Interventions with Sticky Social Norms: A Critique

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Introduction

- policy interventions in an environment where social norms are endogenous but sticky.
- a group engages in production that generates a negative externality
- following Olson; Ostrom and many others we assume that peer pressure is used to mitigate this externality
- following Coase; Townsend; Levine and Modica and others we model the endogeneity of social norms as a mechanism design problem
- new feature: it is costly to redesign social norms
- motivated by evidence that social norms are sticky but can change quickly when incentives are strong: see Acemoglu and Robinson; Bigoni et al; Dell, Lane and Querubin; Levine
The Main Results

basic assumption: it is low cost to abandon the mechanism and revert to “law of the jungle”

examine policy interventions such as a Pigouvian tax designed to reduce output

we find as the size of the intervention (level of tax) increases:

• if the size of the intervention is small the group does not respond at all
• there is a threshold at which output jumps
• if the cost of norm redesign is small output jumps down and remain low
• if the cost of norm redesign is large output jumps up (yet welfare increases)
two anomalous experimental/empirical results seem to support this latter possibility:

- Gneezy-Rustichini’s finding that introducing a fine for lateness increases lateness
- Card-Krueger’s finding that fast food employment rose in response to an increase in the minimum wage
Redistribution and Political Action

We argue that the introduction of social media has reduced the cost of redesign since these experiments.

We examine how the way in which the proceeds of a Pigouvian tax are distributed matter.

We argue that if mechanism redesign takes place it may take the form of political action (tax repeal) and that this fits well the facts of the Yellow Vest political movement in France.
The Environment

a large organized group over two periods $t = 1, 2$

identical group members $i \in [0, 1]$ engage in production

choose a real valued level of output $X \geq x_t^i \geq 0$

utility of a member $i$ in period $t$ depends upon their common real valued public characteristics $\omega_t \geq 0$, their own output, and the average output of the group $\bar{x}_t = \int x_t^i \, di$ according to a smooth function $u(\omega_t, \bar{x}_t, x_t^i)$

second period there are two possibilities in period 2: it may be the same as period 1 with $\omega_2 = \omega_1$, or an unanticipated intervention may take place in which case $\omega_2 > \omega_1$ with $\omega_2 < \bar{\omega}$
The Social Mechanism

because of the externality the group collectively faces a mechanism design problem

we assume that incentives can be given to group members in the form of individual punishments based on monitoring of individual behavior

group can set production quotas \( y_t^i \) and receives signals of whether or not these quotas were violated

based on these signals it can impose punishments
**Monitoring**

monitoring generates a noisy signal $z_t^i \in \{0, 1\}$ of whether member $i$ exceeded the quota ($x_t^i > y_t^i$) where 0 means “good, respected the quota” and 1 means “bad, exceeded the quota”

- If the quota was honored ($x_t^i \leq y_t^i$) the bad signal occurs with probability $\pi > 0$
- if the quota was violated the probability of the bad signal is higher $\pi_1 > \pi$

monitoring difficulty is defined as $\theta = \pi / (\pi_1 - \pi)$

when the signal is bad the group imposes an endogenous utility penalty of $P_t^i$

may be in the form of social disapproval
choose quotas $y^i_t$ and punishments $P^i_t$

period $t$ utility of a member $i$

- who abides by the quota ($x^i_t \leq y^i_t$) is $u(\omega_t, x_t, x^i_t) - \pi P^i_t$
- who violates the quota ($x^i_t > y^i_t$) is $u(\omega_t, x_t, x^i_t) - \pi_1 P^i_t$

if the mechanism designer chooses $(y^i_t, P^i_t)$ we denote by $X (y^i_t, P^i_t)$ the set of pure strategy Nash equilibria of the game between group members (shown to be closed and non-empty)
as standard the mechanism designer gets to choose the equilibrium

a triple $(x^i_t, y^i_t, P^i_t)$ with $(x^i_t) \in X (y^i_t, P^i_t)$ is an incentive compatible social norm

if no punishments re issued ($P^i_t = 0$) we call it a default social norm
Designer Preferences

mechanism designer is benevolent and cares about average expected utility, so receives period $t$ utility from a social norm $(x^i_t, y^i_t, P^i_t)$ of

$$W(x^i_t, y^i_t, P^i_t) \equiv \int \left[ u(\omega_t, \int x^i_t di, x^i_t) - 1[x^i_t > y^i_t] \pi_1 P^i_t - 1[x^i_t \leq y^i_t] \pi P^i_t \right] di.$$ 

the monitoring costs are due to the punishment that takes place in equilibrium both for those who abide by the norm and those who do not
A Motivating Example: Pigou

