Label Confusion

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Erb Institute Conference on Informing Green Markets
University of Michigan, June 2010

Label Confusion

- How can consumers learn the environmental impact of products?
- Voluntary eco-labels are a widely used method
- But how can consumers know the standard for an eco-label?
- Hundreds of different eco-labels by industry, by governments, by NGOs
- We analyze how this uncertainty undermines the value of eco-labels - and how to reduce the problem

What is learned from an eco-label?

- Consumer doesn't know environmental quality of product
- And consumer doesn't know difficulty of standard for eco-label
- Product has an eco-label – really high quality or the standard relatively easy?
- Hard to be sure – learn a little bit about the product AND about the standard
- We examine how this *joint estimation problem* affects the labeling decision

Joint Estimation Problem

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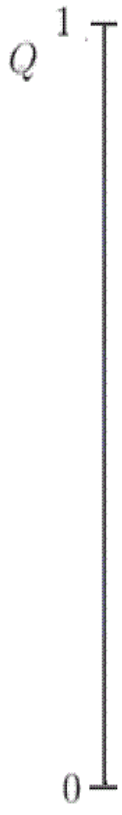

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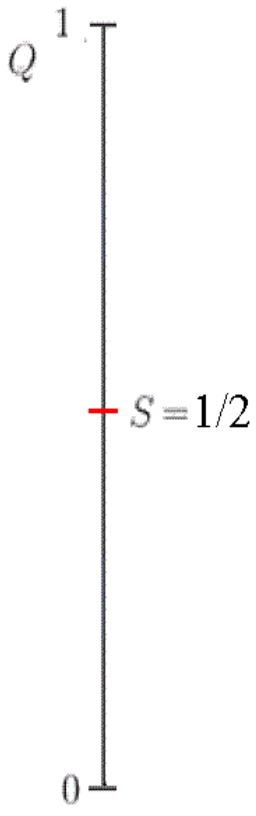

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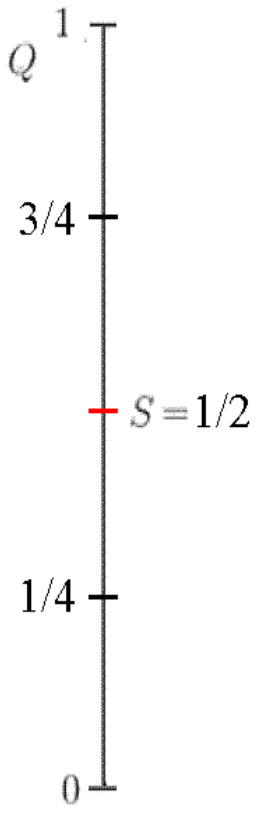

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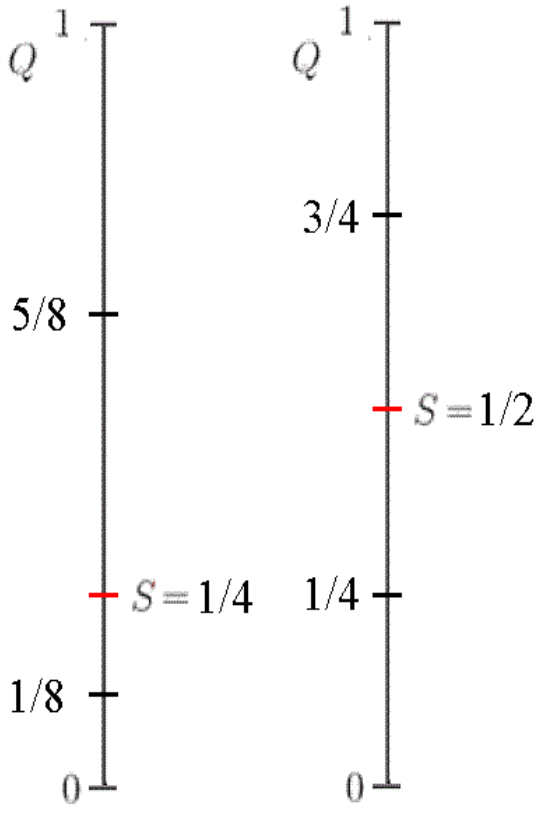

