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THE MICROFOUNDATIONS OF RULES VS. DISCRETION*

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Using an *N*-person model, I explore the microfoundations of benevolent rules-dominant situations (of which the familiar time inconsistency models are examples). I show that under discretion the citizens confront a prisoner's dilemma, and I discuss the similar dilemmas embedded in the time inconsistency models. I then suggest new solutions to benevolent rules dominance: suboptimality can be avoided by accepting the discretionary regime and applying to the citizen population the standard remedies to the prisoner's dilemma.

Nothing emboldens sin so much as mercy.

William Shakespeare

Introduction

Government at all levels has a knack for promoting misfortune. It seems like every crisis is insured against, with the premium and indemnity paid by the taxpayer. Almost half of the claims of subsidized federal flood insurance are for repeat losses suffered by only 3 percent of policyholders.[1] Crisis promotion is clear enough in the S&L debacle, which is likely to leave the taxpayer with a clean debit of at least $200 billion. Crisis promotion as a national habit is manifest in aid to unwed mothers, deposit insurance, crop insurance, unemployment insurance, health insurance, social security, and relief for natural disaster. What needs to be done on the government's part is clear, and equally clear

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1 Editorial "Subsidizing Disaster." *Wall Street Journal*: October 3, 1989.

is that it will not be any time soon.[2] The predicament makes one wonder whether society can do anything about the crisis crisis on its own, apart from improvements in government.

Sometimes a bailout is just a stroke in the fine art of politics. But even a utilitarian government can find itself oversubscribing to misfortune. As Kydland & Prescott (1977) explained in their paper, "Rules Rather than Discretion. . . ," sometimes a binding commitment by the government can make everyone better off. With a discretionary regime citizens might take advantage of the government's second period benevolence. Kydland & Prescott say, "the suboptimality [of the discretionary regime] arises because there is no mechanism to induce *future* policymakers to take into consideration the effect of their policy, via the expectations mechanism, upon *current* decisions of agents (1977: 481)." An unalterable policy rule would be just such a mechanism.

A vast literature has evolved investigating the implications of time inconsistency for government policies.[3] With society depicted as a representative individual, the literature has explored the game between this individual and the monetary or fiscal authority.[4] Authors have discussed numerous political methods of resolving the dilemma (Barro & Gordon 1983; Calvo 1978:1422-23; Rogoff 1985; Rodrik & Zeckhauser 1988; Kotlikoff, Persson, & Svensson 1988).

The focus here is on an entirely different game. I explore the game played by the citizens given the law of the land. I model a variant of

2 The distance American ideology has traveled in the past century is shown by the following passage from Robert Higgs (1987: 83-84) about Grover Cleveland: "The most memorable manifestation of his convictions had occurred in 1887, during his first term as President, after Congress passed the so-called Texas Seed Bill. The act provided for a distribution of seed grain by the U. S. Commissioner of Agriculture to destitute farmers in an area of Texas devastated by drought. Only $10,000, a trifling amount even in those days, was appropriated; and the beneficiaries certainly seemed deserving enough. Yet Cleveland vetoed the bill, because he could 'find no warrant for such an appropriation in the Constitution.' Further, 'A prevalent tendency to disregard the limited mission of [the government's] power and duty should be steadfastly resisted, to the end that the lesson should be constantly enforced that, though the people support the Government, the Government should not support the people.' "

3 See surveys by Barro (1985), Blanchard & Fischer (1989: 592–614), Cukierman (1986), and Rogoff (1987).

4 O'Flaherty (1987), Chari, Kehoe, & Prescott (1988), Hillier & Malcomson (1984), and Rogers (1986) are exceptions to the prevalent use of the representative individual.

the flood plain example sketched by Kydland & Prescott (1977: 477).[5] The ruler's problem will be whether to provide assistance to flood victims, in the form of income redistribution. By jettisoning the representative individual I examine the microfoundations of the rules vs. discretion problem. The problem arises because under the discretionary regime the citizens face a prisoner's dilemma. I discuss the related dilemmas that underlie the standard time inconsistency models. I also suggest new solutions to time inconsistency, solutions which allow the citizens to lift themselves out of the suboptimality.

