Measurement Problems in Regulation

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Introduction

- Regulation is required for 2 reasons:
  - Prevention of monopoly pricing; and,
  - Health and safety.
- Incentives to maximise productivity
- Measurement problems arise when there are multiple outputs and inputs
- But also problem of decomposing values into prices and quantities
- Need data on prices and quantities of all outputs and inputs to measure productivity
Gross Outputs & Intermediates

- Need to decompose revenue into prices and quantities
- Should exclude taxes on outputs
- Major intermediates are:
  - Materials
  - Business services
  - Leased capital
- Unique products problem
- Price index problem
- How to handle leased capital (e.g., aircraft)
- Should include taxes on intermediates
Labour & Capital

- Problem with using number of employees
- Hours worked is better but still has problems
- Changes in skill mix
- Need to include depreciation, interest cost and capital gains in capital user cost
- Ex-ante versus ex-post
- Problem of negative user costs
- Information on economic depreciation is poor
- Physical or deflated asset value quantity measures?
- Allocation of capital taxes
Inventories, Land & Resources

- Many studies simply neglect inventories
- Should be allocated a user cost
- Problems in periods of inflation
- Economic versus accounting/tax treatment
- Quantity of land may be changing for some firms
- Land prices can be quite volatile
- Important to include land in asset base or else rates of return will be overstated
- Need to include property taxes
- Need to recognise depletion of resources & improvements in environmental quality
Service Sector Outputs

- In NAICS 290 of the 545 6-digit level service industries currently have no price deflator
- Unique products
- Complex products
- Tied products
- Joint products
- Marketing and advertising products
- Heavily subsidised products
- Financial products
- Products involving risk and uncertainty
Network Industries

- Output is more than just throughput
- Ability to deliver service very important
- Road analogy
- Need to include system capacity as well
- Also output dimension associated with number of customers
- Service quality important but hard to incorporate
- How do we allocate revenue to these unobservable outputs?
- Econometrics has a role to play but data limitations can be problematic
Seasonal Prices & Quality Change

- Some products are not available in all periods – can be 5-10% of products
- Problem of creating an accurate price index
- Currently much attention on quality change issues
- Around 2% of statistical agency price quotes disappear each *month*
- Hedonic regression methods
- Econometric estimation of reservation prices
- Methodology still to be resolved
- Reproducibility problems
Conclusions

- Measurement problems are ubiquitous
- Can make incentive regulation difficult
- Have to be aware of the measurement pitfalls
- Important to make a start using currently available data
- Important to ensure data collection mechanisms are put in place early and discussion initiated with stakeholders to get agreement on specification
- US railroads model is an ideal but will take considerable time to achieve