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Bargaining unexplained

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Queen's Economics Department Working Paper No. 1208

Bargaining Unexplained

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Bargaining Unexplained

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Abstract

We know that people strike bargains and that civilized life could not proceed otherwise. We do not know how bargains are struck. We have no explanation of bargaining, comparable to the general equilibrium in the economy, accounting for essential features of bargaining as we know it with reference to universal self-interested behaviour subject only to economy-wide rules. This claim is supported here in a survey of the principal models of bargaining: as a reflection of a shared sense of fairness, as an imposed sequence of offers, as a source of transaction cost and as a species of conflict. Also discussed is the dual role of bargaining in politics as a necessary complement to voting and as an impediment to the exploitation of minority groups.

JEL Classification C7

Keywords: bargaining, compromise, fairness, self-interest, transaction cost, conflict

"...think of the formation of governments as involving bargaining in the sense typically understood by civilians, meaning private *negotiation* between key players as opposed to the sequential broadcasting of public offers. If we concede to orthodox bargaining models their own special use of the word "bargaining", we may usefully refer to *negotiation* over government formation as the unstructured interaction that takes place between principals in private. *Privacy* is of the essence, since what is made public following negotiations is what negotiators choose to make public, nothing more." Michael Laver (2008, page 17)

"...constitutional rules are themselves amenable to amendment, but only through a process of negotiation which ensures that there is an opportunity for the constitutionally defined rights of all the parties to be respected and reconciled", Supreme Court of Canada, *Reference re: Secession of Quebec*, (1998 at paragraph 76).

"..if we economists mind our own business, and do that business well, we can, I believe, contribute mightily to the economizing, that is to the full but thrifty utilization, of that scarce resource Love - which *we* know, just as well as anybody else, to be the most precious thing in the world." D. H. Robertson "What does the Economist Economize?"(1956, page 154).

Society runs on a mixture of self-interest and bargaining within the confines of generally-accepted rules. Economics is the study of self-interest as exemplified by the competitive economy where, contrary to what one might expect, an efficient outcome emerges when each person does what is best for himself alone without concern for the welfare of anybody else. Bargaining as compromise is fundamentally different. You want this, I want that, and we strike a deal where each gets a portion, but only a portion, of his demands.

This paper is a study of bargaining models with special reference to the economist's quest to explain as much a possible of the world as the outcome of purely self-interested behaviour. It is argued that the objective has, at best, been attained imperfectly. The theories to be discussed are insightful, but their assumptions are far from the circumstances of negotiation and the motivations of the negotiators. A bargaining equilibrium analogous to the equilibrium in perfect competition remains elusive.

As these words are being written, Sunnis and Shiites in Iraq are attempting to forge a viable government in which the interests of both are taken into account. We do not yet know

whether they will be able to do so. If the argument in this paper is correct, the outcome will depend on something more than a mechanical resolution of competing interests. Comparable, if less lethal, uncertainties arise every day when the Senate and the House of Representatives pass distinct versions of a bill and must resolve their differences if a final bill is to emerge, and when proportional representation requires political parties to form a majority coalition. Recall Duverger's "law" that first-past-the-post and proportional representation differ in the timing of the bargaining required, within political parties before the election in the one case and between political parties after the election in the other. Some time ago in Canada, two rival conservative parties, the Progressive Conservatives and the Alliance, merged into a single Conservative Party which is now the largest party in Parliament. The terms of that merger had to be confined within limits beyond which it was not in the interest of one or the other party to go. Within those limits, the organization of the new party had to be negotiated with nothing analogous to the general equilibrium of a competitive economy determining what the outcome of such negotiation must be. Bargaining is the antithesis of equilibrium. It is the last resort when countervailing self-interest proves inadequate.

This article begins with an exposition of the paradigmatic bargain where two people are jointly entitled to a pie if and only if they can agree about how large each person's slice is to be. The exposition includes a list of assumptions in the paradigmatic bargain and of aspects of actual bargaining that are postulated away. Then, the innards of bargaining are discussed with emphasis on the Nash bargaining solution based upon a common sense of fairness and on the Staahl-Rubinstein bargaining solution based upon an imposed or agreed-upon process. It is argued that both solutions are too far from bargaining as we know it justify the common presumption that deals will necessarily be struck. There follows a discussion of ways to allow for a cost of bargaining; bargaining may be seen as a component of transaction cost to be minimized in the choice of laws, or may be represented in a model of conflict based upon on an analogy between social and physical technology. There is, finally, a comparison of two very different pictures of bargaining in politics, one showing bargains among legislators and the executive as the determinate outcome of a postulated bargaining procedure, and the other showing how the indeterminacy of bargaining protects democracy by blocking the exploitation of minorities by majorities. There are two appendices. The first is a simple proof of the Staahl-Rubinstein bargaining solution, including a discussion of the implications of variations in the assumptions. The second presents examples of bargaining assumptions in business, law, politics and war. .

The words in the title of this paper are used somewhat idiosyncratically. "Bargain" can be a verb or a noun. It may refer to the seeking of an agreement or to the terms of the agreement

itself. The emphasis here is upon the latter, upon bargaining as compromise or voluntary accommodation of partly-conflicting interests. "Explain" is confined to the economist's usage of the word in which a social outcome is explained by showing how that outcome arises when everybody acts in his own material interest, confined only by market-wide prices or by society-wide rules. To say, for example, that people vote from a sense of duty is not an explanation in this narrow sense of the term, despite the fact that the statement may well be true. To say that bargaining is unexplained is not to deny that bargains are struck or that bargaining is determinate within the assumptions of the principal bargaining models. Rather it is to say that the assumptions required to establish the exact connection between interests and outcomes, and when bargaining succeeds, are altogether too far from the circumstances of bargaining as we know it. To label a process as bargaining is not to make it so.

The Paradigmatic Bargain

A bargain is a division of the spoils. Two or more people are entitled to something collectively, but they cannot appropriate or make use of it until they agree about how it is to be shared. Bargaining may be over the allocation of things or of money. A bargain must make all participants better off than if no bargain were struck, but a conflict of interest remains, for a particular allocation must be chosen from the set of all possible allocations, some relatively advantageous to one party, some relatively advantageous to others.

The paradigmatic bargain is illustrated in Figure 1. Two people, E and O, bargain over the sharing of a sum of money, P (mnemonic for pie). The money is disbursed to the bargainers if and when they come to an agreement about how much of the money each is to receive. Without such an agreement, the money is not disbursed at all. The bargain itself is a mutually agreed-upon assignment of shares. The income, Y_E, of person E is shown on the vertical axis, and the income, Y_O, of person O is shown on the horizontal axis. Prior to the bargain or if the bargainers fail to reach an agreement, the incomes of the bargainers are $\underline{Y}_E$ and $\underline{Y}_O$, represented by the point α, called the no-agreement point.

A bargain is an agreed-upon assignment of a share s of the pie to person E and a share (1-s) to person O, raising person E's income from $\underline{Y}_E$ to $\underline{Y}_E + sP$ raising person O's income from $\underline{Y}_O$ to $\underline{Y}_O + (1-s)P$. All feasible pairs of post-bargaining incomes are represented by points on the downward-sloping line cutting both axes at a distance $\underline{Y}_E + \underline{Y}_O + P$ from the origin of the figure. Points at which both bargainers are better off are contained in the segment of that line

between β and δ. The chosen bargain is represented by the point γ. An increase in s moves γ toward β, and a decrease in s moves γ toward δ.

Figure 1: The Paradigmatic Bargain

The paradigmatic bargain in Figure 1 captures central features in all bargaining. Some implicit assumptions and possible extension will prove important.

i) Surrounding Property Rights: In principle, the entire national income might be allocated among people in one vast bargain, but actual bargaining is almost always circumscribed by property rights that all bargainers are presumed to respect. Bargains bridge the gaps in property rights, converting joint ownership of the pie over which people bargain into single ownership by each person of his agreed-upon slice. Bargaining requires a prior agreement about who is (and who is not) entitled to a share of the pie, a recognition of the bargainers' untouchable property rights apart from the object of the bargain, and an understanding that the deal is final, so that no bargainer can return to the table demanding a portion of another's agreed-upon share. Otherwise, a person could appropriate another's property bit by bit, demanding something and acquiring a portion of what he demands, over and over again. Specification of property rights is the business of law and civil rights. One can imaging a specification so complete that there is

nothing left to bargain about. That is more than can be expected in this imperfect world. What can be hoped for is that peoples' rights are well enough defined that bargains are narrowly framed, with little or no dispute as to who is entitled to bargain and what the bargain is about.

ii) Utility vs. Money: The bargain in Figure 1 is about the allocation of a sum of money. Actual bargains may be about the allocation of things - such as territory in international disputes or parental rights after divorce - that are not tradable at market prices, or about the choice among alternative rules - such as whether or not one may sleep on park benches - with different impacts on the different sub-groups of the population. The outcome of bargaining and the specification of the no-agreement point may only be representable in utils rather than in money. Despite the ordinality and interpersonal incomparability of utility, models of bargaining have been designed to yield solutions when tradeoffs between people's utilities must be taken into account.

iii) Bargaining Cost: The paradigmatic bargain recognizes no cost of bargaining or resource-using mechanism by which bargains are struck. Actual bargaining may be different. At a minimum, bargaining takes time that could otherwise be devoted to the production of things rather than of deals. There may be a loss of potential profit until a deal is struck. Bargaining may break down altogether, destroying the pie over which bargaining takes place. It is not clear where to draw the line between the cost of bargaining and the cost of not bargaining as reflected in the no-agreement point. Nor is it always evident whether bargaining will be quick and easy, or long, bitter and expensive. It might be supposed that the cost of bargaining rises with the amount at stake, but that is not always so. People sometimes strike large bargains inexpensively, while long-standing and mutually-advantageous associations may be dissolved over trifles.

iv) Bargains about Actions as well as Sharing: A bargain may be about what each participant must do as well as about the division of the spoils, but only the latter is emphasized in the paradigmatic bargain in figure 1. For example, an agreement between firms to engage in a joint venture might specify each firm's investment of time and money in the project. Recognition of efforts as well as rewards makes little difference to the bargain as long as promises are sure to be kept. Problems arise when neither firm can observe the other's investment or when such observations are unverifiable in court. Bargains that are mutually advantageous when there is full observability and verifiability of each party's actions might cease to be mutually advantageous otherwise. Forms of industrial organization may vary accordingly.

v) Interpretation of the No-agreement Point: The no-agreement point can be looked upon as representing the incomes (or expected incomes) of the bargainers as they would be a) if the pie

over which they bargain did not exist or b) if a dispute that must be resolved one way or another is in fact resolved by some costly alternative to bargaining. The first possibility is exemplified by bargaining over the sharing of the profit from a new venture by two parties whose cooperation is required for the venture to be successful. The second possibility is exemplified by disputes between neighbours that would have to be resolved by costly litigation if no bargain is struck and by disputes among nations, with war as the alternative to peaceful negotiation.

vi) A Multiplicity of No-agreement Points: Implicit in the description of the paradigmatic bargain in Figure 1 is the assumption that everybody's perception of the no-agreement point is the same. In practice, that need not be so. Bargainers may disagree about the location of the no-agreement point and about the size of the pie. They may have private information that they cannot or are unwilling to share. For example, private settlement may be less costly than resort to the courts for the resolution of disputes, but "bargaining in the shadow of the law" may be thwarted if plaintiff and defendant are both relatively optimistic about their prospects in the event of a trial. Starting from either party's perceived no-agreement point, there may be a range of mutually-advantageous bargains, but there need be no commonly-recognized range when perceptions differ significantly. There may also be an advantage to whichever party gives up on bargaining first. In conflicts between nations, a first strike advantage may block the way to peace, even when nations would be better off in expectation if a promise not to strike first were binding.

vii) The Number of Bargainers: Bargaining need not be restricted to two participants. A group of n people may have the collective right to a pie that cannot be touched until an agreement is reached assigning each person's share. With three bargainers - A, B and C - a pie must be divided by agreement into three shares, s_A , s_B and s_C, where

$$s_A + s_B + s_C = 1 \qquad (1)$$

With n bargainers, agreement must be about a set of shares $\{s_1 , s_2 , s_3 , ...s_n\}$ where s_i is the share of person i.

