Connecting to Power: Political Connections, Innovation, and Firm Dynamics

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Disclaimer: The opinions expressed are the authors’ own and do not reflect the views of the Bank of Italy or INPS.
**Motivation**

- A growing empirical literature emphasizes the importance of factor reallocation from less productive to more productive firms (Bartelsman and Doms, 2000; Foster, Haltiwanger, and Krizan, 2001, 2006; Hsieh and Klenow, 2014).

- Theoretically, the basic premise of creative destruction models is that it is sufficient for an entrant to come up with a better technology or quality product to replace an incumbent (Aghion and Howitt, 1992; Grossman and Helpman, 1991).
Motivation

- A growing empirical literature emphasizes the importance of factor reallocation from less productive to more productive firms (Bartelsman and Doms, 2000; Foster, Haltiwanger, and Krizan, 2001, 2006; Hsieh and Klenow, 2014).

- Theoretically, the basic premise of creative destruction models is that it is sufficient for an entrant to come up with a better technology or quality product to replace an incumbent (Aghion and Howitt, 1992; Grossman and Helpman, 1991).

Is this really the case?
How do political connections affect firm dynamics, reallocation, and productivity?
What are the consequences?

Carmelo Zuccaro, Chief Prosecutor of Catania

“There are public officials who, instead of serving the interests of the community, put themselves at the service of private individuals.

It’s a devastating situation: those firms that have political and administrative support, thanks to the “good” friend, manage to obtain illicit benefits, while honest companies look astonished at what happens.”
A brand-new data set, set of stylized facts.

Main analysis:
- Macro level: industry performance;
- Micro level: firm performance, politician’s compensation.

Causal identification:
- Exploit marginal election outcomes.
A new theory of innovation and firm dynamics:

- Entrants replace incumbents through creative destruction;
- Firms decide on innovation and political connections;
- Helps with interpretation and identification of the mechanisms;
- Static benefits vs dynamic social costs.
**Literature**

**Reallocation**, firm dynamics:


**Private returns** from political connections:


**Social costs** from political connections:

- *Greasing wheels* (Kauffman and Wei (1999), Shleifer and Vishny (1994)) vs *grabbing hands* hypothesis (Shleifer and Vishny, 2002).
Empirical Analysis
Local Politicians: distinct feature in our analysis, harder to detect, more pervasive.

Substantial power:
- Issue permits and licenses, construction planning, provide local public goods and services (public utilities, health care, transport, waste management), taxes (in some cases).
- Further increase in power since the 90’s.
### Social Security Data

**Source:** INPS

*Universe of private sector employment 1985-2014.*

<table>
<thead>
<tr>
<th>Individual level:</th>
<th>Firm-level:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics, Employment history, Labor income, Job characteristics.</td>
<td>Entry/exit, Size, Worker characteristics, Industry, Location.</td>
</tr>
</tbody>
</table>
**Data**

**Firm Level**

**Firm-level Data**

*Source: Cerved*

- Universe of limited companies 1993-2014.
- Financials: balance sheet, income statement.

- 1 mln unique firms
- 7 mln firm-year obs

**Social Security Data**

*Source: INPS*

Universe of private sector employment 1985-2014.

**Individual level:**
- Demographics,
- Employment history,
- Labor income,
- Job characteristics.

**Firm-level:**
- Entry/exit,
- Size,
- Worker characteristics,
- Industry, Location.

- 4.5 mln unique firms
- 32 mln firm-year obs
**Data**

**Social Security Data**

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- **Individual level:**
  - Demographics,
  - Employment history,
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  - Job characteristics.

- **Firm-level:**
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**Firm Level**

- 66K patent families
- 14K innovating firms

**Patent Data**

*Source: PATSTAT*

- All EPO patents filed by Italian firms in 1990-2014.
- Patent characteristics: patent families, grant status, technology classification, citations, claims.
Social Security Data

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Universe of private sector employment 1985-2014.

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Demographics, Employment history, Labor income, Job characteristics.

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Entry/exit, Size, Worker characteristics, Industry, Location.
Data

### Registry of Local Politicians

**Source**: Ministry of the Interior

- Universe of local politicians (regional, province, municipality) 1985-2014.
- Demographics, position attributes, party affiliation.

