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CONNECTING TO POWER: POLITICAL CONNECTIONS, INNOVATION, AND FIRM DYNAMICS

by Ufuk Akcigit*, Salomé Baslandze** and Francesca Lotti***

Abstract

How do political connections affect firm dynamics, innovation, and creative destruction? We extend a Schumpeterian growth model with political connections that help firms ease bureaucratic and regulatory burden. The model highlights how political connections influence an economy's business dynamism and innovation, and generates a number of implications guiding our empirical analysis. We construct a new large-scale dataset for the period 1993- 2014, on the universe of firms, workers and politicians, complemented with firms' financial statements, patent and election data, so as to define connected firms as those employing local politicians. We identify a leadership paradox: market leaders are much more likely to be politically connected, but much less likely to innovate. Political connections relate to a higher rate of survival, as well as growth in employment and revenues, but not in productivity— the result that we also confirm using the regression discontinuity design. At the aggregate level, gains from political connections do not offset losses stemming from lower reallocation and growth.

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1 Introduction

A growing body of empirical literature argues that factor reallocation from less-productive to more-productive firms is an important source of productivity growth (e.g., Bartelsman and Doms, 2000; Foster et al., 2001, 2006). Likewise, innovation-based endogenous growth models (e.g., Grossman and Helpman, 1991; Aghion and Howitt, 1992) assert that creative destruction is the key driver of economic growth. Creative destruction describes the replacement of stale incumbent firms by innovative entrants. These models assume that entrepreneurs only need to innovate the most superior product or technology to seamlessly replace an incumbent firm and thus become the new market leader. This conjecture clearly does not bear out in the real world, however, as incumbent firms use a range of strategies to deter innovative competitors and maintain market position. One of such strategies can be the use of political connections that help some firms dominate a market without needing to compete in terms of innovation.

This paper studies firm-level political connections and their implications for firm dynamics, innovation, and aggregate productivity, combining theoretical insights with empirical analysis of a new large-scale micro-level dataset on firms and politicians in Italy. Our analysis begins with a theoretical investigation of how political connections could influence an economy's business dynamism, new firm creation, and innovation. To organize our thoughts, we extend a basic Schumpeterian creative destruction model by introducing political connections. The model features creative destruction by entrants à la Aghion and Howitt (1992). Firms face bureaucratic and regulatory burden that, as in Restuccia and Rogerson (2008); Hsieh and Klenow (2009); Garicano et al. (2016), is modeled as a wedge in the firm's production process.[1] These bureaucratic and regulatory frictions may be alleviated by connecting with politicians at some cost.

The model provides new theoretical insights into understanding the social costs of political connections. Statically, political connections may be beneficial by smoothing out bureaucratic frictions. However, in the dynamic environment, the incumbents' political influence gives them advantage over other market participants, leading to reduced creative destruction and innovation on the whole.

The model provides a set of empirical implications that distinguish this model from an alternative model where firms use political connections to further innovative activities. The static problem implies a threshold rule of firm size above which firms find it profitable to incur the cost of connections to lower the burden of regulations. Hence, the first important prediction of our model is that market leaders are more likely to rely on political connections in the competition for market share, while newcomers are more likely to innovate. We also discover that firms that become connected and remove wedges enjoy temporarily higher employment and sales growth but have lower labor productivity growth. From a dynamic perspective, the model implies that markets with politically connected incumbents see new firms enter at a reduced rate. Intuitively,

[1] For an extensive evidence on high regulatory/bureaucratic burden and political connections in Italy, see Section 4.2.

new firms need to compete with incumbents not only on productivity, but they also need to overcome the regulatory or bureaucratic burden against which the connected incumbent is already immune. The model then implies that market leaders anticipate this dynamic effect and strategically invest in political connections to prolong their lead. We obtain a tractable expression for the gap in connection decisions in the static and dynamic environments. We see that two forces – the existence of bureaucratic frictions and the asymmetric access to the political network, give rise to strategic use of political connections by incumbents. As a result, markets with politically connected incumbents are dominated by older and larger firms that innovate very little and grow slowly.

The second part of the paper evaluates the implications of the model using a large-scale confidential micro-level dataset from Italy. The data spans the years 1993-2014, merging: (i) social security data on the universe of private-sector workers and firms; (ii) firms' financial statements; (iii) patent data from the European Patent Office; (iv) the national registry of local politicians; and (v) detailed data on local elections in Italy.

We define a firm as being politically connected in a particular year if the firm employs at least one local politician serving at the municipal, provincial, or regional level in that year. We also rate the political power of each connection using the position and party affiliation of a politician-employee. We find that firm-level political connections are widespread in Italy, especially among large and old firms. The average share of connected firms by industries is 4.5%, and connected firms account for one-third of employment across all industries.

While most of the empirical literature looks at high-profile political connections, links with local politicians are much more pervasive and can have broader consequences for the overall economy. After a series of reforms and a change of the Constitution, local politicians in Italy were gradually granted greater decision-making power during the time period we consider.

In fact, they are responsible for the majority of the administrative and bureaucratic burden faced by firms and play a crucial role in determining how national regulations are implemented and enforced. Local governments have authority over, and responsibility for, the provision of local public goods and services, administrative authority over the issuing of permits and licenses, and power to set rates for certain categories of taxes (Alesina and Paradisi, 2017).

Hence, focusing on local politicians is not only convenient because these connections are observable; local politicians are also in the best position to help firms.

Empirical patterns in this data match the implications of our model, confirming that the use of political connections has had detrimental effects for innovation and productivity growth in Italy's economy. First, we begin by relating firms' uses of innovation and political connections as a function of their market leadership. We document a "leadership paradox" that clearly illustrates the political economy problem of creative destruction, finding that:

Fact 1 *Market leaders are the most politically connected but the least innovative, relative to their direct competitors.*

This fact is consistent with the view that market followers are incentivized to innovate in order to leapfrog the leader with new products or technologies. Political connections act as an entry barrier, however. Rather than competing on innovation, market leaders can instead rely on defensive strategies to maintain their market position. Since entrants might have lower access to political influence, this "leadership paradox" leads to inefficiency in the market.

Second, we consider firm-level outcomes from political connections. Using cross-firm and within-firm variation in political connections, we document that:

Fact 2 *At the firm level, political connections are associated with higher employment and revenue growth but not with productivity growth.*

Fact 3 *Politically connected firms are more likely to survive, and their survival probability increases along with the political power of the politicians they employ.*

Fact 2 helps distinguish between two alternative hypotheses, namely that connections are either beneficial, or detrimental, to technological progress. Our model suggests that if firms use their connections to push the technological frontier, employment growth should be coupled with productivity growth. However, if political connections are used to gain preferential treatment or to directly eliminate competition by limiting market access, growth in employment would be decoupled from growth in productivity, like our data shows.

We exploit a quasi-random discontinuity caused by local elections decided on a thin margin to gauge causality in our growth regressions (Lee, 2008; Akey, 2015). We collect new data on all local elections in Italy and, based on vote allocation, identify the elections that were decided on a thin margin. Our regression discontinuity design (RDD) compares firms that were connected right before a marginally contested election with a politician from losing versus winning parties. The results of closely contested elections can be considered decided by pure chance, with random events like breaking news or a weather shock driving the outcome. Discontinuities in outcomes between marginally winning and losing firms *after* the election can therefore be attributed to political connections having a causal relationship with firm outcomes. We find that differences in post-election outcomes between marginally winning and marginally losing firms are large: firms with politicians on the winning side grow much more in terms of size but not in productivity.

Given the nature of our confidential social-security data, we can also observe the compensation of politicians employed by each firm. This detail allows us to estimate the level of rent sharing (static surplus) between firms and their employee-politicians. As a result, we find that:

Fact 4 *Politician-employees earn significant wage premiums relative to their co-workers. This premium implies an average 20%-80% rent sharing between the politicians and the firm, respectively.*

Taken together, these four empirical facts from micro-level data fit the predictions of the benchmark model. This strong tie between the facts and the model supports the main mechanism, where the primary role of political connections is to secure preferential treatment, rather than for innovative purposes.

Our last empirical facts relate to aggregate outcomes from political connections. Consistently with the model, data suggest that the effects of firm-level political connections go beyond the micro-level effects on connected firms, exerting a significant drag on the economy. We document that

Fact 5 *New firms enter more-connected industries at a slower rate, but conditional on entry, entrants are more likely to be connected than in other industries.*

Fact 6 *More-connected industries have a lower share of young firms and exhibit lower growth and productivity.*

We conclude our analysis by using our model and empirical data together to quantify bureaucratic and regulatory frictions and to provide a back-of-the-envelope calculations of static benefits and dynamic costs of political connections. Bureaucratic and regulatory burden is pervasive and represents a common obstacle for businesses in Italy;[2]

in facts, the country ranks among the worst in the friendliness of business regulations across developed countries;[3] and Gratton et al. (2017) provide extensive evidence that Italy's bureaucratic efficiency collapsed since the 1990s. We measure industry-level bureaucracy and regulatory burden and combine it with regional data on institutional quality to provide evidence for the importance of bureaucracy and regulatory frictions for the use of political connections. We show that the use of political connections and a negative relationship between connections and business dynamism is particularly strong in heavily regulated industries and regions with poor institutional quality – low regulatory quality and control of corruption.

After parameterizing the model, we estimate that the bureaucratic and regulatory wedges cause an aggregate output loss of 4% relative to the economy without wedges. The presence of political connections that ease the regulatory burden for connected firms leads to a 1.2% static gain in aggregate output, so recovering 30% of output loss from wedges. However, the dynamic losses caused by political connections' effects on creative destruction and productivity growth outweigh the static benefits, they reduce the present value of aggregate output by 3%.

The findings in this paper illustrate that the use of political connections among market leaders is common, and this has dire consequences for aggregate dynamics due to lower reallocation. Political influence is one of the growth strategies of market leaders that results in persistent dominance of large firms, which makes the economy less innovative on the whole. Recent evidence on the increasing dominance of large firms, declining business dynamism in the U.S. and OECD, and an increase in lobbying (Zingales, 2012; Decker et al., 2016; Loecker and Eeckhout, 2018) suggests that the facts we document in the Italian context are not a peculiarity, but can be generalized to other settings.

[2] According to the "Burden Measurement Program" report by the Ministry for Simplification and Public Administration of Italy, the estimated administrative burden faced by private firms in Italy is a staggering 31 billion Euros per year, representing 1.7% of the Italian GDP.

[3] Doing Business Indicator, The World Bank, 2017.

The paper is organized as follows. Next section reviews the related literature. Section 3 provides a theoretical framework and lists the implications of the model. Section 4 overviews our data and variable construction. Section 5 presents the empirical analysis of the micro-level data. Section 6 then explores aggregate outcomes, weighs the importance of channels, and provides back-of-the-envelope calculations for static gains and dynamic losses from political connections. Section 7 concludes.

2 Literature Review

The paper speaks to several strands of the literature. First, it relates to the literature on creative destruction, reallocation, and growth. The process of creative destruction is at the center of endogenous growth models (Aghion and Howitt, 1992; Grossman and Helpman, 1991; Klette and Kortum, 2004; Lentz and Mortensen, 2008; Aghion et al., 2014; Acemoglu et al., 2018; Akcigit and Kerr, 2018; Jones and Kim, 2018),[4] and the importance of factor reallocation through creative destruction has been documented empirically (Bartelsman and Doms, 2000; Foster et al., 2001, 2006). Less is known, however, about the factors that prevent such reallocation. Our theory shows that the existence of market frictions and the unequal distribution of political connections across firms leads to idiosyncratic distortions between incumbents and followers, hampering reallocation and growth. This way, insights from the literature on creative destruction bring new dynamic cost considerations to the largely static literature on wedges and misallocation (Restuccia and Rogerson, 2008; Hsieh and Klenow, 2009).

Second, our study contributes to the growing literature on market power and declining business dynamism (Decker et al., 2016; Loecker and Eeckhout, 2018; Akcigit and Ates, 2019b; Aghion et al., 2019). The evidence increasingly suggests that strategic actions by market leaders might be contributing to the observed decline in competitiveness and productivity growth. Andrews et al. (2019) and Akcigit and Ates (2019a) document a widening productivity gap between market leaders and followers and attribute it to declining knowledge diffusion from frontier firms to laggards. Recent micro-level studies show how market leaders' use of strategic patenting or merger and acquisition deals has negative consequences for competitiveness (Cunningham et al., 2021; Argente et al., 2020; Baslandze, 2021). In this paper we show that political influence is another strategy by which market leaders preserve the market, with negative effects for aggregate business dynamism. In this sense, our work is close to that of Krusell and Rios-Rull (1996) and Mukoyama and Popov (2014), who study models with tensions between incumbents and entrants in environments where firms can influence entry policies, while Comin and Hobijn (2009) show that lobbying dampens new-technology adoption when there are close predecessors in the adopting country.

[4] Some prominent examples of endogenous growth models without creative destruction are Romer (1990); Jones (1995); Acemoglu (2002); Lucas and Moll (2014); and Perla and Tonetti (2014).

Our paper highlights the importance of bureaucratic and regulatory frictions as mediating factors through which connections translate into poor aggregate performance. Gutiérrez and Philippon (2017) suggest that increasing market concentration in the U.S. can be explained by increasing regulations, while Zingales (2012) discusses recent growth in lobbying activity and argues that the American economy has become pro-large-business. Relatedly, Bessen (2016) shows that market regulations and rent-seeking are tightly linked in the U.S. and that increasing corporate profits can largely be attributed to political rent-seeking after the 2000s.

Third, our paper contributes to a large body of literature on the links between firms and politicians. We can roughly split this literature into two strands: one empirically documenting *private returns* from political influence, and the second emphasizing the aggregate *social* implications of political influence.

The first strand has documented large private returns from political influence in different settings (Fisman, 2001; Johnson and Mitton, 2003; Faccio and Parsley, 2006; Akey, 2015; Acemoglu et al., 2017). Connected firms perform better due to various favors received from politicians: credit access and financing (Johnson and Mitton, 2003; Joh and Chiu, 2004; Khwaja and Mian, 2005; Cull and Xu, 2005; Leuz and Oberholzer-Gee, 2006); access to government contracts, stimulus funds, and public subsidies (Goldman et al., 2013; Adelino and Dinc, 2014; Fang et al., 2018; Schoenherr, 2019; Choi et al., 2021); relaxed regulatory oversight of the connected firm or stiffer regulatory oversight of rivals (Kroszner and Stratmann, 1998); lighter taxation (Arayavechkit et al., 2017); and government bailouts of financially distressed firms (Faccio and Parsley, 2006).

The second strand of the literature is largely organized around two classic ideas about the social costs of political connections: the *greasing wheels* hypothesis (Kaufmann and Wei, 1999) and the *grabbing hand* hypothesis (Shleifer and Vishny, 2002).[5] According to the former, connections are expected to have a positive effect on welfare if they increase efficiency by relieving the burden of regulation, i.e., by greasing the wheels. According to the latter, connections have social costs when a firm uses political influence to divert public demand towards themselves.

These two hypotheses are evaluated in Cingano and Pinotti (2013) (CP, henceforth) whose empirical setting is related to ours. Like us, they identify firm-level connections with local politicians in Italy and show that connected firms collect a revenue premium that comes from increased sales to the government, but not from higher productivity. CP, therefore, suggest that the *grabbing hand* hypothesis holds. Although some of the empirical details overlap, the present paper differs significantly from CP in terms of the theoretical and empirical focus on innovation, creative destruction, and the associated political economy of it, as well as the empirical scale of the analysis. In terms of data, CP use a sample of 1,200 manufacturing firms with 50 or more employees,[6] while we rely on data covering the entire private sector of the Italian economy —

[5] More recently, Arayavechkit et al. (2017) and García-Santana et al. (2020) explore another type of social cost coming from capital misallocation.

[6] Those firms in the survey are representative of a population of fewer than 10 thousand firms (around 2% of the number of firms in manufacturing).

4.5 million firms of all sizes in all sectors over the period 1985-2014. Next, we provide causal identification using RDD. In addition, given its universal coverage, our data allow us to focus on important metrics of firm dynamics that have received little attention in the literature so far — market entry and exit, innovation, aggregate productivity, and growth.

The "leadership paradox" on the market leaders' declining innovation but increasing political connections, in turn, has important implications for innovation policy.[7]

More broadly, our theory draws different conclusions about the underlying mechanisms and social costs of political connections. In our large-scale data on the entire economy, we do not find support for the government-demand channel; instead, our results suggest that firms often use political connections to smooth bureaucratic and regulatory frictions. As a result, while CP is concerned about social cost from inefficient provision of public goods, we highlight a new type of dynamic social cost coming from lowered innovation and business dynamism.

3 Theoretical Model

We begin with a simple extension of the basic Schumpeterian growth model (Aghion and Howitt, 1992), introducing firm's choice of political connection. In the model, political connections help firms overcome bureaucratic hurdles and regulatory burdens, which are represented as wedges in the production process, following Restuccia and Rogerson (2008); Hsieh and Klenow (2009), and Garicano et al. (2016).

3.1 Static Environment

A competitive final goods sector uses the following CES aggregation

$$Y = \frac{1}{1-\beta}\left[\sum_{m=1}^{M} q_m^{\frac{\beta}{1-\beta}} y_m\right]^{1-\beta}, \tag{1}$$

where y_m denotes the output of an intermediate goods producer of vintage m. Different vintages differ by their qualities q_m and are perfect substitutes after adjusting for quality. Among the *implemented* M vintages, the latest vintage M is of the highest quality. As it will become clear, in this model, some of the new vintages offered by potential entrepreneurs, even though they are of superior quality, might not get implemented in equilibrium. Production function (1) implies that the demand faced by vintage-m producer is given by:

$$p_m = q_m^{\frac{\beta}{1-\beta}}\left[\sum_{m=1}^{M} q_m^{\frac{\beta}{1-\beta}} y_m\right]^{-\beta} \tag{2}$$

[7] For example, in light of this evidence, the policies should acknowledge the opposing innovation and defensive incentives of the market leaders and followers.

Producers of different vintages compete on prices to capture the whole market. In equilibrium, the firm with the best cost-adjusted quality will win the market. Assumption 1 ensures that the producing firm will charge the monopoly price. Hence, we will study the monopolist's problem throughout this section.

Assumption 1 *Producers of different-quality vintages play a two-stage pricing game. In the first stage, producers choose to pay a fee ε (which we assume to be arbitrarily small, i.e., $\varepsilon \approx 0$) to enter a price competition in the second stage. In the second stage, all firms that already paid the fee bid prices.*

This assumption ensures that only the firm with the highest cost-adjusted quality pays the fee and goes on to the second stage, implying that the producing firm charges the unconstrained monopoly price.[8] The wage rate of the worker is w. Production technology for each intermediate goods producer is one-for-one in labor:

$$y = l \tag{3}$$

Politically Unconnected Firms. Regulatory or bureaucratic burdens are represented as a wedge $\tau \geq 0$ that increases the marginal cost of production from w to $(1+\tau)w$, as in Hsieh and Klenow (2009). Therefore, a monopolist maximizes profit subject to a demand function as follows:

$$\begin{aligned} \pi^n &= \max_l \{py - (1+\tau)wl\} \\ s.t. & \quad p = q^\beta y^{-\beta} \text{ and (3)} \end{aligned}$$

The first column in Table 1 lists optimal choices of labor, revenue, and labor productivity (revenue per labor) of the unconnected firm.

Political Connections. Firms can avoid regulations and bureaucracy costs by forging political connections. If a firm gets connected, it avoids the cost of the wedge τ, yet the political connection carries the cost w^p, which we treat as exogenous for now.[9] We can think of w^p as compensation paid to politicians or any other type of cost that a firm incurs to maintain its political connections. However, a firm must first become familiar with the political network before connections can be formed. We represent access to the political network with a state variable, $s \in \{0,1\}$; $s = 1$ when the firm has access to the political network, $s = 0$ when the firm has no access. If a firm is in state $s = 1$ and is politically connected, then it maximizes profit as follows:

$$\begin{aligned} \pi^p &= \max_l (py - wl - w^p) \\ s.t. & \quad p = q^\beta y^{-\beta} \text{ and (3)} \end{aligned}$$

[8] This structure also gives us theoretical tractability since we do not have to worry about limit pricing.
[9] We endogenize this cost through Nash bargaining between a firm and a politician in Appendix A.

The second column in Table 1 lists optimal choices of labor, revenue, and labor productivity of the connected firm that faces no regulatory burden. The last column of Table 1 points out the direction of change in the relevant moments when an unconnected firm becomes connected. As seen, connected firms employ more labor and have larger revenue since they face no regulatory burdens. However, their labor productivity is lower. Hence, an important result here is that connections lead to growth in size, but not in labor productivity.

