

Governance Institutions and Economic Activity

Author(s): Avinash Dixit

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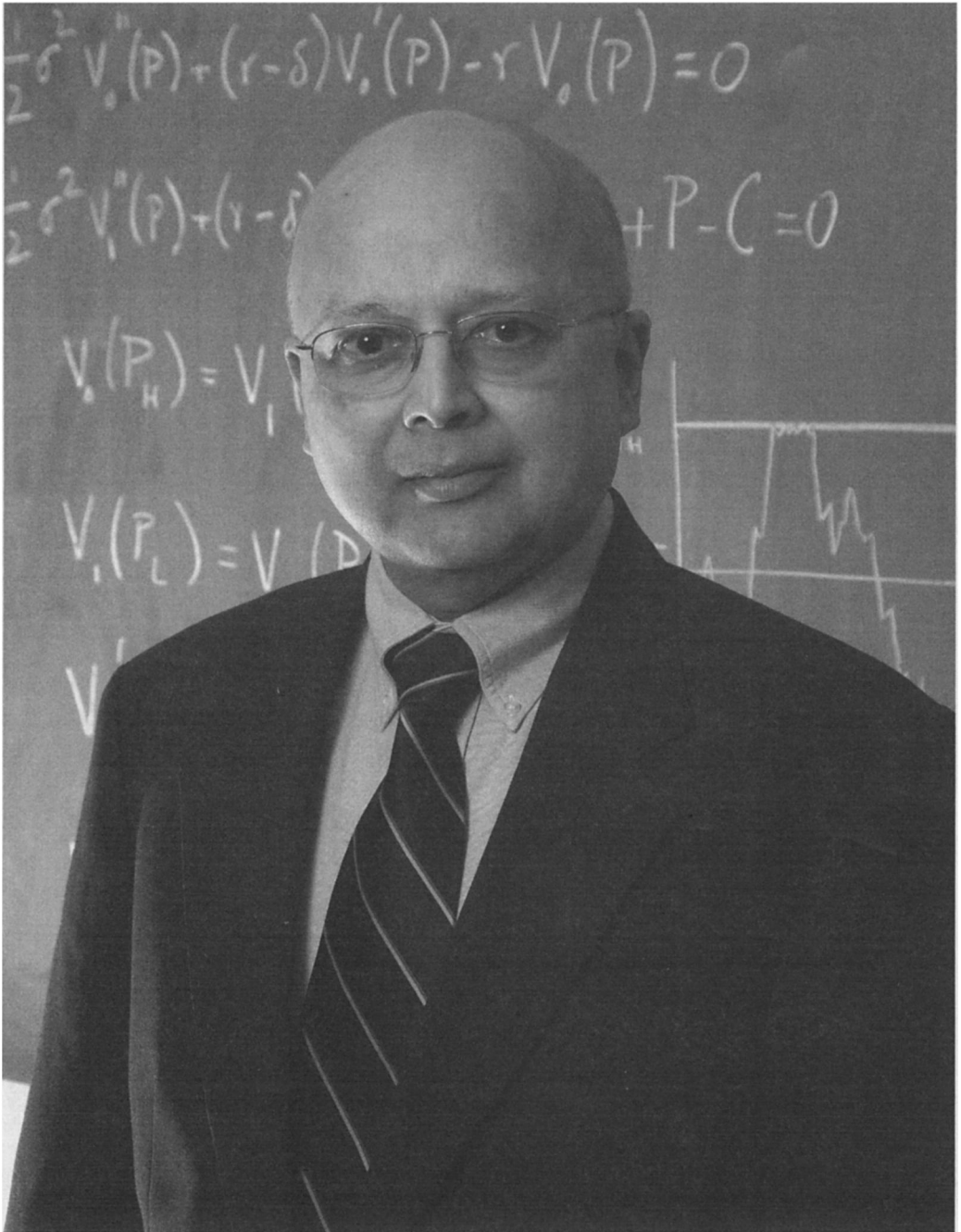


Photo by Steven Waskow, Princeton

Arvind L. Dixit

## Governance Institutions and Economic Activity<sup>†</sup>

By AVINASH DIXIT\*

The concept of “governance” has risen from obscurity to buzzword status in just three decades. EconLit shows only 5 mentions of the word governance in the 1970s; by the end of 2008, it was mentioned 33,177 times. The much more specific phrase “economic governance” has appeared 192 times;<sup>1</sup> its more popular cousin, “corporate governance,” 9,717 times. My focus is on economic governance, but I also examine its relation to corporate governance.

As with any buzzword, everyone understands the concept a little differently. This is unavoidable, so I will just give my definition for the purpose of this article, and leave it at that. By economic governance I mean the structure and functioning of the legal and social institutions that support economic activity and economic transactions by protecting property rights, enforcing contracts, and taking collective action to provide physical and organizational infrastructure.

Economic governance is important because markets, and economic activity and transactions more generally, cannot function well in its absence. Good governance is needed to secure three essential prerequisites of market economies:

(1) *Security of property rights*: Without this, individuals will lack the incentives to save and invest, because they will fear that others will deprive them of the fruits of these activities. They will also forgo capital market trades to achieve efficient allocation of assets, because they will fear for the principal and not just the return on the capital they invest in others’ enterprises. And Erica Field (2007) finds that security of capital improves the productive use of labor, as people no longer have to spend their time and effort guarding their property.

(2) *Enforcement of contracts*: Economic transactions promise gains to all voluntary participants. But each party may lose if the other fails to fulfill its promised role in the transaction, but instead acts opportunistically. Fear of such counterparty cheating may prevent people from entering into the contracts, and mutual gains will go unrealized. Formally, this is a bad equilibrium in a prisoner’s dilemma.

(3) *Collective action*: Much private economic activity depends on an adequate provision of public goods and the control of public “bads.” In this I include not just physical but also institutional and organizational infrastructure. Provision of social safety nets, facilitation of internalization of externalities, and the control of public bads, for example management of common pool

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\* Princeton University, Princeton, NJ 08544 (e-mail: [dixitak@princeton.edu](mailto:dixitak@princeton.edu)). I thank the National Science Foundation for support of the research underlying this talk and paper. Similar material was previously delivered at the World Bank as a PREM Seminar, at the IMF as a training seminar, as the Edward Clarke Lecture at Queen’s University, Canada, the Dynasty Foundation Lecture in Moscow, public lecture at Sabanci University, and at various seminars. I thank the audiences for their comments, and Jessica Goldberg, Charles Plott, Dani Rodrik, Agnar Sandmo, Oliver Williamson, and Viviana Zelizer for their comments on earlier drafts. I am especially grateful to Avner Greif for extremely detailed and perceptive comments on the first draft. Last but not least, Dani Rodrik introduced me to YouTube traffic videos, and Agnar Sandmo got me hooked on the saga of Roald Amundsen; thank you both.

<sup>1</sup> However, people often use the general word “governance” when discussing the specific concept of “economic governance” in the sense defined immediately below.

resources, all involve problems of collective action to avoid free-riding; they are multiperson prisoner's dilemmas.<sup>2</sup>

Good economic governance thus underpins the whole Smithian process whereby individuals specialize in different tasks and then transact with one another to achieve the full economic potential of the society.

