees, or regulatory advantages that they receive at the expense of unconnected firms that do not have such privileges—their impact on aggregate growth could thus still be negative.

It is thus more insightful to assess connected firms' investments and impact on activities that bring growth externalities such as their contribution to technological change. So far, however, information on firms' innovation activities and their political connections have not been available. We use a novel World Bank Enterprise Survey from The Arab Republic of Egypt that provides to the best of our knowledge for the first-time information on firms' political connections and their innovation activities.

We find that connected firms—that have a current or former government official among their managers, owners, or board of directors—innovate less. The finding is robust across different forms of innovation such as introducing a new or significantly improved product, a new production method or organizational process, and investing in quality accreditations. Nevertheless, we find that connected firms are not necessarily less productive due to their higher capital intensity. The latter, however, originates from the generous policy privileges they receive, reducing their marginal cost of capital and diverting economic resources away from innovation activities. The relative policy privileges that connected firms receive tend to be largest when compared to their direct competitors—firms with comparable size and age operating in the same 4-digit sector.

We provide a wide range of evidence supporting a causal interpretation of the findings. The results are robust to the five different innovation measures provided in the survey. The differences relative to non-connected firms tend to be largest if we restrict the comparison to the non-connected direct competitors operating in the same 4-digit sector, demonstrating that the policy privileges are firm specific and not specific to the activities connected firms selected into. Consistent with our results, we also find that connected firms' primary business strategy is to sell in (protected) domestic markets while comparable non-connected firms focus on international

markets. The data further reject potential alternative explanations. Politically connected firms' attenuated innovation activities cannot be explained by their lower quality of managers. And their comparable productivity, despite less innovation, cannot be explained by a higher innovation effectiveness. If anything, we find that non-connected firms not only innovate more but also more effectively.

Section 2 reviews our contributions to the literature on cronyism, competition, and innovation. Section 3 briefly summarizes the evolution of cronyism in Egypt. Section 4 describes the establishment data, including their novel information of firms' political connections and access to specific policy privileges, and characterizes our sample of connected firms relative to previous work on Egypt and other countries. Section 5 discusses the empirical specification used and Section 6 provides the main results and robustness tests. The final section concludes with a discussion of the broader implications of the results.

2. Literature Review

Among others, the theoretical contribution of Parente and Prescott (1999) predicts that close connections between politics and business lead to barriers to entry and competition and thus to slower technological change and economic growth. Similarly, Aghion et al. (2001) predict that non-connected firms operating in sectors with neck-on-neck competition are forced to innovate more to make (temporary) profits. In contrast, non-connected firms that operate in the same sectors as firms that have an exogenous cost advantage, for example due to the exclusive policy favors they receive from their political connection, have less incentive to innovate as the introduction of a new, cost-effective technology might not be sufficient to outweigh connected firms' cost advantage. Politically connected firms, in turn, also have little incentive to innovate since they are already making healthy profits from the policies protecting them from competition.

The empirical relation between competition and innovation is difficult to verify either due to the lack of representative micro data that allow to measure the impact of regulatory changes to competition on firm's innovation activity or the lack of a valid control group (of firms) not affected by such reforms. Nevertheless, several recent contributions provide evidence for a positive impact of competition on firms' innovation activity (Aghion et al. 2008; Aghion et al. 2009; Ospina and Schiffbauer, 2010; de Loecker and Warzynski, 2012; Buccirossi et al. 2013; Bartelsman et al., 2014). Several contributions exploit, for instance, the entry of China in the WTO and the

subsequent rise of import competition from China. Bloom, et al. (2011) and Iacovone et al. (2015) estimate that manufacturing firms in EU countries and Mexico are more likely to adopt new technologies and use them more productively when they sell products that are directly competing with imports from China. The former estimate that the competition from China effect accounts for 15 percent of the technology investment of OECD countries from 2000-07. Atkin et al. (2017) provide evidence that exposure to more competitive international markets by exporting improves Egyptian carpet producers' technical efficiency through knowledge transfers. We contribute to this literature by showing that policies that protect firms from competition discourage firm innovation activities.

Several contributions directly measure the impact of political connections on firm value, policy privileges, and firm profitability. Fisman (2001) estimates that political connections increase firms value in Suharto's Indonesia by about 20 percent by exploiting movements in the stock prices of connected versus non-connected firms in response to exogenous changes in the probability of regime change. Chekir and Diwan (2015) find similar effects in Mubarak's Egypt. Acemoglu et al. (2015) show that street protests in Egypt are associated with differential stock market returns for firms connected to the regime.

A large literature has explained the higher value of connected firms by showing that they benefit from exclusive policy advantages that other firms do not. Most studies focus on access to finance showing that connected firms have higher debt, higher default rates, and are more likely to be bailed out (e.g., Cull and Xu, 2005 for China; Johnson and Mitton, 2003 for Malaysia; Khwaja and Mian, 2005 for Pakistan; Leuz and Oberholzer-Gee, 2006 for Indonesia; Claessens, et al. 2006 for Brazil, Faccio et al., 2006). Goldman, et al. (2008) find that US stock market companies with politically connected board members obtained more valuable state procurement contracts. In a different vein, Fisman (2013), shows that safety regulations are more loosely enforced in connected firms in China which have five-times higher workplace fatalities than non-connected firms. Connected firms in Ben Ali's Tunisia have also been shown to benefit from tax advantages and exclusive licenses to sell specific products, both explaining connected firms' higher profitability (Rijkers et al., 2014). Diwan et al. (2015) show that politically connected firms in Mubarak's Egypt benefitted from exclusive energy subsidies, trade protection through non-technical barriers to import, and access to bank loans; these privileges explained the higher profitability of connected firms. The novel data set we use in this paper allows us to contribute to

this literature by providing quantitative evidence that connected firms in Egypt are treated preferentially in benefitting from input subsidies, government procurement contracts, and favorable official rates in a multiple exchange rate regime.

Several contributions also analyze the productivity or profitability of connected firms relative to non-connected firms. The effects are, in theory, ambiguous. On the one hand, they benefit from privileges that might boost their profitability and they might be insulated from failure and predation. On the other hand, connected firms might have costly political obligations (e.g., to finance political campaigns or create jobs beyond cost efficiency), less talented managers, or fewer incentives to invest in productivity-enhancing innovation activity as they are shielded from cost competition (see above).

