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Monotonicity Paradoxes, Mutual Cooperation, and the End of the Cold War: Merging History and Theory

Thomas Schwartz[•] and Kiron K. Skinner[♦]

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1 Introduction

Like a magic trick, the end of the Cold War fooled and baffled its audience. It happened in full view of scholars and statesmen, yet it flouted all their expectations and left them wondering how and why. Not only why, but why then. If, by 1988 or so, the rulers of Russia saw no profit in projecting power west and south and maintaining a tight grip on Eastern Europe, why had they continued to do just that for so long? And not only how, but who: was Ronald Reagan lucky to be president then, or were we lucky he was president then? Professor Robert Keohane sharpened the puzzle about Ronald Reagan in remarks to Kiron Skinner in the late 1990s: "The assessment [of Ronald Reagan's presidency] was so bad but the outcome [of the Cold War] was so good." He then suggested she attempt to marry the historical account she was interested in with a more theoretical analysis of power and cooperation. To this end, she has joined forces with formal theorist Thomas Schwartz of UCLA.

[•] Professor, Department of Political Science, University of California at Los Angeles.
[♦] Assistant Professor, Department of Social and Decision Sciences, Carnegie Mellon University, and Research Fellow, Hoover Institution at Stanford University. Skinner is a member of Secretary Donald Rumsfeld's Defense Policy Board and the Chief of Naval Operations Executive Panel. The views expressed in this paper do not necessarily reflect the views or policies of the United States government.

There are also the how and why of theoretical anomalies, of axioms proved false. One axiom is (or was) that sovereign states, lacking a common government to protect them from each other, must protect themselves severally by preserving and extending their power – the very thing Gorbachev's Soviet Union finally decided not to keep doing. Another axiom is that sovereign states, lacking a common government to enforce contracts, find mutual cooperation exceedingly hard, all but impossible except on rather trivial and recurrent issues, where cooperators risk little but might encourage reciprocity by creating a reputation for reliability: notoriously the United States and the Soviet Union did little of that for forty-odd years, but in the end they somehow switched from costly confrontation to across-the-board comity in one fell swoop.

This mystery has a dual solution, part historical and part theoretical. The one part has to do with the man Ronald Reagan, more specifically with the content and quality of his strategic thinking as revealed in public and archival records and with the style of his leadership. The other has to do with the game form of the Cold War and the theoretically unexpected incentives it created, more generally with a new way of looking at power and cooperation in geopolitics: a simple but largely unexplored category of games (variants of the folkloric prisoners' dilemma) shows mutual cooperation to be easier to achieve than prevailing scholarship has suggested and a wider category shows power to be, if anything, even more important than the so-called neorealists have contended yet often a downright disadvantageous thing to have beyond certain limits.

We begin with theory. Power, we show, is no unqualified asset: less can be more profitable than more though other things be equal. The idea of disadvantageous increases in power has been treated extensively in connection with electoral systems (Brams and

Fishburn 1983, Hoag and Hallet 1926), positions of authority (Farquharson 1969, Schwartz 1999), representation (Schwartz 1995, Balinski and Young 1982), multi-person combat (Schubik 1954), and economic growth (Moulin (1990). Our paradox of power imports that ideal from the rule-governed arena of domestic institutions to the anarchy of interstate relations. This paradox is closely tied to the problem of cooperation. A simple variant of the Prisoners' Dilemma reveals an important but hitherto unrecognized means for achieving international cooperation. This variant also exemplifies the Paradox of Power: it is when one actor unilaterally sheds power that mutual cooperation is achieved and both actors benefit. That, we argue, is how the Cold War ended.

One the historical side we use our same structure to sift out archival and other documents that show our story about Reagan's strategic innovations to fit his intentions and his own analysis of the geopolitical game. Thus there is more to our story than an "as if" explanation. It is not just that gross outcomes fit our game model. It is not just that Reagan and others acted as if they were rational, perfectly informed strategic players of our fancied game. Rather, the documentary record shows that Reagan interpreted the Cold War game as we do here and saw what had to be done to play it well.