Governance is an organizing concept for many fields in all social sciences; it is not a field per se, and certainly not a field within economics. Case studies in law, political science, sociology, and anthropology, and game-theoretic modeling in economics, have all contributed to the advancement of our knowledge concerning governance institutions. This offers a unique opportunity for the social sciences to have a meeting point, if not for reunification, after their separation over a century ago.

Consistent with the multidisciplinary, multifaceted nature of the topic, this essay will synthesize and build on the work of numerous researchers, not just reprise my own. The literature is vast, my knowledge of it is imperfect, and space is limited even for a presidential address. I apologize in advance for all omissions and misinterpretations.

### I. Governance and Government

Most people's first instinctive reaction to the recognition of the importance of economic governance is that good governance should be provided by the government. But I want to emphasize that *governance* and *government* should not be regarded as almost synonymous; indeed, this may be the most important point of much of my recent research, and will be my main focus here.

Don't get me wrong. Of course governments are important, especially in matters of protection of property rights. As we will see below, private order for protection of property rights has some basic flaws. And the government's failure to protect these rights, and at times the violation of private property rights by the government or its agents (e.g., corruption), are major causes of poor economic performance in many countries, especially less-developed countries and transition economies. But other social institutions of economic governance also exist in almost all countries. They function especially in niches that the government serves poorly, or not at all. Sometimes they work better than the formal law, because they have better expertise or information. And they are essential for guarding against the government's own misbehavior.

It is important to maintain a distinction between the state's laws and actual order that must support economic activity, and between the laws that are on the books and how they actually function (or fail) in reality. The state's role seems simplest in situations that require pure coordination to achieve the better of two equilibria in an assurance game: daylight saving time and traffic lights are commonly cited as examples. However, notoriously dangerous intersections persist despite traffic lights, and well-understood social norms of behavior can allow smooth flows of heavy traffic despite the absence of traffic lights. Tom Vanderbilt (2008, 186–204) argues that norms can work better than traffic lights. At a more entertaining level, YouTube videos illustrate traffic "law without order" in St. Petersburg: <http://www.youtube.com/watch?v=H2JFL1Sk21Y> and conversely, "order without law" in India: <http://www.youtube.com/watch?v=5WU8hilbN9Y> and in Vietnam <http://www.youtube.com/watch?v=eC4BN9kInXg>.

Of course, norms do not always deliver perfect order; traffic accidents do occur in India and Vietnam.

<sup>2</sup> Arrangements for the protection of property rights and for various forms of collective action can be viewed as a part of an overall social contract, and the relative merits of such contractual governance using the state and private ordering can be analyzed in an overarching "lens of contract," as Oliver Williamson (2002) recommends. For the purpose of exposition in this article, it is easier to discuss the three issues separately.

For a law on the statute books to be effective in practice, the citizens must expect that the government will succeed in enforcing the law. The government's legitimacy is important for its laws to translate into effective order (Avner Greif 2006, 147–50), but more may be needed. In situations like traffic, where the good equilibrium entails concerted choices, it also requires common knowledge that others will abide by the law.

Not only may the government's laws remain ineffective; governments and their agents may violate private property rights, violate contracts, and renege on promises. They expropriate assets without compensation, make surprise changes in tax rates and regulations, and extort bribes for licenses, in situations where the applicant has a valid claim to a license as well as in ones where a license has to be granted in contravention of the laws and regulations.

Extortion by the government or its agents is, in many ways, similar to a tax, and deters economic activity just as a tax does. But the uncertainty created by changing and arbitrary policies can be worse than stable high tax rates. It is possible to achieve much despite high stable tax rates; indeed, the United States, in its supposed glory decade of capitalism in the 1950s, had much higher tax rates than it does now, and high-tax Scandinavian countries have not done too badly. It is also possible to progress economically to a point, despite corrupt governments and uncertain policies. Countries can reach middle-income levels despite some corruption, but further growth requires much better institutions (William Easterly 2001, 234–35, 245–48; Dani Rodrik 2003, 16–17).

Less-developed countries and transition economies often have weak formal governance. This is to be expected. These countries have not faced the need to govern property and transactions in large volumes—over large geographic and social distances, and for a sufficiently long period of time—to develop the skills, experience, and organization of governance to the extent demanded in modern economies and by traders and investors from developed market economies. After all, these latter economies also needed long periods of time, measured in decades or even centuries, to reach the level of formal governance they have today. The difference is that today's emerging market economies are under much greater time pressure to achieve comparable progress.

Even in advanced market economies, governments do not provide all governance. Many private institutions exist to serve similar purposes. Sometimes they work in niches where the government cannot or does not operate, for example, when the transaction is in violation of laws regulating or prohibiting production or consumption of the commodity in question. But private governance by social groups or industry associations can have advantages of information and expertise, and can use them for arbitration of disputes that the state's courts would find too complex to interpret and adjudicate. These private forums of governance also have at their disposal quite dire punishments for members who violate the norm or code of conduct; they can ostracize the person, or drive him out of business. Lisa Bernstein's (1992, 2001) analyses of such institutions of private order are among the best known. Courts recognize the advantages of these arrangements, and adopt the attitude of forbearance: if the losing party in a dispute refuses to abide by the verdict of a recognized arbitration tribunal, the court will not rehear the case, but merely stand ready to enforce the arbitrators' judgment.

The fact that informal governance, including such basic concepts as trust, remains important even in advanced market economies has been recognized and emphasized by Alan Greenspan (2007, 256): "in a free society governed by the rights and responsibilities of its citizens, the vast majority of transactions... presuppose trust in the word of... strangers.... Reputation and the trust it fosters [are] the core attributes of market capitalism." However, he also recognizes the limits of trust, and the need to guard against its abuse, again using private rather than state solutions: "The most effective defense against fraud... is counterparties' surveillance. JPMorgan thoroughly scrutinizes the balance sheet of Merrill Lynch before it lends. It does not look to the

SEC to verify Merrill's solvency" (257).<sup>3</sup> Perhaps the right balance is to be found in the Russian proverb that Ronald Reagan repeatedly quoted, much to Mikhail Gorbachev's annoyance: "Trust, but verify" (*Доверяй, но проверяй*).

To repeat and emphasize, governmental and private institutions of governance coexist even in modern market economies. Conversely, many economic transactions take place outside conventional markets, e.g., within families, social networks, and firms. Therefore, the issue in the study of different governance institutions is not the old-style contrast: "market versus government." Rather, it is the interaction of the whole system of governance and transactions—what combinations work well, under what conditions. In this study, a general principle will appear throughout: no institution or system will prove perfect or ideal—the economist's first-best—under all circumstances. Everything is "second-best" at best, subject to numerous constraints of information, incentives, commitment, and rules of the political game.

## II. Alternative Institutions

What kinds of alternative governance institutions should we study in this context? Different distinctions are appropriate for different purposes. For my purpose here, the most relevant distinction is between formal institutions of the state, enforced by its legal apparatus and using its powers of coercion if needed as a last resort, and informal social institutions, which must be self-governing using strategies available to the participants in the economic interaction themselves.<sup>4</sup> I will interpret both categories in a broad and inclusive manner.

