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Strategic Aspects of Hegemony

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Abstract: Hegemony is a central feature of contemporary international politics but it remains seriously under-theorized. We draw on cooperative game theory to represent and analyze different aspects of hegemony. After developing a general conception of hegemony, we analyze the circumstances under which a Hegemon needs assistance from allies, examine when prospective allies have incentives to cooperate with or challenge Hegemon and evaluate the prospects for exploitation by Hegemon. Throughout, we connect the analytic analysis to the existing theories of international hegemony and illustrate the models with real world examples.

1. Introduction

Hegemony is a central international feature of our time. For better and worse, the American Hegemon overshadows all other states in economic, military and even cultural matters. To understand the likely course of international politics, then, we need to understand the impact of hegemony. But the analytic tools for this analysis are not well-developed.[1]

Cooperative game theory offers a set of models that potentially capture some aspects of hegemony but that have not been brought to bear on this important problem. This paper presents and explores these models to expand our understanding of different facets of hegemony. We address a range of important questions that are raised by hegemony:

- What is hegemony? And how can we represent it analytically? We take up this that task in Section 2 and continue it throughout the remainder of the paper with a progression of models.
- When will Hegemon use alliances to help it to achieve its goals? Why do allies join and how do they fare? Will Hegemon prefer to use one general alliance or will it prefer to use *ad hoc* alliances for different problems? (Section 3)
- When can Hegemon exploit its strategic advantage without compromising its power? (Section 4).
- When will other states challenge Hegemon, perhaps by forming alliances of their own to counterbalance against it?[2] (Section 5)

We answer these and further questions rather abstractly, with the help of some game theoretic models. This approach treats hegemony as a power structure rather than as a consequence of the personality of political leaders, such as whether they are ruthless or charismatic. While George W. Bush has certainly affected the direction of American foreign policy, for example, our focus is on those aspects of American policy which are the result of the structural position of the United States as the preeminent state power rather than the particular choices made within that setting. The same is true for subordinate states whose actions we seek to explain by their different location in the same power structure. This focus on structural considerations is neither to deny nor affirm the importance of individual leaders and their decisions.[3] It is to take the position that the choices of individual leaders and states are heavily shaped by the overall distribution of capacities among states. And our particular focus is on the consequences and possibilities when one state is sufficiently dominant that it can be regarded as a Hegemon.

Of course, cooperative game models rest on certain assumptions which might seem inherently suspect in international relations. Cooperative game theory assumes the enforceability of underlying agreements to divide the gains of joint action, for example, whereas international politics are often depicted as a situation of anarchy lacking any such mechanisms. Our use of cooperative games is not intended to deny the importance of enforcement problems but, instead, to raise the discussion of other equally important issues in hegemonic cooperation; we set aside enforcement problems for the moment, in order to focus centrally on the multilateral and distributive elements of hegemonic power that are not typically represented well in non-cooperative games. Moreover, many problems of hegemony in the contemporary world are problems among "friends" where the difficulties of agreement that we illuminate below are more significant than the enforcement of agreements once reached.[4]

It would be desirable to develop a single model that simultaneously illuminates all the aspects of the phenomenon in which we are interested. One may yet be discovered. When it is, however, we fear that that mega-model will probably be far too complex to allow for simple analytic results. To make a start at investigating the strategic aspects of

hegemony, we use different partial models (and different solution concepts) to investigate different specific aspects of hegemony. Our fundamental purpose is simply to open up lines of analysis that will advance us towards a more comprehensive understanding of the operation of international hegemony.

2. What is Hegemony?

International hegemony refers to a preponderance of power and influence that allows Hegemon to have substantially greater impact than other states on international issues and on establishing and maintaining the rules and norms of the system. Hegemony can be regional (as with Chinese hegemony over East Asia at various points in history) or it can be global (as with British hegemony in the nineteenth century or American hegemony in the twenty-first century). However, even global hegemony does not mean total control but only substantial influence across a wide range of areas and issues. In that sense, hegemony is very different from empire, in which control over subordinates is through formalized and hierarchical patterns of control and potentially runs deeper.

Hegemony is inherently multidimensional. The centrality of war and peace at the international level makes the ability to project force and defeat opponents a key underpinning of hegemony. But in an interdependent world, where military coercion is not necessarily the most (cost-)effective form of influence, other dimensions of hegemony are essential. Economic hegemony defined in terms of production, trade, technology and finance provides powerful levers to influence less powerful states. Dominance in other perhaps less desirable capacities, such as the ability to generate more ozone-depleting emissions than anyone else, can also create a certain type of preeminent importance for a state. Finally, dominance can be rooted in ideas, including the ability to persuade others to accept your policies and authority. Examples include the spread of neoliberal economic policies such as free trade, or the *primus inter pares* status of the United States in international institutions such as the Security Council or World Bank where its policies are regularly legitimated. These latter forms of control are more subtle, but not necessarily less consequential, than the more coercive levers normally associated with hegemony.[5]

Is the US really a hegemonic power? On military matters, whether in advanced technology or overall military spending, the United States has a vast advantage over other states – individually or even combined. But even here its power is not total. It could easily defeat and conquer Iraq, but finds it difficult to control that territory and its operations there have proven a major drain on its ability to act militarily elsewhere. Other key security issues (including terrorism, nuclear proliferation and drug traffic) cannot be solved by the United States acting alone. On economic issues, the United States is the most dynamic large economy and certainly directs international policy – but it still needs to call on the other large economies to follow its lead. Effective action on global health, environmental and human rights issues also require participation by other states. Ideologically, America's main values are in the ascendant in the post-Cold War period but its ideas are regularly challenged on issues ranging from global warming to the international criminal court.