Most researchers have found that connected firms are more profitable (Ramalho, 2003; Ferguson and Voth, 2008; Haber and Maurer, 2007; Goldman et al. 2009; Boubakri et al., 2009; Earle and Gehlbach, 2015). A few studies find that connected firms are less profitable, showing that firms managed by connected CEOs in France create more jobs but are also less profitable than non-connected firms (Bertrand et al., 2007) and that politically connected firms in poorer and more corrupt European countries have lower returns on assets (Faccio, 2007, 2010). We find that politically connected firms' productivity is comparable to that of non-connected firms but that they are more capital intensive. Novel data on firms' political connections, innovation activity, and different types of policy privileges in Egypt, allow us to show, however, that the comparable productivity performance masks severe economic inefficiencies. Politically connected firms invest less in productivity enhancing innovation activity, but this is counterbalanced by their generous policy privileges reducing their marginal costs of capital. Our results imply that cronyism diverts economic resources away from innovation activities, reducing countries' rate of technological change and their long-term economic growth potential.

3. State-business relations in Egypt

The way in which market based reforms were implemented in Egypt in the early 1990s led to the expansion of cronyism. While Sadat's opening of a few key sectors in the mid-1970s involved a handful of selected private businessmen, it was under the Mubarak regime that the elite business class began to expand. These businesses took advantage of the withdrawal of the state from several sectors that were formerly considered strategic to the state and expanded their

business interests rapidly during the 1990s (Skafianakis, 2004). In the early 2000s, the country's policies shifted towards accelerated privatization and financial sector and trade reforms. Politically connected firms were able to capture much of the new opportunities created by liberalization.

The rise of politically connected firms in Egypt in the early 2000s paralleled the rise in economic and political influence of Hosni Mubarak's son, Gamal Mubarak, who held several important positions at the National Democratic Party (the ruling party at the time). Under Gamal's influence, the country accelerated privatization and financial sector and trade reforms. However, even as it liberalized the economy in some dimensions, the government erected barriers to entry in others. Government permission was necessary to take advantage of many of the reforms. For example, new factories in energy-intensive manufacturing sectors, such as cement, ceramics or steel, required government licenses and imports of selected products required exclusive licenses. Observers argue that cronyism thrived in the cabinet headed by Ahmad Nazif from 2004 to 2011, which included many of Egypt's top businessmen. Connected firms effectively captured the new opportunities created by liberalization: massive construction projects, tourism in coastal areas, selected manufacturing sectors, banking, and telecom and computer related activities, as well as the local distribution of international consumer brands (Kienle 2004 and Sfakianakis, 2004; Demmelhuber and Roll, 2007; Roll, 2010; Loewe, 2013; Diwan et al., 2015).

On January 25, 2011, thousands of protesters congregated in Tahrir Square to demonstrate against the Mubarak regime, ultimately leading to the fall of Mubarak on February 11. The power was handed over to a military government which ruled Egypt until the presidential elections in June 2012 after which Mohammed Morsi from the Muslim Brotherhood's political party became president. The first months of Morsi's presidency were characterized by a struggle for influence with the Supreme Council of Armed Forces. A new constitution promoting political Islam in December 2012 made Morsi increasingly unpopular with the secular opposition. In the following months, Morsi's party was perceived to further over-step their mandate and cement their power, leading to a new broad-based opposition movement ("Tamarud") in 2013 that culminated in a military coup removing Morsi from power in July. The power was handed over to a military government until 2014 when elections were held and won by a former military leader.

Trials of leading businessmen in these first 2 years after Mubarak's downfall have brought to light the extent of manipulation of government regulations to stifle competition; subsidized borrowing from politically connected banks; and privileged access to energy subsidies, privatized

companies, and state procurement contracts (Ahram Online, various issues). A company owned by a former government official and a close friend of Hosni Mubarak, for instance, acquired a state-owned retail chain at a low price, while arranging for various regulatory protection measures in the domestic clothing market. And large politically connected firms in ceramics, cement, and steel owned by (former) government officials absorbed the lion's share of the generous energy subsidies to industry while benefitting from exclusive licensing procedures to open new factories in these sectors.

Despite the regime changes in and after 2011, state-business relations in Egypt remain important. Acemoglu et al. (2015), for instance, identify a group of firms with politically connections to the Muslim Brootherhood, the (former) NDP, and the Military. They follow the group of connected firms over time from 2011 to 2014, including the latest regime change in July 2013, and document how their firm value varied with political events strengthening or weakening their political basis.

The results suggest that the established business elite initially mostly connected to the Mubarak regime managed to preserve both their economic power and strategic influence. Following the revolution in 2011, both the military and Muslim Brotherhood regimes supported a lenient stance towards the prosecution of some leading businessmen on corruption charges. Since 2014, most trials have been ended or terminated and several previous rulings have been revoked or relaxed. Therefore, even though the power groups have changed, the business elite remain strong, and the importance of privileges to the success of certain firms is likely to have remained similar. That is, large corporates continue to benefit from the political connections they had established in the past and dominate markets such as steel, cement, textile, and food markets. For instance, despite being charged (and later acquitted) for monopolistic practices Ezz Steel continues to enjoy a market share of 50 percent.

4. Data

4.1 Establishment-level data

The World Bank's Enterprise Surveys (WBES) are conducted in developing countries and cover information on establishment characteristics, income statement data, other establishment activities such as their efforts to adopt new technology or to obtain external finance, and establishments' regulatory burden and government services obtained. The survey consists of a

number of questions that are country-specific and other, globalized variables comparable across countries and time.

The survey for Egypt in 2016 provides for the first-time information on firm ownership and the decision-making participation by government officials and thus provides a direct measure of political connections. It also includes some other questions critical to firm growth in Egypt; for instance, if firms received energy subsidies, state procurement contracts, favorable exchange rates, etc. Importantly, the survey contains an innovation module with detailed questions on firms' innovation activities. The 2016 Egypt survey includes manufacturing and construction as well as the following major private service sectors: retail & wholesale trade, hotel & restaurants, travel agencies, transport ICT, and real estate. It has a large sample size relative to other World Bank Enterprise surveys, covering 1,813 establishments. And it is a stratified survey, providing sampling weights that allow to estimate the economy-wide impact for these sectors for all establishments with at least 5 employees, limiting the survey to the formal economy. This size limitation is, however, not critical in our case since politically connected firms are typically formal and much larger, and so are their non-connected establishment peers.

