Good Rents versus Bad Rents: R&D Misallocation & Growth

Aghion, Bergeaud, Boppart, Klenow & Li - Discussion by Maarten De Ridder

NBER SI - Macroeconomics and Productivity

Summary

The idea

$$\text{Productivity growth} = \text{Investment in R\&D} \times \text{Research productivity}$$

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- Can be a "feature of the world"
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This paper: firms with high research productivity $\neq$ highest R&D incentives

- Quantify misallocation using French manufacturing data

The assumptions

Two sources of competitive advantage: innovation steps or process efficiency

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Both have the same effect on markups and private innovation incentives

- But source of long-term growth is quality improvements (externality)
- Social planner would reallocate innovative resources to high-step size firms

Discussion

Comments

Very insightful paper on a key question: misallocation of innovative resources

Three comments:

1. Conceptual point: is price variation evidence of misallocation?
2. Quantification: how should firm-level prices be measured?
3. Extension: model the alternative sources of R&D misallocation?

Price variation = step sizes?

Quality steps and process efficiency distinguished with price data (prodcom)

$$p_{ij} = \left(\frac{\text{input costs}}{\text{process efficiency}_j} \right) \times \frac{\text{process efficiency}_j}{\text{process efficiency}_{\tilde{ij}}} \times \text{quality step}_j$$

- **Price dispersion is driven by quality steps**
- Markup dispersion is driven by quality steps $\times$ process efficiency
- Productivity dispersion is driven by process efficiency

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- Productivity dispersion is driven by process efficiency

$\Rightarrow$ Based on French manufacturing data:

- Large dispersion in innovation step-sizes (prices)
- Planner would increase high-step R&D share by 38%

Price variation = step sizes?

In most growth models: process efficiency and quality steps are isomorphic

$$\ln Y = \int_0^1 \ln \left(\sum_{j \in J} \tilde{y}_{ij} \right) di \quad \text{where} \quad \tilde{y}_{ij} = \varphi_j \times \gamma_j \times q_{i\tilde{j}} \times l_{ij}$$

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- Does standing-on-shoulders/long-run growth come from quality or productivity?
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  - e.g. Cavenaile et al. '22, Ignaszak and Sedlacek '21
- Differs per paper. In practice: mix of quality and productivity drives growth?
- Price variation could reflect "bad rents": opposite policy implications

Price variation = step sizes?

Note: also if quality drives growth, price variation can reflect process efficiency

$$Y^{\frac{\epsilon-1}{\epsilon}} = \int_0^1 \left(\sum_{j\in J} \tilde{y}_{ij}\right)^{\frac{\epsilon-1}{\epsilon}} di \quad \text{where} \quad \epsilon > 1, \quad \tilde{y}_{ij} = \varphi_j \times \gamma \times q_{i\tilde{j}} \times l_{ij}$$

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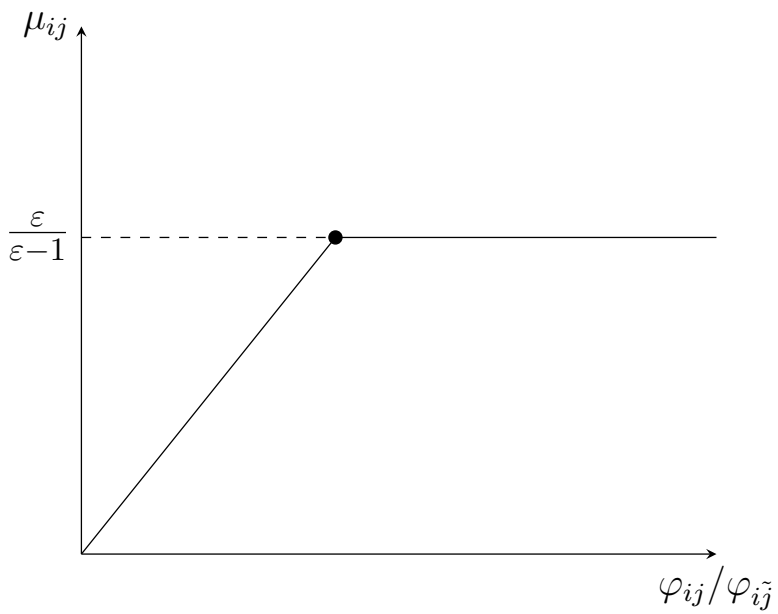
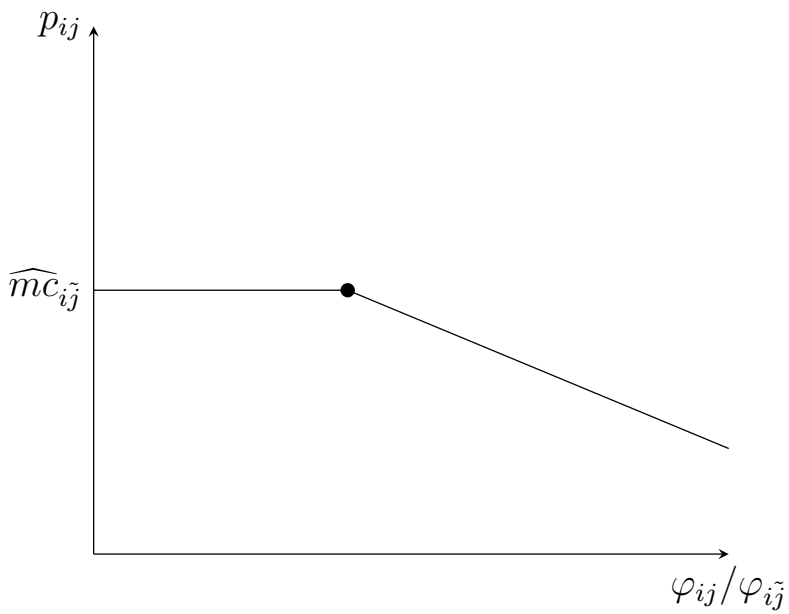
Markup