In the end, we both refine and challenge orthodox geopolitical thought by drawing lessons for theory and policy about power, cooperation, and leadership.

2 Anarchy, Power, and Cooperation

Realists depict geopolitics as Hobbesian anarchy with a statist twist: it is an anarchy of leviathans, of person-like states rather than stateless persons. Others find this picture too austere but prize it all the same, as a point of contrast with richer ones, even a

background on which to paint them. Pictures highlight features, of real or fancied worlds, and this one highlights two: the demand for power and the problem of cooperation. Anarchy, the want of common government, makes states seek power to protect themselves from predators and then perchance to prey. Inequality makes the weak and then others seek power in numbers, friends to fight foes. But friends are fickle: little more than foes of foes, they can and do switch sides. And cooperation beyond shared enmity is even harder to secure: though power rest in peaceful balance, Prisoners' Dilemmas abound, putting the fruits of collective action – of peaceful intercourse and mutual security even more than armed alignment – mostly out of reach.

How much power do states demand? The extreme answer is that each demands the most it can get. This hypothesis has all the appeal of profit-maximization by producers and vote-maximization by parties: it is strong and simple if not quite true, and maybe it is true enough.

Or maybe not. Liberals and idealists contend that international markets and organizations can regulate the use and pursuit of power, and realists themselves see prospects of a self-enforcing balance of power; either arrangement might dampen demand. Liberals further contend that states seek economic gains though others may gain more, yet to gain less than others is arguably to lose power of a sort. Contextualists object to any talk of power as a single maximand, like profit: power is relative to actors, issues, bases, and other contextual factors. Baldwin (1979) adds a wrinkle: a gain in power of one sort can impair a state's ability to gain power of other sorts, more advantageous in context. Following Thucydides' account of the Peloponnesian War, many have argued that a state's growth in power can prove disadvantageous by

encouraging others to start a preventive war from fear of future growth. Perhaps the most sweeping challenge to power-maximization is, in Gilpin's (1981:5) words, that "acquisition of power entails an opportunity cost to society; some other desired good must be abandoned."

These criticisms challenge the idea that power is an all-encompassing asset, a single quantity of which more is always better than less. But none denies that power—power in general or any of several sorts or sources of it – is an important asset, maybe one of many. None denies that is always better for a state to have more of it than less, all else equal.

On the contrary, a state can profit from a loss of context-relevant power, though the loss accompanied no change of states or their goals, no prospect of future gains or losses of power by any state, no offsetting loss by other states, no misperception or miscalculation on any side, no want of information in any quarter, and no savings to spend on other assets. So we now show with a simple example.

2.1 The Paradox of Power

Runny River runs from Upper Riparia through Damnation. Damnation can dam it, creating a lake and with it more accessible water for itself and upstream Upper Riparia. The latter could then achieve a further increase, for itself alone, by digging irrigation canals. So Damnation has two options, to dam (D) and not (~~D~~) and Upper Riparia has two to canalize (C) and not (~~C~~). There are four possible outcomes: DC, D~~C~~, ~~D~~C, ~~DC~~.

Both states want more water, but dams and canals cost something. Were there no dam and lake, canals would not be worth the cost to Upper Riparia, but otherwise they

would be. So Upper Riparia prefers DC to D~~C~~ to ~~DC~~ to ~~D~~C. Were canals in place, the water level would be lowered enough to make the dam too costly to Damnation, but otherwise it would be worth the cost. So Damnation prefers D~~C~~ to ~~DC~~ to ~~D~~C to DC.

Damnation moves first, of course. If it chose D then Upper Riparia would choose C: the latter prefers DC to D~~C~~. Otherwise Upper Riparia would choose ~~C~~: it prefers ~~DC~~ to ~~D~~C. So D would lead to DC, ~~D~~ to ~~DC~~. But Damnation prefers ~~DC~~ to DC. So it chooses ~~D~~ and Upper Riparia ~~C~~: the outcome is ~~DC~~.

