Basics

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Perfect Competition

- **Informal:** Ibn Khaldun (1332-1406), Adam Smith (1723-1790), Ricardo, Mill, Marx, and Jevons, …
- **Formal:** Cournot (1838), Marshal (1890), Leon Walras (1874), Edgeworth (1881), Wald, Menger, Schlesinger, Arrow and Debreu (1954) and Mc Kenzie (1954), Debreu and Scarf (1963), …

$$\underbrace{\text{Convexity, Continuity \& ... of } \succcurlyeq_i \text{ s}}_{Assumptions}$$

1st Fundamental theorem: a **market;** and **wealth distribution** ⇒ ∃ "$efficient\ allocations$"

Prove existence by "Fixed point theorem"

2nd Fundamental theorem: ∀ "$efficient\ allocations$" ⇒ ∃ ***prices*** and **wealth distribution** *implementing them*.

Prove existence by "Separating hyperplane theorem"

⇒ Markets are good because:

- ❖ They are efficient and self satisfactory (no need to intervene).
- ❖ Private interest produces not chaos but coherence.
- ❖ Gives a "psychological" Sense of independence to individuals.
- ❖ …

⇒ Message: Distribution of wealth may be anything while efficiency holds but do not intervene in market mechanism.

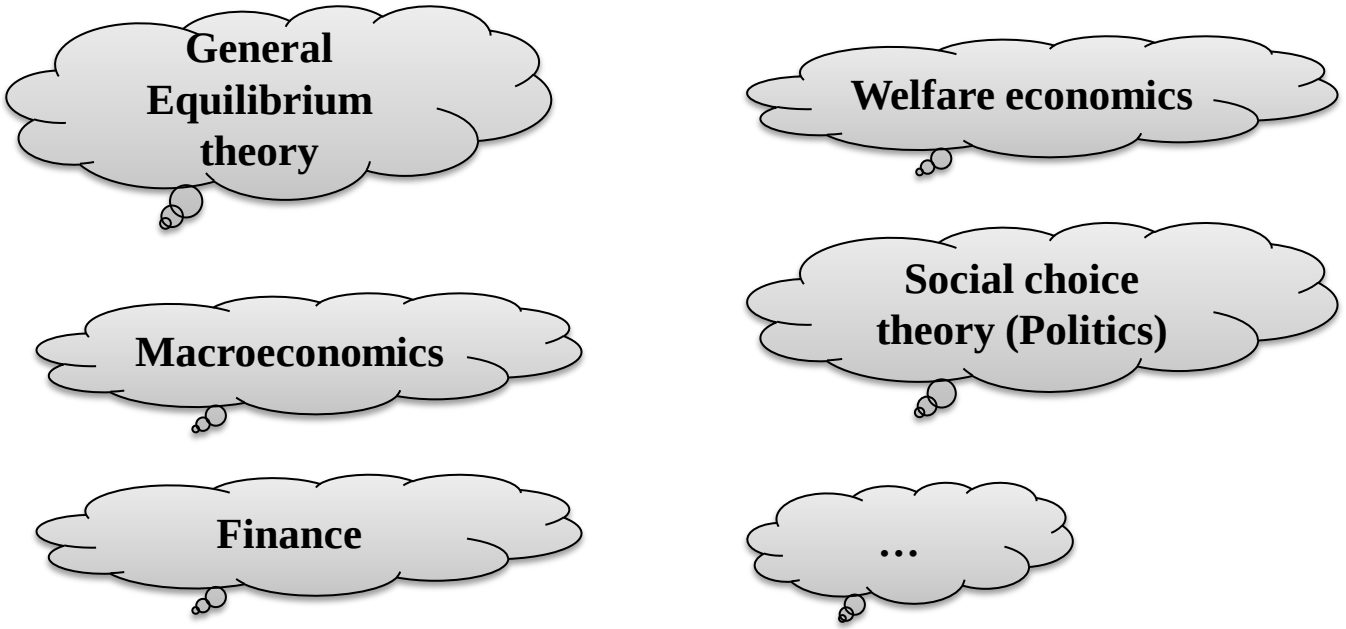
One way to go: Relaxing assumptions and check if fundamentals still hold:

Convexity → strong assumption

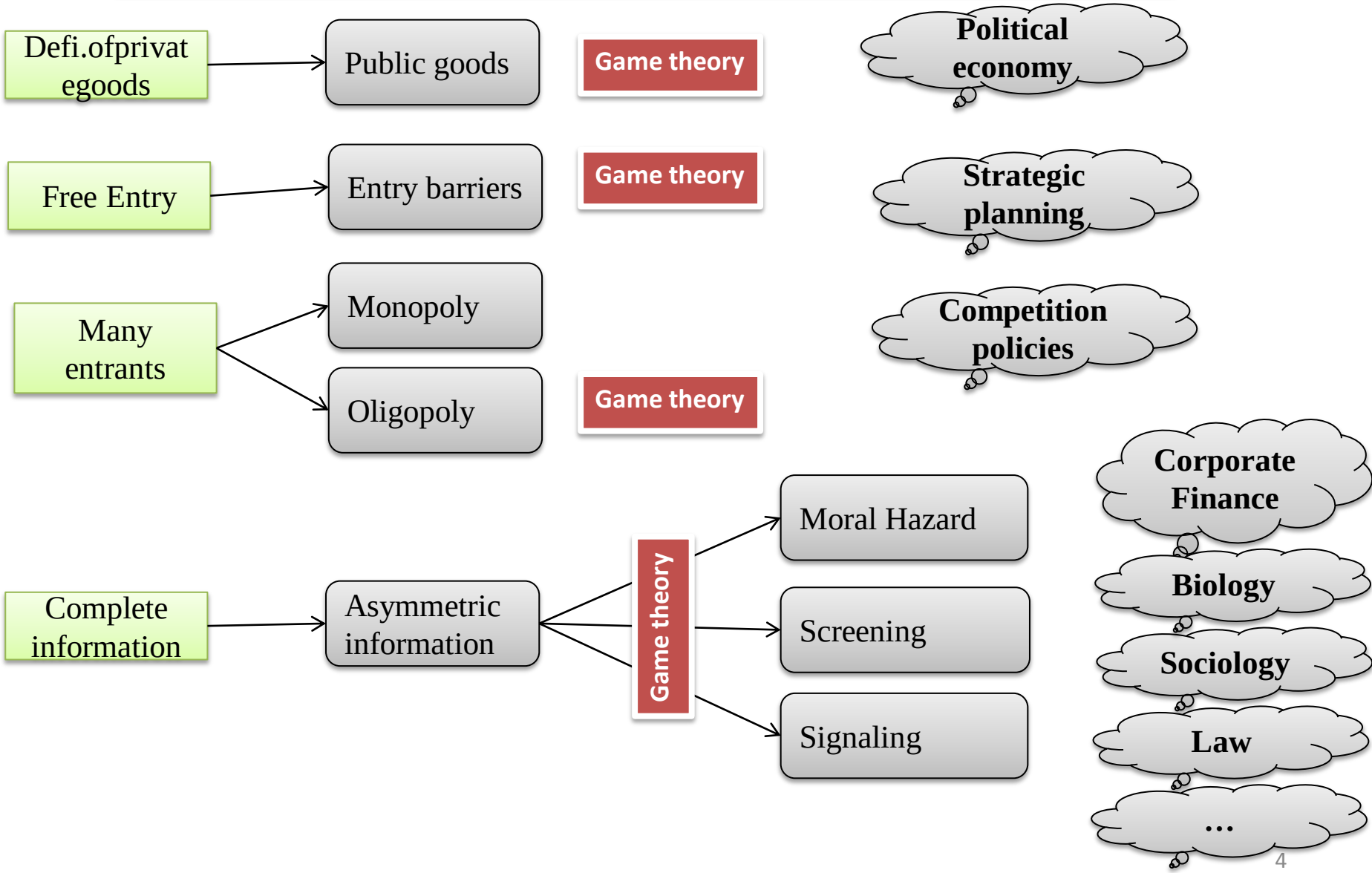
Continuity → may be violated in real world

