Time to Innovate

by Hwang and Kim

Discussion by Ryan Kim

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Summary

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- Timely question: shorter-workweek debates worldwide, AI era

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- Weekly hours $\downarrow$ 2–3 hrs, mostly weekend work
- Capitalized IPs $\uparrow$ in light mfg. (where labor matters most for innovation)
- Output, employment, R&D unchanged

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$\Rightarrow$ Very important and interesting paper!

- New angle on innovation drivers: time, not just R&D
- Multiple identfication (sharp RDD, fuzzy RDD, DiD) with careful and thorough robustness tests (bandwidths, polynomials, placebos, McCrary, ..)

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2. Why would workers innovate?
   - capitalized IPs belong to the firm; wages unchanged (Table B5)
3. Google analogy doesn't fit this context
   - Google's 20% time: engineers, working hours, patent ownership/equity stake
   - Korean light m fg. (food, textiles, apparel, leather) $\neq$ Silicon Valley tech

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Suggestions: Embrace firm-side story, or directly measure worker channel:

- Korean Time Use Survey: what did affected workers do with the extra leisure?
- Employee invention claims (KIPO): did production workers' inventions rise?
- Patent inventors (KIPRIS): production workers as inventors — ever?

Comment 2: Identification - Paper's Placebo Check

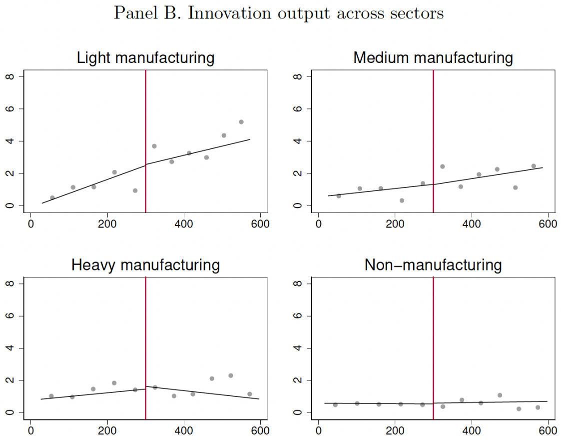


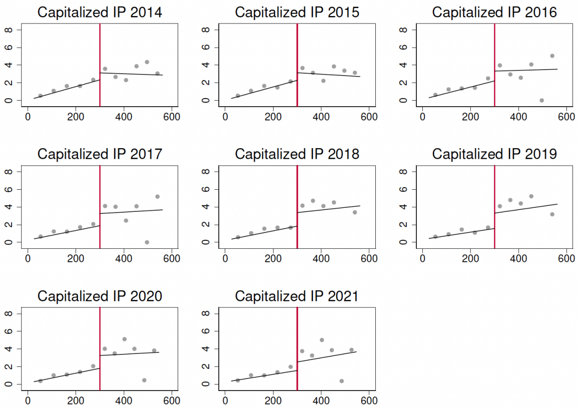
Figure 7 Panel B:
Pre-law continuity check

- Outcome: capitalized IPs at 2015 FY-end
- Forcing: **2015 employment**
- No clear jump at 300

Paper's conclusion:
RDD assumption valid

Comment 2: Identification - But with 2017 Employment...

Panel D. Impacts in light manufacturing across years (RD plots)



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Jump everywhere
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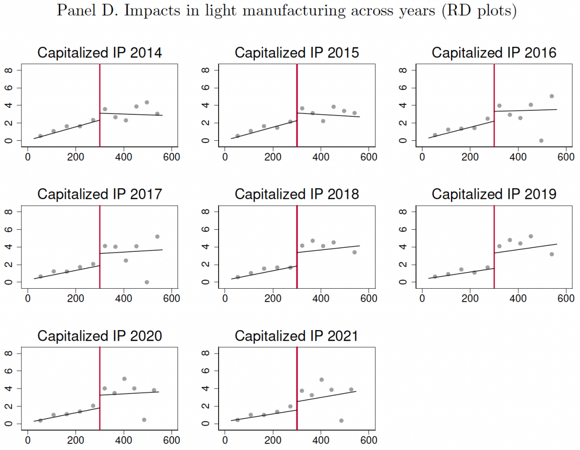

Pre-trend check, forcing fixed at **2017 employment** (paper's main spec) main outcome: 2019

Jump everywhere — even in 2014, 2015 (law proposed May 2016, enforced July 2018)

- **Sorting**: 300+ firms (in 2017) are precisely those already investing in IP; regulation-averse firms split or stay below
- **Anticipation**: firms responded to the May 2016 proposal

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- β_1^{2019} does not cleanly identify the law's effect:

$$\beta_1^{2019} = \underbrace{\text{anticipation}}_{\text{2016–2018}} + \underbrace{\text{sorting}}_{\text{type selection}} + \underbrace{\text{enforcement}}_{\text{2018.7–2019.12}}$$

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- Fuzzy RDD (2015 employment as IV) doesn't fix this completely
  - Exclusion: 2015 employment must affect 2019 IPs *only* via 2017 treatment
  - But large 2015 firms continue to innovate regardless of treatment:
    - persistent firm characteristics (R&D capacity, management)
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Suggestions:

- Donut RDD: exclude firms crossing 300 between 2015 and 2017
- Reduced-form with 2015 employment as main forcing variable (+ robustness)
- Decompose: pre-enforcement (2017) vs. post-enforcement (2019)

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- **Equally plausible alternatives**:
  - Short innovation cycles (food, cosmetics, apparel)
  - Pre-law hours longest in light mfg. $\Rightarrow$ cap binds hardest
  - Low baseline R&D $\Rightarrow$ small changes look large on log scale
  - Cheap, fast IP filings (Table B10: food, tobacco patents)

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- λ story is *one* possibility: not disciplined by the data

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  - Pre-law working hours (WPS, 2014/2016)
  - Baseline R&D intensity
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  - IP composition: patents vs. trademarks vs. designs
- Horse-race: does λ survive after controlling for these characteristics?

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- The model assumes what it claims to show
  - $\lambda > 0$ (creative leisure $\rightarrow$ firm innovation) *is* the mechanism
  - δ (fraction of leisure used creatively) unobserved, no connection to the data

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- Silent on key empirical findings:
  - No prediction distinguishing alternative mechanisms
    (e.g., worker-leisure vs. firm-substitution)
  - Anticipation dynamics (static model)
  - Capital substitution (K fixed; ignores software $\uparrow$)
  - Sector heterogeneity (λ exogenous; cannot explain light mfg.)

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  - Sector heterogeneity (λ exogenous; cannot explain light mfg.)
- **Suggestion**: extend the model to engage with these findings, or present results as clean reduced-form evidence

Comment 5: Very Small and Concentrated Sample

- **Small Sample**: Only 27 establishments above 300 in light mfg. (Table 2)
  - Main spec relies on this small base: $\pm$300: 129 obs, $\pm$200: 72, $\pm$100: 28
- Patents in light mfg. **concentrated** in few categories (Table B10) Foodstuffs (A23): 32%, Tobacco (C12): 12.1%

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Suggestions:

- Which sub-sectors / establishments drive the effect?

Final Comment

- Important question, ambitious paper
  - Rare quasi-experiment on work hours (Korea's 52-hour law)
  - Rich establishment-level data (WPS)
  - Connects time, labor, and innovation in a novel way

- Looking forward to seeing the final version!