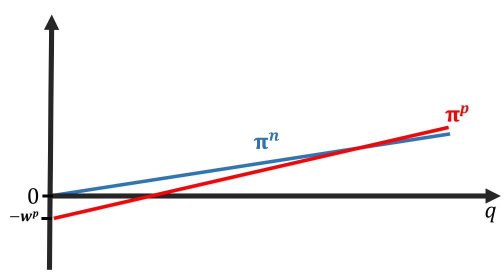
Table 1: Political Connections and Static Moments

	Unconnected Firm	Connected Firm	Change
Labor:	$\left[\frac{(1-\beta)}{(1+\tau)w}\right]^{\frac{1}{\beta}} q$	$\left[\frac{(1-\beta)}{w}\right]^{\frac{1}{\beta}} q$	$\Uparrow$
Revenue:	$\left[\frac{(1-\beta)}{(1+\tau)w}\right]^{\frac{1-\beta}{\beta}} q$	$\left[\frac{(1-\beta)}{w}\right]^{\frac{1-\beta}{\beta}} q$	$\Uparrow$
Labor Productivity:	$\frac{(1+\tau)w}{(1-\beta)}$	$\frac{w}{(1-\beta)}$	$\Downarrow$

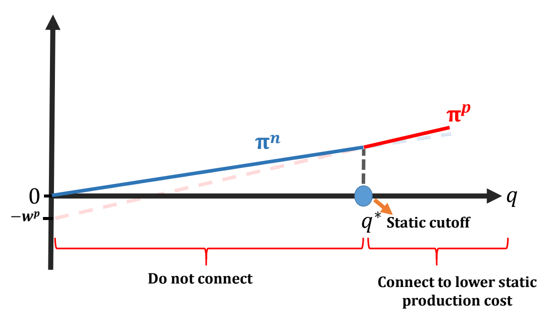
When do firms choose to get connected? Panel (a) in Figure 1 plots the profits of unconnected firms $\pi^n = \pi(1+\tau)^{-\frac{1-\beta}{\beta}} q$ and connected firms $\pi^p = \pi q - w^p$, where $\pi \equiv \beta \left(\frac{1-\beta}{w}\right)^{\frac{1-\beta}{\beta}}$. Panel (b) plots the equilibrium connection decision and indicates the resulting static return — the outer envelope (i.e., the maximum) of the two lines.

Figure 1: Connection Decision in a Static Environment

(a) Profits of Connected and unconnected Firms



(b) Static Connection Decision



Firms that have access to politicians (i.e., $s = 1$) choose to get connected if $\pi^p(q) > \pi^n(q)$. Since both profits are linear in q, the static equilibrium is such that firms have a threshold ($\hat{q}^s$)

and get connected if and only if

$$q > \hat{q}^s \equiv \frac{w^p}{\pi\left(1-(1+\tau)^{-\frac{1-\beta}{\beta}}\right)}$$

Hence, larger firms optimally become connected in order to remove regulatory burdens. For the sake of simplicity, we will assume $\beta = 0.5$ for the rest of this section, and we rewrite the static threshold as

$$\hat{q}^s = \frac{w^p}{\pi}\frac{1+\tau}{\tau} \tag{4}$$

Note that the threshold declines as the regulatory burden τ increases, implying that firms are more likely to be connected in more-regulated industries.

We summarize two main implications so far:

Implication (i): Large firms are more likely to get politically connected.

Implication (ii): After getting politically connected, firms grow in terms of employment and revenue, but not in terms of labor productivity.

Notice how these two implications illustrate that the relationship between political connections and firm size is bidirectional in the model. As firms grow in size, the cost of political connections becomes more appealing as regulatory burdens increase, so larger firms are more likely to be connected. Once large firms are connected, they grow more easily and become even larger.

3.2 Dynamics

Accessing the political network takes time. We assume that a share α of entrants starts with $s = 1$, and $1 - \alpha$ with $s = 0$. Firms switch from state $s = 0$ to $s = 1$ at the Poisson arrival rate ζ. We assume that $s = 1$ is an absorbing state. At each moment, a potential entrant receives a new innovative idea at Poisson arrival rate p and can produce a new vintage. A new idea of quality λ improves on the most-recent vintage of quality q_M as follows:

$$q_{M+1} = (1+\lambda)\, q_M$$

where $\lambda \sim F(0, \infty)$ is the realization of innovation quality that is distributed according to distribution $F(\cdot)$. Importantly, not all entrants with a better-quality product will be able to replace existing incumbents.[10] For an entrant to replace the incumbent, the entrant's quality-adjusted cost must be lower. When the entrant's and incumbent's political connections are asymmetric, an entrant's product must be of much better quality to beat the cost advantage of the incumbent,

[10]If a vintage cannot enter the market, we assume that the vintage is lost; i.e., ideas are implemented immediately or disappear.

who is immune to regulatory costs. To see this, consider the following three cases. In the first case, if the incumbent has no political connection, the system reduces to the standard Schumpeterian economy (Aghion and Howitt, 1992), in which new firms replace incumbents at the rate p. If both incumbent and entrant are connected, the case is similar: any quality improvement by $\lambda > 0$ will lead to creative destruction at the rate p. In the asymmetric case in which the incumbent is connected and the entrant is not, we will see that the process of creative destruction is impeded, since the entrant must produce a superior technology *and* spend resources on the regulatory burden to succeed. To formally show this, let us begin with the price competition between the entrant $M+1$ and incumbent M. The demand for each vintage is given by (2). The entrant must have a better ratio of quality to price to beat the incumbent in the pricing game:

$$\frac{q_{M+1}}{p_{M+1}} > \frac{q_M}{p_M}. \tag{5}$$

Now we can seek a quality threshold for innovation λ^* at which the entrant is guaranteed to produce, in equilibrium. In the price competition, the lowest price that the incumbent can charge is w, whereas the entrant's lowest possible price is $(1+\tau)w$. Since the entrant's quality is $q_{M+1} = (1+\lambda)q_M$, the condition in (5) gives us the innovation-quality threshold λ^*, above which entrants successfully replace incumbents: $\lambda > \lambda^* \equiv \tau$. Since the incumbent's political connections give a cost advantage, the entrant has to overcome this advantage with innovation. This threshold is equal to the regulatory advantage of the incumbents, which is τ. Now we have the formal tools to model the incumbent's decision to forge connections in this dynamic environment. To write down the value function, we will pose that the firms follow a cutoff rule, such that firms with $q > \hat{q}^d$ decide to get connected. We will ultimately solve for the dynamic threshold $\hat{q}^d$. First, consider a firm with $q < \hat{q}^d$ and denote its value by V_{-1}. Then

$$rV_{-1}(q) = \pi(1+\tau)^{-1}q - pV_{-1}(q).$$

where $r > 0$ is the exogenous interest rate. This value function simply equates the safe return $rV_{-1}(q)$ to the risky return on the right-hand side. Firms collect instantaneous profits and get replaced at the rate p, in which case they exit. Rearranging this value function implies

$$V_{-1}(q) = \frac{\pi(1+\tau)^{-1}}{r+p}q. \tag{6}$$

Intuitively, firm value decreases as the regulatory burden τ and rate of creative destruction p increase. The value of a firm with quality above the threshold $q \geq \hat{q}^d$ that does not have political access ($s = 0$). Denoting this value as V_0, we can express it as:

$$rV_0(q) = \pi(1+\tau)^{-1}q - pV_0(q) + \zeta\left(V_1(q) - V_0(q)\right),$$

This value function is very similar to (6), with the exception that firms without political access will gain access at the rate ζ. For a firm in state $s = 1$ with $q \geq \hat{q}^d$, the value function is:

$$rV_1(q) = \pi q - w^p - p \left[\underbrace{\alpha}_{\text{connected}} + \underbrace{(1-\alpha)\Pr(\lambda > \lambda^*)}_{\text{unconnected but major innovation}} \right] V_1(q). \tag{7}$$

The incumbent is replaced at a different rate now. If the entrant has political access (with probability α), any innovation is sufficient to replace the incumbent. If the entrant has no political access (with probability $1-\alpha$), the entrant is disadvantaged by the regulatory burden. In this case, the entrant has to come up with a sufficiently novel innovation $(\lambda > \lambda^*)$ to overcome for the regulatory disadvantage, which happens with probability $\Pr(\lambda > \lambda^*)$. Rearranging (7) delivers:

$$V_1(q) = \frac{\pi q - w^p}{r + p[\alpha + (1-\alpha)\Pr(\lambda > \lambda^*)]}. \tag{8}$$

Firms connect to politicians if and only if getting connected offers more value than staying unconnected: $V_1(q) > V_{-1}(q)$. Using (6) and (8), this condition holds if and only if the quality level is above the dynamic threshold $\hat{q}^d$:

$$q > \hat{q}^d \equiv \frac{w^p}{\pi \left[1 - \frac{r+\tilde{p}}{r+p}\frac{1}{1+\tau}\right]} \tag{9}$$

where $\tilde{p} \equiv p[\alpha + (1-\alpha)\Pr(\lambda > \lambda^*)]$. As in the static case, firms choose to form political connections if they are larger and/or if the regulatory burden τ is larger.

Preemptive Motive. Now we can compare the static cutoff in (4) to the dynamic cutoff in (9):[11]

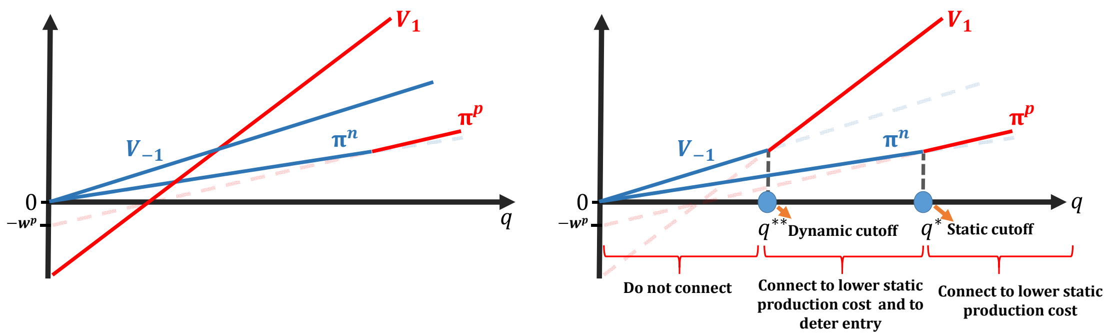
$$\hat{q}^s = \frac{w^p}{\pi\left[1 - \frac{1}{1+\tau}\right]} > \hat{q}^d = \frac{w^p}{\pi\left[1 - \frac{r+\tilde{p}}{r+p}\frac{1}{1+\tau}\right]}$$

We see that $\hat{q}^d < \hat{q}^s$, as illustrated in Figure 2. In the region with $q \in [\hat{q}^d, \hat{q}^s]$, firms encounter an additional preemptive motive to acquire political connections. Incumbents anticipate that, by getting connected, they discourage entry and survive longer, hence they optimally choose to seek connections earlier. Notice that the difference between the two cutoffs comes from the term $\frac{r+\tilde{p}}{r+p}$, and it disappears if $\alpha \to 1$, i.e., if all entrants have political access. Likewise, if there is no regulatory burden ($\tau = 0$), the static and dynamic thresholds collapse to the same value, $\hat{q}^d = \hat{q}^s$. In these two extreme cases, there is no room for strategic entry deterrence. Hence, strategic motives kick in when the industry is heavily regulated (i.e., $\tau \uparrow$) or when the asymmetry in access between incumbents and entrants is large (i.e., $\alpha \downarrow$).

[11]Note that $\pi^p > 0$ when $q > \hat{q}^d$. Hence, connected firms never make any static loss in equilibrium.

Figure 2: CONNECTION DECISION IN A DYNAMIC ENVIRONMENT

(a) Values of Connected and unconnected Firms (b) Dynamic Connection Decision



Finally, we discuss the equilibrium creative destruction rate, which is:

$$\textit{Entry rate} = \begin{cases} p & \text{if incumbent is not connected} \\ \tilde{p} = r + p[\alpha + (1-\alpha)\Pr(\lambda > \lambda^*)] & \text{if incumbent is connected.} \end{cases}$$

Since $\tilde{p} < p$, connected incumbents are less likely to exit. Notice that if $\alpha = 1$ so that all entrants have access to the political network, creative destruction is equal to entry rate p. In fact, politically connected incumbents are more likely to be replaced by connected entrants.[12]

Hence, the coexistence of red tape (τ) and asymmetric political access ($\alpha < 1$) are the factors that impede creative destruction.

These considerations lead us to formulate

Implication (iii): Politically connected firms are less likely to exit than unconnected firms.

Implication (iv): In industries where incumbents are politically connected, creative destruction is lower, and entrants are more likely to be politically connected.

Finally, we summarize last observations at the industry level. Similar to the baseline Schumpeterian model, only entrants innovate in this model. Consequently, industries with connected incumbents have lower innovation rates. In addition, because transition from state $s = 0$ to $s = 1$ is governed by a Poisson process, conditional on size, older firms are more likely to be connected. As a result:

Implication (v): Industries dominated by politically connected firms have older firms and lower productivity growth.

The model generates additional intuitive predictions when we allow w^p to be a politician's compensation determined endogenously as a results of Nash bargaining between the firm and the politicians with heterogenous political powers,[13] namely that *i)* compensation increases with

[12]Conditional on being replaced, a connected incumbent is replaced by a connected entrant with probability $\frac{\alpha}{\alpha+(1-\alpha)\Pr(\lambda>\lambda^*)} > \alpha$, which is this probability for an unconnected incumbent.

[13]See Appendix A for further details.

the political power of a politician; and *ii)* connections with more-powerful politicians increase the firm's likelihood of survival.

3.3 Taking Stock and Alternative Mechanisms

A basic extension of a Schumpeterian creative destruction model with political connections provides some new theoretical insights into understanding the social costs of political connections. Even if we consider a "well-intended" nature of political connections that help firms remove red tape, a simple glimpse into the dynamic effects of misallocation uncovers important aggregate costs. Statically, similar to the "greasing wheels" idea, connections are socially beneficial since they reduce market frictions. However, the model uncovers two new intuitions in a dynamic environment. First, creative destruction endogenously decreases in response to asymmetries in wedges between entrants and incumbents, caused by unequal political access. Second, this mechanism creates additional strategic incentives for market leaders to use political connections to prolong their lead. As a result, markets with politically connected incumbents will see reduced market entry and reallocation, eventually becoming dominated by older and larger firms that innovate little and stagnate in productivity.

Our model implications help distinguish our mechanism from an alternative mechanism in which political connections help firms advance productivity, for example, by reducing effective innovation costs or helping introduce innovations to the market.[14] Against the current implications, this alternative mechanism would imply that at the firm level, connections and innovation go hand-in-hand, and that firms grow both in size and productivity as a result of political connections. In the next sections, we study a new large-scale and granular dataset from Italy to document empirical facts, guided by the implications from the theory.

4 Data and Descriptive Statistics

We tap data from multiple administrative sources to build a comprehensive dataset about firms, workers, and local politicians in Italy, covering the years 1993-2014. The core of this data construction is newly available individual-level data from the Italian Social Security Administration (INPS). We combined this rich Social Security (SS) data with administrative data on firms' financial statements (Cerved) to obtain a detailed matched employer-employee dataset for Italy. On

[14]Some alternative assumptions on the use of connections could give us similar set of implications. For example, we could assume that incumbents use connections purely to block entry, perhaps by influencing entry policies (directly altering p), or that connections help getting procurement contracts (introducing demand wedges, τ^y). We do not incorporate these channels in our theoretical framework for two reasons. First, we lack empirical evidence for the direct-blocking effect, and the government-demand channel does not appear to be an empirically leading channel in our large-scale data for the entire economy (see Section 6.2). Second, even if we considered these channels, the implications for social costs from lower reallocation would be the same. Quantifying the relative importance of these various channels is an important question that we leave for future research. For now, we wish to focus on documenting the tradeoff between the static benefits of political connections and the dynamic costs of impeded reallocation and innovation.

the firm side, the data is further augmented with information on firm-level innovation derived from patent records in PATSTAT. On the employee side, we combine SS data with individual records on the universe of local politicians from the Italian Registry of Local Politicians (RLP). This allows us to identify whether a politician was employed in the private sector while holding office, helping us define firm-level political connections.

Finally, we also gather data about all local elections in Italy held between 1993-2014. Together, the RLP and elections data allow us to define various attributes of an individual's political career, such as position, rank, party affiliation, and participation in marginally contested elections. Below, we provide an overview of the data. We delegate a more detailed discussion of data cleaning and variable construction to Appendix B. Table 2 shows a summary of our data sources.

Table 2: Data Sources

Data	*Source*	*Content*	*Time Span*	*Variables*
1. **Social Security**	INPS	Individual-level: Universe of private sector employees (no contractors & agriculture)	1985-2014	Employment history, labor income, job characteristics, demographics.
	INPS	Firm-level: Universe of firms with at least one paid employee (except agriculture)	1985-2014	Entry, exit, size, workforce characteristics, industry, location.
2. **Firm Financials**	Cerved	Universe of limited companies	1993-2014	Balance sheets, income statements.
3. **Patent Data**	PATSTAT	All EPO patents filed by Italian firms	1990-2014	Patent grant status, patent families, technology classification, citations, claims.
4. **Registry of Local Politicians**	Ministry of Interior	Universe of local politicians (regional, province, municipality)	1985-2014	Political position attributes, party affiliation, demographics.
5. **Elections Data**	Ministry of Interior and own collection	Regional, province, municipality election outcomes	1993-2014	Candidates, parties, coalitions, vote shares, seats.

4.1 Data Sources

Dataset #1: Social Security Data (INPS) We access the Italian social security data at the Italian National Institute of Social Security within the VisitINPS Scholars program. INPS data covers the universe of private sector workers whose employers make social security contributions. Part-time workers and temporary-contract workers are included, while the self-employed, public employees, agricultural workers, and contractors are not. This data provide us information about both employees and firms.

On the employee side, the social security data provide complete information on employment history and demographics. The following information is included: employer's identity, job start and separation dates, gross labor income (including bonuses and overtime), number of weeks worked in a year, type of contract (e.g., full-time or part-time, permanent or temporary), and broad occupational descriptions.

We aggregate the employee data to learn about firms, constructing reliable variables for firm size, average wages paid, and various labor compositions. We have each firm's industry classification (ATECO 2007, which corresponds to Nace Rev.2), location, and entry and exit dates.[15] These data allow us to construct aggregate moments about firm entry, exit, and turnover across industries, locations, and time.

Dataset #2: Firms' Financials (Cerved) We use proprietary firm-level data administered by Cerved Group. The data provide balance sheets and income statements for all incorporated firms in Italy during our period of interest. Sole proprietorships or small household producers are not covered. We make use of standard variables such as assets, intangible assets, value added (VA), and profits. We compute a firm's labor productivity, LP, as the value added per worker. Total factor productivity, TFP, is calculated as the residual z from the standard Cobb-Douglas specification $Y = zK^{\alpha}L^{1-\alpha}$, where Y is the observed value added, K is the observed total assets, L is employment, and the labor share $1-\alpha$ is equal to the average industry-level labor share from the data.[16]

Dataset #3: Patent Data (PATSTAT) Our patent data come from the European Patent Office Worldwide Patent Statistical Database (EPO PATSTAT) covering all patents (granted or not) published before spring 2016. For all patents, we extract information on their patent families, technology classification, application date, grant status,

and backward and forward citations. By matching with the Cerved data, we identify 13,904 firms with patent records in PATSTAT. We construct various measures of innovation at the firm level with the patent data: (i) the count of patent applications; (ii) citations-adjusted patent counts; and (iii) family-size-adjusted patent counts. Citation counts and the patent family size, which indicates the extent of geographical protection sought by a patent, serve as proxies for patent quality.

Dataset #4: Registry of Local Politicians (RLP) We accessed the registry of local politicians (RLP) through the website of the Ministry of the Interior. The RLP contains information on all local politicians at the municipal (8,110 municipalities), provincial (103 provinces) and regional (20 regions) levels from 1985 to 2014. For each politician, we have details about demographic information, location, position (e.g., council member, mayor, regional president, vice-president, etc.), and appointment date. We define an individual's *majority affiliation* – whether a politician is a member of the majority party (or coalition) at the local level. Table 3 reports the distribution of local politicians by their majority affiliation and hierarchical and regional ranks.

[15] We cannot identify establishments using this data, hence our unit of analysis is a firm. However, in Italy the average number of establishments per firm is just 1.07 (Istat, Census 2011 data).

[16] We also consider production function estimation-based TFP measures (Wooldridge, 2009), and find similar results. See Syverson (2011) for the discussion of various measures of productivity.

Table 3: Statistics on Local Politicians

Category	Position	Share
Regional Rank	Region	0.8%
	Province	2.6%
	Municipality	96.6%
Hierarchical Rank	Mayor, President, Vice-mayor, Vice-president	11.3%
	Executive councilor	19.6%
	Council member	69.1%
Majority Affiliation	Majority	73%

Notes: Summary statistics on the distribution of politicians across regional rank, hierarchical rank, and local majority affiliation from the Registry of Local Politicians (RLP). Statistics are from the period between 1993 and 2014 with 2,888,480 observations on 515,201 distinct politicians.

