

“Deep Capture and Economies of Scope between Innovation and Influence”

Ian Sheldon

Brian Roe

**Paper prepared for presentation in FAMPS/International Section
AAEA Meetings, Minneapolis, MN, July 27-29, 2014**



THE OHIO STATE UNIVERSITY

Motivation.....

- **“Without outside help ...the safety bureau (Ocean Energy Safety Institute)...‘cannot realistically be expected to match industry in technical depth or breadth’....” (October 2013, *Fuel Fix*)**
- **“Pharmaceutical companies are skilled at manipulating data in ways that cast their products in a favorable light...the drug manufacturer holds back the ninety five per cent of trials that show the product’s inefficacy. At the same time, it publishes the five percent of trials that attest to the drug’s usefulness.” Iuliano (2010, *Journal of Food Law and Policy*)**

Regulatory and Influence Structure

- Assume following structure:

Firm



Policymaker → Regulator → Consumer

- Policymaker sets rules for regulator who screens information on product quality supplied by innovating firm
 - No *shallow* capture via bribes/revolving door (Stigler, 1971)
 - Influence occurs via *deep* capture – regulator suffers from *fundamental attribution error* (Hanson and Yosifon, 2003)

Notion of Capture

- Draw on definition of credence goods with *diagnosis* stage (Dulleck and Kerschbamer, 2006)
- Innovator as “mechanic”
 - Innovators know more than regulators just as mechanic knows better than consumer of car whether repair is needed
 - Innovations are novel by definition
 - Hence innovators are experts holding asymmetric information about their innovation
 - In our model expert can spend money to “nudge” regulator and this becomes more cost efficient with greater innovation
 - Economies of scope between innovation and influence

Firm-Regulator Timeline

1. Firm

- Invests in process innovation (v) – regulator observes if $v > 0$ (any change in process)
 - Generates data as co-product of innovation
- Invests in deep capture (l) – unobserved by regulator
- Observes quality (b) – unobserved by regulator

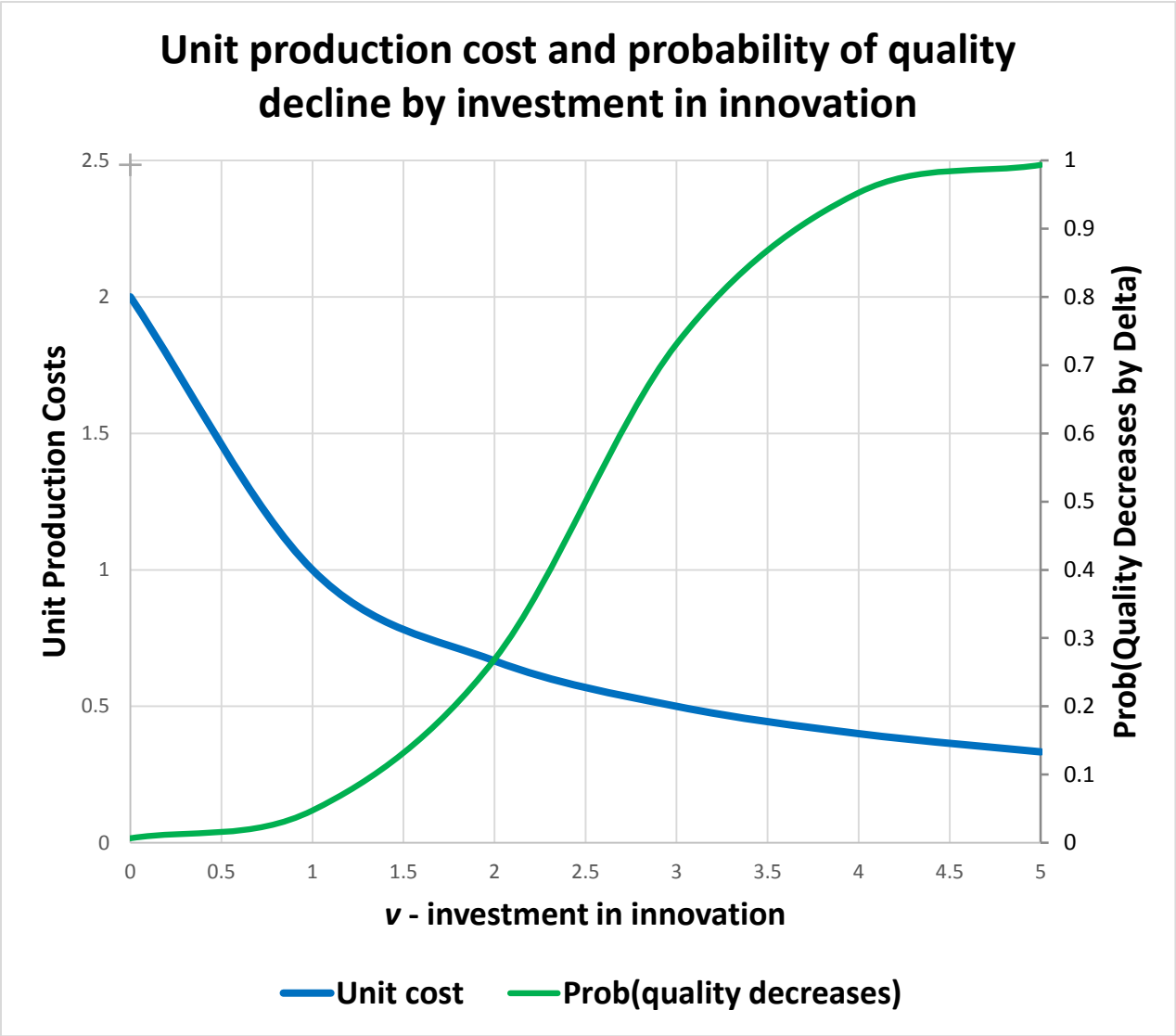
2. If $v > 0$, and no data submitted to regulator