Add power to the story. Wisely or not, Damnation can build the dam and try to stop canalization with a naval bombardment of the project site. But that is the only threat it has, and it is not good enough: Upper Riparia has shore batteries adequate to sink warships near the site.

Now subtract power. Upper Riparia destroys its batteries, losing the power it needed to canalize but (we may suppose) nothing else of value. As a result, Damnation dams but Upper Riparia does not canalize. The outcome is DC, better for both than old ~~DC~~. There is the paradox: Upper Riparia profited from its loss of power, all else having stayed the same.

Yes the destruction of shore batteries might have hurt Upper Riparia in other ways, but not necessarily. Andy yes, it was wasteful for Upper Riparia to have shore batteries to begin with. But that is our point. For vividness we spoke of a <u>decrease</u> in power, but the essential story is that less power would have been better than more for Upper Riparia, not that it would have been best for Upper Riparia to start with more then drop to less.

Power in geopolitics is like God in religion: the idea is elusive but hard to elude. Because relations among sovereign states are not governed by written rules, it is hard to ascribe "powers" to states – we have no authoritative enumeration – but for that every reason it is hard to bypass "power," the missing "s" a mark of elusiveness. If power is the ability to succeed, to achieve goals, then success is its measure, and by that measure Upper Riparia actually gained power. But such a construction destroys power as an analytical concept: we can no longer use it, as an independent variable, to explain successes and failures. Worse: we must conclude, for example, that Costa Rica had greater power than Japan in WWII. Another construction ignores goals and simply equates "power" with "ability," specific powers with specific abilities (the root is pouvoir after all). We can then say that a state loses power when it loses an ability and gains none. But abilities are options, mostly conditional. Your pencil sharpener gives you the ability or power to sharpen pencils, the option of doing so but only on condition that you have some to sharpen. Upper Riparia's batteries gave it the ability or power to sink ships, the option of doing so but only on condition that it had some to sink. By destroying the batteries it lost that ability, that power, that conditional option, and it gained none in return, no new options under any conditions. The loss benefited Upper Riparia by eliminating Damnation's disincentive to dam. Instead of equating power with ability, we might equate it with concrete instruments for punishing others. But Upper Riparia plainly shed power in that sense. Or we might think of power in relative terms: in a conflict between X and Y, a circumstance where one seeks to do something opposed by the other, X has greater power than Y if X can win (or "would win," in case strength of purpose be in question). But Upper Riparia went from more power to less in that sense

too. Her profit came from eliminating the prospect of victory: by winning a conflict over canalization, she would grab so much of the joint benefit with Damnation could provide that Damnation would not have provided it.

2.2 Cooperation

For the moment, set aside the Paradox of Power and look at the problem of cooperation, as exemplified by the Prisoners' Dilemma. In the folkloric version, which we call symmetric, there are two 'players' 1 and 2. Each can cooperate (help the other) or defect (not cooperate). Here are the four possible outcomes and their associated valuations – or payoffs – from 4 (best) to 1 (worst), with 1's value before 2's in each outcome cell:

		2	
		C	D
1	C	3,3 CC	1,4 CD
	D	4,1 DC	2,2 DD

Regardless of what 2 does, 1 is better off defecting, and regardless of what 1 does, 2 is better off defecting. So (we may suppose) both defect. But both would have fared better had both cooperated: both prefer CC to DD. Here, each is greedy, we say: each prefers solo defection to mutual cooperation.