E.g. Mordukhovich (2005) does this in "Variational Analysis and Generalized Differentiation"

Investigations in "characteristics of Preferences" has very broad applications



Other ways to go: Working on other assumptions (market failures)



Assumption

Instrument

Sub-Field of study

Field of Study

Way to go

شناسایی سطح بهینه انگیزه های اقتصادی بر اساس انگیزه های مبتنی بر تصویر

علی مزیکی و جول ون در وله

June 13, 2013

- انگیزه های تصویر پایه چه هستند؟
- ابزارهای سیاستی
- سوال
- مدل تئوریک
- نتایج
- جمع بندی

- قانون:
  - قانون، رفتار یا عمل تجویز شده یا به طور رسمی الزام آوری است
  - که توسط یک مقام کنترل می گردد

- هنجار:
  - قواعدی که مردم معمولاً به آنها احترام می گذارند
  - بایدها و نبایدهای جامعه

هنجارها $\not\supseteq$ قراردادهای اجتماعی ; هنجار$\not\rightleftarrows$قانون

- قوانین و انگیزه ها → اقتصاد کلاسیک
  - یک منوی قیمت برای رفتارهای خوب و بد
- همان دیدگاه + قوانین به عنوان هنجارها → روانشناسان و جامعه شناسان
  - قوانین ارزشهای جامعه را منعکس می کنند
- هنجارها ابزارهای سیگنالینگ → اقتصاد مدرن
  - افراد به تایید اخلاقی توسط جامعه اهمیت می دهند
  - اعمال افراد نوع شخصیت آنها را نشان می دهند

1. کلاسیک → نظام جریمه ها
2. محکومیت های صوری که امروزه در دادگاهها رواج دارد → مشاهده پذیری
3. آموزش
   - کار فرهنگی
   - کمپ ها
   - بیان قانون

- حال این سوالات مطرح می شود:
  - با توجه به وجود هنجارها چه ابزارهای بیشتری برای کاهش جرم از طریق کنترل مشاهده پذیری می توان به کار برد؟
  - در تقابل با ابزارهای اقتصاد سنتی در چه مواقعی از این سیاست بیشتر (یا اصلاً) باید استفاده کرد؟

- Effectiveness of fine intensity?
  - The gap is too high (Posner 2000)
    - Theoretical prediction → No compliance
  - Counterproductive Incentives (Benabou Tirole 2006)
- The role of visibility?
  - Reduction in average electericity consumption (Ayres et al. 2010)
  - Symmetric effect (Schultz et al 2007)
  - Theoretical (Weele, van der J.)
- Possibility and effect of education?
  - Effective in many studies (...)
  - Limited effectiveness in some → Pluralistic ignorance (Prentice &Miller 1991, 1993)

- The action $a \in \{0, 1\}$

$$U_v(a) = \underbrace{[y - c]a + e\bar{a}}_{Material} + va$$

- va: v is intrinsic motivation
  - Something in line with the society's norm
  - $v \sim f_a(v)$

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$$U_v(a) = \underbrace{[y - c]a + e\bar{a}}_{Material} + va + ms\underbrace{E(v|a)}_{R(a)}$$

- va: v is intrinsic motivation
  - Something in line with the society's norm
  - $v \sim f_a(v)$
- $R(a)$: Reputational incentive
  - Higher expectation of v ($E(v|a)$) makes me happier
  - $R(a)$ endogeneously defined via signaling
- ms: *Intensity (or visibility) of reputational concerns* for the self

- Let's solve it
- Control variable is a
- And the question is whether $U_v(a=1)$ is bigger or $U_v(a=0)$.

$$\underbrace{v+y-c+e\bar{a}+msE(v|a=1)}_{U_v(a=1)} \begin{matrix} > \\ = \\ < \end{matrix} \underbrace{e\bar{a}+msE(v|a=0)}_{U_v(a=0)}$$

- The Group's equilibrium: suppose there is a cut-off v^* after which $U_v(a=1) \geq U_v(a=0)$
- $v > v^* \Rightarrow$ compliance $(a=1)$

- v^* lies where the equality happens:

$$v^* + \underbrace{y - c}_{\text{Monetary Reward}} + ms\underbrace{(E(v|v \geq v^*) - E(v|v < v^*))}_{\underbrace{\text{Respect Premium}}_{\Delta(v^*)}} = 0$$

- Or, when

$$-v^* - \text{Monetary Reward} = ms\Delta(v^*)$$

- Let's say

$$-\frac{1}{ms}v^* - \frac{y-c}{ms} = \Delta(v^*)$$

$\Delta(v)$ could be something like this:

