Discussion: Environment and Firm Productivity

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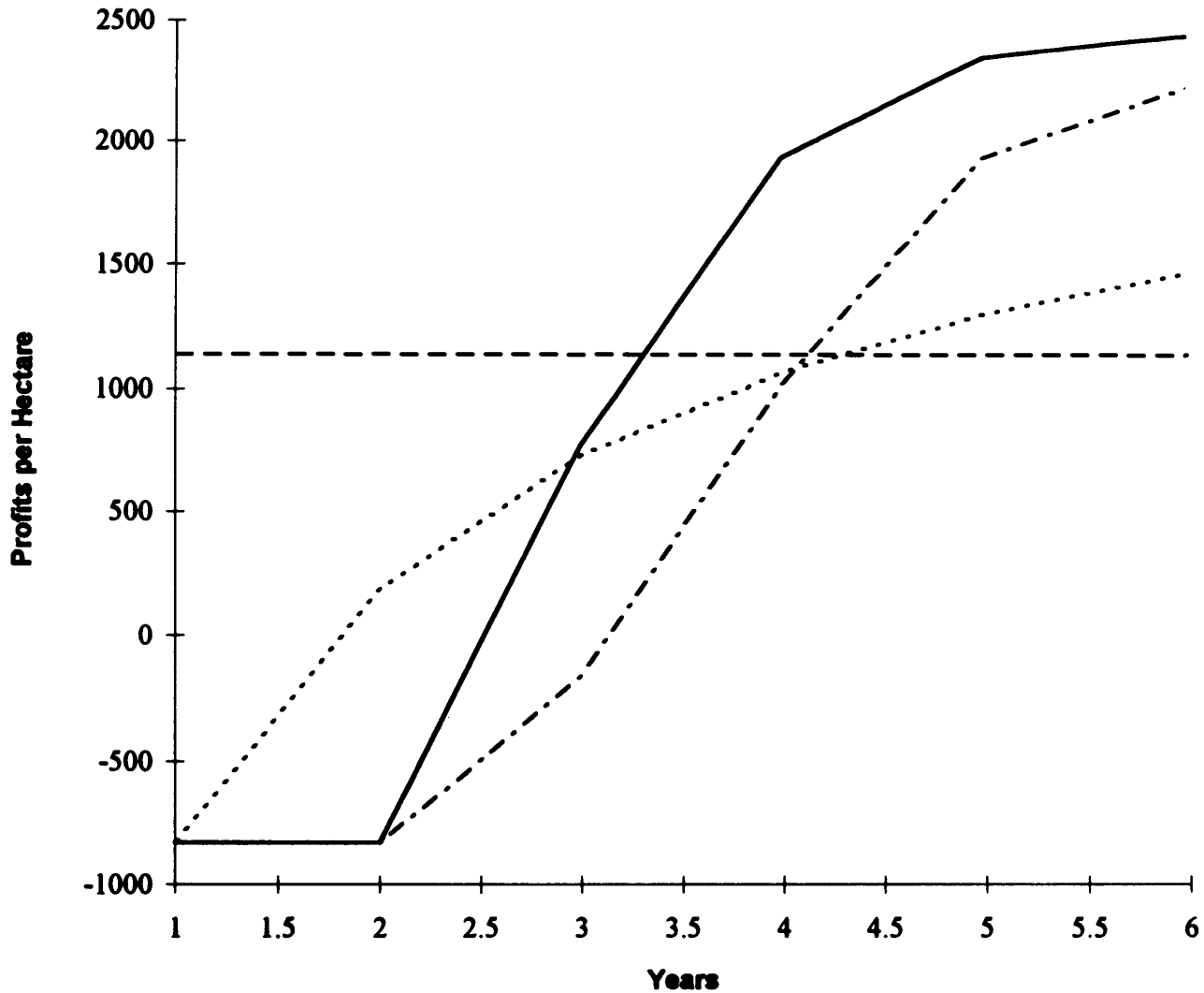
Papers

- Three papers looking at issues of firm productivity
- Different conclusions:
  - Returns to investment in new technologies depends on future credit access
  - Government mandated technological change promoted revenue growth.
  - Green-focused buyers induced a technology innovation which enhanced worker productivity.
- Fundamental relevance both to learning as a barrier to productivity growth in general and green technology adoption in particular

Learning


2500
2000
1500
1000
500
0
-500
-1000
Profits per Hectare
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
Years

Learning

What do we learn from a simple learning by doing model?

$\pi_{it} = (\eta_0 - \frac{\eta_1}{(\rho_0 + \rho_1 S_{it} + rho_2 S_{-it})} H_{it}) + \eta_2 A_i$

$S_{it} = \sum_{s=1}^{t-1} H_{is}$

$\pi_{it} + \beta \pi_{it+1}$

- Adoption of technology is costly as one learns how to use
- Own experience increases profitability of new technology
- Neighboring experience may increase profitability of new technology if sufficiently similar.
- Benefits of experience higher for those with larger second period assets.
- Profitable technology may not be adopted if learning costs too high
- Profitable technology may not be adopted even when socially optimal in the absence of mechanisms to capture learning rents.

Adhvaryu I

Critique

- Strong and convincing empirical evidence that LED lights decreased cost of high temperatures both current and lagged
- The technology seems profitable ex post.
- Is it really temperature or could it be more preicse lighting that decreases physiological cost of work?

Adhvaryu II

Relevance of learning

- What does this tell us more generally about green technology adoption?
- How do we understand lack of adoption of profitable technology?
- Clear transferability across firms but no experimentation without a subsidy–potential role of green markets/government regulation
- Rolled out across plants providing opportunity for learning-can we learn anything from this?

Tanaka I

Critique

- Very good evidence that affected cities had higher revenues among firms in dirty industries and with low energy usage. This is partly due to turnover.
- Could be more convincing if controlled for running variable as imposition of policy based on strict rules.
- A bit hard to see relationship between particular mechanisms and the actual responses.

Tanaka II

Relevance of learning

- Mandate pushes through short term costs to take advantage of downstream benefits, once learned.
- Mandate causes coordination across firrms.
- Possibly raises worker productivity through reduced pollution (see Adhvaryu et al's other paper)

Tanaka II

Implications

- Certainly should not be a general point that raising regulations increases productivity by shutting out less productive firms!
- Possibly relevant if credit market imperfection or other barriers to shut down of bad firms–but seems those issues should be targeted.
- Potential negative implications of reduced competition.

Lopez Martin I

Critique

- Addresses question of low productivity growth in Mexican firms
- Constructs a CGE model with and without investment in knowledge
- Compares regressions of TFP growth on output per capita–beauty of this is that even misspecified regressions can be informative.
- Knowledge does better....but not substantially

Lopez Martin II

Relevance to learning

- Credit market influences not only current performance
- But future constraints to access to credit lowers the returns to learning
- Idea...with effective capital market small learner could appropriate the benefits of experimentation by then substantially expanding working assets.

Lopez Martin III

Implications

- What is CGE buying here? Questions seem mostly partial.
- Is there a better set of regressions?
- TFP growth net of initial conditions predicts asset growth only in large firms?
- Include educatin as mechanism to decrease investment cost?
- Management audits crossed with future credit as an experiment–do they lead to expansion?