My list of formal governmental institutions of governance starts with the constitution (written or merely widely understood) that lays down the rules of the political game, the legislature that makes more detailed rules within this context, and the courts, the police, and licensing and regulatory agencies that interpret and enforce these rules. Informal private and social institutions include networks that facilitate search and information, the norms of behavior, and sanctions for enforcement against violations of norms. There can be private arrangements, whether social organizations (both for-profit and non-profit), or other norms that stipulate individual actions for adjudication and enforcement of the norms. And private order can include internalization of the transaction by placing the parties into one economic unit, in other words, by integration that converts the problem from one of enforcement of an arm's-length contract into an agency problem in corporate governance.

## III. Protection of Property Rights

If the government does not protect private property rights, at least not as well as the owners require, many alternative private arrangements arise to meet the owners' needs. Some work by deterrence: private guards and gated communities exist in many rich societies, especially if the rich are an enclave surrounded by substantially poorer people. Some attempt a mixture of deterrence and private punishment of violators. Indeed, this was the origin of the Sicilian mafia (Oriana Bandiera 2003; Diego Gambetta 1993, chap. 4). After the feudal system in Sicily had collapsed, but before the modern Italian state had emerged, banditry was rife. Landowners (especially the absentee landlords) started hiring the toughest of the bandits as guards to protect their

<sup>3</sup> In view of recent developments, perhaps the "thoroughly scrutinizes" needs to be changed to "should have thoroughly scrutinized."

<sup>4</sup> The state's enforcement is carried out by individuals who have the choice of whether to do so. Therefore, in the last analysis formal institutions also must be self-governing. But what happens when the police or prison officials refuse to carry out a court's orders is too big an issue for my present purpose.

land, livestock, and produce. Gradually the protectors got together to form the association that became the Mafia. The knowledge that a property was under the protection of the Mafia acted as a deterrent. If that didn't work, the protectors resorted to varying degrees of violence against transgressors.

However, private protection of property has some important harmful effects. The Mafia's protection offered to its customers, unlike the state's protection that is in principle available to everyone, creates a negative externality. Thieves selectively target the unprotected properties, so extending protection to one property raises the probability that other properties will be hit. That, in turn, increases their demand for the protection service. Thus, the Mafia is able to extract a high price for its service, and can make this externality-dependent high value evident by not covering everyone.

Can private institutions guard private property rights against the government's predation? This is a complicated collective action problem. An individual is helpless against a government; even in an ongoing relationship, one person cannot offer the government the prospect of a large enough future payoff to keep it honest in its dealings with him today. A group can threaten to boycott collectively a ruler who violates the rights of even one of its members. But the boycott is costly for each trader to enforce; he is forgoing profitable opportunities to sell in that ruler's markets. Therefore, the ruler can try to peel off individuals from this boycott by offering them special deals, and individuals will be tempted. Thus a second layer of punishments is needed: the group must threaten to boycott any of its own members who don't participate in the original boycott against the ruler. And a third layer ...; in fact a whole penal code. Greif, Paul Milgrom, and Barry Weingast (1994) show how guilds in medieval Europe solved collective action problems in just such a way; see also Greif (2006, chap. 4).

Can modern business associations play similar roles, and enforce an anticorruption norm? They collectively stand to benefit if the government does not extract bribes, but each has the individual temptation to get better treatment through bribery. In reasonably small and well-connected groups, the knowledge that someone gained a contract or license through bribery will spread quickly. Then the norm should stipulate that no one will deal with him. The cheater is going to need some things—material inputs, trade credit, and so on—from the others. If the others ostracize him, he will be unable to fulfill the contract and so won't profit from his bribery. Of course, he can try to induce some of the others to violate the ban by offering them shares in his profits. But that is taken care of by the second layer of the stipulation: anyone who engages in dealings with a cheater is himself labeled a cheater and ostracized, and so on, to further levels. Christopher Kingston (2008) constructs a model of such an equilibrium. If the business association includes media entrepreneurs, it may also be possible to ensure media exposure, and resist attempts to control or censor media. All this is perhaps too optimistic, but I don't think it has been tried anywhere, so we don't know for certain that it can't work.<sup>5</sup> It may have some chance of success in a country like India, where there is an established business community with quite good information networks and some leadership by the most prominent businesspersons.

One more point about corruption is worth making: whether the corruption is organized or disorganized makes a difference. Andrei Shleifer and Robert Vishny (1998, chap. 5) and Easterly (2001, 247–48) point out that if some economic activity requires many licenses that must be obtained from different officials or agencies, each of them fails to take into account the fact that if he raises the amount of the bribe he demands, the cost of the activity rises; therefore, less of

<sup>5</sup> Benjamin Olken (2007) reports on a field experiment about a different kind of corruption: stealing from public funds appropriated for local construction projects. Here the results of local participatory monitoring are not encouraging; threats of top-down audits and penalties were more successful.



it is undertaken, and this reduces the bribes for all the other officials. Each demands bribes that are excessive from the point of view of their collective revenues. It would be better for the officialdom to have one agency, which could then “internalize” this “negative externality” among bribe-seekers. They could set lower bribes and yet increase their take. And the lower bribes would increase the volume of the activity and therefore be better for general economic efficiency. The multiple licenses form a package of perfect complements because all of them are required for the activity to proceed and, as is well known, it is better for providers and users alike to have a package of perfect complements supplied by a monopolist rather than by competing oligopolists. The preferred method for achieving this outcome is a “one-stop” licensing agency that is empowered to issue all the licenses the entrepreneur requires. Such agencies have been formed by some US states to lower the overall transaction cost of setting up businesses in their states, but this can also serve to reduce the level of corruption in many countries (including the United States). Carrying the idea further, if there were two or more one-stop agencies, both empowered to issue all licenses, so someone starting a business could choose one or the other for all his licensing needs, then competition between the agencies could drive the bribes down further, perhaps all the way to zero. I wonder if this is a practicable suggestion.

#### IV. Enforcement of Contracts

In the absence of some form of governance, contracts run into problems of prisoner’s dilemmas. Some contracts require one party to act first, in anticipation of reciprocal action by the other. But when the time comes, the other party may be tempted to renege on its promise. The fear of this may deter the first from acting at all; therefore mutual benefits may go unrealized. The classic description of this is in Thomas Hobbes’s *Leviathan* (1651 [2005], chap. 14): “If a Covenant be made, wherein neither of the parties performe presently, but trust one another; in the condition of meer Nature, (which is a condition of Warre of every man against every man,) upon any reasonable suspition, it is Voyd; But if there be a common Power set over them bothe, with right and force sufficient to compell performance; it is not Voyd. For he that performeth first, has no assurance the other will performe after; because the bonds of words are too weak to bridle mens ambition, avarice, anger, and other Passions, without the feare of some coerceive Power.” Oliver Williamson (1985) has labeled this the problem of opportunism and hold-up, and Greif (2006) calls it a one-sided prisoner’s dilemma.