The commitment problem explored in this paper represents a special class of problems pertinent to constitutional political economy, the study of choosing constraints (Buchanan 1990). There are a multitude of reasons why it might be wise to tighten constraints, notably a conflict of interest between the chooser and the one who will face the constraints. But this paper shows, as many have in the past, that even a utilitarian ruler, governing a homogeneous population, may want to tighten the constraints she herself will face later. Thus, even where rulers meet the ideal of benevolence there is a role for constitutional political economy.

I. Rules Dominance and Time Inconsistency

We say the ruler (or Stackelberg leader) faces *rules dominance* if her payoff from commiting herself at the outset of the game to policies over the course of the game (rules regime) is higher than her payoff from sequentially optimizing at her turns to act throughout the game (discretionary regime). It is common knowledge among all agents which sort of regime the ruler has.

In *Figure 1* let player 1 be the ruler. If player 2, the citizen, knows that she is restricted to sequential reoptimization he would foresee that the ruler would move *(R)*, so he would move *(r)*. If the ruler can convey a commitment, she would announce *(L)*, eliciting *(l)* from the citizen. With commitment conveyance the ruler's payoff is higher than without it, so she faces rules dominance.

A subclass of rules-dominant situations is time inconsistent situations, which I proceed to define in standard fashion (e.g., Tesfatsion 1986). A policy plan for the ruler announced at the outset and extending

5 My scenario is a redistribution problem, while theirs is a public goods problem.

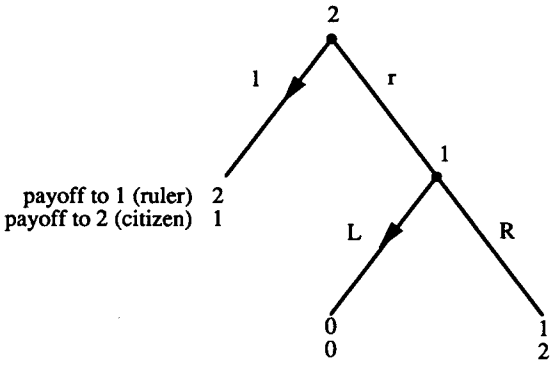

Figure 1. The arrows show the ruler's optimal plan. The plan is rules dominant and time consistent.

over the course of the game is *time consistent* if the following holds: Should the other players believe the announcement and act accordingly, the ruler would adhere to the announced plan throughout the play of the game even if she has the opportunity to reoptimize at each of the action points she arrives at. The ruler faces *time inconsistency* if her optimal plan, announced at the outset and believed by the other players, is not time consistent.

In *Figure 2*, if the citizen knows that the ruler is restricted to sequential reoptimization he would foresee that the ruler would move *(A)*, so he moves *(a)*. If the ruler can convey a commitment (and, for simplicity, permitting only pure strategies), she would announce *(B)*, eliciting *(b)* by the citizen. As in *Figure 1*, the ruler's payoff with commitment conveyance is higher than without it, so she faces rules dominance. Unlike *Figure 1*, however, in this case the ruler's optimal plan is time inconsistent. Once at v she would rather move *(A)* than make good on the announcement.

Assuming as we do that the only way to make others believe an announcement is to truly commit to it, time inconsistency implies rules dominance.[6] If the ruler's optimal plan is time inconsistent it necessarily

6 In the foregoing I am putting aside nongeneric annoyances. Many of the details are chased down and formalized in Klein & O'Flaherty (1990), where the ruler set-up is called an "s-game" (for Stackelberg), rules dominance is called "commitment dominance,"

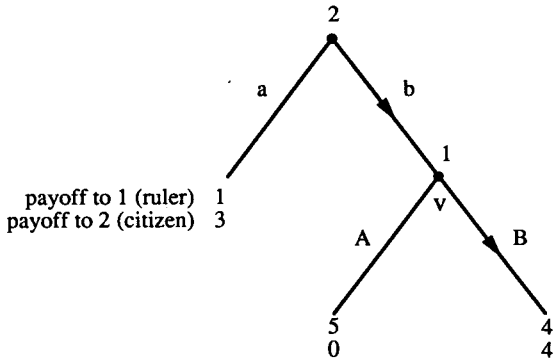

Figure 2. The arrows show the ruler's optimal plan. The plan is rules dominant and time inconsistent.

is not sequentially reoptimizing, so (really by definition) the plan must involve a commitment.

