

Geography of Power: Electrification, Industrial Location and Labour Conflict in Italy (1878-1911)

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The Italian industrialization and the "white coal"

Electrification played a central role in the Italian industrialization: unlike other industrializing nations that relied on coal, **Italy's energy transition was shaped by the adoption of hydroelectric power, the "white coal", constrained by geographical features and early limitations in electricity transmission.**

Malm (2016) argues that **coal-powered steam allowed firms to relocate production and tighten control over workers, while waterpower was less flexible**, potentially increasing labour's bargaining power. Consistently, Molinder et al. (2021) show that hydro-based electrification in Sweden was followed by **more offensive strikes, suggesting stronger worker bargaining power.**

Research question

Did the primary energy source of electrification, (hydropower versus fossil fuels) influence both the frequency and the nature of labour conflict?

Why study the Italian case?

- The staggered municipal rollout of electricity provides a clean setting to isolate infrastructure's impact from broader trends.
- Its peak coinciding with Italy's first major strike wave allows for a causal study on the relationship between electrification and labour power.

Mechanism: From Energy Source to Labour Conflict

Geographical Immobility

Unlike coal-powered steam, which allowed firms to relocate to areas with cheaper labour, **early hydroelectric power was geographically "fixed" due to limited transmission capacity.**

Reduced Employer Flexibility

Because factories had to remain near water-based energy sources, **capital became more fixed, limiting the ability of employers to use relocation as a threat against organized labour.**

Shift in Conflict Nature

Spatially fixed industrial locations and higher productivity **strengthened workers' bargaining power**, shifting labour conflict **from defensive strikes** resisting deterioration to **offensive strikes** demanding improvements.

Data and Methodology

Electricity Grid

GIS mapping of the location, capacity, energy type and activation dates of over 1200 power plants.

Industrial Location

Merge the reconstructed grid with the 1911 Industrial Census data to estimate industrial concentration, assessing whether coal or hydro attracted more industry.

Strikes

A newly assembled dataset of 12,000 strike records taken from government records is used. The methodology is a **staggered diff-in-diff** (Callaway & Sant'Anna, 2021) that exploits variation in the timing of power plant activations across municipalities, with not-yet-treated municipalities as controls.

Example of data on strikes

Sector: clothing

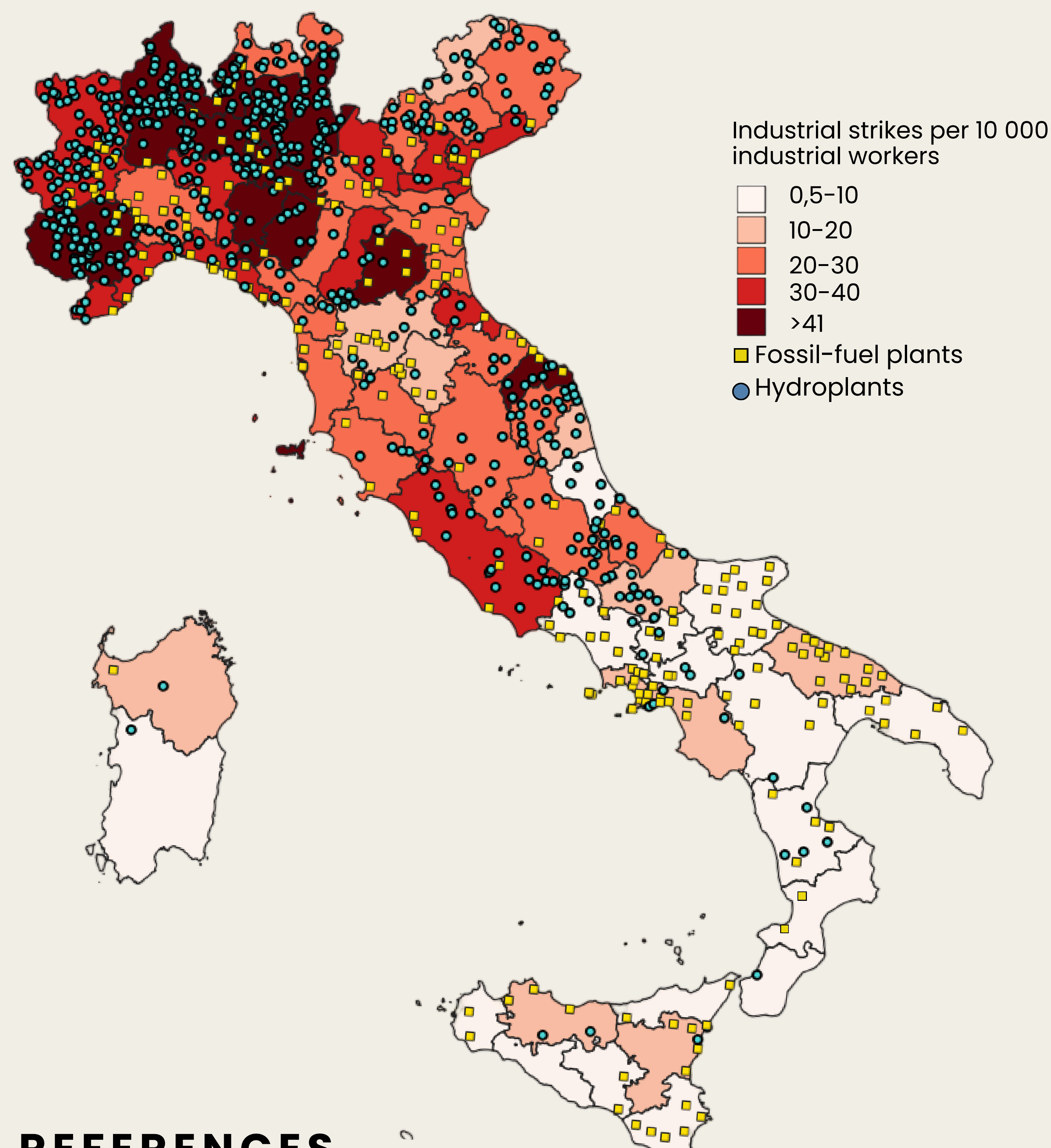
Strikers: 11-year-old delivery girls

Parma. — Circa 60 bambine dai 10 agli 11 anni addette alla consegna delle confezioni delle modisterie e sartorie da donna di Parma, il giorno 24 aprile non si presentarono al lavoro perchè, retribuite con lire 0.50 alla settimana volevano che tale retribuzione venisse loro raddoppiata. La Camera del lavoro presso cui erano iscritte, s'interessò della questione ed infatti le ditte concessero il desiderato aumento e le piccole scioperanti si presentarono ai laboratori il 27 aprile. (Notizie dalla Camera del lavoro, dalla stampa, dalle ditte).

Demand: Increase in pay (offensive strike)

Outcome: victory for workers

Powerplants location and intensity of strikes



Preliminary Results

- **General Electrification:** Increased offensive strikes by 1.3 per 100,000 residents per year across all plant types.
- **Hydropower:** The strongest driver of labor action, sparking 2 additional offensive strikes annually per 100,000 residents with no significant defensive reaction. → **More bargaining power**
- **Coal:** Showed a 60% lower offensive impact than hydro (0.68), but uniquely triggered 0.14 additional defensive strikes.

Why is this relevant?

Workers did not treat electrification as a threat. Instead, they used it to advance proactive, offensive demands rather than resisting worsening conditions.

This suggests that **technology is not inherently harmful to workers**; its effect on bargaining power also depends on how it alters capital mobility.



Workers during the first general strike of 1904.

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