- Regulator bans implementation of process innovation
 - Regulator can observe if production process has changed and shut firm down

Firm-Regulator Timeline

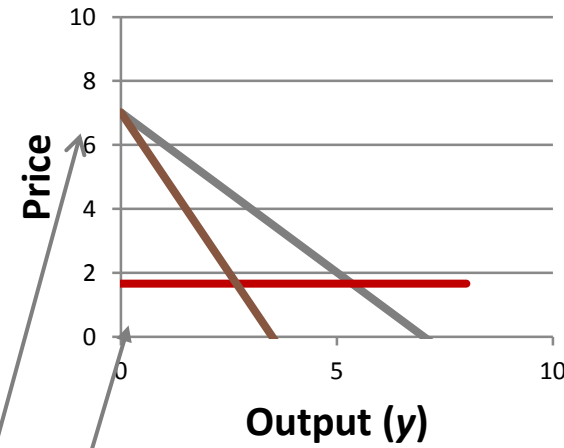
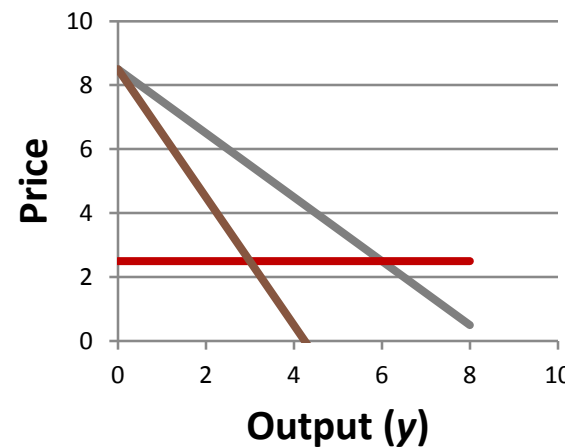
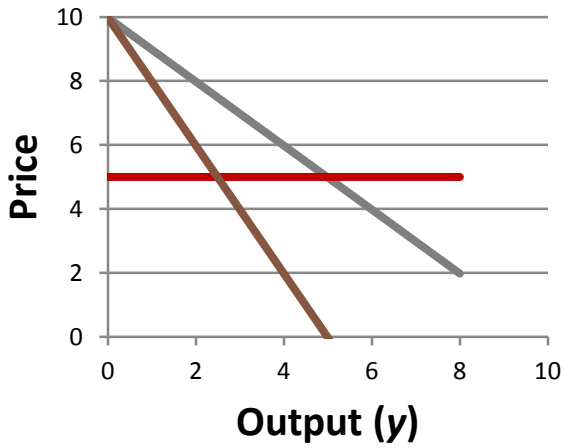
3. If $v > 0$ and data submitted to regulator
 - Regulator uses data to assess product quality and assign IP
 - Using rules established by government, potentially subject to shallow capture and change when trade partners have different rules
 - Using scientific and statistical techniques influenced by firm's deep capture investment
4. Monopolist learns of regulator's product quality assessment
 - Chooses whether to implement innovation (observed by regulator)
5. Regulator communicates relevant product quality to consumers
6. Consumers take regulator's quality assessment as true quality and purchase according to price/quality combination offered by monopolist