But, as illustrated by *Figure 1*, a rules-dominant situation need not be time inconsistent. The tale of *Figure 1* may run: I, as the ruler, say to you in the passenger seat, "Give me your wallet or I drive the car off the precipice." I need to commit to the plan to make it work (yielding the higher utility), but having made the commitment I do *not* reach a point where I want to stray from the plan. You do not test my threat. The situation is rules dominant and time consistent. It is not, however, Paretian (in the sense of my acting on your behalf).

The model of this paper is Paretian, as well as rules dominant, but it is also time consistent. The discussion here is about Paretian rules-dominant problems, which include the familiar time inconsistency models.

sequential reoptimization is called "sequential rationality," commitment dominance is related to subgame perfection, and time consistency is related to Nash equilibrium. The (1990) paper does not deal in particular with Paretianism; an investigation on this special case is in progress.

II. The Set-Up: The Flood Plain

A ruler governs $N \geq 2$ identical citizens who cannot be fooled. The ruler's objective function is to maximize the sum of expected utilities of the citizens:

$$U_R(:) = \sum_{i=1}^{n} EU_i(:) \tag{1}$$

Events take place in four timeless moments, and then utility is derived for one period.

The N citizens are endowed with houses on a pleasant, dry and sturdy plateau. They like their houses and derive utility from them. One inconvenience of their plateau abode, however, is that they have to walk far to get fresh water every day, as the river runs through the plain that is far below them. People have considered building houses on the plain to eliminate the onerous walk for water, but they fear that the plain may be flooded. It is common knowledge that a flood will occur with probability p. A citizen can move to the plain by costlessly disassembling his plateau house and reconstructing it on the plain. This change of abode occurs only at the first moment of the model. If there is a flood, it occurs during the second moment. If a subject is on the plain when the moment for moving comes to a close, he cannot move back to the plateau. The third moment is for the ruler's redistribution of income. The fourth moment is for the citizens to allocate their disposable income. Thus the temporal features are moving, flooding, redistribution, and individual allocation. Once these are settled the citizens "live" for a period.

Every citizen receives an income of y each period, and there is neither saving nor borrowing. Citizen utility is a function of two values, consumption (c) and house-value. House-value is made up of three variables:

1. Location. If the house is on the plateau the location factor has a magnitude of h_T; if the house is on the plain, the location factor has a value of of h_L. Because a house on the plain is conveniently located near the river, $h_L > h_T$.

2. Flood damage F to a house on the plain, with $F < h_L$ and $y + F > h_L$.

3. Flood repairs. Any flood victim can transform one-for-one his income for flood repairs, R, made during the fourth timeless moment.

For convenience only I assume that h_T happens to equal y. The utility of citizen i is written:

$$U_i = ln\ c_i + ln\ (h_i - f_iF + R_i) \tag{2}$$

where

$$f_i = \begin{cases} 1 \text{ if } i\text{'s house is flooded} \\ 0 \text{ if } i\text{'s house is not flooded} \end{cases}$$

The citizen chooses c_i and, if his house is flooded, R_i. If he is not flooded he merely sets c_i equal to his disposable income, $y + Z_i$, where Z_i is i's transfer payment. If he is flooded, the citizen chooses c_i and R_i subject to $c_i + R_i = y + Z_i$.