- 515K unique politicians
- 2.8 mln observations
- 11% (vice)mayor/(vice)president
- 20% executive positions
- 69% council members
- 31% work in private firms
- 145K firms ever get connected

### Social Security Data

**Source**: INPS

**Universe of private sector employment 1985-2014.**

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  - Demographics,
  - Employment history,
  - Labor income,
  - Job characteristics.

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Data

Individual Level

Registry of Local Politicians

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Elections Data

*Source: Ministry of the Interior + own data collection*

- Local elections (regional, province, municipality) 1993-2014.
- Candidates, parties/coalitions, allocation of votes and seats.

Social Security Data

*Source: INPS*

Universe of private sector employment 1985-2014.

**Individual level:**
- Demographics, Employment history, Labor income, Job characteristics.

**Firm-level:**
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- 37K elections
- 2.3K with 2% margin of victory
**Registry of Local Politicians**

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*Source: PATSTAT*

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Firms’ Connections with Local Politicians

- *Connection*: dummy equal to one at $t$ if a firm employs any local politician at time $t$.

- *High-rank Connection*: dummy equal to one at $t$ if a firm employs at least one mayor/president/vice-mayor/vice-president at $t$.

- *Majority-party Connection*: dummy equal to one at $t$ if a firm employs at least one member of a local majority party at time $t$. 
Empirical Analysis: Outline

I. Summary Statistics.

II. Firm Moments:
   1. Connection vs innovation;
   2. Survival;
   3. Growth in size;
   4. Productivity growth.

III. Politicians’ Facts.
I. Summary Statistics
**Summary Statistics I**

**Fact 1.** *Firm-level political connections are widespread, especially among large and old firms.*

- 4.5% of all firms and 46% of large firms (> 100 workers);
- connected firms account for 34% of employment.
Summary Statistics II. Industry Level.

Figure: Connections and Industry Dynamics.

Entry Rate and Connections

Growth and Connections

Notes: Binscatter plots from industry × region × year level regressions. Variables on Y axis are adjusted for industry, year, and region fixed effects. Variables on X axis: industry share of connected firms.
Fact 2. More connected industries face lower firm entry, but conditional on entry, entrants are more likely to be connected than in other industries.

Fact 3. Sectors with a higher share of politically connected firms have a lower share of young firms and exhibit lower employment growth and productivity.
II. Firm Moments
1. The Leadership Paradox

**Figure:** Market Leadership, Innovation, and Political Connection

Notes: Market rank – size rank across firms that operate in the same industry and region. Y axis is demeaned with industry, year and region fixed effects.
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**Figure:** Market Leadership, Innovation, and Political Connection

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1. The Leadership Paradox

Figure: Market Leadership, Innovation, and Political Connection

Notes: Market rank – size rank across firms that operate in the same industry and region. Y axis is demeaned with industry, year and region fixed effects.
Fact 4. *Market leaders are the most politician-intensive but the least innovation-intensive, relative to their direct competitors.*
2. **Firm Performance:**

**Firm Survival and Political Connection**
2. **Firm Performance:**

**Firm Survival and Political Connection**

- **Cox analysis:** *Any conn. → 9.2% ↓; majority-level conn. → 11.5% ↓; high-rank conn. → 31.7% ↓* exit hazard rate.
2. **Firm Performance:**

**Firm Survival and Political Connection**

- **Cox analysis:** *Any conn.* $\rightarrow$ 9.2% ↓; *majority-level conn.* $\rightarrow$ 11.5% ↓; *high-rank conn.* $\rightarrow$ 31.7% ↓ exit hazard rate.
2. Firm Performance: Firm Survival and Political Connection

- Cox analysis: Any conn. $\rightarrow 9.2\% \downarrow$; majority-level conn. $\rightarrow 11.5\% \downarrow$; high-rank conn. $\rightarrow 31.7\% \downarrow$ exit hazard rate.
Fact 5. Politically connected firms are more likely to survive, and their survival probability increases in the political power of the politicians.
3. **Firm Performance:**

