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Financial Market Ethics

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Ethics in Economics

- Ethics is conspicuously absent in standard economic models – and this is not an oversight.
- "Like many economists, I do not want to rely too heavily on substituting ethics for self-interest. I think it best on the whole that the requirement of ethical behavior be confined to those circumstances where the price system breaks down"

– Ken Arrow

Ethics as a last resort

- Draws on a tradition in economics that markets work best when rational agents all act in their own self interest
- But in actual markets ethics seem to play a large role in affecting performance and viability
  - Bank of England/FCA study identifying "a process of ethical drift" where "unethical behavior became progressively more accepted and widespread"

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  - Bank of England/FCA study identifying "a process of ethical drift" where "unethical behavior became progressively more accepted and widespread"
- Can unethical behavior create a type of systemic risk?

The role of market ethics

- Can rational agents care about ethical concerns and can those agents survive in equilibrium?
- Can ethical (or non-ethical) behavior propagate in a market?
  - Are there properties of networks in which non-ethical behavior spreads from node to node, and can it be stopped?
  - Can ethical behavior be contagious?
- Can society make ethical behavior more stable?

A new approach

- We draw on results from psychological games and contagion in networks
- We develop a game-theory model that allows agents to care about others agents' expectations of their behavior
  - Agents exhibit a type of "rational morality"
- We characterize equilibrium strategies with a focus on when agents switch
- We embed this model in a network and examine how network structure leads to ethical/non-ethical behavior diffusing across agents

What's new is old?

- In a psychological game, agents care about what other agents expect them to do. This is reminiscent of Adam Smith's The Theory of Moral Sentiments (1759)
  - Smith argued that we gain happiness from the approbation of others so we should act as if to satisfy the expectations of an "impartial spectator."
  - Our choices reflect not only our immediate wants but also our moral sentiments connected with the expectations of others.

Example - “manufactured defaults”

- Blackstone bought CDS on a firm and simultaneously lent them money with the pre-condition that the firm delay its next bond payment – thereby guaranteeing a hefty payoff from the credit default swap

- Not illegal, but widely viewed as unethical – the market uproar (and a rare joint statement from the CFTC, SEC, FCA) led Blackstone to step down from enforcing claims

Is this an example of ethical behavior prevailing in equilibrium?

But it did not stop there……

- Aurelius Capital using CDS to force Wirestream Holdings into bankruptcy
- Similar tactics at play in the U.S. leveraged loan market
- Alberta Securities Commission decrying Brookfield's use of total return swaps to hide positions in a takeover battle as "clearly abusive of the capital markets"

Is this an example of contagion of unethical behavior across a network?

We show that contagious non-ethical behavior is an externality – it is harmful to others even those far away from the initial unethical player

Our model allows us to address an important policy question:

How can market design and regulation facilitate ethical behavior?

Main results

- We find and quantify critical densities for clusters of each type of behavior that determine everything about contagion
  – Ethical behavior, if it exists, does so in clusters and only clusters of sufficient density can stop contagion
  – Some network shapes are more fragile than others (e.g. star vs core-periphery)
- We expand the nature of guilt to include the beliefs of society as a third player – an externality approach.
  – Non-ethical behavior imposes costs on other players
- We show how regulation can stop or retard the spread of non-ethical behavior by targeting critical nodes.

Literature

- Psychological games
  - Geanakoplos, Pearce, Stacchetti [1989]; Battagalli and Dufwenberg [2007]
- Culture and social norms
  - Glazer, Sacerdote, Scheinkman [2006]; Cremers [1993], Guiso, Sapienza, Zingales [2006]; Liu [2016]; Lo [2016]
  - Elster [1989]; Ostrom [2000]; Young [2015]
- Reciprocity in games
  - Dufwenberger Patel [2017]; Leidrer et al [2009]
- Evolution and Morality
  - Alger and Weibull [2013]