Z_i will depend on everyone's choice of where to live. When a flood occurs, a plateau dweller will be taxed (the opposite of) some amount $Z_T (\leq 0)$. Flood victims on the plain will receive some $Z_L (\geq 0)$. Flood victims consequently maximize (2) with respect to c and R, subject to $c+R = y+Z_L$. Thus the flood victim's optimizing choices are

$$c_{Lf} = (h_L + y - F + Z_L)/2 \tag{3}$$

$$R = (y + Z_L - h_L + F)/2 \tag{4}$$

A plateau dweller has only one use for his disposable income so his consumption is

$$c_{Tf} = y + Z_T \tag{5}$$

I assume that when disaster is borne individually the risk and damage of a flood are too great for the locational advantages of living on the plain to justify moving there. The following condition on y, h_L, F, and p renders houses on the plain individually suboptimal under laissez-faire (i.e., when Z_i is unconditionally equal to zero):

$$1 > (y + h_L - F)^2\ (4yh_L)^{-1}\ (h_L/y)^{1/p} \tag{6}$$

1. Discretion

If the ruler has "discretion," it is common knowledge that she will remain free to reoptimize at her turn to move; she cannot make any commitment, and any announcement is regarded as hot air. As Rodrik & Zeckhauser say in their excellent discussion of real world commitment problems, "homeowners will build too close to the river or the sea when they expect that the authorities will come to their assistance in case of flood" (1988:605).

Because of the separable utility function, if no flood occurs, no redistribution of income will increase the sum of utilities regardless of where folks live. If a flood occurs, it is socially optimal for income to be transferred from the plateau to the plain.

Specifically, if N-m citizens have built on the plain and m have remained on the plateau and a flood occurs, the ruler redistributes income according to the following optimization problem:

$$\underset{z_L,\, z_T}{Max}\ m \ln c_{Tf} + (N\text{-}m) \ln c_{Lf} + (N\text{-}m) \ln (h_L - F + R) \tag{7}$$

subject to: $Ny = (N\text{-}m)(c_{Lf} + R) + m\, c_{Tf}$
and subject to: (3), (4), and (5)
(because the ruler knows the levels which the citizens will subsequently choose)
yielding

$$Z_T = [(N\text{-}m)(y - h_L + F)]/(m\text{-}2N) \tag{8}$$

$$Z_L = [m(y - h_L + F)]/(2N\text{-}m) \tag{9}$$

Plugging (7) and (8) into (3), (4), and (5) we get

$$c_{Tf} = c_{Lf} = [(N\text{-}m)(h_L - F) + Ny]/(2N\text{-}m) \tag{10}$$

and

$$R = N(y - h_L + F)/(2N\text{-}m) \tag{11}$$

We see clearly that the citizens are involved in a game with each other, as payoffs depend on the actions of fellow citizens.

A final specification of the model is that under discretion moving to the plain is a dominant strategy. Given that *(N-m-1)* have moved to the plain and *m* have remained on the plateau, we require that it be individually optimal for the one undecided citizen to prefer the plain. Setting expected utility on the plain higher than this expected utility on the plateau implies:

$$1 < \frac{(2N-m-1)\,[(N-m)(h_L-F) + Ny][(2N-m)(h_L-F) + N(y-h_L + F)]\,(h_L/y)^{1/p}}{[(N-m-1)(h_L-F) + Ny]\,(2N-m)^2\,(h_L)} \qquad (12)$$

for all $m = 0, 1, 2, \ldots, (N-1)$

Under discretion each citizen knows that if he moves to the plain and a flood occurs, the ruler will partially bail him out with wealth from the plateau (if there is any), and if a flood does not occur he securely holds on to his higher house-value. If he remains on the plateau he will be taxed if a flood occurs.[7]

2. *Rules*

Under the rules regime the ruler can commit publicly to a plan other than sequential reoptimization. The question arises: In forming a plan, how much refinement is the ruler permitted? In the time inconsistency literature definite limitations are put on the refineness of available plans. In the savings taxation model of Fischer (1980), for example, the optimal rules (and time inconsistent) plan performs worse than a plan that would severely punish individuals if they did not behave in accordance with the first-best optimum. Futhermore, such a plan, though rules dominant, would be time consistent. But such refinement of plans is not permitted in the model. The model permits only a single tax formula for any savings history standing at the government's time to act.