**Firm Growth and Political Connection**

<table>
<thead>
<tr>
<th></th>
<th>Empl growth (OLS)</th>
<th>Empl growth (FE)</th>
<th>VA growth (OLS)</th>
<th>VA growth (FE)</th>
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<tr>
<td>Connection</td>
<td>0.032***</td>
<td>0.040***</td>
<td>0.039***</td>
<td>0.014***</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
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<tr>
<td>Connection major</td>
<td>0.003*</td>
<td>0.007***</td>
<td>0.010***</td>
<td>0.002</td>
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<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
</tr>
<tr>
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<td>0.203***</td>
<td>0.036***</td>
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<tr>
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<tr>
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<td>-0.011***</td>
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<td>YES</td>
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<td>NO</td>
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<tr>
<td>Firm FE</td>
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<td>YES</td>
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<tr>
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<td>5710338</td>
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</tbody>
</table>

Notes: *Connections/Connection major* are dummy variables equal to one if firm is connected with any/majority-party politician at time t. Results using connection definition using high-rank politicians is here.
4. **Firm Performance:**

**Productivity Growth and Political Connection**

<table>
<thead>
<tr>
<th></th>
<th>LP growth (OLS)</th>
<th>LP growth (FE)</th>
<th>TFP growth (OLS)</th>
<th>TFP growth (FE)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Connection</strong></td>
<td>-0.014***</td>
<td>-0.028***</td>
<td>-0.008***</td>
<td>-0.019***</td>
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<tr>
<td></td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.001)</td>
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<tr>
<td><strong>Connection major</strong></td>
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<td>0.000</td>
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<td>(0.002)</td>
<td>(0.003)</td>
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</tr>
<tr>
<td><strong>Log Assets</strong></td>
<td>-0.028***</td>
<td>-0.274***</td>
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</tr>
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<tr>
<td><strong>Log Size</strong></td>
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<td>0.274***</td>
<td>-0.006***</td>
<td>0.125***</td>
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<tr>
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<td>(0.001)</td>
<td>(0.000)</td>
<td>(0.001)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>-0.001***</td>
<td>-0.002***</td>
<td>-0.001***</td>
<td>-0.003***</td>
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<tr>
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<td>(0.000)</td>
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<td>(0.000)</td>
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<tr>
<td><strong>Year FE</strong></td>
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<td>YES</td>
<td>YES</td>
<td>YES</td>
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<tr>
<td><strong>Region FE</strong></td>
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<td>YES</td>
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<tr>
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<tr>
<td><strong>Firm FE</strong></td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
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<tr>
<td><strong>Observations</strong></td>
<td>5598367</td>
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<td>5271002</td>
<td>5291979</td>
</tr>
</tbody>
</table>

Notes: Connections/Connection major are dummy variables equal to one if firm is connected with any/majority-party politician at time t. Results using connection definition using high-rank politicians is here.
Firm Performance: Causal Inference
Causality: RD Design

- **Causal identification** of the effect of connections on growth and productivity.

-**Regression discontinuity (RD) design:**
  - Sharp discontinuities caused by local elections decided on a thin margin.
  - Compare firms connected with politicians from **marginally winning** vs **marginally losing** parties/coalitions right before the election.
  - 2.3K (5.7K) with 2% (5%) margin of victory.

- Identification vs external validity.
**RD Estimation**

\[ y_{iT}(m) = \alpha + \beta \text{Win}_{iT}(m) - 1 + f(\text{margin}_m) + (\delta_1 X_{iT}(m) + \delta_2 X_m + \delta_3 X_T) + \nu_{iT}(m) \]

- **T(m)** - time of a marginal election \( m \).
- **\( y_{iT}(m) \)** - outcome for firm \( i \) at \( T(m) \).
- **\( \text{Win}_{iT}(m) - 1 \)** - dummy equal to one if at \( T(m) - 1 \) \( i \) is connected with a member of a marginally winning party in the election \( m \) at \( T(m) \).
- **\( \text{Margin}_m \)** - victory margin: difference in vote shares btw a winner and the runner-up.
- \( f(\text{margin}_m) \) is a smooth polynomial estimated on both sides of the threshold.
- **\( X_{iT}(m), X_m, X_T \)**: firm controls, time, location F.E.
RD Results: Employment and Productivity Growth

Emp. Growth After Election ($T \rightarrow T + 1$)