In other situations the two parties act effectively simultaneously: a good or a service is exchanged for some form of payment. But in most instances the quality of the product is not immediately apparent, and the payment is only a promise, even if the delay is as little as 30 days of trade credit. Then the situation is a familiar simultaneous-action prisoner’s dilemma, neatly exemplified by what a cattle rancher told Gambetta (1993, 15) in the course of his study of the Sicilian Mafia: “When the butcher comes to me to buy an animal, he knows that I want to cheat him [by supplying a low-quality animal]. But I know that he wants to cheat me [by renegeing on payment]. Thus we need Peppe [the third-party mafioso] to make us agree. And we both pay Peppe a commission.” Here we have the case for governance, and also one form of private governance, in a nutshell.

##### A. Governance Using Social Preferences

I classify methods of private governance of contracts into first-party, second-party, and third-party systems. First-party systems operate on the potential cheater’s own internal value system: either internal satisfaction or pleasure of behaving honorably, or an internalized sense of shame

or guilt in cheating others.<sup>6</sup> If individuals have such preferences, opportunistic behavior can be reduced or eliminated at the source and governance simplified.

It is important to recognize prosocial preferences, not merely because they exist, but also because the intrinsic incentives they generate can interact with the standard monetary or other extrinsic incentives (see Roland Bénabou and Jean Tirole 2003). Reforms to improve incentives that are typically advocated can prove counterproductive if they destroy the existing benefits of prosocial preferences.

The usual theory of prosocial preferences relies on an evolutionary mechanism of group selection. A society whose members have such preferences can take collective action that benefits the whole group in its competition with other groups. But this runs into a fundamental problem: can such social equilibrium be stable, or will it be destroyed because the selfish mutants that arise within a social group will seize more of the gain, and therefore be more fit in the sense of evolutionary dynamics, than cooperators? To sustain the good equilibrium, societies also need some mechanism whereby the selfish are prevented from getting a higher payoff. This can be achieved if the social norms of behavior include a mechanism for punishing noncooperators, at a personal cost if need be. And indeed several experiments have found such behavior is widespread and may even have a neurological basis (Colin Camerer 2003, 46–47). Robert Boyd, Herbert Gintis, Samuel Bowles, and Peter Richardson (2003) show that a cooperative equilibrium can be sustained by cultural group-selection for such “strong reciprocator” strategies. When the prevailing strategy in the population is one that reciprocates nice behavior but punishes selfish deviations, selfish mutants cannot flourish.

Prosocial preferences are not merely exogenous and genetically transmitted. Societies go to great lengths to instill such preferences in children during their process of socialization in families, school, and religious establishments, and continue the process in adults. Growth of such preferences is seen in experiments on ultimatum and dictator games (Colin Camerer 2003, 65–67). When these experiments are conducted on children of different ages, very young children behave selfishly. By age 8 they develop a significant sense of equality. True prosocial preferences develop gradually thereafter, with some relapses, finally to an adult fair-mindedness. Thus a long process of education and experience instills internalized norms into people’s preferences.

Economists have at last begun to recognize the practical importance of deliberate social formation of prosocial preferences, and incorporate it in their theories. Guido Tabellini (2008) models this in the context of contract enforcement; other recent contributions include Assar Lindbeck and Sten Nyberg (2006) on work norms. In these models, each parent makes an independent decision on the upbringing of his/her own child, and a Nash equilibrium is studied. Bénabou and Tirole (2006) consider transmission of beliefs rather than preferences, and the choice variable is the level of taxation determined through a political process. Later in the context of collective action, I offer a simple example of a political choice of education to instill prosocial preferences in children.

### *B. Integration and Corporate Governance*

First-party enforcement can be achieved between firms by merging the contracting parties into one entity with a common objective. Williamson’s (1985, chap. 4, 5) transaction cost theory of vertical integration is the most prominent example of this. The merger of two firms does not

<sup>6</sup> Here and throughout this paper, I use the word cheating in a very broad sense—not simply outright fraud, but also failure to exercise due diligence, or failure to adhere to the spirit and not just the formal wording of a contract. Williamson (2005, 2) and Jessica Goldberg (2005) argue that the latter is often the real problem in governance; fraud can be controlled using available formal methods.

eliminate the problem of contract enforcement; it merely transforms the contract into a principal-agent problem within one firm. Economic governance between distinct economic units becomes corporate governance within one unit. The costs of contract enforcement are part of transaction costs broadly defined; therefore, the choice between external and internal enforcement depends on the comparison of the two costs.

Family-owned conglomerates in less-developed countries exemplify this choice. These firms often engage in activities that have no conceivable economic synergies or economies of scope that explain their integration. Rather, the firm provides an internal capital market, when external flows of funds would be plagued by problems of weak governance. Of course, integration has its own cost: by compartmentalizing the capital market, it may preclude the reallocation of capital to its most productive use. This inefficiency has to be tolerated as a second best if the costs of external governance would be even higher.

The possibility of second-party enforcement based on repeated interaction brings a third option into the mix. The firms can remain distinct, but contracts between them can be self-enforcing as an equilibrium of their repeated game. Barak Richman (2004) discusses such three-way choices.

### *C. Bilateral and Multilateral Self-Enforcement*

In second-party institutions, I include not only repeated interaction between a given pair, but also multilateral enforcement among a community of traders. This sense of “second party” is different from that of Greif (2006, chap. 9); what I call multilateral second-party institutions, he calls “collectivist.” Examples of my usage thus include Greif’s Maghribi traders (chap. 3), and also industry associations and Better Business Bureaus that monitor their members’ conduct, investigate complaints and arbitrate disputes, impose sanctions where appropriate, and publicize miscreants’ names so others can ostracize them, or at least be on guard when dealing with them. Bernstein (1992, 2001) studies two such industry-based institutions of governance. Other prominent examples are the various rotating saving and credit associations of small groups of friends that underlie many systems of microcredit (see Timothy Besley, Stephen Coate, and Glenn Loury 1993).

Second-party governance, whether bilateral or multilateral, attempts to resolve prisoner’s dilemmas by repetition. For one-sided dilemmas, this is essentially an “efficiency wage” idea: the second mover should get enough surplus from each stage game to exceed the annuity he would get by investing the one-time gain from cheating. Then the resolution of two-sided simultaneous-action dilemmas can be thought of as a two-sided efficiency wage: the total surplus available from mutual cooperation in each stage game must be divided in such a way that each player gets enough to offset the temptation to cheat.

Enforcement on a multilateral basis brings further problems. If A cheats B in their current match-up, A may not expect to meet B sufficiently frequently in the future, but he expects to meet other members of the group, such as C, D . . . , and they will inflict the established punishment, be it mere withholding of future trades, or more serious sanctions such as fines and ostracism. This prospect can keep A honest in his dealings with B. But this process has its difficulties. It requires a stable community with many ongoing interactions, and good information flows about members’ behavior. It is not enough to know that cheating occurred; the cheater must be identified. Otherwise the punishment cannot be targeted, and blunt punishments may be insufficient to deter specific cheaters. Also, C, D . . . may have to incur some private cost to punish A on B’s behalf. Then participation in punishment becomes a public good, and individuals have the temptation to free-ride just as in any other context of private provision of a public good. “Second-round enforcement” can overcome this: anyone who fails to participate in a socially approved

punishment is himself a miscreant who has to be punished. Such penal codes can work in theory, but are only partially effective in practice. For example, Princeton University's Honor Code requires students to report observed instances of cheating in examinations, and anyone who fails to do so also violates the Code. But surveys find that over 60 percent of respondents would not turn in a friend who cheated (Jeremy Caplan 1996).

