Strengthening Efficiency and Competitiveness in the European Knowledge Economies (SEEK)
Conference 2011: Going for Smart Growth with Knowledge and Innovations

Seek Project 2010:

Interaction Between Innovation and Firm Dynamics and Its Impact on Industry Productivity

Motivation

"The most important discovery from microeconometric investigations was the evidence on the pervasiveness of heterogeneity and diversity in economic life."

James J. Heckman, Nobel award speach (2000)

"Of the basic findings related to productivity and productivity growth uncovered by recent research using microdata, perhaps most significant is the degree of heterogeneity across establishments and firms in productivity in nearly all industries examined."

Eric Bartelsman/Mark Doms, Journal of Economic Literature (2000)

- Starting point of our research are the following two empirical observations:
  - Since the mid nineties aggregate productivity performance was much lower in Europe than in the US.
  - At a disaggregate level, however, the productivity distribution is **highly skewed across industries** and even **across firms within industries** and that this heterogeneity is fairly persistent over time.

Research Questions

- Can these differences in the productivity distribution across industries be explained by variations in the productivity effects of innovation, human capital, or competitive pressure?
- How can differences in the productivity effects be explained?
  - Can a single driver such as innovation, human capital, or competitive pressure be identified that boost productivity on its own or do these drivers reinforce each other?
  - Do the productivity effects depend on the technological position of firms, industries, or countries?
- This project takes a novel, integrated micro-meso approach.
- It is aimed at bridging firm- and industry-level approaches in order to gain a better understanding of policies that affect aggregate productivity outcomes in European knowledge-based economies.

Research Team

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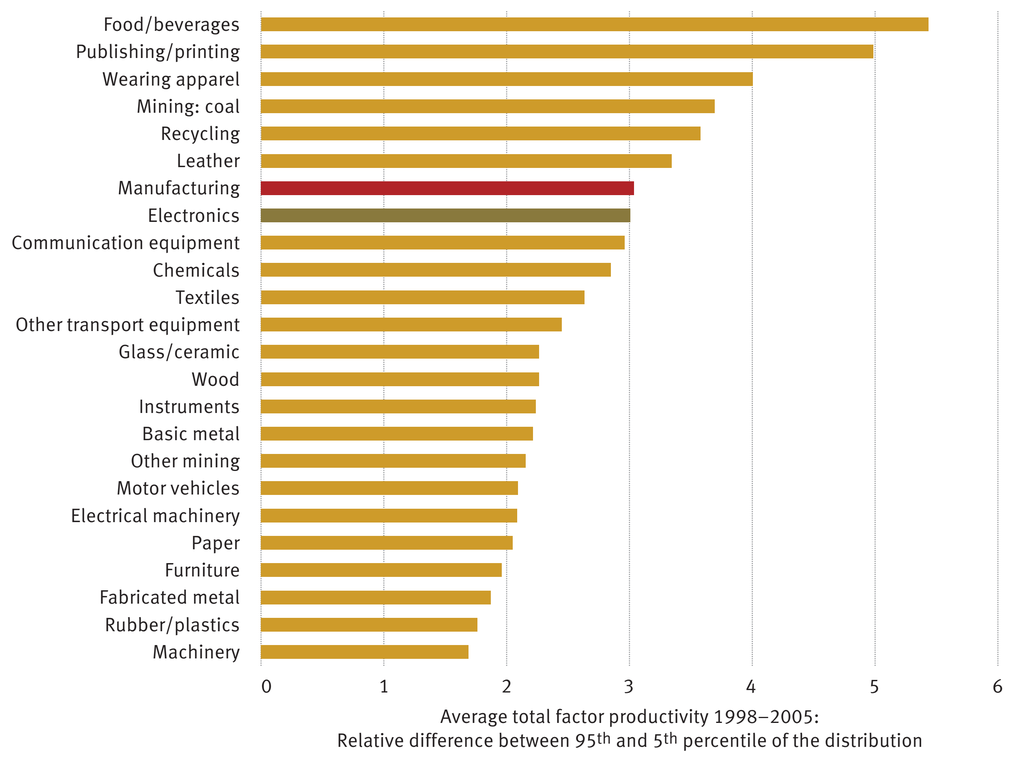
Some Descriptives

Heterogeneity of Total Factor Productivity Within Industries in Germany



Source: German Federal Statistical Office: Structural Business Statistics 1998–2005. Own calculation. TFP estimates based on productivity regressions using fixed effect estimators.