Dataset #5: Elections Data We take data about elections at the regional, province, and municipal levels from the Ministry of Interior and complement it with data we have collected from various online archives. The final dataset covers all local elections during the period 1993-2014, and includes the identities of all mayoral/presidential candidates (names and demographics); parties/coalitions participating in the elections and candidates that they support; candidate and party votes; and the allocation of council seats. We use this data to identify marginally contested elections and identities of winning and losing parties/coalitions, as discussed in Section 5.3.

4.2 Descriptive Statistics

We link individual politicians listed in the RLP to the INPS data to identify a firm's connections based on the employment of local politicians contemporaneous with their terms of office. Specifically, we define the following indicators:

$Connection_{it}$: $= 1$ if at least one politician is employed by firm i at time t; $Connection\ majority_{it}$: $= 1$ if at least one politician from the majority party/coalition at local level is employed by firm i at time t. $Connection\ high\text{-}rank_{it}$: $= 1$ if at least one high-ranking politician–(vice-) mayor, region or province (vice-) president, or a (vice-)president of a council, is employed by firm i at time t.

Almost 10% of politicians employed in the firms hold top or middle-management positions, while 55% perform other white-collar jobs.[17] In 63% of cases, firms become connected when an employee gets elected; in the remaining cases a politician already in office is hired by the firm. We report summary statistics of the final matched dataset for the period 1993-2014 in Table 4. In total, we have about 32 million observations at the firm level, with 4 million unique firms in 1993-2014. Among these, 1 million firms match to Cerved so that financial data is available.

[17] Appendix Table B.3 provides more details about the politician-employees.

Table 4: Summary Statistics of the Matched Firm-level Data

PANEL A: Number of Observations

	All firms	With balance sheet
Years	1993-2014	1993-2014
Observations (firms × year)	32,776,800	7,292,069
Unique firms	4,432,111	1,028,063
Observations (firms × year), connected firms	449,236	270,843
Unique firms ever-connected	112,333	64,612

Variable	*Mean*	*Median*	*St dev*	*Mean*	*Median*	*St dev*
PANEL B: Variables from INPS (Data #1)						
Employment	7.223	2.000	129.005	18.481	5.000	213.193
Average weekly pay, thous. €	0.357	0.346	3.545	0.440	0.415	0.388
Employment growth	0.125	0.000	0.782	0.069	0.000	0.633
PANEL C: Variables from Cerved (Data #2)						
Assets, thous. €	-	-	-	3198.352	768.080	8171.213
VA growth	-	-	-	0.167	0.016	0.800
LP growth	-	-	-	0.098	-0.018	0.686
TFP growth	-	-	-	0.064	-0.020	0.554
PANEL D: Variables from PATSTAT (Data #3)						
Num. patents (yearly)	2.113	1.000	5.028	2.114	1.000	5.042
Num. family-size-adj. patents (yearly)	11.304	5.000	28.183	11.361	5.000	27.979
Num. citations-adj. patents (yearly)	4.286	1.000	21.657	4.229	1.000	20.606
PANEL E: Variables from the Registry of Local Politicians (Data #4)						
Connection	0.014	0.000	0.119	0.035	0.000	0.183
Connection high-rank	0.002	0.000	0.040	0.004	0.000	0.059
Connection majority	0.008	0.000	0.090	0.020	0.000	0.138
Num. politicians (cond on employing)	1.759	1.000	6.841	1.780	1.000	6.947
Num. majority-politicians (cond on employing)	0.896	1.000	3.517	0.892	1.000	3.623
Num. high-rank politicians (cond on employing)	0.152	0.000	0.882	0.132	0.000	0.860

Notes: Summary statistics of the matched data at the firm × year level. The columns under "All firms" report statistics for all firms in the INPS data, our largest baseline sample. The columns "With balance sheet" present statistics for all observations where balance sheet information is not missing (observations matched to Cerved). All nominal variables are expressed in thousands of 2014 Euros. Employment is defined based on the number of employees in March. Employment growth is computed as $gr_{it} = (empl_{it} - empl_{it-1}) / [0.5 \times (empl_{it} + empl_{it-1})]$ as in (Davis et al., 1998). The "All firms" sample includes also firms that report zero employment in a particular year but still appear in INPS data. Number of observations with non-zero employment is 27,982,454 (employment growth excluding zero-employment observations is significantly lower, so a bulk of positive growth comes from entry years). Average weekly pay is the average gross weekly pay of all workers employed in March. Patent-related variables are defined in Section 4.1. The statistics on number of patents are given conditional on patenting. Definitions of Connection, Connection high-rank, and Connection majority are given in Section 4.2. The statistics on number of politicians employed are given conditional on having a connection. Standard balance sheet variables are defined in Section 4.1.

Firm-level political connections are widespread. In total, 112,333 unique firms can be identified as connected at some point in their existence. Conditional on being connected, the average number of politicians employed per year is 1.7. The average share of connected firms by industries is around 4.5%, though connected firms account for 33.6% of employment across industries. Hence, connections are particularly common among large firms: 45% of firms with more than 100 workers are connected with politicians. Conditional on size, older firms are more likely to be connected than younger firms.

5 Empirical Analysis

The empirical results of this section are organized around the theoretical implications discussed in Section 3.

We begin by observing firms' use of innovation or political connections as a function of the firms' market position. Second, we examine firm-level outcomes from political connections. Third, we study politicians' wage premiums and estimate the extent of rent sharing between firms and the politicians they employ. Taken together, our micro-level empirical results give evidence for the explanatory power of the main mechanism in our model. Firms primarily spend resources on political connections to obtain preferential treatment, which those firms do not use to innovate or advance productivity.

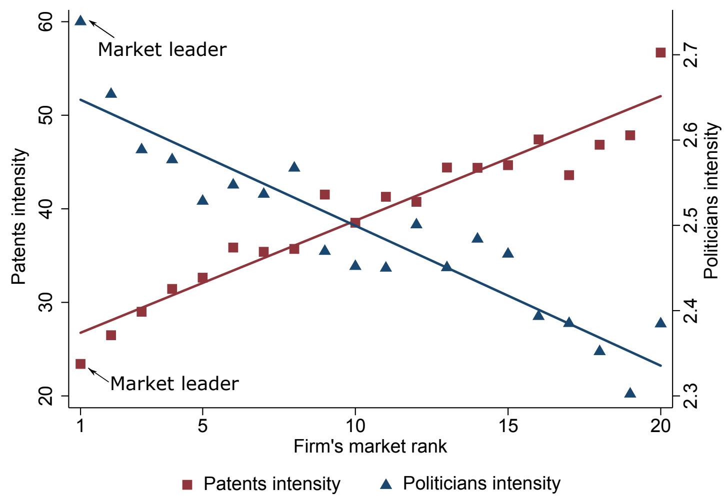
5.1 The "Leadership Paradox"

This section gives our evidence for the first implication of the model. We consider the top-20 firms in a market ranked on employment share. A market is defined at the (6-digit) industry $\times$ region $\times$ year level. Figure 3 plots the average intensities of political connections and innovation over firms' market rank. Politicians intensity is defined as the number of politicians employed by a firm, normalized by 100 white-collar employees.[18] Innovation intensity is the number of patent applications published in a year, again normalized by 100 white-collar employees. Both outcome variables are adjusted for industry-, region-, and year-fixed effects. We also plot regression lines from regressing outcome variables on market rank, controlling for industry-, region-, and year-fixed effects. We document a "leadership paradox": dominant market leaders engage less in innovation but increasingly rely on political connections.

This "leadership paradox" is robust to many alternative specifications that are presented in Appendix D. We measure innovation intensity using quality-adjusted patent filings, where quality is measured by patent citations or patent family size, or using intangible assets over a firm's value added. We also consider majority-level politician-employees for our definition of politician intensity. We also consider different definitions of market rank by calculating market share based on value added or by defining the market at the industry level, so excluding the regional dimension. Finally, we show that the relationship is also present outside the top 20 firms in the market. Innovation intensity declines monotonically, while politician intensity increases monotonically with a firm's market rank.

[18] Since politicians are mostly employed in white-collar positions, we normalize by the number of white-collar workers in a firm. However, normalizing by total employment does not alter results significantly.

Figure 3: Leadership Paradox: Market Rank, Innovation, and Political Connection



Notes: Figure plots politician intensity and innovation intensity over firm's market rank for the top 20 firms in each market. Market is defined at (6-digit) industry × region × year level. Markets in which top 1 firm holds less than 10% share are excluded. Politician intensity (blue triangles) is the number of politicians employed in a firm normalized by 100 white-collar employees. Innovation intensity (red squares) is the number of patent applications in a year normalized by 100 white-collar employees (conditional on patenting). Both outcome variables are adjusted for industry-, region-, and year-fixed effects. The blue and red lines depict regressions of politician intensity and innovation intensity, respectively, on market rank, controlling for industry-, region-, and year-fixed effects.

The following empirical fact supports our first theoretical implication, that larger firms are incentivized toward political connections to reduce market frictions and preempt competition from market entrants.

Fact 1. *Market leaders are the most politician-intensive but the least innovation-intensive, relative to their direct competitors.*

5.2 Connections and Firm Outcomes: Evidence from Universe of Private-Sector Data

We next turn to political connections' effects on firm outcomes. We evaluate firm growth both in terms of size and productivity to discern whether connections help or hinder technological progress. Our model points out that if firms use their connections to push the technological frontier, we should observe that employment growth is coupled with productivity growth. Alternatively, if political connections are used to gain preferential treatment (as our theoretical model suggests) or to directly eliminate competition, workers freed up from competitors would be reallocated to connected firms. In the data, such growth in employment would be detached from productivity growth.

We start with an analysis of data covering the whole Italian economy. In the next section, we zoom into specific setting that offers exogenous variation in the power of political connections.

Political Connections and Firm Growth

In Table 5, we estimate the following regressions:

$$y_{it} = \beta_0 + \beta_1 Connection_{it} + \beta_2 Connection\ majority_{it} + \zeta \mathbf{x}_{it} + \eta \mathbf{x}_t + \gamma \mathbf{x}_i + \varepsilon_{it} \qquad (10)$$

where y_{it} is firm i's growth from t to $t+1$. The main explanatory variables $Connection_{it}$ and $Connection\ majority_{it}$ are dummy variables that were defined in Section 4.2. $\mathbf{x}_{it}$ includes time-varying firm-level controls – log total assets, log size (employment), and age. $\mathbf{x}_t$ includes time dummies, while $\mathbf{x}_i$ includes firm region and industry dummies or firm fixed effects.

Table 5: Political Connections and Measures of Firm Growth

	(1) Empl (OLS)	(2) Empl (FE)	(3) VA (OLS)	(4) VA (FE)	(5) LP (OLS)	(6) LP (FE)	(7) TFP (OLS)	(8) TFP (FE)
Connection	0.032***	0.040***	0.039***	0.014***	-0.014***	-0.028***	-0.008***	-0.019***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)
Connection major	0.003*	0.007***	0.010***	0.002	-0.001	-0.004	0.000	-0.003
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Region FE	YES	NO	YES	NO	YES	NO	YES	NO
Industry FE	YES	NO	YES	NO	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES	NO	YES	NO	YES
Observations	6,545,131	6,585,740	5,684,519	5,710,338	5,598,367	5,623,077	5,271,002	5,291,979

Notes: Firm-level regressions described in equation (10). Dependent variables are growth in employment (columns 1 and 2), value added (columns 3 and 4), labor productivity (columns 5 and 6), and TFP (columns 7 and 8) from time t to time $t+1$. TFP is calculated as described in Section 4.1. Main control variables are *Connection* – a dummy variable equal to one if the firm employs a politician, and *Connection major* – a dummy equal to one if the firm employs a politician from a majority party/coalition. The regressions, in addition, control for a firm's log assets, log size, age, as well as year, region, and industry fixed effects in columns 1 3, 5, and 7; and for year dummies and firm fixed effects in columns 2, 4, 6, and 8. The data cover the years 1993-2014. Average length of political connections within firms is 4.2 years. Robust standard errors clustered at firm level reported in parentheses. $^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$.

Columns 1 to 4 of Table 5 report results for growth in size in terms of employment and value added, while columns 5 to 8 reports results for growth in productivity in terms of labor productivity and TFP. Both OLS and within-firm regressions show that connected firms' employment grows 3% faster, on average. Being connected to a majority party is associated with an additional 0.3 percentage points in employment growth. Connected firms also grow 1 to 4 percentage points faster in value added. This growth in size is not accompanied by corresponding growth in productivity. We see that connections are associated with some decline in productivity growth, while the party affiliation of politician-employees has no significant effect.[19]

This disconnect between growth in size and growth in productivity also appears when we use other measures of firm size and productivity. In Appendix Table C.2, we present similar positive results for growth in white-collar employment and profits and negative results for growth in

[19]Both in the model and the data, our productivity measure is the revenue productivity. As a result, if connected firms have higher markups, all else equal, their (revenue) productivity should be higher, going against of what we find. Hence, our evidence on the declining revenue productivity for connected firms puts a lower bound on the implied wedge τ.

intangibles intensity and patent applications.

Fact 2 summarizes our findings. Consistent with the main channel discussed in the model, Fact 1 and Fact 2 together suggest that the primary role of political connections is to help firms obtain preferential treatment that they do not necessarily use to innovate and advance productivity.

Fact 2. *At the firm level, political connections are associated with increased employment and revenue growth, but not with higher productivity growth.*

Firm survival

We also observe that political connections are associated with increased likelihood of firm survival. We estimate a Cox survival model in Table 6. Conditional on firm size, market share, and year and industry dummies, firms that are connected face less of an exit hazard. Survival probability increases even further if a firm is connected with a majority-party or high-ranking politician. Relative to unconnected firms, firms that are connected with high-rank politicians experience a 0.275 decline in the yearly-log hazard rate, while connection with a majority-party politician is associated with a 0.109 decline in the yearly log hazard rate. This is our Fact 3:

Fact 3. *Politically connected firms are more likely to survive, and their survival probability increases in the political power of the politicians they employ.*

Table 6: COX SURVIVAL ANALYSIS

	Exit	Exit	Exit
Connection	-0.088***	-0.059***	-0.067***
	(0.009)	(0.013)	(0.010)
Connection major		-0.050***	
		(0.019)	
Connection high-rank			-0.208***
			(0.033)
Other controls & Year, Industry FE	Yes	Yes	Yes
Observations	25,773,082	25,842,288	25,773,082

Notes: Cox proportional hazard model of firm survival as a function of connection status at a point in time. Definitions of *Connection*, *Connection major* and *Connection high-rank* are given in Section 4.2. Other controls are log employment, market share defined as share of a firm's employment in industry × region × year, and year, and industry dummies. Efron method for tied failures is used. The survival model is estimated on the entire sample of INPS firms in the period 1993-2014. Standard errors in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

5.3 Connections and Firm Outcomes. Regression Discontinuity Design

In the spirit of Lee (2008) and Akey (2015), we exploit quasi-random discontinuity caused by local elections decided on a thin margin to gauge the causality of our firm-level growth results. This method allows us to compare the post-election performance of two different firms that were politically connected to different competing parties immediately *before* a marginally-contested election. Since the outcomes of closely contested elections can be considered as decided by pure chance, discontinuity in outcomes between marginally winning and losing firms *after* the election can be attributed to a causal effect of majority-party connections on firms' outcomes. Before we go into the details of the methodology, it is useful to briefly describe the institutional setting of local elections in Italy and the identification of closely contested elections in our data.

Elections at the municipal level. Local elections are typically held every five years, and voters choose the mayor and members of the local council. Italy has about 8,100 municipalities, with populations ranging from 100 inhabitants to 3 million inhabitants. Electoral laws vary somewhat depending on the size of a municipality. Elections generally use "one-shot" voting with a majoritarian system for both the mayor and council members. Votes are cast for mayor candidates and for the parties that support those candidates.[20] Votes cast for the candidates determine the mayor and the allocation of council seats between parties. Importantly, the winning candidate gets a majority premium, such that his/her party/coalition is guaranteed to have a majority of the seats on the council. After determining the total allocation of seats to a winning coalition, any further allocation of seats is determined by the votes cast for each party.

Provincial elections. Elections are normally held every 5 years, and voters choose the province president and the composition of the provincial council. Electoral rules for province-level elections are very similar to the ones for large municipalities described above.

Regional elections. Regional elections are generally held every 5 years in the twenty regions of Italy. Before 1995, voters did not directly choose a regional president. Instead, they cast votes for parties/coalitions that formed a council, and seats were allocated among parties proportionally.[21] However, since 1995, citizens cast votes for a presidential candidate, as well as for parties/coalitions that form the government (with lists running at the district or regional level). Runoffs are no longer possible. The coalition associated with a winning president is generally assured a majority of the seats in the government (at least 55%). The rest of the seats are determined by the number of votes cast for each party.

Identifying marginally contested elections. The level of detail in our data allows us to identify elections that were contested on a thin margin. As described above, votes cast for the candidates (not for parties) determine the margin of victory and the identity of the majority party/coalition in a particular election. In most cases, the minimum threshold of votes is 50%, and if no candidate reaches that threshold, a runoff is expected. Important exceptions to the 50% threshold are elections in small municipalities with a population below $15,000$ inhabitants, as well as in regional elections. In such cases, a second round is never held and the winner is the candidate receiving the largest share of votes in the first round.

[20] In general, "split-ticket" voting is not allowed, except for in large municipalities.
[21] As a result, we cannot define marginal elections for regional elections before 1995.

We identify the marginal elections as follows: let p_1 denote the share of votes obtained by a winner and p_2 the share of votes held by the runner-up in a decisive election . We define the *margin of victory* as the difference between these shares: *margin of victory* $\equiv p_1 - p_2$.

During the 1993-2014 period, 36,513 municipal elections were held. Out of those, 19,589 were decided within a 20% margin, 5,879 within a 5% margin, and 2,395 within a very-narrow 2% margin. At the provincial level, 239 out of 404 elections were decided within a 20% margin, and 69 and 16 – within 5% and 2% margins, respectively.[22] This provides us with a large sample for regression discontinuity analysis. Analyzing elections data, we see no kinks in the victory margin distribution across elections, and we see no particular geographic concentration of marginal elections in Italy.

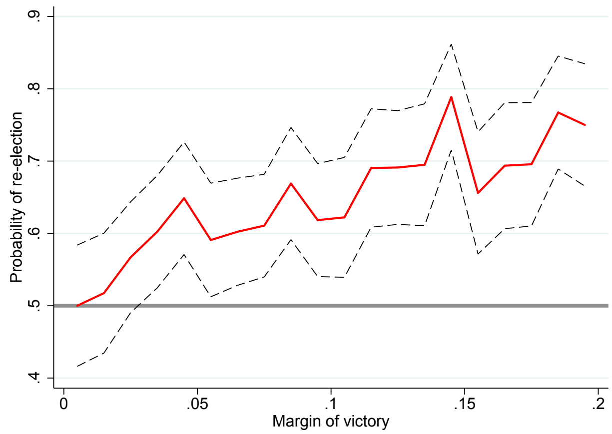
Random outcomes of marginal elections. Our identification strategy relies on the randomness of election outcomes when the margin of victory is close to zero. A threat to this randomness could come from incumbency advantage – incumbent politicians may have higher chances of re-election even in tight contests. We examine this possibility by looking at the re-election probability of incumbent parties. If the outcomes of close elections cannot be anticipated, then the odds of winning for an incumbent party/coalition should be the same as odds of non-incumbents. Figure 4 plots the probability of re-election – the share of elections won by an incumbent party as a function of the margin of victory. The sample contains all those elections (within the 20% margin) where an incumbent party/coalition is either a winner or a runner-up. We see that elections with a wide victory margin feature a large incumbency advantage in terms of re-election. However, closer to the zero margin of victory, the outcome of an election resembles a coin flip – an incumbent is exactly as likely to win as the other candidate.

Another potential concern could be that our identification of treated and control groups could be noisy if, in anticipation of a closely contested election, firms employ politicians from both competing parties. We screen for this possibility and find that only 4% of firms whose employees run for elections within 10% victory margin in t, simultaneously employ politicians from competing parties at $t-1$. In subsequent analysis, we drop those observations.[23]

[22] At the regional level, 66 out of 92 elections were decided within a 20% margin, 23 were decided within a 5% margin, and just 10 elections were decided within a 2% margin.

[23] Appendix Figure C.5 plots the distribution of politician-workers across firms right before the election to further rule out anticipation effects.

Figure 4: Probability of Re-election against the Margin of Victory



Notes: The share of elections won by an incumbent party against the margin of victory in those elections. *Re-election* is equal to one if a winning party is the same (or shares at least one common party, in the case of coalitions) as an incumbent party/coalition that won the last election. Margin of victory is equal to the difference between share of votes received by a winning candidate minus the share of votes by a runner-up. The sample focuses on all the elections, where margin of victory is less than 0.2 and an incumbent party/coalition is either a winner or a runner-up.