Therefore, people try to build bilateral relationships upon successful encounters. Joel Watson (2002) constructs theoretical models of how bilateral relationships can be developed in a gradual way. But in many situations a given pair of people may not have enough ongoing pairwise transaction opportunities, and multilateral institutions may be unavoidable. An extreme example can be found in Yogi Berra's dictum: "Always go to other people's funerals. Otherwise they won't come to yours." Here is a social norm that must be enforced on a multilateral basis because bilateral enforcement is infeasible in the very nature of the interaction. Without going to this extreme, when each player may be involved in several bilateral relationships at the same time, and the partnerships may dissolve and reform, the group still benefits from multilateral governance. The Maghribi traders in Greif (2006) and Goldberg (2005) are an example of this.<sup>7</sup>

The information and communication channels that are needed for second-party governance become weaker as the size and scope of the group expand. Successful governance in a large group, or one with a large geographic or social spread, eventually requires a shift toward more formal methods of governance (Shuhe Li 2003; Dixit 2004, chap. 3).

Li draws a distinction between formal rule-based governance and informal relation-based governance, based on different costs of the two institutions. A rule-based formal legal system requires substantial fixed costs to pass the laws and to establish the courts to adjudicate disputes, and a police force to enforce the court's verdicts. But once the system is in place, people can deal with strangers in relative confidence, so the marginal costs of expansion are low. A relation-based system has little or no fixed costs; one starts by dealing with close friends and neighbors. But as business expands, one must deal with strangers and must first establish relationships with them; therefore the marginal costs of expansion are high and rising. The low fixed cost, rising marginal cost system will have lower overall costs for small-scale transactions, and the high fixed cost, low marginal cost system will be better for larger scales.

Dixit constructs a more detailed spatial model of information transmission and its fading at large distances to explain the idea of rising marginal costs. This leads to some surprising implications for what happens when the relation-based system reaches the limit of its size.

The figure shows a continuum of economic agents located along a circle, which should be interpreted as a socioeconomic rather than strictly geographic space. Each period they are randomly matched in pairs to play a contracting game that is a prisoner's dilemma. The probability of meeting a near-neighbor is higher than that of meeting one farther away. The probability of meeting the same partner again is negligible, so there is no direct repeated game mechanism to sustain honesty. But information about cheating is spread by the victim, and someone who knows that you cheated in the past will not deal with you. The spread of information decays with distance from the victim. The result is that people act honestly upon meeting close neighbors, because cheating is more likely to be discovered by other close neighbors whom one is more

<sup>7</sup> See also a critique of Greif's analysis by Jeremy Edwards and Sheilagh Ogilvie (2008) and Greif's reply (2008). What I learned from this exchange, and especially from Goldberg (2005), is that traders undertake many different activities with many different partners, the governance institutions best for handling the different aspects of their activities are also different, and the whole complex of activities and governance interacts across these dimensions. Such multidimensional extensions of Greif's model should be a fruitful avenue of future research in this area, just as the multitask agency model of Bengt Holmström and Paul Milgrom (1991) was an important extension of the first-generation single task agency models.

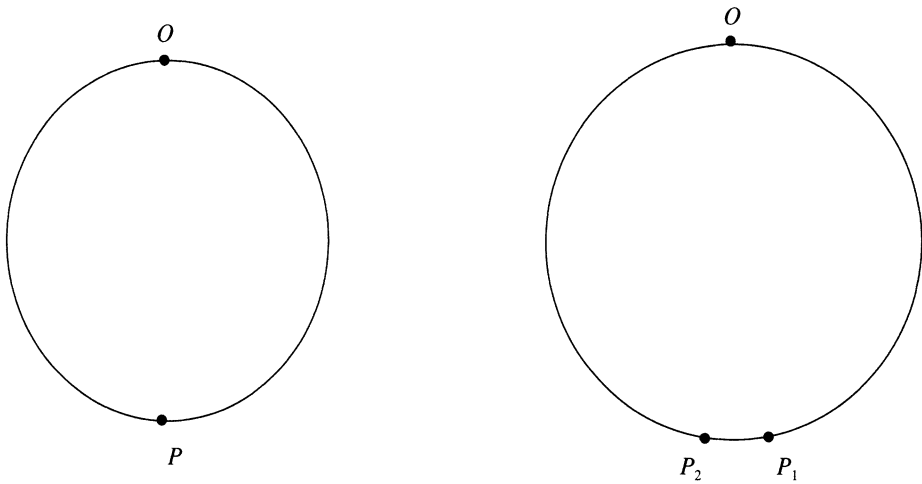


FIGURE 1. LIMIT OF RELATION-BASED GOVERNANCE

likely to meet in the future. In equilibrium there is a threshold of distance such that pairs located within this distance play honestly and those located farther apart cheat.

If the circle is small enough, honesty may be achievable over all of it. The left-hand circle is of the critical size, where an agent located at  $O$  is just indifferent between honesty and cheating if he happens to be matched with  $P$  located diametrically opposite. The right-hand circle is slightly larger. The distances  $OP_1$  and  $OP_2$  along the shorter arcs are exactly equal to the critical distance  $OP$  (measured either way) in the left-hand circle, but there are added people in the short arc  $P_1P_2$ . Now if  $O$  meets  $P_1$  and cheats, the probability that  $P_2$  gets to hear of this is strictly less than one, whereas in the left-hand circle the probability that someone just to one side of  $P$  would get to hear of  $O$ 's cheating another agent just to the other side of  $P$  was almost equal to one. Therefore  $O$ 's indifference when playing someone at the distance  $OP$  in the left circle changes to favoring cheating someone at equal distance  $OP_1$  (or  $OP_2$ ) in the larger right circle.

By continuity,  $O$  will also cheat people located slightly closer than  $P_1$  (or  $P_2$ ). Enlargement of the circle beyond the critical size actually shrinks the distance over which honesty can be achieved!<sup>8</sup>

#### D. Private External Enforcement

In my classification, third-party institutions provide governance by outsiders who are not direct parties to this class of transactions. This works in several different ways: (1) private adjudication and enforcement under the shadow of formal law; (2) provision of information that then becomes an input to second-party enforcement; and (3) enforcement for profit by the third party. Industry-based arbitration forums mentioned above are an example of the first. Gambetta's Don Peppe acts in the second as well as the third of the categories. He can provide one or both of two types of services. In an information role, he keeps track of the behavior of all traders in his area and tells his customers whether the others with whom they are proposing to do business have good reputations; in this aspect he is like a credit-rating agency. In an enforcement role, he inflicts punishment, including (especially) physical violence, on those who cheat his clients; in

<sup>8</sup> This simple intuition leaves out some important details; see Dixit (2003b, 1304-05) for the missing arguments.

this respect he is like a combination of court and police or jailer. Formal law, where enforcement is provided by governmental or quasi-governmental bodies, is also third-party governance, but not for profit.