In this model there are *N* citizens, each with a binary choice, so there are *2N* possible public histories at the ruler's time to act. If the ruler

7 The time inconsistency literature almost universally gives a representative individual presentation, which may lull the reader into viewing the society (apart from the government) as one agent. Such a view leads to a contradiction. In the present model, suppose $N=1$ $(m=0)$. Condition (12) would reduce to condition (6) with the inequality *reversed*. Utilitarian rules dominance cannot exist if there is just one citizen. In a game with just you and me, with my only concern being your welfare (which we have a common understanding of), we would be a team and I would have no need of commitment. This point is made as well by Fischer (1980, 99), O'Flaherty (1987), and Hillier (1989, 263).

enjoyed "perfect policy formation" (Klein & O'Flaherty 1990), in conveying a commitment she could specify different policies for each of these histories. But I assume imperfect policy formation, as do the writers in the time inconsistency literature. Specifically, I will be very restrictive and permit the rules regime to choose only from the set of plans {sequential reoptimization, laissez-faire}. The ideas developed below do not hang precariously on this simplification.

Condition (12) tells us that under discretion everyone ends up on the plain, leaving no one to tax after flooding. Condition (6) tells us that when transfers are zero unconditionally, the citizen is better off on the plateau. Thus the best rules plan available is laissez-faire, or commiting to not bailing people out.

3. Numerical Example

We can depict the model with a game tree if we specify values for the parameters. Let $N = 2$, $y = 1.2\ (= h_T)$, $h_L = 1.8$, $F = 1.1$, and $p = 0.5$. These values determine the payoffs shown in *Figure 3*. The citizens choose simultaneously where to live (hence the decision nodes of Citizen 2 form a single information set.)

The strategies under discretion are shown by the double arrows. The citizens know there will be a bailout unless they are both on the plain or both on the plateau. In consequence moving to the plain is the best action for each and the outcome is the far left terminal node.

The strategies under rules are shown by the single arrows. The ruler commits to not bailing out. In consequence staying on the plateau is the best action for each citizen. (The dashed line connecting the ruler nodes shows that the ruler is restricted to choosing like actions at each node when sequential reoptimization is violated.) The outcome is the far right terminal node. It can be seen that the rules regime is time consistent: the ruler never arrives at a point where she would like to deviate from the announcement.

4. Rules vs. Discretion

Under discretion everyone is led into a Pareto inferior point. *Figure 4* shows the two-player matrix game induced by the discretionary regime in the numerical example: it is a prisoner's dilemma. Thinking of laissez-faire vs. discretion, we see that injecting an altruist into a game can actually make the objects of altruism worse off. The discretionary ruler cannot make himself do nothing. Yet as it turns out he in fact does

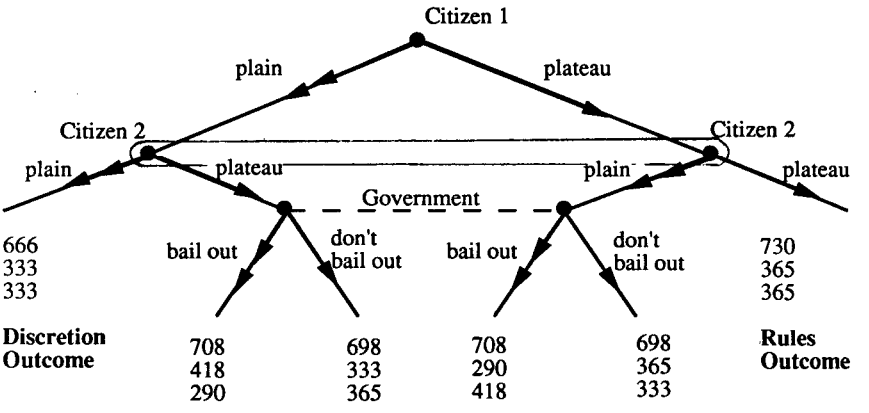

Figure 3. The flood plain model of the numerical example

Payoffs are listed in the order: ruler
citizen 1
citizen 2

Payoffs shown are x 1000.