Literature

- Contagion in financial networks
  - Allen and Gale [2000]; Allen and Babus [2008]; Acemoglue and Jackson [2015]; Blume et al [2013]; Erol and Vohra [2014]; Babus [2016]
- Empirical financial misconduct studies
  - Lie [2005]; Kedia, Koh, Rajgopla [2015]; Karpoff et al [2017]; Parsons, Sulaeman, Titman [2018]; Dimmock et al [2015]; Liu [2016]; Egan, Matvos, and Seru [2019]

The game

- Two-player game embedded in an underlying network in which each agent chooses each period to play E or N.
  - By ethical (E) we mean that agent's care about other agent's expectations of their behavior
  - Agent chooses a single behavior for all interactions in a period

One-period game setting

- Agents will play this game many times, but do not view their interactions as a repeated game.
- We analyze the infinitely repeated game and show that for sufficiency low, but non-zero discount factors, the one-period game we analyze is consistent with subgame perfect Nash equilibrium of the infinite horizon game
  - In this equilibrium, agents do not build and exploit reputations.

Psychological Games

Allows payoffs to depend directly on beliefs rather than just on actions as in traditional game theory

A player experiences guilt, and thus a reduction in payoff, if he disappoints others.

Key point – payoff reduction from behaving non-ethically is endogenous; it only occurs when others expect ethical behavior

Payoff Matrix

		Player 2: E	N
Player 1	E	a, a	$0, c - g\hat{\beta}$
	N	$c - g\hat{\alpha}, 0$	$b - g\hat{\alpha}, b - g\hat{\beta}$

Base model assumptions: b > g > 0 and a > c - g

A (psychological) Nash equilibrium

- A pair of strategies, one for each player, beliefs about the other player's strategy and beliefs about beliefs such that each player best responds to the strategy of the other player and each player's beliefs are correct
- If g< c-a, then N is strictly dominant and the unique equilibrium is (N,N)
- If g>c-a, there are multiple equilibria

Payoffs and Strategies: 1

- A player's payoff depends on its play, the play of its neighbors, and on what those neighbors expect it to do.
  - We assume that each player expects its neighbors to play as they did in the previous period
- If a node played non-ethically last time, then it will play non-ethically this time as that is a dominant strategy

What if they played ethically?

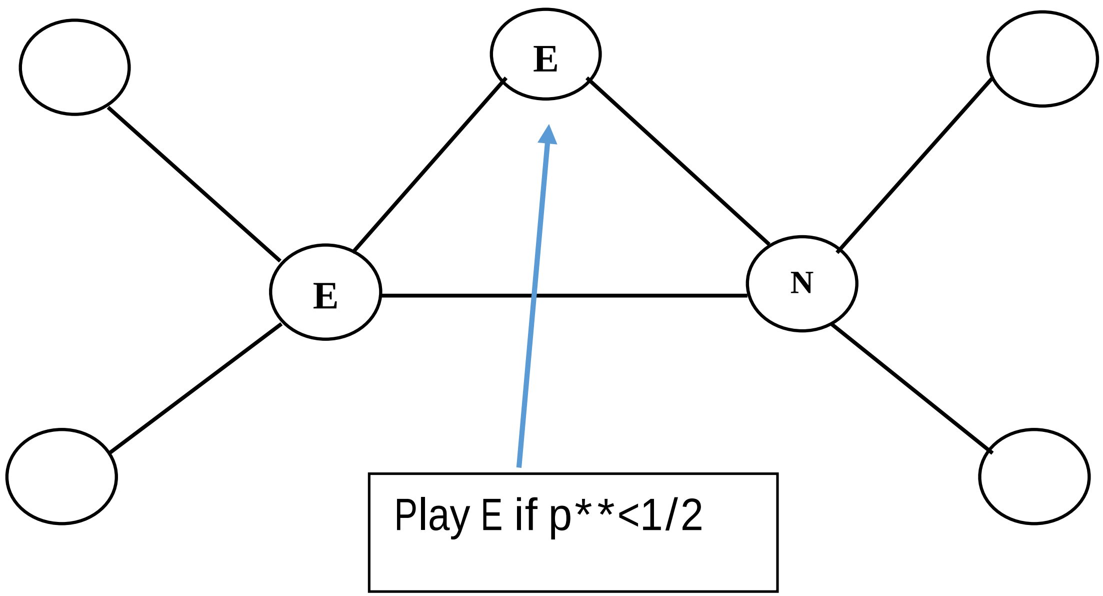
Payoffs and Strategies

- Critical value of fraction of neighbors playing ethically, p**, such that a node will continue to play ethically if at least p** of its neighbors play ethically