Honesty of these third parties is not automatic. Formal courts may also be biased or corrupt, and the police and jailers may likewise be corrupt in enforcing the judgment of the courts. Private for-profit enforcement brings the problem out into the open. If *Pepe* conspires with the other trader to double-cross one of his customers, the customer has little recourse. *Pepe*'s honesty must be a part of the condition of equilibrium of the system. Governance works by converting a one-shot prisoner's dilemma game of the two traders into two repeated games of each with the third party. To sustain honest behavior in each game, each trader and *Pepe* both need a sufficiently large share in the total pie. This places upper and lower bounds on the fee of the third party: *Pepe*'s fee has to be high enough to keep him honest, but low enough to keep the trader honest (Dixit 2004, chap. 4; further details in Dixit 2003a).

A simple special case of the analysis will illustrate the point. Consider a one-shot game with the payoff matrix

|          |        |          |        |
|----------|--------|----------|--------|
|          |        | Player 2 |        |
|          |        | Honest   | Cheat  |
| Player 1 | Honest | $H, H$   | $L, W$ |
|          | Cheat  | $W, L$   | $C, C$ |

where  $W > H > C > 0 > L$ , and 0 is the outside option. This game is a prisoner's dilemma; it is worth playing even without governance, but can yield a higher payoff if governance ensures honesty. Suppose both parties engage a *Pepe*, who charges each of them a fee  $F$  each period for his services. Consider separately the cases of information and enforcement services.

Under the information service, each customer can cheat to get a one-time payoff  $W - F$  instead of  $H - F$  for an extra benefit ( $W - H$ ), but then the game will collapse into the cheating equilibrium, so the player will get  $C$  instead of  $H - F$  forever. If  $r$  is the discount rate, the condition for this deviation to be undesirable is

$$(H - F) - C > r(W - H), \quad \text{or} \quad F < (H - C) - r(W - H).$$

*Pepe* can double-cross one of the customers to let the other gain  $W$  instead of  $H$ , and can extract at most this excess ( $W - H$ ) for this. But then the cheated customer will not deal with *Pepe* in the future, so *Pepe* will lose  $F$  forever. The condition to keep *Pepe* honest is therefore

$$F > r'(W - H),$$

where  $r'$  is *Pepe*'s discount rate (which may be higher than  $r$ , to reflect the probability of loss of business or death in the cutthroat competition to become the next *Pepe*). These two inequalities are the conditions on the division of surplus, or the two-sided efficiency wage. If

$$r'(W - H) < (H - C) - r(W - H),$$

we can find an  $F$  satisfying both inequalities.

If Peppe provides enforcement services, then anyone who cheats one of his clients must suffer a payoff loss  $P$  corresponding to the cost of the punishment Peppe can inflict, and then drop out of the market altogether, getting 0 instead of  $C$  thereafter. Therefore, the condition for the customer's honesty is that the immediate net gain is less than the capitalized value of the future cost,

$$W - H - P < (H - F) / r, \quad \text{or} \quad F < H - r(W - H - P).$$

The right-hand side of this exceeds (by  $C + rP$ ) the right-hand side of the corresponding inequality for the information service. Therefore, an enforcer Peppe can charge a higher fee. But this does not mean that all Peppes will become enforcers rather than information providers. Competition for entry into the Peppe business leads to an equilibrium determined by an ex ante zero expected profit condition, which determines Peppe's effective discount rate  $r'$  by endogenizing the probability of his survival. The higher profit from enforcement entails stiffer competition for entry, and therefore a higher effective discount rate in that activity than in information provision. Therefore there can be an equilibrium where both types of services are provided, and the marginal Peppe is indifferent between entry into the two.

#### E. *The Downside of Private Order*

Thus far, I have discussed the positive aspects of informal or private institutions. However, in keeping with my theme that nothing is perfect, I should discuss negative aspects of private order, some of which were already mentioned.

The most serious limitation of private order stems from its reliance on a good private communication network and on threats of expulsion from the group. Therefore, it becomes harder to maintain as the size of the group expands. It can sustain credible contract performance only in the small group. This fragments capital and even labor markets; highly productive opportunities for dealing with people outside the group go unfulfilled.

If private order is maintained by a profit-motivated third-party enforcer, that party can use its power for extortion. Any member he fails to protect has a very poor outcome; he can use this threat to extract a high fee from each member for their service. As Gambetta (1993, 198) points out, "protectors, once enlisted, invariably overstay their welcome." Once a group gets trapped into this equilibrium, it will take some difficult collective action to get rid of the protector.

#### V. **Collective Action**

Numerous theoretical analyses and case studies exist to consider whether and how the problem of free-riding in multiperson prisoner's dilemmas of collective action can be resolved. Many of these studies, notably Elinor Ostrom (1990), come to similar conclusions.

First, successful governance of collective action requires stability of composition of the group, and good local information about (1) who is and is not a member of the group, (2) what are the members' rights and duties (what is and what is not acceptable behavior), (3) consequences of misbehavior, and (4) history of individual members' behavior.

Next, it is important that the rules specifying unacceptable behavior be compatible with the availability of information about the relevant actions; otherwise the norm cannot be enforced and can become worse than useless because it can cause members to hold the whole institution in derision. For example, successfully managed fisheries often use methods such as restrictions on the days or seasons when fish can be caught, on sizes of boats and nets, and so on—methods that would be inferior to direct limits on the quantity of fish caught if those quantities were observable and enforceable.

Finally, the incentives—carrots and sticks—for members to adhere to norms, and to partake in imposing sanctions on others who violate the norms, must be designed correctly. Here the finding of case studies contrasts with one result of many theoretical models of repeated prisoner's dilemmas. These models broadly argue that the harshest feasible punishments support the most cooperative outcomes. Case studies, however, find that successful systems use graduated punishments. In the first instance, members who violate the group's norm of conduct are given mild reminders of the transgression and opportunities to make restitutions. If these don't work, punishments are gradually ratcheted up. Breaking off the relationship—the “grim trigger” strategy that is the immediate response in many theoretical models—is the last resort in reality.

The theory of repeated games with imperfect monitoring shows that less than extreme punishment is optimal when it is likely to be triggered by error along the equilibrium path of play. But for graduated punishments, something more is needed: a signal that the other player has cheated should cause the first player to update some information about the other. In other words, we need a repeated game with adverse selection as well as moral hazard. Dilip Abreu, B. Douglas Bernheim, and Dixit (2005) construct some examples that illustrate the possibilities in such situations, but we await more general theoretical understanding of graduated punishments.

#### A. Internalizing Norms of Prosocial Behavior

When discussing contract enforcement, I emphasized the social value and practical importance of internalized prosocial preferences (first-party governance), and of deliberate efforts to generate such preferences by socialization and education of children. Collective action also benefits from similar preferences. Dixit (2008) constructs a simple example that can serve as a starter model for this.