Thus American hegemony is a mixture. The United States does not control every issue, but no other state comes close to its overwhelming capacity or is as necessary for successful international collaboration. Thus the view we take below is of a Hegemon that has a preponderant impact on outcomes but that cannot achieve everything on its own. This creates incentives for cooperation that are intermixed with distributive issues whereby Hegemon has incentives to exploit the subordinate states, which in turn have incentives to challenge hegemony. The result is that the exercise of hegemony, and the exercise of resistance against hegemony, are inherently political and are reflected in the forming of coalitions among the parties to achieve their ends. In brief, hegemony is not just about preponderant power but about how it is used and how it is resisted.[6]

2.1. The Cooperative Game Theoretic Approach

Cooperative game theory, with its abstract representation of power constellations via their characteristic function, provides a way to investigate the circumstances of hegemony. This formulation captures both the preponderant ability of the Hegemon as well as its inability simply to impose its desired outcomes. It does not capture all of the nuances of different international settings, but concentrates on the differential capacity of states to affect systemic

outcomes – which is the central feature of Hegemony. Finally, cooperative game theory allows us to see Hegemony as involving both a cooperative project as well as a contested one – both from above and from below.[8]

For an easy illustration of the cooperative game approach, consider Figure 1. There, the potential Hegemon player *h* is at the top; the other players are *s* (second) and *t* (third). The payoff sums *a*, *b* and *c* are the surpluses that neighbouring players can share by working together:

h and *s* together could share *a*;

h and *t* together could share *b*;

s and *t* together could share *c*.[9]

Ex hypothesi, $a>b>c\geq 0$, so the power relations of the three players is obvious. The stronger player in each bilateral relation is the one who is relatively less reliant on that relationship by dint of having a superior "outside option" in terms of collaborating with the third party:

h is stronger than *s* since $b>c$;

h is stronger than *t* since $a>c$;

s is stronger than *t* since $a>b$.

But this in itself is not sufficient to justify calling player *h* a Hegemon, since the differences a-b and b-c could be rather small, rendering the power discrepancies rather minor. Thus we view a formal definition of Hegemony as a situation where one state is stronger than any other to be rather unconvincing.

[Figure 1 about here]

2.2. The Quota Solution Approach

An alternative would be if the solution payoffs of the weakest and/or of the two weaker players approach their minimum. An easy way to explore this is to examine the quota solution that makes players indifferent between the coalitions they can form, but leaves open the question of which coalition actually should result.

Assuming that each player acting alone gets nothing, the quota solution $u=(u_h, u_s, u_t)$ requires

$$u_h + u_s = a;\ u_h + u_t = b;\ u_s + u_t = c.$$

Since $a>b>c\geq 0$, this yields

$$u_h = [(a+b-c)/2] > u_s = [(a+c-b)/2] > u_t = [(b+c-a)/2] \geq 0$$

The grand coalition $\{h, s, t\}$ can only guarantee these quota payoffs when its value is at least $u_h+ u_s+ u_t = (a+b+c)/2$. Since core stability in the sense of

$$u_h + u_s \geq a$$

$$u_h + u_t \geq b$$

$$u_s + u_t \geq c$$

implies $u_h + u_s + u_t \geq (a+b+c)/2$, the condition for a non-empty core is equivalent to the feasibility of the quota solution.

2.3. Divide-and-conquer and Bandwagons

One limiting case rendering h rather powerful occurs when $a=b+c$ yielding $u_h = b$, u_s=c, and u_t=0. Now player t is powerless in the sense of u_t=0, and from

$$u_s/u_h = c/b$$

we see that player h becomes more hegemonic as $(c/b)\rightarrow 0$. Since $b > 0$, this condition also corresponds to $c \rightarrow 0$, which means that the other actors have no effective outside option of acting without Hegemon. Moreover, $c\rightarrow 0$ together with $a = b+c$ means that $b\rightarrow a$. The intuition for h's hegemony in this sense is that h can join a profitable coalition with either s or t who must compete for his attention, whereas players s and t can only join a profitable coalition with h who is indifferent between them as partners..

This situation represents the political strategy of "divide and conquer" whereby Hegemon plays the other actors off against one another in order to extract all of the gains for

itself. Note, however, that the dominant actor does not act alone but must instead work with others to achieve its goals. Hegemon achieves $u_h = b \rightarrow a$ only by forming a coalition with one of the other players, even as he extracts their entire joint surplus by the implicit threat to work instead with the other. The British used this tactic in Ireland and then perfected it in India and its African colonies by dividing a colonial population along ethnic or religious differences in order to create coalitional divisions it could exploit in this way.

This situation also resembles what international relations scholars label "bandwagoning," where "as soon as someone looks like the winner, nearly all jump on the bandwagon rather than continuing to build [opposing] coalitions …" (Waltz 1979:126). Although traditional realist theory argues that bandwagoning is less likely than balancing (discussed below), recent evidence suggest that even great powers frequently bandwagon (Sweeney and Fritz 2004). Bandwagoning applies to more than security matters, of course. The eagerness of other states to join free trade arrangement with the United States – such as CAFTA – allows the US to get a very favorable deal and the small economic allies relatively little. The quota solution suggests that such countries do so, not because they necessarily gain much from bandwagoning, but rather because (given the competition among them to curry favor with Hegemon) it is the best that they can achieve.

2.4. A Limit of the Quota Solution

There are however some serious arguments against analyzing hegemony in this way.

To see why, let $a = b + c$ and $c = \varepsilon$ be a small positive number much smaller than either *a* or *b*. The quota solution suggests that player *h* is a Hegemon that captures virtually all the gains in the game[11] represented by Figure 2, whereas *ex hypothesi*, player *h* by himself can achieve only the value of the non-coalition $\{h\}$ – which has been set equal to 0 by normalization (without loss of generality). Does that not suggest that our intuition is too superficial? For $\varepsilon \rightarrow 0$ the quota solution implies $(u_h, u_s, u_t) \rightarrow (a, 0, 0)$, which is contrary to the fact that *h* cannot achieve anything alone. That result raises questions as to whether the quota solution provides a proper representation of hegemony.

[Figure 2 about here]

Moreover, since $a=b+c$ and $c=\varepsilon$ imply $b=a-\varepsilon$, Hegemon is only marginally stronger than the second actor so the circumstances is bipolar rather than hegemonic. These considerations lead us to consider an alternative solution concept which pays more attention to what a player can achieve on its own.

2.5. The Shapley Value Approach

For this approach, we need to make some further stipulations. Let us guarantee superadditivity[12] by assigning the grand coalition $\{h, s, t\}$ the maximal payoff of all two-player coalitions, i.e. $v(\{h,s,t\}) \geq a$. Our analysis above showed that this also guarantees the feasibility of the quota solution and the non-emptiness of the core.

Under these circumstances, the Shapley (1953) value can provide an alternative measure of "power" in coalitions. It is derived by assuming that all sequences of gradually building up the grand coalition $\{h, s, t\}$ are equally likely, and then attributing to each successive player the amount that he adds to the coalition value in each sequence. Table 1 calculates the Shapley value $(u_h, u_s, u_t) = [(2/3)a-(\varepsilon/2), (a/6)+(\varepsilon/2), a/6]$ for the current example. Now, as $\varepsilon \to 0$, Hegemon's power approaches 2/3 rather than 1, suggested by the quota solution. Thus even $\varepsilon \to 0$ would not render h fully hegemonic as measured by h's Shapley-value.