Process Innovation and Product Quality



Transparent Product Quality

Innovation investment increases from 0 to 1 to 2



— $p(v=0)$ — $c(v=0)$ — $mr(v=0)$

— $p(v=1)$ — $c(v=1)$ — $mr(v=1)$

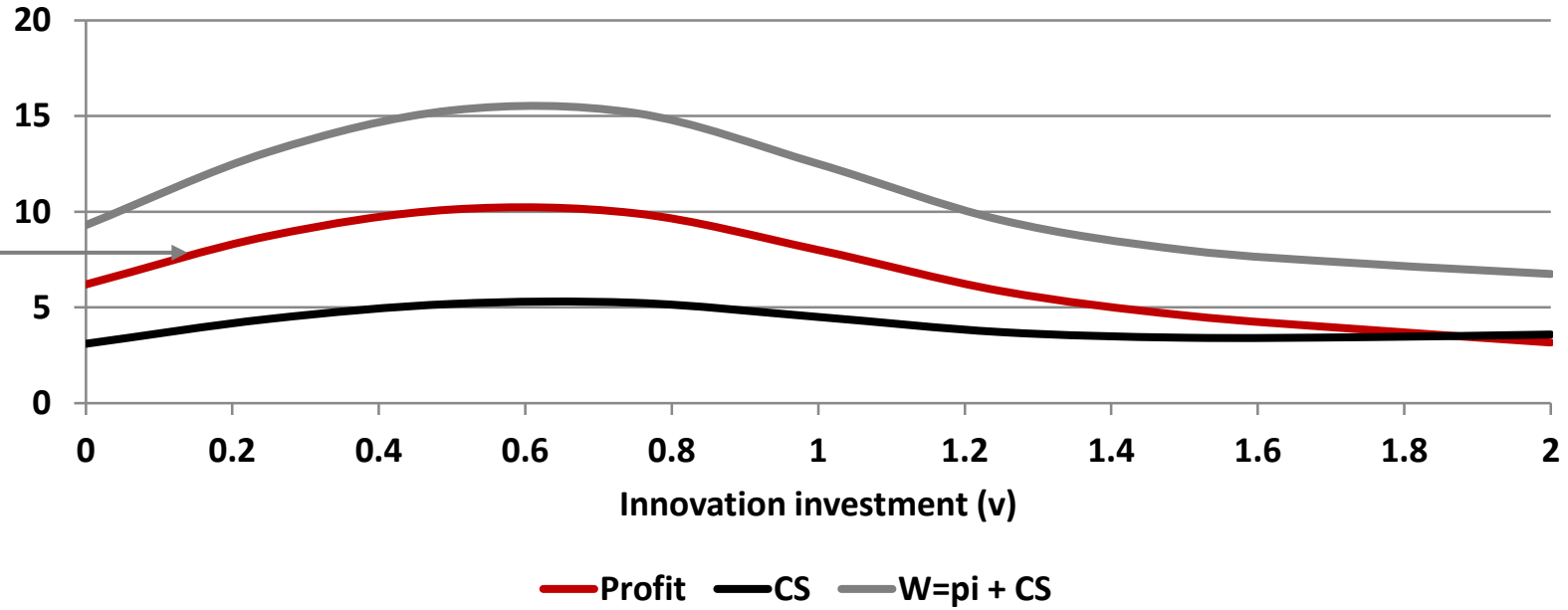
— $p(v=2)$ — $c(v=2)$ — $mr(v=2)$

Quality loss nearly certain when investment = 2
 – expected choke price approaches 7

Cost reduction is diminishing

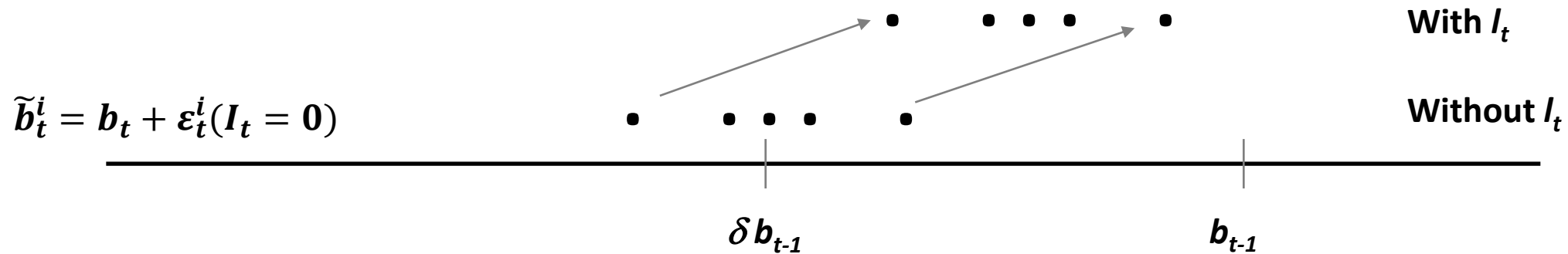
Transparent Product Quality

Firm profit also includes cost of innovation investment, but no cost of influence as quality is freely transparent