Single arrows show strategies under Rules.
Double arrows show strategies under Discretion.

Citizen 1

Citizen 2	Plateau	Plain
Plat	.365 .365	.418 .290
Plain	.290 .418	.333 .333

Figure 4. Game faced by citizens under discretion in the numerical example.

nothing—but everyone is in the wrong place. The insight is not a new one. Sidgwick pointed out long ago that "it is conceivable that a greater equality in the distribution of produce would lead ultimately to a reduction in the total amount to be distributed, in consequence of a general preference [for] leisure" [1969 (1901): 519–20].

III. The Prisoner's Dilemma in Time Inconsistency Models

If we designate a "state of nature," with neither a discretionary nor a rule-bound government, we may ask whether the introduction of discretionary government has a positive, negative, or neutral effect on society. In the flood plain model the introduction of a discretionary regime has a negative effect—it generates the prisoner's dilemma. This is not the case generally, however.

In the Phillips curve example introduced by Kydland & Prescott (1977), the natural rate of employment (or output) is too low because of an externality: the working individual does not capture some external benefit resulting from his labor. Unexpected inflation induces people to work more, but inflation, expected or not, also does some damage. In this setting the prisoner's dilemma exists in the state of nature. The cooperative outcome would be for everyone to do the extra labor even though they are not sufficiently compensated for it, but the noncooperative outcome is for everyone to defect by working only to the point where the marginal private benefit equals the marginal private cost. With the introduction of the discretionary regime, matters are made worse because the only Nash equilibrium inflation rate between the benevolent monetary authority and the governed is some positive (and fully anticipated) level. Discretion in this model does not generate the prisoner's dilemma, but it aggravates it by subtracting from each state-of-nature payoff the harm associated with fully anticipated inflation. Under rules the monetary authority precommits to not inflating, yielding a world equivalent to the state of nature.

The rules regime (and the state of nature) would be bettered by the fooling regime where people believe the monetary authority will not inflate but in fact it does. Hence the inconsistency. This dissembling leads people to cooperate unwittingly in the prisoner's dilemma they confront. Each person loses individually by working too much but he is more than compensated by the positive externalities resulting from everyone else being similarly fooled.

Another well-known time inconsistency problem is the savings taxation scenario discussed by Kydland & Prescott (1977) and Fischer (1980). In the first period citizens decide whether to consume or save, and in the second period they decide how much to work. In the first period a discretionary government does nothing, and at the beginning of the second period it sets tax rates on labor income and accumulated savings to finance a public good. Because savings taxation is nondistortionary, it opts to tax savings heavily. But foreseeing this citizens curtail savings in the first period. Everyone is worse off than when the government precommits at the outset to limit the tax rate on accumulated savings. (A game tree depiction of the savings taxation example is provided in Klein & O'Flaherty 1990.)

If we say that in a state of nature no public good is provided, the introduction of the discretionary regime may mitigate the prisoner's dilemma existing in the state of nature, but the dilemma is not eradicated. Under discretion people are still free riding in the form of curtailed savings. A rules regime, though an improvement, does not eradicate the problem either, because come the second period the government could do even better for all if it could break its commitment.

Patent policy is another cited time inconsistency problem (Kydland & Prescott 1977:477). A discretionary, continually reoptimizing patent office would dissolve all existing patents since once products have been invented it is optimal to permit imitation. Yet such a regime would remove the incentive to invent, so a rules regime that preserved patents would be superior. If we assume a population where everyone is a potential inventor, the prisoner's dilemma exists in the state of nature where patents do not exist, and the move to a discretionary regime does not change the situation at all. A rules regime will induce greater innovation, but still it will not accomodate optimal imitation of inventions.

IV. Social Solutions to Benevolent Rules Dominance

Studies investigating how to ameliorate a rules-dominant, or time inconsistent, situation when rules are not available have focused on the game played between the representative individual and the ruler. Barro & Gordon (1983) have made the largest strides in discussing reputational aspects of government behavior in repeated scenarios. This solution

and those discussed by others[8] induce outcomes superior to simple discretion.

