

# Crafting an AI Compass: The Influence of Global AI Standards on Firms

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# Motivation

- ▶ What is the role of AI standardization on corporate outcomes?
- ▶ Two opposing perspectives:
  - ▶ AI standards reduce economic uncertainty, lower barriers to entry, etc.
  - ▶ AI standards impose limits, leads to technological lock-in.

## Data Source

- ▶ The principal source of the dataset is the publicly available NIST report: US Leadership in AI: A Plan for Federal Engagement in Developing Technical Standards and Related Tools.
- ▶ The authors identify the critical AI standardization committees from the report and collect data from the respective website of the committee.
- ▶ 5,456 standards from 1972-2003.  
But estimation covers 2017-2022.

# Identification Strategy

$$y_{i,c,t} = \beta_0 + \beta_1 \log(\text{AI Standards}_{i,c,t}) + \gamma \text{FirmChars}_{i,c,t-1} \\ + \tau \text{CountryChars} + \text{Fixed Effects} + \epsilon_{i,c,t}$$

- ▶  $y_{i,c,t}$  = capital expenditures
- ▶ AI Standards  $_{i,c,t}$  = number of AI Standards.
- ▶ Downward bias on  $\beta_1$ : firms with unobserved quality may hold off investments until uncertainty is resolved.
- ▶ 2SLS: Use two-year rotation of the UNSC membership as an instrument for  $\log(\text{AI Standards}_{i,c,t})$ .  
Idea: Committees with more insiders pass more regulations than more diverse committees.

# Findings

- ▶ A 100% increase in AI standards increases capital expenditures by 0.50% and R&D expenditures by 1.65%. Quantities seem small. Is this economically significant? How to gauge?
- ▶ Ethics-focused committees different from technical ones:
  - ▶ Positive: Machine Learning, Data, Automation, Programming Language, Interchange, and Machinery & Equipment.
  - ▶ Negative: Ethics & Accountability and Privacy.

# Theory

- ▶ Real Option Model.
- ▶ Prediction: The difference between firm investment on dates with publications of AI standards and dates without publications is higher when the published standards:
  - ▶ aim to increase interoperability
  - ▶ provide instructions on implementations of AI technologies
  - ▶ is not about ethical and privacy restrictions
  - ▶ endorsed the technology that the firm has a comparative advantage in

## Comments 1/2: Framing and measurement

- ▶ Highlight what's surprising.  
If a government passes a standard, is a benefit surprising?  
Is the magnitude surprising?  
Is the ethics standard exception surprising? Or, maybe no one had raised that?
- ▶ Who will use these findings? What purpose?  
Regulators, model-builders, business forecasters ...?
- ▶ The instrument (committee members) probably interacts with the number of standards. When many standards are passed by your reps, this increases home investment more. Partly capturing a joint effect?  
Is this a problem? Not clear.
- ▶ Is there really more investment in the long-run? Or is this a temporary delay of investment while standards are written?

## Comments 2/2: Mechanism

- ▶ What causes the increase in investment besides reducing uncertainty? In the model, the investment boost comes from knowing whether certain AI investments are compliant or not. But that should happen regardless of the composition of the committee.
- ▶ Is this about more investment overall or more investment for countries that benefit? The paper goes back and forth.
- ▶ What about welfare? The current findings are only about increases in investments in some countries. Is this a good thing? Or are these countries stealing rents from others?
- ▶ The paper starts by asking: Do standards help by reducing uncertainty or hurt by imposing lock-in? Did we really answer that? Or did we answer that for some set of countries when those countries write the standards?

# Conclusion

- ▶ Countries that lead standards committees get substantial local benefits.
- ▶ AI standards substantially sway investment behavior. The type of standards and issuing committees are crucial determinants.