We provide detailed information of the survey in Appendix A. Table 1 reports the descriptive statistics for these establishment-level variables, separately for politically connected (PC) and all other firms; additionally, "not politically connected" (NPC) firms are sub-divided into two categories of those with a PC firm in their (four-digit ISIC) sector—providing a measure of direct competition from PC firms—and those in sectors without PC firms. Consistent with previous studies, the descriptive statistics show that PC firms are older and much larger. We also find that they have closer ownership structures with the government, either through direct government ownership shares or having been established by the privatization of a state-owned enterprise (we control for both in the estimations below). The descriptive statistics also suggest that PC firms tend to innovate less frequently (for all measures except for having an internationally recognized quality certificate). Yet, PC firms have a higher labor productivity which appears to stem from their higher capital intensity. Importantly, PC firms are much more likely to have received subsidized inputs, a government contract, and investment financing from banks.

Measure of establishment's political connection:

We label a firm as politically connected if one of its managers, owners, or board members is a government official that can directly influence economic regulations and policy making to her own private benefit. We thus focus on clear-cut conflict of interest cases in that the government official associated with the company has the incentive and power to tilt economic regulations in her favor.[1] In fact, previous research has demonstrated that politically connected firms managed, owned, or having a government official as a board member receive substantial policy privileges in Egypt (Schiffbauer et al., 2015), leading the WBES team to include the following question to directly identifying connected firms in the most recent survey for the country:

- *Has this establishment ever had a (current or former) government official among its managers, owners, or board of directors?*

The question was confirmed as positive for 105 firms, corresponding to 5.8 percent of all surveyed firms.[2] Notably, only 3 out of the 1,813 firms refused to answer or indicated not to know the answer.[3] Politically connected firms operate in various sectors but are especially concentrated in manufacturing of chemicals, fabricated metal products, mineral products, and construction (see Table B.1 in the Appendix). At least 1 of these 105 politically connected firms operate in 51 of the 118 4-digit (ISIC Rev. 3.1) sectors included in the WBES for Egypt, corresponding to 43 percent of all 4-digit sectors.

The nature of the question and the consistency check of the survey answer by the World Bank trained interviewer after each face-to-face interview, make it very unlikely that these 105 political connected firms include false positives (a firm identified as connected that, in fact, has never been associated with a government official). As in all previous work on cronyism, however, it is possible that our measure includes false negatives to the extent that some surveyed firms did not reveal their ownership by government officials and could not be falsified. Several facts assure, however, that these cases cannot be prevalent.

First, consistent with previous work on Egypt and other countries, we find similar characteristics of connected firms in our sample; most importantly, they are older and significantly

[1] Many countries have conflict of interest laws that could force individuals to sell their businesses when they take political office. A conflict of interest law was introduced in Egypt in 2012 but it has not been enforced yet.
[2] After the face-to-face survey interview, the interviewers check the consistency of the answers based on available information, including the identity of the interviewee (i.e., the CEO or owner of the company), which facilitates the identification of establishments that are managed, owned, or directed by a government official.
[3] Appendix Table 1 accordingly corresponds to 1,810 observations.

larger (Table 1). Second, we find a distribution of connected firms across detailed 4-digit sectors that is very similar to the distribution of connected firms in previous work on Egypt. We observe at least 1 connected firm in 42 percent of all included 4-digit sectors (51 out of 118) relative to 47 percent in Diwan et al. (2015).[4] Moreover, out of the 51 connected 4-digit sectors, 44 have also been identified as connected in Diwan et al. (2015) in 2011.[5] We further find that politically connected firms benefit from exclusive input subsidies, including energy subsidies, and have superior access to bank financing, both, concurring the findings for Egypt of Diwan et al. (2015). Third, the number of politically connected firms in our sample is comparable to the number identified in previous research.[6]

Finally, it is important to note that false negatives, if existent, would create a bias against our finding that politically connected firms benefit from policy favors such as privileged access to input subsidies, state contracts, and favorable exchange rates. Our estimates on the impact of political connections should therefore be regarded as a lower bound.

Innovation and other firm performance measures:

The survey for Egypt provides detailed information across different dimensions of establishments' innovation activity which allow us to define the following five innovation variables which are equal to 1 if a firm introduced in the last 3 years (i) a new or significantly improved product, (ii) a new or significantly improved process such as a new production, logistics, delivery, or distribution method or supporting activities for these processes, (iii) either introduced a new product or a new process, (iv) a new or significantly improved product that is new to the establishments main market, and (v) invested in an internationally recognized quality certification.

The survey also provides information on each establishment's specific new product they introduced as well as on the exact type of process innovation adopted. The information was

[4] Diwan et al. (2015) define politically connected firms as firms that that have a manager, owner, or board director that has a high political post in the ruling National Democratic Party (NDP) or is a member of the cabinet of ministers of the central government.

[5] Arguably, we should not expect major changes in the group of firms with political connections to high-level (former) government officials in this study relative to Diwan et al., 2015 (compare Section 3).

[6] Fisman (2001) and Ryjkers et al. (2016) identify about the same number of politically connected firms with available financial data in Indonesia and Tunisia, respectively. Diwan et al. (2015) observe a somewhat larger number of connected firms in Mubarak's Egypt in 2011, but their sample includes a significant number of connected firms observed in sectors not covered in our sample such as in mining and extractives and finance.

evaluated to make sure that the reported innovation activities of establishments indeed reflect significant product and process innovations.[7]

Moreover, we use information on firms' revenues per worker (in logs). Capital is only observed for manufacturing firms for which we derive revenue-based total factor productivity (TFPR) as the log-difference of firms' sales, capital, intermediate inputs, and labor, weighted by the different input shares relative to the corresponding sector averages. We also use two different measures of firms' capital intensity: (i) the (log) capital-labor ratio for manufacturing firms and (ii) a dummy which is equal to 1 if the firm uses a generator which is available for firms in all sectors.

Policy privileges:

The 2016 Egypt establishment survey contains representative information on several country-specific variables measuring the governments direct support for specific firms in the form of subsidies, state contracts, and access to the more favorable official exchange rate in a period when Egypt had a (de facto) multiple exchange rate regime. Especially, we use the following establishment level information:

- *Over the last three years has this establishment received access to subsidized input or energy prices?*
- *Over the last year, has this establishment secured or attempted to secure a government contract?*
- *It is sometimes said that establishments access foreign currencies at different exchange rates than the official one. Would you please estimate approximately how much more expensive as a percentage it would be to access foreign currency at an unofficial exchange rate?*

Moreover, we use information on the share of investments financed by banks to measure as establishments' access to bank financing and a dummy which is equal to 1 if an establishments main market is international and 0 if domestic which is available for manufacturing firms.