Threshold depends on payoff parameters

$$p \geq p^{**} = \frac{b-g}{a+b-c}$$

- Strategic complementarity – the more neighbors playing E, the more likely you play E



Nodes labeled by last period play of E or N

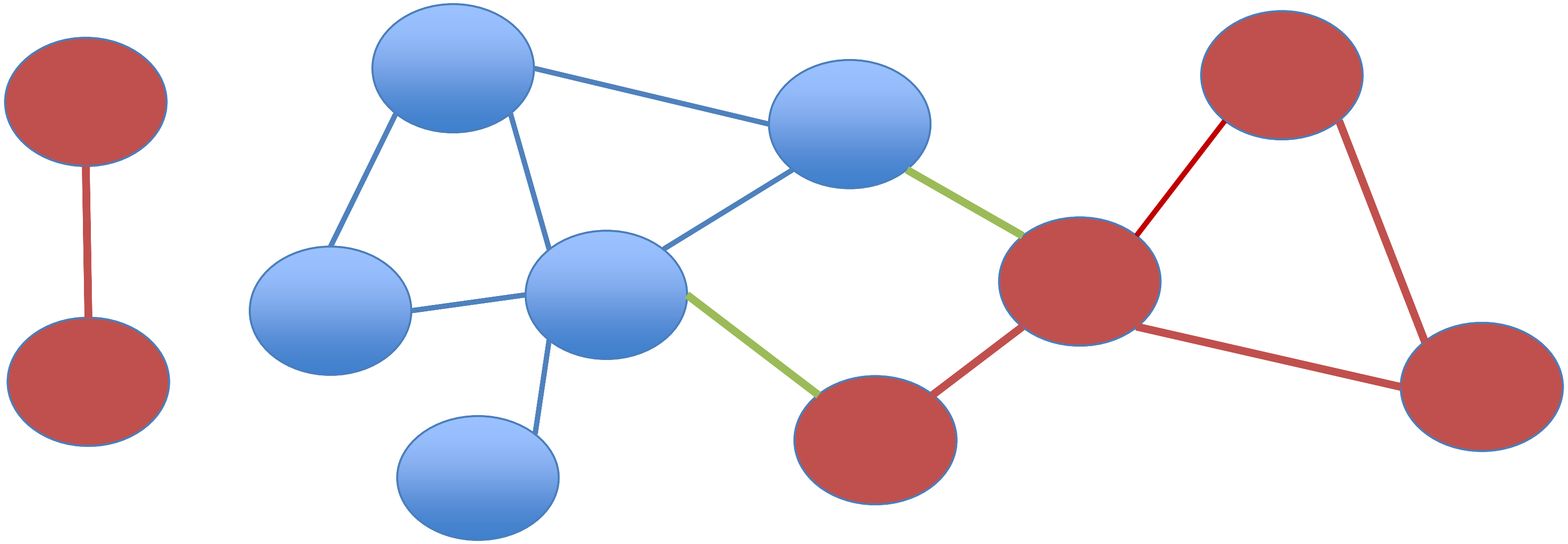
Dynamics

- Starting with everyone playing either ethically or non-ethically, can a small number of nodes flipping to the other behavior cause the new behavior to spread, possibly flipping everyone to the new behavior?
- If every node flips we have a complete cascade.

Dynamic process

1. Each node labelled; either all E or all N
2. Labels for some nodes exogenously switched from E to N, or from N to E
3. Each node, expecting its neighbors to play as labelled, chooses its best response
4. The nodes are labelled with the best responses and step 3 repeated
5. Process is declared stopped if in two successive labelings no labels modified.