Output $x_t^i$ brings an individual benefit $U(x_t^i)$ which is strictly concave $U''(x_t^i) < 0$ and a social cost $L(x_t^i)$ strictly increasing $L'(x_t) > 0$ and weakly convex $L''(x_t) \geq 0$

in one application output is driving speed: reduced commuting time versus cost of accidents to others

intervention is a Pigouvian tax $\omega_t x_t^i$ imposed by an outside agency. Here the type corresponds to the tax rate.

A portion of the tax $\alpha \in [0, 1]$ is returned to the group as an equally distributed lump sum, with the remainder going to the outside agency imposing the tax

member $i$'s utility function

$$u(\omega_t, x_t, x_t^i) = U(x_t^i) - \omega_t x_t^i - L(x_t) + \alpha \omega_t x_t.$$
Additional Assumptions

boundary conditions

• individual marginal benefit is large at the lower bound

• upper bound is sufficiently large that individual benefit is no longer strictly increasing

adequate range of policy interventions.

require that the initial tax rate not be too high and that the maximum possible tax rate be “high enough”

these assumptions are a special case of the more general assumptions used for the general model; those general assumptions also apply to the Cournot case of a cartel facing a minimum wage
A Revelation Principle of Sorts

for \( \omega_t \) and \( \overline{x} \) we say \( x^b(\omega_t, \overline{x}) \) is a best response if it is a maximizer of \( u(\omega_t, \overline{x}, x^i) \) show that is sufficient to restrict attention to incentive compatible common quotas \( y_t \) and that the optimal quota is the unique solution of

\[
\max u(\omega_t, y_t, y_t) - \theta \left[ u(\omega_t, y_t, x^b(\omega_t, y_t)) - u(\omega_t, y_t, y_t) \right].
\]

The term subtracted from individual utility represents the monitoring cost due to the need for the quota to be incentive compatible

note: only upward deviations matter

denote by \( \overline{y}^c(\omega_t) \) the solution to this problem.
Adjustment Costs and the Mechanism Design Problem

initial period no intervention is anticipated so the group solves the myopic mechanism design with $\omega_1$

solution: $\left( x_1^i, y_1^i, P_1^i \right)$

if period two if there is no intervention they continue to do the same called simple social norm

what matters is the common quota $\bar{y}^s$
Unanticipated Intervention

three possibilities:

1. The initial design \( (y_1^i, P_1^i) \) can be costlessly maintained, with the designer choosing any \( (x_2^i) \) such that \( (x_2^i, y_1^i, P_1^i) \) is incentive compatible

2. For a fixed cost of \( f \geq 0 \) any incentive compatible default social norm \( (x_2^i, y_2^i, 0) \) may be chosen (“law of the jungle”)

3. For a fixed cost of \( F > f \) an arbitrary incentive compatible social norm \( (x_2^i, y_2^i, P_2^i) \) may be chosen

under some circumstances there may a fourth option to organize to repeal the intervention as well as choosing a new social norm
An Assumption About Fixed Costs Costs

the monitoring cost of implementing the simple social norm:

\[ M \equiv \theta \left[ u(\omega_1, \bar{y}^s, x^b(\omega_1, \bar{y}^s)) - u(\omega_1, \bar{y}^s, \bar{y}^s) \right]. \]

assumption: \( f < M \) (that is, for law of the jungle)
Comparative Statics of Intervention

We examine the comparative statics of increasing $\omega_2$ from the initial level $\omega_1$ towards the upper bound $\overline{\omega}$ in the different regions of the parameter space $\theta, f, F$: how does optimal average output vary?

Optimal average output is denoted by $\overline{y}^o(\omega_2)$

- default social norm is just Nash equilibrium in $(x^i_t)$, we denote that output by $\overline{y}^d(\omega_2)$
- $\overline{y}^c(\omega_2)$ denotes output if a new optimal social norm is chosen
- quota in the initial simple norm is denoted by $\overline{y}^s$. 
The Classical Case of the Default Social Norm

**Theorem:** The default social norm $\bar{y}^d(\omega_2)$ is well-defined, weakly interior, smooth and strictly decreasing.