Regression Specification. Let m denote an election that has been decided with the margin $Victory\ margin_m$, $T(m)$ – the year in which it was held, $y_{iT(m)}$ – the outcome variable (e.g., firm i's employment or labor productivity growth from $T(m)$ to $T(m)+1$), winning dummy $Win_{iT(m)-1}$ – a dummy equal to one if firm i at time $T(m)-1$ employs a politician from a party that wins the election m. We ultimately estimate the following relationship:

$$y_{iT(m)} = \alpha + \beta Win_{iT(m)-1} + f(Victory\ margin_m) + \delta_1 X_{iT(m)} + \delta_2 X_m + \delta_3 X_T + \nu_{iT(m)}, \tag{11}$$

where $f(Victory\ margin_m)$ is a polynomial function of the margin of victory of election m estimated on both sides of the threshold, $X_{iT(m)}$ are firm-level controls, such as the firm's age and size at time $T(m)$, X_m is a set of province dummies, X_T is a year dummy, and $\nu_{iT(m)}$ is an error term. The parameter of interest β identifies the causal effect of the treatment (winning) at the threshold.

Our benchmark specification includes $Win_{iT(m)-1}$ and $f(Victory\ margin_m)$. When the assignment of treatment is random, our estimate of β should be invariant to the inclusion of additional controls $X_{iT(m)}$, X_m or X_T, since they should be orthogonal to the treatment. We validate this assumption below and show our results with and without those additional controls. We follow the recent literature (see Imbens and Lemieux (2008) and Cattaneo et al. (2018) for an excellent review), and in our baseline results we approximate the regression functions above and below the threshold using local linear polynomials, with weights implied by triangular kernel. Hence, our benchmark $f(Victory\ margin_m)$ is the first-order polynomial interacted with the winning dummy. The benchmark bandwidth is chosen following the optimal bandwidth choice of Imbens and Kalyanaraman (2012). We demonstrate robustness to different choices of the order of the local polynomial, the weighting function, and the bandwidth.

Graphical Analysis. We first illustrate the discontinuity at the threshold graphically in Panel (a) of Figure 5, where the outcome variable is firm-level employment growth. We plot a firm's growth from T to $T+1$ against margin of victory at time T. Positive margins of victory denote firms that were connected at time $T-1$ with a politician from a party that won the election at time T with a corresponding margin of victory. Likewise, negative margins of victory depict firms that are connected with losing politicians. The figure focuses on all the elections that were decided with no more than a 10% margin. For visibility, we divide the x-axis into 0.01-wide intervals of the margin of victory at time T. Each point denotes average growth of firms in that interval; the solid lines represent predicted flexible polynomial fits from a regression that includes third order polynomial in margin of victory,[24] the winning dummy $Win_{i,T-1}$, and an interaction of the dummy with the polynomial. Figures are normalized such that outcome variables for marginal losers at the threshold are equal to zero.

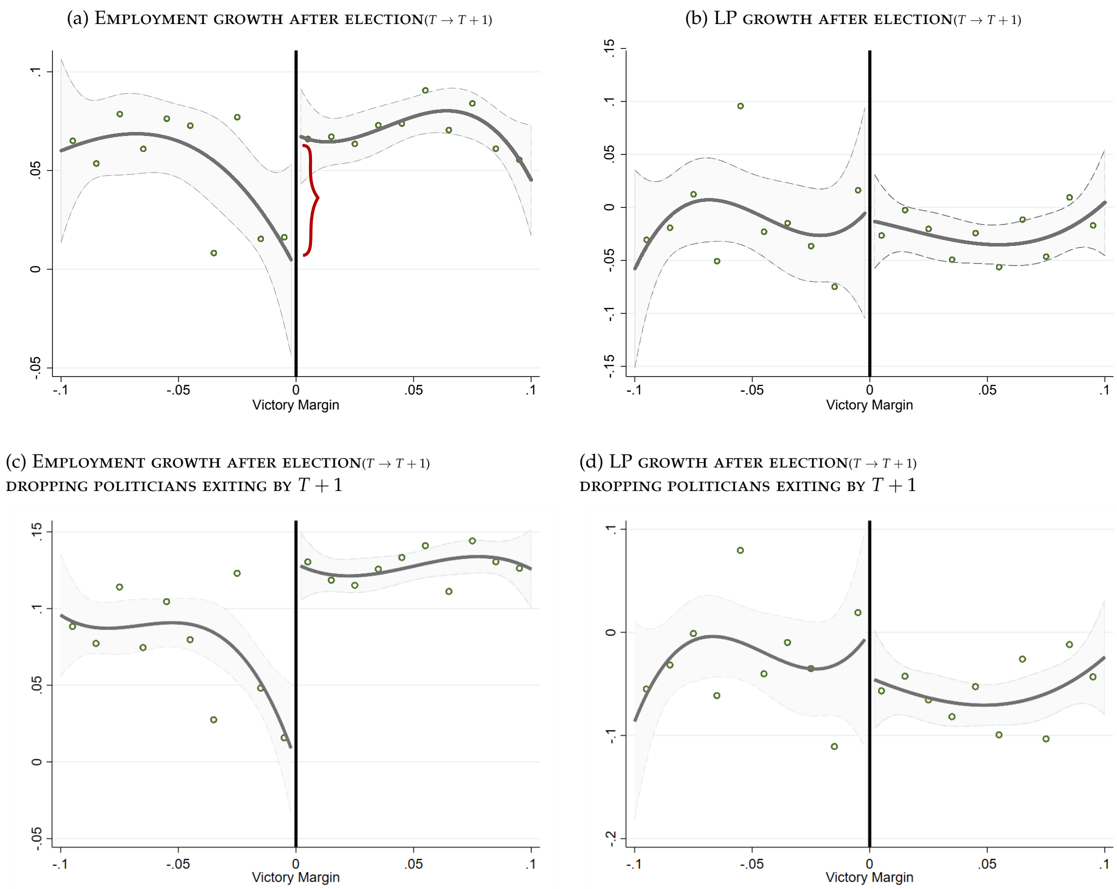
The large positive discontinuity at the zero victory margin threshold visible in Panel (a) identifies the existence of a positive causal effect of majority-party connections on employment growth after elections, relative to the minority-party connections. This discontinuity estimate may underestimate the true causal effect of winning on growth from T to $T+1$ if the winning politicians are likely to exit firms by $T+1$ (due to increased demand on their time or because of poaching of the winning politicians from other firms). Indeed, we find that 30% of the winning politicians who are employed at the firms in $T-1$ exit these firms by $T+1$. Hence, in Panel (c) we repeat the same plot, but dropping firms whose winning politicians exit the firm before $T+1$. We again see a large positive discontinuity at the threshold. As expected, the discontinuity is even larger than in Panel (a).

An interesting observation is that firms connected with marginally losing politicians have lower post-election growth rates than firms connected with politicians whose parties lost by a wide margin; at the same time, the growth of marginal winners is similar to the growth of firms winning with a wide margin. However, these growth patterns may not be surprising given the peculiarities of the marginal election years. For example, the uncertainty effect in marginal election years can naturally lead to these growth patterns. Relative to other times, tightly contested election years are characterized by heightened uncertainty (Baker et al., 2020). Since the increased uncertainty is likely to be associated with a lower future firm growth (Bloom et al., 2007; Kang et al., 2014), this can explain the overall lower growth rates of connected firms in marginal elections compared to other elections.[25]

[24] The fourth-order polynomial fits look very similar.

[25] Our preliminary analysis shows that election years are associated with lower growth for connected firms. Results are available upon request.

Figure 5: Employment and Labor Productivity Growth after Election



Notes: Figures plot a firm's growth from T to $T+1$ against margin of victory at time T. Positive margins of victory denote firms that were connected at time $T-1$ with a politician from a party that won an election at time T with the corresponding margin of victory. Likewise, negative margins of victory depict firms that are connected with losing politicians. For visibility, we divide the x-axis into 0.01-wide intervals of the margin of victory at time T, and each point denotes average outcome of firms in that interval. The solid lines represent predicted third order polynomial fits from the regression that includes third order polynomial in margin of victory, a dummy Win_{it-1}, and an interaction of the dummy with the polynomial. The dashed line represents 90% confidence intervals. Outcome variable in Panel (a) is employment growth, while in Panel (b) it is labor productivity growth. Panels (c) and (d) repeat the figures dropping firms whose winning politicians do not stay till $T+1$. Figures are normalized such that outcome variables for marginal losers at the threshold are equal to zero.

Within the marginal elections, though, winners grow more than losers, a positive effect of winning that largely offsets the negative election-year effect. Our regression-discontinuity plots also confirm our causal interpretation of firm-level results on labor productivity growth. Panels (b) and (d) of Figure 5 show no positive effects of connections on productivity growth, consistent with the coefficient estimates on the majority dummy from the within-firm regressions in Table 5.

Regression Discontinuity Estimates. Table 7 reports the benchmark estimates from the RD specification in (11). Columns 1 and 3 correspond to the regression (11) including Win_{iT-1}

and $f(Victory\ margin)$, without additional controls. The coefficient of the winning dummy is large and significant for employment growth, translating into a 4-percentage-point difference in growth rates, which is economically considerable. The effect on productivity growth is negative and not statistically different from zero. Appendix Table C.3 repeats these benchmark regressions, dropping firms whose winning politicians do not stay until T+1.[26]

Table 8 illustrates robustness to the choice of kernel function for local polynomial regression,

Table 7: Employment and Productivity Growth after Election. RD Estimates.

	(1) Empl Growth	(2) Empl Growth	(3) LP Growth	(4) LP Growth
Win dummy	0.0392**	0.0408**	-0.0128	-0.0141
	(0.0178)	(0.0169)	(0.0308)	(0.0299)
Age		-0.0000		-0.0005
		(0.0003)		(0.0006)
Log Size		0.0018		-0.0106
		(0.0033)		(0.0076)
f(Victory margin)	YES	YES	YES	YES
Year FE	NO	YES	NO	YES
Province FE	NO	YES	NO	YES
Observations	19,465	19,362	10,437	10,422

Notes: RD estimates for employment growth (columns 1 and 2) and labor productivity growth (columns 3 and 4) based on regression specification (11). Growth rates are defined from T to $T+1$. In the columns 1 and 3, regressions include win dummy, $Win_{i,T-1}$, and $f(Victory\ margin)$ – a linear polynomial interacted with win dummy. Columns 2 and 4 also include additional controls such as year and firm province fixed effects, log size, and age. The local linear regressions are estimated on the optimal Imbens and Kalyanaraman (2012) bandwidth and are weighted using a triangular kernel function. Robust standard errors are in parentheses.

polynomial order, and bandwidths. Panel A repeats our benchmark specification but uses uniform kernel weighting for the local linear regression; Panel B uses a second-order local polynomial approximation for $f(Victory\ margin)$; while Panels C and D report benchmark results on 20% and 10% bandwidths. Our results are robust to these variations.

Tests for Quasi-Random Assignment

Additional controls. Our identification strategy relies on the assumption that the assignment of the winner in marginally contested elections is random. This implies that marginally winning and marginally losing firms are comparable and should not show systematic differences in predetermined covariates. We provide some tests to support the quasi-random assignment of our RD design. First, the inclusion of additional covariates in the regressions ($X_{iT(m)}$, X_m, X_T in equation (11)) should not change the main effect of the treatment. Indeed, after including additional controls, such as year- and province-fixed effects, log size and age in columns 2 and 4 of Tables

[26] In Appendix, we also report RDD for other outcomes (Table C.4) and the comparison of RDD estimates for newly-elected and existing politicians (Table C.5).

Table 8: Employment and Productivity Growth after Election. RD Robustness

	(1) Empl Growth	(2) Empl Growth	(3) LP Growth	(4) LP Growth
	— Panel A. Uniform kernel function —			
Win dummy	0.0329**	0.0300**	-0.0153	-0.0114
	(0.0154)	(0.0146)	(0.0279)	(0.0272)
f(Victory margin)	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
	— Panel B. Second-order local polynomial —			
Win dummy	0.0482*	0.0556**	0.0057	-0.0058
	(0.0278)	(0.0262)	(0.0491)	(0.0487)
f(Victory margin)	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
	— Panel C. 20% victory margin bandwidth —			
Win dummy	0.0360**	0.0355**	-0.0099	-0.0091
	(0.0163)	(0.0155)	(0.0285)	(0.0277)
f(Victory margin)	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
	— Panel D. 10% victory margin bandwidth —			
Win dummy	0.0451*	0.0513**	0.0048	-0.0049
	(0.0243)	(0.0229)	(0.0421)	(0.0416)
f(Victory margin)	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes

Notes: Different panels illustrate robustness checks on the results reported in Table 7. Growth rates are defined from T to $T+1$. In columns 1 and 3, the regressions include winning dummy, $Win_{i,T-1}$, and f(Victory margin). Columns 2 and 4 also include additional controls such as year- and firm-province-fixed effects, log size, and age. Panel A repeats the benchmark results but uses uniform kernel weighting for the local linear regression. Panel B employs a local polynomial regression of order 2. Panels C and D report benchmark results with 20% and 10% bandwidths. Standard errors are in parentheses.

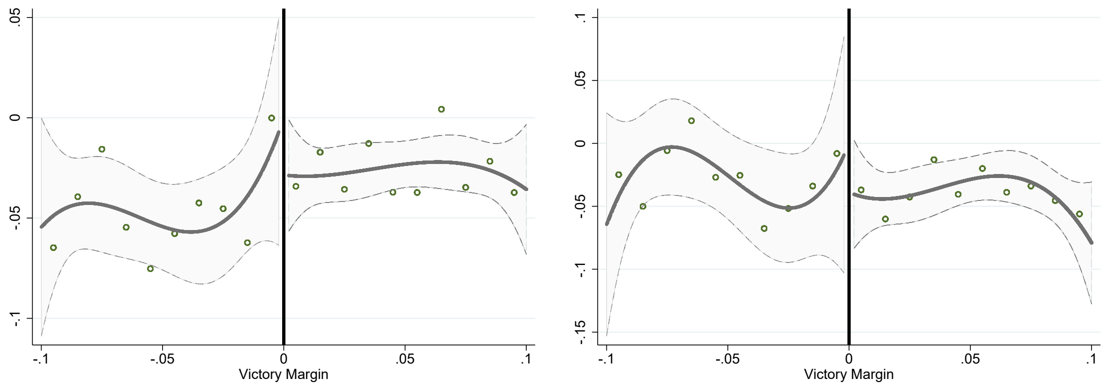
7 and 8, we see that the magnitude of the main coefficients does not significantly change.

Pre-trends. Next, we examine pre-trends in the outcome variables. Figure 6 illustrates RD plots similar to those above, but for the employment growth and labor productivity growth at $T-1$, immediately before the election. We see no significant difference in pre-election growth rates at the threshold, which implies that the firms on the winning and losing sides do not show any systematic difference in main outcome variables prior to the election.

Balancing tests. Lastly, we show balancing tests for various pre-determined firm-level variables at time $T-1$. To analyze any discontinuity in the pre-determined covariates at the zero margin threshold, we use the same techniques as in our benchmark RD setup. Specifically, for each covariate of interest, we employ a local linear estimation with optimal bandwidth and triangular kernel. We report estimates of discontinuity for the before-election firm size, value added, assets,

Figure 6: Pre-Trends in Employment and Labor Productivity Growth Before Election

(a) Empl growth before election ($T-1 \to T$) (b) LP growth before election ($T-1 \to T$)



Notes: Figure plots a firm's growth from $T-1$ to T against margin of victory at time T. Positive margins of victory denote firms that have been connected at time $T-1$ with a politician from a party that won an election at time T with the corresponding margin of victory. Likewise, negative margins of victory depict firms that are connected with losing politicians. For visibility, we divide the x-axis into 0.01-wide intervals of the margin of victory at time T, and each point denotes average outcome of firms in that interval. The solid lines represent predicted third order polynomial fits from the regression that includes third order polynomial in margin of victory, a dummy Win_{iT-1}, and an interaction of the dummy with the polynomial. The dashed lines represent 90% confidence intervals. Outcome variable in panel (a) is employment growth, while panel (b) depicts labor productivity growth. Figures are normalized such that outcome variables for marginal losers at the threshold are equal to zero.

intangible capital, labor productivity, profits, previous-period growth in size and productivity, age, and geographic location in various columns of Table 9. These results show that the treatment and control groups are comparable around the threshold. The only statistically significant difference emerges from firm age, however the magnitude of one year is economically small.

Table 9: Balancing Tests

Dependent variable:	Log Size	Log Value Added	Log Assets	Log Intangibles	Log Labor Productivity	Log Profits
Win Dummy	0.0472	-0.0152	-0.0344	-0.0956	-0.0342	-0.0672
	(0.0656)	(0.102)	(0.108)	(0.161)	(0.0358)	(0.124)
f(Victory margin)	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,956	7,666	8,369	8,005	12,855	7,680
Dependent variable:	Empl growth (last period)	LP growth (last period)	Age	Center	North	
Win dummy	0.0101	0.0001	-1.105**	-0.0129	0.0117	
	(0.0225)	(0.0392)	(0.556)	(0.0203)	(0.0181)	
f(Victory margin)	Yes	Yes	Yes	Yes	Yes	
Observations	16,063	7,066	17,164	11,355	21,197	

Notes: Table reports balancing tests for various pre-determined firm-level variables at time $T-1$ (before the election). Different columns report estimates of discontinuity for the before-election firm size, value added, assets, intangible capital, labor productivity, profits, growth in size, growth in productivity, age, and geographic location. For each covariate, we employ a local linear estimation with optimal bandwidth and triangular kernel (similar to our benchmark RD design from specification (11)). Robust standard errors are in parentheses.

5.4 Politician-Employee Compensation

On average, politician-employees are paid 10% more, relative to their co-workers of the same gender and job type (white-collar or blue-collar). Provincial and regional politicians are paid much greater wage premiums, reaching 108% for female white-collar regional politicians.

Since differences in worker characteristics could account for these wage differentials, we perform an event study. We focus on employees who become politicians during their period of employment and look at the evolution of their wages in the same firm before and after they become politicians. An event, denoted by $t = 0$, is the year in which an individual becomes a politician for the first time; and the event time is indexed relative to that year. Following Kleven et al. (2018), we estimate the following specification for the event study in the 10-year window before and after the event within the same firm:

$$y_{ist} = \sum_{j \neq -1} \alpha_j I[j = t] + \sum_k \beta_k I[k = age_{ist}] + \sum_y \gamma_y I[y = s] + \varepsilon_{ist}, \qquad (12)$$

where y_{ist} is the wage premium– the percentage difference between politician's and co-workers' average weekly earnings, of individual i in year s at event time t. The regression includes event time dummies, the full set of year dummies, and individual's age dummies. Individuals who worked for the same firm at least a year before and after the event are included. Since in this exercise all the employee- and firm- fixed characteristics are conditioned on, a jump in the wage premium right after the event can be attributed to the worker's acquisition of political power.[27]

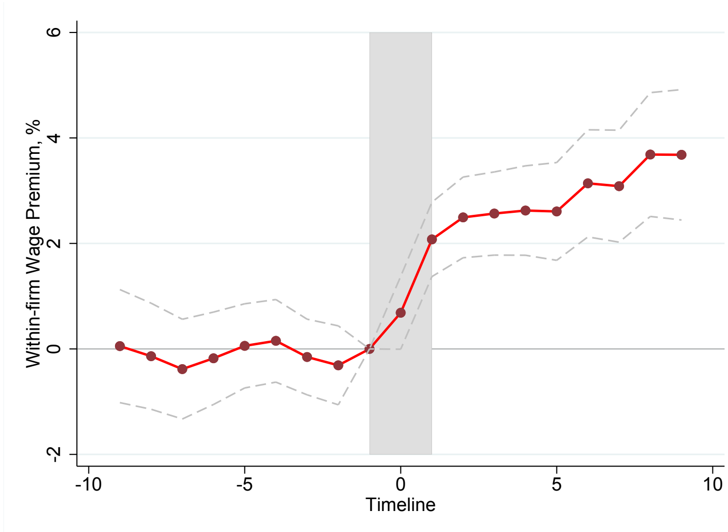
Figure 7 plots the α_j coefficients on the event time dummies. The coefficient on $t = -1$ is normalized to zero. We see that the wage premium increases at $t = 0$ and $t = 1$, stabilizing at around 3-4% in the years after the event. This increase in the wage premium suggests that a worker becomes more valuable after acquiring political power or that the worker's outside options increase after entering politics. Interestingly, we find no evidence of a decline (nor of an increase) in a politician's wage premium after he or she loses his or her political seat but stays in the firm.

Rent sharing. As the first step in understanding the bargaining process between a firm and relevant politicians, we attempt to quantify the (static) rent sharing between a firm and its politician-employees.