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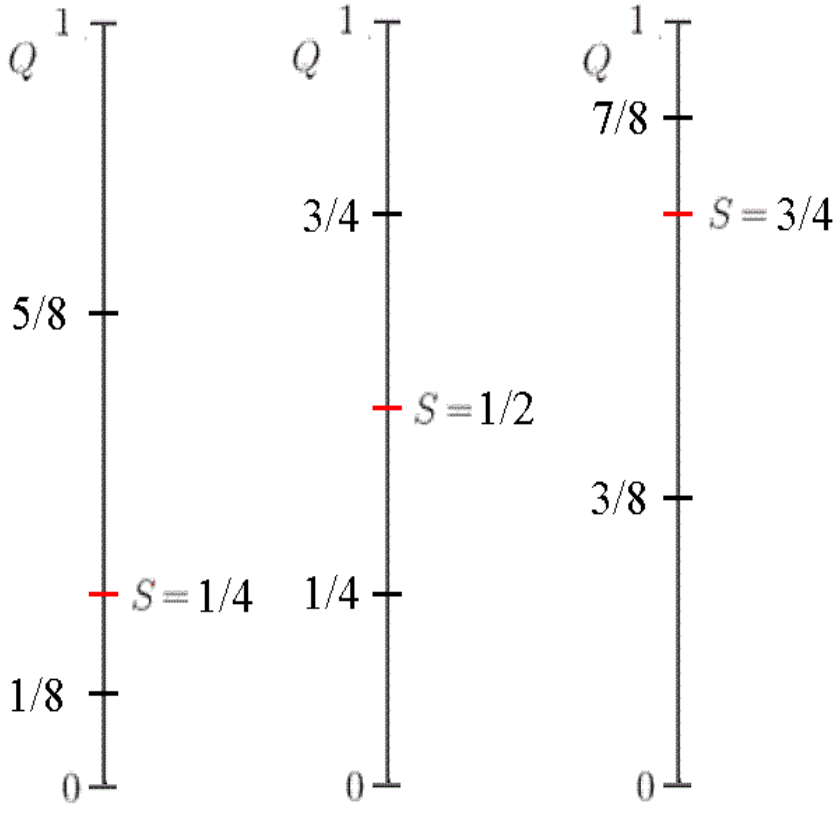

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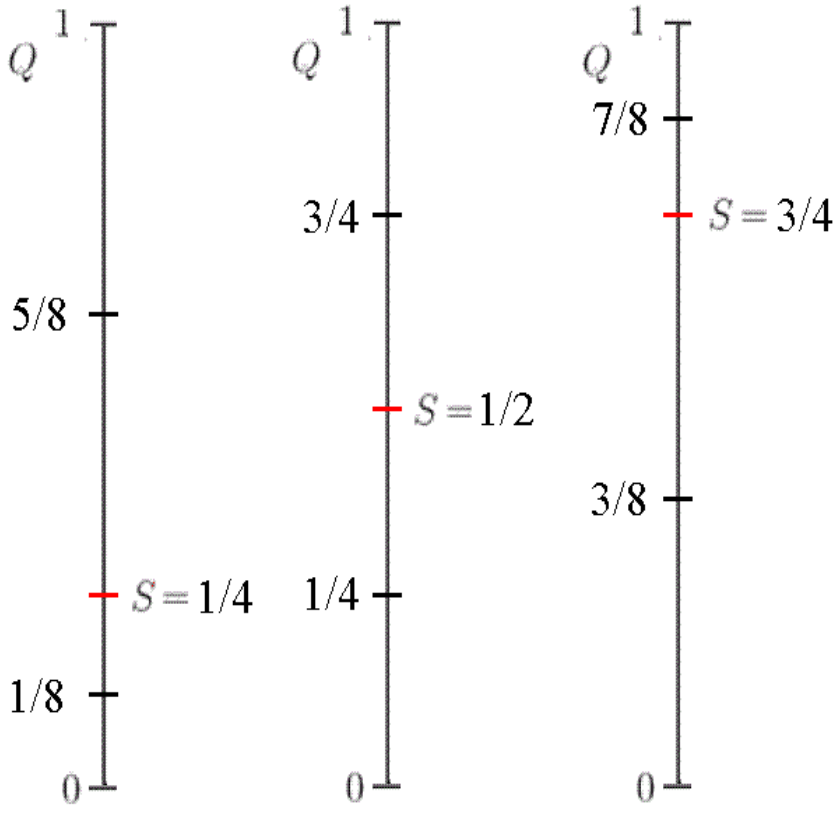

