Elite-Led and Majoritarian Institutional Reforms*

by
Avinash Dixit
Princeton University

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Abstract

As the size and scope of trade expands, informal institutions of governance based on social networks and norms lose their efficacy relative to formal institutions based on the state's legal system. Attempts to bring about such a shift are sometimes led by a small group of large traders taking private initiatives, and at other times by a coalition of many small traders operating through the political process. This paper constructs a model of repeated prisoner's dilemma with players of unequal size, to help us understand when the one or the other approach to institutional reform is more likely to be taken. Elite-led reform is found to be more likely the greater the degree of inequality in sizes, and the smaller the proportion of the large-size traders.

Address of author:

Department of Economics, Princeton University, Princeton, NJ 08544–1021, USA.
Phone: 609-258-4013. Fax: 609-258-6419.
E-mail: `dixitak@princeton.edu`
Web: `http://www.princeton.edu/~dixitak/home`

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1 Introduction

Research on formal and informal institutions of contract enforcement has given us some understanding of the limits of the latter. Small networks of traders, with their norms of behavior and sanctions for misbehavior, can deter opportunism and achieve self-enforcing adherence to contractual promises. This requires good monitoring and communication in the network, and the marginal costs of these activities increase as the size of the community of traders expands. Eventually a formal system of laws and their enforcement based on the state's coercive powers becomes more efficient, despite the fixed cost of making the laws and establishing the machinery of enforcement. Greif's (2006) comparison of Maghribi and Genoese traders is an instance of this, and Li (2003) and Dixit (2004, ch. 3) construct theoretical models that yield this result.

The process that can generate the shift toward a formal institution of governance is less well understood. Although there is some long-run presumption that transactions and governance structures will align themselves to economize on transaction costs (Williamson 1998), there are many obstacles and delays in the process, and even lock-in of dysfunctional institutions (North 1991 chs. 9–11, Eggertson 2005). Greif (2006, ch. 10) demonstrates how a "community responsibility system" intermediated the transition in late medieval Europe; Greif (2008) demonstrates the role of administration in bringing about institutional reform.

In this paper I explore one specific feature that plays a role in determining the path of institutional reform, namely heterogeneity in the size of the traders. Many situations of trade and contract involve a few large traders and more numerous small ones. Sometimes the efforts to establish formal governance are led by the small group of large traders. In international trade, for example, large and rich countries are usually the ones working toward a framework of laws and enforcement mechanisms for protection of direct investment and intellectual property. At other times, the pressure for institutional reform comes from the masses. For example, in the early twentieth century the progressive movement in the United States arose in response to the economic, safety, and environmental problems caused by large trusts and other large producers.

The theory of repeated games offers a conceptual framework to explain this difference. Traders of different sizes have different temptations to cheat, and stand to gain different benefits from a formal governance. Therefore their willingness to pay for such an institution will also differ. A group of trades that tries to establish the formal institution has to solve its internal collective action problem; its success depends among other things on the number of traders in the group. For both these reasons, the size distribution of traders will be a factor in the process of institutional reform. If a few large traders stand to make large gains from good governance, they may be able to take collective action and bear the fixed costs of the reform themselves. Conversely, a sufficiently numerous group of traders may be able to take political action to implement the reform by majority vote and require everyone to share the fixed costs of reform. History shows instances of both processes – reform led by the elite as well as reform arising from a popular movement. I construct a model in which both possibilities exist, for different values of the parameters. In both cases the process of reform occurs later than the socially optimal date, but the delay mechanism is different in the two cases.

2 Effect of Size on Self-Enforcement

The underlying idea is that under certain conditions repetition can convert a one-shot prisoners' dilemma into an assurance game in which a good outcome can be self-enforcing. However, the conditions become more stringent if the traders are of unequal size. If the inequality is so large that these conditions are violated, then the good outcome can only be sustained by a formal institution that would impose coercive punishment on a defector.

The starting point of the analysis is a simple prisoners' dilemma whose payoff matrix is shown in Table 1. The payoffs reflect the assumption that a cheater's benefit, and the victim's loss, are both proportional to the size of the victim. The strict proportionality simplifies the analysis, but the general idea is intuitive. There is more to steal if the victim is large, but if the victim is small, not much can be gained by cheating him, regardless of the size of the cheater.