Large Positive Effect

$\beta(g_{LT}) = 0.089^{**}(0.039)$
**RD Results: Employment and Productivity Growth**

**Empl Growth After Election** ($T \rightarrow T + 1$)

**LP Growth After Election** ($T \rightarrow T + 1$)

Large Positive Effect

$$\beta(g_{LT}) = 0.089^{**}(0.039)$$

No effect

$$\beta(g_{LP\,T}) = 0.001(0.078)$$
III. Politicians’ Facts
**Politician’s Compensation in a Firm**

**Wage premium:**

- Positive within-firm within-group wage premium, increasing with rank and position
- Event Study: within-firm wage premium, before and after becoming a politician

**Event Study:**

[Graph showing within-firm wage premium over a timeline]
Fact 7. Worker-politicians earn significant wage premiums relative to their co-workers. This premium increases with the political rank of a worker.

- Back of the envelope calculation for the rent sharing:
  - Politician: Estimated yearly wage premium in a firm.
  - Firm: Estimated profit gain from connection.
Model
**Potential Mechanisms**

- **Starting point:** Benchmark Schumpeterian Model
- **Frictions:** at each time, firms face *wedges* in the input market.
  - Hsieh and Klenow (2009) – reduced form representation of various market frictions;
  - Example: regulation/bureaucracy costs (Relevant! Firms’ spending on bureaucracy in Italy is estimated 1.7% of GDP, vs private R&D spending of 0.6% of GDP. See Factiva graph...).

- **Political connections** reduce these frictions ("well-intended") but come at a cost.

- Model highlights *static* gains vs *dynamic* losses.
**Figure**: Industry bureaucracy/regulation and Connections

[Graph showing the relationship between bureaucracy index and share of connected firms across different industries.]

- Water utilities
- Telecomm
- Pharma
- Tobacco
- Utilities
- Agriculture
- Primary metals
- Machinery
- Computer services
- Textiles
- Retail
- Vehicle dealing
- Restaurants

**Regulation and Political Connections**
**Static Problem 1**

- Unique sectoral output \( (Y) \) is produced as:

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

- \( y_m \): quantity of vintage \( m \in 1, ..., M \).

- Different vintages are perfect substitutes after adjusting for their quality.

- Incumbents or entrants can introduce the next vintage \( (M + 1) \).
Static Problem 2

- Final good producer solves:

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

- Production technology for each intermediate goods producer is one-for-one in labor:

\[ y = l \tag{2} \]
Static Problem 3

  \( \implies \) For each unit of input, wedge implies extra \( \tau \) cost.
  \( \implies \) Political connection removes the wedge but it comes at a cost \( w^p \).

- Non-connected firm:
  \[
  \pi^n = \max \left\{ py - (1 + \tau)wl \right\} \quad \text{subject to (1) and (2)}. 
  \]

- Politically connected firm:
  \[
  \pi^c = \max \left\{ py - wl - w^p \right\} \quad \text{subject to (1) and (2)}. 
  \]

where \( w^p \) is the cost of connection.
### Static Problem 4

<table>
<thead>
<tr>
<th></th>
<th>If not connected</th>
<th>If connected</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Labor</strong></td>
<td>$\left[ \frac{(1-\beta)}{(1+\tau)w} \right]^{\frac{1}{\beta}} q$ vs $\left[ \frac{(1-\beta)}{w} \right]^{\frac{1}{\beta}} q$</td>
<td></td>
<td>↑</td>
</tr>
<tr>
<td><strong>Revenue</strong></td>
<td>$\left[ \frac{(1-\beta)}{(1+\tau)w} \right]^{\frac{1-\beta}{\beta}} q$ vs $\left[ \frac{(1-\beta)}{w} \right]^{\frac{1-\beta}{\beta}} q$</td>
<td></td>
<td>↑</td>
</tr>
<tr>
<td><strong>Profits</strong></td>
<td>$\alpha \left[ \frac{(1-\alpha)}{(1+\tau_i)w} \right]^{\frac{1-\alpha}{\alpha}} q_i$ vs $\alpha \left[ \frac{(1-\alpha)}{w} \right]^{\frac{1-\alpha}{\alpha}} q_i - w^p$</td>
<td></td>
<td>↑</td>
</tr>
<tr>
<td><strong>LP</strong></td>
<td>$\frac{(1+\tau)w}{(1-\beta)}$ vs $\frac{w}{(1-\beta)}$</td>
<td></td>
<td>↓</td>
</tr>
</tbody>
</table>

**Prediction 1:** Connections lead to higher employment, revenue and profits BUT lower labor productivity.
Static Choice of Connection

Connect iff $\pi^c > \pi^n$, i.e. $q_i > q^* \equiv \frac{w_p}{\Pi} \left(1 + \tau\right) \tau$.
Prediction 2: Large firms are more likely to get connected.