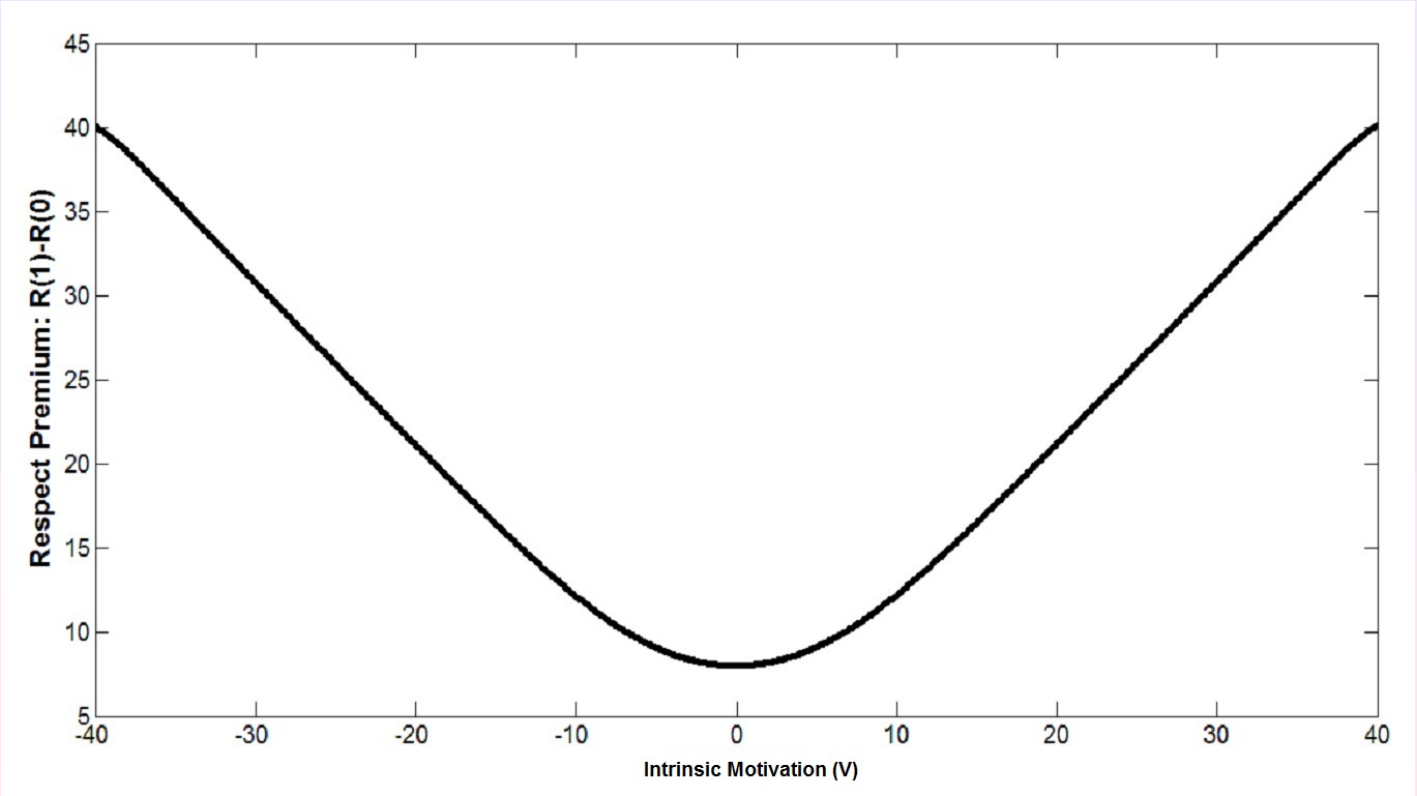
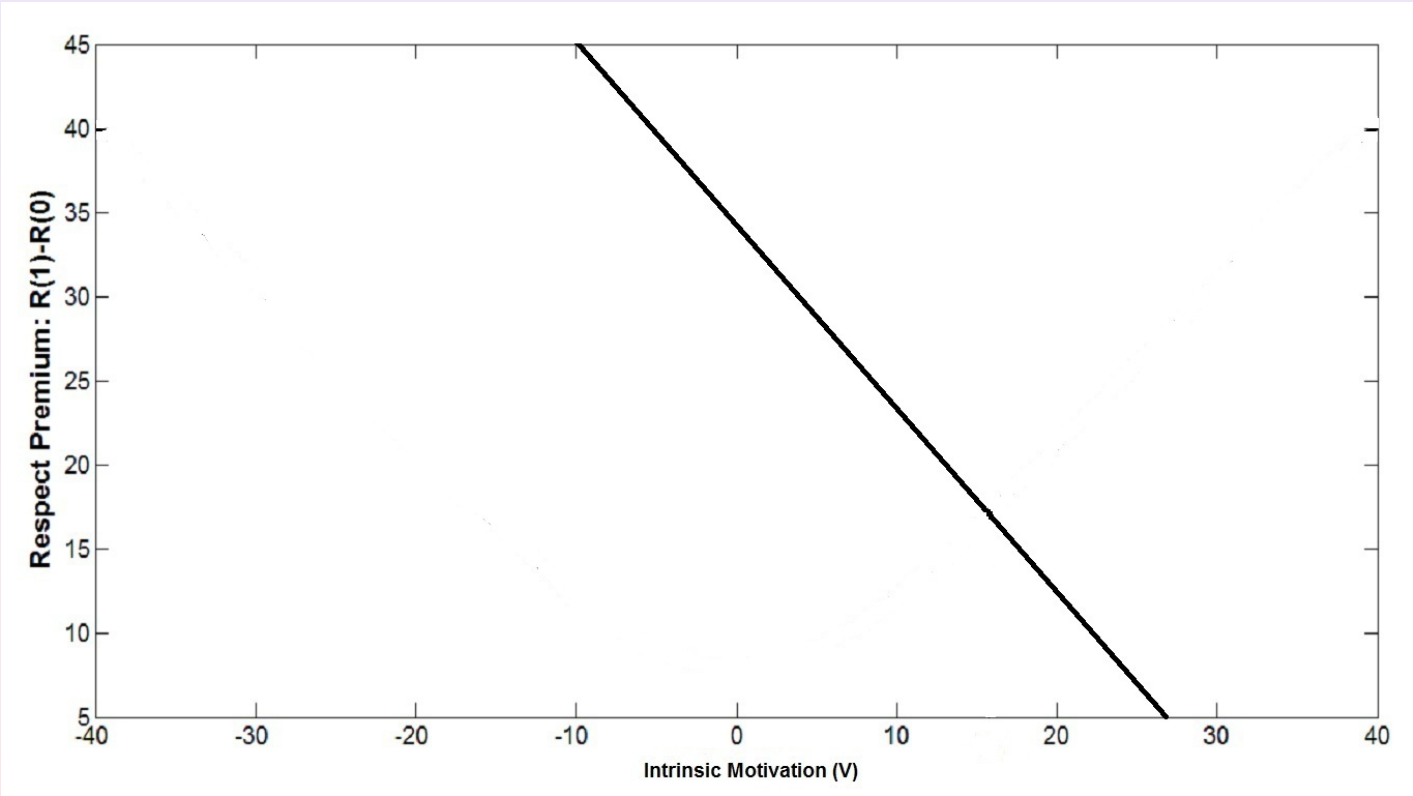