[Table 1 about here]

For the more general game structure in Figure 1, the Shapley-value is $(u_h, u_s, u_t) = [(a/2)+(b/6)+(c/3), a/2)-(b/3)+(c/6), (b/6)+(c/6)]$ or if normalized, i.e., divided by a, $[(1/2)+(b/6a)-(c/3a), (1/2)-(b/3a)+(c/6a), (b/6a)+(c/6a)]$. To render the weakest player t powerless thus requires both $b, c \to 0$. That however would mean that h and s become equally powerful – which undermines the notion of hegemony. This illustrates that defining hegemony via power indices requires more extreme assumptions. For the game of Figure 1 with $a > b > c \geq 0$ the Shapley-value of h can never become 1. Actually for $c = 0$ a

(relative) Shapley-value $u_h = 1$ requires $b = 3a$ and thus $b > a$ and $v(\{s\}) \leq -\frac{1}{2}$ due to $u_t = 1/2$.

With a hegemonic power, the assumption that all orders of forming the grand coalition are equally likely may be hard to accept. To avoid this, one might assign more weight to orders favoring stronger players (so in Table 1 a higher row would get more weight). But this would question the axioms characterizing the Shapley-value. Furthermore, in asymmetric power situations the Shapley-value will, quite pathologically, fail to be in the (non-empty) core – which, as shown above, reveals the extreme exploitation possibilities of the hegemonic power more dramatically.

There is a large literature on the uses of the Shapley-Shubik and other power indices, most recently in the context of the European Union. Different power indices are premised on different formal assumptions (Laruelle and Valenciano 2001) and can under certain circumstances very yield different results (Nurmi and Meskanen 1999).

One thing that all power indices have in common is that they all are highly sensitive to institutional context. That is true not just in terms of the decision rule within the institution in question, such as the EU (Nurmi and Meskanen 1999). It is also and more importantly in terms of the larger concatenation of institutions dictating the menu and order of options for that particular institution to consider (Garrett and Tsebelis 1999; Dowding 2000).[13] The same is clearly true when considering the power of Hegemon, more generally.

Another thing that all power indices also have in common is that they all revolve around the idea of being "pivotal," or decisive for a coalition. That is a notion that lies at the heart of the next approach that we shall consider.

2.6. Is Hegemony an Apex-game?

"America stands alone as the world's indispensable nation," President Clinton declared in his Second Inaugural address and the phrase became a catchword for American foreign policy. [14] French Foreign Minister Hubert Vedrine made the same point in a perhaps less complimentary way by coining the term "hyper-puissance" to describe the American

position. But indispensability and hyper-power does not mean that pure unilateralism is an adequate policy. Madeleine Albright has elaborated "while I said indispensable, I never said omnipotent."[15]

The Apex game provides a way to represent this situation. Let the set of players be $N = \{h, 1, ..., n\}$ with $n \geq 2$. The Apex-game relies on the characteristic function

$$v(C) = \begin{cases} 1 \text{ if } [h \in C \text{ and } \#C \geq 2] \text{ or } [C \supseteq \{1, ..., n\}] \\ 0 \text{ otherwise} \end{cases}$$

for all $\varnothing \neq C \subset N$. Note that the core is empty. $u_h > 0$ can be blocked by $C = \{1, ..., n\}$ and $u_i > 0$ can be blocked by $C = \{h, j\}$ with $j \neq i$. The quota solution is more generous regarding the small players *i = 1,…, n* due to

$u_h^* = \dfrac{n-1}{n}$ and $u_i^* = \dfrac{1}{n}$ for all $i = 1, ..., n$.

Hegemony, as captured by $u_h^* > u_i^*$ for $i \neq h$, thus requires *n>2* (since for *n=2* the quota vector is symmetric) and its strength could be measured by *n-2*.

3. Forming Coalitions to Bandwagon with Hegemon

Often the hegemonic player *h*, in spite of its dominance, prefers to form an alliance rather than going it alone as it intervenes on some issue. The US, for example, has been the most influential actor in former Yugoslavia, Afghanistan and Iraq but has actively sought and relied upon support from various countries (or "coalitions of the willing") in each case. Here we briefly discuss why Hegemon seeks such support and then explore its implications for the composition and stability of coalitions.

Sometimes Hegemon requires support for logistical or other reasons. Its airplanes may need overflight permission when traveling on missions from Europe to the Middle East, or its armies may need bases for local staging before an invasion. Often there are alternatives: if Turkey won't offer an invasion route into Iraq, Kuwait is available. But to the extent that other countries control resources that are necessary or valuable for hegemonic activity, or can

dramatically lower its costs, then we might expect those states to be influential in the hegemonic coalition.

A more general reason for seeking support is burden-sharing. Sometimes this comes in kind as when allied nations provide material and share in the cost of war, including casualties. Burden-sharing can also be monetary, as illustrated by the over fifty billion dollars provided by allies (notably Kuwait, Saudi Arabia, the Gulf States, Germany and Japan) in support of the First Gulf War. Finally, even when other states do not directly support Hegemon's operations, they can facilitate them by not opposing them in ways that might raise the costs of the activity.

An underappreciated but vital form of support is international legitimation of Hegemon's actions. Hegemon's need for this is well-illustrated by the strong efforts of the United States to gain UN backing for the Second Gulf War and, especially in the absence of that, to establish a long list of "coalition of the willing" members (even if it included many states that were of no real consequence to the War). On the international side, such legitimation is part of an effort to assure other countries that Hegemon is not inherently aggressive and is only taking its action at the behest and in the interest of the broader international community (Abbott and Snidal 1998). On the domestic side, international legitimation helps reassure domestic audiences that the costs of international adventures will not become too high and provides some independent corroboration that the reasons given for the external action are valid.

3.1. Entering Hegemon's Coalition

Consider two possible international political outcomes: H (successful hegemonic coalition) or N (international disorder). Suppose that:

$$u_h(H) = \quad 1 > u_h(N) = 0$$

$$u_i(H) = \begin{cases} 1 \text{ with no participation} \\ c_i \text{ with participation} \end{cases} \qquad u_i(N)=0$$

where $0 < c_i < 1$ for all smaller states $i = 1, \ldots, n (\geq 2)$.