Prediction 3: For any given size, firms are more likely to get connected if the industry is more regulated ($q^* \downarrow$ if $\tau \uparrow$).
Dynamics: Key Ingredients

Entry

- Two types of firms: type=0: unable to get connected – share $\alpha$ of firms at entry; type=1: able to connect if they want to.
- Switch from type=0 to type=1 at a Poisson arrival rate of $\zeta$.

Productivity

- Free entry with linear cost, $\psi q_j$.
- Innovation arrival rate is $p$ (entry rate)
- Draw an innovation size $\lambda \sim U[0, \lambda_{max}]$. $q_{j,M+1} = (1 + \lambda)q_{j,M}$

Tradeoff: Entrants have a better technology BUT are relatively disadvantaged in removing regulatory burden.

Implications for creative destruction – probability of incumbent’s replacement by an entrant, $z$. $z < p$ if only incumbent is connected.
Static vs Dynamic connection choice I
Static vs Dynamic connection choice I
Static vs Dynamic connection choice I

- Connect to lower static production cost
Static vs Dynamic connection choice I

\[ q^* \text{ Static cutoff} \]

Connect to lower static production cost
Static vs Dynamic connection choice I

\[ V_n \]
\[ V_c \]
\[ \pi_c \]
\[ \pi_n \]

0 \( q^* \) Static cutoff

Connect to lower static production cost

\( q^* \) Static cutoff

Connect to lower static production cost
**Preemptive motives to connect**: firms connect earlier to reduce incentives of others to enter and compete.
**Static vs Dynamic Connection Choice II**

\[ q^* \equiv \frac{w_p}{\Pi} \frac{1 + \tau}{\tau} \quad \text{VS} \quad q^{**} \equiv \frac{w_p}{\Pi} \frac{1 + \tau}{\tau + \frac{\alpha \tau}{\lambda_{\text{max}}}} \frac{p}{r+p} \]

**Prediction 4:** Connected incumbents are less likely to exit.

**Prediction 5:** Connected incumbents are more likely to be replaced by connected entrants.

**Prediction 6:** Connected industries have lower reallocation.
Model Implications

Static

- “Well-intended” connections lead to gains by removing frictions in the economy (production level).

Dynamic

Reasons for lower entry and reallocation:

1. Reduction in entry is an endogenous response of the economy to the market conditions, where the ability to get connected is distributed unequally between entrants and incumbents.

2. This response arises only dynamically: in a static environment, political connections are socially beneficial and represent the second best, given the market frictions.

3. Strategic anticipation by entrants.
MODEL IMPLICATIONS

Static

- “Well-intended” connections lead to gains by removing frictions in the economy (production level).

Dynamic

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2. This response arises only dynamically: in a static environment, political connections are socially beneficial and represent the second best, given the market frictions.

3. Strategic anticipation by entrants.

Static gains vs Dynamic losses
Model Predictions

Connection vs Innovation:

1. Large firms are more likely to get connected, BUT are less innovative.

2. For any given size, firms are more likely to get connected if the industry faces bigger bureaucratic/regulatory burden.

Private returns:

3. Connections lead to higher employment, revenues and profits BUT lower labor productivity.

4. Connected incumbents are less likely to exit.

Macro implications:

5. In more connected industries: lower entry and reallocation, larger and older firms with lower productivity, lower average growth.
Final Remarks

• New large-scale data on the universe of firms and politicians in Italy.

• Empirical findings on the relation between political connections and number of micro and macro moments. – leadership paradox

• A new model of firm dynamics, innovation, and political connections. Channel of connections affecting incumbents’ production seems relevant. Static gains vs dynamic losses
Thank you!