Other control variables:

[7] The survey also asks for firms R&D activity but the activities reported by establishments revealed substantial mis-reporting so that this variable has not been used.

The WBES allows to include detailed information on corporate control variables which capture establishment-level differences that could be correlated with firms' innovation activity and ownership structure. We account for the following firm-specific characteristics: establishment age, size (the number of permanent, full-time employees), and two dummy variables that are equal to1 if the establishment was established through privatization of a state-owned enterprise; and if it is partially government owned. The results show that it is especially important to control for firm size since connected firms are significantly larger in Egypt and firm size is generally positively associated with innovation activity. Moreover, it is critical to be able to control for the extent that some firms are partially government owned and they have been established through privatization as both firm characteristics are likely to be correlated with the ownership of politically connected businessmen as well as innovation activity.

4.2 Other data sources

The WBES for Egypt does not contain information on firms operating in banking and financial sectors. We do, however, have information if establishments included in the survey obtained a credit from some of the major private sector banks. We use information on private sector politically connected banks from Diwan and Schiffbauer (2017). As the large banks are publicly listed, they can observe if they were managed or owned by a government official or if they had a government official as a board member. We use this information to test if politically connected firms superior access to bank loans can (in part) be explained by lending for politically connected private sector banks.

We also use information on politically connected firms in Egypt from Diwan et al. (2015) to check the precision of our measure of political connected firms obtained directly from the 2016 WBES for Egypt. The authors identify connected firms as firms that are managed or owned by businessmen with a high political post in the government or the National Democratic Party or that have such a businessmen as a board member. See Diwan et al. (2015) for details.

5. Empirical Specification

To estimate the effects of cronyism on innovation and outcome variables specific to firms, we consider empirical specifications of the form:

$$Y_{jps} = \beta_0 + \beta_1 NCF_{jps} + \beta_2 X_{jps} + I_s + I_p + \varepsilon_{jps} \qquad (1)$$

where j stands for a firm, p for province, and s for a sector. Y_{jps} is an outcome variable which measures firms' innovation activity, productivity, capital intensity, or the firm specific policy privileges. NCF_{jps} is a dummy which is equal to 1 for non-connected firms and 0 for politically connected firms. X_{jps} is a matrix of control variables such as firm size, age, government ownership, and a dummy which is equal to 1 if the firm has been privatized. I_s and I_p are vectors controlling for sector and province fixed effects and ε is an independent and identically distributed error (i.i.d).

The coefficient β_1 measures the impact of not being connected on innovation after controlling for important firm characteristics and the sector and location of firms which can be correlated with firms' innovation activity as well as their ownership by government officials. β_1 is negative if politically connected firms innovate more and positive otherwise.

We further test if politically connected firms innovate less or receive more policy privileges relative to their close competitors operating in the same 4-digit sector or relative to firms operating in different 4-digit sectors. The specification follows the theoretical model of Aghion et al. (2001) which predicts that non-connected firms operating in sectors with neck-on-neck competition are most likely to innovate while neither politically connected firms nor non-connected firms directly competing with them in the same sector have a strong incentive to innovate. We thus expect non-connected firms in non-connected sectors to innovate more while the model's prediction for non-connected firms in connected sectors is ambiguous. Moreover, we expect that connected firms benefit from stronger policy privileges relative to their direct competitors operating in the same 4-digit sector. We thus employ the following additional empirical specification:

$$Y_{jps} = \delta_0 + \delta_1\left(NCF_{jps} * NCS_s\right) + \delta_2\left(NCF_{jps} * PCS_s\right) + \delta_3 X_{jps} + I_s + I_p + \varepsilon_{jps} \quad (2)$$

Where, in addition to the variables defined above, NCF_s and PCF_s are dummies which are equal to 1 if no or at least 1 politically connected firm operates in the 4-digit sector, respectively. Following Aghion et al. (2001), we expect δ_1 to be positive if competition is a main driver of innovation activity while the theoretical prediction for δ_2 is unclear.

6. Results

6.1 Crony firms innovate less but are not necessarily less productive as they are shielded from competition by generous policy privileges

Table 2 reports the impact of the ownership of politically connected businessmen on firms' innovation activity. The first column shows that politically connected firms are less likely to introduce a new or significantly improved product or service than non-connected firms after controlling for firms' size, age, partial government ownership, privatization, sector, and location. The probability that firms invest in product innovation increases from under 1 percent for PC firms to over 7 percent if they are not politically connected.[8]

The second column reveals that connected firms are less likely to introduce a new product relative to non-connected firms operating in different 4-digit sectors as well as relative to non-connected firms operating in the same 4-digit sector. As predicted by Aghion et al. (2001), the difference is larger when non-connected firms operate in different 4-digit sectors, having market structures not characterized by direct competition with connected firms; the difference is not significant at conventional levels though (the test is provided in the last row of Table 1).

The third and fourth columns show that politically connected firms are also less likely to invest in process innovation such as introducing a more efficient production method or improving organizational management processes. Process innovation among connected firms is less likely relative to non-connected firms operating in the same and different 4-digit sectors. The remaining columns of Table 1 show that this result is robust for the remaining 3 measures of firms' innovation activity: politically connected firms are less likely to invest in new production or process technology, to introduce a product new to the establishment's main market, and to adopt an internationally recognized quality certification. The probability to conduct the different innovation activities tends to be somewhat stronger if non-connected firms do not directly compete with connected firms. But even within the same 4-digit sector, non-connected firms are more likely to adopt any of these new technologies.

The qualitative results are robust to variations in the control variables. Notably, the adverse impact of cronyism on firms' probability to any form of innovation is about half as large but still statistically significant once we drop all control variables. Thus, politically connected firms innovate less independent of their sector, location, size, age, or previous ownership status. Notably, the quantitative effect declines significantly once we control for firm size since connected firms

[8] Calculated using margins in Stata; all else equal, the probability of product innovation for PC firms is 0.6% and 7.3% for NPC firms (at 0 for all control dummies and holding age and size (both logs) at the in-sample medians from Table 2, Col. 1).

are larger (see Table 1) and larger firms are more likely to innovate (Table 2), illustrating the importance to control for firm characteristics.

All else equal the lower innovation activity of connected firms should translate into lower productivity. Table 3 shows that this is not necessarily the case. Table 3 shows that connected firms have higher labor productivity that non-connected firms operating in the same or different sectors (columns 1-2). In manufacturing, they have (statistically) the same labor productivity and total factor productivity (TFP) as non-connected firms (columns 3-6).[9] But politically connected firms have a significantly higher capital intensity than non-connected firms—in other words lower marginal cost of capital. They have a higher capital-labor ratio in manufacturing (columns 7-8). Connected firms in any sector are also more likely to use a generator than non-connected firms operating in the same 4-digit sector, indicating than they are more capital intensive.