- A cluster of density p is a set of nodes such that each node in the set has at least fraction p of its neighbors in the set.
- Cluster of blue nodes has density 2/3



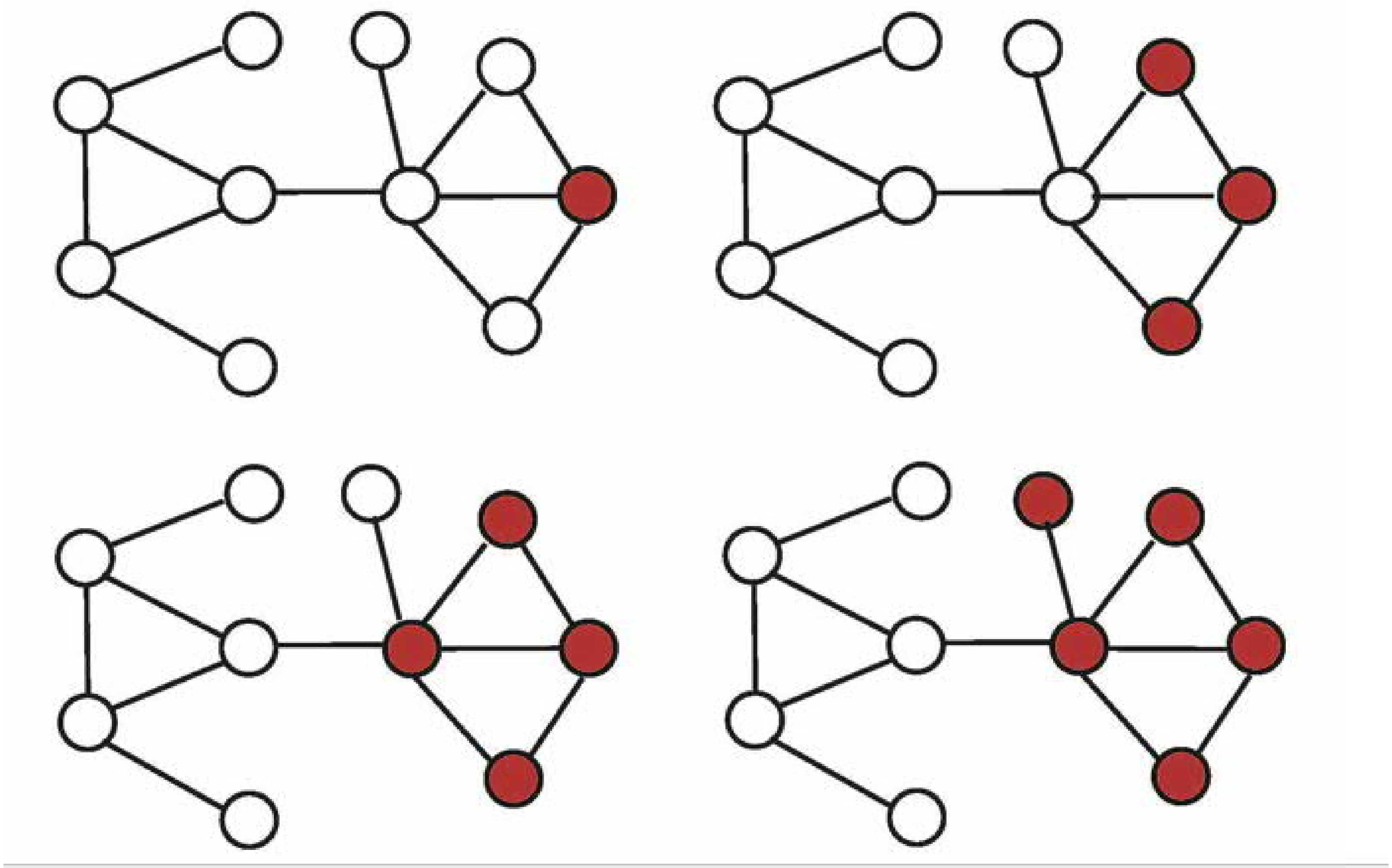
Cascades are Determined by Clusters

Theorem 1: Suppose the parameters of the game satisfy the basic model assumption and $c > a$. Consider a network in which every node initially plays E. Suppose that a set S of nodes switches to behavior N.