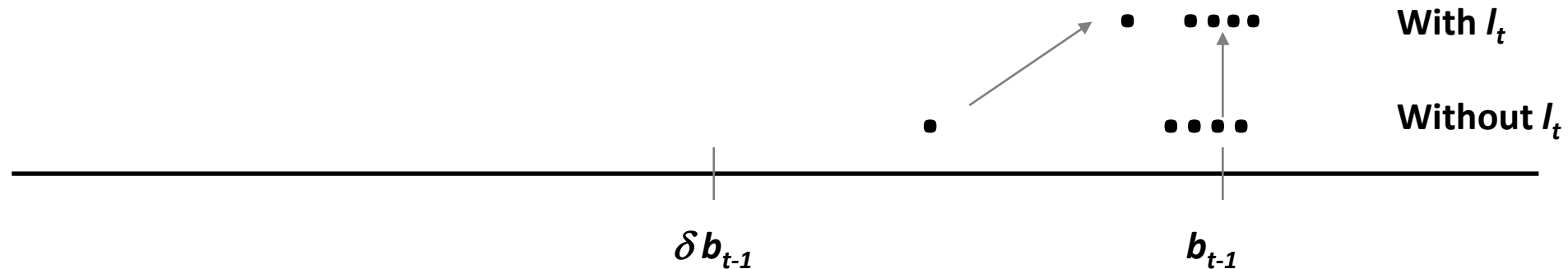


Firm Influence on Regulatory Assessment of Quality Samples

When true quality (b_t) has decreased

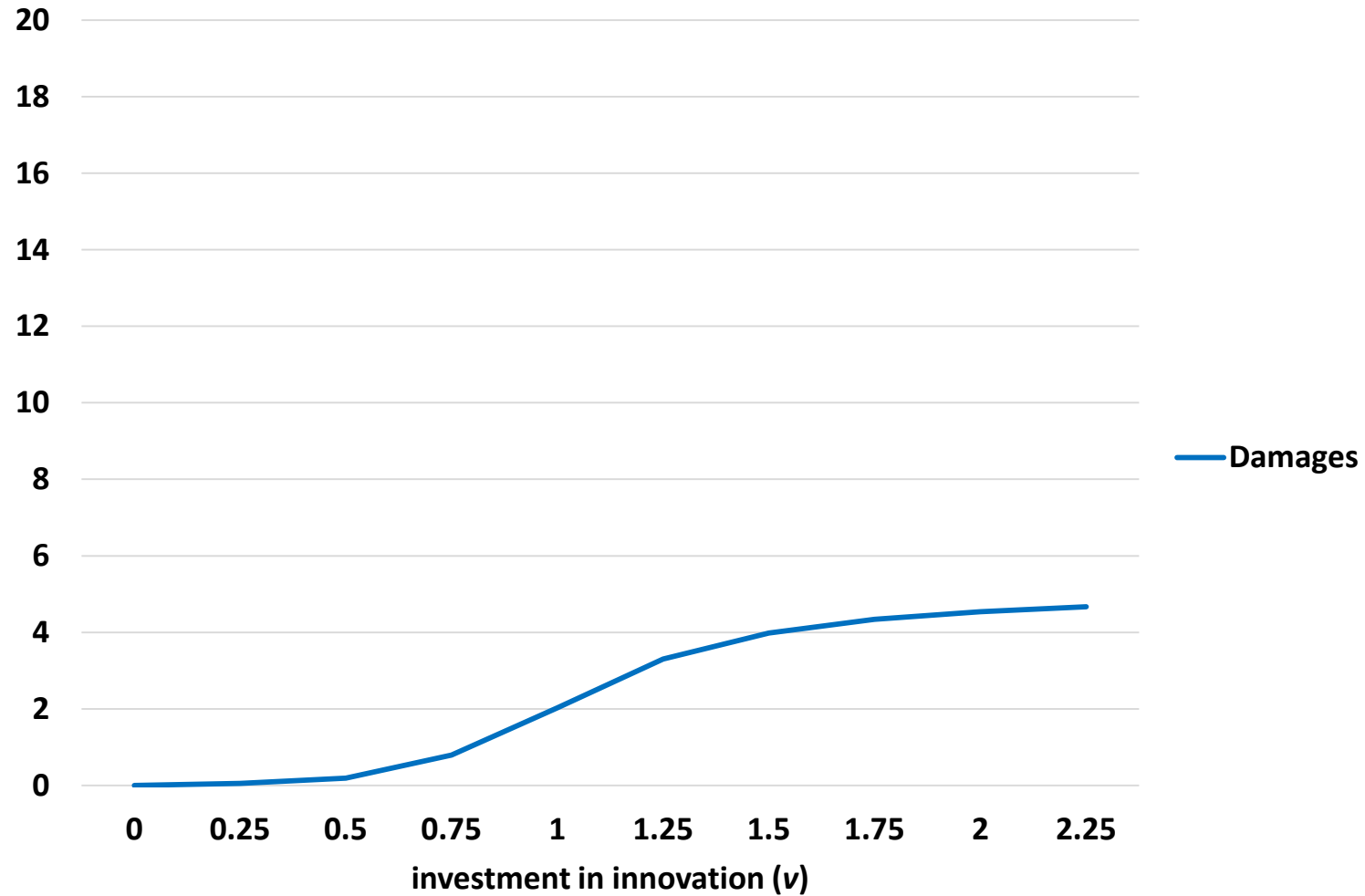