Consider a society of  $n$  individuals. Each individual  $i$  can expend two types of effort, private  $x_i$  and public  $z_i$ . The resulting income of individual  $i$  is given by

$$y_i = (1 + \bar{z}) x_i,$$

where  $\bar{z}$  is the average of the  $z_i$ . Thus public effort creates a public input that raises the average and marginal product of private input.

The private or selfish utility of individual  $i$  is

$$u_i = y_i - \frac{1}{3}(x_i + z_i)^2.$$

With this specification, the noncooperative Nash equilibrium has no public effort:

$$(1) \quad x_i = 3/2, \quad z_i = 0, \quad y_i = 3/2, \quad u_i = 3/4,$$

but the cooperative optimum has positive public effort yielding higher selfish utility:

$$(2) \quad x_i = 2, \quad z_i = 1, \quad y_i = 4, \quad u_i = 1.$$

If the society cannot compel individuals to exert the public effort directly, it may induce them to do so by changing their preferences to include a prosocial element. Suppose individual 1 is given a prosocial utility

$$v_1 = u_1 + \phi \sum_{i=2}^n u_i,$$



and similarly for other individuals. In the case of large  $n$ , if  $\phi > 2/3$  we have a Nash equilibrium with positive public effort:

$$(3) \quad x_i = \frac{2}{2 - \phi}, \quad z_i = \frac{3\phi - 2}{2 - \phi}, \quad y_i = \frac{4\phi}{(2 - \phi)^2}, \quad u_i = \frac{\phi(4 - 3\phi)}{(2 - \phi)^2}.$$

As  $\phi$  increases from  $2/3$  to  $1$ , the solution in (3) moves monotonically from the purely selfish Nash equilibrium (1) to the purely cooperative optimum (2). A higher  $\phi$  in this range raises everyone's *private* utility.

Next, suppose there is a succession of generations. Each individual has one child, whose selfish utility is denoted by  $u_i^c$  defined similarly to the  $u_i$  above. The parent has private family utility

$$f_i = u_i + \delta u_i^c.$$

Education can instill a social utility with parameter  $\phi$  into each child. The cost of this per capita is  $t$  given by

$$t = \frac{k}{1 - \phi}, \quad \text{or} \quad \phi = 1 - \frac{k}{t}.$$

Although each parent cares only about the family utility, he/she recognizes that instilling sufficient prosocial preference in all children will increase the child's private utility. Each generation votes on a tax  $t$  per capita to finance education. Since there is no heterogeneity, the  $t$  that maximizes the parent's net private family utility  $f_i - t$  will emerge as the Condorcet winner. Calculation shows that if  $\delta > 36k$ , the optimum choice of  $\phi$  is given by

$$\phi = \frac{2(1 - \theta)}{2 - \theta} \quad \text{where} \quad \theta = \left(\frac{k}{\delta}\right)^{1/3}.$$

When  $\delta$  is at its lower limit,  $\delta \cong 36k$ , we have  $\theta \cong 0.305$ , and then  $\phi \cong 0.82$ . At the other extreme, when  $k$  is very small compared to  $\delta$ ,  $\theta$  is close to  $0$  and  $\phi$  is close to  $1$ .

The interesting aspect here is the double dimension of other-regarding preferences—toward one's own children and toward strangers—and their interaction. The former is present in a natural way, and in this context it is served by instilling the latter.

This "starter" example can be generalized into a full-fledged model in many ways. The most important feature to introduce is heterogeneity. People in a given society differ in the extent of their selfish or prosocial behavior, and societies and cultures around the world differ in this respect; see Camerer (2003, 63–75). To model this, we can have a genetically determined distribution of  $\phi$  in the population, and education can shift this distribution to the right in the sense of first-order stochastic dominance. Individuals can differ in their patience; those with high  $\delta$  will vote for a higher amount of social spending  $t$  per capita on education, and the median voter's most preferred  $t$  will be implemented.

## VI. Evolution and Reform of Governance Institutions

In the discussion of theories and case studies above, we identified many characteristics of institutions that are conducive to good economic governance and therefore to the proper underpinning of well-functioning markets. Of course, these are only necessary conditions, not sufficient ones. Other institutions and policies—a stable macroeconomic environment, a broadly open regime for trade and investment flows, and many other dimensions of good policies—are also

important. However, continuing to focus on governance institutions, we next ask whether these institutions can evolve toward more efficient forms, and whether and how they can be reformed.

As regards a natural process of evolution, scholars have expressed contrasting views. Williamson's "discriminating alignment hypothesis" (1996, 12) holds that transactions align with governance structures to minimize transaction costs; in other words, there is a natural tendency toward more efficient structures that match institutions to the needs of governance. Douglass North (1990) argues that such alignment may fail to occur, emphasizing obstacles presented by the political process of reform.

Discriminating alignment can work well and reasonably quickly when the decision is made by one actor, or by a small group with common interests. Williamson's (1985, chap. 4, 5) classic analysis of vertical integration choices by firms is a case in point. Robert Ellickson (1991) and Gary Libecap (1989, chap. 3) have cases where small groups quickly established and enforced private order for property rights.<sup>9</sup>

But institutions constitute an equilibrium, and institutional change means shifting to a new equilibrium. In any moderately complex social context, this requires (1) either compensating those who would lose from the change or overcoming their resistance in the existing political process; (2) changing information and aligning incentives; and (3) creating common knowledge of actions to sustain the new equilibrium. All these steps present difficulties; therefore the process of institution reform is often slow, and old institutions may persist as a lock-in phenomenon. Thrainn Eggertson (2005) gives a striking example of how an Icelandic institution of sharing of hay persisted for more than a century and prevented an efficient reallocation of resources away from farming and toward fishing. Some of Libecap's other cases (1989, chap. 4–6) also present a mixed record of success and failure.

One important desideratum for shifting an institutional equilibrium is that the new institutions interact well, not dysfunctionally, with existing ones, and case studies support this. Here are some examples. (1) Everyone emphasizes the importance of secure property rights, and in the case of land, formal titling seems the best way to define these. But Frank Shipton (1988) and Jean Ensminger (1997) show how titling in Kenya failed in its aims because existing informal rights could not be overridden; for example, land to which you have formal title cannot be used as collateral for borrowing if traditional institutions give your extended family some rights to shares in the product of the land. (2) Daniel Berkowitz, Katharina Pistor, and Jean-Francois Richard (2003) found that success of attempts to transplant legal systems to new countries depended significantly on whether the population in the recipient country already had familiarity with the basic principles of the transplanted law. (3) Rachel Kranton and Anand Swamy (1999) show how arm's length market arrangements for bank lending in India destroyed existing relational arrangements that served other useful aims, such as insurance. (4) Dixit (2004, chap. 2) shows theoretically how a partial improvement in a weak system of formal governance can worsen the performance of the existing system of informal relational governance, by making the consequences of cheating less harmful. These examples also show that when making institutional reforms that are expected to lead to eventual improvements, it may be necessary to accept some transitional worsening of performance.