(i) If the remaining network, consisting of nodes in $\mathcal{J} - S$ and the edges between them, contains a cluster of density at least p^{**} then a complete cascade does not occur.

(ii) If a complete cascade does not occur, then the remaining network must contain a cluster of density at least p^{**}.

Example: p**= 0.6



Critical Results

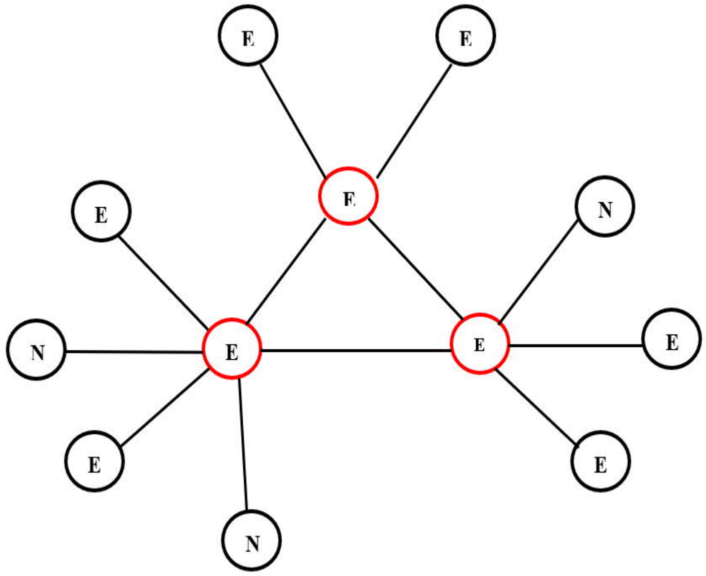
- Stable configurations of behavior involve clusters – and clusters are stable if and only if they are dense enough

- Clusters stop contagion and contagion can only be stopped by clusters

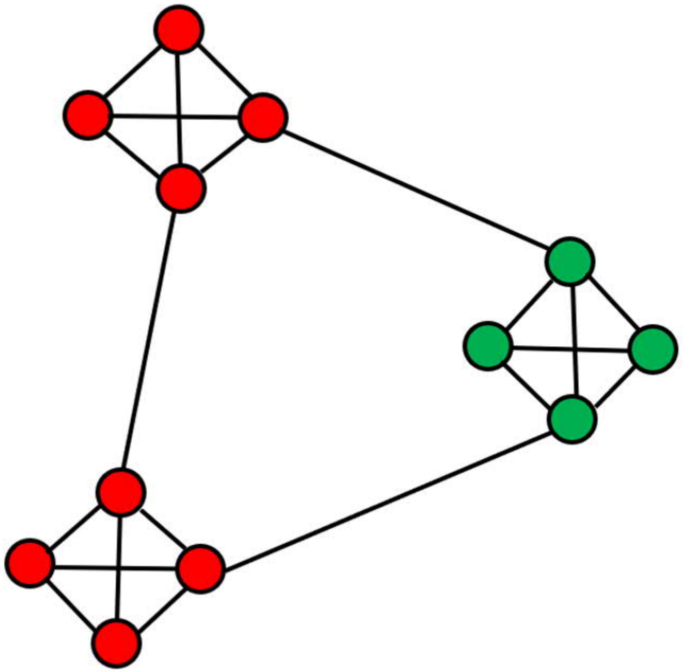
- The structure of the network matters

Some stable networks

Core-periphery network



Clique network



Variations on the basic model

- **Dynamics with Non-ethical play not Dominant (c<a)**
  - Now there are two pure strategy Nash equilibria (E,E) and (N,N)
  - This induces a coordination equilibrium
  - We now have two critical values for cluster density - p_E^{**} for Ethical and $1 - p_N^{**}$ for Non-Ethical – and the density needed to make each type of cluster stable can be small