We estimate the joint surplus created by the firm and its politicians as the sum of the firm's profit premium and the politicians' wage premiums. To compute the monetary value of the wage premium, we take estimates from equation (12). Since wage contracts adjust gradually, we take the average percentage change in the wage premium for several years after becoming a

[27] To condition on colleague characteristics, we also consider an exercise where we calculate the premium relative to stable co-workers from the last year, instead of all co-workers. Such exercise produces higher wage premium estimates.

Figure 7: Within-Firm Wage Premium Before and After Becoming a Politician



Notes: The Figure depicts the within-individual within-firm wage premium evolution before and after becoming a politician. The wage premium is the percentage difference between politician's weekly wage and other co-workers' average weekly wage. Red dots depict event time dummy coefficients from regression (12). Omitted dummy is at $t = -1$. The dashed grey lines denote 95% confidence intervals. Standard errors are clustered at the individual level. The vertical shaded area corresponds to the time around the event when a worker becomes a politician for the first time while working in a firm. The sample (700, 622 observations) includes all the workers who at some point during their career in a firm become politicians and are observed in the firm for at least a year before and after the event. An increase in the wage premium is even higher if we calculate the premium only relative to stable co-workers from the previous period (instead of all co-workers).

politician – 0.035 percentage points. Taking the average weekly pay of (non-politician) co-workers of 747 Euros, and given that on average firms employ 1.7 politician-workers conditional on being connected, we obtain an estimated yearly income gain of 2, 311 Euros for politicians in the firm.

To estimate gains in profits associated with political connections, we use estimates from the firm-level fixed effect regression of yearly profit growth on the connection dummy (Appendix Table C.2), which amounts to 2.8 percentage points. Given the average value of profits in the sample, we obtain an estimate of 9, 037 Euros for the static yearly profit gain for a firm. Then our back-of-the-envelope calculation indicates that politicians' income gain accounts for 20% of the total surplus from the interaction of a firm and politicians, while the remaining 80% goes to the firm in terms of additional profits.[28]

The estimated rent attributed to politicians is likely a lower bound for several reasons. First, the above event study estimates the wage gain from a *change* in the worker's wage premium after becoming a politician. However, if firms anticipate the political careers of their employees, part of the political wage premium is already embedded in the wages of employees before they are elected to office. Second, if after becoming politicians, employees reduce their work hours in the firms, in the absence of data on exact hours, we underestimate the true change in wage

[28]The same rent-sharing calculations at the median levels of wages and profit allocates 56% of total rents to politicians.

premium. Finally, we do not capture other non-wage monetary transfers from the firm that might be relevant (Fisman et al., 2014).

Fact 4. *Politician-employees earn significant wage premiums relative to their co-workers. This premium implies an average 20-80% rent sharing between the politicians and the firm, respectively.*

6 Aggregate Outcomes

Our analysis concludes with a treatment of the aggregate outcomes of political connections. We first provide evidence that political connections are linked to negative aggregate dynamics, then discuss bureaucracy and regulatory channels, and show back-of-the-envelope calculations that roughly quantify the static gains and dynamic losses of having political connections in the Italian economy.

6.1 Firm-Level Political Connections and Business Dynamism

We now turn to the aggregate implications of political connections. As highlighted by our theory, if political connections slow down competition, markets with connected firms should face lower firm entry and reallocation, be dominated by larger and older firms and, as a result, have lower productivity and growth. In this section, we provide supporting evidence at the levels of industries and regions for this conjecture.

We explore whether markets with more political connections exhibit lower business dynamism. We define a market at the industry $\times$ region $\times$ year level, and for each market, we compute the share of connected firms and various metrics of business dynamism: the firm-entry rate, total employment growth, market-level labor productivity, the share of young firms, and the share of small firms.[29] Table 10 shows the results from regressing market-level variables of business dynamism on the share of connected firms, conditional on region, industry, and year fixed effects.

We find that more politically connected markets have lower entry of new firms and slower aggregate growth. In addition, these markets are less productive, have fewer young firms, and are dominated by large firms – all clear signals of reduced creative destruction. Interestingly, conditional on entry, in those markets that are more populated by connected firms, new firms tend to start off with connections, as evidenced by the last column of the table. In connected markets, in order to compete with incumbents, entrants might need to seek protection before entering the market. However, we cannot exclude that other time-variant factors at the market level that lead incumbents to resort to political connections could also make entrants do the same. Even if these relationships cannot be interpreted as being causal, our results show a strong and negative correlation between connections and business dynamism in Italy, in line with aggregate implications from the model. We summarize our results in the following stylized facts:

[29] To avoid mechanical dependence, we use the share of connected incumbents as the explanatory variable for the entry regressions.

Table 10: Political Connections and Industry Dynamics

	(1)	(2)	(3)	(4)	(5)	(6)
	Growth empl	Log LP	Share young	Share small	Entry rate	Share conn. entry
Share of connected firms	-0.0980***	-1.243***	-0.290***	-0.992***	-0.0309***	0.234***
	(0.0289)	(0.114)	(0.0215)	(0.0180)	(0.0114)	(0.00900)
Observations	34,214	33,569	36,049	36,049	35,857	30,411

Notes: Table reports coefficients from OLS regressions of various outcomes at the market level (industry × region × year) on the share of connected firms (share of connected incumbents in the case of columns 5 and 6). Columns list various outcome variables: 1) market-level employment growth; 2) market-level labor productivity (total value added over total employment); 3) share of firms younger than 5 years; 4) share of small firms (<5 workers); 5) entry rate of new firms; and 6) share of connected firms among entrants. All regressions include year, region, and industry fixed effects. Regressions are weighted by the number of firms in each industry × region × year to weight more representative markets more heavily. Standard errors are in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

Fact 5. *More connected markets face lower firm entry, and conditional on entry, entrants are more likely to be connected than in other industries.*

Fact 6. *Markets with a higher share of politically connected firms have a lower share of young firms and exhibit lower employment growth and productivity.*

In Appendix C, we explore the industry heterogeneity of these results and study cross-border spillover effects. First, local political connections could be particularly valuable for firms serving local markets and the ones exposed less to international trade. Indeed, we find that the negative relationship between political connections in the market and the market's business dynamism is particularly pronounced in non-tradable sectors with a lower share of exports in their sales. Second, one may wonder if the high presence of political connections in local markets reallocates business activities across borders. We find only weak evidence for cross-border spillovers, suggesting that at the aggregate, a decline in entry at the local level is not fully offset by the reallocation of entry elsewhere.

6.2 Bureaucracy and Regulatory Burden

We conclude our analysis by quantifying the importance of bureaucratic and regulatory frictions for political connections, providing first empirical support for this channel and leaving the details of the analysis to Appendix D.

Following Pellegrino and Zingales (2014), we start by building an industry-level *Bureaucracy Index* that measures the regulatory and bureaucratic burden faced by firms, based on the texts of newspaper articles. This index is simply the share of newspaper articles about an industry that have certain keywords that are related to bureaucracy/regulation (e.g.,"regulation", "bureaucracy", "paperwork", "red tape", and "license"). Consistent with an idea that firms rely on political connections to smooth out bureaucratic and regulatory frictions, we see that in industries with a higher Bureaucracy Index, firms rely more on political connections. Next, we combine this index with the data on institutional quality across Italian regions (Nifo and Vecchione, 2015) to get closer to measuring local business environment and to identify those industries in regions where firms would potentially gain most from local political connections. We show that the negative relationship between political connections and business dynamism is particularly strong in heavily regulated industries and regions with poor institutional quality – low regulatory quality and control of corruption. We find no support for the alternative channel according to which firms rely on political connections to secure higher demand from the government (Cingano and Pinotti, 2013). Using the sectoral input-output table for Italy, we construct the standard *Government Dependence Index* that measures the share of an industry's output that is demanded by public sector. In our data, there is no significant correlation between connection intensity of the industry and measures of industry's government dependence.[30]

6.3 Back-of-the-Envelope Calculations from the Model

This section further quantifies the importance of bureaucratic frictions and provides back-of-the-envelope estimates of the static gains and dynamic losses from the presence of political connections in Italy. Appendix E discusses model calibration and the details of the calculations. Here, we briefly summarize the results.

First, we calculate the implied bureaucratic and regulatory wedge τ. In the model, the firm's connection with a politician alleviates the wedge, creating a profit gain for the firm and a wage gain for the politician. Hence, rent estimates from Section 5.4 can be used to pin down the implied wedge τ. The wedge is estimated to be equivalent to 0.9% - 3.8% tax rate on labor, implying the yearly total cost of wedges ranging from 0.18% to 0.71% of GDP. Relative to the counterfactual economy with no wedges, the existence of these wedges reduces aggregate output by 4%.

To put τ estimates in perspective, we first compare them to Garicano et al. (2016) who estimate a corresponding labor wedge of 2.3% and 5.9% caused by labor regulations in France. Although Garicano et al. (2016) find twice larger tax rates, in their case, the regulatory wedges kick in only for the firms above 50 employees; hence the average wedge applied to all firms is lower. Second, it is important to note that the magnitude of wedges we identify is a lower bound on the aggregate amount of regulatory and bureaucratic costs in the Italian economy. In the model, a firm with political connections faces zero wedges. Hence, we should interpret the implied τ as that part of the regulatory and bureaucratic costs that connections with local politicians can alleviate.

Finally, we calculate static gains and dynamic costs from the existence of political connections in our model. We estimate that statically, relative to the economy with wedges and no political connections, the observed level of connections in Italy creates a 1.2% gain in output. Hence static gain from removing wedges recovers 30% of output loss from wedges. However, dynamic

[30]Indeed, if we jointly regress the share of connected firms in an industry on the Bureaucracy and Government Dependence Indices, we find that a one-standard-deviation increase in the Bureaucracy Index is associated with 44% increase in the share of connected firms from the mean. However, the coefficient on the Government Dependence Index is statistically indistinguishable from zero.

losses from political connections through lower creative destruction and growth outweigh the static benefits, reducing the present value of aggregate output by 3%. Hence, on net, political connections reduce the present value of output by 1.8%. Therefore, our calculations show that the presence of political connections is likely to exacerbate the economic losses already created by the burden of bureaucracy and regulations.

7 Conclusion

In this paper, we studied the link between political connections and firm dynamics, theoretically and empirically, with Italy as our example. Our brand-new data, matching multiple administrative datasets together for the first time, enabled us to uncover new findings at the micro and macro levels. In turn, the model generalized our empirical facts by suggesting that structural features of the economy drive them. We show that in an environment with high market frictions such as regulatory barriers or bureaucratic burden – where a firm's route to success often runs through the political system – political connections by market leaders may impede growth by lowering innovation and reallocation. Hence, while political connections may create static benefits for connected firms, they may also imply high dynamic social costs. Future work should incorporate these static benefits and dynamic costs to assess the quantitative importance of political influence for declining business dynamism in the U.S. and Europe, where market concentration has increased, and lobbying spending has grown to record levels.

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Appendix

Appendix A - Model Extension: Endogenizing Politician's Compensation

Our benchmark model in the main text has focused on the static gains and dynamic losses. To keep these aspects tractable, we kept the determination of the politician's compensation exogenous. However, it is fairly straightforward to incorporate a Nash bargaining framework that would provide some additional insights. To this end, let us assume that politicians have different political powers $\phi \in (0,1)$, in line with their hierarchies. A politician with a political power ϕ is able to remove red tape by the same fraction ϕ, thus the firm has to pay $(1+(1-\phi)\tau)wl$ for hiring l workers (our benchmark model corresponds to $\phi = 1$). This implies that a firm with a politician with power ϕ earns the following gross profit:

$$\frac{\pi q}{1+(1-\phi)\,\tau} \tag{1}$$

Denote the bargaining power of the politician by γ and assume his/her outside value is simply $\eta(\phi)$, where $\eta'(\phi) > 0$. For simplicity, we also assume that the firm's outside option is to operate without a politician, hence it is $V_{-1}(q)$. Once the firm and the politician decide to match together, they stay together until the firm is replaced by another firm. It is convenient to formulate the problem in terms of the lump-sum compensation of the politician, which we denote by $\bar{\varpi}^p$. We denote the dynamic value of being connected to a ϕ-power politician (including politician's compensation) by V_1^ϕ and of not being connected by V_{-1}. Then the Nash bargaining problem is simply

$$\begin{aligned}
\bar{\varpi}^p\,(\phi) &\equiv \arg\max_{\bar{\varpi}^p(\phi)} \left[V_1^\phi(q) - V_{-1}(q) - \bar{\varpi}^p(\phi)\right]^{1-\gamma} \left[\bar{\varpi}^p\,(\phi) - \eta\,(\phi)\right]^\gamma \\
&= \gamma\pi q \left(\frac{1}{[1+(1-\phi)\,\tau]\,[r+\tilde{p}\,(\phi)]} - \frac{1}{[1+\tau]\,[r+p]}\right) + (1-\gamma)\,\eta\,(\phi)
\end{aligned} \tag{2}$$

where $\tilde{p}\,(\phi)$ is creative destruction rate faced by a firm connected with ϕ-power politician, while p is creative destruction rate faced by a non-connected firm. Note that by connecting to a politician with ϕ, the incumbent manages to generate a cost advantage equal to $\phi\tau$. Hence, the quality threshold for the creative destruction to take place becomes $\lambda^*(\phi) = \phi\tau$.

This time, the rate at which a connected incumbent gets replaced is

$$\tilde{p}(\phi) = p[\alpha + (1-\alpha)\Pr(\lambda > \phi\tau)] \tag{3}$$

which implies $\tilde{p}'(\phi) < 0$. This implies that a firm that is connected to a more powerful politician is more likely to survive.

Next, we interpret the compensation of the politician as a function of its political power. The compensation $\bar{w}^p(\phi)$ increases in ϕ through three channels evident from equation (2): first, a more powerful (large ϕ) politician brings higher static profits due to lower wedges ($(1-\phi)\tau$) that the firm is required to pay. Second, a more powerful politician leads to lower replacement rate of the incumbent ($\tilde{p}(\phi)$). Finally, a more powerful politician has a better outside option, which allows him/her to extract a bigger fraction of the joint surplus. We conclude this section with the following implication. Politician's compensation $\bar{w}^p(\phi)$ increases in his/her political power ϕ.

Appendix B - Data Construction

This section provides more details on the steps undertaken during the data and variables construction.

Dataset #1: Social Security Data (INPS)

The Italian SS data contains rich information on the universe of private-sector firms and their workers making social security contributions at INPS. At the individual level, we calculate an individual *weekly wage* – weekly gross labor income (including bonuses and overtime) as total yearly labor income, divided by number of weeks worked. We classify a worker as a *white-collar* if s/he is a manager, executive, professional, or an office worker (*qualifica1* variable from UniEMENS equal to 2, 3, 7, 9, or P).

At the firm level, we describe a construction of three variables from INPS – employment, average weekly pay, and age. To construct yearly employment at the firm level[31] – a variable firm *Size* – we count the number of workers present in a firm in March.[32] Some observations may be zeros, especially when firm is just starting or before it exits the business. We define employment growth at time t as employment growth to the next period:

$$gL_{it} = 2\frac{L_{it+1} - L_{it}}{L_{it+1} + L_{it}} \tag{4}$$

where gL_{it} stands for growth rate and L_{it} for employment. This measure follows Davis *et al* (1998) and is bounded between -2 and 2 and reduces impact of outliers – which is especially important at the entry and exit of a firm.

At the firm level, *Average weekly pay* refers to the average weekly pay (in thousands of 2014 Euros) of workers who are present in March. A firm's *Age* is calculated from the first year when

[31] Note that firm-level employment variable in Cerved data is of very poor quality, so INPS data is crucial to construct a complete firm-level dataset.

[32] This is consistent with data construction by Haltiwanger *et al* (2013) using the U.S. Census data. Alternatively, one can look at average monthly employment in a year, but the measures are very similar.

it gives a formal notice of operations to the INPS office intending to have an employee on the payroll.

Dataset #2: Firm Financials Data (Cerved)

We use the following main company accounts variables from Cerved: a firm's total assets, intangible assets, value added, and profits. In addition, we compute labor productivity, *LP*, and total factor productivity, *TFP*.

VA is the yearly value added of a firm – revenue less the cost of intermediates. We replace with missing any negative value added (*valore_aggiunto_operativo*). *Profits* is value added less operating expenses, depreciation, and financial costs. *Assets* (*attivo*) is the total assets of a firm. *Intangibles* is intangible fixed assets. For tangible assets (*immob_mat*) and intangible fixed assets (*immob_immat*), we replace missings with zeros when possible. In most cases, Cerved data does not distinguish between missing values and zeros: observations whose value is less than 1 (in 1000) and observations that are truly missing in the report will both appear as missing. This is the case with tangible and intangible fixed assets variables. We impute with 0.5 (in 1000) the value of intangible assets if value of tangible assets is not missing, and vice versa for tangible assets. We verify these imputations with another simple imputation of missing values in the panel of firms – by simply imputing the missing value with latest non-missing observation. If such an imputation is too far off from the initial imputation of 0.5, we revert back to the missing value.

LP – labor productivity – is defined as value added per employee. We calculate a firm's total factor productivity, *TFP*, using a standard Cobb-Douglas specification: $Y = zK^{\alpha}L^{1-\alpha}$. Output ($Y$) is measured as value added, capital (K) is measured as total assets, labor (L) is employment, and labor share ($1-\alpha$) is the average industry-level labor share from the data. This gives us z – our TFP measure.

Corresponding growth rates of the above variables at time t are calculated as a growth from t to $t+1$. All nominal variables are deflated with GDP deflator (2014 is the base year). In the analysis, we winsorize all these variables at top and bottom 1 percent.

Dataset #3: Patent Data (PATSTAT)

We use EPO PATSTAT to obtain information on patenting activities of Italian firms. This section describes the matching procedure of EPO PATSTAT to our firm-level data, as well as the construction of our patent-based innovation measures.

First, we identify the sample of EPO patents applied for by Italian firms. Focusing on the period of 1990-2014, we identify 84,085 EPO patent applications filed by Italian companies. Some of those applications represent variants of the same patent and belong to the same patent family. Applicants may seek for protection for their inventions in multiple national offices, resulting in multiple applications that effectively represent the same invention. Hence, the relevant count is a count of unique patent families: we have 71,240 EPO patent families. In what follows, when it does not incur ambiguity, we will refer to patent families as just patents.

Second, we need to match patent records with our firm-level datasets. Unfortunately, patent data does not provide firm fiscal codes, which we could use to directly match PATSTAT records to Cerved data. Hence, we turn to company name cleaning routines to help to standardize company names in PATSTAT, and then match those names to fiscal codes. We proceed in the following three steps. We start by using an extensive patent-firm fiscal code match conducted by Unioncamere-Dintec. The name cleaning by Unioncamere is very precise, as it combines standard name cleaning routines with extensive manual checks to maximize patent matches for the period of 2000-2016. We extend the Unioncamere matches backwards by applying the Unioncamere "dictionary" from 2000-2016 to the period 1990-1999. Combined, this procedure results in up to 90% of patent matches. We further increase the matching rate (especially for the 90's) by using name cleaning routines from Lotti and Marin (2013) and the matched sample of patents from Thoma *et al* (2010). Final matches result in a 93% matching rate of all EPO patents for the period of 1990-2014. We identify 13,904 unique companies who file for patents. To the best of our knowledge, this is by far the most comprehensive match of Italian patent records to Italian firms spanning the longest time period.

Third, for all patents, we extract information on their technology classification (IPC – international patent classification), application date, grant status, number of claims, and backward and forward citations. We take the application date of a patent to be the earliest application date of all patents in the same patent family. This data allows us to construct various measures of a firm's patenting activity considering different measures of patent qualities.

1. Clearly, whether a patent is granted or not is one type of patent quality measure. Hence, for each year, we construct a simple count of all patents and of all granted patents of a firm in a year.

2. The number of claims is another quality measure often used in the literature to proxy for patent breadth (Lerner, 1994, and Schankerman and Lanjouw, 2004); for each year, we construct claims-weighted patent counts of a firm.

3. We also consider patent family size as another proxy for patent quality, as it indicates the extent of the geographical protection that and applicant is seeking. Hence, another measure of firm's inventive activity in a year is family-size-weighted patent counts in a year.

4. The number of citations a patent receives has traditionally been used as a measure of the economic and technological significance of a patent (see Pakes, 1986; Schankerman and Pakes, 1996; Trajtenberg, 1990; Hall *et al*, 2001; Kogan *et al*, 2012; Abrams *et al*, 2013) Our main measure of a firm's inventive activity is citations-weighted patent counts. We consider different variations when constructing this measure. First, citations received clearly suffer

from a truncation problem – the fact that later patents have less time to get cited. To reduce this problem, we also consider a 5-year citations measure – the number of citations received by patent within 5 years from its application date. Second, our data allow us to see whether citations reported in a patent application originate from the applicant, were introduced during the prior art search at the time of application, or were introduced by an examiner. In the data, about one third of all citations made originate from the applicants themselves. Since this may be a closer proxy for the impact of a patent, we also consider a citations measure that just counts citations made by applicants. In all these cases, we construct family-to-family citations and we also count citations originating not only from the Italian, but all EPO patents.

