

Aggregate Dynamics and Microeconomic Heterogeneity: The Role of Vintage Technology

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Summary

- Starting point: “lumpiness” of investment
- Firms’ investment function is not smooth but rather is characterized by periodic jumps
- Main result: firms that **recently** experienced a large investment episode (spike) are more productive
- Causal effect of investment on productivity

Summary

▮ Robustness tests:

- alternative empirical definitions of spikes
- different sample periods
- accounting for firms' propensity to innovate
- age composition of the firms
- Rule out that news about current or future profitability is
 - Comment: Market to book ratio would be a better measure

▮ Conclusion: The timing of firms' investment decisions leads to productivity heterogeneity across firms and contributes to determining aggregate productivity

Summary

- They also present a RBC model that incorporates the effect
- Simulations of the model for the Italian economy are consistent with the empirical evidence
- In the model permanent technology shocks are also considered: Newer vintage investment increases productivity more than older vintages
- Result: when the growth rate of productivity of newer vintages slows down, firms postpone adopting the latest technology and reduce capital expenditures
- Reason: the productivity gap with the technology frontier increases less

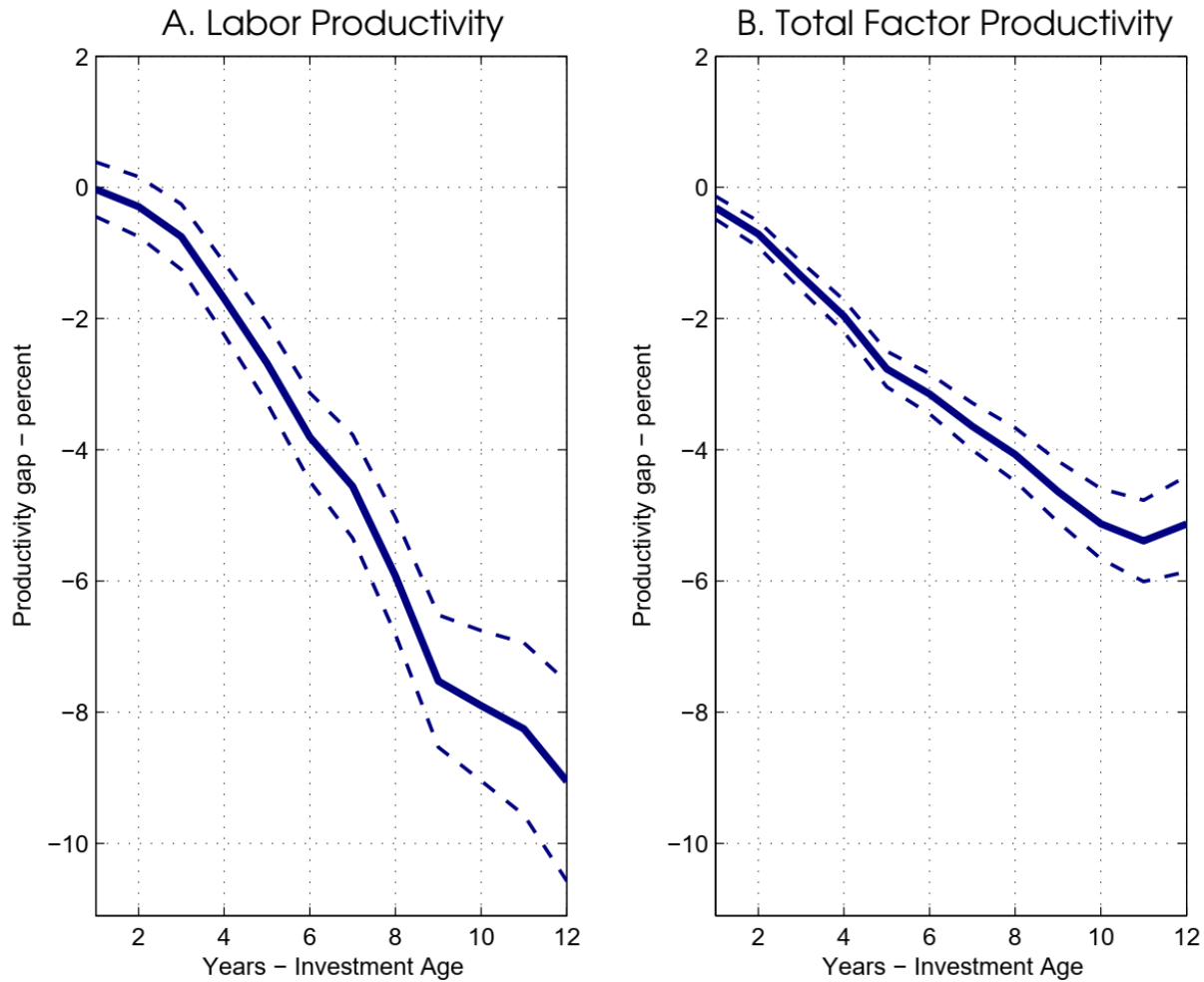


Figure 1: Investment Age and Productivity

General comments

- ✧ Nice data: 75% of Italian value added
- ✧ Paper using micro data to estimate macro general equilibrium effects
- ✧ I will not comment (much) on the RBC model the authors develop, but focus on the estimates of the link between investment and productivity
 - Results are very similar for labor productivity and for TFP (solow residual), so I will use just the term “productivity”
- ✧ Split the paper in two?

General comments

- ▮ What drives productivity?
- ▮ Is it investment spikes as this paper suggests?
- ▮ Or are the investment spikes themselves driven by something else?
- ▮ If investment spikes drive productivity growth then understanding what drives these spikes is central to understanding productivity growth

General comments

- Crucial assumption: Investment spikes that drive productivity are exogenous to the firm
- Investment in new capital then increases productivity
- Paper makes no attempt at explaining why investment is so lumpy
- What are the frictions that keep firms from investing in new technologies?
 - Credit constraints
 - Transaction costs
 - ...