Higher Pigouvian tax or minimum wage results in lower output
The Main Result

basic picture is as $\omega_2$ increases

• output is initially constant due to stickiness of the existing norm

• a threshold at which output jumps and then (in a general sense) starts to decline and ultimately for high enough $\omega_2$ is lower than in the first period

anomaly relative to classical theory: for large $F$ output will jump up rather than down
Intuition for the Anomaly

when $F$ is high the choice is between the simple social norm and the default social norm
At the Simple Social Norm

• since the simple social norm was strictly optimal with no intervention it will remain optimal if the intervention is small

• at the original quota as the intervention (tax) increases the incentive to violate the quota goes down, so the quota remains incentive compatible

• at the original quota without punishment everyone strictly prefers higher output, so as the intervention increases they do not want to lower their output and stick at the quota
At the Default Social Norm

- output declines until when the intervention is large enough output is equal to the original quota
- at this point the default social norm is definitely and strictly better since it achieves the same output result as the simple social norm but without monitoring cost
- hence the optimal switch point is when the default social norm still has higher output than the simple social norm
- hence output jumps up
Case Study: School Fines (Gneezy/Rustichini)

a modest fine for being late to pick up children at a day-care center resulted in more parents picking up their children late. A behavioral interpretation of the finding

- initially there was no fine $\omega_1 = 0$ then (definitely unanticipated)
- then one was imposed $\omega_2 > 0$
- likely both that parents at day-care know each other and that there are some mild social sanctions towards parents who are persistently late -
- unlikely that prior to the fine parents simply picked up their children at the moment of the day they personally found most convenient
How Big Was the Renegotiation Cost?

• fine was introduced suddenly and without explanation it might well have been (correctly) anticipated to be of short duration

• field experiment conducted in 1998 well before the advent of social media (Facebook was founded in 2004).

it is plausible that $F$ was relatively large

for large $F$ and an intermediate level of fine our results show that if prior to the fine lateness was disciplined through a social norm among parents, after its imposition the old norm could be abandoned and lateness increase
Case Study: Minimum Wage (Card and Krueger)

a 1992 moderate minimum wage increase in New Jersey increased employment of unskilled labor in the fast food industry.

In the absence of norms the classical result applies that an increase of the minimum wage results in a drop in production.

When firms are members of a norm-enforcing large cartel such as a fast food chain our result shows output can jump upward in response to a moderate increase in the minimum wage.

If there is sufficient lack of sustainability between unskilled labor and other factors (for example, Leontief) the increase in output will result as well in an increase in employment of unskilled labor.

- Hence employment of unskilled labor can jump up in response to a moderate minimum wage increase.
- This is totally uninformative about large minimum wage increases which always lower output and employment of unskilled labor.
Redistribution and Welfare

now focus on the Pigouvian case and particularly the role of $\alpha = 1$
which is the fraction of the tax rebated to the group lump sum
in classical theory this makes no difference, and indeed here it makes
no difference to incentive constraints
it does, however, change group incentives, and has consequences for
group behavior as well as for group welfare
two reasons why we might have $\alpha < 1$

- inefficiency in tax collection
- tax revenues accrue to an outside agency
The Case $\alpha = 1$ and Welfare

here the group completely internalizes the externality, the issue is the least cost way to deal with it

this may be a reasonable approximation:

- the cost of collecting the fines is low
- since the school is supported by fees from the parents and different schools compete with each other. Implicitly, the money from fines either reduces what parents have to pay, or increases the services they receive.

we examine the case in which $F$ is large
What it Means

• with small scale interventions output remains unchanged and the intervention has no welfare consequence behavior does not change, taxes are collected

• with a medium scale intervention output jumps up at the point where the group is indifferent between the simple social norm and the default social norm, so welfare at the default social norm is the same as in the first period

• as the intervention increases output then declines and welfare increases

• in the neighborhood of the jump output remains above the first period; increased output reduces welfare but this is more than compensated by the reduction in monitoring costs

in the classical analysis the upward jump in output is regarded as a failure of policy; here it represents a success of policy
behavioral economists consider naive agents unable to discern their personal interest against sophisticated planners who are better able to determine what is best for individuals.

we explore the opposite point of view, and consider a naive planner.

a naive planner chooses a Pigouvian tax so that it is individually optimal to produce the $\bar{x}^*$ maximizing $U(\bar{x}) - L(\bar{x})$,

that is: $\omega_2 = \omega^*$ satisfying $U'(\bar{x}^*) = L'(\bar{x}^*) = \omega^*$

in all the debates we have seen about, for example, a carbon tax this seems to be the computation made by planners and would-be planners.

the first conclusion: if $F$ is small and $\alpha < 1$ there will be overproduction.