Appendix Table B.1 presents the correlation matrix for different quality measures defined at the patent level. Though all measures are positively correlated, in many cases, the correlation is not very strong, indicating that these measures entail information on different aspects of patent quality. We show summary statistics of those measures in Appendix Table B.2.

Appendix Table B.1: Cross-correlations of Various Patent Quality Measures

Variables	Grant	Fam. size	Claims	Cits	5-yr cits	Cits, applicant
Grant	1.000					
Family size	0.410	1.000				
Claims	0.313	0.106	1.000			
Citations	0.207	0.362	0.163	1.000		
5-yr citations	0.151	0.293	0.154	0.750	1.000	
Cits, applicant	0.144	0.305	0.121	0.878	0.593	1.000
5-yr cits, applicant	0.097	0.251	0.122	0.592	0.813	0.637

Notes: Table presents a correlation matrix of different measures of patent qualities. Grant- dummy for whether patent has been granted; Family size – number of different patent applications within one patent family ID; Claims – number of patent claims; Citations – number of citations received; 5-yr citations – number of citations received within 5 years from the application date; Cits, applicant – number of citations received, excluding non-applicant citations (made by examiners or else); 5-yr cits, applicant – number of applicant-citations received within 5 years from application date.

Appendix Table B.2: Statistics on Patent Quality for Italian Patents (1990-2014)

Variable	Average
Patent family size	5.43
Grant dummy	0.54
Number of claims	10.43
Citations received	4.94
Citations received in 5 yrs	2.00
Applicant citations	1.71
Applicant citations in 5 yrs	0.63

Notes: Table provides summary statistics for the universe of EPO patents applied by Italian firms in the 1990-2014 time period. Observation is a patent family – one or more patent applications that are the variants of the same patent. Sample contains 66,176 patent families.

Dataset #4: Registry of Local Politicians (RLP)

The following are the steps undertaken to clean and make use of RLP data.

Step 1. First, to link individual politicians to SS data on private-sector employees, we need to assign fiscal codes (similar to social security numbers in the U.S.) to politicians. In Italy, the assignment of a fiscal code follows a specific rule that deterministically assigns a fiscal code using an individual's demographic information – name, surname, date of birth, place of birth, and gender. We develop an algorithm following this rule, and use a detailed demographic information from RLP to assign fiscal codes to each politician.

Step 2. We determine which parties are the majority or minority based on political affiliations of politicians in RLP. The data provides either the party or coalition to which a politician is affiliated. For example, a typical example of an observation would be an entry "A | B" meaning that politician belongs to a list/coalition consisting of two parties A and B, which together participate in an election in that area. To define majorities, we first clean individual party names and then define major parties at local level.

- *Cleaning party names:* Cleaning political party/coalition names in the data turned out to be a tedious task. The first challenge is misspellings and abbreviations of party names. The second is that political parties sometimes change their names, merge, split, form coalitions, etc. We tackle these issues by developing a name cleaning algorithm, based on information from extensive online searches and manual checks. More specifically, in the example above with the "A | B" entry, we parse this entry into two separate party names, "A" and "B", clean each of those names separately, and then combine those names again. To clean names, we first compile a list of full names and abbreviations of parties/coalitions at all levels – municipality, province, regional or national – from Wikipedia articles. This represents a basic dictionary that helps to spot multiple forms of the same party/coalition name in the data. Next, we develop a name cleaning algorithm, where we standardize commonly used words and special characters, correct for word misspellings and shortcuts. Using this name standardization and dictionary-based approach gets us a long way in cleaning the data. Furthermore, we iteratively improve the algorithm by manually verifying and updating special cases.

- *Defining majority parties/coalitions in RLP:* Next, we define parties/coalitions that represent majorities at the regional/provincial/municipal level in a given year. We start by defining two variants of majority party variable at the location-year level. The first definition uses the political affiliation of a president/mayor. Second definition uses most frequent political affiliation of all politicians found in RLP.[33] Specifically, we define following variables at

[33] For the benchmark definition, we prefer defining majority using sample of councilmen only. In effect, president's/mayor's elections determine party composition in the councils. Hence, to determine a majority – party that

j-location and t-year level:

Main party $(RLP)_{jt}$ - party (coalition) of a regional president/provincial president/mayor in year t in a j region/province/municipality, respectively.[34]

#1 *Party* $(RLP)_{jt}$ - most frequent party (coalition) affiliation of politicians in a region/province/ municipality.

Since the winning candidate is generally also assured the majority of seats, the first and second definitions should be equivalent. However, there is one main reason for why, in many cases, those definitions provide different information in RLP. Consider this example: suppose, a winning candidate belongs to a party "B" and is supported by a coalition consisting of parties "A", "B", and "C". In such a case, RLP could report the candidate's party affiliation as either "A | B | C", "B", or "Z", where "Z" is some name of a coalition.[35] Often, the third variant appears. Similarly, other politicians may have an affiliation reported in one of those ways (often, the second variant appears for an ordinary council member). Hence, we combine information from both variables – an affiliation reported by a president/mayor (*Main party* $(RLP)_{jt}$) and most frequent affiliation reported by all politicians (#1 *Party* $(RLP)_{jt}$) to define the majority party/coalition in the most accurate fashion. Importantly, we will complement these definitions with further information from the Elections data, which we discuss below. Using this data on majority parties, we can define whether individual belongs to the majority or the minority. We postpone further discussion after we describe the Elections data below.

Step 3. We define the following variables using political position attributes in RLP.
Regional Rank$_{it}$ – a categorical variable for whether a politician i is a regional, provincial, or municipal politician at time t. In a few cases, when a politician has multiple observations in RLP at different position levels within a year, we keep the observation with the highest position level held in that year.
Hierarchical Rank$_{it}$ – a categorical variable for the position level (within *Regional Rank*$_{it}$) of a politician i at time t. In the first category, we group together the key positions of a municipality's mayor or vice mayor; provincial/regional president or a vice/president; as well as the important positions of president/vice-president of the local councils. The second category includes so called "assessore" that represent town councilors – executive position holders similar to local ministers. The third category is for regular council members.[36]

has the largest representation, one needs to look at party affiliations of council members. Indeed, councilmen represent majority of politicians in RLP and about 15% of politicians in RLP are not elected.

[34] If affiliation is missing (in less than 3% of cases), we use an affiliation of council president. If those are still missing, we use affiliation of a vice-president/vice-mayor or a council vice-president.

[35] Often, for example, coalition may be listed as "Centro Destra" (center-right), or "Lista Civica" (civil list), or using other official name of a coalition, like "Polo per le Libertá" instead of listing its members "Forza Italia", "Alleanza Nazionale" or others.

[36] Data also includes other positions of "questore/commissario" – a super-intendent or commissioner. But these are temporary positions that appear on rare occasions, hence we do not report statistics on them.

Dataset #5: Elections Data

Our newly constructed, detailed dataset on local elections at the regional, provincial, and municipal levels serves two purposes. First, using information on vote shares in the election, we identify marginally contested elections. The details are described in Section 5.3. Second, we use this data to construct another variable on majority parties at the local level, and combine it with the RLP definitions of majority parties ($Main\ party\ (RLP)_{jt}$ and #1 $Party\ (RLP)_{jt}$ explained above). This gives us confidence in the accuracy of our definition of local majorities as it taps the information from multiple sources.

- *Defining majority parties/coalitions in the Elections data:* For each election, we define a coalition as a set of parties supporting the same candidate (it may be just one party or multiple). Then, we define a coalition that gets most seats and define a coalition that supports a winning candidate (mayor or president). Because of the existence of a majority premium for the winning candidate, these two definitions should be equivalent. Indeed, these definitions are the same in all instances except for the rare cases, which account for well under 1% of observations. Hence, we define a variable:

  $Main\ party\ (Elections)_{jt}$ - the party or coalition that gets the most seats in an election in region/province/ municipality j at time t. It is equivalent to a party/coalition of a winning regional president/province president/municipality mayor in j at time t.

Combining Dataset #4 and Dataset #5 and Defining Individual Majority Affiliation

Next we describe construction of $Majority\ Affiliation$ for each politician from RLP. For that, we combine information on local majority parties/coalitions derived from RLP – $Main\ party\ (RLP)_{jt}$ and #1 $Party\ (RLP)_{jt}$, and from the Elections data – $Main\ party\ (Elections)_{jt}$.[37] There are two challenges when defining majority affiliation for individual politicians.

The first challenge has been already mentioned above. Since, for any politician, RLP may report an affiliation with just one party (in our previous example, "B"), or a coalition ("A | B | C"), or a coalition name "Z", there may be some noise in defining majorities just based on this data. In those cases, when, for example, mayor reports "Z", we would not be able to classify politicians reporting "A", "B" or "C" as belonging to mayor's coalition. Hence, it is very useful to complement this data with information from the Elections data. The main advantage of the Elections data is that we observe all party names ("A", "B", and "C" separately) that form a coalition, and we also often observe an official coalition name ("Z"), if this exists. Hence, when defining majority affiliation at the individual level, we compare individual affiliation with both majority definitions from RLP and majority definition from the Elections data. This gives us

[37] Notice that the Elections data is an unbalanced panel data with time gaps in between of elections. We impute most recent election outcomes (up to 4 years) to fill in those time gaps.

confidence that majority affiliations can be defined as cleanly as possible. Extensive manual checks confirm that this definition significantly improves upon the definition based on RLP only.

The second challenge concerns politicians at the municipal level: in small municipalities, many politicians are affiliated with local political lists/coalitions – so called, civil lists, "lista civica", that may unite various party members. As an example, in an election held in the municipality of Cecima, there were two coalitions "Lista Civica con Voi per Voi" and "Lista Civica per Cecima". However, in RLP, both of them were reported as "Lista Civica" for short. If then both of those lists got at least one seat after the election, it would not be possible to understand whether the "Lista Civica" affiliation reported for a politician in RLP that of the winning list or not. We call such cases (elections that have multiple "Lista Civica" coalitions that got at least one seat in the council) elections with ambiguous "Lista Civica" names. Such cases are quite prevalent and represent half of all elections at the municipal level. In these ambiguous cases, if a winning party is "Lista Civica" and a politician reports "Lista Civica", we treat individual majority affiliation as missing. This results in more than 600 thousand missing values from up to 3 million individual-level observations at the municipal level. For some of those missing cases, however, we can be certain that individuals belong to local majorities. This happens for individuals holding key positions (the highest *Hierarchical rank*). This decreases the number of missing observations in the *Majority affiliation*.

Matching INPS with Politicians Data (Combining Dataset #1 with Datasets #4 and #5)

We merge Politicians Data with INPS worker records using individual fiscal codes over time. This allows us to identify those local politicians that are employed in private firms, while also holding political office. Appendix Table B.3 shows summary statistics for the matched politician-workers sample (in the years when they are both employed in a firm and work as politicians). We see that, among all local politicians, about one third (162,417) have ever taken a private job while also in office. Clearly, the overwhelming majority of connections are through politicians at the municipal level. This is both because majority of politicians are municipality politicians and because, proportionally, municipality-level politicians work in private sector more than other politicians. It is also interesting to look at their education levels (this is a self-reported education level from RLP). Relative to the full sample of politicians, worker-politicians, on average, have slightly lower education levels (relatively more high-school graduates than university graduates, when compared to the whole sample). The share of politicians with majority affiliation is just slightly higher among worker-politicians than among all politicians. As Table B.4 shows, politician-workers are distinct along many dimensions from other workers in the private sector: they are older, more likely to be males, have longer tenure, are paid more, have more secure permanent contracts, and perform more white-collar or managerial jobs.

Appendix Table B.3: Statistics on Local Politicians Employed in the Private Sector

Variables		
Observations	825,105	
Distinct politicians	162,417	
Years	1993 – 2014	
Job in the firm:	Top management	2.86%
	Middle management	6.66%
	Other white-collar job	55%
	Blue collar job	33%
	Trainee	1.25%
Education:	< high school	28.57%
	high school	53.09%
	University	18.29%
	Post-graduate	0.05%
Average weekly pay		829
Political variables		
Regional Rank:	Region	0.4%
	Province	2.1%
	Municipality	97.5%
Hierarchical Rank:	Mayor, President, Vice-mayor, Vice-president	8.63%
	Executive councilor	17.79%
	Council member	73.58%
Majority Affiliation:	Majority	73%

Notes: Summary statistics for the sample of politicians who work in the private sector while holding office. The table is an extended version of Table 3 but on a sample of politicians who match to INPS. Nominal variables are deflated with GDP deflator with a base year in 2014.

Appendix Table B.4: Characteristics of Politician and Non-politician Worker

Variables	Politicians	Non-politicians
White-collar	.65	.52
Manager	.09	.07
Temporary contract	.29	.35
Full-time	.90	.85
Wages (weekly)	.67	.62
Work experience	11.36	9.83
Job tenure	6.46	5.59
Age	41.56	39.97
Female	.17	.37
Observations	825,054	94,369,600

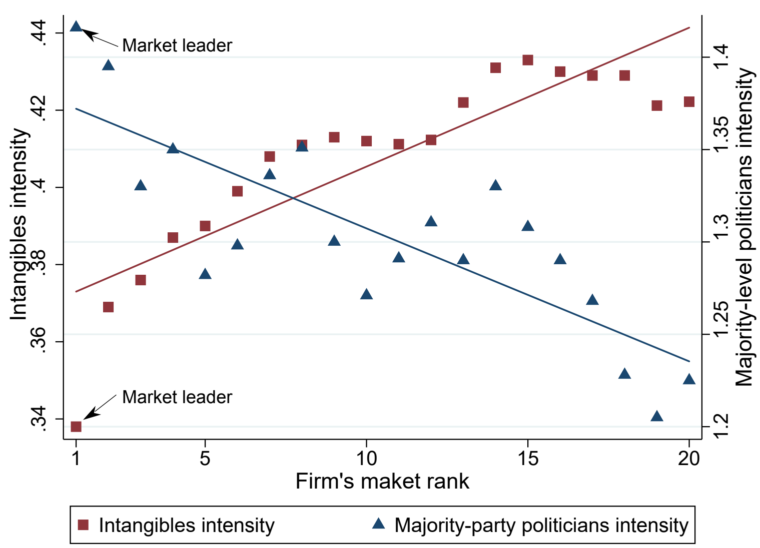
Notes: Characteristics of politician- and non-politician- employees. The sample includes all employees of the firms that employ at least one politician in 1993-2014.

Matching INPS with the Firm Financials and Patent Data (Combining Dataset #1 with Datasets #2 and #3)

We match firm-level data from INPS with Cerved using firms' fiscal codes. Many firm observations in INPS data do not match to Cerved, as can be seen from Table 4 – these are mainly small or short-lived firms not filing balance sheet information, sole-proprietorships, or household producers. On the other hand, for about 16% of observations from Cerved, firm fiscal codes were not possible to match to INPS. This means those firms did not make any INPS social security contributions for their workers – they might be employing only contractors or workers in agriculture. Finally, we merge this data with firms' patenting information from Dataset #3. Only about 4% of patents did not get matched with INPS firms. In the data, over 12 thousand firms filed a patent at least once.

Appendix C - Robustness and Additional Empirical Results

Appendix Figure C.1: Leadership Paradox; alternative innovation and connection measures



Notes: Figure plots politician intensity and innovation intensity over a firm's market rank for top 20 firms in the markets. Market is defined at (6-digit) industry × region × year level. Markets in which top 1 firm holds less than 10% share are excluded. Politician intensity (blue triangles) is the number of majority-member politicians employed in a firm normalized by 100 white-collar employees. Innovation intensity (red squares) is intangible assets over value added. Both outcome variables are adjusted for industry, region, and year fixed effects. The blue and red lines depict regression lines from regressing politician intensity and innovation intensity, respectively, on market rank controlling for industry, region, and year fixed effects.

Appendix Table C.1: Market Rank, Innovation, and Political Connection

	(1) Politicians intensity	(2) Majority politicians intensity	(3) Intangibles intensity	(4) Patents intensity
Rank 1	0.298***	0.125***	-3.485***	-18.71***
	(0.0181)	(0.0129)	(0.227)	(0.798)
Rank 2	0.240***	0.116***	-1.443***	-16.81***
	(0.0191)	(0.0136)	(0.239)	(0.972)
Rank 3	0.204***	0.0734***	-0.804***	-15.39***
	(0.0202)	(0.0143)	(0.253)	(1.080)
Rank 4	0.179***	0.0792***	-0.442*	-13.15***
	(0.0212)	(0.0150)	(0.265)	(1.234)
Rank 5	0.163***	0.0525***	0.0955	-13.67***
	(0.0221)	(0.0157)	(0.277)	(1.392)
Log age	0.0377***	0.0249***	-5.178***	-7.186***
	(0.00331)	(0.00235)	(0.0413)	(0.302)
N	5,441,271	5,441,271	4,962,755	23,409

Notes: Firm-level OLS regressions of political connection and innovation intensity over firm's market rank. Market is defined at (6-digit) industry × region × year level. *Rank n* is a dummy equal to one if a firm is ranked *n*'th in the market in that year based on its employment level. Omitted group pools firms that are ranked 6 and above. Dependent variables: column 1 – *Politicians intensity* is the number of politicians employed over 100 white-collar workers; columns 2 – *Majority politicians intensity* is the number of majority-party politicians employed over 100 white-collar workers; columns 3 – *Intangibles intensity* is intangibles over firm value added; columns 4 – *Patents intensity* is the number of patents (conditional on patenting) over 100 white-collar workers. All regressions include year, region, and industry fixed effects. $^{*}p < 0.1,^{**} p < 0.05,^{***} p < 0.01$. Similar to Figures 3 and C.1, this table shows that the largest market leaders are more politician intensive but less innovation intensive. In addition, age has a strong effect for both connections and innovation intensities.

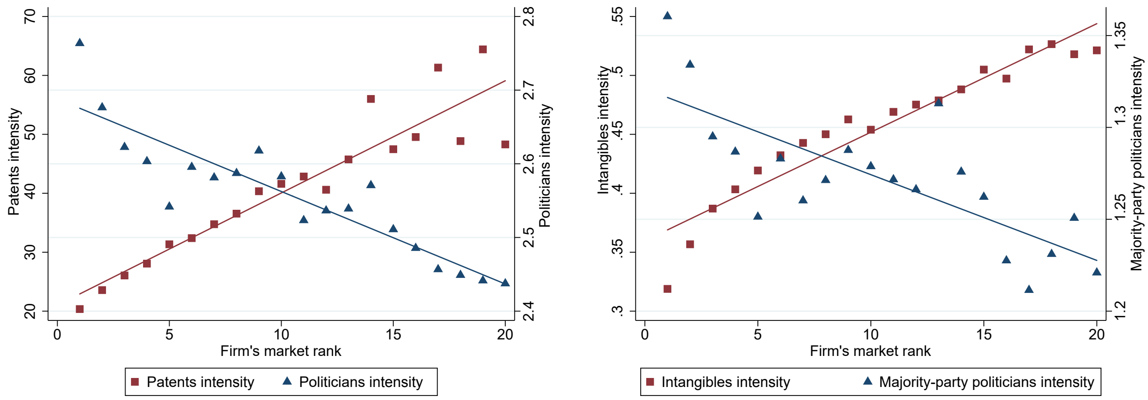
Appendix Table C.2: Political Connections and Growth in Size versus Productivity. Other Outcomes

Dependent variable – Growth in:	Profits	Employment, white-collar	Intangibles	Patents
Connection	0.0284***	0.0312***	-0.0510***	-0.0042
	(0.0135)	(0.106)	(0.0112)	(0.0038)
Age, Size, Assets	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	5983604	5237358	5538995	73180

Notes: Firm-level regressions described in equation (10). Table shows a positive association of firm-level political connections with the next-period growth in profits and white-collar employment and a negative association of connections with the next-period growth in intangibles intensity (intangibles over value added) and patenting. Since patenting is a slow-moving process, we use the average (annualized) 3-year patent growth of firms. The data cover the years 1993-2014. Average length of political connections within firms is 4.2 years. Robust standard errors clustered at firm level reported in parentheses. $^{*}p < 0.1,^{**} p < 0.05,^{***} p < 0.01$.