Table 1: The Basic Prisoners' Dilemma

		Trader 2	
		Honest	Cheat
Trader 1	Honest	$k_1,\ k_2$	$-\ell\, k_1,\ k_2 + g\, k_1$
	Cheat	$k_1 + g\, k_2,\ -\ell\, k_2$	0, 0

2.1 Self-Enforcing Honesty with Repetition

Now suppose this pair plays the dilemma repeatedly, and the effective discount rate is r for each. (Different discount rates would complicate the algebra without yielding additional insight for the issue that is my focus here.) To keep the analysis at the simplest level appropriate for studying the question, I consider just two strategies for each: the trigger strategy T that consists of playing honest until any history of cheating has occurred and thereafter playing cheat for ever, and the constant cheating or defection strategy D. The payoff matrix for this repeated game is shown in Table 2.

As usual, (D, D) is always an equilibrium in this game; the game has an assurance structure and (T, T) is also an equilibrium if and only if

$$\frac{k_1}{r} > g\, k_2 \qquad \text{and} \qquad \frac{k_2}{r} > g\, k_1\,, \tag{1}$$

Table 2: The Repeated Prisoners' Dilemma

		Trader 2	
		Trigger (T)	Defect (D)
Trader 1	Trigger (T)	$k_1 + \frac{k_1}{r},\ k_2 + \frac{k_2}{r}$	$-\ell\, k_1,\ k_2 + g\, k_1$
	Defect (D)	$k_1 + g\, k_2,\ -\ell\, k_2$	0, 0

or

$$g\, r < \frac{k_1}{k_2} < \frac{1}{g\, r}\,. \tag{2}$$

This condition shows in the simplest way how the relative size of the traders matters for the possibility of self-enforcing cooperation. If k_1 is too large relative to k_2, then the right-hand inequality in (2), corresponding to player 2's dynamic incentive constraint in (1), will be violated. If k_1 is too small relative to k_1, then the left-hand inequality in (2), corresponding to player 1's dynamic incentive constraint in (1), will be violated. In each case, the smaller of the two players has the greater incentive to cheat, so his incentive constraint is more vulnerable.

To focus on the effect of unequal sizes, I assume that if the sizes were equal the (T, T) outcome would be sustainable. In this setting it means simply

$$1 > g\, r\,. \tag{3}$$

2.2 Self-Enforcement by Risk-Dominance

Requirements for the (T, T) to be self-enforcing may be more or less stringent than its being a Pareto preferred outcome. More stringently, we may require it to be risk-dominant, because under quite general conditions iterated dominance in a global game with slight lack of common knowledge forces selection of the risk-dominant equilibrium (Carlsson and van Damme 1993), and stochastic dynamics converge to it (Young 1998, Theorem 4.1). The condition for (T, T) to be risk-dominant is

$$\left(\frac{k_1}{r} - g\, k_2\right)\,\left(\frac{k_2}{r} - g\, k_1\right) > (\ell\, k_1)\,(\ell\, k_2)\,.$$

Define $k = k_1/k_2$ and write this as

$$\left(\frac{k}{r} - g\right)\,\left(\frac{1}{r} - g\, k\right) - k\ \ell^2 > 0\,, \tag{4}$$

or

$$\frac{g}{r}\, k^2 - \left(\frac{1}{r^2} + g^2 - \ell^2 \right)\, k + \frac{g}{r} < 0\,,$$

or

$$\phi(k) \equiv k^2 - \frac{r}{g}\, \left(\frac{1}{r^2} + g^2 - \ell^2 \right)\, k + 1 < 0\,. \tag{5}$$

We have $\phi(0) = 1 > 0$ and $\phi(k) > 0$ for k sufficiently large. Next,

$$\phi(1) = \frac{r}{g} \left[\, \ell^2 - \left(\frac{1}{r} - g \right)^2 \,\right]\,.$$

Once again I assume that the (T,T) outcome is self-enforcing (here risk-dominant) in the symmetric case, that is, $\phi(1) < 0$ or

$$\ell < \frac{1}{r} - g \qquad \text{or} \qquad 1 > r\,(g + \ell)\,. \tag{6}$$

Observe that this is more stringent than the condition (3) for (T,T) to be merely an equilibrium.