Now change the game so 1 no longer is greedy though 2 still is:

		2 C	2 D
1	C	4,3 CC	1,4 CD
	D	3,1 DC	2,2 DD

In this case, we say, 1 is generous: he prizes mutual cooperation (CC) above all else. The result we call an Asymmetric Prisoners' Dilemma. At first, mutual cooperation is elusive, as in the classical Hobbesian picture of geopolitics. But suppose we stagger choices so one state can move first without backtracking. Then if the generous state, which so prizes mutual cooperation, is ruthless enough in its refusal to cooperate, the greedy one has an incentive to initiate irreversible one-sided cooperation: if 2 irreversibly chooses C, 1 is then better off choosing C as well since, being generous, 1 prefers CC even to DC.

Put otherwise: We might stagger moves in either game so one-player moves first. In the symmetric version, we still get DD. In the asymmetric version too we get DD if 1 moves first, but if 2 moves first we get CC, as lately explained. If C and D represent short-term acts then the fancied staggering may well be possible. But if these choices are long-term strategies or policies then a first move by 2 could take decades to complete. Still, 2 can accomplish the same end – mutual cooperation – even in the short run if it can irreversibly choose C. That requires not only the willingness to choose C but the opportunity to shed its power to defect.

3 Application

That, we contend is how the Cold War ended. C and D were broad policy options, not short-term moves or even long term but detailed strategies. The Soviet Union was player 2, greedy for empire. The United States was player 1, generous in the sense of not seeking territorial expansion and being willing to engage in commercial, scientific, cultural, and other mutually advantageous exchanges with the Soviet Union. Soviet President Michael Gorbachev was willing to cooperate, or so he said, but U.S. President Ronald Reagan insisted that Gorbachev initiate irreversible cooperation. This required that Gorbachev shed the power to defect. He did so by shedding his chief power asset: the Red Army of occupation was effectively withdrawn from Eastern Europe.

Reagan had his work cut out. Even when construed in purely ordinal terms, all relevant actors did not necessarily see the payoff numbers we assigned to the four outcomes. The complexity and temporal lengths of the C and D policies, the variety of beliefs and preferences within each superpower, and the fog of uncertainty that always

envelopes geopolitical grand strategy options inevitably led some influential Soviet actors to underestimate the cost of mutual defection (DD) and maybe the advantages of mutual cooperation (CC). As a result, it behooved Reagan to make those costs and benefits as striking as possible by making our commitment to CC as credible as possible and driving up the prevailing cost of DD as much as possible. The latter entailed a massive increase in defense spending and a manifest willingness to fight the Cold War on the ground in such peripheral combat zones as Nicaragua, Angola, and Afghanistan.

Space does not allow us to present a full analysis of the strategic interaction of the superpowers that led to the end of the Cold War, marked by the dissolution of the Soviet Union and its empire. We will thus focus on a brief historical sketch of the American side by examining Reagan's strategy.

3.1 The Cold War Game

For wise play, the resister's position may require patience and skill and a heavy investment. Obviously it should make its willingness to resist, its preference for two-way defection over cooperation by itself alone, as evident as possible to the predator. Likewise its generosity, its preference for two-way cooperation over defection by itself alone. The predator might or might not be able to shed power. But if it can, then the resister may have to do something more to achieve two-way cooperation: bear the cost of making two-way defection as costly as possible to the predator. The U.S. under President Reagan contributed to ending the Cold War by following these maxims.

The Cold War involved an arms race, which might be portrayed as Symmetric PD. But it was a byproduct of the main issue, Soviet imperialism. The Soviet Union

played predator, the U.S. resister: the one sought empire, the forcible rule of most of Eastern Europe and as much influence as possible elsewhere, the other the contraction or at least containment of that empire.

U.S. generosity was evident. This was especially the case on the issue of territorial acquisition at the end of WWII. The Soviet Union, not the United States, seized territory as WWII was ending. The United States emerged from the war a major economic, military, and political power, but its leaders and citizenry were disinclined to build an empire based on territorial acquisition. Though appreciative of the Soviet threat and sympathetic to captive peoples, American voters were not covetous of foreign territory and obviously were loathe to spend lives and taxes on imperialist adventures, their distaste for war obviously increased by Vietnam.