Why are politically connected firms more capital intensive and not less productive despite their lack of innovation activities? Table 4 reveals that they do not need to experiment with the costly and risky adoption of new technology but can instead rely on a rent-seeking strategy by receiving exclusive cost advantages in the form of policy privileges granted by the government.

Politically connected firms are more likely to receive input subsidies, including energy subsidies, relative to non-connected firms even after controlling for sector specific characteristics (column 1). The difference is significant relative to non-connected firms operating in the same 4-digit sector (column 2), showing that the superior access to input subsidies is an exclusive privilege of connected firms and not based on detailed sector characteristics. Input subsidies such as energy subsidies thus reduce politically connected firms' marginal costs of capital, explaining why they are more capital intensive relative to non-connected firms operating in the same (4-digit) sector. Among non-connected firms, it is important to note that they are least likely to receive input subsidies if they compete with connected firms in the same 4-digit sector (as shown in the last row of Table 4). The result suggests that input subsidies are not only used to channel privileges to connected firms but also to displace their direct competitors selling the same products or services.

Politically connected firms are also more likely to obtain a government procurement contract. This privilege is especially pronounced relative to non-connected firms operating in different 4-digit sectors, indicating that the concentration of connected firms in producing products or providing services procured by the government explains an important part (columns 3-4).

[9] The survey does not provide information on firms' capital for firms in sectors other than manufacturing.

Connected firms also had exclusive access to the more favorable official exchange rate regime, paying, if any, a smaller average black-market premium to buy foreign inputs or to convert their exports into domestic currency (columns 5-6). The difference is largest relative to their direct competitors— firms with comparable size and age operating in the same 4-digit sector operating in the same 4-digit sector.

Moreover, politically connected firms have better access to bank loans to finance for their investments relative to non-connected firms operating in the same 4-digit sector, further reducing their marginal costs of capital (columns 7-8). The superior access to bank finance is in part explained by their privileged access to loans form politically connected banks (see Table B.2 in the Appendix). Politically connected firms are more likely to receive loans from politically connected banks relative to their direct competitors operating in the same sector; the difference is significant even after controlling for the larger size of connected firms in the manufacturing sector (column 4 in Table B.2).

Finally, these substantial policy privileges, providing connected firms cost exclusive advantages and guaranteeing healthy profits in the domestic market are also reflected in their business strategy: they are more likely to report that their main market is domestic relative to non-connected manufacturing firms of comparable size in the same 4-digit sector who are more likely to report that their main market for selling comparable products is international (columns 9-10 of Table 4).[10] Among non-connected firms, especially those competing with connected firms in the same 4-digit sector sidestep the domestic national market, suggesting that they cannot compete with the domestic policy privileges that connected firms receive.

The results suggest that politically connected firms overcome their competitors by investing in lobbying for policy privileges instead of investing in innovation. That is, they do not need to undergo the costly and risky process of innovation to augment their revenues or lower their costs because they receive exclusive policy privileges giving them an "unfair" cost advantage over non-connected firms. Thus, using their political connections to lobby for policy privileges is a more promising profit maximization strategy than investing in the potentially costly and risky process of adopting new technologies. In other words, why innovate if government subsidies and exclusive access to state procurement contracts guarantee healthy profits?

[10] Smaller non-connected firms often indicate that their main market is local.

6.2 More robustness tests

In the following, we test potential alternative mechanisms, other than the lack of competition due to policy privileges, that could explain connected firms' higher capital intensity and comparable productivity despite their lack of innovation. First, politically connected firms could be led by lower quality managers that do not recognize the potential of adopting new product or process technologies in their line of business. Notably, this argument might explain their lower innovation activity but not their comparable productivity. In any case, our establishment data provide information on management quality, suggesting that it cannot explain connected firms' lower investment in innovation since their managers have the same years of experience and are even more educated as managers of non-connected firms (see columns 1-4 of Table B.3 in the Appendix). The lack of innovation activity must thus stem from missing incentives rather than missing skills.

Second, connected firms might be less likely to innovate but could at the same time be more effective in converting their innovations into productivity-gains. Thus, while they are less likely to innovate, their higher innovation effectiveness could explain the comparable productivity performance. Our establishment data show that this is not the case. We find that the correlation between innovation activity and firm productivity is not higher among politically connected firms. We even find a stronger relation between the adoption of a new or significantly improved product and firm productivity among non-connected firms. The results thus suggest that, if anything, non-connected firms innovate not only more frequently but also more effectively (see columns 5-8 of Table B.3 in the Appendix).

7. Conclusion

We present novel evidence that cronyism reduces establishments' innovation activities and thus countries' long-term growth potential. The results are based on novel establishment survey data from Egypt which provide simultaneous information on establishments' political connections as well as their innovation activities and access to country-specific policy privileges. We find that politically connected firms innovate less. Nevertheless, they are not necessarily less productive and are more capital intensive due to the generous policy privileges they receive, including their exclusive access to government procurement contracts, input subsidies, favorable official exchange rates, and bank financing. The latter is in part explained by their privileged access

to loans form politically connected banks. A wide array of supporting evidence suggests that this effect is causal and not due to selection.

We note that the policy privileges granted to politically connected firms in Egypt are also economically very costly. In 2010, for example, energy subsidies to industries accounted for 2.9 percent of Egypt's GDP (US$7.4 billion), more than half of Egypt's total capital expenditures in that year.

Overall, the results demonstrate that connected firms' profit maximization strategy is to lobby for policy privileges instead of investing in the potentially costly and risky process of adopting new technologies. The generous policy privileges shield politically connected firms in Egypt from competition and thus discourage them to invest in potentially costly or risky innovation activities such as introducing a new product and production process or investing in internationally recognized quality accreditations. Politically connected firms in Egypt thus divert economic resources away from innovation activities and, instead, finance unproductive capital accumulation of a few large connected firms, which reduces the country's rate of technological change and thus its long-term growth potential. This paper thus not only sheds light on politically connected firms' innovation activities but also on the critical question if cronyism affects aggregate economic growth or only has distributional consequences.

One implication of our results is to cast doubt on the feasibility of industrial policy under a closed political system. While this was successful in other parts of the world, it has not worked in Egypt. The evidence suggests that industrial policy in Egypt often ended up as firm specific support that discouraged rather than promoted technological progress.