Given this condition, the quadratic equation $\phi(k) = 0$ will have two real roots, say $k_L < 1 < k_H$, such that $\phi(k) < 0$ for $k_L < k < k_H$. Moreover, by the standard formula for the product of the roots, $k_L\, k_H = 1$, so the range of $k = k_1/k_2$ over which the risk-dominance condition is fulfilled is (geometrically) symmetric around 1. Finally,

$$\phi(g\, r) = \frac{r}{g}\, (rg)\, \ell^2 > 0\,,$$

and

$$\phi(1/(r\, g)) = \frac{r}{g}\, \frac{1}{r\, g}\, \ell^2 > 0\,;$$

therefore

$$r\, g < k_L < 1 < k_H < \frac{1}{r\, g}\,,$$

that is, the range of risk-dominance of (T,T) is narrower than the range for it merely to be an equilibrium.

As an aside, write the condition (4) for (T,T) to be risk-dominant as

$$\psi(k) \equiv \left(\frac{k}{r} - g \right)\, \left(\frac{1}{r} - g\, k \right) / \left(k\, \ell^2 \right) > 1\,.$$

Then

$$\frac{d\, \ln[\psi(k)]}{dk} = \frac{\frac{1}{r}}{\frac{k}{r} - g} - \frac{g}{\frac{1}{r} - g\, k} - 1\,.$$

This is a decreasing function of k, and when $k = 1$ it equals

$$\frac{\frac{1}{r}}{\frac{1}{r} - g} - \frac{g}{\frac{1}{r} - g} - 1 = 0\,.$$

Therefore $\psi(k)$ is maximized at $k = 1$. In this sense the symmetric game is most conducive to risk-dominance of (T,T).

2.3 Self-Enforcement Using Transfers

Alternatively, the range of self-enforcing honesty could be expanded by the large player giving the small player (who has the greater temptation to deviate) a transfer each period to increase his incentive to play honest. To keep the direction of transfer obvious, for this part I set $k_2 = 1$ and $k_1 = k > 1$. Let t denote the transfer given by the large player 1 each period to the smaller player 2 in the specification of the candidate equilibrium strategy T. If player 2 deviates to playing D while 1 continues to play T, in the period of cheating player 2 gets the transfer plus the extra gain $g\,k$. If player 1 deviates, he gets the gain g and does not make the transfer t. (We could separate the two aspects of cheating, but if one is going to cheat, it is obviously better to cheat in both dimensions at once.) Therefore the payoff matrix is as shown in Table 3.

Table 3: The Repeated Game with Transfer

		Trader 2	
		Trigger (T)	Defect (D)
Trader 1	Trigger (T)	$k - t + \frac{k-t}{r},\ 1 + t + \frac{1+t}{r}$	$-t - \ell\, k,\ 1 + t + g\, k$
	Defect (D)	$k + g,\ -\ell$	$0,\ 0$

Now the conditions for (T, T) to be a (Pareto-preferred) equilibrium are as follows. To keep the large player 1 honest:

$$k - t + \frac{k-t}{r} > k + g\,,$$

or

$$t < \frac{r}{1+r}\left(\frac{k}{r} - g\right), \tag{7}$$

and to keep the small player 2 honest,

$$\frac{1+t}{r} > g\,k\,,$$

or

$$t > g\,r\;k - 1\,. \tag{8}$$

I am assuming that the symmetric game would have honesty as an equilibrium. Therefore $g\,r < 1$, or $1/r > g$, so $k/r > g$. I also assume that the asymmetric game would not have honesty as an equilibrium without transfers, so from (2) we have $k > 1/(rg)$, or $g\,r\,k > 1$.

Therefore both (7) and (8) impose meaningful restrictions on t. Putting them together, we need

$$g\,r\;k - 1 < t < \frac{r}{1+r}\;\left(\frac{k}{r} - g\right). \tag{9}$$

It is possible to find such a t if and only if

$$g\,r\;k - 1 < \frac{r}{1+r}\;\left(\frac{k}{r} - g\right).$$

This simplifies to

$$[\,(1+r)\,r\,g - 1\,]\;k < r + (1 - r\,g)\,. \tag{10}$$

Two cases now arise. [1] If $(1+r)\,r\,g < 1$, then k is multiplied by a negative entity on the left hand side of (10), so the inequality holds for all k. Then transfers can achieve self-enforcing honesty regardless of the degree of inequality in size. [2] If $(1+r)\,r\,g > 1$, then (10) imposes an upper bound on the degree of inequality of size k that is compatible with self-enforcing honesty. It is easy to verify that

$$\frac{r + (1 - r\,g)}{(1+r)\,r\,g - 1} > \frac{1}{rg}$$

so this bound is larger than the bound in absence of transfers. That is, the possibility of transfers does enlarge the scope of self-enforcing honesty.