(note the assumption that the externality is local to the group, and that the naïve planner is attempting to act in the best interest of the group)
Tax Repeal

a group has a range of alternatives not available to an individual

an important alternative is political action, including rebellion and protest

we refer to this generically as “tax repeal”

if the group is going to renegotiate they may well decide not only on a new social norm, but (perhaps at additional cost) that it is desirable to engage in tax repeal
Even With Small $\alpha$ Repeal Might Not Be Optimal

$\Omega(\alpha)$ denotes the set of optimal taxes for the group, that is the set of taxes that are part of a solution to the design problem in which they choose taxes, quotas, and punishments.

Suppose $\theta$ is large and $\alpha$ small.

A lower tax creates a dilemma.

It creates a tax gain to the group.

It creates an incentive for individuals to increase.

Because $\theta$ is large it is costly to prevent output from increasing a lot.

If it is allowed to increase a lot since $\alpha$ is small it creates a large tax loss.

It could be best to raise the tax and use the improved incentives to reduce output offsetting the tax loss from the increased tax.
When $\theta$ is Small and $\alpha$ is Large

then the optimal tax must decline as $\alpha$ goes down

since the naïve tax is optimal form $\alpha = 1$ the tax preferred by the group is smaller

to focus thinking imagine $\omega_1$ is the optimal tax for the group

the group would not wish to repeal such a tax

however if $F$ is small and the naïve planner introduces $\omega^*$ the group will wish to repeal the tax

rather than improving efficiency, the naive planner may instead create a political backlash that will lead to lower rather than higher taxes
Case Study: Yellow Vests (Boyer et al 2019)

output represents driving speed

the intervention is the inverse of the speed limit which is equivalent to a higher tax

- July 1, 2018 the French Federal Government lowered the speed limit on secondary highways from 90 km/h to 80 km/h
- this was apparently motivated by the idea that the accident rate was too high
- bulk of impact fell on rural communities where there are no primary highways and secondary highways are widely used
Theory

in these areas social norms regulating driving speed are likely important

• drivers who are perceived to drive excessively fast are often punished, for example, by blocking their progress by intentionally slowing down, making it difficult to pass, or simply through obscene gestures

• as an extreme, see the Damián Szifron film “Relatos Salvajes” illustrates the idea well

as drivers observe one another well $\theta$ is relatively low

$\alpha < 1$: as the speed camera revenue is not returned to rural drivers who receive only an indirect benefit.

$F$ low due to the advent of social media: Facebook played a key role in the organization of rural communities.

theory says that if the group could do so at low cost it would organize not only a new driving speed norm, but also a lowering of taxes
Tax Repeal

the rate of traffic camera destruction jumped by 400% and in the year following the speed limit change about 75% of all traffic cameras in France were destroyed

(according to newspaper accounts they have since been replaced with indestructible cameras which have also been destroyed)
Observations

it is not true in this model that taxes are generally rejected: even with \( \alpha < 1 \) the group will often prefer a positive tax rate to partially substitute even for relatively inexpensive monitoring

setting the naïve Pigouvian tax - the usual policy prescription - is a mistake when \( \alpha < 1 \) for two reasons.

1. if a new social norm is introduced output will be too low

2. it creates an incentive for the group to attempt to (partially) repeal the tax

conclusion: a credible commitment to \( \alpha = 1 \) is highly desirable for implementing Pigouvian taxes.
Conclusion

main contention of this paper: role of social norms in enforcing pro-social behavior should not be neglected - it makes a difference for behavior and for welfare

increases in taxes designed to decrease an externality may increase output - but never-the-less increase welfare

impact of taxes on behavior can depend upon how the revenue is spent

the ability of groups to self-organize through social media can play a significant role in determining the consequences of interventions.