Let us now add the requirement that Hegemon is indispensable to coalition success but that the participation of at least *some* other state or states is also essential for *H*. In this circumstance there can exist multiple equilibria of the coalition-entry game. (It also raises issues of burden-sharing which we discuss in section 3.3 below.) Equilibrium selection theory implies a solution based on the formation of the most efficient hegemonic coalition (i.e, countries *i* join *h* in H such that joint payoff, i.e. the sum of $u_h(\cdot)$ and all $u_i(\cdot)$ is maximized).[16] This can be elaborated as follows. Let

$i = 1,...,n(\geq 2)$ be *h's* potential partners

m with $1 \leq m \leq n$ is the minimum number of partners needed by *h*

a_i : *i*'s payoff if H forms

d_i : *i*'s payoff under N

c_i with $0 < c_i < a_i - d_i$: *i*'s cost of participating

Choices (simultaneous by all *i = 1,…, n*):
Strict equilibria: $\delta^* = (\delta_1^*,...\delta_n^*)$ with $\sum_{i=1}^{n} \delta_i^* = m$

Equilibrium Selection (see Selten/Güth):
$\delta_i^* = 1$ if $a_i - d_i - c_i$ belongs to the m largest $a_k - d_k - c_k$.

That is simply to say that Hegemon's coalition partners will be determined by a suite of familiar factors. The "coalition of the willing" is most likely to be drawn from potential partners who gain more if Hegemon's coalition succeeds, who lose more if it fails, and whose relative costs of participating in the coalition are lower.[17] That is to say, it is formed by those who altogether receive the (*m*) largest dividends $a_k - d_k - c_k$ from intervention.

These variables help explain the pattern of hegemonic coalitions that we observe both in coalitions at a point in time and in comparing coalitions across time. Consider the two most recent Gulf Wars. In both cases, the United States sought allies who could lower its costs, and prospective allies who faced lower cost were more likely to participate. Middle Eastern countries found it relatively "inexpensive" to participate in the First Gulf War which could be presented to domestic the Arab "street" as defense of another Arab state (Kuwait). These same states found it much more costly to participate in the Second Gulf War where the

impetus for invasion was largely external to the region. Other costs also mattered. Thus, whereas Saudi Arabia gave very strong support in the first war because of the threat to its oil, it was not even a nominal member of the coalition in the second war. Jordan, primarily concerned with its relations with the Palestinians, was unwilling even to join the first coalition and gave tacit support to Iraq.

A similar pattern can be found among the Western states where strong support for the First Gulf War was replaced by mixed support and even substantial opposition to the Second Gulf War. Canada, for example, sent troops to the first war but opposed the second one. Particularly strong opposition to the second war came from countries such as France and Russia which had significant oil and debt-related considerations vis-à-vis Iraq. Conversely, the strongest supporters for the Second Gulf War included Britain and Australia who found greater value from assisting America with whom a strong partnership has been a central part of their general foreign policy strategy. Finally, the majority of the most recent "coalition of the willing" members were small countries which provided essentially verbal support and thus small amounts of legitimation of American strategy at low cost to themselves. And, as al Qaeda understands, increasing costs cause members to drop out of the coalition.

3.2. Ultimatum Proposing when Confronting Several Responders

Next we consider how Hegemon might exploit its strategic position in a situation where, as above, Hegemon requires "any of many" potential coalition partners to join with it to succeed (Goodin 2003). We model that situation as an Ultimatum Game, in which Hegemon is the Proposer and the many potential coalition partners are each treated as Responders.

p: monetary pie with $p>1$

$c_i \in (0,1)$: i's cost if no agreement is reached

$c_i = U(0,1)$: uniform distribution of c_i which is independent and identical for all $i = 1,\ldots,n(\geq 2)$

m: minimum number of responders who must accept

$o \in [0,1]$: offer by h to (all) responders, i.e. even to those who do not accept.

Solution:

i's acceptance only if $o \geq c_i$

$$U_h = [p - no]F(o) - c_h[1 - F(o)] \text{ with } F(o) = \sum_{k \geq m}^{n} \binom{n}{k} o^k (1-0)^{n-k}$$

$$U_h'(o) = (p - no)F'(o) - nF(o) + c_h F'(o) = 0$$

$$\Leftrightarrow F'(o)[p - no + c_h] = nF(o)$$

$$\frac{F'(o)}{F(o)} = \frac{n}{p - no + c_h} \qquad \text{equation for solving}$$

with $F'(o) = \sum_{k \geq m} {}^{n}_{k} o^{k-1} (1-o)^{n-k-1} (k - no)$ yields $o^* = o^*(m)$!

What this captures is a situation where:

* supporting Hegemon is costly for the other states;
* the gains of intervention can be shared between Hegemon and all other states, but in the latter case without discriminating among them; and
* only *m* supporters are needed.

The costs of supporting could be the threat of terrorism or domestic troubles. The condition that all other countries gain equally would hold when, for instance, a common risk is avoided by intervention.

Now, any offer $o < 1$ runs the risk that than *m* partners join the alliance, so that no intervention takes place. Thus Hegemon faces a tradeoff between guaranteeing an intervention (by $o \rightarrow 1$) and burdening its allies with its costs (by $o \rightarrow 0$). Apparently, in the Iraq War, the US relied more on large *o*, i.e. high compensations for potential allies, in order to guarantee that the intervention can be framed as "alliance intervention."

3.3. Hegemonic Coalition-hopping and "Indispensable Allies"

Hegemon may be indispensable, but is the same ever true of other allies? Even the most powerful Hegemon can use help from other states. As noted above, ally assistance can make hegemonic operations easier, whether by providing overflight for military aircraft, by sharing information on terrorist networks or by more general burden-sharing. But can certain allies also become indispensable in the sense of being so valuable that Hegemon needs to turn to them for collaboration – and, of course, reward them for their services?

Local indispensability may arise when a country's location makes it essential for some task. Pakistan is perhaps indispensable in the quest to capture Bin Laden, which has greatly strengthened its bargaining position with the United States. But, in general, even when Hegemon requires assistance from other actors, no single source of local support is absolutely necessary. In the run up to the Second Gulf War, for example, the need for a Northern front made Turkey appear indispensable and it was reported to have been offered $30 billion in US foreign assistance as a reward for its participation. The fact that the invasion was successful without strong Turkish support shows that indispensability is often relative and depends on the available alternatives.

"Location" for local indispensability need not be geographic, of course. It can be religious or cultural – one of the advantages of Turkish support would have been to have a major Islamic country as a prominent member of the coalition. Location can also be political. States are favorably located as nonpermanent members of the Security Council when it has important issues before it. This was very apparent before each of the Gulf Wars as the United States showered promises of aid on potential supporters on the Security Council. A recent study shows that these were not idiosyncratic events and estimates that "US economic aid increases by 77 percent and UN development aid rises by 42 percent to countries that serve during a typical important year for the council" (Kuziemko and Werker 2004). The authors also find suggestive evidence that United States seeks to build the "cheapest winning coalition" which is consistent with the assumptions of the analysis below.