The exposition here suggests other ways of ameliorating the suboptimality of the discretionary regime. Having seen the prisoner's dilemma involved, we can apply the various proposals for handling the prisoner's dilemma. These approaches take the discretionary regime as a given, and will be called "social solutions." Although the ideas behind social solutions are not new, their employment as an antidote to Paretian commitment problems, for the most part, is new.

Fischer (1980) has suggested the simplest social solution to rules dominance: assume that the individuals act cooperatively. If transactions costs are zero, Coasian negotiation eliminates the suboptimality.

Where full cooperative play is not feasible, limited contracting may still lead to an improvement. In the flood plain model, improvement can be made if all the citizens can contract with one pivotal citizen. In the manner of contingently contracting for a public good elaborated by Schmidtz (1987), the pivotal citizen could propose that each fellow citizen agree to surrender all his second period wealth to the pivotal citizen if the following two conditions hold come the moment for redistribution: (1) the agreeing citizen moved to the plain, and (2) all the other citizens agree to the proposal. It is a dominant strategy for each citizen to agree: if all the other citizens agree to the proposal, the citizen in question is decisive in bringing about the cooperative result (everyone on the plateau); if less than all the other citizens agree the citizen in question loses nothing by agreeing. Everyone agrees and no one moves to the plain.[9]

If the rules-dominant problem is repeated, selective incentives may become common under discretion (Olson 1971: 51-65). Returning to *Figure 3*, without tampering with the discretionary behavior shown by the double arrows, what can the two citizens do to avoid life on the flood plain? The inglorious "winner" payoff associated with being on

8 For example, Calvo (1978: 1422-1423); Rogoff (1985); Rodrik & Zeckhauser (1988: 605-613); and Kotlikoff, Persson, and Svensson (1989). Cohen & Glazer (1990) discuss front loading the cost structure of public projects as a way that the current political body imposes its will on, or constrains the choice of, a future public body.

9 If the pivotal individual had a monopoly on being able to contract with everyone, he could enjoy a large share of society wealth. This possibility is avoided if we assume that individuals compete to be the pivotal contractor. A Bertrand type of price competition can be thought of here.

the plain while the other is on the plateau must be reduced. The 418 must be reduced to a value less than 333. If the "winner" position is sufficiently stigmatized so, on balance, it becomes, say, 300, despite the discretionary behavior mutual plateau residence will be a new and superior Nash equilibrium.[10] Mutual plateau residence is made the unique equilibrium if, in addition, the 333's associated with mutual plain residence can be reduced to a value less than 290.[11]

How can these values be reduced? Although the model is just an institutionless skeleton, we might suppose that the citizens would recognize the dysfunctional aspect of moving to the plain. Moving to the plain may come to be regarded as reprehensible behavior and either be punished or simply generate feelings of guilt in the offender. As de Tocqueville said,

> . . . whenever men collect together as a distinct community, the notion of honor instantly grows up among them; that is to say, a system of opinions peculiar to themselves as to what is blamable or commendable; and these peculiar rules always originate in the special habits and special interests of the community (1945, II, 247).

Citizens who move to the plain may be punished for their parasitic behavior. We are familiar with the stigma attached to welfare payments. Angry public tirades against aid to unwed mothers and similar "redneck" animadversions may be viewed as reactions to the negative externalities generated by a discretionary regime. People recognize the need for a public ethic denouncing the irresponsibility that leads to government dependence. Under a discretionary regime, eternal heartlessness may be the price of social betterment.