As long as agreement requires unanimity, the representation of a three-person bargain becomes a straightforward three-dimensional extension of Figure 1. The no-agreement point is lodged in a three-dimensional space, the set of all mutually-advantageous bargains is expanded from a segment on a line to a triangle on a plane, and the bargaining problem is to agree upon some point within the triangle. With more than three bargainers, the representation of the bargaining problem becomes an n-dimensional extension of Figure 1.

viii) Coalitions: With more than two bargainers, consent of a majority of bargainers may be sufficient to cement a deal. With n bargainers, agreement among any m of them may be sufficient as long as m is at least half the number of bargainers, to avoid situations where two coalitions are both entitled to impose shares. The constraint is that $n > m > (n+1)/2$. There now emerge two distinct bargaining problems: who forms a coalition with whom, and how the pie is divided among the members of the coalition. The latter problem is a straightforward extension of the paradigmatic bargaining problem in figure 1. The former is endemic in majority rule voting.

If the pie consists of the entire national income and if only a minimal coalition is required to determine an allocation of the pie, then the bargaining problem is automatically transformed into the exploitation problem in majority rule voting where a bare majority of the population may grab the lion's share of the national income for itself. Members of the majority coalition may be bound together by some identifiable characteristic - such as race, ethnicity, geography, religion or income - or perhaps by nothing more than the prospect of gain from inclusion in a majority coalition. Such bargaining may also give rise to the classic paradox of voting where every possible allocation of the pie can be defeated in a pair-wise vote by some other allocation.

ix) A Sequence of Bargains: Bargaining today may be influenced by bargains struck yesterday or by the prospect of new bargains tomorrow. A bargain today may set a precedent or may influence the location of the no-agreement point in a bargain to come. Precedent is exemplified by on-going dealings between firms where shares of profit once agreed upon may persist for a long time. Influence upon the location of no-agreement points in future bargains can be important in disputes between countries over territory. The more territory a country acquires today, the stronger it may become tomorrow, and the more it may claim in the next round of negotiation.

x) Extrnalities: As described in figure 1, the paradigmatic bargain is beneficial to the bargainers themselves, but, since nothing is said about the matter, it is implicitly assumed to be of no consequence one way or another to anybody else. Not all bargains are like that. Bargains may convey externalities to non-participants. Bargains may therefore be classified as *benign*, *predatory* or *neutral* according to whether non-participants are helped, harmed or unaffected. Benign bargains are exemplified by arrangements among scientists with different skills to invent a new product. Predatory bargains are exemplified by the establishment of cartels designed to raise the cost of the cartel's products to the rest of the community. Neutral bargains are exemplified by wage-setting between workers and employers when outsiders' incomes are the same regardless of whether wages are high or low.

The Bargaining Presumption

In studies of relations among firms, between employers and employees, among legislators, between legislature and executive, between disputants deciding whether to go to court and between countries on the brink of war, it is often supposed that, one way or another, a bargain will be struck, that some point on the bargaining line of Figure 1 will be agreed upon. This "bargaining presumption" is typically invoked in at least two distinct contexts: as working assumptions in models focusing upon something else, and as a background premise in explanations of why bargaining fails when actual bargaining differs significantly from the paradigmatic bargain. The first usage is exemplified by Hart's (1995) assumption that firms split a verifiable surplus equally as part of an explanation of whether firms doing business with one another remain entirely separate, establish close working relations or amalgamate into one large company. It is also exemplified Alesina and Rosenthal's (1995) postulate that legislators, some on the left and others on the right, choose policies in between, splitting of the difference between left and right policy in proportion to the number of legislators on each side. Their postulate is introduced not for its own sake, but as part of a model explaining, among other things, how voting for legislators depends on whether or not an election for President is held in the same year. The other usage is exemplified by Priest and Klein's (1984) explanation of why a rational plaintiff and a rational defendant might fail to avoid the cost of trial by settling their differences privately. Defendant and plaintiff may differ so much in their assessments of the location of the no-agreement point that there remains no common ground on the bargaining line of figure 1. Fearon (1995) has a similar explanation of the descent into war, but differences in the perceived location of the no-agreement point may be compounded by a first-strike advantage not accounted for in the simple paradigmatic bargain.[1]

These articles reflect the common presumption, as expressed in the quote from the Canadian Supreme Court at the beginning of this paper, that people "sitting around a table" can resolve their differences. This may well be true much of the time. The question to which we now turn is whether this presumed empirical reality can be explained by bargaining theories analogous to the model of price-taking in a competitive economy. Would some point on the bargaining line of Figure 1 be selected in the unmodified circumstances of the paradigmatic bargain? Can we predict which point that would be? Do our formal models of bargaining supply independent grounds for confidence that bargains will, in fact, be struck?

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[1]These models are described in some detail in Appendix B.

Bargaining Models

Implicitly or explicitly, confidence in the determinacy of bargaining may be bolstered by the existence of equilibrium in explicit models of bargaining. Three such models will be examined briefly in turn, models based upon a common sense of fairness, a sequence of concessions and a prescribed bargaining procedure.[2] For each, it will be argued that the model, though interesting and instructive, does not in the end supply the confidence we seek.

A) A Shared Sense of What is Fair.

Begin with the working assumption (to be examined presently) that, for the simple paradigmatic bargain over the apportionment of a fixed sum of money between two people, a "fair" bargain is a fifty-fifty split. Even so, the notion of fairness would be vague and perhaps of little use unless it could be extended in some natural way from bargaining over dollars to bargaining over the apportionment of things - like family heirlooms or authority over children in the event of divorce - for which there are no well-specified market prices. Sometimes people's gains from a bargain can only be represented as utilities. Utility supplants money as the object of bargaining when a sense of fairness leads bargainers to take account of disparities in their incomes.

The difficulty in bargaining about utilities is that utility is ordinal, defined up to a linear transformation, and not comparable from one person to the next. For bargaining over a sum of money, P, it is commonly supposed that a fair bargain is a fifty-fifty split, with $\Delta Y_E = \Delta Y_O$ where $\Delta Y_E = sP$ and $\Delta Y_O = (1-s)P$ so that person E's share, s, of the pie is exactly one half. Similarly, in bargaining is over the assignment of utilities, we would like to equate Δu^E and Δu^O where Δu^E is the impact of the bargain on the utility, $u^E(Y_E)$, of person E and Δu^O is the impact of the bargain on the utility, $u^O(Y_O)$, of person O. We would like to define a fair division of the pie as one for which $\Delta u^E = \Delta u^O$

where $$\Delta u^E = [u^E(\underline{Y}_E + sP) - u^E(\underline{Y}_E)] \quad (4)$$

$$\Delta u^O = [u^O(\underline{Y}_O + (1 - s)P) - u^O(\underline{Y}_O)] \quad (5)$$

[2]For an excellent survey of contemporary bargaining theory, see Muthoo, (1999), and for useful collection of earlier literature, see Young (1975). See also Harsanyi (1956)

and where $\underline{Y}_E$ and $\underline{Y}_E$ are incomes of persons E and O as they were prior to the bargain. That is not feasible because utilities are incommensurate. The resulting value of s would be affected by a linear transformation of either utility function.

There is a way around this difficulty, leading to a rule called the Nash bargaining solution (Nash, 1950). Whenever ΔY_E is equal to ΔY_O, the product $\Delta Y_E \, \Delta Y_O$ is automatically maximized subject to the constraint that $\Delta Y_E + \Delta Y_O = P$, and the product s(1 - s) is maximized as well. This property of fair allocation can be extended from income to utility even though the simple equality of shares cannot. The Nash bargaining solution is to choose s to maximize the product

$$\Delta u^E \, \Delta u^O = [u^E(\underline{Y}_E + s\,P) - u^E(\underline{Y}_E)]\,[u^O(\underline{Y}_O + (1 - s)P) - u^O(\underline{Y}_O)] \qquad (6)$$

yielding a value of s that is independent of a linear transformation of either utility function and that equals ½ - a 50-50 split of the pie - whenever both utilities are linear functions of income.

The Nash bargaining solution is a theorem derived, like all theorems, from a set of axioms. In high school geometry, axioms were presented as "self-evident truths". In the social sciences, we have no such luxury. Our axioms must be substantive, and theorems can be no stronger than the axioms from which they are derived. Among Nash's axioms is this: "If S is symmetric and u_1 and u_2 display this then c(S) must lie on the line $u_1 = u_2$." (axiom # 8) where S is the set of all possible outcomes and c(S) is the set of all possible fair outcomes. All by itself, Nash's axiom #8 mandates a fifty-fifty split of the pie in the simple paradigmatic bargain or whenever utility is proportional to income. Nash's program is to extend the notion of fair allocation from money to utils, but not to justify the fair allocation itself. Bargainers who for one reason or another refuse to accept a fifty-fifty split as a fair allocation of the pie - bargainers who do not conform to axiom #8 - would have no difficulty in refusing to accept the shares assigned in the Nash bargaining solution.

The Nash bargaining solution is redistributive - assigning the larger slice to the person with the smaller income - if bargainers' utility of income functions are the same and if the common utility of income function is concave, but the Nash bargaining solution is not always redistributive. [3] Also, to agree on an allocation of the pie in accordance with the Nash bargaining

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[3]Suppose i) that persons E and O are bargaining over the allocation of \$P, ii) that their utility functions are $U_E = (Y_E)^{½}$ and $U_O = (Y_O)$ where Y_E and Y_O are their incomes, and iii) that, to

solution, bargainers would need to know one another's utility of income functions. Without such knowledge, a resort to a fifty-fifty split might be the only feasible procedure.

For bargains over the allocation of money, a fifty-fifty split might be acceptable not just because it is fair, but because it is a focal point, the only readily-recognizable rule. If a fifty-fifty split were customary, then all bargainers would know exactly what to do. A general convention that people in a dispute ought to split the difference evenly would be relatively easy for everybody to follow. Other conventions would be difficult to maintain. For instance, a convention supplying two-thirds of the pie to person E and the remaining third to person O is meaningless without a prior understanding about who is to play the role of person E and who is to play the role of person O. Perhaps such a convention might be founded on class structure, but that would require a substantial modification of the assumptions about the paradigmatic bargain in Figure 1.

A convention to divide the pie equally might be enforced by an understanding that anybody who deviates from the convention will be punished not by the state as one would be punished for robbery, but by his fellow citizens who would refuse to deal with him again.[4] On the other hand, a convention enforced by sanction is the antithesis of what most people would think of as a bargain. There is a sense in which a law punishing people for robbery can be seen as a nation-wide convention not to steal, but such a convention is not a bargain in the sense described in Figure 1. Nor is a convention punishing people by ostracism for refusing to accept an equal division of the pie. Bargaining only takes place in the absence of coercion.

There are two incentive problems. The first has to do with the creation of disputes. If disputes are to be resolved by a fifty-fifty split of the pie, it becomes in everybody's interest to create disputes at other people's expense. I assert that a third of what you claim to be your land is really mine, and we agree that I get one sixth. A state of affairs where what anybody chooses to call a dispute is resolved by a fifty-fifty split is untenable in the long run. The moral of the story, as already mentioned in the discussion of the paradigmatic bargain, is that the notion of a fair

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keep the arithmetic simple, the initial income of person E is 0. On these assumptions, the value of $\Delta u^E \Delta u^O$ in equation (13) reduces to $[(s P)^{½}][(1 - s)P]$ which is maximized when s = 1/3. The fair share of person E is either ½ or 1/3 depending on whether fairness is defined with reference to dollars or to utils. This is true despite the fact that person E could well be very much less well off than person O.

[4]Such a mechanism is analyzed by Axelrod (1984).

bargain is meaningless except in a context of well-established property rights. A bargain to split what is initially jointly-owned or collective property may be fair. A bargain to split what is initially your exclusive property is automatically unfair. Unfortunately, the line between individually-owned and collectively-owned property is not always as sharp as we would like. Disputes over the redistribution of income can be framed as being between people who see the present distribution of property as inviolate and people who see the present distribution of property as the residue of ancient theft or who look upon the entire national income as collective property to be allocated in the service of the common good.

The other problem has to do with bargainers' motivation. When we speak of "explaining" bargains, what we really have in mind is a bargaining outcome comparable to the outcome in general equilibrium in competitive markets where people act in their own interest exclusively, responding to market-determined prices but not to one another. Nobody in perfect competition is "fair". Everybody is unremittingly greedy, cooperating with others if and only if it is personally advantageous to do so. To accept a fair bargain because it is fair is a different order of behaviour altogether. It is the incorporation of uncoerced good-will into the core of the market. It is an admission of failure in the great project of explaining outcomes in the economy by self-interest alone. Indeed, if people could be relied upon to be "fair" voluntarily, the market itself might prove unnecessary except perhaps to identify each person's appropriate behaviour in any given situation.

Genuine bargaining is, almost by definition, indeterminate. A bargain is the resolution of a dispute. If bargainers can be relied upon to respect a notion of fairness, to agree on a fifty-fifty split of the pie, or to accept shares mandated by the Nash bargaining solution, then bargaining is just playacting, for there is no real dispute and nothing left to bargain about.