Perhaps the most interesting case of prospective indispensability is suggested by the British "poodle" strategy of developing a special relation in support of the United States.[18] Britain has presented itself as possibly the only country with both the will and capacity to assist the United States around the globe. The case for its policy rests in part on the assumption that such participation gives it special leverage with Hegemon.

To assess the virtues of this policy, let h be the Hegemon and denote three other players a, i and g. There are two different intervention places A and T. At both places h is the decisive power; but it needs assistance to succeed.[19] Intervention in place A is the only place

where *a* can be helpful, and *T* is the only place where *i* can be helpful; but *g*, being relatively influential and powerful on its own, can be of global help at both places *A* and *T*.

We capture the power discrepancies rather abstractly by representing the situation of different alliances *A* and *T* at the two different intervention locations as well as the case of a global alliance *G* intervening at both places by the various characteristic functions where, of course,

$$h \in A, T \text{ and } G$$

must hold invariantly. Here again our example is rather stylized to show that the existence of alternative coalitions, and the possibility of alliance-hopping, might help the hegemonic power *h*.

At place *A*, resp. *T*, let the power structure be captured by the characteristic function

$$v_A(C) = \begin{cases} 1 \text{ if } h \in C \text{ and } |C| \geq 2 \\ 0 \text{ otherwise} \end{cases}$$

for all coalitions *C* with $C \subseteq \{h, a, g\}$ and

$$v_T(D) = \begin{cases} 1 \text{ if } h \in D \text{ and } |D| \geq 2 \\ 0 \text{ otherwise} \end{cases}$$

for all coalitions $D \subseteq \{h, i, g\}$. Thus like h also country g is a power which can intervene at various places whereas countries *a* and *i* can at most intervene locally. What distinguishes *h* and *g* is that whereas *h*'s participation is a *conditio qua non* for coalitional success, *g* can be replaced by various local actors (*a* or *i*). For the case *G* of a global alliance we assume that any global alliance *E* including *h* and *g* can intervene at both places and gets whatever its subgroups can achieve at the individual places. Compared to this, any non-global alliance can intervene only at one of two places. Thus we obtain

$$v_G(E) = \begin{cases} 2 \text{ if } h \in E \text{ and } [g \in E \text{ or both } a \text{ and } i \in E] \\ 1 \text{ if } h \in E \text{ and } [g \notin E \text{ but } |E| \geq 2] \\ 0 \text{ otherwise} \end{cases}$$

for all $E \subset \{h, a, i, g\}$.

Core stability requires that each subgroup, including the individual players and the grand coalition of all players, collectively receives what it can guarantee to itself according to the characteristic function. Applying that requirement yields, for the case of keeping the two interventions separate, the result that at place *A* it must hold that

$$u_h+u_a \geq 1,\ u_h+u_g \geq 1 \text{ with } u_h+u_a+u_g=1;\ u_h,\ u_a,\ u_g \geq 0$$

which implies u_h=1, u_a=0, u_g=0. Similarly we obtain u_h=1, u_i=0, u_g=0 for independent intervention at place *T*.

When, however, relying on the same coalition, resp. alliance, at both places, i.e. when the power structure is captured by $v_G(.)$, the core stability requirements are

$$u_h+u_g \geq 2,\ u_h+u_a+u_i \geq 1,\ u_h+u_a \geq 1,\ u_h+u_i \geq 1 \qquad (*)$$

together with

$$u_h+u_a+u_i+u_g = 2 \text{ and } u_h,\ u_a,\ u_i,\ u_g \geq 0.$$

To prove that coalition-hopping might help *h*, we need to show that *h* does not fare as well if it can only rely on the global alliance at both intervention places. To prove that, it suffices to show that there exist solutions (u_h, u_a, u_i, u_g) of (*) with u_h<2, since u_h=2 is what *h* can achieve in case of forming separate local alliances at places *A* and *T*. To illustrate this possibility let ε be positive and smaller than 2 and assume

$$u_h=x,\ u_a=o,\ u_i=o \text{ and } u_g=2-x.$$

Clearly, all the requirements in (*) are satisfied by all solutions

$$u(\varepsilon)=[u_h(\varepsilon)=x,\ u_a(\varepsilon)=o,\ u_i(\varepsilon)=o,\ u_g(\varepsilon)=2-x]$$

satisfying $1 \leq x \leq 2$. In case of an overall alliance, it is even possible that $u_h = u_g$, namely for $x=1$. For all $u(x)$-solutions, however, it quite generally holds that $u_h(x) \geq u_g(x) \geq u_a(x) + u_i(x)$. This, in our view, illustrates in a rather abstract but simple way that hegemonic powers like the US may be interested in alliance-hopping.

The hegemonic power does not actually have to shift coalitions since the possibility of such shifts is sufficient to limit the sharing of benefits of the alliance. Even if the second state is always in the alliance, it is not indispensable provided Hegemon has the alternative of seeking different local partners. As a result, second states should expect to have their payoffs suppressed while the hegemon extracts the greater share of gains from their collaboration. The (rare?) exception will be when an ally truly is indispensable, most likely for reason of geography.

4. The Conflict between Exploiting and Preserving Hegemony

Two views of hegemony have been prominent in the international relations literature. "Benevolent hegemony" is associated prominently with Charles Kindleberger's (1973) argument that hegemony was beneficial because Hegemon provides the public good of international order (including peace, stability, open markets and a sound currency) within which the international system works well. "Coercive hegemony," adopts a more traditional realist view, following in the spirit of Thucydides, that hegemony enables the exploitation of the weak by the strong. The "power transition" argument, however, suggests that even power-oriented approaches can see preponderant power as more generally valuable insofar as overt conflict is avoided when no state can challenge Hegemon.[20]

When analyzing the tension between exploiting and preserving hegemony, we obviously need to find some reason why it can exist in the first place and some reason why it may end. Some causes of hegemony are exogenous, such as economic growth that caused first the rise of British hegemony and then its decline as the US and Germany caught up. The "power transition" literature sees internal economic developments as the main engine of change in the distribution of power and argues that a peaceful transition from one hegemon to another is possible provided that the rising state is relatively satisfied with the international

order under the declining hegemon. Another possibility is that hegemony is endogenous and is determined by the distribution of gains among states over time. The "relative gains" debate revolves around this issue and whether such distributive considerations might actually render cooperation infeasible (Grieco 1988; Powell 1991; Snidal 1991). If such power shifts are possible, however, they might lead to peculiar dynamics surrounding declining powers. For example, all actors may have an incentive to support a not-too-exploitative Hegemon, in order to avoid end-game effects as a hegemon tries to extract heavily because it has no future. In that case we might expect hegemony to persist until there is some big external shock.