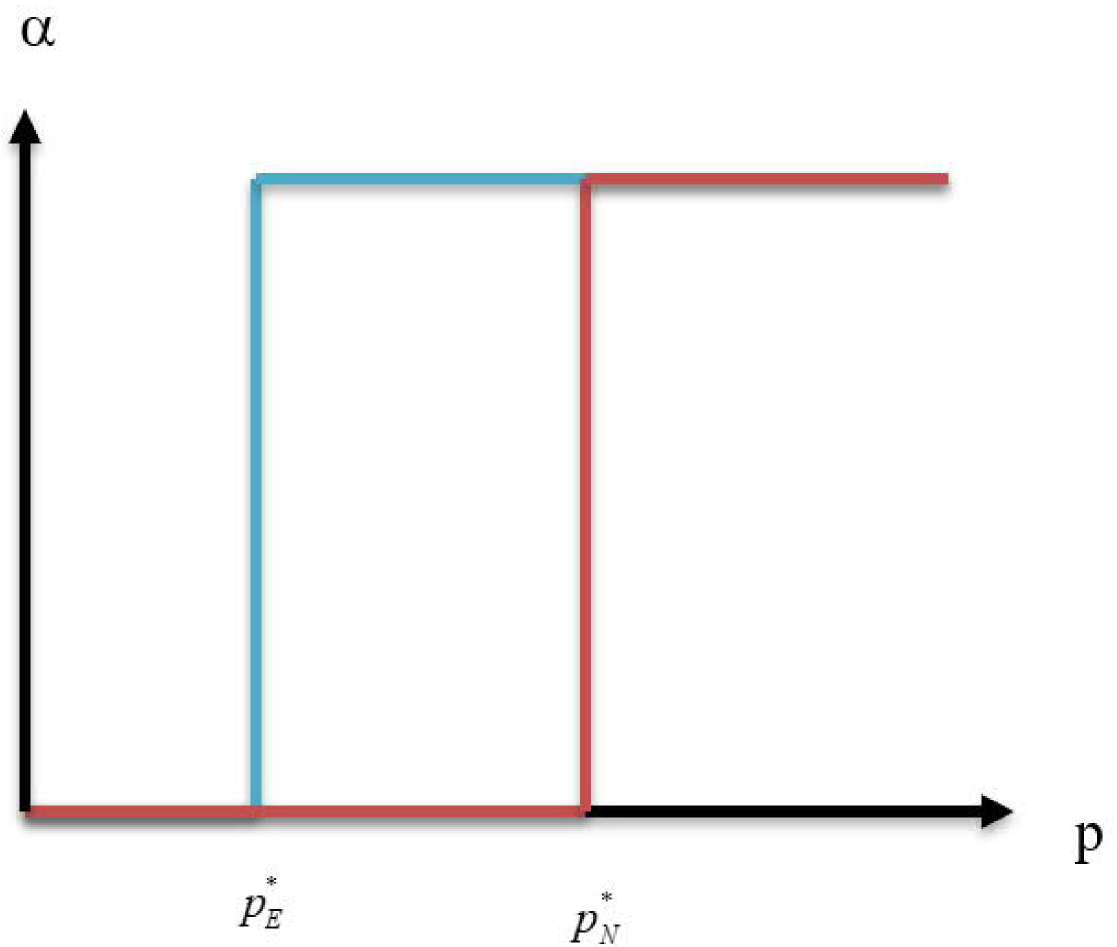


Figure 6: This figure describes optimal play as a function of the fraction of neighbors expected to play ethically. The blue curve provides this relationship for a node that previously played ethically; the red curve describes the relationship for a node that previously played non-ethically.

Heterogeneous agents – the role of gatekeepers

- A gatekeeper is a node such that all paths to a set of nodes passes through this node.
- Suppose some people (nodes) are always ethical.
  - Then if a gatekeeper, it can stop the spread of unethical behavior

Expanding the nature of guilt – an externality interpretation

- Here we let agents play a coordination game whose outcomes can impose negative externalities on society
- Society is a "dummy" player in the game and is akin to Smith's impartial spectator. Players feel guilt if society expects them to play ethically and they don't
  - Parameter assumptions are $a>0$ and $b>g>0$.