Appendix Figure C.2: Market Rank, Innovation, and Political Connection, with an Alternative Definition of Market Rank

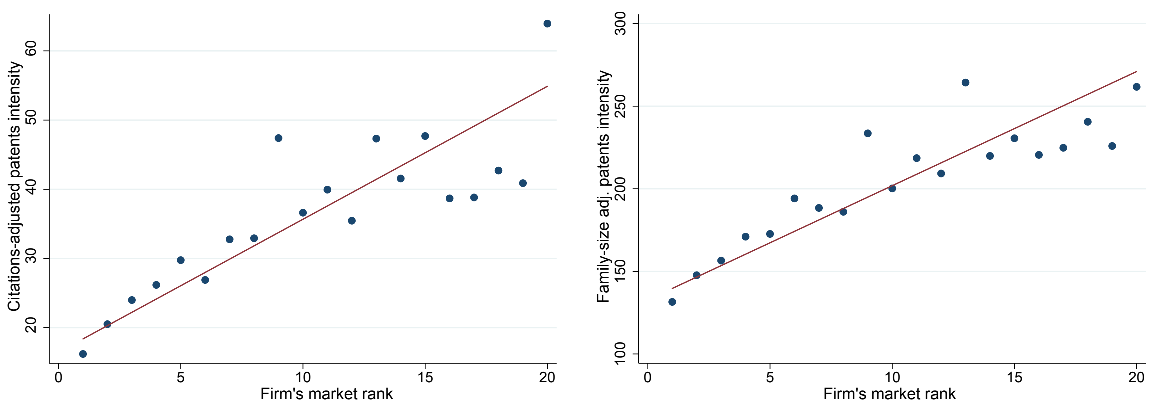
(a) Politician and Patent Intensities | (b) Majority-level Politician and Intangible Intensities



Notes: Figure repeats main plots from Figures 3 and C.1 but with an alternative definition of market rank based on firms' value added. Market is defined at (6-digit) industry × region × year level. Markets in which the top 1 firm holds less than 10% share are dropped. In Panel (a), politician intensity (blue triangles) is the number of politicians employed in a firm normalized by 100 white-collar employees. Innovation intensity (red squares) is the number of patent applications in a year normalized by 100 white-collar employees (conditional on patenting). In Panel (b), politician intensity (blue triangles) is the number of majority-member politicians employed in a firm normalized by 100 white-collar employees. Innovation intensity (red squares) is intangible assets over value added. All outcome variables are adjusted for industry, region, and year fixed effects. The blue and red lines depict regression lines from regressing politician intensity and innovation intensity, respectively, on market rank controlling for industry, region, and year fixed effects. Market leaders are less innovation-intensive and more politician-intensive relative to their competitors.

Appendix Figure C.3: Market Rank, Innovation, and Political Connection, with Quality-adjusted Patent Intensity

(a) Citations-adjusted Patent Intensity | (b) Family-size-adjusted Patent Intensity

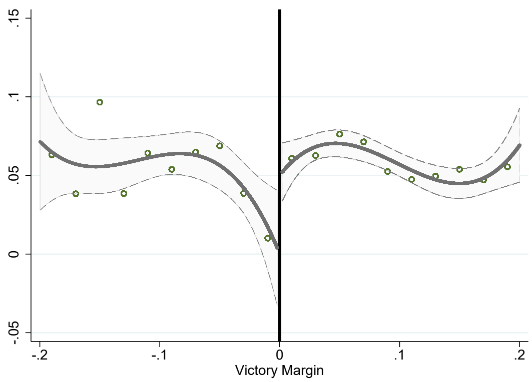


Notes: Figure plots average outcome variable over firm's market rank for top 20 firms in the markets. Market is defined at (6-digit) industry × region × year level. Market rank is defined by a firm's employment level. Markets in which top 1 firm holds less than 10% share are dropped. Outcome variables are demeaned with industry, year, and region fixed effects. The red line depicts a regression line from regressing firm's outcome on market rank, controlling for industry, region, and year fixed effects. In Panel (a) the outcome is 5-year citations-adjusted patent counts per 100 white-collar workers; Panel (b) considers patent family size-adjusted patent counts per 100 white-collar workers. Market leaders produce lower quality-adjusted innovation, when compared to their competitors.

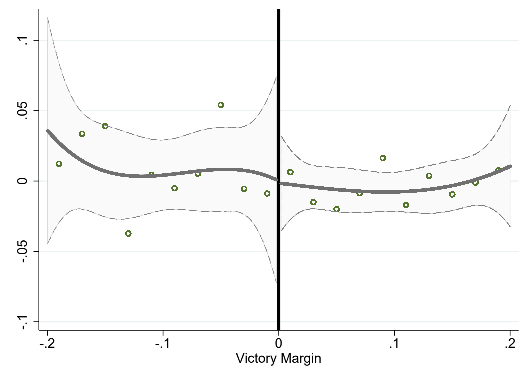
RDD Analysis

Appendix Figure C.4: Employment and Labor Productivity Growth after Election. 20% Margin of Victory Sample.

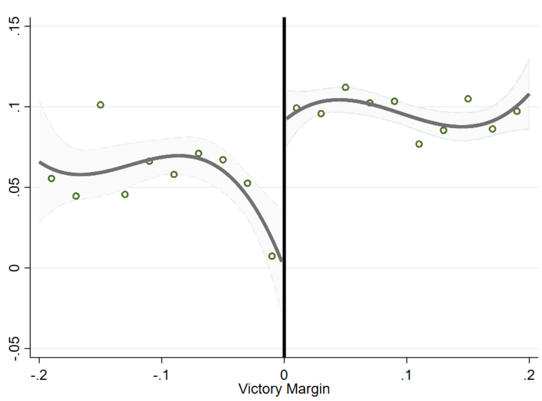
(a) Employment growth after election ($T \rightarrow T+1$)



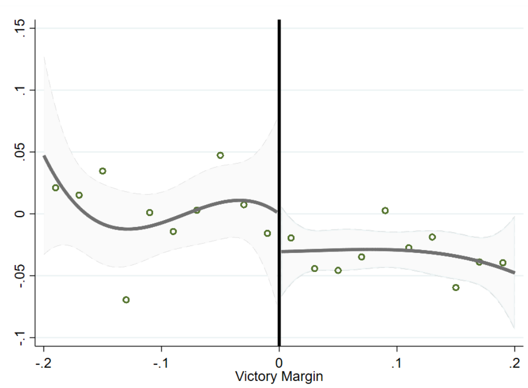
(b) LP growth after election ($T \rightarrow T+1$)



(c) Employment growth after election ($T \rightarrow T+1$) dropping politicians exiting by $T+1$

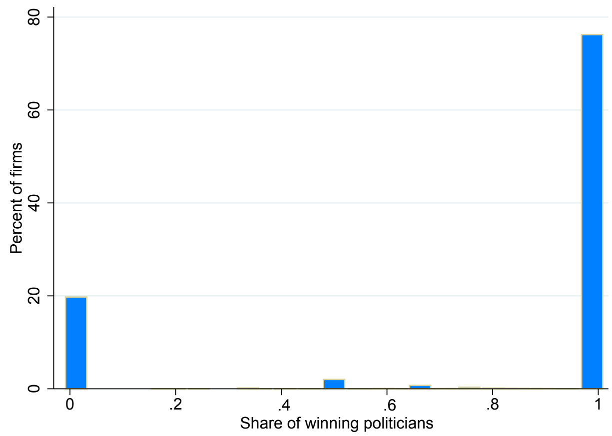


(d) LP growth after election ($T \rightarrow T+1$) dropping politicians exiting by $T+1$



Notes: Figure plots a firm's growth from T to $T+1$ against margin of victory at time T for the sample of elections within a 5% margin of victory. Positive margins of victory denote firms that have been connected at time $T-1$ with a politician from a party that won an election at time T with the corresponding margin of victory. Likewise, negative margins of victory depict firms that are connected with losing politicians. For visibility, we divide the x-axis into 0.01-wide intervals of the margin of victory at time T and each point denotes the average outcome for firms in that interval. The solid lines represent predicted third order polynomial fits from a regression that includes third order polynomial in the margin of victory, a dummy Win_{iT-1}, and an interaction of the dummy with the polynomial (a regression in equation (11) that excludes additional controls). The dashed lines represent 90% confidence intervals. Outcome variable in Panel (a) is employment growth, while in Panel (b) is labor productivity growth. Figures are normalized such that outcome variables for marginal losers at the threshold are equal to zero.

Appendix Figure C.5: Distribution of the Share of Winning Politicians across Firms, conditional on getting any seat



Notes: Figure shows distribution of firms over *share of winning politicians* for elections within 10% victory margin. *Share of winning politicians* in a firm is the number of employees at $t-1$ who win elections at t, divided by the total number of employees at $t-1$ winning or losing at t. These shares are *conditional* on these politicians getting any seats. We cannot identify individuals on a party list who did not get any seats since these individuals would not be considered as politicians in RLP. Because of the majority premium, the count of politicians from the majority party is always higher than the count of politicians from the minority party (after *any* election, including the ones with a thin margin). Then, recall from our summary statistics that 73% of politicians in RLP are from majority parties. This means that if every firm had employed only one randomly-chosen politician, by construction, we would have observed about 73% of the firms at one. This is indeed very close to the actual distribution the Figure shows (75% of firms at one).

Appendix Table C.3: Employment and Productivity Growth after Election. RD Estimates; dropping politicians exiting by $T+1$.

	(1) Empl Growth	(2) Empl Growth	(3) LP Growth	(4) LP Growth
Win dummy	0.0788***	0.0796***	-0.0371	-0.0392
	(0.0220)	(0.0211)	(0.0426)	(0.0416)
Age		-0.0001		-0.0000
		(0.0003)		(0.0007)
Log Size		-0.0000		-0.0064
		(0.0038)		(0.0090)
f(Victory margin)	YES	YES	YES	YES
Year FE	NO	YES	NO	YES
Province FE	NO	YES	NO	YES
Observations	11,642	11,600	6,362	6,352

Notes: RD estimates for employment growth (columns 1 and 2) and labor productivity growth (columns 3 and 4) based on regression specification (11). Growth rates are defined from T to $T+1$. The sample excludes firms whose winning politicians do not stay till T+1. In the columns 1 and 3, regressions include win dummy, Win_{iT-1}, and $f(Victory\ margin)$ – a linear polynomial interacted with win dummy. Columns 2 and 4 also include additional controls such as year and firm province fixed effects, log size, and age. The local linear regressions are estimated on the optimal Imbens and Kalyanaraman (2012) bandwidth and are weighted using a triangular kernel function. Robust standard errors reported in parentheses.

Appendix Table C.4: RD Estimates for Other Outcomes

	(1) VA Growth_t	(2) VA Growth_{t+1}	(3) TFP Growth_t	(4) External finance dependence_t	(5) Investment Growth_t
Win dummy	0.0055	0.0559**	-0.0063	2.416**	-0.115*
	(0.0280)	(0.0279)	(0.0237)	(0.964)	(0.062)
f(Victory margin)	Yes	Yes	Yes	Yes	Yes
Log size, age	Yes	Yes	Yes	Yes	Yes
Province, Year FE	Yes	Yes	Yes	Yes	Yes
Observations	10,452	5,961	10,264	10,336	11,148

Notes: RD estimates for various outcome variables based on regression specification (11). Growth rates are defined from T to $T+1$, where T denotes election year. The local linear regressions are estimated on the optimal Imbens and Kalyanaraman (2012) bandwidth and are weighted using a triangular kernel function. Robust standard errors are in parentheses. The effect of winning on value added growth is very small and not statistically significant from t to $t+1$, however the effect increases tenfold in the subsequent year. The effect on TFP growth is not significant. The financial conditions of the firms on the winning side improve significantly after the election. External finance dependence, measured as capital expenditures minus cash flow, divided by cash flow, increases after firm's politician gets into majority party or a coalition. Finally, we see a decline in investment growth right after the elections, consistent with our facts on declining productivity and innovation-enhancing activities with political connections.

Appendix Table C.5: Employment Growth after Election. RDD for Newly Elected and Existing Politicians

	— *Newly-elected politicians* —		— *Existing politicians* —	
Win dummy	0.0461**	0.0487***	0.0333*	0.0310*
	(0.0193)	(0.0183)	(0.0197)	(0.0184)
Age		-0.0001		0.0003
		(0.0003)		(0.0003)
Log Size		0.0039		-0.0034
		(0.0040)		(0.0045)
f(Victory margin)	Yes	Yes	Yes	Yes
Year, province FE	No	Yes	No	Yes
Observations	13,403	13,330	11,079	11,014

Notes: RD estimates for employment growth based on regression specification (11). Growth rates are defined from T to $T+1$, where T denotes the election year. *Newly-elected politicians* denotes a sample of firms with employee-politicians elected to office for the first time at T. Hence, these firms go from unconnected to the connected status at T. *Existing politicians* denotes a sample of firms with employee-politicians who already held office at $T-1$. In the columns 1 and 3, regressions include win dummy, Win_{iT-1}, and $f(\textit{Victory margin})$ – a linear polynomial interacted with win dummy. Columns 2 and 4 also include additional controls such as year and firm province fixed effects, log size, and age. The local linear regressions are estimated on the optimal Imbens and Kalyanaraman (2012) bandwidth and are weighted using a triangular kernel function. Robust standard errors are in parentheses.

Industry Dynamics

Appendix Table C.6: POLITICAL CONNECTIONS AND INDUSTRY DYNAMICS. TRADABLE VS NON-TRADABLE

	(1) Growth	(2) Log LP	(3) Share young	(4) Share small	(5) Entry rate	(6) Share conn. entry
Share of conn.	-0.106***	-0.405***	-0.273***	-0.728***	-0.0495***	0.182***
firms	(-2.96)	(-2.76)	(-10.26)	(-32.97)	(-3.50)	(16.02)
Share of conn.	0.0203	-1.840***	-0.0455	-0.678***	0.0469**	0.123***
firms × Trad.	(0.38)	(-8.98)	(-1.13)	(-20.31)	(2.21)	(7.55)
Observations	34,214	33,569	36,049	36,049	35,857	30,411

Note: Table reports coefficients from OLS regressions of various outcomes at the market level (industry × region × year) on the share of connected firms (share of connected incumbents in the case of columns 5 and 6), distinguishing between tradable and non-tradable industries. We define a sector as (non-)tradable if its share of export over total production is (below) above the median. Columns list various outcome variables: 1) market-level employment growth; 2) market-level labor productivity (total value added over total employment); 3) share of firms younger than 5 years; 4) share of small firms (5 workers); 5) entry rate of new firms; and 6) share of connected firms among entrants. Regressions include year, region, and industry fixed effects. Regressions are weighted by the number of firms in each industry × region × year to weight more representative markets more heavily. Standard errors are in parentheses. $^{*}p < 0.1,^{**} p < 0.05,^{***} p < 0.01$.

Appendix Table C.7: POLITICAL CONNECTIONS AND INDUSTRY DYNAMICS. MANUFACTURING VS NON-MANUFACTURING

	(1) Growth	(2) Log LP	(3) Share young	(4) Share small	(5) Entry rate	(6) Share conn. entry
Share of conn.	-0.115***	-0.585***	-0.276***	-0.746***	-0.0526***	0.177***
firms	(-3.35)	(-4.23)	(-10.89)	(-35.50)	(-3.92)	(16.43)
Share of conn.	0.0509	-1.742***	-0.0451	-0.763***	0.0677**	0.163***
firms × Mnfg.	(0.91)	(-8.28)	(-1.08)	(-22.01)	(3.06)	(9.71)
Observations	34,214	33,569	36,049	36,049	35,857	30,411

Note: Table reports coefficients from OLS regressions of various outcomes at the market level (industry × region × year) on the share of connected firms (share of connected incumbents in the case of columns 5 and 6), distinguishing between manufacturing and non-manufacturing industries. Columns list various outcome variables: 1) market-level employment growth; 2) market-level labor productivity (total value added over total employment); 3) share of firms younger than 5 years; 4) share of small firms (<5 workers); 5) entry rate of new firms; and 6) share of connected firms among entrants. Regressions include year, region, and industry fixed effects. Regressions are weighted by the number of firms in each industry × region × year to weight more representative markets more heavily. Standard errors are in parentheses. $^{*}p < 0.1,^{**} p < 0.05,^{***} p < 0.01$.

Cross-border Effects.- In the spirit of Wilson (2009), we investigate if the high presence of political connections in the neighboring areas is associated with an increase in entry locally. To identify cross-border entry spillovers from political connections, we focus on provinces as our geographic unit since regional aggregation, previously used in our regressions, is too coarse to identify any neighboring effects.

Hence, we consider province-industry-level data and use the following two specifications to identify cross-border effects at the extensive and intensive margins. The first, extensive-margin analysis estimates

$$\begin{aligned}Entry\ rate_{jpt} = \beta Conn.\ own_{jpt-1} + \\ + \gamma D\{Conn.\ neighb_{jpt-1} > Conn.\ own_{jpt-1}\} + FE + \varepsilon_{jpt},\end{aligned} \quad (5)$$

where $Conn.\ own_{jpt-1}$ is the share of connected firms in a province p in industry j and time $t-1$. $Conn.\ neighb_{jpt-1}$ is the average or the maximum share of connected firms across all neighboring provinces of p in industry j at time $t-1$. Operator D returns one if neighbors' connection share is higher than own connection share, and zero otherwise. FE denote province, industry, and year fixed effects. If the cross-border effects are present at the extensive margin, entry in a focal province should be higher if firms are more connected in neighboring provinces than in the focal province. Hence, we should expect $\gamma > 0$.
In addition, we check for intensive margin of the cross-border effects. In the following specification, we check if the share of connections in neighboring provinces, conditional on it being higher than in the focal province, is associated with higher entry. Hence, we check if $\zeta > 0$ in specification (6):

$$\begin{aligned}Entry\ rate_{jpt} = \beta Conn.\ own_{jpt-1} + \\ + \zeta Conn.\ neighb_{jpt-1} + FE + \varepsilon_{jpt}\Big|_{Conn.\ neighb_{jpt-1} > Conn.\ own_{jpt-1}}\end{aligned} \quad (6)$$

Table C.8 presents results for entry rate in Panel A and entry rate of connected firms in Panel B. The first column repeats our benchmark entry regressions and confirms that there is a negative relationship between entry and the share of connected firms at industry $\times$ province level, too. Column 2 estimates the regression specification in (5) and shows that the cross-border effects at the extensive margin are positive, however small in magnitude. We further estimate the intensive-margin regressions from (6) in Columns 3 and 4 using the maximum and the average share of connections in neighboring provinces to measure *Conn. neighb*. We do not see a support for the positive cross-border spillovers at the intensive margin. Taken together, our results suggest that there is weak evidence for cross-border spillovers. Hence, a decline in entry at local level is not offset by the reallocation of entry to other places.

Appendix Table C.8: Connections and Entry. Cross-Border Analysis

	(1)	(2)	(3)	(4)
— Panel A. Entry Rate —				
			Conn. neighb > Conn. own	
$Conn.\ own_{t-1}$	-0.0183***	-0.0127**	-0.0935***	-0.0781***
	(0.0056)	(0.0058)	(0.0123)	(0.0129)
$D\{Conn.\ neighb_{t-1} > Conn.\ own_{t-1}\}$		0.0012***		
		(0.0003)		
$Conn.\ neighb_{t-1}$			0.0002	-0.032***
			(0.0039)	(0.0107)
Observations	171,678	171,678	84,994	84,994
— Panel B. Connected Entry Rate —				
	(1)	(2)	(3)	(4)
			Conn. neighb > Conn. own	
$Conn.\ own_{t-1}$	-0.0282***	-0.0226**	-0.103***	-0.0868***
		(0.0057)	(0.0122)	(0.0129)
$D\{Conn.\ neighb_{t-1} > Conn.\ own_{t-1}\}$		0.0012***		
		(0.0003)		
$Conn.\ neighb_{t-1}$			0.0006	-0.035***
			(0.0039)	(0.0106)
Observations	171,678	171,678	84,994	84,994

Notes: Table reports province × industry× year-level regressions of entry rate of new firms (Panel A) and the share of connected firms among entrants (Panel B). Column (2) estimates specification (5), and Columns (3) and (4) estimate specification (6). They all include year, province and industry fixed effects. $Conn.\ own_{t-1}$ is the share of connected firms in a province × industry in the previous year. $Conn.\ neighb_{t-1}$ is the maximum and the average share of connected firms across all neighboring province × industries in the previous year in Column (3) and Column (4), respectively. $D\{Conn.\ neighb_{t-1} > Conn.\ own_{t-1}\}$ is a dummy equal to one if the neighbors' average connection share is higher than own connection share. All regressions include year, province, and industry fixed effects. Regressions are weighted by the number of firms in each industry × province × year to weight more representative markets more heavily. Standard errors are in parentheses. $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$

Appendix D - Bureaucracy and Regulation Channel

We build on Pellegrino and Zingales (2014) and develop our industry-level "*Bureaucracy Index*" that measures the level of regulatory or bureaucratic burden, based on newspaper articles from *Factiva* – an online search engine that searches newspaper articles.