- For example: In electronics, the top 5% of the firms are 3 times more productive than the bottom 5%

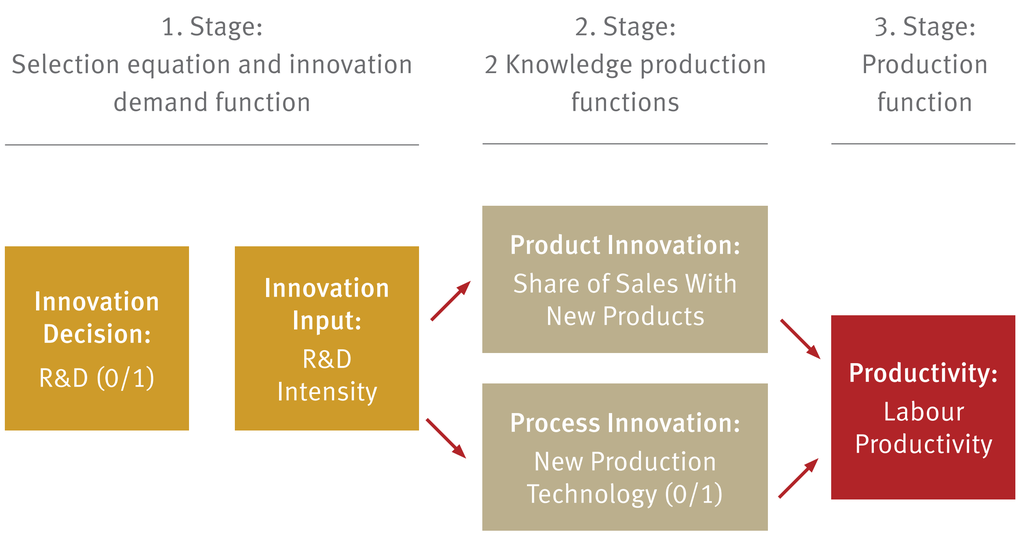
Data

- Project is a cross-country comparison between German and Dutch firms
- **Germany:**
  - Mannheim Innovation Panel (MIP) (German contribution to Community Innovation Surveys), 1996–2009
    - Information on various innovation indicators, productivity measures, share of high-skilled personnel (whole period) and perceived entry threat and technology leaders (2004, 2008)
  - Structural Business Statistics
    - Information on productivity distribution within and across industries
- **The Netherlands:**
  - Community Innovation Surveys in the Netherlands, 1996–2008
  - R&D surveys
  - Production surveys
    - Information on sales, employment, material, investment, productivity distribution
  - Matched employer-employee data set
    - information on skills

Methods

Step 1: Analysis at the Firm Level

- Investigating the interrelations between R&D input, innovation output, and productivity using the CDM model (Crépon, Duguet, and Mairesse, 1998)



- Extending the CDM model to test for two complementarity hypotheses recently put forward in the literature

  Hypothesis I:
  Is the R&D-, innovation- and productivity-enhancing effect of a marginal increase in the stock of skilled human capital stronger the closer the firm is to the technology frontier (Vandenbussche et al., 2006)?

  Hypothesis II:
  Is the R&D-, innovation- and productivity-enhancing effect of competitive pressure stronger the closer the firm is to the technology frontier (Amable et al., 2009 and Etro et al., 2008)?

- Allowing effects (parameters) to differ between industries

Step 2: Analysis at the Industry Level

- Examine different dimensions of the productivity distribution across industries that are highly skewed and persistent over time
- Can these differences be explained by heterogeneity in productivity responses on innovation?
- Starting point: Firm-level results on the degree of heterogeneity of productivity responses