Additional work is needed to fully evaluate the macro-economic impact of cronyism and to predict how the Egyptian economy would have performed in the absence of cronyism. For instance, how did connected sectors weaken forward and backward linkages with unconnected firms, exacerbating negative effects on aggregate growth? In this paper, we have not focused on the broader economic impact of cronyism such as implications of cronyism for income inequality and inequality of opportunities in labor markets, other important drivers (in addition to sluggish aggregate economic growth and job creation) of the Arab Spring Uprisings. These are important subjects for future research.

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Table 1. Summary Statistics of the firm-level data

		Politically Connected, PC	Not Politically Connected, NPC		
			All NPC	NPC, NPC sector	NPC, PC sector
Proportion	Weighted proportion	2.44	97.56	55.38	42.18
	…unweighted no. of obs.	105	1,705	1,160	562
Innovative Activity (proportions)	Product Innovation	1.86 (0.014)	5.82 (0.012)	5.90 (0.018)	5.75 (0.015)
	Process Innovation	1.40 (0.009)	4.04 (0.011)	3.73 (0.015)	4.27 (0.015)
	Product & Process Innovation	0.32 (0.002)	1.40 (0.006)	2.02 (0.012)	0.93 (0.004)
	Product Innovation New to Establishment's Main Market	0.58 (0.003)	4.82 (0.011)	5.29 (0.018)	4.46 (0.013)
	Internationally Recognized Quality Certification	32.60 (0.152)	11.98 (0.015)	8.91 (0.021)	14.36 (0.020)
Performance Measures	Labor productivity[(a)]	10.70 (0.271)	9.58 (0.071)	9.50 (0.104)	9.65 (0.099)
	...exp(logged estimate)	44,287.0	14,472.2	13,325.0	15,475.4
	TFPR [(a)(b)]	1.89 (0.206)	1.74 (0.083)	1.80 (0.144)	1.69 (0.062)
	K-L ratio [(b)]	2.65 (0.471)	1.35 (0.169)	1.37 (0.286)	1.33 (0.208)
	Own or share a generator (proportion)	1.77 (0.001)	1.93 (0.000)	1.91 (0.000)	1.94 (0.000)
Access Measures (proportions)	Received Access to Subsidized Inputs	7.26 (0.067)	0.95 (0.005)	1.48 (0.013)	0.55 (0.001)
	Government Contract Secured or Attempted	31.78 (0.134)	8.41 (0.013)	5.30 (0.018)	10.80 (0.019)
	Pct. Difference Between Unofficial & Official Exchange Rate	44.12 (0.149)	44.75 (0.027)	39.90 (0.039)	48.28 (0.037)
	Proportion of investments financed by banks	14.68 (0.031)	7.72 (0.030)	6.81 (0.065)	8.34 (0.019)
	Main Market International [(b)]	3.25 (0.028)	4.84 (0.010)	2.61 (0.005)	6.80 (0.018)
Control Measures	Size, employees [(a)]	3.82 (0.397)	2.71 (0.046)	2.56 (0.068)	2.83 (0.065)
	...exp(logged estimate)	45.7	15.1	12.9	17.0
	Age, years [(a)]	3.33 (0.226)	2.88 (0.041)	2.77 (0.072)	2.96 (0.043)
	...exp(logged estimate)	27.9	17.8	16.0	19.4
	Partially government owned (proportion)	21.47 (0.157)	0.04 (0.000)	0.00 (0.000)	0.08 (0.000)
	Privatized State-Owned Enterprise (proportion)	5.65 (0.028)	1.63 (0.007)	1.02 (0.007)	2.10 (0.010)

Survey-weighted estimates, using Stata's svy: prefix. Linearized, Taylor standard errors included in the parentheses.
(a) natural log
(b) manufacturing only

Table 2. Politically connected firms innovate less

	Product Innovation (yes=1)		Process Innovation (yes=1)		Product & Process Innovation (yes=1)		Product Innovation New to Establishment's Main Market (yes=1)		Internationally Recognized Quality Certification (yes=1)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	probit	probit	probit	probit	probit	Probit	probit	probit	probit	probit
NPC	1.236**		0.865***		1.419***		1.618***		0.715*	
	(0.515)		(0.307)		(0.345)		(0.507)		(0.366)	
NPC, PC sector		1.180**		0.863***		1.354***		1.537***		0.720*
		(0.519)		(0.308)		(0.348)		(0.525)		(0.367)
NPC, NPC sector		1.435**		0.847**		1.778***		1.904***		0.695*
		(0.562)		(0.409)		(0.383)		(0.582)		(0.411)
Size, empl (log)	0.256***	0.270***	0.198**	0.197**	0.301***	0.324***	0.179**	0.199**	0.643***	0.642***
	(0.080)	(0.080)	(0.081)	(0.080)	(0.097)	(0.087)	(0.078)	(0.080)	(0.065)	(0.065)
Age, years (log)	-0.083	-0.084	0.238	0.237	0.105	0.122	-0.144	-0.149	-0.090	-0.091
	(0.132)	(0.130)	(0.158)	(0.158)	(0.306)	(0.297)	(0.151)	(0.148)	(0.105)	(0.105)
Part. gov owned	0.553	0.531	0.370	0.358	0.364	0.308	0.500	0.441	1.718**	1.717**
	(0.650)	(0.666)	(0.359)	(0.359)	(0.494)	(0.497)	(0.709)	(0.724)	(0.750)	(0.744)
Privatized	0.808	0.812	0.083	0.077	0.564	0.613	0.892*	0.907	0.609	0.609
	(0.528)	(0.549)	(0.344)	(0.345)	(0.431)	(0.443)	(0.536)	(0.581)	(0.657)	(0.659)
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,773	1,776	1,708	1,711	1,568	1,571	1,773	1,776	1,762	1,765
PC sec = NPC sec		0.339		0.959		0.216		0.194		0.916

Source: World Bank Enterprise Survey Egypt, 2016. Note: NPC: dummy equal to 1 if firm is NOT politically connected; PC(NPC)-sector is dummy equal to 1 if the 4-digit sector in that the firm operates contains at least 1 (NOT) politically connected firm. The last row provides tests if the coefficient of NPCs in PC sectors and NPCs in NPC sectors is different; heteroscedasticity robust s.e. are presented in parenthesis; *,**,*** indicate significance at the 10,5,1 percent level.