Statesmen from Truman to Carter had found it hard to raise the cost of defection to the Soviet Union in a sustained way, and the domestic fallout from Vietnam made that even harder. So after a while they tried lowering the Cold War cost to both sides with linkage, a policy of dealing across issues: one side gets its way on some issues, the other on other issues. That exposed U.S. weakness: Soviet dominion over much of the world was accepted and at best contained with cheap rewards and punishments. It also lowered the cost of DD to the Soviet Union when mutual cooperation in Asymmetric PD requires the opposite. The irony of linkage is that it raised the cost of cooperation by showing the Soviets that the U.S. would not invest much in defection. Never, for example, did the United States walk out of the SALT talks because of Soviet support for North Vietnam, Angola, Ethiopia, South Yemen, or Cuba. And President Carter's request that the U.S. Senate halt deliberations on SALT II after the Soviet invasion of Afghanistan was no

more than a recognition that, in the new international context, the Senate was in no mood to approve the treaty. In fact, soon after his request, he asked that the Senate ratify SALT II. The problem was that the United States wanted strategic arms control more than real containment. Your power to withhold something is no lever unless you are willing to withhold it. Or, as Schelling has observed, "a promise is costly when it succeeds and a threat is costly when it fails." (1960)

Besides using nonlevers, the U.S. centered superpower relations on the wrong issue. The arms race was a symptom. The disease was high stakes Asymmetric PD, curable only by fighting the geopolitical fight with maximum vigor. The Soviets recognized the containment-on-the-cheap game played by the U.S. and found the cost acceptable. As a result, the cost of defection rose for the U.S., and that raised the long-run cost of mutual cooperation, the U.S. goal. The Soviets expected no great U.S. response as they expanded their influence throughout the Third World. They were right. Between FY 1970 and FY 1976 the U.S. defense budget declined. Although this Vietnam trend was turned around after the Soviet build-up in Angola in 1975-76, regional competition continued to be a post-Vietnam taboo for the United States. By consistently not competing, the U.S. set itself up for a hard swing in the opposite direction in order to regain credibility and move toward its real goal of mutual cooperation.

Linkage reduced U.S. options to little but the rhetoric of linkage. This was painfully obvious when the Soviet Union invaded Afghanistan in December 1979. The few economic and political sanctions the United States invoked were no match for the imperial sugar plumb of the Persian Gulf. President Carter finally decided to abandon the decade-long strategy. The new Carter Doctrine was an attempt to increase the cost of the

geopolitical game in the Gulf and Southwest Asia, to move back toward a stronger version of containment.

As linkage gave way to renewed hostility, many began to argue that American strength had to be restored: after four decades of wanting mutual cooperation but reinforcing mutual defection by focusing on such sub game issues as arms control, the United States was prepared to abide by the dictates of high-states Asymmetric PD and pay the price. Ronald Reagan campaigned on this sentiment in 1976 and 1980. He was doubly lucky: not only was public sentiment moving in the direction of his long-standing beliefs about U.S.-Soviet relations, but by the early 1980s the Soviet Union had already grown weary of its predatory role. Brezhnev's Kremlin had begun reassessing Soviet penetration of the Middle East and Angola, and Gorbachev seriously questioned the value of a far-flung empire.

The full Reagan plan began with massive rearmament. Within two weeks of taking office, for example, President Reagan took Carter's $26.4 billion increase in defense spending and added another $32.6 billion. This policy was combined with the Four Part Agenda: (1) Strategic-arms reduction would be sought but not linked to other issues. (2) Soviet expansion would be fought on the ground, wherever it occurred. (3) Human rights would be encouraged but not linked, and it would be welcomed quietly. (4) The limited trade allowed by law would likewise be encouraged but not linked. The keystone of U.S-Soviet relations in 1980s, this plan has been virtually ignored by scholars. Reagan’s reputation as a hard-liner who did not understand the intricacies of arms control and napped at the helm made it hard for analysts at the time to believe that the four-part agenda represented a well-developed strategy. But it did. It rejected linkage

as the core of America's Soviet strategy, held firm to that position, and saw U.S.-Soviet competition as something that could be resolved by making the core military costs extremely high.