Guilt at-large results

- Both clusters of E and clusters of N can be stable and the densities needed to make clusters stable can be small.
- Guilt plays a critical role. If there is guilt, then $p_{NS}^{**} > p_{ES}^{**}$ and it is easier to sustain ethical behavior
- If g is large, then it is hard for non-ethical play to spread; if small, it spreads more easily.
- Non-ethical behavior as an externality

How can society make ethical behavior more stable?

- In our model ethical outcomes are, at best, fragile outcomes in market economies

How can we influence the outcomes in markets away from non-ethical equilibria and toward ethical ones?

Game payoffs

- Reduce payoffs to playing non-ethically
  - This lowers p** and results in larger clusters of ethical behavior
    increased supervision, fines, or even banishment from the market for more egregious cases
  - Note this must be done ex ante!

- Increase the guilt factor


文明广州 遵德守礼
文明游园
请勿攀爬
Be civilized. No Climbing.

Disappointing society

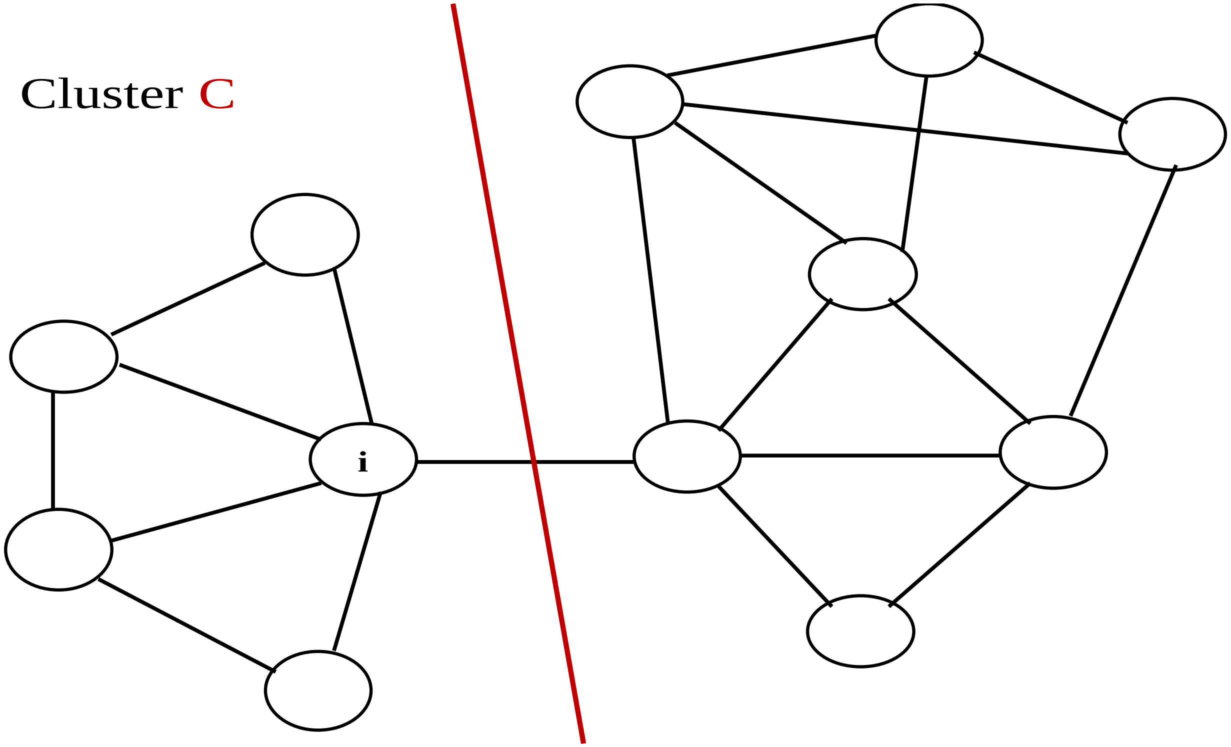
– China’s discredited persons list.