Figure : Respect Premium for $v \backsim \mathcal{N}(0,1)$

And $-\frac{1}{ms}v^* - \frac{y-c}{ms}$ is clearly a line



And the cut-off v^* is where the two curves intersect:

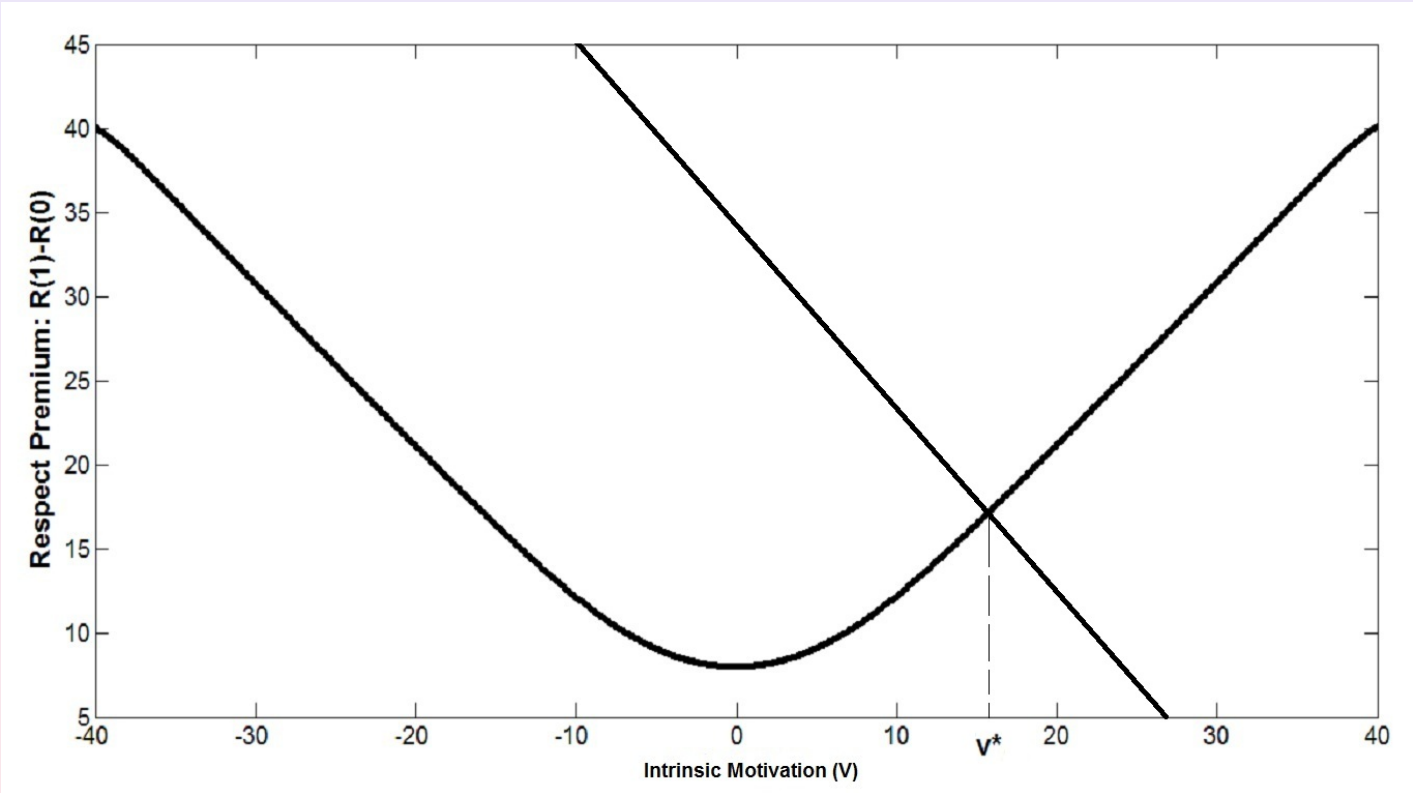


Figure : The cut-off v^*

Increase Fine (y, or c) $\Rightarrow$ More Compliance