When true quality (b_t) has *not* decreased

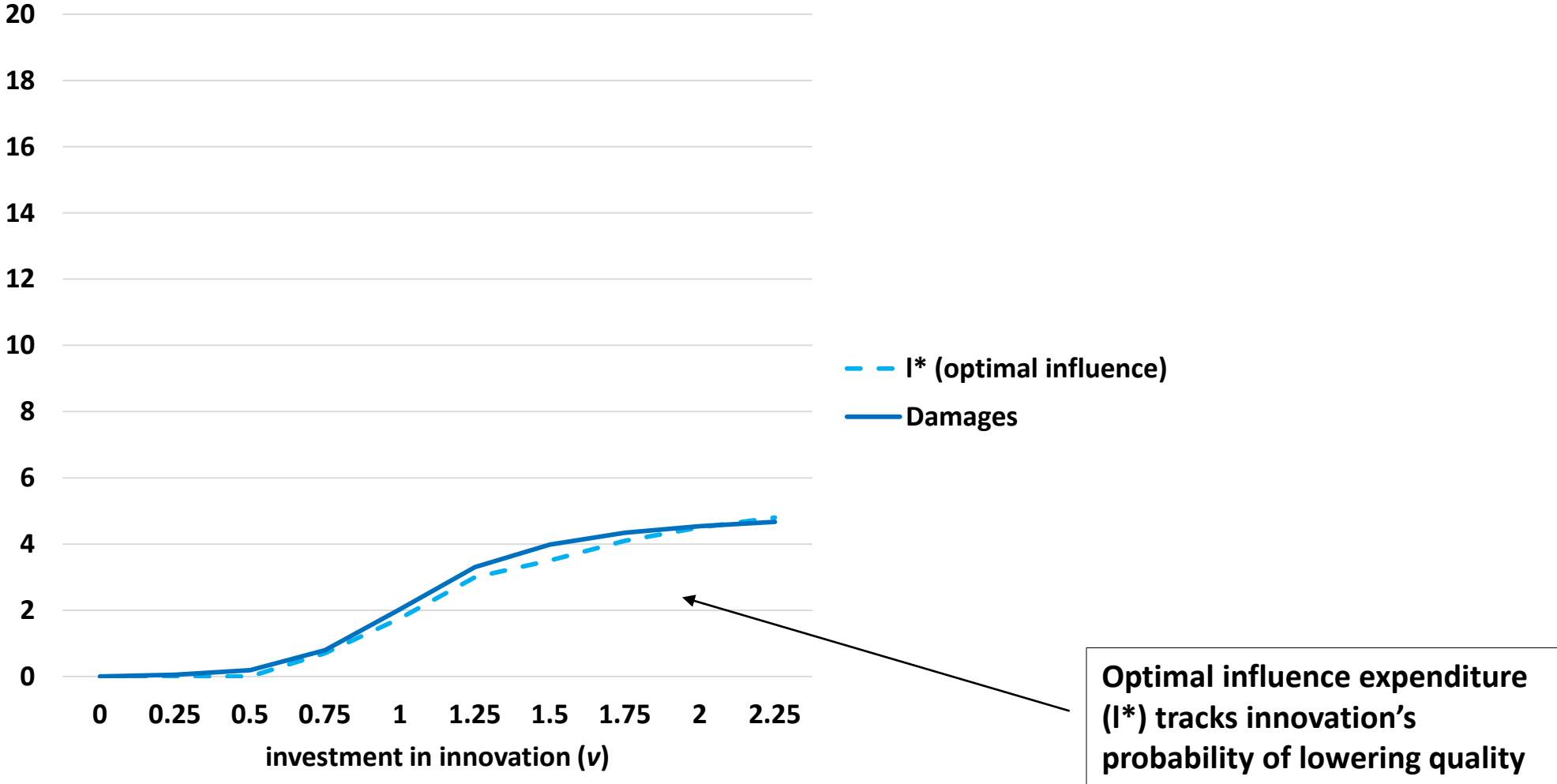


Possible rules for $E[b_t]$: $\min[\tilde{b}_t^i]$, $\text{average