Do asymmetric info and/or lemons problems inhibit EE?

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Outline

1. Asymmetric information, lemons, principal-agent problems: links.
2. Theory.
3. Evidence to date.
   a. From other markets: insurance, cars and trucks, mortgages.
   b. From EE
4. Policy implications and directions for research.

1. Asymmetric information, lemons, principal-agent problems: links.

   - Landlords or home builders know the energy efficiency of homes they rent or sell. Renters and buyers do not.
   - Asymmetric info is one explanation for the persistence of utility-included rent.
   - Twin problems: "usage" (moral hazard), “efficiency” (adverse selection)
   - Renters know their propensity to use energy. Landlords do not.
   - Lemons model … only poorly insulated, energy inefficient homes rent or sell.

   - [Other venues – heavy duty truck rule]

2. Theory is simple and intuitive.

   - Oft cited
   - One reason: based on a well-established theory that has stood the test of time (and the Nobel committee)
   - Two points:
     - Asymmetric info = same as "split incentives"
       ▪ The latter is more media-friendly descriptive language
       ▪ If incentives are aligned, asymmetric information doesn't matter. If information is symmetric, split incentives don't matter.
     - Many such problems are two sided, which means it's not obvious which way the bias goes.
       ▪ If utilities are included in rent, tenants use too much energy (MC=0), but landlord have incentive to invest in energy efficiency.
       ▪ If utilities are charged to tenants, tenants have incentives to conserve (MC=Pe), but landlords have no incentive to invest in efficient construction or appliances.
Murtishaw and Saathaye (2006) call this the "usage problem" and the "efficiency problem"

- Other venues
  - Heavy Duty Truck Rule (USEPA 2011).
    - Since the used truck market has a lemons problem with respect to fuel economy, buyers of new trucks are unwilling to invest.
    - "purchaser’s willingness to pay for fuel efficiency technologies may be even lower in the resale market than in the original equipment market... [and] purchasers of used vehicles may not be willing to compensate their original owners fully for their remaining value. As a result, the purchasers of original equipment may expect the resale market to provide inadequate appropriate compensation for the new technologies..." (p. 9-5)
  - Similar argument regarding home sales. (Harding and Levinson, in progress).

3. Evidence

a. From other markets: Buyer advantage — insurance

\[
\text{Coverage}_i = X_i \beta + \varepsilon_i \\
\text{Losses}_i = X_i \gamma + \mu_i
\]

Symmetric information \( \Rightarrow \varepsilon_i \text{ and } \mu_i \) uncorrelated


- tests Rothschild and Stiglitz (1976) — "contracts with more comprehensive coverage are chosen by agents with higher accident probabilities"
- "suggests a very simple test: a positive correlation between coverage and frequency of accidents should be observed on observationally identical agents: (but could be adverse selection or moral hazard)
- consistent evidence against asymmetric info


- Israeli auto insurance ... Evidence for asymmetric info


- "We test for unobservables linking health insurance status and health care consumption. We find no evidence of informational asymmetries"

iv. Finkelstein and Poterba, 2013. Annuities
b. From other markets: Seller advantage -- insurance

- cars and trucks
  i. Bond, 1982
    - trucks purchased used required no more maintenance than trucks of similar age and mileage purchased new
  ii. Emons & Sheldon, 2009
    - Swiss used cars more likely defective
  iii. Lewis, 2011
    - eBay Motors – info cost decline reduces problem

- mortgages
  i. many recent finance papers about lower-quality loans sold into CMBS pools

c. EE
- "remarkably limited" (Gillingham et al., 2010)
- obstacles
  o selection by landlords and tenants into apartments and rental contracts
  o moral hazard confused w. adverse selection
- Condition differences between owners and renters in appliances and insulation.
  o Davis (2012). Renters less likely to have energy efficient appliances.
  o Gillingham, et al. (2011). California residents who pay the marginal cost of heat are 16% more likely to turn the thermostat down at night. Homeowners 20% more likely to insulate ceilings.
    - It's small: Alcott and Greenstone infer rental properties use 1.2-2 % more energy.
    - Efficiency problem bigger than usage problem – rent should include utilities.
  o Wood, et al. (2011) find no evidence that Australian homeowners spend more on energy than otherwise similar renters.

- Lack of capitalization
- **Asymmetric info**

  o Levinson and Neimann (2004).
    - "energy costs are 1.7% higher in heat-included apartments than they would be if these same apartments, with the same tenants, were individually metered".
    - Some new, electrically-heated buildings have utilities included → metering costs cannot be the only story.
    - In most cases, the higher rent in heat-included apartments "is never large enough to offset the costs of utilities" → landlord-side explanations, though those could be metering costs as well as asymmetric info

  o Choi and Kim (2012).
    - "well-maintained" units are more likely to have utilities included – consistent with asymmetric info/lemons story

    - Renters more likely to say their homes are “cold” and “expensive to heat”
    - Tenants willing to pay higher rent in exchange for improved energy efficiency

4. **Policy implications from current evidence**
   - Utility-included rents.
     - "agency issues, in the sense of landlord–tenant issues, are not as widespread as often thought . . . In total, approximately 9 percent of potential across all sectors is affected by this type of agency issue. (McKinsey & Co., 2009)

   - Asymmetric info / lemons and resale market.
     - scant evidence

**Further research**

- Existing evidence based on conditional comparisons suspect.
- RCTs like Haas/MIT E2e ?
- Use factors correlated with asymmetric info. e.g. Test: Less capitalization for homes in high turnover areas or owners in high turnover occupations.
- Model predictions from “learning”. e.g. Harding and Levinson

**Takeaways**

1. Oft cited justification for policy based on solid theory but scant evidence.
2. Very little evidence of asymmetric info in any context – even less in energy efficiency.
3. Asymmetric info may explain utility-included rents, but efficiency a larger issue than usage.
4. An area worthy of research attention – experimental or otherwise.

References


