Private Equity Buyouts and Productivity: A Narrative from Italy

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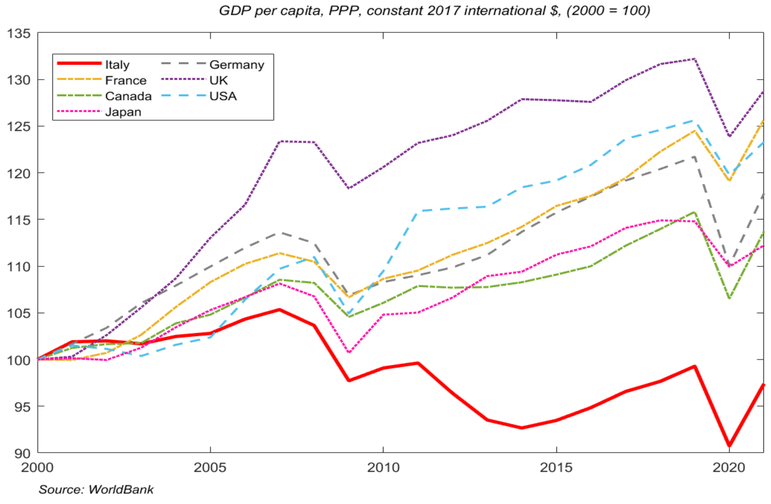
1. RESEARCH QUESTION

DO **BUYOUTS** AFFECT FIRM **PRODUCTIVITY** IN **ITALY**?

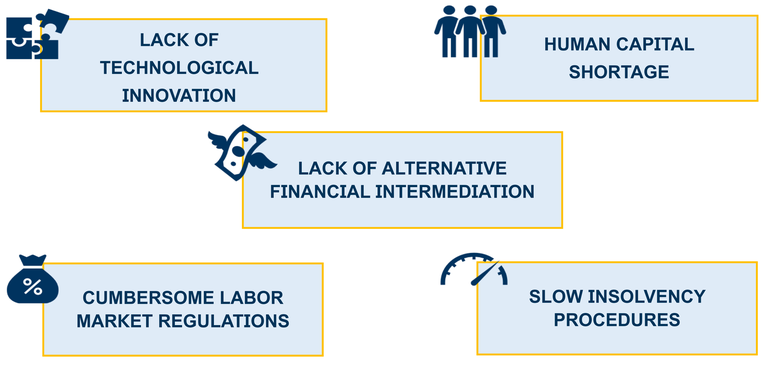
2. BACKGROUND & MOTIVATION

- Over the past decade, **capital allocations to private equity (PE) have exploded.** In 2021, a record sum of $1.2 trillion was raised, reflecting a 14% increase compared to 2020(1).
- **PE investors** are **driven by sharp financial incentives** encouraging them to hunt for every attainable source of return. Nevertheless, the **economic and social consequences** are still to be fully understood.
- While PE literature has been limited to finance, entrepreneurship, and governance studies(2), less attention has been dedicated to the **real economic impact of PE investments**(3).
- We aim to fill this gap by **studying the effect of buyouts**, as the largest PE sub-category, **on firm productivity** being a key driver of economic growth(4).
- As a case study, we examine the **Italian economy** presenting a **puzzling institutional setting:**
  - Compared to the other G7 countries, **Italy** has been struggling with **low economic growth** over the past two decades:



Source: WorldBank

- Literature suggests that this can be explained by **stagnation of productivity due to**(5),(6) :



- Besides, Italy has recently seen increased **PE investment volumes**(7) and it provides an attractive laboratory for private firm research due to its **exceptional data coverage** compared to other countries(8).