We could combine the possibility of transfers and the requirement of risk-dominance; that will yield a similar result with somewhat more complex algebra.

To sum up, in all these cases honesty is self-enforcing so long as the ratio of the sizes of the two players, k_1/k_2, is within a range $[k_L, k_H]$ where $k_L < 1 < k_H$ and $k_l\,k_H = 1$. I will proceed using this general notation; the actual values and interpretation of k_L and k_H will depend on the precise specification of the game and the requirements of self-enforcement.

3 Emergence of Formal Institution

In this section I consider various situations in which members of a population play a game of the kind analyzed in the previous section. I focus on size inequalities that preclude the self-enforcement of honesty, and examine when a subset or all of the members can put in place a formal legal system that will achieve honesty using the state's power of coercion. In all cases, I assume that C is the total cost in present value terms of the formal institution. How the cost might be borne by different members of the population will differ in the various situations studied.

Note that everyone benefits (gets a higher payoff in the repeated game) if an effective formal governance is brought into being. The only questions are whether the gain exceeds the cost, and who will bear the cost. If the whole society is not able to solve the collective action problem and allocate cost, a subset of players whose private gain exceeds the total cost may give up on the grand coalition and undertake the cost themselves. The analysis here is concerned with such possibilities.

3.1 Two Sizes, Pairwise Matching

First consider a continuum population of mass 1. They are matched randomly in pairs, and each pair plays a repeated game of the kind described above. To start with, everyone was the same size 1, and honesty was self-enforcing. Now a fraction $\lambda < 1/2$ grow to size $k > k_H > 1$ where k_H is the upper bound on the size ratio compatible with self-enforcement of honesty.

If honesty can be enforced, the payoffs per period to each pair will be $(1 + k)$, so the present value will be

$$V = \frac{1+r}{r}\,(1+k)\,.$$

I assume that once a pair is formed, the sizes of both members are common knowledge between them. There is a mass of size 1/2 of matches. Of these, a fraction λ^2 are between two large players and $(1-\lambda)^2$ are between two small players; in these cases honesty is automatically self-enforcing. The remaining fraction $2\,\lambda\,(1-\lambda)$, that is, a mass $\lambda\,(1-\lambda)$ of matches, occurs between one large player and one small player, where honesty is not self-enforcing. Therefore a formal legal system that enforces honesty will add value $\lambda\,(1-\lambda)\,V$.

This social optimum can be achieved if all players are brought together after the sizes have emerged but before any matches have been formed, and engage in perfect Coasian negotiation. Each of the λ large players knows that with probability $(1-\lambda)$ he will meet a small player and will forgo payoff $k\,(1+r)/r$ unless there is a formal system to enforce honesty; each of the $(1-\lambda)$ small players knows that with probability λ he will meet a large player and will forgo payoff $(1+r)/r$ unless there is a formal system to enforce honesty. Therefore the total expected gain from the formal institution is

$$\lambda\,(1-\lambda)\,k\,\frac{1+r}{r} + (1-\lambda)\,\lambda\,\frac{1+r}{r} = \lambda\,(1-\lambda)\,(1+k)\,\frac{1+r}{r} = \lambda\,(1-\lambda)\,V\,.$$

This is the full social gain, so the outcome of the Coasian negotiation will be socially optimal.

However, this ideal setting is unrealistic. There are two scenarios more plausible in a political process: [1] A small elite who stand to benefit most from the change may get together to implement it and bear its costs, allowing the numerous small traders to become free riders; This is reminiscent of Olson's (1971) idea of "the exploitation of the great by the small." [2] A beneficiary group that constitutes a majority of the population may vote for the change, requiring all to share the cost. Of course neither of these is guaranteed; the elite may not be able to solve their own internal collective action problem, and the majority may not get together for informational or other reasons. Other scenarios are also conceivable. But I confine my analysis to how well these two possibilities can work, assuming that they do work.