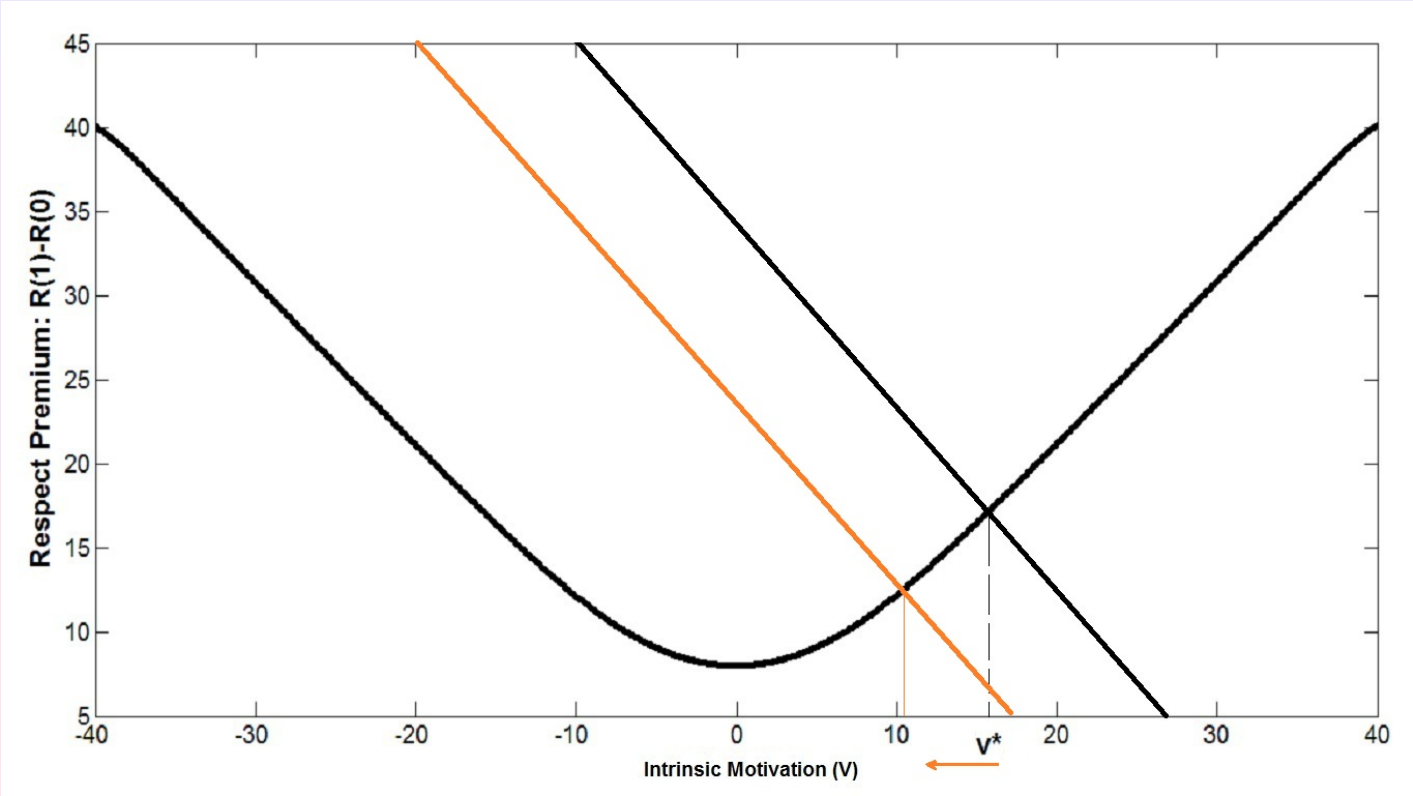


Figure : The effect of classic fines

Increase visibility (s) $\Rightarrow$ More Compliance

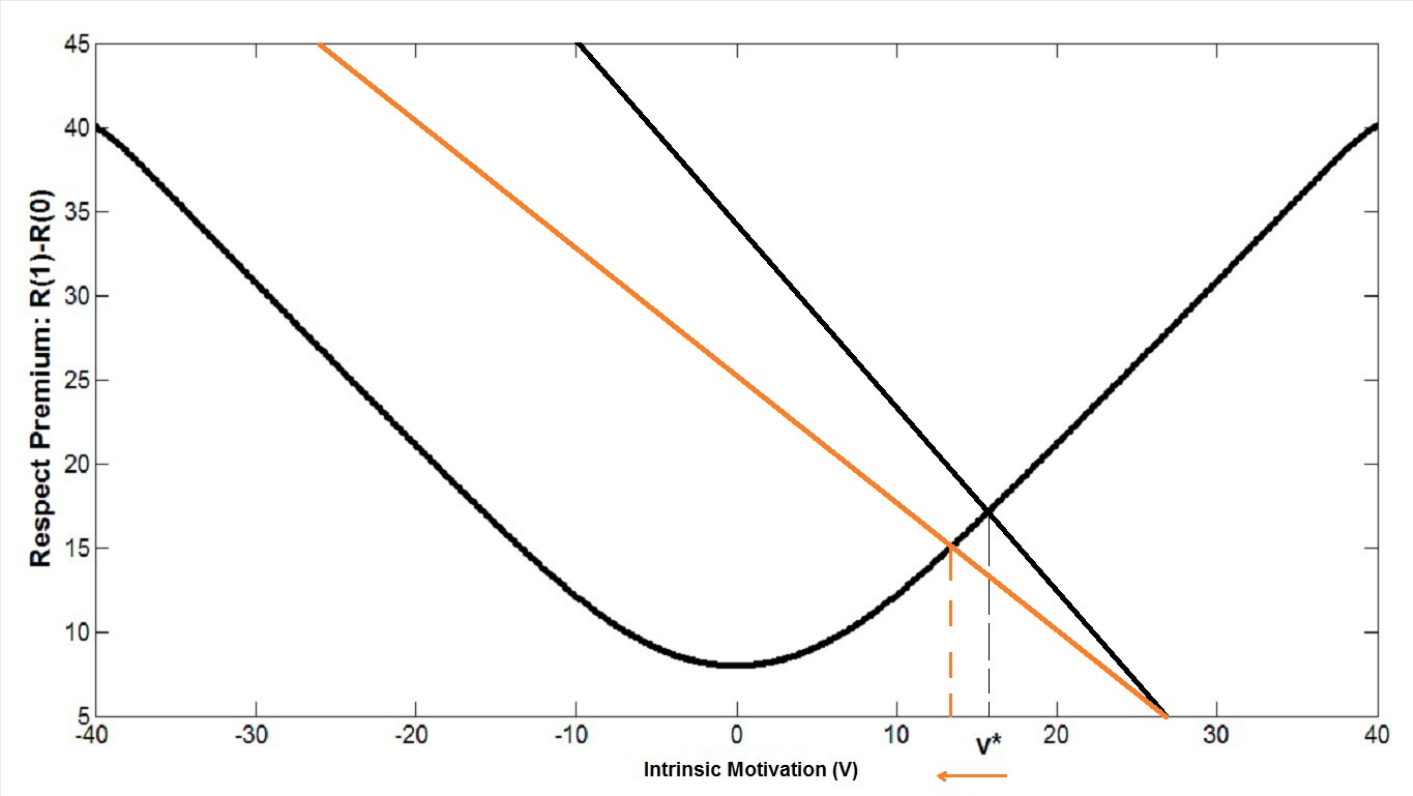


Figure : The effect of modern fines

More educated among non-compliants ⇒ Less Compliance!