Another case of selective incentives is the faculty seminar guided by the kind but overly permissive (i.e., discretionary) moderator. The efficient regime (rules) is to permit only brief clarifying questions during the main presentation. Once a substantive question interrupts the presentation, however, the principal damage has been done, as attention has shifted from the speaker's line of reasoning to the point of the

10 Brams (1990) offers a useful taxonomy of symmetric 2x2 games by payoff orderings.

11 Note that the selective incentive dimension of citizen welfare is assumed to be off budget as far as the ruler's utilitarian calculus goes. The ruler is blind or indifferent to these machinations.

question. Reoptimization on the part of the moderator will permit discussion of the interrupting question. In consequence, too many substantive questions are raised during the main presentation. Under such a regime the more justice-conscious participants might take the law into their own hands by punishing the interrupter with a sour look or an impatient rejoinder. In many situations people have a natural demand to provide what they view as justice, so such selective incentives may be forthcoming even if they are costly.[12]

Justice oriented members of society can influence the group's notion of proper behavior. Indeed, sometimes participants are explicit about such intentions. Consider the last page of *The Reason of Rules* by Brennan and Buchanan (1985), where the authors say

> this book is an expression of the hope that a new "civic religion" is on the way to being born . . . Our normative role, as social philosophers, is to shape this civic religion . . .

Buchanan's career overall can be taken as a case of one person consciously trying to generate norms to counteract perceived problems, and it might be said that he sees these problems as stemming from a cluster of discretionary authorities (although the term "discretionary" is used here in a looser sense than simply sequential reoptimization in a well-defined setting).

Another means of improvement is to rely on trigger strategies. If the discretionary flood plain world is repeated infinitely, a perfect Nash equilibrium is for all the citizens to obey the following strategy: if no one moved to the plain last round, stay on the plateau this round; if someone moved to the plain last round (and last round was not a punishment period), move to the plain for the next t rounds, where

$$t > \frac{ln\ y^{(-1-p)} h_L^{(1-p)} [(h_L - F + Ny)/(N+1)]^{2p}}{ln\ y^{(1+p)}\ h_L^{(p-1)}\ [2/(y + h_L - F)]^{2p}} \tag{13}$$

t is determined by setting the expected utility from abiding by the plateau norm for t periods greater than the expected utility from defecting from this norm, delivering a one period boon, plus suffering afterward t

12 For experimental evidence of a positive demand to punish wrong-doers, see Kahneman, Knetsch, and Thaler (1986). For an historical investigation of selective incentives, see Klein (1990).

periods of unaided life on the plain (I assume no discounting).[13] With such a strategy folks stay clear of the flood plain despite the discretionary regime. The numerous game-theoretic wrinkles to the basic trigger story could of course be fitted to the model with suitable adjustments.

In small group situations such as inside an organization, a club, or a family, the social solutions are plausible. In pursuing a trigger strategy, if my brother buys an impractical sports car and counts on Mom to foot the bill when the fuel pump fails, I might retaliate in kind by undertaking a risky investment. These social solutions will operate nicely in the "rotten kid" literature, which assumes an altruistic family head (Becker 1974). Lindbeck & Weibull (1988) and Bernheim & Stark (1988) have extended Becker's analysis to show that if the family head is soft-hearted—that is, is always overcome with mercy when the child faces misfortune—the parent's altruism is partly undermined. The situation breeds misfortune. Social solutions in this context are eminently likely, and this line of research can be extended accordingly.

In a large group situation like the inflation model, however, it is ridiculous to think of citizens abiding by a trigger strategy. Trigger-style cooperation systems may be useful interpretations only of situations that are clearly defined (to deliver the common knowledge assumption) and where sudden reversions to punishment strategies are conceivable. For a hyper-complex situation like, say, the inflation model, a trigger interpretation stretches all bounds of plausibility. Even in a large group problem, however, it is not implausible to see selective incentives such as social stigmas and notions of honor and justice develop to discourage the irresponsible strategy.

Conclusion

The study of microfoundations enables a better grasp of the benevolent rules-dominance (or time inconsistency) problem. We found that the familiar models of time inconsistency involve a prisoner's dilemma under the discretionary regime. The prisoner's dilemma is embedded in the various models in different ways.

The rules-dominance problem can be resolved, or at least ameliorated, by applying the conventional solutions to the prisoner's dilemma. Since these solutions simply work around the discretionary regime, I

13 In the numerical example t is any integer greater than or equal to two.

call these "social solutions." They include varying degrees of cooperation, selective incentives, and trigger strategies. These solutions make most sense in small group settings.

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