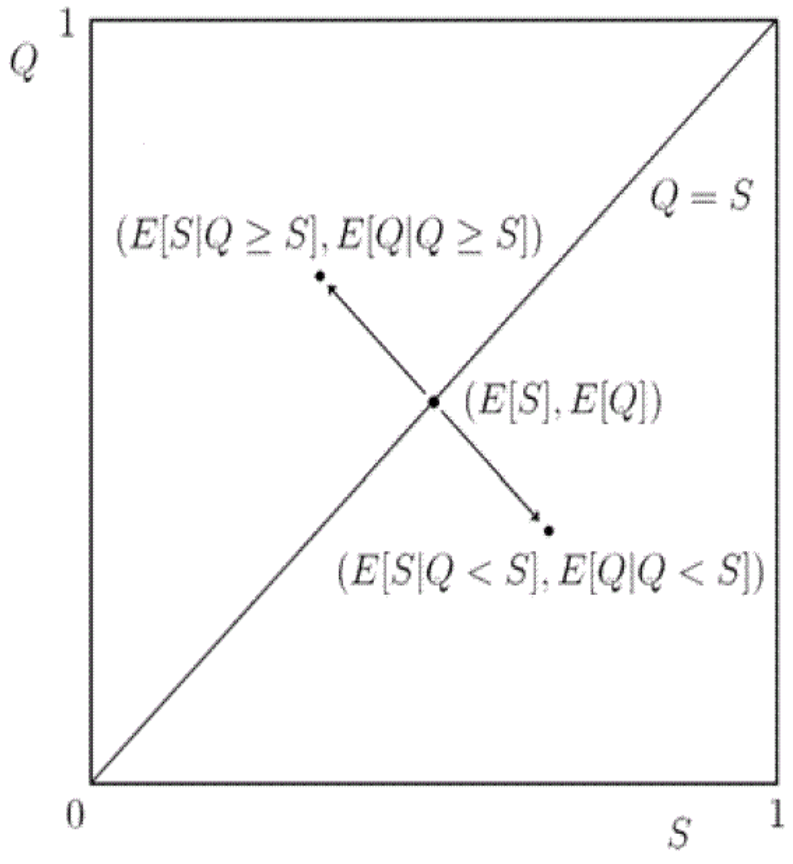

Preview of Problems due to Joint Estimation

1. Labeling less informative
2. Firms are less likely to obtain label
3. Firms that are perceived to be low quality cannot disprove low expectations
4. Label proliferation aggravates these problems, and adds to strategic uncertainty
5. Firm strategic interactions further aggravate these problems

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Basic Model Set Up

- Two players: firm and consumer
- Environmental quality Q of good is uncertain
- Consumer is willing to pay more for higher expected quality
- Standard S for an eco-label
- If $Q \geq S$ firm can pay c to get eco-label
- Firm payoff is expected quality minus c if get label
- Firm knows own quality Q and standard S for eco-label
- Consumer knows only distributions of Q and S

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Costly Disclosure Game

- "Disclosure" or "Persuasion" or "Verifiable Message" game (Viscusi, 1978)
- Sender-receiver game but not "signaling" or "cheap talk"
- Verifiable message - eco-label implies $Q \geq S$ for certain
- Twist is that consumer jointly updates estimates of Q and S based on label or not and based on equilibrium strategy of firm
- Consumers and firms are "rational" and in equilibrium actions and beliefs are consistent

Multiple equilibria can arise (as common in economic models)

- Label equilibrium:
  - Consumer expects firm to adopt label if it can
  - So not getting label leads to low estimate of Q
  - So firm is willing to pay cost c for certification
- No-label equilibrium:
  - Consumer does not expect firm to adopt label even if it can
  - So not getting label does not hurt firm very much
  - So firm is not willing to pay cost c

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Problem I: Informativeness of a label

- Consumers update label standard S and environmental quality Q from same information
- So in label equilibrium the estimates of Q are less precise on average than if S is known
- Not surprising but still a problem

Proposition

The expected informativeness of a label equilibrium is higher if the standard is certain than if it is uncertain.