B) A Sequence of Concessions

In the early nineteen-thirties, Hicks (1932) and Zeuthen (1930) developed models of bargaining between companies and unions when both have a degree of monopoly power. Bargaining in these models consisted of a series of concessions dependent on the harm to each party from a failure to agree and upon each party's judgment of the likelihood that the other would concede instead. Hicks draws what he calls an "employer's concession curve" and a "union's resistance curve". The crossing of these curves identifies the agreed-upon wage. In the Zeuthen model, the failure of employees and owners to agree leads to "conflict", the exact meaning of which is not spelled out in detail. Zeuthen's principal assumption is that each

bargainer's concession to the other is proportional to his expected harm from conflict as it would be if antagonism between the bargainers rises to the point where the entire pie is wasted through a failure to agree.

Both models allocate the surplus in proportion to harms that do not actually occur because they are averted by timely concessions. Strikes in Hick's model are imagined strikes. Conflict in Zeuthen's model is imagined conflict. Neither model contains an explanation of when, if at all, bargaining breaks down and the unfortunate alternative to agreement is realized. Nor is it explained how bargaining in the midst of a strike or bargaining in the midst of conflict differs from bargaining in anticipation of these events. Neither party is bloody-minded, insisting on favourable terms come hell or high water. This consideration is especially problematic because, if one bargainer is really and truly adamant, it is usually in the interest of the other party to back down. More will be said about this presently. Bargaining is made determinate within these models, but only by ignoring essential features of the world where bargains are struck. There is no satisfactory explanation of the timing and the magnitude of concessions, and no allowance for the possibility that the final agreement is conditioned by the history of bidding as well as by the initial values of the bargainers' harms from conflict.

Genuine concessions are modeled by Cross (1965). Both parties' concessions are rendered determinate by the principle that delay is costly so that, if you do not concede quickly, then I must. At least three kinds of harm might be identified. a) loss by both parties of what would otherwise be their shares of the pie, b) delay which may be more costly for one party than for another depending on their rates of discount, and c) actual harm inflicted as when a labour union goes on strike or when the firm locks out its employees. Cross attempts to derive the sequence of concessions as the outcome of rational, self-interested behaviour, transporting this aspect of bargaining from the domain of psychology - where people may act stubbornly, vindictively or irrationally - into the domain of economics - where each person does what is best for himself in the light of his best guess of what others will do. Yet the model contains no persuasive explanation of why bargainers do not proceed to the ultimate deal all at once if the ultimate deal is predictable from the initial conditions, as Cross assumes it to be.

In the light of subsequent literature, these models would seem to be open to the objection that the bargainers are neither entirely fair-minded, as in the Nash bargaining solution, nor entirely self-interested in any rational and calculating way. Bargainers are seen as making concessions, but their concessions do not arise naturally from the maximization of an objective function in response to given constraints. It is difficult to decide how much weight to attach to

this objection. Want of strict rationality may account for the eclipse of these models in economic literature, but, in their defense, it may be argued that bargaining is not really as rational a process as more recent models would suggest.

C) Mutually-agreed upon Procedures

A bargaining solution may arise not just from a common sense of fairness or as the outcome of a sequence of concessions, but as the outcome of a prescribed sequence of alternating offers by one party to be accepted or rejected by the other.

Begin with the simplest possible case. Persons E and O are bargaining over the allocation of a pie that emerges just for an instant and disappears if it is not shared at once. The pie appears for just long enough for one person say, "I offer you such-and-such a share and I will take the rest.", and for the other person to reply either "yes" or "no". No other speech is admitted. Suppose, no matter why, it is person O who is entitled to make the offer. If the person E's response is "yes", the pie is shared accordingly. If person E's response is "no", the pie vanishes and nobody gets anything.

It is obvious what happens. As long as both parties are super-rational, person O offers person E a penny, keeping all the rest of the pie for himself. Recognizing that a penny is better than nothing, person E accepts the offer, and the pie is allocated accordingly. If the original pie was $100, person E ends up with one penny and person O ends up with $99.99. In effect, the person entitled to make the take-it-or-leave-it offer gets to keep the entire pie.

If that seems a bit harsh, and much too far from anything we would ordinarily call bargaining, we can even out the allocation by allowing the pie to disappear over two time periods rather than just one. Suppose that i) the pie appears at sunrise of day 1 and disappears in two stages, half at sunset on day 1 and the other half at sunset on day 2, ii) offers to share of the pie (or what remains of it when the offer is made) are at noon each day, by person O on day 1 and, if person O's offer is rejected, by person E on day 2, iii) every offer is an assignment of shares, iv) the recipient of an offer is made must accept or reject it immediately, v) nothing else may be said by either person and vi) (an assumption soon to be relaxed) there is no discounting of future income.

Again it is obvious what must happen. At noon on day 1, person O offers person E *half* the pie, and person E accepts. Why? If person E rejected person O's offer on day 1, the most

person E could expect would be half the original pie because nothing more would be left on day 2 when it is person E's turn to make an offer. Except for the switch in roles and the size of the pie, both parties find themselves in the same situation at noon on day 2 as in the one period take-it-or-leave-it bargain, and they act accordingly. Since person E can assure himself half of the pie (less a penny) by waiting until his turn to make an offer comes round, he would never accept less than half of the pie in any offer from person O on day 1, and person O has no incentive to offer more.

There is, of course, nothing inevitable about the equal sharing of the pie or about the restriction of bargaining to two periods. The pie may disappear over any number of days, and the disappearances each day need not be the same. Suppose the pie diminishes over four days: 1/10 at sunset on day 1, 2/10 at sunset on day 2, 3/10 at sunset on day 3 and the remaining 4/10 at sunset on day 4. If so, then at noon on day 1, person O offers 3/5 of the pie [2/10 plus 4/10] to person E, leaving the remaining 2/5 of the pie [1/10 plus 3/10] for himself, and person E accepts. Person O would accept nothing less. Person E need offer nothing more. The logic of this allocations is backward induction.

Begin by supposing that no deal has been struck by noon on day 4, the last day when any of the pie remains. Since the day 4 is an even day, it is person E's turn to make an offer. As in the one period case, person E offers just a penny to person O, keeping the remainder - which is only 4/10 of the original pie - for himself. Now step backward from the day 4 to day 3 when 7/10 of the pie remains and when person O is entitled to make the offer. Person O cannot expect person E to accept anything less than 4/10 of the pie, for that is what person E could acquire by waiting for his turn to make an offer, but person O need not offer more. Person O offers 4/10 of the pie to person E, keeping the remaining 3/10 of the pie for himself. Step backward one more day to day 2 when 9/10 of the pie remains and person E is entitled to make the offer. Person E cannot expect person O to accept anything less than 3/10 of the pie, for that is what person O could acquire by waiting, but person E need not offer more. Person E offers 3/10 of the pie to person O, and keeps the remaining 6/10 of the pie for himself. Finally, person O is entitled to make the offer in day 1 before any of the pie has vanished. Person O cannot expect person E to accept anything less than 6/10 of the pie which is what person E could acquire by waiting, but person O need not offer more. Person O offers 6/10 of the pie to person E, keeping the remaining 4/10 of the pie for himself.

When the pie diminishes over a number of days, each bargainer captures the sum of the diminutions of the pie on the evenings of all the days when he is entitled to make the offer. Person E obtains a slice equal to the sum of the diminutions in all even-numbered days, and

person O obtains a slice equal to the sum of the diminutions on all odd-numbered days.

Generalizing slightly, when time is graduated in years rather than days, when a pie of size P diminishes spontaneously over the course of n years, when person E is entitled to make an offer in all even years and when person O is entitled to make an offer in all odd years, then an acceptable offer would be made in the very first year of bargaining with a slice P_E to person E and a slice P_O to person O where

$$P_E = \sum_{t \text{ even}} p_t \quad \text{and} \quad P_O = \sum_{t \text{ odd}} p_t \quad \text{and} \quad P_E + P_O = P \tag{7}$$

where p_t is the size of the slice of the pie that disappears on the tth year and where P_E and P_O must sum to P. This is an equilibrium bargain because it is in the interest for each person to accept a share of the pie equal to the sum of the disappearances on all of the times when he would be entitled to make the take-it-or-leave-it offer. None of the pie is lost in the process of bargaining because the bargain is struck in the of the first year before any of the pie has disappeared.

An interesting extension of this model replaces disappearance by discounting. Suppose that i) the pie over which people bargain lasts undiminished forever, or would do so unless a bargain is struck, but ii) the bargainers value present income over future income, each in accordance with his own rate of discount, and iii) each bargainer is entitled to make offers in alternative years. It can be shown that, once again, a bargain is struck as soon as bargaining begins, but that now the equilibrium shares of the pie are inversely proportional to the bargainers' discount rates. Specifically, person E's share becomes

$$s = r_O / (r_E + r_O) \tag{8a}$$

and person O's share must be

$$(1 - s) = r_E / (r_E + r_O) \tag{8b}$$

where r_E and r_O are the discount rates of persons E and O. If my discount rate is high, my share of the pie is correspondingly low. To have a high discount rate is analogous to sacrificing a large share of the pie if one refuses the other bargainer's offer, so that one's equilibrium share of the

pie is correspondingly reduced. Equation (8) is called the Staahl-Rubinstein bargaining theorem.[5] A simple, and hopefully intuitive, proof of the theorem is presented as an appendix.

To induce a deal as soon as bargaining begins, the present value of the pie must be made to shrink when the deal is delayed. Two equally effective processes have been discussed: physical contraction over time, and reduction in present value due to discounting. The processes are analytically similar, but the latter has the distinct advantage that it is based upon the characteristics of bargainers (their rates of discount) rather than upon the imposed conditions in which bargaining takes place. Rates of discount are attached to people. Physical shrinkage of the pie is not.

The explanation based upon bargainers' discount rates has serious problems of its own. As shown in the apppendix, equation (8) is strictly valid as a bargaining equilibrium if and only if the bargainers are immortal and the pie lasts forever in the event that no bargain is struck. The Staahl-Rubinstein bargaining solution requires that bargainers E and O must be prepared to carry on making offer and counter-offer in the year 3009 if no agreement had been reached before that date. Without that assumption, equation (8) is just an approximation, though it becomes more and more accurate the longer the time before the pie finally disintegrates.

Nothing so extreme is required for the explanation based on physical diminution of the pie. Bargaining opportunities arise from time to time, and then disappear. In business and politics, it is rare for today's opportunities to remain available in five years time, and it is not unreasonable to suppose that physical shrinkage of the pie might have more impact on the outcome of bargains than bargainers' rates of discount.

The combined effect of shrinkage of the pie and discounting by bargainers is easy enough to compute. Consider a "bargaining" regime with alternating offers beginning in the year 0 and continuing up to the year T , where, for convenience, T is assumed to be even. If no deal has been struck by the year T, there is an arbitrarily-imposed apportionment in that year with a share S to person E and a share (1 - S) to person O . It is shown in the appendix that a bargain is struck immediately in the very first year of bargaining, with a share s(0) to person E, where (to a first approximation and abstracting from a small first-mover advantage)

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[5]The earliest bargaining solution of this type was proposed by Ingolf Staahl (1972). A more tractable form of the model was proposed by Ariel Rubinstein (1982). For a short and simple demonstration of the Staahl-Rubinstein bargaining model, see Sutton (1986). For a thorough treatment of the subject, see Osborne and Rubinstein, (1990).

$$s(0) = (1 - z)[r_O /(r_E + r_O)] + zS \qquad (9)$$

and where

$$z = [\{1/(1 + r_E)\}\{1/(1 + r_O\}]^{(T - 1)/2} \qquad (10)$$

It follows immediately from equation (9) that person E's share varies steadily from S when T = 0 to $r_O /\{r_E + r_O\}$, which is the Staahl-Rubinstein bargaining solution, when T approaches infinity. Person E's share is a weighted average of what it would be if bargainers did not discount future income and what it would be with discounting in circumstances where the pie lasts undiminished forever unless a deal is struck.

Suppose, for example, that the pie is divided equally (S = ½) in the eighth year unless a deal is struck beforehand (i.e. T = 8), that person E's discount rate is 9% (r_E =.09) and that person O's discount rate is 1% (r_O = .01). If so, the pie is allocated by common consent in the year 0, with a share of 38.6% to person E and the remaining 41.4% to person O. In the year 0, person E would offer person O a share of 41.4% and person E would accept. By contrast, if the pie would remain undiminished forever, person E's share would be only 10% in accordance with the pure Staahl- Rubinstein bargaining solution in equation (8) or in equation (9) as T approaches infinity. Person E's share of 38.6% in this deal is much closer to the 50% he would obtain if the bargainers did not discount future income than the 10% he would obtain if bargainers discounted future income but the pie lasted forever. One example proves nothing, but it does highlight the significance of the assumption in the Staahl -Rubinstein model that the pie remains undiminished, and ready to be allocated, forever unless some bargain is struck.