Table 3. Despite innovating less, politically connected firms do not have lower productivity and are more capital intensive

	Labor productivity		Labor productivity (manufacturing only)		TFP (manufacturing only)		Capital intensity proxied by K-L ratio (manufacturing only)		Capital intensity proxied by firm owning generator	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	LS	LS	LS	LS	LS	LS	LS	LS	Probit	Probit
NPC	-0.671**		-0.465		-0.070		-1.248***		-0.801**	
	(0.299)		(0.305)		(0.193)		(0.333)		(0.391)	
NPC, PC sector		-0.683**		-0.437		-0.108		-1.210***		-0.946**
		(0.302)		(0.310)		(0.201)		(0.361)		(0.393)
NPC, NPC sector		-0.644**		-0.591		0.077		-1.383***		-0.388
		(0.324)		(0.368)		(0.250)		(0.508)		(0.399)
Size, empl (log)	0.174***	0.175***	0.189**	0.186**	0.087	0.089	0.218	0.213	0.205***	0.239***
	(0.057)	(0.057)	(0.087)	(0.087)	(0.061)	(0.059)	(0.145)	(0.145)	(0.057)	(0.060)
Age, years (log)	-0.168**	-0.166*	-0.139	-0.142	-0.121	-0.116	-0.186	-0.191	-0.329***	-0.302***
	(0.085)	(0.085)	(0.106)	(0.108)	(0.108)	(0.106)	(0.329)	(0.325)	(0.092)	(0.092)
Part. gov owned	0.847**	0.834**	-0.772	-0.787*	0.486	0.531	-1.127	-1.029	-0.861	-0.898
	(0.401)	(0.398)	(0.482)	(0.470)	(0.369)	(0.356)	(1.102)	(1.090)	(0.698)	(0.667)
Privatized	-0.214	-0.215	-0.103	-0.113	0.011	0.019	0.179	0.160	-0.112	-0.082
	(0.404)	(0.402)	(0.286)	(0.278)	(0.097)	(0.089)	(0.522)	(0.507)	(0.309)	(0.314)
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,447	1,450	647	650	538	541	635	638	1,769	1,772
PC sec = NPC sec		0.821		0.557		0.419		0.750		0.010

Source: World Bank Enterprise Survey Egypt, 2016. Note: NPC: dummy equal to 1 if firm is NOT politically connected; PC(NPC)-sector is dummy equal to 1 if the 4-digit sector in that the firm operates contains at least 1 (NOT) politically connected firm. The last row provides tests if the coefficient of NPCs in PC sectors and NPCs in NPC sectors is different; heteroscedasticity robust s.e. are presented in parenthesis; *,**,*** indicate significance at the 10,5,1 percent level.

Table 4. Politically connected firm receive various policy privileges, keeping their productivity on par despite innovating less

	Received Access to Subsidized Inputs (yes=1)		Government Contract Secured or Attempted (yes=1)		Pct. Difference Between Unofficial & Official Exchange Rate		Proportion of investments financed by banks (%)		Main Market International (yes=1) (manufacturing only)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	probit	probit	probit	probit	LS	LS	LS	LS	probit	probit
NPC	-1.243*		-0.764*		11.48**		-0.152***		1.677**	
	(0.722)		(0.451)		(4.954)		-0.047		(0.774)	
NPC, PC sector		-1.415*		-0.703		12.13**		-0.149***		1.668**
		(0.756)		(0.452)		(5.126)		(0.0484)		(0.831)
NPC, NPC sector		-0.604		-0.988**		9.438		-0.171		0.977
		(0.709)		(0.451)		(7.231)		(0.106)		(0.827)
Size, empl (log)	0.311***	0.363***	0.203***	0.193***	1.787	1.667	-0.001	-0.00140	0.908***	0.868***
	(0.113)	(0.113)	(0.0624)	(0.0585)	(1.900)	(1.928)	-0.009	(0.0103)	(0.127)	(0.112)
Age, years (log)	-0.312	-0.288	0.113	0.107	5.290	5.180	0.042	0.0400	-0.600***	-0.681***
	(0.368)	(0.363)	(0.0996)	(0.0983)	(3.985)	(3.990)	-0.049	(0.0553)	(0.136)	(0.152)
Part. gov owned	-0.275	-0.262	-0.360	-0.383	18.18	18.44	-0.140	-0.136	-1.198	-1.351
	(1.267)	(1.222)	(0.559)	(0.558)	(14.76)	(14.60)	-0.085	(0.0903)	(1.035)	(1.067)
Privatized	0.343	0.651	-0.724***	-0.682***	29.05	28.53	0.059	0.0550	-0.530	-0.857
	(0.604)	(0.491)	(0.249)	(0.258)	(44.95)	(44.60)	-0.058	(0.0564)	(1.225)	(1.250)
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	654	655	1,764	1,767	1,546	1,566	400	401	806	809
PC sec = NPC sec		0.024		0.114		0.677		0.838		0.072

Source: World Bank Enterprise Survey Egypt, 2016. Note: NPC: dummy equal to 1 if firm is NOT politically connected; PC(NPC)-sector is dummy equal to 1 if the 4-digit sector in that the firm operates contains at least 1 (NOT) politically connected firm. The last row provides tests if the coefficient of NPCs in PC sectors and NPCs in NPC sectors is different; heteroscedasticity robust s.e. are presented in parenthesis; *,**,*** indicate significance at the 10,5,1 percent level.

Appendix A: Establishment-level survey data description

The sampling of the 2016 Egypt survey generates a representative sample of the whole economy. It considers the following industries (ISIC codes): all manufacturing sectors (group D), construction (group F), services (groups G and H), and transport, storage, and communications (group I). In particular, the sample size ensures a minimum precision of 7.5\% for the 90\% confidence interval about estimates of (i) the population proportion and (ii) the mean of log sales of these industries. A second level of stratification is firm size defined as small (5-19 employees), medium (20-99 employees), and large (100 or more employees). The targeted firms are establishments with at least five full-time employees with a minimum of eight working hours (or a complete work shift) per day. The restriction in firm size is supposed to limit the surveys to the formal economy; firms that are un-registered with the registrar/tax authority are thus also excluded. An establishment is defined as a single physical business location and may be part of a firm. However, establishments are required to make their own financial decisions, have its own managerial oversight, and have books separated from the parent firm. Moreover, targeted establishments are located in major metropolitan areas of a country.