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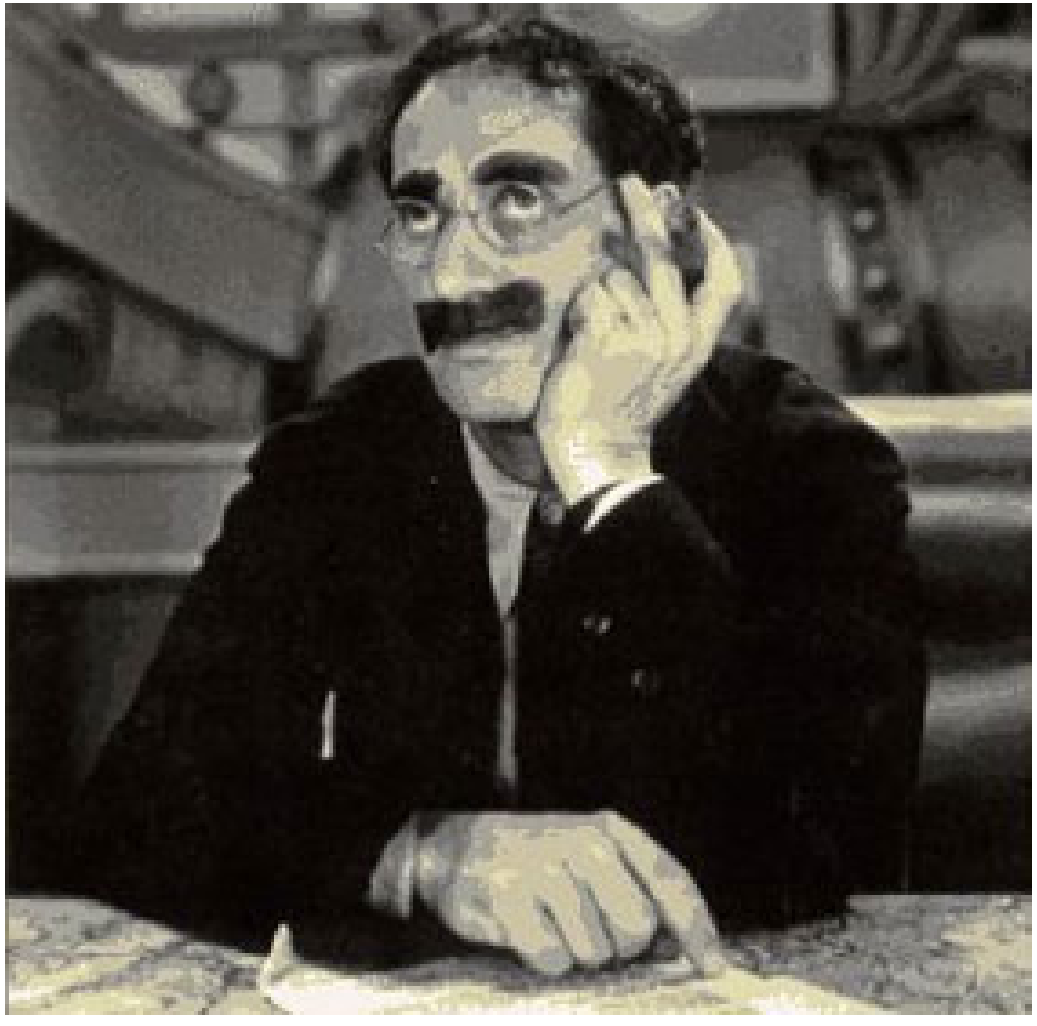
Problem II: Groucho Effect reduces labeling incentive