An equilibrium bargain can be computed for any arbitrarily-assigned pattern of disappearance of the pie or apportionment of the pie between bargainers at an assigned time some years ahead. What cannot be altered if there is to be an equilibrium at all is the imposed sequence of offers to be accepted or rejected by the other party. Nothing works unless bargainers respect the required sequence of speech. The procedure itself may be agreed-upon by bargainers or externally-imposed. If the procedure originates from a prior agreement between the bargainers, and in so far as its outcome may be predicted from the characteristics of the bargainers and of the procedure itself, then the outcome of bargaining is foretold in the chosen procedure, and there is really nothing to bargain about. What we are calling bargaining would, once again, be play-acting, with no real give and take between bargainers, and there would be is some question about whether what is being called bargaining theory is really about bargaining at all. Nor would the procedure correspond to what we normally think of as a bargain if the procedure were externally imposed, for, once again, the outcome of bargaining would be pre-determined before the

bargainers ever meet.

D) Conversations and Threats

Whatever else it may be, bargaining is a conversation. Bargainers talk to one another, make offers, tell stories about why their offers ought to be accepted, appeal to one another's sense of fairness, reject offers, and so on. The model of bargaining as fair division ignores this aspect of bargaining altogether, for outcomes emerge directly from the initial conditions with no room for speech at all. The Staahl-Rubinstein solution acquires a certain plausibility from its resemblance to conversation, but the conversation is artificial in two respects: It is artificial because, as discussed above, the equilibrium deal is struck before any actual conversation takes place. It is also artificial because bargainers are severely restricted in what they can say and when they can say it. Speech is limited to three, and only three, utterances:"I offer ...", "Yes" and "No", with a switch in the bargainers' roles at each stage of the conversation, until a deal is struck. There is a prescribed spacing between utterances and a prescribed order of speech, neither of which are to be found in actual conversation or negotiation between firms, between employer and employees or between the buyer and seller of a house.

Actual bargaining is far less orderly and coherent than the model would suggest. There is no fixed order of speech. People interrupt one another. People try to persuade one another of their good faith and of their unwillingness to accept one penny less than some offered amount. *Ex post*, negotiation may have been a sequence of offers, first by one person, then by the other. *Ex ante*, there is no prescribed order of speech, no restriction on the content of speech and, most importantly, no prescribed time between utterances. And it is the *ex ante* sequence, or absence of sequence, that matters in actual bargaining. Nobody enforces the prescribed sequence of offers or the rule of silence in the intervals between one offer and the next. Talk is unrestricted. There are in practice no gags, and, without gags, it is virtually impossible to predict what the outcome of bargaining will be. The ordering of speech in the Staahl-Rubinstein model is more than a convenient simplification. It is an essential part of the model without which the model falls apart completely.

More importantly, the key assumption in the Staahl-Rubinstein bargaining solution - an assumption without which the solution breaks down completely - is "sub-game perfection": that bargainers cannot promise today to act tomorrow in a way that will not be in their interest when tomorrow comes. What this amounts to is the total banishment from the model of promises and threats. Suppose, for example, that the equilibrium bargain under the Staahl-Rubinstein

procedure supplies 10% of the pie to person E and the remaining 90% to person O. By contrast, as long as person O is rational and if person E can commit himself while person O cannot, person E can appropriate any share of the pie - say 60% - by committing himself to accept nothing less. Person E might make the commitment binding by means of a side contract with a third party to pay the third party a substantial sum if he accepts less than 60% of the pie in his bargain with person O. Person O must give way, for the alternative is to lose the entire pie and to acquire nothing. To be sure, person E has no monopoly on threats. If person E can make threats backed up by side contracts or by a need to preserve his reputation as a tough and astute bargainer, then so too can person O. If they threaten one another and if their threats are incompatible, adding up to more than the value of the pie to be shared, there can be no agreement and both end up with nothing.

Risk of failure makes bargainers cautious but does not abolish threats altogether. Abandon the rigid sequence, and the outcome of bargaining comes to depend on who gets to make the first threat, on the credibility of threats, on the parties' concern for their reputations, on how stubborn they choose to be. Abandon the rigid sequence, and the neat bargaining equilibrium disintegrates. The postulate of sub-game perfection preserves the sequence automatically. There may be times when this postulate is reasonable and accurate, but there are surely other times when it is not. Bargainers may have an incentive to hang tough, to "make yourself into a force of nature". Adolph Hitler is alleged to have said while bargaining that "one of us has got to be reasonable, and it isn't going to be Hitler."

The *locus classicus* on threats and blackmail is Schelling (1956). It is not, strictly-speaking, a theory of bargaining, for it supplies no formal prediction of how shares of a pie will actually be allocated among the claimants. The article is an examination of relevant considerations, placing considerable stress on commitment and on the importance of binding oneself to refuse anything less than some large share of the pie. Perhaps, the lion's share of the pie goes to whoever is the first to commit himself and to communicate that commitment to the other bargainer, but it is virtually impossible to say *a priori* who that will turn out to be.

Concern for reputation may influence bargaining in two opposite ways. On the one hand, you want a reputation for being reasonable and accommodating to induce prospective partners to join with you in new ventures. Nobody wants to become your partner if you are expected to be too rigid whenever conflicts of interest arise. One the other hand, costly intransigence today may pay off tomorrow as a warning to partners in future bargains that you are tough. Your partners might be induced to concede to your demands if you acquire a reputation for being stubborn

enough to resist conceding to their's. You want to appear soft to prospective partners and hard afterwards. The postulate of sequential rationality, or sub-game perfection assumes such behaviour away. Seduced by the elegance of these assumptions - possibly even by the connotations of the words "rationality" and "perfection", for who can object to anything that is at once rational and perfect - a vast range of behaviour is swept out of sight. Schelling's essay remains as a corrective, even a reproach, to much of the more recent literature on bargaining.

E) The Production of Bargains

Missing from the paradigmatic bargain in Figure 1, from the Nash bargaining solution and from the Staahl-Rubinstein bargaining solution, a cost of bargaining may be restored by a recognition of "transaction cost" or "conflict", concepts by no means restricted to bargaining but that can be attached to bargaining in some circumstances and may help to fill a gap in simple bargaining models. These concepts will be discussed in turn.

The notion of transaction cost is employed extensively in the study of law. Transaction cost has been defined as encompassing "all those costs that cannot be conceived to exist in a Robinson Crusoe economy....a spectrum of institutional costs including those of information, of negotiation, of drawing up and enforcing contracts, of delineating and policing property rights, of monitoring performance, and of changing institutional arrangements. In short, they comprise all those costs not directly incurred in the physical process of production."(Cheung, 1987, 57). Though transaction cost is distinguished from ordinary cost of production, the reference to "cost" necessarily implies some analogy with production; inputs of time and resources yield outputs of transactions, bargains or whatever else the inputs are intended to procure. Minimization of transaction cost is among the objectives in the choice of laws by the legislature and in the interpretation of laws by the courts.[6] Other things equal, the lower transaction cost, the better the law must be.The notion of transaction cost is especially useful in the context of bargaining theory is as a corrective to the presumption, implicitly introduced into bargaining models or derived as a theorem, that bargaining is costless, dividing the pie without diminishing it at the same time.

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[6]"A doctor chances upon a stranger lying unconscious on the street, treats him, and later demands a fee...The cause of the high transaction cost in that case is incapacity. In other cases it may be time (e.g., the stranger is conscious but bleeding profusely and there is no time to discuss term). In such cases, the law considers whether, had transaction cost not been prohibitive, the parties would have come to terms, and if so what (approximately) the terms would be."(Posner, 1998, 151)

Useful as it may be for the choice of laws or among forms of industrial organization, the notion of transaction cost is of little help in explaining how bargains are struck. It comes unequipped with mechanism for deciding whether cost is large or small in any particular case. Legislators passing laws and judges interpreting laws are expected to minimize transaction cost in circumstances where they must rely on gut feelings or experience in deciding when transaction cost is likely to be high and when it is likely to be low. That may be the best we can hope for in this imperfect world, but there remains a nagging suspicion that what is unmeasured in theory may turn out to be mischievous in practice.

The notion of transaction is divorced from any apportionment among bargainers of whatever it is they are bargaining about. A doctrine emphasizing the total cost of bargaining without reference to how the bargain is struck or how the pie is ultimately divided is only half a theory, and there is some question as to whether one half can be trusted without the other. In practice, transaction cost may depend on who gets what in the splitting of the pie. We may not know the cost of splitting the pie until we know how and to whose advantage it is split.

Though not introduced primarily an an explanation of bargaining, the notion of "conflict", as developed by Hirshleifer (1991), captures aspects of bargaining that might otherwise be overlooked. Unlike transaction cost, which is seen as a given, fixed expenditure in some bargaining situation, the notion of conflict - an off-shoot of the concept of rent-seeking - allows each bargainer to enlarge his share of the pie at some cost to himself. The original rent seeking problem was the allocation of an import quota among interested importers where a restriction on total imports lifts the domestic price above the world price, generating a surplus for importers fortunate enough to receive a share, and where all or part of the potential surplus is dissipated as would-be quota holders compete for the attention of the government agency entrusted to assign shares. Rent seeking becomes conflict when the prize, surplus or object of competition is endogenous. The paradigmatic conflict is outright war with all spoils to the victor, but the conflict model has been claimed relevant in a range of non-military contexts - labour disputes, legal disputes and commercial disputes - where people do not actually attack one another and where bargaining is normally thought of as an integral part of the resolution of disputes. Formally, conflict differs from rent seeking in that the combined income of the competitors becomes the prize over which they compete.

The main ingredient of both models is the "conflict success function"[7]. With only two rent seekers (or two contestants), person E and person O, the conflict success function becomes

$$s = C(F_E , F_O) \tag{11}$$

where s can be interpreted either as person E's share of the prize or as person E's probability of acquiring the entire prize, and where F_E and F_O (with F mnemonic for fighting) are peoples' expenditures to augment their shares. For the function C to serve its purpose in this context, person E's share must be an increasing function of F_E and a decreasing function of F_O . So defined, the conflict success function is a social analogue to the production function. Inputs F_E and F_O yield output s.

Models of rent seeking and conflict are alike in that F_E and F_O are chosen in a Nash equilibrium, but they differ in the nature of the prize. In rent seeking, the prize is external, a valuable privilege such as a share of an import quota, apportioned by the government as influenced by the recipients' rent-seeking expenditures. In conflict the prize is internal, typically the participants' combined income net of their combined cost of struggle to maximize their shares.

Models of rent-seeking and conflict stand or fall upon the strength of the analogy between social and physical technology, upon whether a function connecting inputs with output of bargaining corresponds to something in the economy or is pulled out of thin air. It does not matter that the form of the ordinary production is chosen arbitrarily (Cobb-Douglas, for example) because confidence in the existence of *some* relation between inputs and outputs is warranted by the laws of physics. Confidence in the existence of the conflict success function in its original usage to explain rent seeking rests on the belief that governments offering favours are influenced by the expenditures of rent-seekers. Confidence in the existence of the conflict success function for military expenditure rests on the belief in the existence of more or less predictable laws of war. Confidence in the existence of a conflict success function for bargaining has no comparable foundation. Bargains are not constructed like automobiles in accordance with well-recognized techniques. Some bargains get struck quickly, easily and costlessly. Other bargains only emerge after costly litigation and delay. Other bargains fail altogether. We have no basis for predicting

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[7]An implicit conflict success function was employed in Bush (1972). An explicit function was employed by Tullock (1980). The conflict success function was named and more fully analysed in Hirshleifer (1998).

which is which.

There is also some question about use of the Nash equilibrium. There is said to be a Nash equilibrium when each person acts on the presumption that other peoples' actions are what they are regardless of what he chooses to do. The presumption is entirely reasonable within a competitive market where each person is a minute part of the whole. It is much less reasonable in two-person interactions such as bargaining. In choosing F_E, person E is assumed to look upon person O's choice of F_O as invariant regardless of how he, person E, chooses to behave. In choosing F_O, person O is assumed to look upon person E's choice of F_E as invariant regardless of how he, person O, chooses to behave. Necessary though it may be to generate a determinate outcome, this assumption is far from innocuous, for each person's behaviour would normally be influenced by his assessment of how the other would respond, especially if bargaining is stalled and a resumption of bargaining might be part of that response. The presumption in ordinary bargaining that, if I concede a bit, you might concede a bit too is ruled out by the Nash equilibrium and has no counterpart in models of rent seeking and conflict.

