

Measurement Problems in Regulation

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Introduction



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- **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 (eg aircraft)
- Should include taxes on intermediates

Labour & Capital



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- 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



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- **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



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- **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**