Elite-Led Reform: If the λ elite, each of whom stands to gain an expected payoff $(1-\lambda)\,k\,(1+r)/r$, get together and share the cost, each will have to pay C/λ. They will be willing to do this if

$$(1-\lambda)\,k\,(1+r)/r > C/\lambda, \qquad \text{or} \qquad \lambda\,(1-\lambda)\;k\,(1+r)/r > C.$$

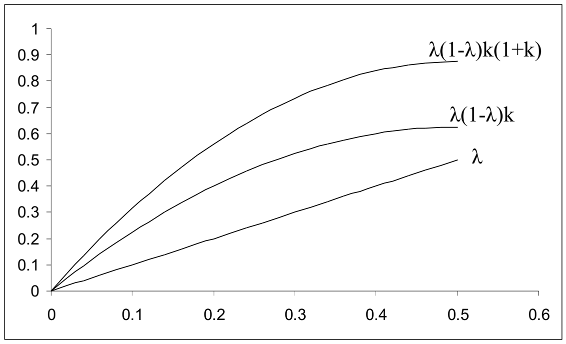

Figure 1: Case $k > 2$

The left hand side only a fraction $k/(1+k)$ of the social gain $\lambda\,(1-\lambda)\,(1+k)\,V$. Therefore elite provision will be suboptimal. But if k is large, the suboptimality will be relatively small.

Majoritarian Reform: Each of the $(1-\lambda)$ small traders, assumed to constitute a majority (that is, $\lambda < 1/2$), has an expected gain of $\lambda\,(1+r)/r$ from the enforcement system. They can impose the cost on the whole population; I assume that they are constrained by the information availability or the rules of the political process not to discriminate between types. Therefore each pays C. This is in the interest of this majority if

$$\lambda\,(1+r)/r > C\,.$$

Note that when $k > 1$ and $\lambda < 1/2$, $(1-\lambda)(1+k) > 1$. Therefore the above inequality implies

$$\lambda\,(1-\lambda)\,(1+k)\,(1+r)/r > C\,, \qquad \text{or} \qquad \lambda\,(1-\lambda)\,V > C\,.$$

Therefore if the institution will be established in a majority vote along these lines, then it is socially desirable, but not vice versa. Thus majoritarian reform is also socially suboptimal.

The resulting possibilities are shown in Figures 1 and 2. Each shows three functions of λ over the interval $[0, 0.5]$:

$$\begin{aligned} f_1(\lambda) &= \lambda \\ f_2(\lambda) &= \lambda\,(1-\lambda)\,k \\ f_3(\lambda) &= \lambda\,(1-\lambda)\,(1+k) \end{aligned}$$

The enforcement institution is socially desirable if $f_3(\lambda) > C\,r/(1+r)$. It can be implemented by the elite if $f_2(\lambda) > C\,r/(1+r)$. And it can be implemented by the majority consisting of the small players if $f_1(\lambda) > C\,r/(1+r)$. Two cases arise; Figure 1 shows the case $k > 2$, and Figure 2 shows the case $k < 2$.

The easiest way to understand the differences is to suppose that k and λ have attained their values and that C is gradually reduced from an initial high value, for example as the technology of contract law enforcement improves. When $Cr/(1+r)$ falls below the curve

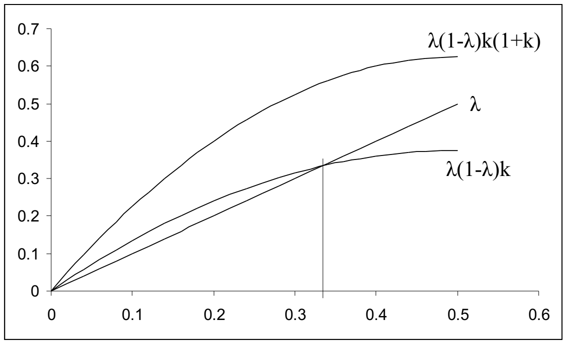

Figure 2: Case $k < 2$

$\lambda(1-\lambda)(1+k)$, which is the topmost curve in both figures, it becomes socially desirable to implement the formal legal system, but it is not yet in the interests of either group to proceed along the lines indicated above. As C decreases further, in Figure 1 it crosses the curve $\lambda(1-\lambda)k$, which makes it in the large traders' interests to go ahead and pay for the institution. The same happens in Figure 2 if λ is smaller than a critical level of about 0.33. For λ above this, $Cr/(1+r)$ first falls below the λ curve, leading to a majoritarian reform.