}[\tilde{b}_t^i]$, $\text{weighted average}[E[b_{t-1}], \tilde{b}_t^i]$

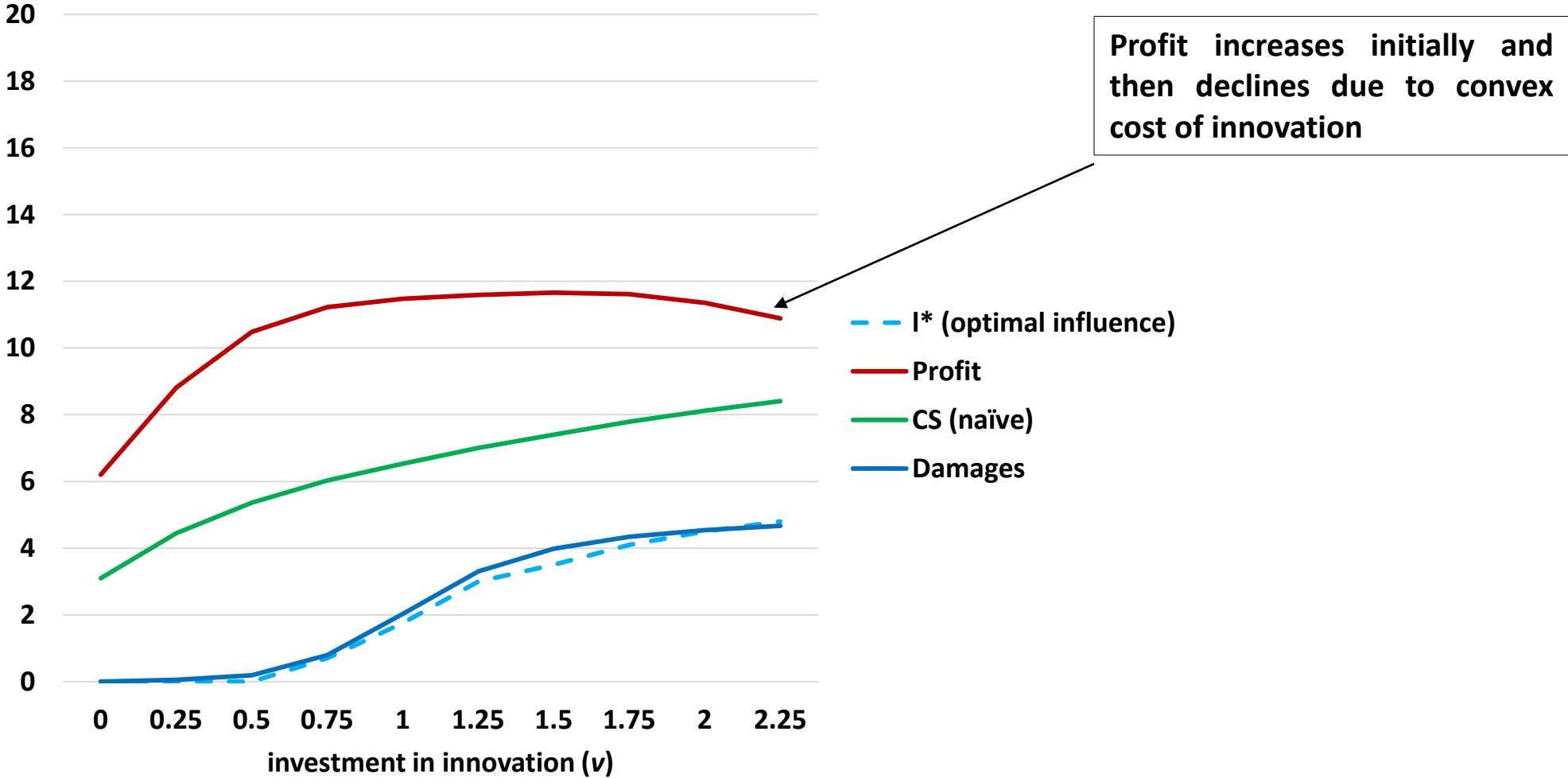
Innovation: Optimal Influence, Profits and Welfare



