Patents that Match your Standards

Bergeaud, Schmidt & Zago – Discussion by Maarten De Ridder

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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) $\Delta E(EPS)$
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
Cumulative returns?

Figure 2: Standardization Shock and Financial Markets’ Reaction

(a) ar$^{\text{NAICS3}}$

(b) $\Delta \text{EPS}$
Authors follow De Loecker, Eeckhout, Unger (2020).

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

$$\mu_{it} = \alpha^v_{it} \left( \frac{P_{it} Y_{it}}{P^v_t V_{it}} \right)$$

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

$V$ 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 $\alpha^v_{it}$
Goal: find the output elasticity of a flexible input:

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

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 $\omega_{it}$: idiosyncratic or AR(1)
- Problem: endogeneity because both $v_{it}$ and $y_{it}$ depend on $\omega_{it}$
- Solution: run an IV regression, instrumenting $v_{it}$ by $v_{it-1}$
Estimate $\alpha$ but we observe only revenue $r_{it}$:

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

- Solving for $\hat{\alpha}$ shows that there is omitted variable bias:
  $$\hat{\alpha} = \alpha + \frac{\mathbb{E}[p_{it}v_{it-1}]}{\mathbb{E}[v_{it}v_{it-1}]}$$

- 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

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

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

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
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