The specific functional forms and the numerical examples are of course special, but the general idea makes intuitive sense: an elite-led reform is more likely if the extent of inequality is large (k is large) or the elite constitute a small fraction of society (λ is small); in the opposite case a majoritarian reform is more likely.

3.2 Continuum of Sizes, Pairwise Matching

Now suppose the population of total mass 1 consists of a continuum of sizes $s \in [1, \infty)$ with a cumulative distribution function

$$F(s) = 1 - s^{-\alpha}\,.$$

The payoffs from honest trade are proportional to size. To keep the total payoff

$$\int_1^\infty s\,F'(s)\,ds = \alpha \int_1^\infty s^{1-\alpha}\,ds$$

finite, we need $\alpha > 1$.

The players are matched randomly in pairs. If a player of size s is matched with another of size in the interval $[s\,k_L, s\,k_H]$ (truncated below at 1), they will interact with self-governing honesty; otherwise they will not.

Let $x = \ln(s)$ and $h = \ln(k_H)$, then we can equivalently use x to indicate size, and an x matched with someone in the interval $[x-h, x+h]$ (truncated below at 0) will interact with self-enforcing honesty. The cumulative distribution function of x in the population is

$$G(x) = 1 - e^{-\alpha\,x}\,.$$

If $x \geq h$, the probability that x gets matched with a y outside the range of self-enforcing honesty is

$$\begin{aligned} \text{Prob}[y < x - h] + \text{Prob}[y > x + h] &= G(x-h) + [\,1 - G(x+h)\,] \\ &= 1 - e^{-\alpha\,(x-h)} + e^{-\alpha\,(x+h)} \\ &= 1 - e^{-\alpha\,x}\,\left[e^{\alpha\,h} - e^{-\alpha\,h}\right] \end{aligned}$$

If $x < h$, the probability is

$$\begin{aligned} \text{Prob}[y > x + h] &= 1 - G(x+h) \\ &= e^{-\alpha\,(x+h)} \end{aligned}$$

The benefit of enforcement to x in such a match is $s(1+r)/r = e^x\,(1+r)/r$. Therefore the expected benefit of the governance institution for x is

$$B(x) = \begin{cases} \frac{1+r}{r}\,\left\{\,e^x - e^{-(\alpha-1)\,x}\left[e^{\alpha\,h} - e^{-\alpha\,h}\right]\,\right\} & \text{if } x \geq h \\ \frac{1+r}{r}\,e^{-(\alpha-1)\,x}\,e^{-\alpha\,h} & \text{if } x < h \end{cases} \tag{11}$$

Since $\alpha > 1$, it is easy to verify that $B(x)$ is decreasing over $x \in [0, h]$ and increasing over $[h, \infty)$.

The total net social benefit of the formal institution is

$$\int_0^\infty B(x) F'(x)\,dx - C\,;$$

we do not need the explicit expression for this.

Will the elite have an incentive to take the lead in establishing the formal enforcement system? If all those in the upper tail $[x, \infty)$ of the size distribution share the costs equally, the net payoff to each will be

$$B(x) - C/[1 - G(x)] = B(x) - C\;e^{\alpha\,x}\,.$$

For large x, $B(x)$ behaves like e^x. Since $\alpha > 1$, the net payoff turns negative for large x. Thus the purest version of elite-led reform will not work. Even though the elite stand to benefit most from the institution, there are so few of them that the share of the cost dominates. For other distributions of sizes elite-led reform may be possible, but this example is useful precisely because it shows the limits of that.

However, reform led by a relatively small proportion of the population is possible even for the exponential distribution with its relatively thin upper tail. The following numerical calculation illustrates the possibilities. I set $r = 0.2$ and $g = 1.84$, and consider the simple self-enforcement criterion of whether honesty is an equilibrium in the repeated game, so $k_H = 1/(rg) = 2.717$ and $h = \ln(k_H) = 1$.