I won't belong to any organization that would have me as a member – Groucho Marx

Problem II: Groucho Effect reduces labeling incentive

- Groucho Effect due to joint estimation problem
  - Meeting standard is still good news, but not as good
  - Could be that the product is high quality
  - Or that standard is pretty low
  - Meeting the standard diminishes the standard itself
- Reverse Groucho Effect
  - Not meeting standard is still bad news, but not as bad
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- Label equilibrium
  - Adopt label if net benefit greater than labeling cost
  - $E[Q|Q \geq S] - E[Q|Q < S] \geq c$
  - Groucho effect lowers $E[Q|Q \geq S]$ and raises $E[Q|Q < S]$
  - So label equilibrium is less likely
- No-label equilibrium
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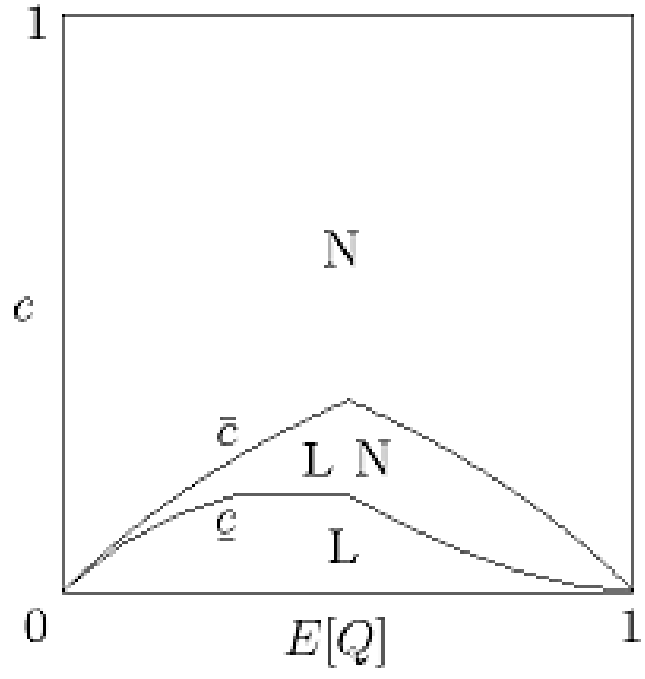
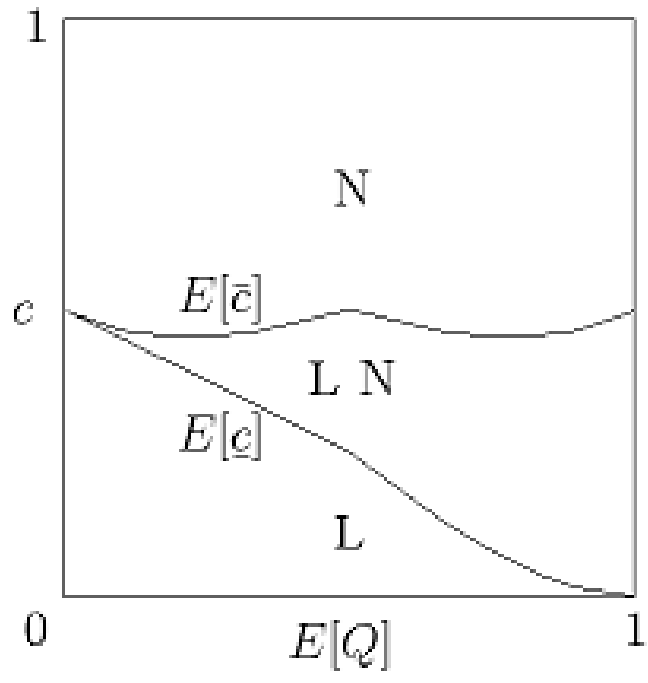


Uncertain Standard



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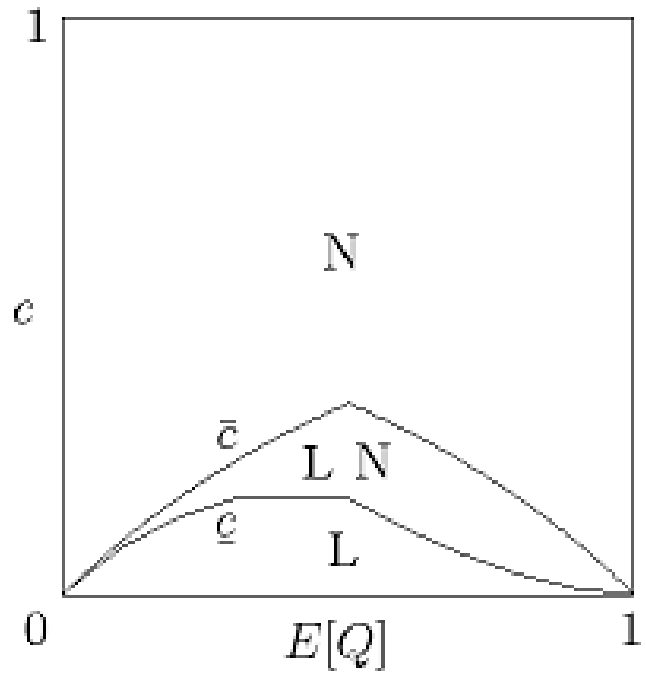