Price



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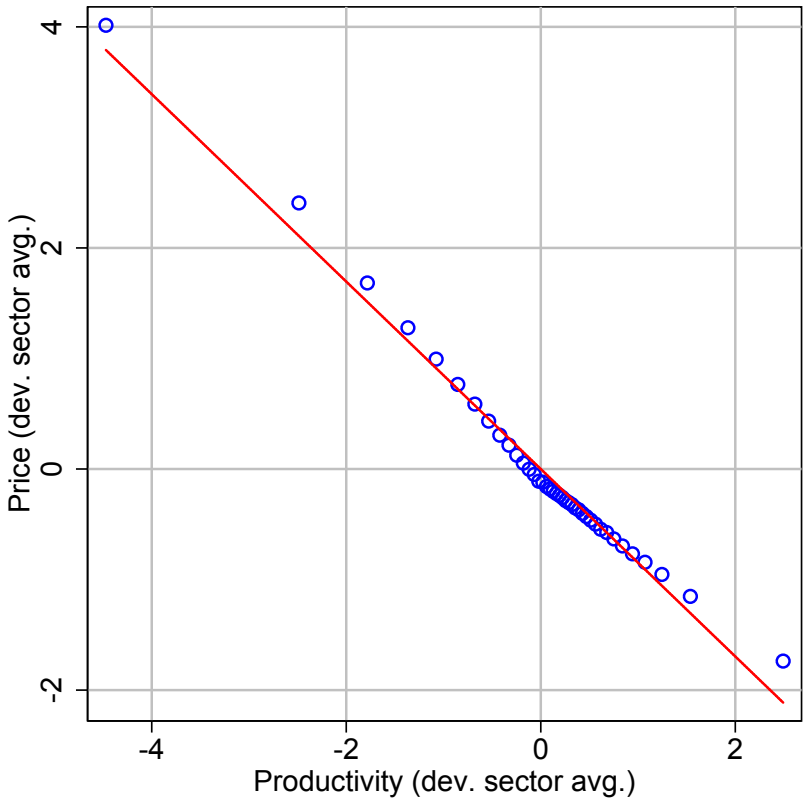

Production function estimates from *The Hitchhiker's Guide to Markup Estimation* (De Ridder, Grassi, Morzenti '22)

Hence: hard to identify high step-size firms in practice (subsidize high price?)

Quantification: measuring prices

Surprising finding: process efficiency is very homogeneous across firms

- Structural estimation: ratio high/low process efficiency of 1.02
  - Benchmark for the US: within-sector 90/10 ratio of 1.92 (Syverson '04)

    $\Rightarrow$ most misallocation doesn't come from bad rents

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Could be caused by price definition? Price index:

$$p_j = \prod_{i \in I_j} \left(\frac{py_{ij}}{y_{ij}} \Big/ \frac{\overline{py_j}}{\overline{y_j}} \right)^{\omega_{ij}}$$

8 or 10 digit: (Eslava & Haltiwanger '20; De Ridder, Grassi & Morzenti '22; Lenzu, Rivers & Tielens '22).

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$$p_j \quad + \text{ labor-price relationship regression} \quad \Rightarrow \quad 99\% \text{ meas. error}$$

$\Rightarrow$ could this cause understatement TFPQ variance + high step size variance?

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French innovation survey:

- Revenue % comes from products where process innovation has happened?
  - Among innovating firms: average of 54%
  - Other questions: did you innovate on a good you already produced? etc.

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$$rd_j = \phi_z \cdot x_j^{\theta} \cdot n_j^{\sigma} \quad \text{where} \quad \theta > 1$$

- θ maps to cost elasticity of R&D $\Rightarrow$ well-estimated from tax discontinuities
- Any heterogeneity in private R&D incentives cause efficiency loss

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Matters for policy: lower returns to reallocation of R&D to high-step firms

Conclusion

Great paper, first-order question, significant policy implications

- Open question: is variation in prices evidence of misallocation?
- Practical issue: identify high step-size firms. Subsidize high-price firms?
- May be able to improve measurement of prices (and hence TFPQ)

And there are other sources of R&D misallocation $\Rightarrow$ great for future research