There is, finally, some question as to whether rent-seeking and conflict are best seen as an aspect of bargaining or as activities that bargainers hope to circumvent. The question is whether - again with reference to figure 1 - rent-seeking and conflict are appropriately seen as leading to a unique point on the bargaining line between β and δ, or as influencing the location of the no-agreement point, α, from which bargaining begins. Perhaps a distinction can be drawn between the cost of bargaining and the cost of conflict when bargaining fails, but the distinction is at best murky, and a rule would be required for deciding which is which. Extension of the conflict success function from its core meanings in rent-seeking and in war to the explanation of the cost of bargaining is at best a useful device for analyzing problems where bargaining is involved, but it leaves many questions unanswered and contains no real explanation of how bargains are struck.[8]

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[8]Conflict models may never have been intended to apply to bargaining. "Conflict, as opposed to mere failure of cooperation, comes about when one or more parties calls upon a special technology. To wit, a technology where some or all contenders for resources incur cost in an attempt to weaken or disable competitors. This definition is broad enough to encompass not only war but strikes and lockouts, lawsuits, sibling rivalries within families and redistributive politics. But, for concreteness here, I use military language." (Hirshleifer, 1991, page130).

Bargaining, Voting and Parliamentary Procedure

Bargaining is a greater impediment in politics than in the economy. If two businessmen fail to strike a deal, the cost to themselves may be considerable, but the cost to society may be small because the lost opportunity may be grabbed up by other businessmen instead. Politics is different. Failure to strike a deal among groups of leftist parties may keep the rightist coalition in office, radically affecting domestic and foreign policy. Gridlock may the outcome of the failure of the Senate and the House of Representatives to agree. It is said that Hitler's rise was made possible by a bargaining failure among the democratic parties in the Weimar republic. The economy consists of a large number of organizations each responsible for a small share of the total output, so that, if one organization breaks down due to a failure of the personnel to agree on the allocation of rewards, the rest can take up the slack [9] . By contrast, the government consists of a single organization responsible for the production of the entire spectrum of public goods, creating havoc when that organization fails to run smoothly. Resilience to bargaining failure should be added to the list of virtues - notably Pareto optimality and the automatic dissemination of information - of the price mechanism

It is well-recognized that there may be no equilibrium outcome in majority-rule voting, no option that beats every other option in a pair-wise vote. Sometimes the available options and the voters' preferences among them are such that this "paradox of voting" is avoided, but it is invariably present in voting about the allocation of the national income as a whole.

Think of a legislature allocating something - perhaps cabinet posts, perhaps the entire national income - among its members or their constituents. A political equilibrium in this context is an allocation emerging when each legislator does what is best for himself in the light of what others are doing. Suppose, for example, a legislature consisting of just 5 people (the legislators) is allocating 150 units among its members. The paradox of voting is that each and every allocation can be defeated by some other allocation in a pair-wise vote. The "fair" allocation {30, 30, 30, 30, 30} can be overturned in majority-rule voting by an unfair allocation, such as (50, 50, 50, 0, 0}, which in turn can be overturned by an allocation such as (60, 0, 0, 45, 45), and so on ad infinitum.

In a model of what they call "bargaining in legislatures", Baron and Frerejohn (1989)

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[9]On the confinement of the scope for bargaining in a competitive economy see Newman (1965) and Osborne and Rubinstein (1990)

employ a modification of the Staahl-Rubinstein bargaining solution to derive an allocation of "one unit of benefit" in an equilibrium emerging from a combination of random events and self-interested voting by legislators. Escape from the paradox of voting - and assurance of a determinate outcome in other contexts as well - is arranged by strengthening the requirements for the acceptance of a proposal by the legislature. The unattainable ideal of an allocation that can defeat any other allocation in a pair-wise vote is replaced by the rule that the right to propose an allocation belongs to a randomly-chosen "formateur" who may propose any allocation he pleases on the understanding that his choice becomes the decision of the legislature if accepted in an up-or-down vote, and that, if not, a new formateur is chosen at random in a process repeated as many times as is necessary until some proposal is accepted.

Why is this determinate? The allocation by voting of 150 units of something among 5 people has a "continuation value" of 30 because each of the five people is on the same footing at any moment prior to the announcement of who the formateur is to be. Suppose the randomly-chosen formateur turns out to be the third person. Since the continuation value in the event that the formateur's offer is turned down is 30, each of the other four people, being rational, must be prepared to accept any offer in excess of 30. Since any three people constitutes a majority, the formateur requires only two of the remaining four people to vote for his proposal. Suppose he offers 31 to each of the first two people and nothing to the fourth and fifth, setting aside the remaining 88 for himself. His proposal becomes (31,31, 88, 0, 0}. The proposal is adopted by a three-to-two majority, and that is the end of the story. The allocation of cabinet posts is much the same as the allocation of money, except that, in the allocation of cabinet posts, the different number of legislators from the different political parties must be taken into account. As explained in Baron and Frerejohn (1989), a much less lopsided allocation of national income or of cabinet posts can be derived through the addition of rules for amendments and for the termination of the amending process.

The model is valid in the sense that an equilibrium really does emerge when political processes are as postulated and when each legislator acts rationally in hisr own self-interest as economics normally assumes people to do. Doubts may, nonetheless, be raised about the assumptions. How close are the assumptions to politics as we know it? Does what is described as bargaining in legislatures correspond to what people normally think of as bargaining? There are several difficulties.

The *alternation* of offers in Staahl-Rubinstein bargaining theorem is replaced by a *random selection* of offers in the Baron and Frerejohn model. The substitution is significant

because the alternation of offers has something of the character of a conversation, while random selection of a formateur retains very little of what most people think of as bargaining. It is closer, in my opinion, to parliamentary procedure, to implicit or explicit rules surrounding decision-making by voting about laws or leaders in a context where negotiation has an inextricable role to play.

Equally important is the retention of the assumption of "sub-game perfection" which disposed of Schelling's stubborn bargainer in the Staahl-Rubinstein bargaining solution. The assumption is that I cannot promise to act tomorrow in a way that will not be in my interest when tomorrow comes. But what was stubborn behaviour in the Staahl-Rubinstein formulation of two-person bargaining becomes simple honesty in deals among legislators. Sub-game perfection becomes a universal unwillingness or inability to keep one's word. Without that assumption, a majority in the legislature can side-line the formateur altogether by agreeing among themselves on the allocation of the national income, the composition of the cabinet or the policies of the government in office, and automatically rejecting any offer by a formateur who is not part of the coalition. Then, as soon as the random process by which formateurs are selected yields a formateur from the coalition, he proposes the pre-arranged deal and it is approved by a majority of voters. Parties in the coalition "simply say no" until their deal is finally proposed. Such binding promises are postulated away by the assumption of sub-game perfect equilibrium, but eviction from the model is not eviction from politics as actually conducted.

In the example set out above, a coalition of - say - the first three legislators can grab the entire pie for themselves by promising to vote for the allocation {50, 50, 50, 0, 0} if and only if members of the coalition can trust one another to vote against any other alternative. If so, any other allocation would be voted down by a three-to-two majority until such time as a member of the coalition wins the lottery to become the formateur. If not, the deal would collapse because any person selected as formateur can make himself better off than he would become by respecting the agreement. If person 1 becomes the formateur, it would be in the his interest to betray his partners in the coalition by proposing an allocation of {88, 0, 0, 31, 31} which would be adopted by the consent of the two legislators who were excluded from the original coalition.

The formateur is a shadowy character who exists in the models without necessarily existing in the world. He is not necessarily the prime minister. He is not necessarily the Governor General. He is not necessarily any particular person. He is an artificial construction required to generate an equilibrium that need not exist in practice if people can make binding promises to one another and can bargain with one another in the conventional sense of the term.

"Bargaining in legislatures" can be thought of as part of a larger enterprise, the search for a "political equilibrium" comparable to the general equilibrium in the economy. (See, for instance, Ordershook and Shepsle (1982). This literature includes the probabilistic voting theorem about platforms of political parties (Mueller, 2003, chapter 12 and Usher,1995) and the citizen-candidate model in which politics is confined to the election of a dictator rendered benevolent because he would not be elected unless his preferences corresponded to those of the great majority of voters (Osborne and Slivinski, 1996, Besley and Coate, 1997, and Usher, 2005). The holy grail of this literature is a technical connection between preferences and outcomes which, if discovered, would remove the need for bargaining altogether. To say that no such connection has not yet been established is not to say that the search has been in vain. The more that can be explained by self-interested behaviour within the confines of generally-respected rules, the less society need rely upon negotiation, and the less likely it becomes that negotiation breaks down into chaos.

On the other hand, if bargaining in legislatures were as feasible and as determinate as the Baron and Frerejohn bargaining model might lead one to believe, there would seem to be no reason why it would be confined to bargaining within the legislature as a whole. If the entire legislature could agree on an allocation of income among its members, so too could a majority in the legislature bent upon exploitation of the corresponding minority. Strictly-speaking, the model is constructed with reference to the entire legislature, but in so far as it can be said to explain bargaining, it should apply to a faction in the legislature as well. If feasible at all, bargaining should be equally feasible in both contexts.

This consideration places bargaining - and impediments to bargaining - in an entirely different light. So far, bargaining has been looked upon as desirable in the sense that the bargainers themselves and society as a whole become better off when bargains are easily struck. There are circumstances where that is not so. Throughout recorded history, thoughtful people have doubted whether democracy could ever be made to work. Whatever its merits as an ideal, government by majority-rule voting was thought to be impossible in practice. Sooner or later, democracy would self-destruct. A majority of voters would employ its authority over the government and the army to deprive the corresponding minority of income, property and civil rights, redirecting income and privilege to members of the majority coalition and, in the end, eroding the willingness of citizens to accept the will of the majority peacefully. Anticipating its fate at the hands of a predatory majority, the minority may rebel, abolishing democracy in the process. Or, anticipating its fate at the hands of its successors, an unpopular party in office might use the power of the state to squelch the opposition; better to rule tyrannically than to be

dominated by a predatory majority in a democratic state. Recognition of a certain validity in the anti-democratic argument has led political theorists to search for constraints upon predatory voting and, more importantly, to design institutions that hold predatory majorities in check. Fear of predatory majorities was a central concern of the authors of the Constitution of the United States.

If the model of "bargaining in legislatures" did what it was intended to do - establishing the existence of a political equilibrium comparable to the equilibrium in a competitive economy - it would have proved too much, for it is precisely the absence of such a mechanism that is required as a defense against the exploitation problem. It is hard to see how democracy could be maintained if bargaining as easy and determinate as the model suggests. Bargaining must at once difficult enough to block the formation of predatory majorities, but not so difficult as to block compromise altogether.[10]

Democracy is defended, albeit imperfectly, against predatory bargaining by the institution of private property, by the composition of society, by parliamentary procedure and by the design of government. It is defended by the institution of private property because, other things equal, democracy is stronger when there is less for legislators to bargain about. Respect for property rights places a limit on what a minority stands to lose at the ballot box. Property rights are respected because, and to the extent that, a majority's gain from the expropriation of the property of the corresponding minority can be expected to fall short of its loss from the resulting disorganization of the economy. Not all capitalist societies are democracies, but all democracies are capitalist, at least to the extent of maintaining private ownership of a significant portion of the means of production.[11] The rule of law plays a similar role. A ban on ad hominem legislation (the prohibition of Bills of Attainder in the US Constitution) and on unequal treatment by the courts places a floor on what one stands to lose if one's party fails to win the election. Laws must not reward the supporters of the party in power or punish its enemies. Actual governments violate this principle to some extent, but there is a limit to how far one can go without placing democracy in jeopardy.

Democracy is defended by he composition of society in that, as has been recognized since the beginning of political theorizing in Ancient Greece, predatory bargaining is easier in some

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[10]Bargaining in the economy may be predatory too, as in bargaining among monopolists over the proceeds of monopolization.

[11] On the logic of the connection between voting and capitalism, see Usher (1981).

types of society than in others. It is relatively easy in a society composed of a few clearly-identified races, religions or tribes than in either a very diverse society or a society where people are much alike. Referring principally to democracies, Aristotle (1946, 210) wrote that a "state cannot be constructed from any chance body of persons....Most of the states that have admitted persons of another stock.... have been troubled by sedition...". Voltaire (quoted in Gordon, 1999, 230.) observed that "If there were only one religion in England, we should have no fear of despotism; if there were two, they would cut each other's throats; but there are thirty, and live in peace and happiness". In defense of the new American constitution, James Madison (1789, #51) observed that "Whilst all ...will be derived from, and dependant on the society, the society itself will be broken into many parts, interests and classes of citizens, that the rights of individuals, or of a minority, will be in little danger from interested combinations of the majority. ... security of civil rights...consists... in the multiplicity of interests and.... in the multiplication of sects." Any badge separating people into two distinct factions is potentially corruptive. A recognition of this danger is the basis for the separation of church and state in the Constitution of the United States. Rabushka and Shepsle, (1972) and Mann (2005) have extended this line of reasoning to the study of ethnic cleansing.