Comments

- The paper suggests a **causal** relationship between investment and productivity
- What could be alternative explanations?
 - Page 13: “..., higher productivity for firms with more recent investment spikes could be the byproduct of the propensity of the firm to innovate.
 - Causality would then run differently: the firm innovates (registers a patent for example), and then invests in order to implement the innovation.
 - The interesting aspect of this explanation is that it would **also** explain why firms invest rarely, but if they do big amounts.

Comments

- ✧ The authors perform a number of tests to address this
 - One, they estimate the persistence of productivity and obtain estimates of around 0.38.
 - They then claim: Such a low persistence,..., makes it hard to rationalize the productivity gap observed over 12 years with the idiosyncratic component of productivity
 - Explain...
 - Second, the authors control for future news about profitability
 - Sample split between innovative and non-innovative firms (this seems somewhat contradictory to the underlying idea of the paper...)
 - Use the share of intangible capital as a proxy for innovation.

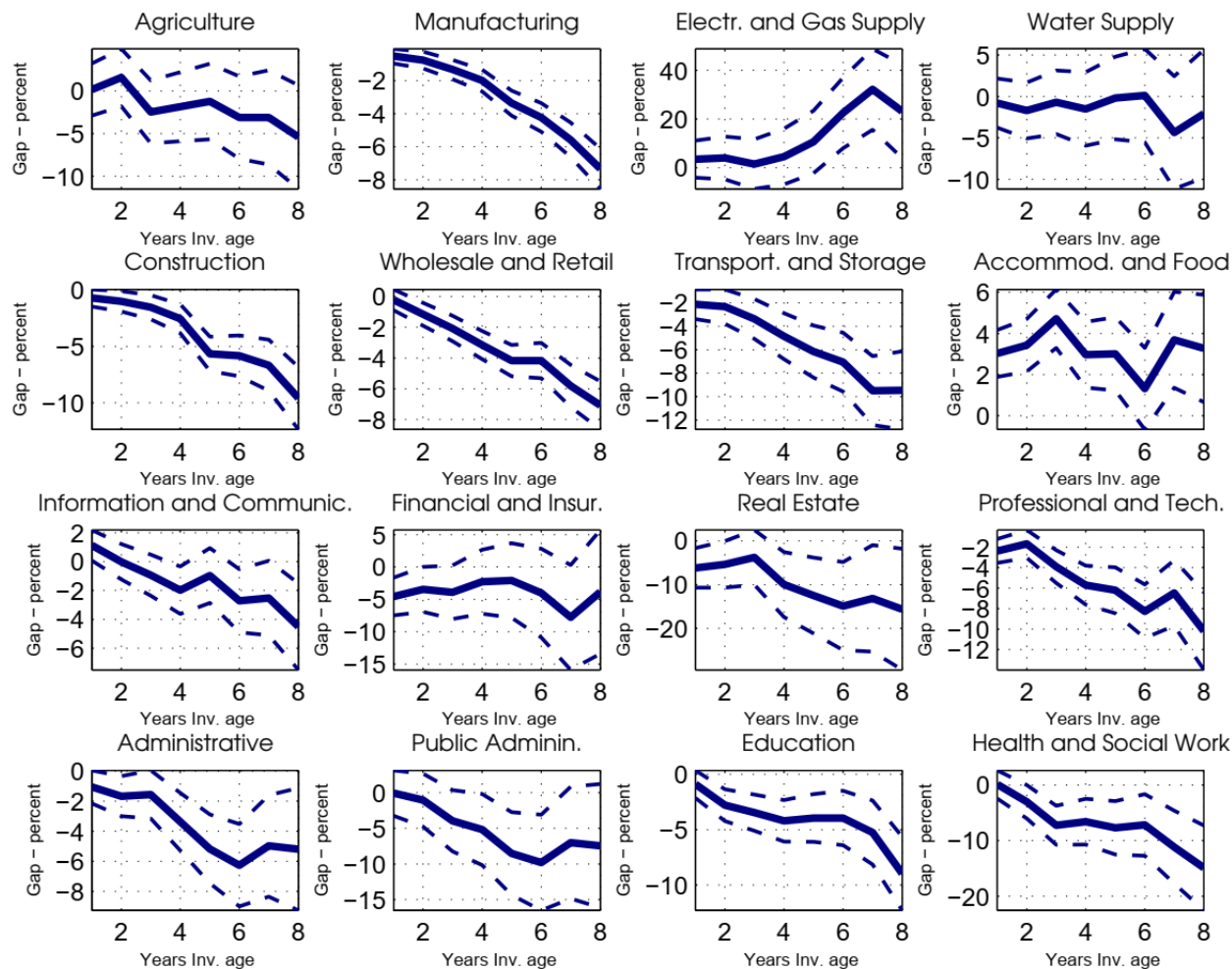


Figure A.3: Investment Age and Labor Productivity - Sectoral Analysis

Comments

- ▮ We may be able to learn something from the large heterogeneity across sectors
 - Economies of scale vs. innovation?
 - Continuous innovation in some sectors?
- ▮ I was missing a table that links investment lumpiness to size
 - In larger firms, innovation (as in registering a patent) may be a smoother process
 - Is investment less lumpy in very large firms? Or in relatively diversified firms (conglomerates)? Conglomerates are generally less innovative, but innovation may be smoother

Comments

- Slow down in productivity growth is not explained in the paper
- If anything, it would suggest that productivity growth should have increased
- Is there a way to incorporate the dissemination of technology into the approach of the paper?
 - Do firms in the same sector experience spikes simultaneously?
 - Has this changed over time?