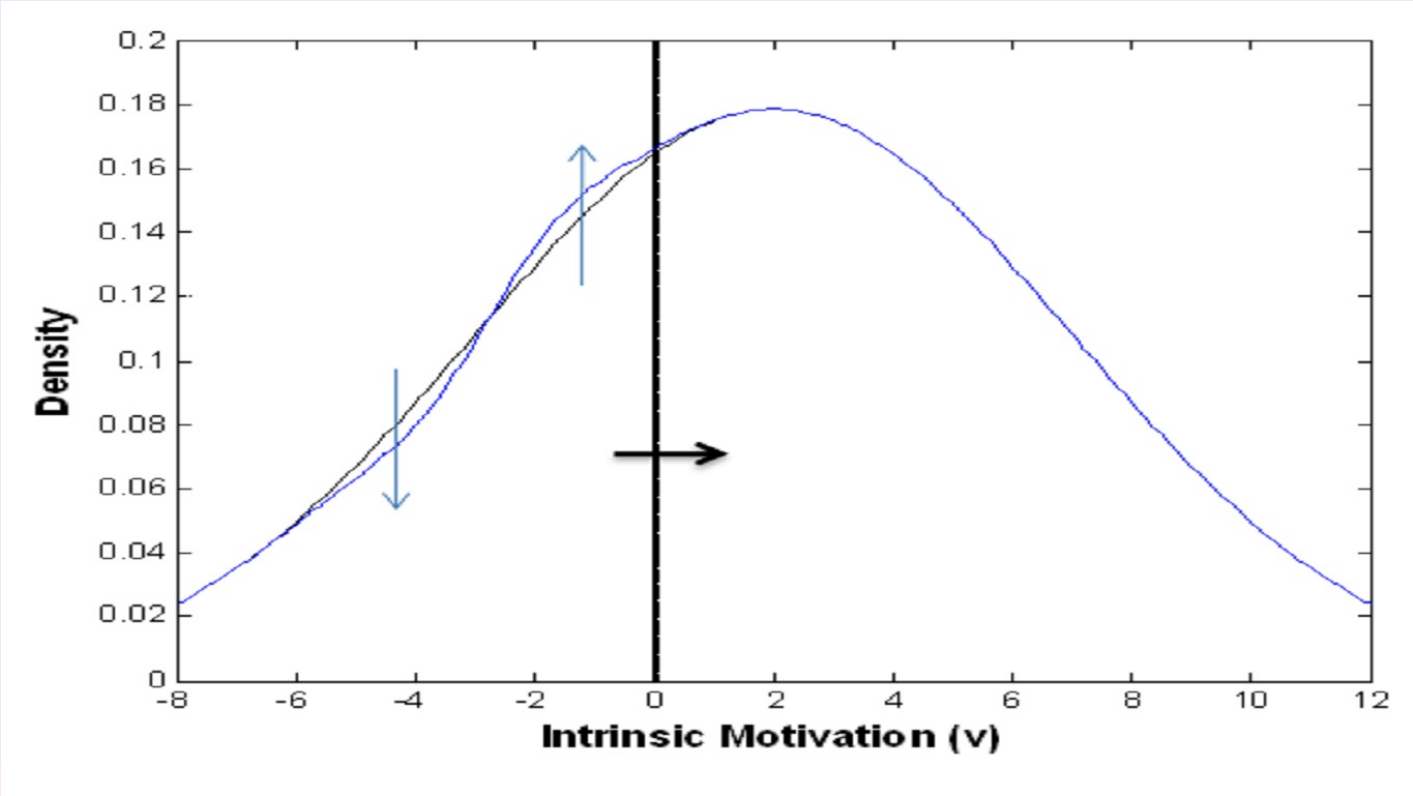


Figure : Surprising effect of education of noncompliants

More educated among non-compliants $\Rightarrow$ Less Compliance!
The reason:
Remember

$$v^* + \underbrace{y - c}_{\text{Monetary Reward}} + ms\underbrace{\underbrace{(E(v|v \geq v^*) - E(v|v < v^*))}_{\text{Respect Premium}}}_{\Delta(v^*)} = 0$$

In effect:
$E(v|v < v^*) \nearrow \Rightarrow \Delta(v^*) \searrow \Rightarrow v^* \nearrow \Rightarrow$Aggregate compliance$\searrow$

However if they manage to bring them among compliants

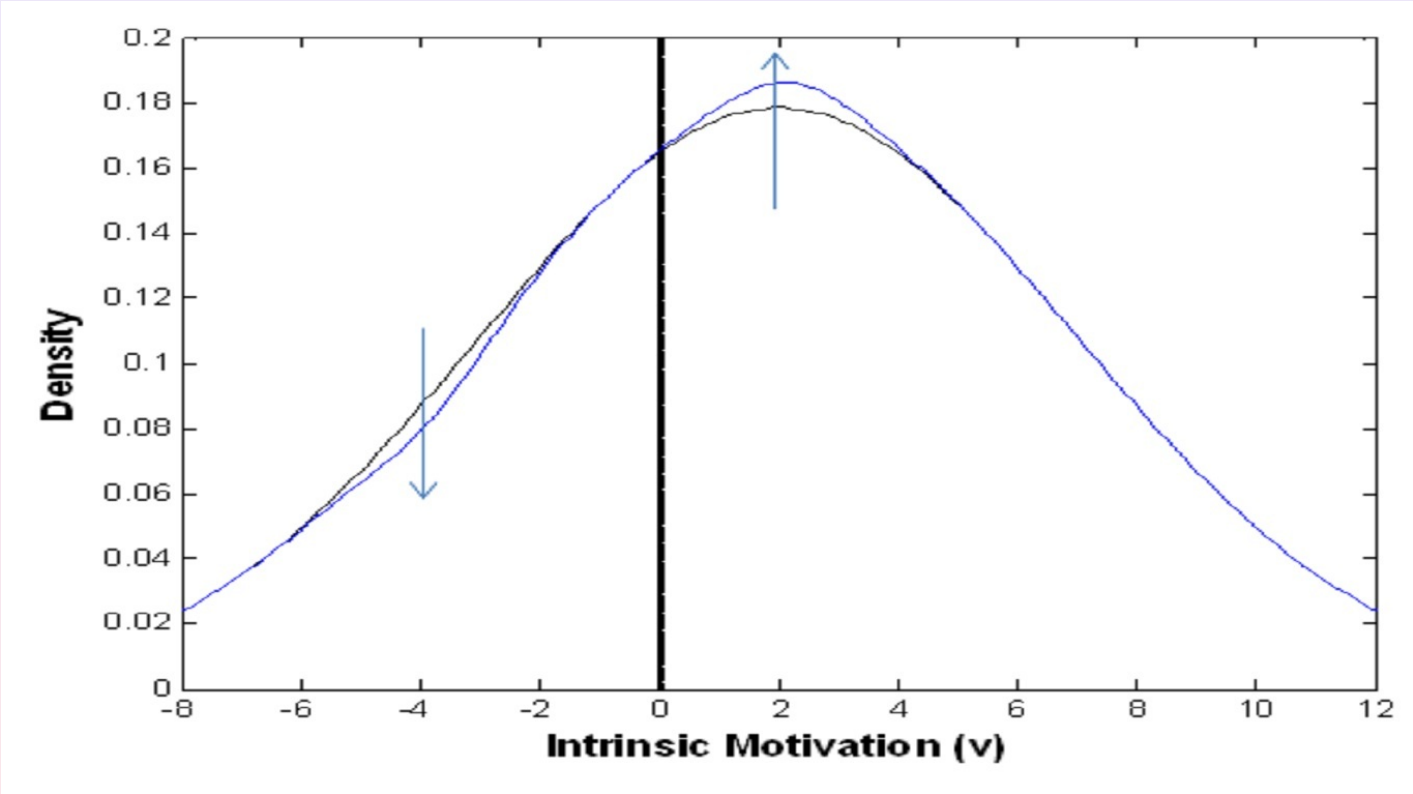


Figure : Effective influence of education of noncompliants

- E.g. Protests:
- We know: If many people are protesting the expression should be very strong to change the trend.
- Naive intuition says "talk to the marginal guys to change their idea"
  - Talking to the marginal guys $\rightarrow$ The effect is not clear
  - However, if visibility (ms) high $\rightarrow$ causes less compliance