Although it was prepared to negotiate over arms control, the Reagan team believed that arms control should not be the bellwether of relations. The INF deployments in Western Europe in November and December 1983 made the Soviet SS-20 deployment in Eastern Europe an action with a high price tag. Unlike earlier arms control efforts, Reagan's would not deliver arms control on a platter to Moscow.

Some saw Part (2) as rhetoric more than action, but it revised the containment approach of the 1970s, which had made regional competition a post-Vietnam taboo. For instance, the Clark Amendment of 1976, which banned aid to pro-U.S. Angolan forces, was repealed in the spring of 1985.

For all his anti-Soviet rhetoric, Reagan decided that in most instances human rights and trade would be de-linked from the Cold War. In 1983, the first private breakthrough in U.S.-Soviet relations occurred, and it was on a human-rights issue. Reagan and Shultz quietly obtained the freedom of Soviet Pentecostals. In exchange, Reagan and Shultz assured the Soviets that they would not crow about the deal but instead would begin a private bilateral dialogue on a range of issues (Shultz 1993). Also in 1983, Reagan and Andropov opened up a private channel in which all aspects of the four-part agenda could be discussed at the highest level. Under the Reagan plan, grain sales and other aspects of trade that did not compromise America's national security would not be held hostage to specific acts of Soviet malfeasance as long as the United States was responding to that behavior within the same realm. For Reagan, economic

linkage represented American weakness. The limited amount of U.S.-Soviet trade should not be the method by which the United States responded to Soviet external or internal abuses. Trade and other policies were packaged, not "linked": they worked together but were not traded against each other.

The four-part strategy made it possible to take a strong stand on Soviet aggression but continue negotiations in other areas: confrontation and cooperation were possible at the same time. The four-part strategy began to regulate the potentially disruptive domestic responses to Soviet behavior.

Playing high-stakes Asymmetric PD can be tricky for the generous player. It is necessary to make the cost of defection high for the other side, but also to show that mutual cooperation is possible. The puzzle of why Reagan was being cooperative at the very moment that he was being confrontational is not really a puzzle if one understands that the game he was playing was Asymmetric PD, the game that the United States had been trying to play for quite some time.

In addition to regulating domestic responses, the four-part strategy also began to regulate Soviet responses. The four-part strategy coincided with the foreign policy reassessment of Soviet General Secretary Leonid Brezhnev, which seems to have mandated a Soviet pullback in some regions of the world, the opening of a private Reagan-Andropov channel in 1983, the beginning of Soviet recognition of over-extension in Afghanistan, and then fresh leadership in the Kremlin in 1985. But few Soviet specialists would argue that the dramatic conceptual changes that were taking place in the Soviet Union alone could have transformed U.S.-Soviet relations. The Reagan strategy was necessary.

A common explanation of Reagan's commitment to SDI and rejection of MAD is that he wanted to steal the thunder from the nuclear-freeze and peace movements. That seems to have happened after he announced SDI in March 1983, but Reagan had been developing his ideas about MAD and missile defense since the late 1960s. For him, SDI was not a domestic lever but a program that could protect the U.S. and raise the cost of military competition for the Soviet Union. Reagan firmly believed that the Soviet Union could not win a technology race and that such a race could push the Soviet Union toward the hard choice of cooperation. Gorbachev came to understand the seriousness of Reagan's message and challenge on SDI at the Geneva summit in November 1985 when the U.S. President would not back down.