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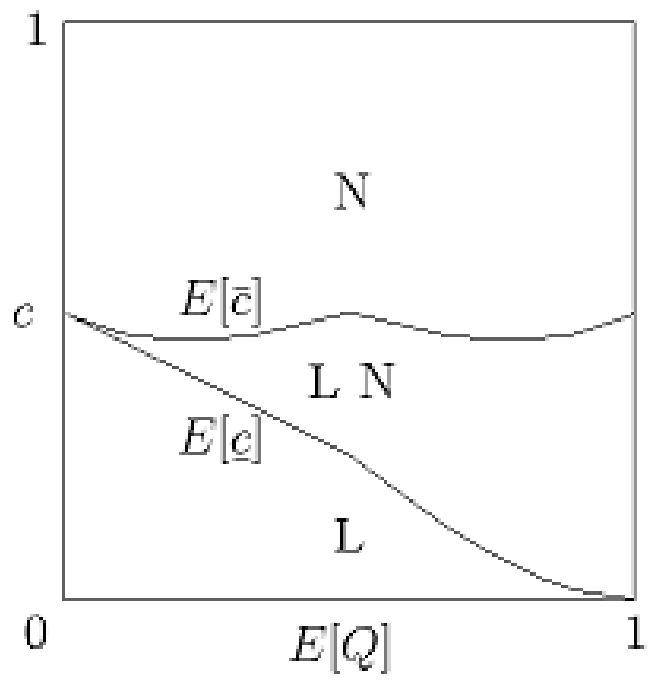

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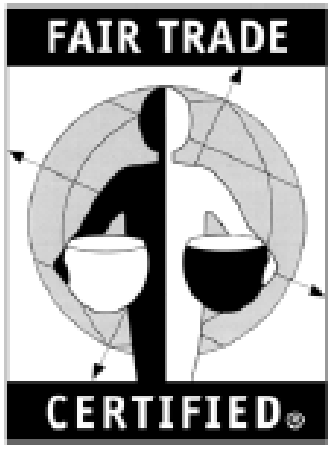
Problem III: Groucho effect hurts firms with "bad" reputation most

- Ideally eco-labels allows firms to reveal their true environmental quality
- This is most valuable to the firm when the firm is incorrectly thought to be bad
- But Groucho effect makes it hard for these firms to disprove their bad reputation
- So their incentive to disclose is weakened
- Instead, "average" firms have the strongest incentive to disclose

Problem IV: Multiple labels aggravate problems



Problem IV: Multiple labels aggravate problems

- In many cases firms may choose from multiple different labels with different standards
- Government, NGO and Industry
- A label only shows firm has met at least the worst standard
- Very different than if standards are certain

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As the number of labels with uncertain standards increases, (i) the support of a no-label equilibrium increases, and (ii) the informativeness of a label equilibrium converges to zero.

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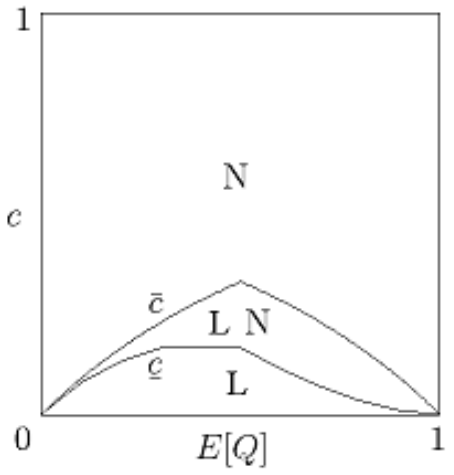

