Patents that Match your Standards

Bergeaud, Schmidt & Zago – Discussion by Maarten De Ridder

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Today

Summary

Research question:

- Effect of standardization on market shares, sales, investments?
  - Standardization: industry body adopts standard technology (e.g. 5G)

- Is the effect different between competitive and uncompetitive sectors?

Approach:

- Match patents to standards set by standard-setting orgs (e.g. ISO)

- Use textual similarity using standardized words: estimate score

- Aggregate to firm-level: shock in patents based on stock-standard link

Three main results:

1. Patent's score on similarity to standards correlates with economic value

2. Firm's patents become standard? Higher sales, market share, stock price

3. Effect on investment, research depend on how competitive sector is
   - Competitive sector? Higher investment in R&D, capital after shock
   - Potential interpretation: standards are an anti-competitive shock

Discussion

Very interesting paper on an understudied subject

- Clearly written, interesting results

- Very impressive data effort and good use of text-mining algorithm

Main comments

- Identification

- Measuring industry competitiveness

- Theoretical interpretation and mechanisms

Figure 2: STANDARDIZATION SHOCK AND FINANCIAL MARKETS' REACTION

(a) ar^{NAICS3}

(b) $\Delta\mathbb{E}(EPS)$

Identification
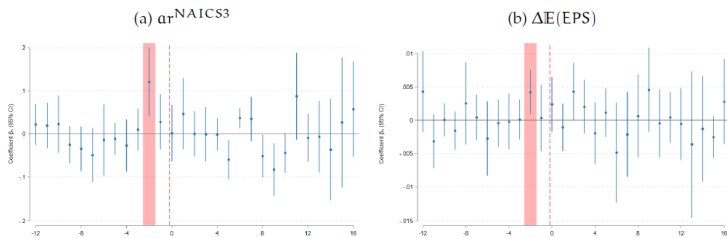
Claim "(..)in the short-term, the timing and outcome of the standardization can be considered exogenous to the firm"

Can we conclude this from the paper?

- Maybe for daily trading returns, but not over longer horizon (quarters).

- Firms may affect standardization by supporting or objecting?
  - ("consensus standards" → bargaining power?)

- More broadly, many reasons why standard-setting firms may be different

- Exogeneity: path of sales, market share, investment would be the same absence standardization

- Paper should formulate identification assumptions explicitly

- Paper should include things like balance checks, descriptive statistics

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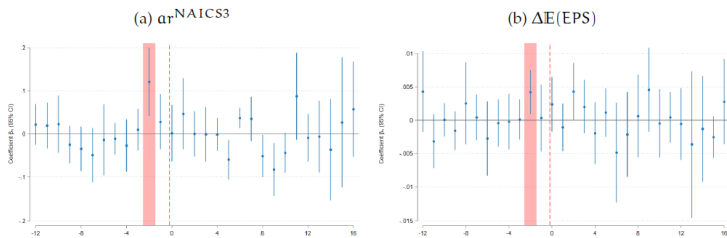
Authors follow De Loecker, Eeckhout, Unger (2020).

Hall (1986, 1988): markup for cost-minimizing firms can be written as

$$\mu_{it} = \alpha_{it}^v \left(\frac{P_{it} Y_{it}}{P_t^v V_{it}} \right)$$

$$\alpha_{it}^v = \frac{\partial Y_{it}}{\partial v_{it}} \frac{V_{it}}{Y_{it}}$$

V is set with no intertemporal constraints or monopsony power

- Convenient: derivation does not assume demand system

- Revenue and variable input spending: income statement

- Main obstacle: need to estimate a production function to find α_{it}^v

De Ridder, Grassi, Morzenti (2022)

Goal: find the output elasticity of a flexible input:

$$\alpha_{it}^{v} = \frac{\partial Y_{it}}{\partial v_{it}} \frac{V_{it}}{Y_{it}}$$

Say (for now) log production function is very simple

$$y_{it} = \alpha v_{it} + \omega_{it} + \eta_{it}$$

- y_{it} is output (sometimes observed), v_{it} variable input (observed)

- Total factor productivity ω_{it}: idiosyncratic or AR(1)

- Problem: endogeneity because both v_{it} and y_{it} depend on ω_{it}

- Solution: run an IV regression, instrumenting v_{it} by v_{it-1}

De Ridder, Grassi, Morzenti (2022)

Estimate α but we observe only revenue r_{it}:

$$r_{it} = y_{it} + p_{it} = \alpha v_{it} + \omega_{it} + p_{it}$$

- Solving for $\widehat{\alpha}$ shows that there is omitted variable bias:

$$\widehat{\alpha} = \alpha + \frac{\mathbb{E}[p_{it} v_{it-1}]}{\mathbb{E}[v_{it} v_{it-1}]}$$

- Correlation between prices and inputs: driven by price-elasticity of demand

- Problem: markups also driven by price-elasticity $\mu_{it} = (1 - d_{it})^{-1}$

- Bias in markup estimates: equal to inverse of avg. markup

$$\widehat{\alpha} = \left(\underbrace{1 - \frac{\mathbb{E}[d_{it} v_{it} v_{it-1}]}{\mathbb{E}[v_{it} v_{it-1}]}}_{\approx \overline{\mu}^{-1}} \right) \alpha$$

- Markup loses interpretation across sectors (can look at trends, dispersion)

Hope is not lost!

- Can still analyze variation in competitiveness within 2-digit industries

- Or consider other measures of competitiveness:
    - Import penetration, market concentration, firm's market share, profitability

- In general, a theory of how standards affect competitiveness is useful

A theory of standards and innovation would be useful:

1. Sharpen our thinking on the mechanisms

   - What is a standard? Why does a firm benefit from closeness?
   - What are the trade offs that drive the relationship with competitiveness?
   - Through which channels does closeness benefit the firm?
   - Can those channels be tested?

2. Quantify the effect of policies

   - To what extent is standardization beneficial for innovation?

3. Help with interpretation of the results

   - In particular, what's the effect of spillovers on the reduced-form estimates?

Conclusion

- Really interesting paper, novel contribution, relevant results

- Could use better test of identification assumptions, competition measures

- Lots of potential avenues for exciting future theoretical work