Our analysis assumes that the hegemonic power has gained its dominance by some prior move whose costs are sunk and can therefore be neglected (unless the hegemonic player *h* suffers from some sunk-cost fallacy). But Hegemon's position does not necessarily remain unchallenged. If Hegemon *h* exploits its dominant position too much, the other parties (here, countries) may invest to gain in, for example, military strength or influence to overturn Hegemon.

As before, we keep matters as simple as possible. Let us therefore assume that there is just one potential "Challenger" that could, by incurring some cost C, break h's hegemony.[21] We assume these costs to be a random variable with (for the sake of simplicity) some positive density function $F(.)$ on $[0,\infty)$ with distribution $F'(.)$. Let us consider R, the degree of exploiting hegemony, as h's strategic decision variable. It is intuitive that h's benefit $B(R)$ depends positively on R, whereas Challenger's benefit $b(R)$ depends negatively on $R(\geq 0)$. In addition, the benefits to Hegemon and to Challenger from the Hegemon's provision of international order can be captured by the Υ and α terms, respectively. Let us assume a linear specification for Hegemon's payoff of

$$B(R) = \Upsilon + \varepsilon R \text{ with } \Upsilon, \varepsilon > 0$$

and a specification for Challenger's payoff of

$$b(R) = \alpha - \beta R \text{ with } \alpha, \beta > 0$$

where the absence of hegemony results in zero payoffs to both players.[22]

Now, if Challenger has to invest C to break h's hegemony (where C measures both the cost plus the benefit or loss from living without a dominant counterpart), then Challenger will refrain from trying to break h's hegemony as long as

$$\alpha\text{-}\beta R \geq C$$

Thus the probability of maintaining hegemony is $F(\alpha\text{-}\beta R)$, namely, the likelihood that the cost level C does not exceed $\alpha - \beta R$.

Since losing hegemony results in a zero payoff, h tries to maximize the expected benefit

$$U(R) = F(\alpha\text{-}\beta R)[\gamma + \varepsilon R]$$

from hegemony. From

$$U'(R) = -\beta F'(\alpha - \beta R)[\gamma + \varepsilon R] + \varepsilon F(\alpha\text{-}\beta R) = 0$$

and

$$U''(R) = \beta^2 F''(\alpha\text{-}\beta R)[\gamma + \varepsilon R] - 2\beta\varepsilon F'(\alpha\text{-}\beta R) < 0$$

under appropriate assumptions we can derive an interior optimum which is Hegemon's optimal use of his presently dominant position.

Suppose F (.) is the uniform distribution on [0,1], so that $U(R)$ becomes $U(R)=(\alpha\text{-}\beta R)(\gamma+\varepsilon R)$ and $U''(R) = -2\beta\varepsilon < 0$ holds.

Thus

$U'(R)=0$ implies $R^*=(\varepsilon\alpha\text{-}\beta\gamma)/2\beta\varepsilon$

where we assume parameters such that $0<R^*<1$ holds.[23]

It is unsurprising that exploitation increases when it provides more benefits (ε) to Hegemon, or even that exploitation decreases when it is more costly (β) to Challenger and thus more likely to provoke a challenge. Several less obvious points are however worth noting about the optimal level of exploitation. First, R^* is also increasing in the benefits that

hegemony provides to Challenger (α) since Hegemon can then exploit at a higher level without provoking a challenge. Second, if (contrary to our earlier assumption) hegemony does *not* benefit the Challenger ($\alpha \leq 0$) then Hegemon will not exploit ($R^* = 0$, its lower bound) because Challenger is easily provoked. Thus a benevolent Hegemon (by virtue of the order that it imposes) can also be a more exploitative Hegemon (in terms of the policies that it pursues). Third, R^* is decreasing in (γ) since if the prevailing order serves its interests well then Hegemon does not want to risk upsetting those benefits through excessive exploitation.

This more dynamic view incorporating Hegemon's concern for maintaining its hegemony in the face of a possible Challenger helps us refine our conception of "coercive" versus "benevolent" hegemony. Rather than being separate understandings of hegemony (as standardly portrayed in the international relations literature), coercion and benevolence are inter-mixed in the operation of hegemony. Hegemony by its nature creates the ability for Hegemon to structure the system in ways that potentially have wider benefits even for subordinates but simultaneously opens up opportunities for their exploitation. The mix of coercion and benevolence that obtains then depends on the specific values for the positive and exploitative impacts of hegemony in combination with Challenger's possibilities for overthrowing Hegemon.

5. Forming Balancing Counter-coalitions Against Hegemon

Sometimes no single state can challenge Hegemon but a coalition of states can join together to counterbalance against Hegemon's power. Although the classic "balance of power" system of eighteenth- and nineteenth- century Europe is typically framed as oriented towards preventing the emergence of a preponderance of power, the same general principle can be used to describe efforts to balance against and check a preponderant power.[24] Here we examine the potential for a coalition among subordinate states operating to limit hegemonic exploitation.

Here we explore in some more detail – for a negotiation problem rather than for a military conflict – whether a counter-alliance is likely to form when one side at the negotiating table is hegemonically structured. More specifically, it is assumed that the

hegemonic side is just one player *H* (Hegemon), whereas the other side is split up into two (asymmetric) players who could, however, work together in a counter-alliance.

We begin with the decentralized case *D* where parties *X* and *Y* negotiate independently with *H* -- in two separate demand games -- to distribute a given positive surplus ("pie") p_x and p_y respectively. In each game, parties *i* (*i*=*X*,Y) and *H* make demands u_i and u_H; parties earn what they demand if $u_i+u_H \leq p_i$; otherwise conflict results. The conflict payoffs are $c_x=0$, $c_y=\gamma$ with $0<\gamma<p_y$ and $c_H=0$ in both cases. This specification differentiates the two bilateral games since for *X* and *H* the agreement surplus is p_x whereas it is only $p_y-\gamma$ for *Y* and *H*. Finally, we rely on the Nash (1950; 1953) bargaining solution to select a unique strict equilibrium outcome.