3. METHODOLOGY & DATA

3.1 SAMPLE SELECTION

- We combine data from two commercial datasets:
  - the **Bureau van Dijk (BVD) historical database** - from which we gather mainly financials to compute firm-level productivity and control variables;
  - and the **Preqin Pro database** - to identify buyouts from **1998-2020**.
- Since the distribution of buyouts within the firm universe is not random, we employ a **matching procedure** to mitigate selection concerns:
  - We sort observations into **industry-year cells** excluding unpopulated cells;
  - and run separate **propensity-score logit regressions** on each of the 303 cells conditioning on pre-buyout **SIZE, PROFITABILITY and LEVERAGE.** We locate matches through **one-to-one nearest neighbor matching** with replacement and we specify common support.
- Our **final sample** includes **1,374 buyout target** and **matched control firms**.

3.2 FIRM PRODUCTIVITY MEASURES

- Productivity captures the efficiency by which inputs are transformed into outputs.
- We consider two productivity measures for **firm i** at **time t**:
  - **Labor Productivity (LP)** $LP_{i,t} = va_{i,t} / l_{i,t}$
  - **Total Factor Productivity (TFP)** $TFP_{i,t} = va_{i,t} - \tilde{\beta}_{j,K} k_{i,t} - \tilde{\beta}_{j,L} l_{i,t}$

  Where:
  - $va_{i,t}$ is the log of **real output** in terms of added value, i.e. deflated by country-industry-year specific OECD STAN deflators.
  - $k_{i,t}$ and $l_{i,t}$ are **real capital**, i.e. log of country-industry-year deflated tangible fixed assets and **labor**, i.e. log of employee count, respectively.
  - We follow Wooldridge(9) and compute TFP as the residual of the Cobb-Douglas production function estimating $\tilde{\beta}_{j,K}$ and $\tilde{\beta}_{j,L}$ parametrically for each industry **j** within the Italian BVD firm universe.

3.3 REGRESSION MODEL

- To address the research question, we conduct an **event study** with **staggered treatment adoption**, i.e. a Difference-in-Differences with multiple time periods.
- We follow the novel methodology proposed by Sun & Abraham(10) to allow for **treatment effect heterogeneity**.
- Using their alternative estimator, we fit a **two-way fixed effect** regression with a **fully dynamic specification**:

$$Y_{i,t} = \alpha_i + \gamma_t + \mathbf{X}_{i,t} + \sum \mu_{\ell,\, leads} D^{\ell}_{i,t} + \sum \mu_{\ell,\, lags} D^{\ell}_{i,t} + \varepsilon_{i,t}$$

Where:

- $Y_{i,t}$ indicates productivity, i.e. **Labor Productivity (LP)** in Models (I) and (II) and **Total Factor Productivity (TFP)** in Models (III) and (IV);
- α_i and γ_t capture **firm and time fixed effects**, respectively;
- $\mathbf{X}_{i,t}$ is a vector of **firm features** (size, leverage, profitability, firm age, listing status, legal activity status) included in Models (II) and (IV) only;
- $D^{\ell}_{i,t}$ is a **time indicator** for firm **i** being **ℓ** periods away from initial treatment (buyout deal year) at calendar time **t**;
- $\mu_{\ell,leads}$ captures **treatment anticipation** and potential violation of the parallel trend assumption;
- $\mu_{\ell,lags}$ captures how the **treatment effects** evolve with elapsed treatment. For instance, at ℓ=0, μ_ℓ will represent the instantaneous treatment effect, at ℓ=1, the effect one year after the treatment and so on. Our reference period is ℓ=-1, i.e. the pre-deal year.