We look at newspaper articles from four large news providers and count the number of articles that contain keywords that proxy for government intervention or bureaucracy level that sectors are facing.[38] Factiva groups newspaper articles into 58 sectors that roughly correspond to 2-digit NACE Rev 2 industry classification. We focus on articles starting from 1991 and experiment with alternative lists of keywords. List 1 consists of "regulation*", "regulated", "regulator*", "bureaucracy", "bureaucratic", "deregulation*", "deregulated", "paperwork*", "red tape", "license*" and plural forms of these words. List 2 adds additional words: "authority", "authorities", "liberaliz*", "reform*", "Agency", "Agencies", "Commission", "Commissions", "policy maker*", "policymaker*", "government", "official form*", "official procedure*." The * character denotes that variations of these words were also included. We calculate the *Bureaucracy Index 1 (2)* of sector i as:

$$Bureaucracy\ Index\ 1(2)_i = \frac{[\text{All articles related to } i] \ \cap\ [\text{All articles with keywords from List 1(2)}]}{\text{All articles related to } i}. \tag{7}$$

This measure is simply the share of newspaper articles in a sector that have certain keywords that are related to bureaucracy/regulation. Figure D.1 shows a strong and positive relationship between industry's Bureaucracy Indices and the share of firms that are politically connected.[39] Table D.1 reports Bureaucracy Indices and connection intensities for all sectors available in Factiva.[40]

Next, to get closer to measuring local business environment faced by firms and to identify those industries in regions that would potentially gain most from local political connections, we bring in data on the Institutional Quality Index (IQI) across Italian regions for the period 2004-2019 (Nifo and Vecchione, 2015). We consider two indicators evaluating regional control of corruption (*IQI Corru*) and the regulatory quality (*IQI regu*). We define the Institutional Deficiency Indexes (IDI), where *IDI=1-IQI*. IDI indexes range from zero to one, with one indicating the worst institutional quality. To arrive at our final index, we interact our bureaucracy index[41] at the industry level with the average institutional quality indexes at the regional level. Now, the

[38] These news providers are Bloomberg, Dow Jones Adviser, Financial Times, and The Wall Street Journal. Using international newspapers alleviates concerns of endogeneity and reverse causality, as opposed to looking at Italian news.

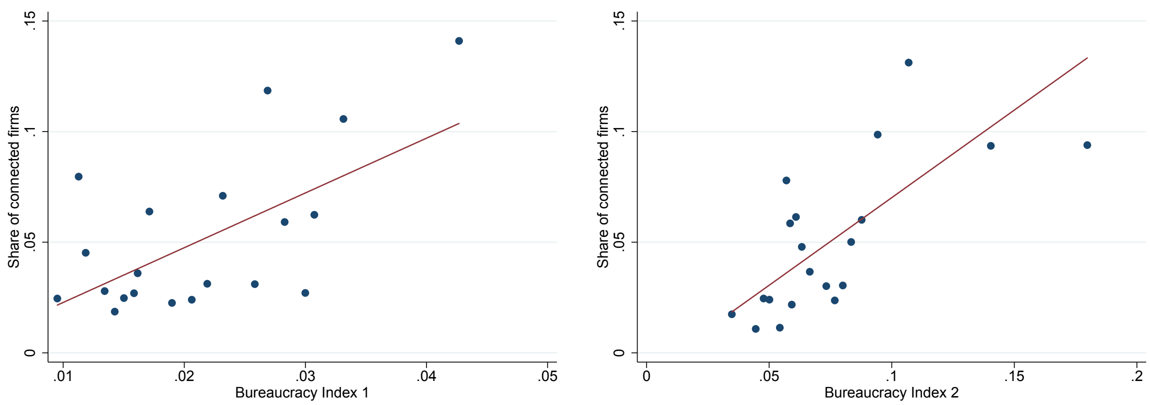
[39] For this exercise, we aggregate industry classification from INPS (ATECO 2007) to the 58 sectors reported in Factiva.

[40] These correlations are stronger if consider majority-level or high-rank connections instead.

[41] Both indices lead to the same results, so we chose bureaucracy index 1.

Appendix Figure D.1: Bureaucracy and Connections across Industries

(a) Bureaucracy Index 1 and connections (b) Bureaucracy Index 2 and connections



Notes: The binscatter plots with linear fits of the share of firms connected with politicians against the Bureaucracy Index for all sectors available in Factiva News search. Sector-level Bureaucracy Index is defined in equation 7 and is the share of newspaper articles in a sector that have certain keywords related to bureaucracy or regulation. Panel (a) uses the benchmark Bureaucracy Index from the main text, while panel (b) uses Bureaucracy Index 2.

interacted indexes $Bur \times IDI\ Corru$ and $Bur \times IDI\ Regu$ vary over regions and industries.

Table D.2 illustrates that political connections are especially detrimental for industry dynamics in sectors and regions with high bureaucracy and low institutional quality. Table D.2 presents regressions of aggregate employment growth, entry rate, and the share of connected entrants on political connections as in Table 10, but interacting connections with our indices. *High Bur*, $High\ Bur \times IDI\ Corru$, and $High\ Bur \times IDI\ Regu$ are the dummies equal to one if an industry or an industry $\times$ region is in the top quartile of the respective index distribution. In different panels, we see that the interaction terms are large and significant, indicating that bureaucracy and regulations are important channels through which political connections transmit into worse aggregate business dynamics.

Government Dependence Index and Political Connections

We define industry-level indices of government dependence to proxy for the importance of government demand and procurement contracts for the firms. For this purpose, we use a 2-digit input-output table issued by the Italian National Statistical Institute (Istat) in 2010. Denote by Y_j total output of an industry j. Then $Y_j = F_j + I_j$, where F_j denotes industry's output used as final consumption, while I_j denotes industry's output used as an intermediate input. Our Government Dependence Indices then measure the share of industry's output – by type of use – demanded by the public sector, i.e. public administration, education, health, and waste management services. Specifically,

$$Government\ Dependence\ Index\ 1 = \frac{F_j^P}{F_j} \qquad Government\ Dependence\ Index\ 2 = \frac{I_j^P}{I_j}, \tag{8}$$

Appendix Table D.1: Connections and Bureacracy Index across Industries

Code	*Industry description*	*Connection intensity*	*High-rank connection intensity*	*Bureaucracy Index 1*	*Bureaucracy Index 2*
E36	Water Utilities	0.254	0.065	0.046	0.159
K64	Banking/Credit or Investment/Securities	0.222	0.075	0.027	0.110
D	Electricity/Gas Utilities	0.155	0.032	0.033	0.191
C12	Tobacco Products	0.146	0.005	0.028	0.092
C21	Pharmaceuticals	0.139	0.024	0.031	0.087
C24	Primary Metals	0.119	0.026	0.011	0.057
J61	Telecommunication Services	0.114	0.040	0.031	0.095
B	Mining/Quarrying	0.101	0.008	0.011	0.057
C29	Motor Vehicles or Motor Vehicle Parts	0.099	0.008	0.017	0.062
C11	Beverages/Drinks	0.083	0.005	0.023	0.059
C19	Downstream Operations	0.080	0.015	0.012	0.071
E38	Waste Treatment/Disposal	0.060	0.005	0.013	0.085
C26	Computer Hardware/Consumer Electronics	0.059	0.005	0.023	0.060
C22	Rubber Products or Plastics Products	0.057	0.009	0.018	0.058
C20	Chemicals	0.057	0.006	0.026	0.081
C28	Machinery	0.051	0.005	0.015	0.051
A	Agriculture	0.049	0.009	0.011	0.063
C27	Batteries/Electric Lighting Eqpm/Electrical Components	0.047	0.005	0.021	0.064
F42	Heavy Construction Not Sewer Construction	0.041	0.005	0.022	0.104
N	Rental/Leasing/Recruitment Services/Admin/Support Serv	0.040	0.004	0.016	0.082
J58	Publishing	0.039	0.007	0.031	0.076
C17	Paper/Pulp	0.039	0.004	0.022	0.047
H	Transportation/Logistics or Postal Service	0.036	0.005	0.020	0.096
C23	Building Materials/Products or Glass/Glass Products	0.036	0.003	0.017	0.059
J62	Computer Services	0.034	0.004	0.016	0.071
E37	Sewer Construction or Wastewater Treatment	0.033	0.003	0.016	0.169
C30	Aerospace/Defense or Shipbuilding or Railroads	0.032	0.005	0.016	0.079
C33	Machinery Repair/Maintenance/Aircraft Maintenance Serv	0.028	0.002	0.040	0.076
C13	Textiles	0.026	0.002	0.030	0.061
R	Theaters/Entertainment Venues/Libraries/Archives	0.024	0.003	0.035	0.090
F41	Building Construction	0.022	0.001	0.014	0.059
J59	TV Program/Sound/Music Recording/Publishing	0.022	0.001	0.021	0.059
J63	Online Service Providers	0.019	0.002	0.025	0.077
C15	Leather Goods	0.018	0.002	0.011	0.028
C31	Furniture	0.018	0.001	0.015	0.037
J60	Broadcasting	0.018	0.001	0.029	0.086
I55	Lodgings	0.017	0.001	0.027	0.073
C16	Wood Products	0.016	0.001	0.014	0.044
C25	Metal Products	0.016	0.001	0.008	0.048
C32	Jewelry/Musical Instruments/Sport Goods/Games	0.016	0.001	0.030	0.065
C18	Printing	0.015	0.002	0.014	0.039
M	Legal and Professional	0.015	0.002	0.027	0.145
C10	Food Products	0.014	0.001	0.022	0.064
G46	Wholesalers Non-Auto/Auto Part Wholesale	0.014	0.001	0.016	0.055
C14	Clothing	0.013	0.002	0.028	0.057
K	Financial Services	0.011	0.001	0.031	0.118
L68	Real Estate	0.011	0.000	0.011	0.048
G45	Motor Vehicle Dealing/Repair/Maintenance/Auto Stores	0.009	0.000	0.018	0.053
F43	Special Trade Contractors or Building Refurbishment	0.009	0.000	0.010	0.044
G47	Retail Non-Auto Parts/Tire Stores Not Auto Dealing	0.007	0.000	0.013	0.046
I56	Bars/Public Houses or Restaurants/Cafes	0.005	0.000	0.015	0.051
E39	Waste Management/Recycling Services	0.003	0.000	0.020	0.080

Notes: Table reports measures of connections and the bureaucracy indices across industries. Industry codes are based on classifications from the Factiva News search and the codes correspond to NACE Rev 2 classification. Column 3 reports the average share of connected firms in an industry. Column 4 reports the average share of high-rank connected firms in an industry. Columns 5 and 6 report Bureaucracy Index 1 and Index 2, respectively. The indices show the average share of newspaper articles about a sector from Factiva News search that mention government regulation- or bureaucracy-related words. Industry-level Bureaucracy Index 1 is our benchmark index defined in Section 3, while Bureaucracy Index 2 is defined in Section 7.

Appendix Table D.2: Political Connections and Industry Dynamics. Bureaucracy, Regulation, and Institutional Quality Indexes

— Panel A. Bureaucracy Index —

	Growth, Empl	Entry Rate	Share Conn. Entrants
Share of connected firms	-0.0531	0.0024	0.232***
	(0.0383)	(0.0152)	(0.0103)
Share of connected firms	-0.143*	-0.102***	0.0588***
× High Bur	(0.0749)	(0.0295)	(0.0203)
Observations	30,427	31,895	31,914

— Panel B. Bureaucracy × IDI Corruption Index —

	Growth, Empl	Entry Rate	Share Conn. Entrants
Share of connected firms	-0.0564*	-0.0145**	0.292***
	(0.0306)	(0.0065)	(0.0177)
Share of connected firms	-0.165***	-0.0227**	0.0043
× High (Bur × IDI Corru)	(0.0539)	(0.0114)	(0.0328)
High (Bur × IDI Corru)	-0.0021	-0.0016***	0.0001
	(0.0018)	(0.0004)	(0.0009)
Observations	27,967	29,239	22,477

— Panel C. Bureaucracy × IDI Regulation Index —

	Growth, Empl	Entry Rate	Share Connected Entrants
Share of connected firms	-0.0453	-0.0133**	0.288***
	(0.0306)	(0.0065)	(0.0177)
Share of connected firms	-0.205***	-0.0211**	0.0285
× High (Bur × IDI Regu)	(0.0493)	(0.0104)	(0.291)
High (Bur × IDI Regu)	0.0023	-0.0015***	0.0001
	(0.0021)	(0.0004)	(0.0010)
Observations	27,967	29,239	22,477

Notes. Table reports the coefficients from OLS regressions at the industry × region × year level of various outcomes on the share of connected firms (share of connected incumbents in the case of columns 2 and 3). Outcome variables: 1) aggregate industry × region employment growth; 2) firm entry rate; and 3) the share of connected firms among entrants. All regressions include year, region, and industry fixed effects. Regressions are weighted by the number of firms in each industry × region × year to weight more representative markets more heavily. Standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

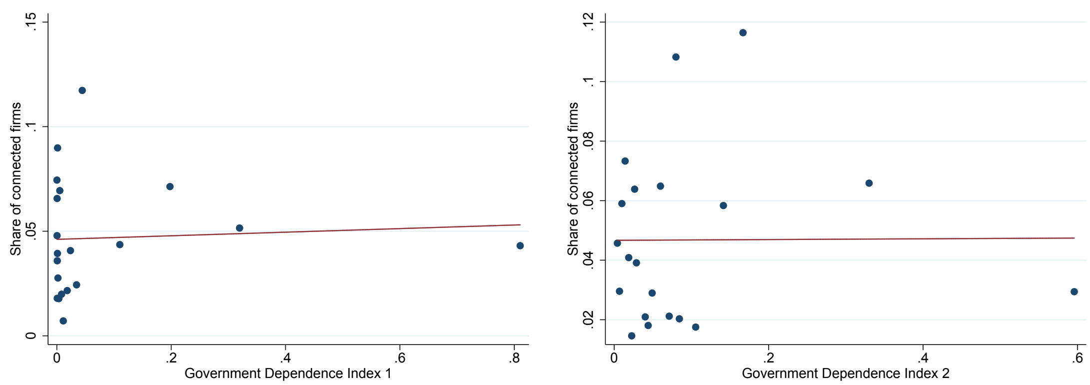
where superscript P denotes output demanded by the public sector.

Government Dependence Index 2 is similar to the index defined in Cingano and Pinotti (2013). Figure D.2 shows that none of these measures of government dependence correlate with the share of firms that are politically connected. These correlations are essentially zero also if we look at majority-level or high-rank connections instead.

Appendix Figure D.2: Government Dependence and Connections across Industries

(a) Government Dependence Index 1 and connections

(b) Government Dependence Index 2 and connections



Notes: The binscatter plots with linear fits of the share of firms connected with politicians against the Government Dependence Index for all 2-digit sectors from Istat. Industry-level Government Dependence Indices are defined in equation 8 and are based on input-output tables from Istat in 2010. Correspondingly, an industry's share of connected firms is calculated as an average for 2009-2011 period. Panel (a) uses Index 1 for the final-use output, while panel (b) uses Index 2 for the intermediate-use output.

Appendix E - Model-Based Calculations of Static Gains and Dynamic Losses

Using our model, we provide back-of the envelope estimates of the static gains and dynamic losses from political connections in Italy.

First, we calculate the implied wedge τ. Recall that in Section 5.4, the total rent created from the politicians-firm relationship was estimated at 11,348 Euros. This rent estimate can be mapped to the model as follows:

$$Total\ Rent = \pi^{p} - \pi^{np} + w^{p} = \pi^{np}\left((1+\tau)^{\frac{1-\beta}{\beta}} - 1\right) \tag{9}$$

In Table E.1, we present calculations for different values of β. In our example in the paper, we fixed $\beta = 0.5$ (which would also correspond to the parameter values considered in Hsieh and Klenow (2009) and Garicano *et al* (2016), however we also consider the value of $\beta = 0.2$ following estimates from Guner *et al* (2008) and Akcigit *et al* (2021). In addition, given that markups in the model are equal to $\frac{1}{1-\beta}$, the markup value of 1.2 in Italy (Ciapanna *et al*, 2022) implies a similar estimate of β. Given the average profit of 300,000 Euros in the sample, the implied wedge is equivalent to 0.9% to 3.8% tax rate on labor. Since the total labor remuneration in Italy is 300 billion (Istat, National Accounts, 2014), the total cost of wedges paid in the economy ranges from 2.8 to 11 billion Euros, which amounts to 0.2-0.7% of GDP.

It is worth putting the estimated wedge in perspective. First, we compare it to Garicano *et al* (2016), who estimate a labor wedge caused by labor regulations in France. τ in their case is 2.3% and 5.9% for the β choices presented in our calculations. Although Garicano *et al* (2016) finds twice larger tax rates, these regulatory wedges kick in only for the firms above 50 employees; hence the average wedge applied to all firms is lower. Second, it is important to note that the magnitude of wedges we identify is a lower bound on the aggregate amount of bureaucracy and regulatory costs in the Italian economy. In the model, the firm with political connections faces zero wedges. Hence, we should interpret the implied τ as that part of the regulatory and bureaucratic costs that connections with local politicians can alleviate.

Next, we calculate the implied output loss from the bureaucracy and regulation wedges. Using expressions for the equilibrium value of output of unconnected and connected firms, y^{n} and y^{p}, and substituting into aggregate production function (eq. 1), we can calculate $Y^{\tau,np}/Y$, where $Y^{\tau,np}$ denotes aggregate output in the economy where all the firms face regulation and bureaucracy wedges, while Y is an output in the economy with no regulation and bureaucracy: $Y^{\tau,np}/Y = (1+\tau)^{\frac{\beta-1}{\beta}}$. This implies that the economy facing regulations and bureaucracy has 4% lower output than the economy without.[42]

Some of these output losses are recovered by static gains from the presence of political con-

[42]Notice that this calculation is unaffected by our choice of β since $(1+\tau)^{\frac{\beta-1}{\beta}} = 1/1.0378$ from equation (9).

nections that remove wedges for the connected firms. We estimate aggregate static gains obtained from political connections by calculating $\frac{Y^{\tau,p}}{Y^{\tau,np}} = \frac{s^{np} \times Y^{\tau,np} + s^{p} \times Y}{Y^{\tau,np}}$, where $Y^{\tau,p}$ denotes output in the benchmark economy with wedges and political connections as in Italy; and s^{np} and s^{p} are the shares of output accounted for by unconnected and connected firms, respectively. These shares are 67% and 33% in the data, respectively. The implied static gain is 1.2% of output. Hence, the third of output loss is recovered with existing political connections.

Finally, we provide a back-of-the-envelope estimate for dynamic output losses from political connections. For that, we need to compare growth rate in the economy with no political connections ($g^{\tau,np}$) with the growth rate in the economy with political connections as in Italy ($g^{\tau,p}$). We take a steady state growth rate of 1%, so that $g^{\tau,np} = 0.01$.[43] Next, we estimate the reduction in productivity growth from lowered creative destruction. Note that the estimates from column 5 of Table 10 imply the reduction in entry rate by 0.014 from political connections.[44] This constitutes a 38% reduction in entry rate relative to the economy with no political connections. Given that entrants' contribution to productivity growth is 33% (Citino *et al*, 2022), this implies that the reduction in growth rate due to lower creative destruction is $0.33 \times 0.38 = 0.12\%$, hence ($g^{\tau,p} = 0.0088$). We can now calculate the ratio of the discounted present value of output in the economy with and without political connections as:

$$\frac{PV \quad Y^{\tau,p}}{PV \quad Y^{\tau,np}} = \frac{Y^{\tau,p}\frac{1+r}{r-g^{\tau,p}}}{Y^{\tau,np}\frac{1+r}{r-g^{\tau,np}}} = \underbrace{\frac{Y^{\tau,p}}{Y^{\tau,np}}}_{=1.012,\text{ static gain}} \times \underbrace{\frac{r-g^{\tau,np}}{r-g^{\tau,p}}}_{=0.97,\text{ dynamic loss}} = 0.982,$$

where we took interest rate of $r = 0.05$. We obtain that political connections imply 3% output loss through the dynamic channel, outweighing static gains and resulting in the net loss of 1.8% of output from political connections. Therefore, our calculations show that the presence of political connections is likely to exacerbate the economic losses already created by the burden of bureaucracy and regulations.

[43] Italy's growth in 1993-2014 was 0.62%.

[44] The coefficient -0.031 multiplied by the average share of connected firms among large incumbents (45%) is -0.014.

Appendix Table E.1: Back-of-the-Envelope Calculations from the Model

	$\beta = 0.2$	$\beta = 0.5$
Wedge, τ	0.0093	0.0378
Total (labor) cost of wedges	2.8 billion	11 billion
Total cost of wedges % of GDP	0.175	0.71
Output loss from wedges, $Y^{\tau,np}/Y$	0.96	0.96
Static gain from connections, $Y^{\tau,p}/Y^{\tau,np}$	1.012	1.012
Dynamic loss from connections	0.97	0.97
Net effect of connections, $\frac{PV\ \ Y^{\tau,p}}{PV\ \ Y^{\tau,np}}$	0.982	0.982

Notes: The table summarizes the back-of-the-envelope calculations of bureaucracy and regulation wedges and the static gains and dynamic losses from political connections in Italy. Y is an output in the economy with no regulation and bureaucracy. $Y^{\tau,np}$ denotes aggregate output in the economy where all the firms face regulation and bureaucracy wedges. $Y^{\tau,p}$ denotes output in the benchmark economy with wedges and political connections as in Italy.

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