We assume that only two alternative agreements are available. This simplifying assumption is for analytic purposes but it might also capture substantive features of international politics. In particular, focusing on the two cooperative outcomes allows us to capture the possibility that an important aspect of hegemony may be the capacity to change the international agenda.[27] (Indeed, one complaint against recent US international behavior is that it has required other states to dramatically alter agreements including the Kyoto Protocol and the ICC, even though it did not ultimately ratify the changed agreement.) If Hegemon presents no alternative, then agreement *A* will result according to the prevailing rules and norms of the international system. If Hegemon places an alternative agreement *B* on the agenda, however, then the choice between *A* and *B* depends on bargaining between Hegemon and other countries.

We therefore first consider the decentralized choice over two bilateral agreements between Hegemon and each of the others states, *X* and *Y*, in isolation:

- *A*-agreement assigning α with $\min\{p_x, p_y\}>\alpha>\gamma$ to parties *X* and *Y* in each negotiation; and
- *B*-agreement assigning β to *X* and *Y* where $\alpha>\beta>\gamma$ holds.

Hegemon receives the positive residuals $p_x-\alpha$, $p_y-\alpha$, $p_x-\beta$, and $p_y-\beta$ and, since $\alpha>\beta$, Hegemon will attempt to use its agenda setting power to achieve *B*.

In the decentralized and isolated negotiation with *X,* Hegemon's agenda-setting power will be effective and its preferred *B*-agreement will be chosen over the *A*-agreement if[28]

$$(p_x-\beta)\beta > (p_x-\alpha)\alpha$$

or

$$\alpha+\beta > p_x$$

Similarly, in its negotiation with *Y*, Hegemon will achieve the *B*-agreement if

$$(p_y-\beta)(\beta-\gamma) > (p_y-\alpha)(\alpha-\gamma)$$

or

$$\alpha+\beta > p_y+\gamma$$

How much power does this agenda setting confer on Hegemon? A sophisticated Hegemon can design Agreement *B* in order to maximize its gains in dealing with each of the actors and, depending on the problem, may even be able to offer different β's to the respective states. Although we do not explore that here, such strategic agenda-setting power would appear to confer significant advantages to the Hegemon. In fact the circumstances of its effectiveness are somewhat limited. In particular, Hegemon's agenda power is effective only if *h* offers more to *X* under Agreement *B* than Hegemon would have received under Agreement *A* (i.e., $\beta > p_x-\alpha$). The strength of *Y*'s outside option (γ) further circumscribes Hegemon's agenda-setting power in their bilateral relation (i.e., $\beta > p_x - \alpha + \gamma$). In short, this agenda-setting power helps Hegemon most when he does poorly under Agreement *A*; when Hegemon fares well under the initial agreement then agenda-setting power is of limited value.

Now consider the alternative case *C* of centralization, where states *X* and *Y* merge their negotiation positions in counter-alliance *XY* to Hegemon *H (*who must now offer the same α or β to both states) . We assume that *XY* has everything at its command that *X* and *Y* have individually at their command. Thus $p_{xy}=p_x+p_y$ and $c_{xy}=\gamma, c_H=0$ holds for the case *C* of centralization. In case *C* the condition for an A-agreement is therefore

$$(p_{xy}-2\alpha)(2\alpha-\gamma) > (p_{xy}-2\beta)(2\beta-\gamma)$$

or

$$(p_x+p_y+\gamma)/2 > \alpha+\beta$$

where again the reversed inequality would induce a *B*-agreement for case *C*.

We now can answer the question of when counteralliance *XY* can limit *H*'s dominance. In our stylized set-up this requires an *A*-agreement between *XY* and *H* in place of at least one bilateral *B*-agreement in the decentralized case *D*. (We concentrate on the dyad involving *X* and *H* since *X* has a lower conflict payoff than *Y* and therefore is the state that will fare poorly on its own.) Thus we need

$$(p_x+p_y+\gamma)/2 > \alpha+\beta > p_x$$

which combines the condition that case *C* leads to an A-agreement with case *D* resulting in B-agreement between *X* and *H*. Here the right-hand inequality requires that the sum of α and β exceeds p_x, i.e., what *X* and *H* can share when negotiating bilaterally and independently of Y. This is why *X* achieves the less favourable negotiation result. The left inequality demands will $p_{xy} = p_x+p_y > 2(\alpha+\beta)-\gamma$. To see that the overall condition defines a generic parameter region one can either[30] let $p_y-p_x \rightarrow 0$ or explore the region where the condition holds in the full $(p_x, p_y, \alpha, \beta, \gamma)$-space as defined by the initially imposed restrictions. This proves that there exists the possibility that a hegemonic power on one side of the bargaining table might inspire the formation of a counter-alliance on the other side. Note that the asymmetry in conflict payoffs of *X* and *Y* is essential. In the special case of, for instance, $p_x = p = p_y$ the requirement that *X* and *Y* gain by merging cannot be fulfilled.

It is, of course, also possible that *X* and *Y* would lose by forming a counter-alliance, in which case it should not form. This disincentive would apply, for instance, when $p_y+\gamma > \alpha+\beta > (p_x+p_y+\gamma)/2$; there, *XY* would fail to reach the more favourable *A*-agreement, but *Y* alone would still manage to do so.

Moreover, it is not the case that *both X* and *Y* can be made *better* off through coalition which requires that both bilateral (i.e., decentralized) negotiations yield the same (*A*- or *B*-) agreement.

6. Conclusion

In short:

- Hegemony in the modern world is not absolute but depends variously on acquiescence of, assistance from, and collaboration with others.

- Hegemony need not depend on coercion but can be effective, including at exploiting allies, because of the possibility of cooperating with multiple others.

- Hegemon's power is greatest when it can "divide and conquer" because it depends on no other states yet they all depend on it. When Hegemon is truly powerful, "bandwagoning" may be the only recourse for other states.

- But subordinate states are not powerless. Sometimes the possibility that one of them can challenge Hegemon works to reduce the level of exploitation. Alternatively, subordinate states may form coalitions to balance against Hegemon.

- Hegemony is never a simple matter of coercion versus benevolence. The two elements are inter-mixed and the rational Hegemon partakes of both.

The models we have canvassed are all partial. Each captures some aspect of hegemony, but none captures all. The correct choice of model thus depends on a substantive understanding of the particular issue. As we emphasized at the outset , hegemony is not a simple or singular phenomenon to be captured by a single model. Instead, it is a complex circumstance that depends on a range of things, including

coalitional possibilities (going to a more detailed characterization of the structure of power and interests), particular circumstances of different issues and associated institutional details. Partial though it is, hopefully the set of analyses we have here presented might stimulate further work on this, one of the most important topics of our time.