The questionnaire is designed to be administered in face-to-face interviews with owners, managing directors, accountants, or other relevant staff. The interviewers as well as all other staff involved in the survey are thoroughly trained, whereas the World Bank experts supervise the training. The interviewers have to pass an exam in the end of the training in order to qualify for the work. The World Bank assures the strict confidentiality of the survey information. Neither the name of the respondent nor the name of the firm is used in any document based on the survey. The high degree of confidentiality is necessary to avoid biased declarations of respondents, who are informed of these conditions at the outset of the interview. Moreover, the World Bank widely publicizes the launch of the survey, e.g. via newspaper advertisements, and contacts local agencies to gain the support of the local business communities. This creates a value of potential reform recommendations resulting from the survey and thereby improves a firm's incentives to respond to the questionnaire. In addition, pilot surveys and field experience suggest that the completion of the core Enterprise Survey lasts approximately 45 minutes. This limitation in the length also contributes to the quality of the responses. Finally, any missing data or inconsistencies are checked by the interviewer and a field supervisor immediately after the interview and after the filing of the data.

The resulting data sets exclusively contain firms that are willing to participate. If randomly selected firms decide not to respond they are replaced by willing participants to ensure a sufficient sample size. However, non-responses might compromise the random nature of the sample if the rationales for it vary systematically with the respondents' assessments of the obstacles to firm growth. Thus, the Enterprise Survey provides a field-work report that lists the reasons for non-response, including the refusal to respond, in each country, industry, and class of firm size (see above).

Appendix B: Additional results

Table B.1. Distribution of politically connected firms across 2-digit sectors

	Number of politically connected firms
Food & Beverages	7
Textiles	5
Wearing apparel	2
Leather products	5
Paper products	1
Chemicals	15
Plastics & rubber	8
Mineral products	9
Basic metals	2
Fabricated metal	9
Machinery & equipment	2
Electrical machinery	3
Construction	16
Sale of motor vehicles	2
Wholesale trade	4
Retail trade	4
Hotels & restaurants	4
Travel agencies	5
Computer & related activities	3

Table B.2. Politically connected firms are more likely to receive a loan from politically connected banks

	Loan from a Politically Connected Bank (yes=1)		Loan from a Politically Connected Bank (yes=1)		Loan from a Politically Connected Bank (yes=1) (manufacturing only)		Loan from a Politically Connected Bank (yes=1) (manufacturing only)	
	(1) probit	(2) probit	(3) probit	(4) probit	(5) probit	(6) probit	(7) probit	(8) probit
NPC	-1.134*	-0.887			-1.388**	-1.190*		
	(0.662)	(0.689)			(0.590)	(0.616)		
NPC, PC sector			-1.269*	-1.067			-1.556**	-1.550*
			(0.677)	(0.729)			(0.611)	(0.760)
NPC, NPC sector			-0.836	-0.634			-1.037	-0.687
			(0.712)	(0.749)			(0.739)	(0.736)
Size, empl (log)		0.272**		0.279**		0.270**		0.283*
		(0.108)		(0.119)		(0.121)		(0.139)
Age, years (log)		0.341		0.342		0.129		0.172
		(0.323)		(0.350)		(0.302)		(0.421)
Part. gov owned								
Privatized		-0.814		-0.676		0.737		1.243
		(1.272)		(1.279)		(0.856)		(1.079)
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	198	176	198	176	97	87	97	87
PC sec = NPC sec			0.125	0.239			0.429	0.286

Source: World Bank Enterprise Survey Egypt, 2016. Note: NPC: dummy equal to 1 if firm is NOT politically connected; PC(NPC)-sector is dummy equal to 1 if the 4-digit sector in that the firm operates contains at least 1 (NOT) politically connected firm. The last row provides tests if the coefficient of NPCs in PC sectors and NPCs in NPC sectors is different; heteroscedasticity robust s.e. are presented in parenthesis; *,**,*** indicate significance at the 10,5,1 percent level.

Table B.3. Additional robustness tests: politically connected firms do not have worse managers and are not more effective in innovating

	Top manager's years of experience working in the sector		Manager Has Completed University (yes=1)		Labor Productivity (log, 2009 USD)		Labor Productivity (log, 2009 USD)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Innovation variable (RHS)					**Product innovation**		**Process innovation**	
	LS	LS	probit	probit	LS	LS	LS	LS
NPC	-4.810		-2.492**		-0.734**		-0.680**	
	(3.584)		(0.984)		(0.303)		(0.302)	
Innovation variable					-1.080**	-1.083***	-0.454	-0.454
					(0.423)	(0.418)	(0.354)	(0.352)
Innovation variable * NPC					**1.419*** **		**0.546**	
					(0.504)		**(0.392)**	
NPC, PC sector		-4.520		-2.472**		-0.726**		-0.691**
		(3.552)		(0.990)		(0.306)		(0.305)
NPC, NPC sector		-5.711		-2.607***		-0.738**		-0.656**
		(3.663)		(1.009)		(0.330)		(0.328)
Innovation variable * NPC, PC sector						**1.176****		**0.510**
						(0.545)		**(0.435)**
Innovation variable * NPC, NPC sector						**1.705*** **		**0.574**
						(0.608)		**(0.427)**
Size, empl (log)	0.483	0.432	0.723***	0.718***	0.167***	0.167***	0.174***	0.175***
	(0.378)	(0.381)	(0.0905)	(0.0911)	(0.0589)	(0.0582)	(0.0576)	(0.0570)
Age, years (log)	5.583***	5.537***	-0.215**	-0.219**	-0.165*	-0.171**	-0.169**	-0.167**
	(0.750)	(0.748)	(0.107)	(0.108)	(0.0845)	(0.0856)	(0.0847)	(0.0851)
Part. gov owned	-16.32**	-16.20**			0.815**	0.815**	0.851**	0.837**
	(6.358)	(6.395)			(0.403)	(0.398)	(0.400)	(0.397)
Privatized	0.395	0.445	1.134	1.089	-0.262	-0.207	-0.208	-0.208
	(5.003)	(4.891)	(0.795)	(0.773)	(0.422)	(0.411)	(0.407)	(0.405)
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,761	1,764	1,677	1,716	1,446	1,449	1,447	1,450
PC sec = NPC sec		0.327		0.581				

Source: World Bank Enterprise Survey Egypt, 2016. Note: NPC: dummy equal to 1 if firm is NOT politically connected; PC(NPC)-sector is dummy equal to 1 if the 4-digit sector in that the firm operates contains at least 1 (NOT) politically connected firm. The last row provides tests if the coefficient of NPCs in PC sectors and NPCs in NPC sectors is different; heteroscedasticity robust s.e. are presented in parenthesis; *,**,*** indicate significance at the 10,5,1 percent level.