Talking to the marginal guys

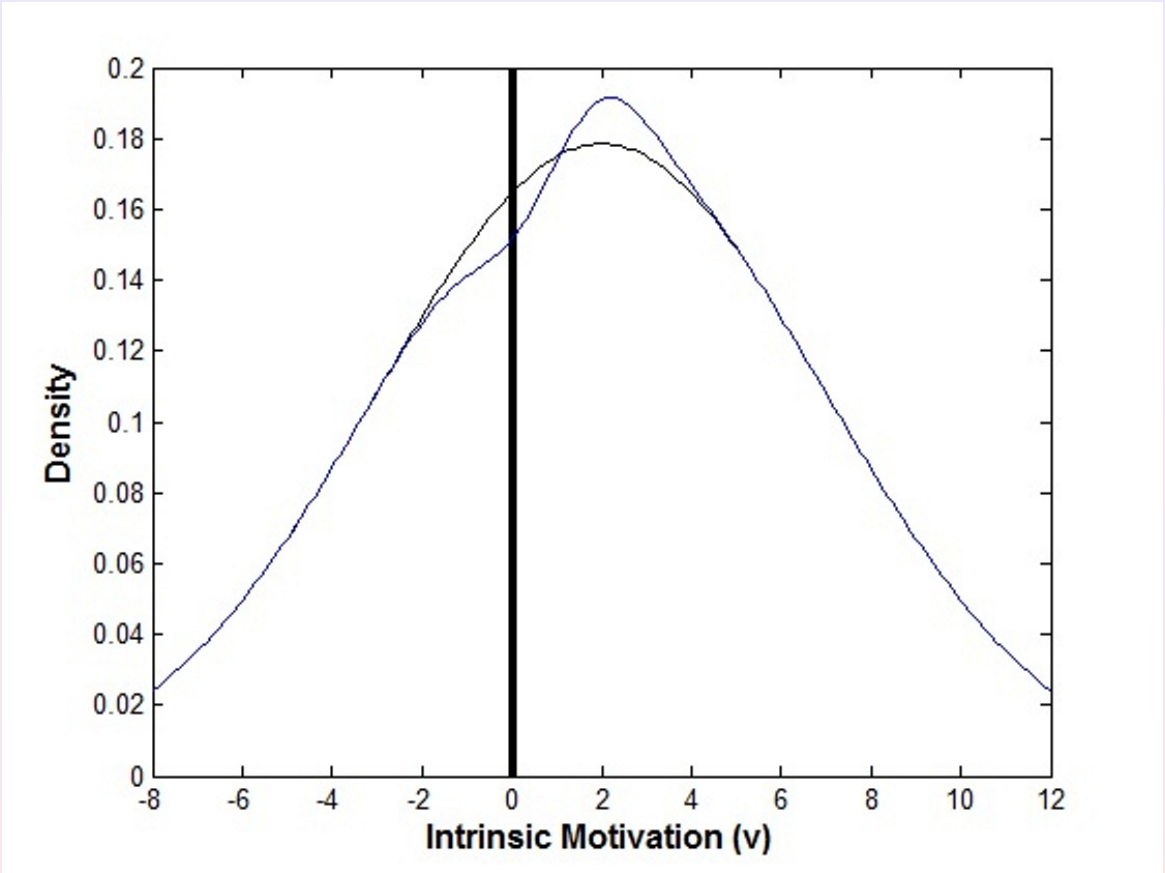


Figure : Ambiguous influence of education of marginal guys

- Counterproductive effect of education because of increment in reputational motives
  - In line with excess drinking by the young (Prentice & Miller 1991, 1993)
    - Efforts at individual education and public campaigns → very limited effectiveness.
    - Role of peer influence highly recognized.
- Policy recommendation
  - Individual education (less visibility to neutralize the reputational effect of drinking)
  - Don't give up
- All three policies are valid
- Study in more details
- Study the interaction

$$U_v(a) = \underbrace{[y - c]\, a + e\bar{a}}_{\text{Material}} + \underbrace{va}_{\text{Intrinsic}} + \underbrace{msE(v|a)}_{\text{Reputation}}, \tag{1}$$

$$W(y, s) = \bar{U} - y\bar{a} - \left(c_y \frac{y^2}{2} + c_s \frac{s^2}{2} \right) \bar{a} \tag{2}$$

- Government is a social maximizer
- Policy instruments:
  - Hard policy:
    - y Material reward and punishment
  - Soft policy:
    - s Visibility

Proposition

In equilibrium, material and image policies have the following effects on v^* respectively

$$\frac{\partial v^*}{\partial y} = -\frac{1}{1 + ms\Delta'(v^*))} < 0 \tag{3}$$

$$\frac{\partial v^*}{\partial s} = -\frac{m\Delta(v^*)}{1 + ms\Delta'(v^*))} < 0. \tag{4}$$

In which $\Delta(v) = R(1) - R(0)$

Definition

Image and material policies are complements if $\frac{\partial^2 v^*}{\partial y \partial s} < 0$. They are substitutes if $\frac{\partial^2 v^*}{\partial y \partial s} > 0$. They are independent if $\frac{\partial^2 v^*}{\partial y \partial s} = 0$.

Proposition

The two policies are complements if and only if

$$\Delta'(v^*) \quad < \quad -s\frac{\partial v^*}{\partial s}\Delta''(v^*) \tag{5}$$

Welfare function can be rewritten as

$$W(y,s) = \int_{v^*(y,s)}^{\bar{v}} \left(e + v - c - c_y \frac{y^2}{2} - c_s \frac{s^2}{2} \right) f(v)\,dv. \qquad (6)$$

We first establish the existence of an equilibrium:

Proposition

If c_y and c_s are sufficiently small, and the density function $f(v)$ is sufficiently flat (i.e. not increasing too steeply anywhere on it's domain), an equilibrium exists and is unique.

The restriction on the density function is necessary, because if the density function increases very fast, the two policies are very strong complements, and an equilibrium may not exist.