These studies have also given us a few broad generalizations about successful institutional change. (1) The government has an important role as partner and facilitator of reforms. But top-down reforms may be difficult to achieve because of lack of adequate local knowledge and lack of appropriate incentives for the existing administrative structures to reform themselves; therefore the results may be disappointing (Easterly 2008; Rodrik 2008). (2) A major entrepreneur

<sup>9</sup> But, illustrating the importance of stable composition of the group, the arrival of an outsider among the cattle ranchers in Ellickson's study created problems for norm enforcement in the group.

can take an initiative that others are then compelled to follow. J. P. Morgan voluntarily started publishing quarterly accounts of his steel corporation; laws requiring this were enacted later by the reforming administration of Theodore Roosevelt (Jean Strouse 2000, 439). Recently the CEO of AFLAC allowed the company's shareholders to vote on his compensation; this practice may also spread. (3) Media, public interest litigation, and people's courts can help, but they can also hurt if they pursue some special interest, e.g., the environment or some perceived rights of some small groups, too far to the detriment of more general interests. (4) Crises are conducive to change because they destroy existing special interests (Olson 1982); but not many people recommend engineering a crisis in the hope of facilitating institutional reform. Competition also forces change (North 1990).

But these insights do not constitute an overall framework for understanding institutional change. Much more research is needed to achieve that. Such research will have to combine many disciplinary perspectives—economics, history, political science, sociology, psychology, anthropology, law, and evolutionary biology—and use many methodologies—case studies and analytic narratives, statistical empirical studies, and theoretical modeling using both rational choice and behavioral approaches. This is an ambitious but exciting endeavor and an important one both scientifically and in its potential practical applications, and I hope this paper will stimulate many economists and other social scientists to contribute to it.

## VII. Recommendations for Reforms

Everyone wants an essay like this to conclude with practical recommendations for policy and institutional reform or design. This is very difficult because research on governance institutions is very much a work in progress. Case studies and theory alike show a great diversity of possible remedies and the contexts to which they may apply. Each case is different in many important ways, but there are also some broad themes common to them all. The general and the particular must be combined appropriately in each situation. Any recommendations at the level of this article must be correspondingly broad, vague, and tentative: suggestions rather than prescriptions. With this proviso, here are a few, which summarize some arguments and remarks made earlier and add some concluding thoughts.

### A. *Suggestions for Investors and Traders*

A businessman who comes from economies with well-functioning formal governance is likely to find the relation-based informal institutions in many less-developed countries and transition economies bewildering, and is likely to make mistakes. He can avoid these mistakes by using a local partner with established ties to social networks. Of course, he must first find and build a relationship with a partner, and then must share the surplus with the partner appropriately to maintain an honest equilibrium. But this cost is still likely to be less than the cost of losing the investment because the property right or the contract cannot be enforced in the formal system.

This observation also suggests that businessmen from one country with poor formal governance will have an advantage in investing or trading with another, as compared to those who come from countries with good formal governance. They may not know the precise customs and may not be insiders to the relationships in the other country, but they are better aware of the need to learn the customs and build the relationships. This may explain some of the recent success of multinationals from these countries when it comes to making foreign direct investments—their specific asset is the entrepreneurial and managerial skill in navigating economic systems with poor governance.

Where the institutions and agents of the host country government are predatory, investors and traders have to cope with this, or attempt collective action to resist the extortion. This has

to include not only a refusal to bribe, and publicizing the agent's misdeeds, but also sanctions against other businesspersons who try to benefit from bribery.

Finally, domestic and foreign businesspersons alike should explore the potential of taking private leadership in institution design and reform.

### B. *Suggestions for Policy Advisers*

The advisers from Western countries, international organizations, and even academia who prescribe institutional and policy reforms to less-developed countries and transition economies need to remember one very important general principle. You should first achieve a good understanding of the structure and properties of the existing institutional equilibrium. This understanding is important even if (especially if?) your aim is to undermine and replace the institutions. But there is more. Before recommending any change, you should determine whether existing institutions and organizations are there for a good reason, and how your reforms would interact with them in the short run and the long run. I am not saying that everything that is there is there for a good reason, but it is better to start with a presumption in favor of what has existed for a while than the presumption that everything should be changed to match the successful formal institutions in advanced countries. The biologist Richard Dawkins had similar advice for his colleagues when they tried to understand the role of some specific feature of an animal or plant: "Evolution is smarter than you are" (quoted by Easterly 2008). In the same way, people "on the ground" who have been developing and using an arrangement for decades may be smarter than the outside expert who has spent a few days at most in the country.

I should emphasize, again, that this suggestion is not meant to accept the status quo unthinkingly, but merely to think carefully. In biological evolution, what we observe may not be optimal adaptations at all, but instead "remnants of the past that don't make sense in present terms" (Stephen Jay Gould 1980 28), or "spandrels" that are side-effects of other adaptations (Gould, 1997). Similarly, a social custom or institution may be an irrelevant or even dysfunctional accident of history. The successful reformer will combine respect for the past and thoughtful innovation.

### C. *Suggestions for Policymakers*

Others may advise, but ultimately the governments and the political process of a country must decide whether and how to reform its institutions and policies. There are many models, and it is tempting to imitate the latest success. With this proviso, I want to mention a recent flavor of the day, Vietnam, and "a quintessentially Vietnamese trait: casting around for role models, then trying to meld the best aspects of several of them into something uniquely suited to Vietnam" (*The Economist* 2008). This suggests that the country's decision makers should listen to everyone—the Washington consensus, United Nations agencies, academic experts, journalists, and columnists. But they should not slavishly follow any one, not even their own prior dogmatic belief. Instead, they should study their situation in light of theories and other cases, and then make their own choice.

As a role model for this, albeit from a very different context, I offer the Arctic and Antarctic explorer Roald Amundsen, and contrast him with Robert Scott. In 1911, the two were rivals in a race to be the first human to set foot on the South Pole. In preparation for his journey, Amundsen used many of the practices he had found among the Netsilik Eskimos during his traverse of the Northwest Passage some years earlier. He learned dog-sled driving from them, he copied their leather and fur clothing and the way they iced their sledge runners for smooth traction in very low temperatures, he brought a large number of Greenlander huskies for his dog teams, and so on. He combined this with traditional Nordic practices, most notably skiing, and with modern

inventions, most notably the primus stove. He spent several months in Norway thinking and planning, and kept improving his equipment and methods during the previous winter's sojourn at his base camp in Antarctica. Scott, by contrast, relied on his own ideas and a belief that everything British, and specifically everything previously done by the British navy, was the best. The results were starkly different. Amundsen won the race by a big margin; his sledging round-trip record of 99 days still stands. Scott and his companions were delayed by their inadequate skills and equipment. Because of the delay, they were caught in the cold of the late autumn on the way back, and perished. (See Roland Huntford 1979.<sup>10</sup>) My advice to designers and reformers of institutions and policies is: be like Amundsen, not like Scott.

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<sup>10</sup> Scott has his defenders. In particular, Susan Solomon (2001) has argued that Scott was merely unlucky: he was caught in exceptionally cold weather on his return journey. She shows that Scott had access to temperature data for three previous seasons, and made his preparations assuming the average. But this is hardly good decision-making under uncertainty in a matter of life and death. Also, bad weather in March 1912 does not explain why he lost the race so badly in December 1911.

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