Disparities in peoples' incomes may be divisive, but are not necessarily so. Democracy is unlikely to withstand a bifurcation of society into distinct social classes, one very rich and the other very poor, for the poor would have every incentive to vote for the expropriation of the rich, while the rich in turn would have every incentive to abandon democracy to preserve their privileges. But, with a broad continuum of incomes, the distribution of income may be safely contracted by progressive income taxation. Unlike exploitation of the adherents of one religion by the adherents of another, progressive income taxation need pose no threat to democracy because there is a limit - well short of 100% - to how high a tax it would be in the interest of the poor to impose. The constraint is deadweight loss in taxation - through the trade-offs between labour and leisure, between consumption and investment, between tax payment and tax evasion - causing the tax base to shrink as the tax rate rises, and placing a ceiling on the tax rate it is in anybody's interest to impose. Deadweight loss in taxation supplements other impediments to bargaining in the preservation of democracy.

Democracy is defended by parliamentary procedure, not just because voting would be chaotic without rules specifying legislators' rights to make proposals and amendments, as well as the sequence in which proposals and amendments are voted upon in the process of forming legislation, but because some rules are less threatening than others. For example, the rule requiring the last vote in any sequence to be between the bill as amended and the status quo

ensures that whatever the legislature decides does not leave a majority worse off than before voting began.

Democracy is defended by the design of government itself: by checks and balances inherent in the separation of powers among legislature, executive and judiciary as well as in the duplication of legislatures. This consideration was of great concern to the authors of the American Constitution. In the words of Thomas Jefferson, "An elective despotism was not the government we fought for, but one which should not only be founded on free principles but in which the power of government should be so divided and balanced among the several bodies of magistracy, as so no one could transcend their legal limits, without being effectively checked and restrained by the others." (Madison, 1789*, The Federalist Papers* #48). "In the compound republic of America, the power surrendered by the people is first divided between two distinct governments, and then the portion allotted to each is subdivided among distinct and separate departments. Hence a double security arises to the rights of people. The different governments will control each other at the same time as it will be controlled by itself" (Madison, *The Federalist Papers* , #51).

Exploitation of minorities by majorities requires a two-fold bargain. Members of the majority coalition must recognize one another, and they must agree upon a division of the spoils. Both requirements become more difficult under the constitutional arrangements that Jefferson and Madison proposed. With two legislatures, a predatory majority in one may be thwarted by a different predatory majority (or by the absence of any such majority) in the other. To exploit their minorities, the two factions would need to compromise. That in itself may be difficult. If successful, it would be tantamount to the formation of a larger majority in society as a whole with a correspondingly smaller minority and correspondingly smaller gains from exploitation. Beyond that, a predatory majority in the legislature may be blocked by the executive or by the judiciary. Allocation of income and the spoils of office among members of the majority coalition becomes correspondingly difficult.

It is at least arguable that the separation of powers - between central and state governments and between the different houses of the legislature and among president, legislature and judiciary - is explicitly designed to make government inefficient by requiring consent among different branches of government if anything constructive is to be done. Constitutions of democratic countries are designed with bargaining as friction to stop governments from working too well. None of this would block a predatory majority if bargaining were as determinate and as costless as some of our bargaining models would suggest. The division of powers and the

corresponding checks and balances supports democratic government because and only because bargaining is costly and indeterminate. The hope is that friction and indeterminacy in bargaining drive up the cost of exploitation by majority rule voting to the point where the manoeuvre is no longer advantageous.

Democratic politics is infused with bargaining in two very different ways: Bargaining is required to fill in the gaps when outcomes under the rules of parliamentary procedure are less than completely determinate. Bargaining is indispensable when, for instance, committees of the Senate and the House of representatives come together to forge a common bill in the event that two somewhat different bills on one and the same subject have been passed in the two houses of Congress, or when a political party forges a common platform out of the somewhat similar, somewhat different views of the party supporters. But bargaining is also an essential part of the process by which a majority in the legislature can employ the power of the vote to exploit the corresponding minority, directing to itself a disproportionate share of the national income and the fruits of office. A principal objective in the design of democratic government and parliamentary procedure is to foster one aspect of bargaining and to thwart the other.

Concluding Observations

The economist's project is to explain as much as possible of the world as the outcome of greed. Ideally, a determinate bargaining equilibrium would be identified, comparable to price-taking in a competitive economy, where each bargainer acts in his own interest in response to general rules and to characteristics of the economy as a whole, and conditions would be identified where the bargaining equilibrium is conducive to the common good. The review of bargaining in this paper suggests that the ideal has not been, and perhaps can never be, attained.

Propositions about bargaining - like the blind men and the elephant in the old Hindu tale - are useful half-truths or rules of thumb. Bargainers have a common notion of fair division. Bargains favour the party with the lower rate of discount. Bargains are costly, but some are more costly than others. Bargainers respond to threats and recognize focal points. The smaller the pie in dispute, the lower bargaining cost is likely to be. Bargaining outcomes reflect the efforts of the bargainers. None of these assertions is altogether wrong, but they do not fit well together. There no central switching mechanism assigning particular bargains to one mechanism or another. Nor is there any mixing process by which the different sketches are combined into a well-drawn portrait of how bargains are struck.

Three closely-connected morals of the story are encapsulated in the quotes at the beginning of the paper: Bargaining is not adequately explained as a species of self-interested behaviour subject to society-wide constraints. What is not adequately explained cannot be fully trusted, hence the need to beware of the common supposition, implicit in the injunction of the Canadian Supreme court, that people "sitting around the table" can always resolve their disputes. Laws and customs should be designed, wherever possible, with reliance on self-interest rather than compromise to get the world's work done, confining our limited supply of compromise to matters that cannot be settled any other way.

A fourth moral is about the dual role of bargaining in democratic government. On the one hand, democracy is distinguished from autocracy - from absolute monarchy and dictatorship - not just by the institution of voting, but by a much greater reliance on compromise among politicians with different interests and objectives. Democracy is an amalgam of voting and bargaining. On the other hand, the rules of voting and the organization of government must be designed to frustrate or block predatory bargains that would, if unconstrained, lead democracy to self-destruct. Bargaining as "explained" could not play the double role - as good guy and as bad guy - that democratic government requires.

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Appendix A: Derivation of the Staahl-Rubinstein Bargaining Solution

A pie is to be shared by agreement between two people, E and O, both completely rational and unreservedly greedy, through a prescribed sequence of alternating offers, terminating when an offer is accepted. There is one, and only one, offer per year. In the first minute of every year t, one person - person E in even years and person O in odd years - makes an offer assigning a share s(t) to person E and a share 1 - s(t) to person O. In the second minute, the other person says either "yes" or "no". If "yes", the pie is immediately divided accordingly. If "no", nothing happens until the following year when the process is repeated with the roles reversed.

The Staahl-Rubinstein bargaining solution is an equilibrium determination of shares depending on the persons' rates of interest, r_E for person E and r_O for person O. Though bargaining could go on forever, the very opposite occurs. Whichever person is entitled to make the first offer proposes a share $s(0) = r_O/(r_O + r_E)$ for person E, leaving a share $r_E/(r_O + r_E)$ for person O. The other party accepts.

The derivation of the Staahl-Rubinstein bargaining solution is based upon a modification of the longevity assumption. Instead of supposing that the pie last forever in the absence of an agreement, it is supposed that in some year T a share S is arbitrarily assigned to person E (leaving a share 1 - S for person O) if no agreement has been reached by that time. The solution emerges when T goes to infinity, though a different solution emerges when T is finite. A key assumption in the proof is sub-game perfection: Advantageous offers are always accepted. Neither party can promise to refuse any offer of less than some given share if that offer is the best available at the time it is made. Suppose for convenience that the process begins in the year 0 and that T is even, so that person E makes the first offer and the final offer as well.

The proof is by reverse induction. In the year T, person E offers to take a share S, leaving person O with a share (1 - S). Person O will not take less because (1 - S) is his arbitrarily-assigned share in the year T, and person E need not offer more. Go back one year to the year T - 1 when it is person O's turn to make the offer. His offer, s(T - 1), to person E must be $S/(1 - r_E)$ - the present value in the year T - 1 of a share S in the year T - leaving person as well off in the year T - 1 as he would be by waiting for the arbitrary assignment in the year T. Person O's share in the year T- 1 becomes the remainder of the pie, 1 - s(T - 1), equal to $1 - S/(1 - r_E)$. Now step back an additional year to T - 2 when person E is again entitled to make the offer. The most that person E need offer person O is $[1 - S/(1 - r_E)]/(1 - r_O)$ which is the present value of what Person E could obtain by waiting a year for his turn to make an offer. Person E's share is the remainder

$$s(T - 2) = 1 - [1 - S/(1 - r_E)]/(1 - r_O) = x + yS \qquad (A1)$$

where $x = r_O/(1 + r_O)$ and $z = 1/(1 + r_O)(1 + r_E)$.

From here on the derivation of equilibrium shares in the first offer - made by person E in the year 0 when the sequence of offers and responses begins, and accepted by person O - is entirely mechanical. Person E's share in the year T - 4 bears precisely the relation to his share in the year T -2 that his share in the year T - 2 bore to his share in the year T, and so on all the way back to the year 0 Specifically,

$$s(T - 4) = x + ys(T - 2) = x + z[x + yS] = x[1 + z] + z^2S \qquad (A2)$$

$$s(T - 6) = x + zs(T - 4) = x[1 + z + z^2] + z^3S \qquad (A3)$$

and so on, each two years back adding an extra term to the time series in square brackets, until

$$s(0) = x[1 + z + zy^2 + ... + z^{(T/2) - 1}] + z^{T/2}S = (1 - z^{T/2})[x/(1 - z)] + z^{T/2}S \qquad (A4)$$

which is a weighted average of $[x/(1 - z)]$ and S, equal to the former when T approaches infinity and to the latter when T = 0. Note finally that

$$x/(1 - z) = (r_O + r_O r_E)/(r_O + r_E + r_O r_E) \cong r_O/(r_O + r_E) \qquad (A5)$$

where the approximation holds exactly when the "years" are short enough to remove person E's first mover advantage. Ignoring $r_O r_E$, the equilibrium share, s(0), of person E is

$$s(0) = (1 - z^{T/2})[r_O/(r_O + r_E)] + (z^{T/2})S \qquad (A6)$$

which is equation (9) in the text. As soon as bargaining begins, person E offers a share 1 - s(0) to person O, leaving a share s(0) for himself. Person O accepts, and the bargain is struck.

Suppose r_O = 1% and r_E = 9%. Person E's share in the Staahl-Rubinstein bargaining solution is 1/10. Person E's share rises to 38.6%, in accordance to equation (A6), when an arbitrary distribution with S = ½ would be imposed in the year 8 (i.e. T = 8) if a deal has not already been reached. A similar formula could be derived from the assumption that the pie disintegrates if not already allocated by agreement in some year T.

Appendix B: Applications of the Bargaining Premise in Models of Business, Law, Politics and the Choice between War and Peace

Each of the four models described in this appendix starts with the premise that some bargain would be struck in the circumstances of the paradigmatic bargain as described in figure 1 of the text, and employs that premise to explain some aspect of society. The model of business shows why the most efficient form of associations between firms may not be adopted. The model of law explains why parties to a dispute may resort to litigation even though it would be far less expensive to resolve differences privately. The model of politics shows, among other things, why the party of the President tends to lose votes in elections for Congress in years when the president is not up for re election, The model of war shows why war may not be averted by negotiation.

1) Bargains between Firms

In *Firms, Contracts and Financial Structure*, Hart (1995) explains the pattern of ownership as a trade off between economies of scale and the loss of incentive when one cannot reap the full benefit from one's activities. Patterns of ownership are exemplified by the relation between General Motors and the Fisher Body company that makes frames for General Motors' cars. The question is whether these two companies i) remain entirely separate, buying or selling from one another or from other companies on the open market, ii) amalgamate into one large company or iii) establish a close working relation with one another. The choice among these options depends upon economies of management and impediments to cooperation when neither firm can verify the other's relation-specific investment. Hart shows that, though the *potential* combined profit under cooperation (iii) may exceed the combined profit under amalgamation (ii), amalgamation may nevertheless be the better option when relation-specific expenditures are unverifiable. Hart's model is quite complicated, but a stripped down version is sufficient to focus on his assumption about bargaining which is our immediate concern.