Proposition

Equilibrium policy levels satisfy the following comparative statics:

1. y^* *is increasing in* c_s *and* e*, and decreasing in* c *and* c_y*,*
2. s^* *is increasing in* c_y *and* e*, and decreasing in* c *and* c_s*.*

These results are rather intuitive. Note that y^* (s^*) is increasing in c_s (c_y) does not necessarily mean that the two policies are substitutes.

Define $z \equiv \frac{s}{y}$.

Proposition

The optimal policy mix satisfies

$$z^* = \frac{c_y}{c_s} m \Delta(v^*) \tag{7}$$

$\Delta(v^*) > 0$ and bounded, Proposition also implies that the optimal policy mix features positive levels of both policies.

Results depend on the shape of the respect function $\Delta(v^*)$, which in turn depends on the distribution $F(v)$.

In what follows, assume that types are distributed according to a truncated normal distribution.

Proposition

Under the normal distribution, $z^* = m\frac{c_y}{c_s}\left(\frac{\sigma^2 f(v^*)}{(1-F(v^*))F(v^*)}\right)$. *This implies that* z^* *is higher for 'extreme' levels of* v^*, *i.e. behaviors that either very few or very many people do.* z^* *is minimized if* $v^* = 0$, *i.e. exactly half of the population chooses* $a = 1$.

The proposition implies that z^* increases in the variance of the type distribution σ^2.

A larger variance implies a larger difference between the expected types corresponding to the two actions, and thereby raises the importance of image concerns.

–> A more heterogeneous society will rely relatively more on image-based incentives.

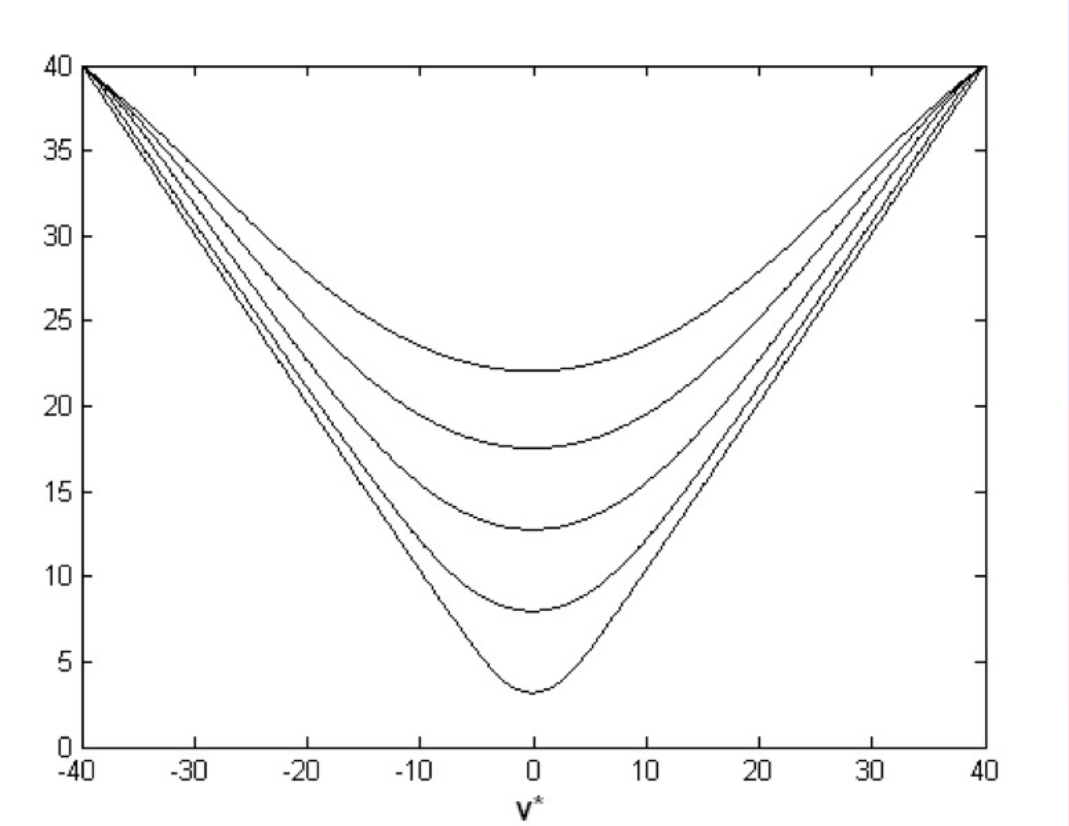


Figure : The respect function $\Delta(v^*)$ of the truncated normal distribution. The function gets flatter if the variance σ^2 increases

- Relative usage of **shaming penalty** to material punishment would be **higher** if:
  - **Most of people behave in that way**
    - The level of social esteem (of the behavior) is high
    - The violation is perceived very badly in the society
    - E.g. In USA or Sweden vs in Italy
  - **Diversity in intrinsic motivations is higher**
    - E.g. if there is a pick in number of immigrants
- In these cases material punishment or reward has relatively less effect comparing shaming penalty.
- Use education and shaming punishment or praising the good citizens in public.

- استفاده از سیاست های نرم به جای سیاست های سخت در موارد زیر منطقی تر است
  - بیشتر مردم رفتار آنچنینی داشته باشند
    - سطح احترام اجتماعی حاصل از انجام آن عمل مثبت (از دید آن جامعه) بالا باشد
    - سطح تحریم اجتماعی حاصل از انجام آن عمل منفی (از دید آن جامعه) بالا باشد
    - برای مثال آمریکا و ایتالیا در پرداخت مالیات
  - بالا بودن گوناگونی در جامعه
    - مثلاً اگر جهشی در میزان مهاجرت به داخل کشور بوجود بیاید
- در این موارد سیاست های نرم بیشتر از سیاست های سخت استفاده می شوند اما اگر (برای مثال) نیمی از مردم آن کار را انجام دهند سیاست های کلاسیک سخت منطقی ترند.
- برای سیاست های نرم از آموزش و مجازات های آبرویی و یا تشویق شهروندان خوب در عموم استفاده می شود

- Strong assumptions
  - to prove existence we assumed $m\Delta'(v^*) > -\frac{1}{s}$
  - Not so restrictive but still no reason for that
- Characteristices of stigma needs more consideration
  - Jewitt (2004) in an unpublished paper claims that wherever $f(v)$ is increasing, then $\Delta(v)$ is decreasing and vice versa.
  - However, we may show that: $\lim_{v^* \to -\infty} \Delta'(v^*) = +\infty$.
  - Therefpre, although the numerical illustrations support it, I doubt if it is always true.