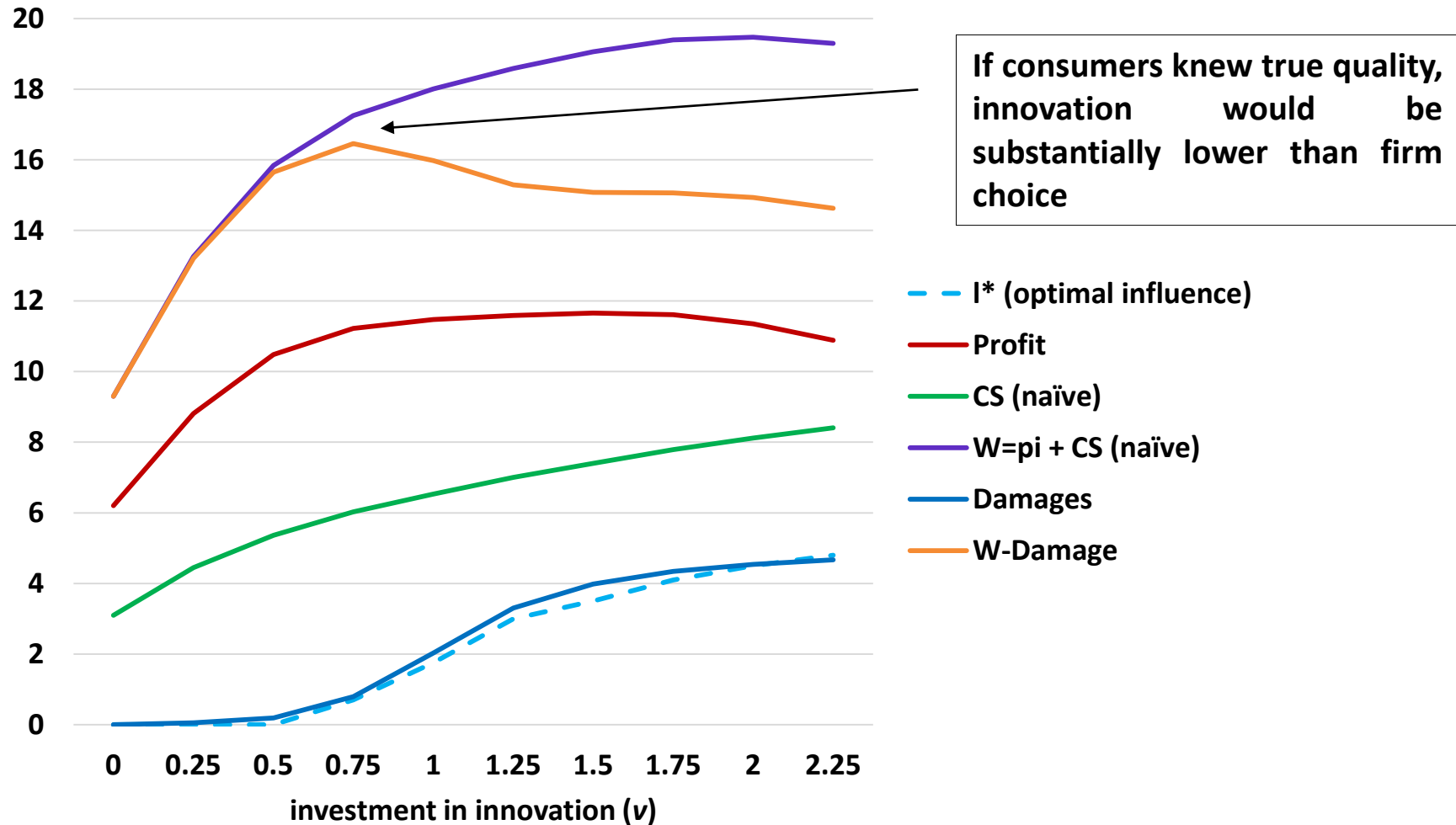
Innovation: Optimal Influence, Profits and Welfare