4. RESULTS & TAKEAWAYS

4.1 THE IMPACT OF BUYOUTS ON FIRM PRODUCTIVITY

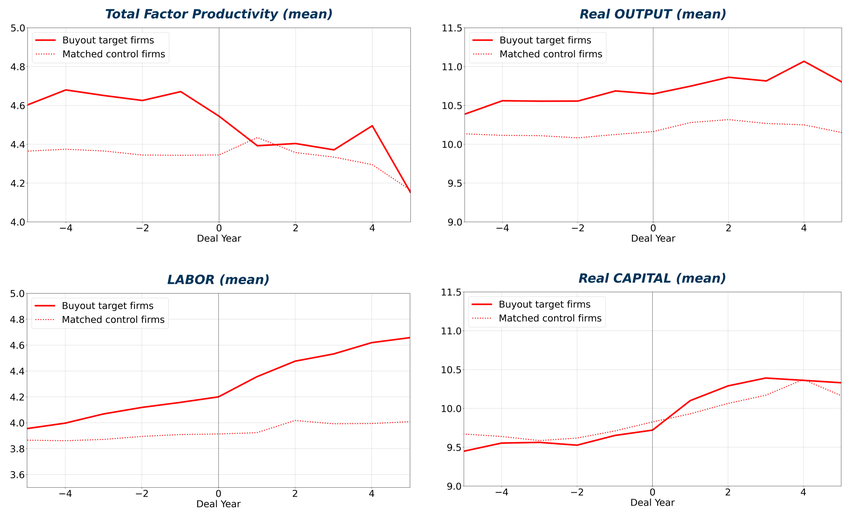
- In the years immediately **following a buyout**, we find a **significant decrease in firm productivity**, both in terms of labor and total factor productivity, of approximately 12% to 46% relative to the pre-deal year.

Model	*(I)*	*(II)*	*(III)*	*(IV)*
Dependent Var.	***LP***	***LP***	***TFP***	***TFP***
$\mu_{\ell=-5}$	-0.12*** [0.050]	-0.04 [0.044]	-0.08 [0.076]	-0.04 [0.071]
$\mu_{\ell=-4}$	-0.05 [0.040]	0.00 [0.039]	0.01 [0.062]	0.04 [0.060]
$\mu_{\ell=-3}$	-0.07 [0.039]	-0.02 [0.037]	-0.01 [0.057]	0.04 [0.056]
$\mu_{\ell=-2}$	-0.05 [0.034]	-0.04 [0.033]	-0.03 [0.057]	-0.02 [0.056]
$\mu_{\ell=0}$	**-0.12** [0.039]**	**-0.17*** [0.040]**	**-0.13 . [0.067]**	**-0.15* [0.067]**
$\mu_{\ell=1}$	**-0.19** [0.056]**	**-0.26*** [0.057]**	**-0.27*** [0.089]**	**-0.28** [0.093]**
$\mu_{\ell=2}$	**-0.18** [0.058]**	**-0.25*** [0.055]**	**-0.27** [0.095]**	**-0.29** [0.093]**
$\mu_{\ell=3}$	**-0.24* [0.074]**	**-0.27*** [0.070]**	**-0.30* [0.122]**	**-0.28* [0.122]**
$\mu_{\ell=4}$	**-0.17* [0.079]**	**-0.22* [0.074]**	**-0.20 [0.122]**	**-0.18 [0.122]**
$\mu_{\ell=5}$	**-0.34** [0.107]**	**-0.31** [0.098]**	**-0.46* [0.193]**	**-0.33 . [0.189]**
Firm Features	No	Yes	No	Yes
Firm and Year FE	Yes	Yes	Yes	Yes
Observations n°	21,965	20,458	21,890	20,413
R^2	47.13%	54.15%	52.21%	56.70%

*Significance Codes: 0'***' 0.001'**' 0.01'*' 0.05'.' ; Clustered Standard Errors are shown in squared brackets.*

4.2 FIRM PRODUCTIVITY DRIVERS

- We study the **components** of firm productivity, i.e. **output, labor, and capital.**
- Our findings suggest that the **negative effects** derive from **growing inputs**, but **stable output**.



4.3 NEXT STEPS

- Even though one would expect PE investors to mitigate the aforementioned issues and positively impact firm productivity, we find a **negative effect**.
- We argue that the negative effect stems from **heterogeneity among PE buyouts** and the underlying **Italian institutional setting**.
- To this aim, we want to further investigate **cross-sectional differences** in PE deal types, PE target firms and PE investors as well as **extend our sample** to other fast-growing G7 economies.

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