– The LA Lakers and that $4.6 m PPP Covid loan

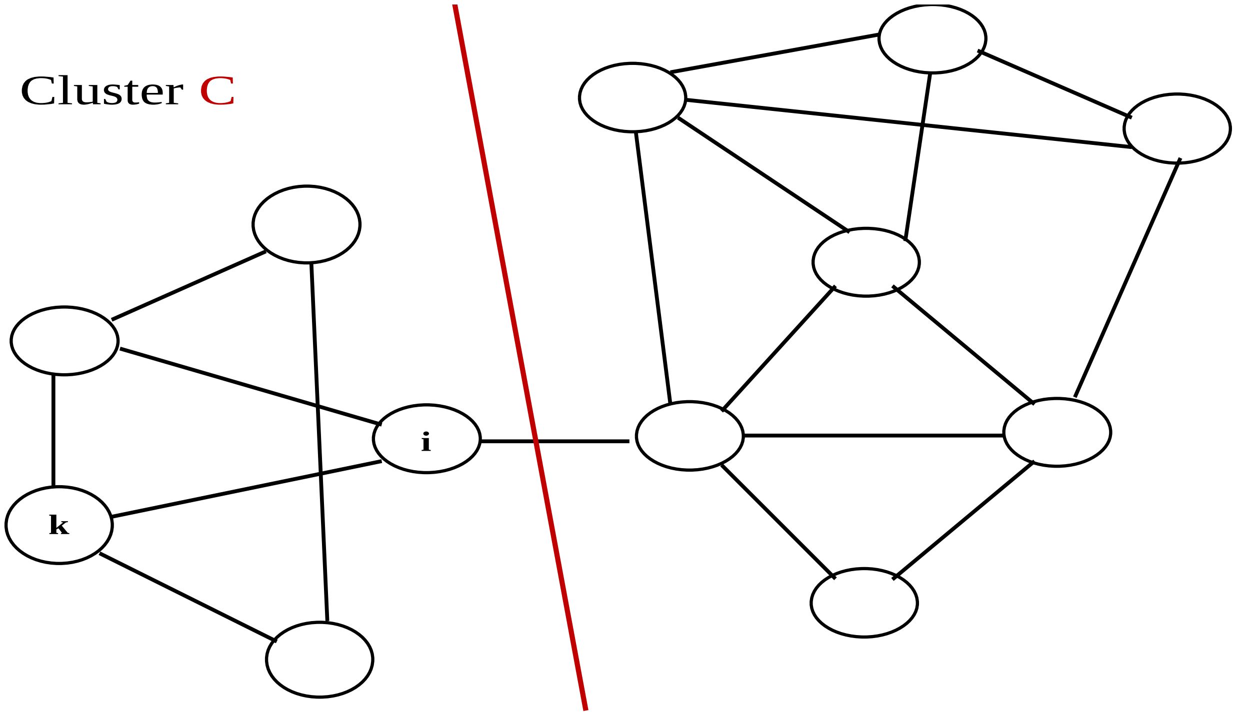
(Maybe a $4 billion dollar private company should not take money meant for small business’ even it if is “legal”?)

Network structure

- Network structures and clusters matter – and some nodes are more important than others
- Lessons from disease dynamics
  - Regulators need to maintain “critical” nodes as ethical to stop the spread of non-ethical behavior– but what are these nodes??



Node i is a critical node. If all nodes in C play E we have a cluster of density 4/5 plying E. If i switches to N the density falls to ½.



Node i is not the most critical node. If all nodes in C play E and all others play N we have a cluster of density 2/3 playing E. If i switches to N the density of C-i is still 2/3. If k switches to N the density of C-k falls to 1/3.

Bottom line for regulators

Policies that target individuals without changing the cluster density have little effect

Either make a significant intervention or don't bother

Conclusions

- We used psychological games played on a network to demonstrate
  - a role for endogenously determined, rationally chosen ethics
  - that ethical behavior can survive but generally only in clusters- and it is fragile.
  - Market design and regulation can facilitate ethical behavior.
- Can this approach be used in other applications? We think it can.

What you expect others to expect of you can affect the equilibrium – in both good and bad ways.

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Thank you