Consider two firms, F and G. If they remain entirely separate from one another, their profits would be π_F and π_G. If they amalgamate into one large firm, its profit would be π_A. If they remain as separate entities but cooperate, their combined profit, $\pi_C(f, g)$, would be dependent upon their relation-specific investments, f by firm F and g by firm G. The critical assumption about the relation-specific investments is that neither firm's investment is *verifiable* by the other. Each firm is assumed to know both firms' profits, π_F and π_G, in the absence of cooperation, the profit, π_A, of the amalgamated firm and the profit function, π_C (f, g), of the two firms together in the event that they cooperate. Knowing its own relation-specific investment, f or g as the case

may be, each firm is in a position to infer the relation-specific of the other firm, but it cannot demonstrate this knowledge objectively to a third party because outsiders cannot be expected to know f or g. That being so, an agreed-upon rule for apportioning combined profit between the firms cannot be made to depend upon their relation-specific investments. A distinction is therefore drawn between the *true* surplus, T, from cooperation where

$$T = \pi_C(f, g) - [\pi_F + \pi_G] - f - g \qquad \text{(B1)}$$

and the *verifiable* surplus, S, from cooperation where

$$S = \pi_C(f, g) - [\pi_F + \pi_G] \qquad \text{(B2)}$$

Two key behavioural assumptions are introduced: the *informational* assumption that only the verifiable surplus can serve as a basis for assigning each firm's share of the benefit of cooperation and the *bargaining* assumption that the two firms split the verifiable surplus, S, evenly, half to firm F and half to firm G. On these assumption, firm F's profit in the event of cooperation, π_{FC} where C is mnemonic for cooperation, becomes

$$\pi_{FC} = \pi_F + S/2 - f \qquad \text{(B3)}$$

and firm G's profit in the event of cooperation, π_{GC}, becomes

$$\pi_{GC} = \pi_G + S/2 - g \qquad \text{(B4)}$$

Hart's main proposition is that, without verification, both relation-specific investments are too small and the combined profit is less than it might be because both firms invest to maximize their own surpluses rather than the surplus of the two firms together. It could easily happen that - as between amalgamation and cooperation - the total profit of the two firms together would be higher under cooperation if relation-specific investments could be verified, but the total profit is actually higher under amalgamation because each firm's relation-specific investment is concealed from the other.

Bargaining failure in this context is manifest in the form of industrial organization. Even on the assumption that bargainers split the pie evenly where each party's actions can be observed, the "wrong" form of industrial organization may be chosen when the firms' actions are not only

observable but verifiable by a third party in a position to punish firms for malfeasance.

2) Settlement to Avoid a Trial

Private disputes can be resolved in court or by a settlement out of court in the light of how the court might be expected to rule. Whenever the combined cost of settlement, to plaintiff and defendant together, exceeds the combined cost of trial, one might expect that "bargaining in the shadow of the law" would displace trials altogether. In "The Selection of Disputes for Litigation", Priest and Klein (1984) ask why that is not always so. They begin with two observations: that 1) about 95% of personal injury cases are settled without going to trial and that 2) among cases that do go to trial, the plaintiff's success rate is about 50%. Their explanation is that there must be a major discrepancy between the plaintiff's and the defendant's expectations of the court's decision, coupled with a more or less equal chances that either party is mistaken.

A dispute between plaintiff and defendant can be represented by a variant of figure 1 in the text. Represented on the axes are not total incomes, but changes in incomes as a consequence of settlement or trial The plaintiff's gain is shown above the origin on the vertical axis. The defendant's loss is shown to the left of the origin on the horizontal axis. Increments to income (which may be positive or negative) take account of i) the court's mandated transfer of income from defendant to plaintiff, ii) each person's legal cost in the event of a trial and iii) each person's the cost of settlement. The analysis will be undertaken in three stages. In the first, the court's judgment is known in advance to both plaintiff and defendant. In the second, there is a universally-recognized probability of a judgment for the plaintiff, but the amount of that judgment is known to both parties. Only in the third stage might plaintiff and defendant have different expectations about what the probability or the magnitude of the judgment might be.

When the court's judgment, J, is known in advance, the choice between settlement and trial is as shown in figure B1. The legal costs of a trial are C^p to the plaintiff and C^d to the defendant, represented together on the figure by the point C. The costs of arranging a settlement are S^p to the plaintiff and S^d to the defendant, represented together on the figure by the point S. Settlement costs are assumed to be very much less than legal costs of a trial, i.e. $S^p < C^p$ and $S^d < C^d$. The diagonal line - at 45 degrees to both axes - through the point C traces out all possible increments to income of plaintiff and defendant when both pay the legal costs required for a trial and there is a transfer of income between them. Similarly, the diagonal line through the point S shows all possible increments to income of plaintiff and defendant when both pay the required cost of settling the case without a trial and there is a transfer of income between them.

The horizontal distance, L, between the trial line and the settlement line is $(C^p + C^d) - (S^p + S^d)$. It is the surplus - the sum of both parties' gains - from settlement rather than trial.

Figure B1: Settlement verses Trial

If plaintiff and defendant paid the legal cost of trial but the court excused the defendant from any payment to the plaintiff, the parties would find themselves at the point C. If, instead, the court required the defendant to pay the plaintiff an amount J, the parties would find themselves at the point δ, at which the total *loss* to the defendant is $J + C^d$ and the net *gain* to the plaintiff is $J - C^p$.

From here on the story is essentially the same as in figure 1 of the text. A trial brings plaintiff and defendant to the point δ which is below and to the left of the settlement line, so that there must be room for a mutually-advantageous deal, moving in the first instance to the point S on the settlement line and then, via the appropriate transfer, to some point between α and β - where α is directly above and β is to the right of the point δ - making both parties better off. When

the court would mandate a payment J from defendant to plaintiff, the defendant would be made better off by any settlement less than $J + (C^d - S^d)$ and the plaintiff would be made better off with any settlement greater than $J - (C^p - S^p)$. If this model were a true and complete representation of the confrontation of plaintiff and defendant and as long as the surplus, L, from settlement is positive, there need be no civil trials at all, for all disputes could be negotiated away.

Suppose that it costs nothing to settle disputes privately, that plaintiff and defendant would both face legal costs of $200 if the case went to trial, and that the defendant would be required to pay $1,000 to the plaintiff if the case when to court. Is so, any settlement from defendant to plaintiff of between $800 and $1200 would leave both parties better off than they would be by going to court. The bargaining premise is that some settlement between these limits would be chosen. The premise is that a mutually-advantageous settlement would not be blocked because the parties are too stubborn to reach an agreement.

Nothing of importance changes when the assumption of a sure judgment J is replaced with a universally-recognized probability π of a judgment $ J coupled with a probability $(1 - \pi)$ that the defendant is deemed by the court not to be liable at all. As long as plaintiff and defendant are risk neutral, they are in the same position as they would be with a judgment of $\$\pi J$ and no risk at all. Figure B1 and its implications would be unchanged except that J is replaced by πJ. Once again, there is a range $\alpha\beta$ of mutually-advantageous settlements from which one must be chosen. Settlement would be expected as long as plaintiff and defendant are not too stubborn.

While not denying that parties may prove to be stubborn, Priest and Klein emphasize a different reason why a mutually-acceptable settlement might not be reached. Bargaining may fail because plaintiff and defendant have different expectations about the outcome of a trial. Suppose the plaintiff expects a large award, the defendant expects something smaller and both expectations are held with the force of certainty. The plaintiff expects the award to be J^p and that the defendant expects the award to be J^d , where J^d is less than J^p. There is, of course, no strong reason why expectations should not go the other way, with the plaintiff expecting a relatively small reward and the defendant expecting a relatively large one, but, were that so, both parties would be especially averse to trial and especially willing to settle, reinforcing the advantage of settlement when expectations about J are the same.

The pattern of expectations and its influence on the parties' willingness to settle out of court is illustrated in Figure B2. Anticipating the larger judgment of J^p, the plaintiff expects the trial to generate increments to the incomes of plaintiff and defendant as represented by the point

δ^p, and, as a consequence of that expectation, would accept no point on the settlement line below and to the right of β^p. Similarly, anticipating the smaller judgment of J^d, the defendant expects the trial to generate increments to the incomes of plaintiff and defendant as represented by the point δ^d and, as a consequence of that expectation, would accept no point on the settlement line above and to the left of α^d.

Figure B2: Plaintiff and Defendant are Both Relatively Optimistic about the Magnitude of the Judgment

As the figure is drawn - with J^p very much larger than J^d - there is no point on the settlement line that is at once above β^p (and therefore acceptable to the plaintiff) and below α^d (and therefore acceptable to the defendant). There is in short no deal. The parties go to trial despite the fact a settlement would be mutually-advantageous if only they knew what J would turn out to be.

Plaintiff and defendant can both expect to be better off by settling out of court as long as the combined cost saving, $(C^p + C^d) - (S^p + S^d)$, exceeds the plaintiff's optimism, $J^p - J^d$, about the size of the court's award. Only if the court's award were common knowledge, would the

choice depend upon the cost alone. Plaintiff and defendant fail to resolve their dispute without resort to trial a) if plaintiff and defendant cannot agree upon one among many mutually-advantageous deals, some more favourable to the plaintiff and others more favourable to the defendant, or b) if the plaintiff is so optimistic about his chance of success at trial that there are no perceived mutually-advantageous settlements.

Several extensions and qualifications may be of interest;

Expectations may differ about the probability of the award, about its magnitude, or both. If plaintiff expects an award J^p with a probability π^p while defendant expects an award J^d with a probability π^d, then J^p and J^p in figure B2 must be replaced with $\pi^p J^p$, and J^d in figure B2 must be replaced with $\pi^d J^d$, but everything else remains the same. There is an implicit assumption here of risk neutrality. Risk aversion magnifies the advantage of settlement over trial.

Legal costs, C^p and C^d, have been assumed invariant. It might instead have been assumed that the magnitude or probability of an award is influenced by the amounts parties are willing to spend to influence these variables. In other words, a rent-seeking model of legal cost might have been appended to the basic model of settlement and trial. The defendant may be in a position to deter suits altogether by forcing up the legal cost of the plaintiff to the point where the expected return to the plaintiff turns negative. Class action suits may then be the plaintiffs' only recourse.

It has been assumed so far that J^p differs from J^d because one or both parties is mistaken about the true value of J. That is a reasonable assumption to make about accident law which is primarily what Priest and Klein had in mind. But a difference between J^p and J^d may be genuine. One party may really have more to gain from a trial than the other has to lose. In compensation for injury, a dollar extra to the plaintiff is a dollar extra from the defendant as well, but, in suits over product liability, the full cost of a trial to the producer may be many times the award to the plaintiff because such an award may set a precedent for many disputes to come. A defendant might prefer settlement to trial if trial sets a precedent, but settlement does not.

3) Legislature and Executive

In *Partisan Politics, Divided Government and the Economy*, Alesina and Rosenthal (1995) consider a society where all political outcomes can be represented by points on a left-right continuum. Politics is about the choice of a number, x, on a scale from 0 to 1. Every voter has a favourite position on that scale, and his only concern is to minimize the distance between his

favourite positions and the political outcome as determined by voting and by bargaining among politicians elected to office. There are two parties, left and right, with different ideal points on the continuum. Preferences of politicians within each political party are the same. All politicians in the "left" party have the same first preference x_L, and all politicians in the "right" party have the same first preference x_R, where, of course. $x_L < x_R$ meaning that the preferred outcome of the "right" party is to the right of the preferred outcome of the "left" party on the left-right scale. Each party, if it could have its own way, would arrange a political outcome in accordance with its first preference.

Citizens elect legislators and a president. Voting for legislators is by proportional representation. Citizens vote for parties rather than for legislators directly, and then seats in the legislature are allocated to the parties in accordance with the number of votes received.

The final outcome is a point on the left-right continuum, determined simultaneously by two costless bargains, one within the legislature and another between the legislature and the president. Bargaining within the legislature yields a legislative preference, x_Q , where

$$x_Q = \alpha x_L + (1-\alpha)x_R \tag{B5}$$

where x_L and x_R are the first preferences of the "left" and "right" parties and where α is the left party's share of the seats in the legislature. All legislators' preferences are weighted equally in a compromise where each party's political power is proportional to its membership in the legislature. This is a very strong assumption, for it might have been assumed that the majority party gets its way completely. Bargaining between the legislature and the executive supplies the final political outcome, x, where

$$x = \beta x_Q + (1- \beta)x_P \tag{B6}$$

where x_P is the first preference of the president (which must be either x_L if the president is from the "left" party or x_R if the president is from the "right" party) and where β, which must lie between 0 and 1, is the legislature's bargaining power in its dealings with the president. Nothing in the model determines the magnitude of β.