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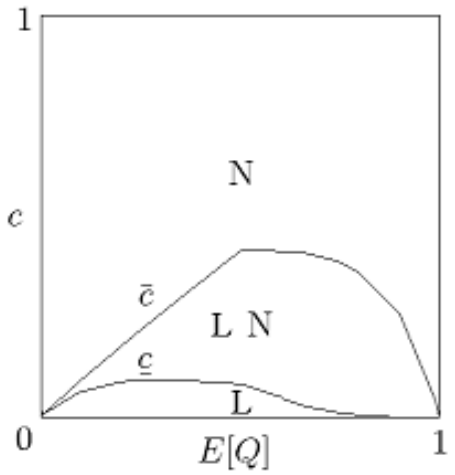
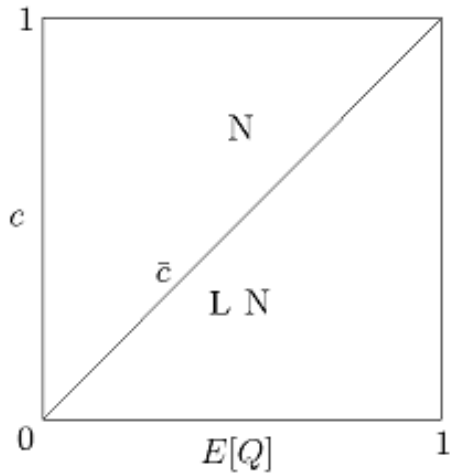
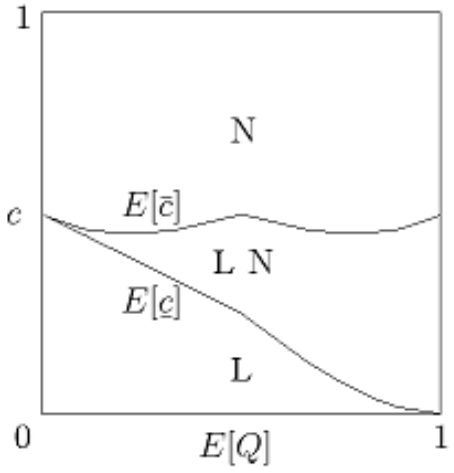


b) $n = 4$ Uncertain Standards



c) $n = \infty$ Uncertain Standards



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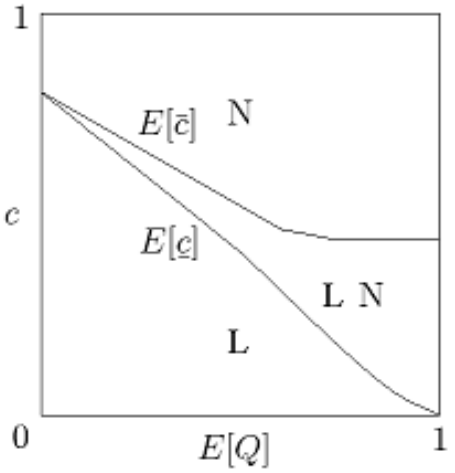

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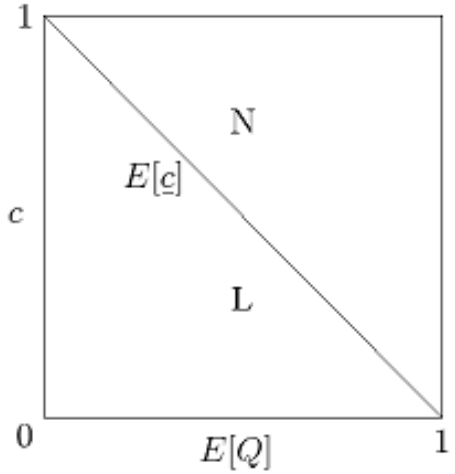

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Problem V: Strategic choice of labels by different firms

- A reputable firm can "legitimize" a label, while a disreputable firm can "spoil" it
- So firms want the same label as a reputable firm, and a different label than a disreputable firm
- Generically no equilibrium where firms simply adopt the best label attainable
- Sequencing of label adoption can make big difference

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Policy Implications

1. Reduce uncertainty over labels – double payback
2. Mandatory label adoption – eliminates no-label equilibrium and facilitates learning
3. Look for the label campaigns – makes label equilibrium focal
4. Look for specific label – make specific label equilibrium focal and facilitates learning
5. Ranked labels ("A,B,C,...") better – but do they discourage voluntary adoption?
6. Incentivize label adoption by quality firms – encourages adoption by other firms

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