Measurement Challenges:
Lessons from Four Case Studies

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General Questions

- **Description:** What kind of subsidies/industrial policy have been applied in various countries in each of the four sectors?
  - What are the conditions associated with these subsidies? Specifically, are there any local content requirements (discriminatory)?
  - Are they WTO-compliant?

- **Motivation:** What problems are they intended to address?

- **Effectiveness:** Have they been effective at addressing those problems?

- **Cross-country Spillovers:** What are the effects on other countries? (positive or negative)

- **Accurate Measurement = Prerequisite for Evaluation**. But accurate measurement is elusive

Case Studies: Overview

Sector	Authors (presenters in red)	Policy Instruments
Shipbuilding	**Panle Barwick** & Myrto Kalouptsidi	Subsidies in China (measurement challenging → use model as detection tool)
Semiconductors	Penny Goldberg & **Reka Juhasz** & Nathan Lane & Giulia Lo Forte & Jeff Thurk	Various, (difficult if not impossible to accurately measure → use historical analysis & GTA data & ML & model as detection tool)
Renewables (Wind & Solar)	Todd Gerarden **Mar Reguant** Daniel Xu	Demand Subsidies (well measured) Supply Subsidies (measurement challenging for China)
Electric Vehicles	Panle Barwick & & Hyuk-soo Kwon & **Shanjun Li** & Nahim Zahur	Consumer Subsidies & Local Content Requirements (well measured)

Measurement Challenges
Main Takeaways

➢ Not all Industrial Policy is hard to measure: Demand-side vs. Supply-side

   o Consumer Subsidies & Local Content Requirements: Very well measured. Can only be effective if salient (EVs; Solar Panels)

   o But subsidies and other interventions at the plant or firm or district or national level hard to detect.

➢ Challenges related to:

   o Form of support: Grants vs. below market financing vs. other forms of implicit support

   o Ex-ante vs. ex-post measures

   o Implementation: In China policies are announced at the national level, but implemented by provinces. Hard to keep track, firm-level measures often lead to double-counting.

Measurement Challenges
Main Takeaways (contd.)

➢ Even when subsidies are well measured, need theoretical framework for judging their magnitudes and evaluating their effects.

  o Example: Chinese subsidies on EVs: Large or Small given the size of the market?

  o Example: Chinese support for semiconductors: China provides the highest support (according to prevailing estimates). But if one scales this support by GDP, then Korea is the most heavily subsidizing country.

➢ What is the right metric? Need conceptual framework to judge this

  → Grossman and Sykes or

  → Model-based Approach

Data-Driven vs. Model-Based Approach

- Given measurement difficulties, resort to model-based approach (Barwick et al for Shipbuilding; Goldberg et al for Semiconductors).

- **Idea:**
  - Develop a model of the sector/industry
  - Use the model structure and data to estimate the costs facing firms
  - If these costs appear systematically lower for one country or a subset of firms, even after one has controlled for all possible confounding factors, strong suggestion that these firms are being subsidized.
  - Works particularly well when there is a smoking gun. See graphs for shipbuilding.
  - Hence, most powerful when model results are combined with strong descriptive evidence.
  - Note: Model delivers EX-POST measure of IP (size of support & effectiveness)

- **Advantages:**
  - Allows not only measurement, but also evaluation of industrial policy
  - Captures implicit support through broad measures (e.g., education policy or infrastructure investments).

- **Disadvantages:**
  - Model assumptions may drive the conclusions. But can conduct robustness analysis
  - Very time-consuming. But can apply the criterion "beyond reasonable doubt" as opposed to "beyond any doubt"
  - Perhaps most important from a policy point of view: Cannot pinpoint which policies are responsible for what, and which of them are WTO-compliant.
    - → Needs to be complemented by data-driven analysis

Conclusions

- Detection of Industrial Policy is detective work

- Ideally, combine data, processing of government documents and historical analysis with flexible economic model

- Need for:

  - An open mind re:
    - Methods
    - Countries' IPs (willingness to update priors)
  - A case-by-case approach for each industry