The weights α and β are representations of bargaining power, looked upon as unexplained facts of political life. Within the legislature, each party's bargaining power is proportional to its number of seats. Between legislature and president, bargaining power depends on a parameter pulled out of thin air. This mode of analysis is wrong or useless, but nor is it grounded upon any

persuasive explanation of how rational and self-interested people come to agree. Bargaining power is postulated, not rationalized or explained.

Alesina and Rosenthal's bargaining postulates are advanced, in my opinion, not as an accurate depiction of bargaining, as it were, from the inside, but as components of a larger model of the workings of democratic government and as springboard enabling Alesina and Rosenthal to develop interesting and insightful propositions about voting in the formation of public policy. They explain, for example, how rational voters' choices between Republican and Democratic candidates for the legislature are influenced by whether the President is Republican or Democratic. Like any theory, this theory of political behaviour might be verified by the accuracy of its predictions, but that line of defense is only available if we are not interested in bargaining *per se* and as long as we do not allow ourselves, on the strength of the theory, to suppose that bargaining is more predictable and determinate than is really the case.

4) Bargaining as an Alternative to War

In "Rational Explanations for War", Fearon (1995) raises the intriguing question of why war is not always averted by bargaining, for "...under broad conditions, the fact that fighting is costly and risky implies that there should exist negotiated agreements that rationally-led states in dispute would prefer to war" (p. 409). The article is an account of the circumstances where the statement may turn out to be false, where war cannot be averted by negotiation and compromise. The claim is that war cannot be averted when "(1) the combination of private information about resolve or capability and incentives to misrepresent these, and (2) states' inability, in specific circumstances, to commit to uphold a deal." (P.409) The first of these impediments to bargaining is exemplified by a situation where leaders in both states believe they have an 80% chance of winning. The second is exemplified by a situation where both states' chance of winning a war are substantially enhanced by striking first and where there is no international policeman to punish states that break a promise not to do so. Fearon's development of these propositions will be reviewed here because they are of interest in their own right but primarily to emphasize a major premise of the analysis, that, but for these impediments, some bargain from a set of all mutually-advantageous bargains would always be struck.

The paradigmatic bargain in Figure 1 can be reconstructed to represent the choice between negotiated settlement and war. Bargainers E and O become countries, perhaps England and the Ottoman Empire. Incomes of people become supposedly well-defined utilities of nations. The no-agreement point becomes the utilities of nations in the event of war. The bargaining range

becomes a continuum of peaceful outcomes, from the most advantageous for one country to the most advantageous for the other. The two principal modifications are the transformation of the no-agreement point to represent *expected* utilities rather than *given* incomes, and the distinction between the no-agreement point and the status quo. Resort to war differs significantly from a mere absence of agreement, and harmony between nations may be fostered by a status quo. These modifications will be examined in a reformulation of the bargaining problem in Figure B3.

T

he intrinsic uncertainty about the outcome of war converts the no-agreement point into an expected outcome. War, in this context, is a gamble in which each country's expected utility is a weighted average of its probabilities of victory and defeat. If country E wins, its utility becomes U_E(W, v), where W is mnemonic for war and v is mnemonic for victory, and country O's utility becomes U_O(W,d), where d is mnemonic for defeat. If country O wins, its utility becomes U_O(W, v), and country E's utility becomes U_E(W,d). As it is always better to win than to lose,

$U_E(W, v) > U_E(W, d)$ and $U_O(W, v) > U_O(W, d)$ as illustrated in the figure.

If country E's probability of winning is π, then its expected utility in the event of war becomes $U_E(W, \pi)$ where

$$U_E(W, \pi) = \pi U_E(W, v) + (1-\pi)U_E(W,d)\} \qquad \text{(B7)}$$

and where $U_E(W, \pi) = U_E(W, v)$ when $\pi = 1$ and $U_E(W, \pi) = U_E(W, d)$ when $\pi = 0$. Essentially the same relation holds for country O.

$$U_O(W,\pi)\} = (1-\pi) U_O(W, v) + \pi U_O(W,d)\} \qquad \text{(B8)}$$

For all values of π from 1 to 0, the countries' expected utilities can be represented by points on the "war line" in figure B3, a downward sloping straight line from the point $\{U_E(W, v), U_O(W,d)\}$ when $\pi = 1$ to the point $\{U_E(W, d), U_O(W,v)\}$ when $\pi = 0$. For any given value of π, the utilities of the two countries - $U_E(W, \pi)$ and $U_O(W,\pi)$ - are represented by a point α on the war line. The point α plays the role of the no-agreement point in Figure 1, once the opportunities for bargaining are introduced.

Since war is harmful while bargaining is not, any outcome on the war line can be bettered for both countries by a deal to avoid war, but, as in the paradigmatic bargain, such deals are not unique. All peaceful accommodations are shown on the "bargaining line" in figure B3, a downward sloping from a point (not labeled) where country O is no better off than if it had lost the war but country E is better off than if it had won, to a point where country E is no better off than if it had lost the war but country O is better off than if it had won. For any point such as α on the war line, there must be a range of points on the bargaining line at which utilities of both countries are greater than at the point α.

Not all peaceful allocations are preferable to both nations than the resort to war. When the nations' expected utilities in the event of war are represented by the point α, the range of feasible bargains becomes the portion of the bargaining line from β to δ. At the point β, the entire surplus accrues to country E, leaving country O just as well off but E distinctly better off than if there had been a war. At the point δ, the entire surplus accrues to country O, leaving country E no better off but country O distinctly better off than if there had been a war. As in Figure 1, the bargaining problem is to choose a point between β and δ.

The other special feature of bargaining between nations is that there may be a "status quo" represented in figure B3 by the point φ on the bargaining line. In negotiation between businessmen over the sharing of profit from a joint venture, the no-agreement point and the status quo were one and the same. Failure to agree caused a reversion of incomes to whatever they would have been if the joint venture had never been considered. In dealings between nations, failure to agree peacefully can leave one or both nations worse off than before. In one case, negotiation takes both parties from their original position to something better. In the other, negotiation failure takes one or both parties from their original position to something worse.

As long as the status quo lies within the range from β to δ, it may serve as a focal point for peaceful cooperation. War may be averted through mutual recognition of its privileged position on the bargaining line.[12] Each country says to the other, "I'll fight rather than accept any point on the bargaining line other than the status quo itself." Neither country may be inclined to push for change, and there is no war. No country would accept a bargain different from the status quo for fear that it would be pushed, bit by bit, to the wrong edge of the bargaining range - country E to toward δ and country O toward β - at which peace is no better than the expected outcome of war.

When potential conflict is over territory, the status quo would be a more or less well-recognized border that both nations are willing to respect. But respect for a status quo is far from inevitable. In a dispute about territory, country E may claim ownership because it captured the territory in the glorious battle of 1362, while country O may claim ownership because it captured the territory in the glorious battle of 1478. Or disputes between nations may be about matters such as trade relations or global warming for which there is no prior rule that all nations have been accustomed to recognize. Or a status quo once recognized may not be recognized forever. It is an unfortunate characteristic of any status quo that, as illustrated in figure B3, both countries may be better off ceding some territory to the other - country E moving along the bargaining line toward the point δ, or country O moving along the bargaining line toward the point β - if the only alternative to concession is war. One country may simply announce that the old status quo is no longer acceptable.

There is another possibility. As illustrated in Figure B4, countries may resort to war because they differ in their assessments of the prospect of victory. It was assumed in the construction of figure B3 that there is no disagreement about the probabilities of victory or about the countries' expected utilities, as represented by the point α on the war line. That may not be so.

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[12]Focal points are discussed in Schelling (1956).

Instead, as in the choice between settlement and trial as described below, each nation may be relatively confident of its prospect of victory. Country E may see its probability of winning as π_E, and country O may see its probability of winning as π_O where, $\pi_E > \pi_O$. Different expectations of victory imply different expected utilities of war represented by distinct no-agreement points α_E ard α_O, where excess confidence in victory implies that α_E is to the left of α_O along the war line.

Figure B4: Some Causes of War

Corresponding to the no-agreement points, α_E and α_O, are a distinct ranges, $\{\beta_E , \delta_E\}$ and $\{\beta_O , \delta_O\}$, on the bargaining line. Country E's bargaining range $\{\beta_E , \delta_E\}$ must begin and end to the left of the beginning and the end country O's bargaining range $\{\beta_O , \delta_O\}$, but the ranges may or may not overlap. If the ranges overlap, there is still room for a bargain to avert war, somewhere between β_O and δ_E. Otherwise, as illustrated in figure B4, there is none. As figure B4 is constructed, the countries' predicted utilities in the event of war - $U_E(W, \pi_E)$ and $U_O(W, \pi_O)$ as indicated by the point α^* above the bargaining line - are high enough that war really would be preferable to negotiation if both countries' predictions of their utilities were correct. One or both predictions must be mistaken, but that mistake leads to war.

Another cause of war can be illustrated by a reinterpretation of Figure B4. Think of α_E and α_O not as perceived no-agreement points, but as actual no-agreement points depending on which country strikes first. Once again, there would be a mutually-advantageous bargain if α_E and α_O were close enough that β_O is to the left of δ_E , leaving a range within which both countries are better off than they would expect to be in the event of war, regardless of who strikes first. Such a bargain is possible but very fragile. Fearing that the other country might strike first regardless, each country acquires a strong incentive to do so itself.[13]

A third interpretation of the no-agreement points in figure B4 is that countries' prospects at war may change over time. Think of π_E and π_O as pertaining to different times rather than different expectations or different actions. Let π_E be country E's probability of winning a war today, while π_O is country E's probability of winning a war tomorrow. If π_E is significantly larger than π_O, then country E has an incentive to declare war today, when its probability of winning is high, rather than to wait until tomorrow when its probability of winning is low and when the terms of a bargain to avert war will have be become unfavourable. Bargains at different times may be interdependent, as when a country's ability to wage war tomorrow depends on how much territory it will have acquired in bargaining today. A reasonable and accommodating country might be nickle-and-dimed into defeat.

Behind these causes of war lies a problem of commitment. Almost regardless of the technologies of bargaining and of war, some bargain preferable to war can almost always be devised as long as both sides can be confident that promises will be kept. It is precisely that confidence which may be lacking in relations between nations. Promises not to strike first or not to reopen negotiation tomorrow when relative strengths have changed are not credible unless resort to war is disadvantageous to both countries.

In explaining the descent from negotiation to war, Fearon starts with the premise that one way or another, some bargain from the set of all mutually-advantageous bargains would be struck if circumstances conformed to the paradigmatic bargain in figure 1. Somehow, countries would settle upon one point on the continuum from β, which the is best for country O, to δ, which is the

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[13]Both countries' first strike advantage may be reduced when both countries are armed. By arming itself, country E increases its chances of winning a war, pushing α^E and α^O to the left along the war line. Correspondingly, country O would push α^E and α^O to the right. When both countries arm themselves, it is at least possible that α^E ard α^O are pushed together, opening an opportunity for bargaining that might not otherwise exist. On arming see, Garfinkel (1990) and Intrilligator and Brito (1984).

best for country E. Fearon's argument is that even if some bargain would be struck in these conditions, the circumstances of nations are different enough from the paradigmatic bargain that no alternative to war can be agreed upon. This not to deny that the premise may turn out to be false. Countries may resort to war because they cannot agree on which bargain to adopt. Countries may be just plain stubborn, each demanding a better deal than the other is prepared to allow.

A common thread runs through all of the examples in this appendix: the sharing of profit, the choice between settlement and trial, the balance of influence between legislature and executive, the determination of public policy by voters, legislators and the executive, and the descent into war. All identify special circumstances of the parties in conflict, on the working assumption that some accommodation will be found when disputes conform to the paradigmatic bargain. Either a specific bargain (such as a fifty-fifty split) is postulated or it is explained how actual disputes differ enough from the paradigmatic bargain that no common ground remains. It is not my purpose to fault this procedure. Bargainers do often split the difference. Special circumstances can be interesting and important. My purpose is to suggest that confidence in the determinacy of bargaining can be unwarranted and to call attention to the distance between the common premise that mutually-advantageous will, one way or another, be struck, and a full-fledged bargaining equilibrium where people act in their own interest exclusively, maximizing utility in the light of what others are expected to do.