The question is, for what values of x is reform led and paid for by players in the tail $[x, \infty)$ logically possible in the sense of yielding them all a positive net payoff when they share the cost equally? Table 4 shows the results for different values of α. For each α, $[x_{min}, x_{max}]$

is the range of x such that the right tail from x can pay for reforms and get positive net benefits. The smallest proportion of the population that can do so is $1 - G(x_{max})$; this is relevant because the smaller this number, the easier it will be for them to solve their internal collective action problem. The value of x for which the net benefit is maximum is x^*, and NB^* is the corresponding net benefit; this is of interest because the person who stands to get the largest net benefit is the one most likely to make an effort to set the process in motion.

Table 4: Range of Elite-Led Reform

α	x_{min}	x_{max}	$1 - G(x_{max})$	x^*	NB^*
1.42	2.00	2.00	0.063	2.00	0.018
1.40	1.75	2.38	0.036	2.10	1.305
1.35	1.60	2.93	0.020	2.40	5.756
1.30	1.51	3.55	0.010	2.90	13.750

The general pattern is as follows. When α exceeds a critical level, reform led by players of the largest sizes is infeasible. Below this critical level, the required proportion decreases as α decreases toward 1. Whether one labels 1 percent of the population as an elite is debatable, but quite small proportions of the population are capable of implementing and paying for reform.

3.3 Regulating a Monopolist

In the models considered so far, each individual game was played by two players. In reality often a large player deals with several small players simultaneously. For example, an insurance company has many policyholders among whom it pools risks. This game offers opportunities to cheat on both sides: a policyholder may refrain from hidden risk-reducing actions, and the company may unfairly deny claims knowing that it would be too costly for individual claimants to pursue their cases. Even though the company is a large player, its potential gain from cheating is proportional to its aggregate customer base, because if it chooses to cheat it will cheat all customers simultaneously. Therefore when we ask who is h larger player, we should compare the sizes of the insurance company and the collectivity of its insured. Then it is an open question as to which side will stand to gain from a system of formal governance, in this case a regulatory or oversight agency. Such an institution, if it does get established, may come from the producer side, such as an arbitration forum or a better business bureau, or by means of a political process representing the numerous individually small consumers.

4 Concluding Comments

The above analysis gives some useful understanding of the effect of differential size and numbers on the incentives of different groups of traders to establish or reform formal institutions of contract enforcement. However, the model is only suggestive; it is far from being a complete characterization of the process of institutional change. It shows what kinds of changes are in the various players' interests to achieve and pay for, but it does not treat the collective action problem that the groups must solve before they can implement the desired changes. It can be a useful component of richer models.

References

Carlsson, Hans and Eric van Damme. 1993. "Global Games and Equilibrium Selection." *Econometrica* 61(5), September, 989–1018.

Dixit, Avinash. 2004. *Lawlessness and Economics: Alternative Modes of Governance.* Princeton, NJ and Oxford, UK: Princeton University Press.

Eggertson, Thrainn. 2005. *Imperfect Institutions: Possibilities and Limits of Reform.* Ann Arbor, MI: University of Michigan Press.

Greif, Avner. 2006. *Institutions and the Path to the Modern Economy: Lessons from Medieval Trade.* Cambridge, UK and New York, NY: Cambridge University Press.

Greif, Avner. 2008. "Toward Political Economy of Implementation: The Impact of Administrative Power on Institutional and Economic Developments. Forthcoming in Elhanan Helpman ed., *Institutions and Growth,* Cambridge, MA: Harvard University Press.

Li, Shuhe. 2003. "Relation-based versus Rule-based Governance: an Explanation of the East Asian Miracle and Asian Crisis.'*Review of International Economics* 11(4), September, 651–673.

North, Douglass. 1990. *Institutions, Institutional Change and Economic Performance.* Cambridge, UK and New York, NY: Cambridge University Press.

Olson, Mancur. 1971. *The Logic of Collective Action.* Cambridge, MA: Harvard University Press.

Williamson, Oliver E. 1998. "The Institutions of Governance. *American Economic Review, Papers and Proceedings* 88(2), May, 75–79.

Young, H. Peyton. 1998. *Individual Strategy and Social Structure: An Evolutionary Theory of Institutions.* Princeton, NJ: Princeton University Press.