Reagan raised the cost of Soviet defection in other areas as well. In accordance with the four-part strategy he began to meet the Soviets on the ground in Angola, Afghanistan, and other places. By supplying Soviet resisters with arms, Reagan frustrated Soviet aims in conflicts where its military expenditures were high. The four-part strategy also made room for cooperation in these conflicts. Once the Soviets began to taste the new cost of their defection, Reagan was standing at the door ready to cooperate. When the cost of the Soviet empire in Africa became an unnecessary burden (especially after the decline in world oil prices in 1986, which reduced Soviet hard currency earnings from oil- rich clients like Angola), the U.S. brokered the Angola-Namibia peace, which extricated the Soviet Union from that quagmire.

The four-part strategy demonstrated American commitment to mutual cooperation by tough U.S. defection and exceptional cooperation. That opened a path for a safe and irreversible Soviet retreat.

Beginning around 1986, Soviet General Secretary Mikhail Gorbachev tried to end the Asymmetric PD by initiating cooperation. At first he did no more than signal a willingness to cooperate and make moves in that direction, notably withdrawal from Afghanistan. As we have argued, that sort of thing is not enough against an opponent correctly playing resister. The Soviet Union had to tie its own hands, to surrender enough power that a reversal would be impossible.

The chief source of power was the Red Army of occupation in Eastern Europe, the power investment that had started the Cold War. A total withdrawal would be irreversible: the investment was a byproduct of German defeat through Western cooperation, irreplaceable once lost. Since the U.S. was resister, not predator—generous, not greedy—a replay of Peter's withdrawal would be enough to end any threat to Soviet security, any need for the two states to continue their extreme investments in power, and any obstacle to the ramified economic advantages of comity. Gorbachev made an irreversible move on the issue of Soviet imperialism in December 1988 when, in a speech at the United Nations, he declared that the Soviet Union would voluntarily remove 500,000 troops from Eastern Europe and essentially abandon the class struggle. It was around this time that British Prime Minister Margaret Thatcher declared that the Cold War was over.

Gorbachev did not stop there. In the years that followed, he gave up more of his country's empire, including the German plumb. Concerning Germany, he undertook the

greatest hand-tying measure of all: German was reunified as a democratic country and within the U.S.-dominated NATO. The Soviet Union withdrew.

Things did not work out for the Soviet Union as Gorbachev had wished—chiefly, we think, because his simultaneous reforms, political and economic, were ill-crated—it is clear that he acted as the greedy player should in an Asymmetric PD, or one whose defection cost is too great to be offset within any wider game. It is clear too that Reagan not only played Asymmetric PD as a generous player should but raised the stakes enough to end the game: reversing past policy, he scrapped the goal of low-cost two-way defection, cheap containment of Soviet power, and invested enough in defection to secure a surrender of power by the greedy player.

Asymmetry was essential. Had the PD been Symmetric, had the U.S. been another greedy predator, the Soviet incentive to shed power would have been less, despite the cost of defection. Conceivably U.S. productivity could have led to outright U.S. conquest of the Soviet empire. But that would have been too costly even for the U.S. A continued moderate-cost stalemate seems more likely.

4 Conclusions

How to explain cooperation and its evolution? The prominent explanations of cooperation are two: coercion by a central power, and the shadow of the future—the anticipation of future rewards by developing a reputation for always cooperating except in response to defectors. A third explanation is generosity, by one or both—but maybe

only one—of two sides. It does not rely on the indefinite repetition of low-stakes games—games whose payoffs, positive and negative, are small enough that one is willing to risk the occasional defection by others while trying to lure them into a long-term pattern of mutual cooperation.

It has become eminently fashionable, especially since Axelrod's brilliant book (1984), to use the shadow of the future to explain how cooperation might evolve, within either the human race or particular communities of humans and maybe other animals or the geopolitical "community" of sovereign states. The idea is that a strategy (of cooperating and defecting, contingent on the acts of one's fellow player) conduces to survival to the extent that it secures cooperation. Although we would insist that cooperation as such need have no survival value, let us take a world and a class of cases in which it does have survival value. There, if complex, hard-to-implement game strategies could evolve, consider how much easier it might be for simple preferences to evolve? The value of a generous preference is that it spawns cooperation with greedy as well as generous fellow actors.

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