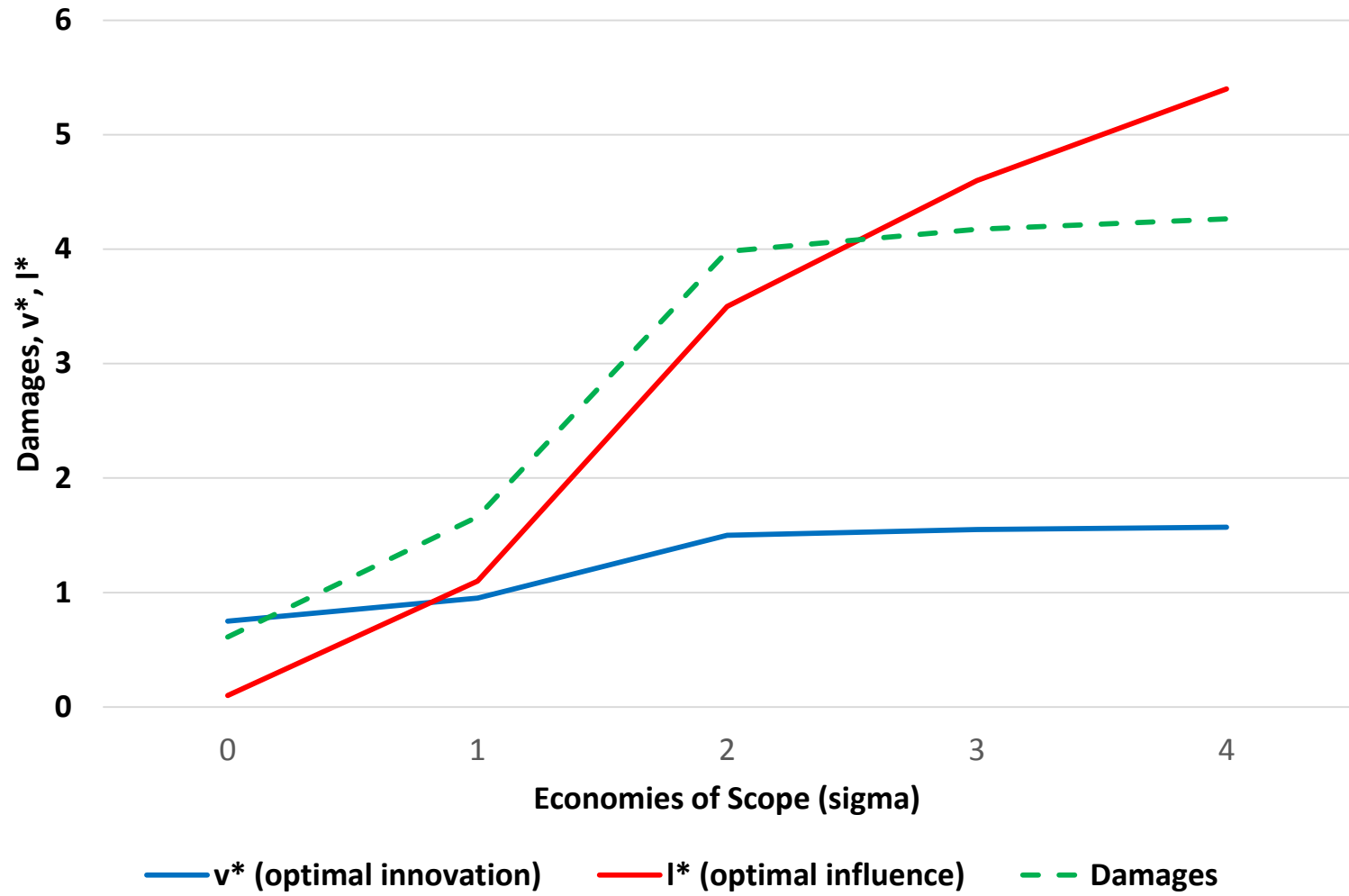
Innovation: Optimal Influence, Profits and Welfare



Innovation: Optimal Influence, Profits and Welfare



Effect of Economies of Scope



Policy options

1. **Taxes**
 - **Innovation (fees for processing applications)**
 - **Monopoly profits**
2. **Precautionary principle**
 - **Taking worst data point (static)**
 - **Delaying implementation (dynamic)**
3. **Punitive damages**
 - **Guessing game on understanding how seldom firms held liable**
4. **Publicly conducted innovation**
5. **Investment in regulator knowledge/education**
6. **Government-replicated studies**

Implications for Trade

- **Innovation as source of comparative advantage determined by both rules set by policymaker and extent of capture**
- **Trade impact of asynchronous regulatory approval not just function of speed of approval (Kalaitzandonakes *et al.*, 2014), but also depth of capture of approval process**
- **Firms have incentive to spend resources on capture of foreign regulators during approval process**
- **Benefits of “behind the border” integration affected by depth of harmonized regulatory systems**