Figure 1: Payoffs to Players in a Hegemonic Game ($a > b > c \geq 0$)

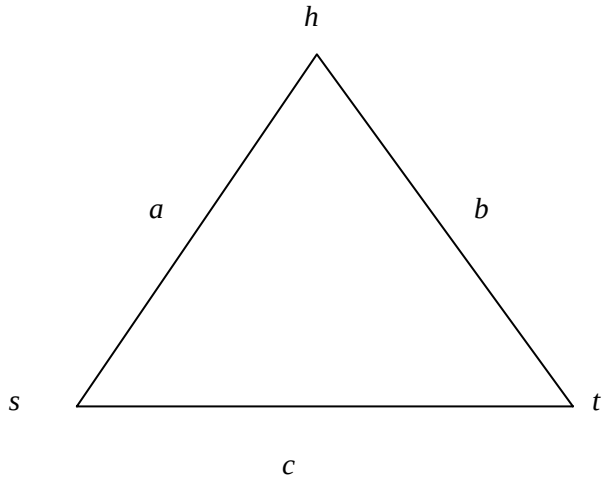

Figure 2: Payoffs to Players in a Hegemonic Game ($a >> \varepsilon \geq 0$)

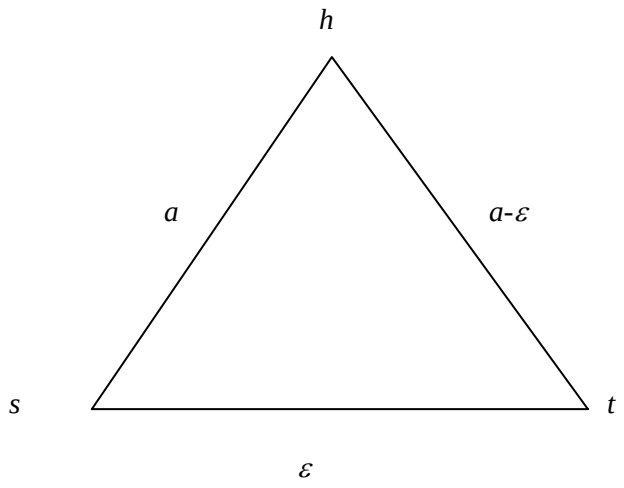

Table 1

Sequence			Value added by:		
1st	2nd	3rd	h	s	t
h	s	t	0	a	0
h	t	s	0	ε	a-ε
s	h	t	a	0	0
s	t	h	a-ε	0	ε
t	h	s	a-ε	ε	0
t	s	h	a-ε	ε	0
$\sum/6$			$(2/3)a$-$(\varepsilon/2)$	$(a/6)$+$(\varepsilon/2)$	$a/6$

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Notes

[1] The partial exception is the public good/privileged group analysis that underlies some strands of "hegemonic stability theory." But this is a very special case which, in particular, does not capture the potentially exploitative aspects of hegemony.

[2] This of course presupposes that others suffer from hegemony. In the literature (e.g. Snidal 1985, p. 581) this is often questioned by viewing hegemony as one-sided public-good provision like military security. Then the "small may exploit the large" (Olson and Zeckhauser 1966). This can be shown formally by reinterpreting the analytic results of price leadership (Güth, Ockenfels and Stephan 1989) and experimentally for leadership by example (Güth, Levati, Sutter and van der Hejden, 2005).

[3] Of course, sometimes the focus on individual leaders is misleading. Every German Chancellor would have brought about German reunification, if given the chance afforded Kohl by Gorbachev. Similarly, the fact that the Christian Democrats have attacked the German government, especially Chancellor Schröder, for its opposition to intervention in Iraq does not mean that they, in power, would have joined the US alliance.

[4] Indeed, the relation between cooperative and noncooperative games is closer that often understood; see Moulin (1995).

[5] Thus the term *primus inter pares* ("first among equals") is itself a deceptive oxymoron. It denotes an actor who is equal except for seemingly minor housekeeping responsibilities (calling meetings, setting agendas etc.),but these capacities often can be parlayed into more substantial influence as with the Prime Minister of Britain or the Chief Justice of the US Supreme Court. Although we do not define hegemony in terms of these institutional strengths, we do show below how they may matter.

[6] To some extent, this parallels the view that "soft power" matters (Nye 2004; Pape 2005). But "soft power" is not well defined and this paper can be seen as exploring some of the channels through which it can be better understood.

[8] Because cooperative game theory focuses on the distribution of payoffs, it is stronger on the material dimensions of Hegemony than on ideational dimensions where factors such as information are more central.

[9] Here, we do not consider the grand coalition (i.e., the coalition {h, s, t}) but focus for now on hegemony "over" some other actors. Later we look at hegemony deriving from Hegemon's special importance in the grand coalition.

[11] Note that for Figure 2 feasibility of the quota solution requires $v(\{h,s,t\}) \geq a$.

[12] Superadditivity means that a group can achieve at least as much by working together as its members can achieve by working separately or in smaller groups. Substantively, it is a generally easy assumption to accept since the larger coalition can simply operate by having members behave as they would have on their own.

[13] Modeling the latter would require a shift from cooperative to non-cooperative game theoretic models.

[14] The phrase "indispensable nation" is usually associated with Madeline Albright but Clinton used it to introduce her appointment as Secretary of State in December 1996. The concept was not totally new -- Woodrow Wilson enunciated a similar position that "every nation of the world needs to be drawn into the tutelage of America" (quoted in Colley 2005).

[15] Interview on Australian Broadcasting Corporation, National Radio, March 7, 2004.

[16] See Harsanyi and Selten (1988) and, for application to entry games, Selten and Güth (1982).

[17] In effect, this equilibrium criterion is that the most efficient coalition will form. One way to conceive of this is with the Hegemon as an entrepreneur assembling the lowest-cost coalition that can provide the public good. This extends the "benevolent" hegemony model discussed below.

[18] We name this in honor of British Prime Minister Tony Blair who was seen as "George's Bush's poodle" for his unwavering support of American policy towards Iraq. Blair's

strategy was premised on the notion that Britain would have more influence inside the American tent than outside of it.

[19] This specification is therefore of a relatively weak Hegemon whose participation is necessary but not sufficient for successful intervention. This raises the bargaining power of weaker states that can potentially "hold up" Hegemon, rather than simply raise its costs by withholding support. Conversely, we do not show that case where other actors cannot hold up Hegemon but they are monopoly providers of some form of assistance (e.g., the Northern front) that lowers its costs – and therefore can expect to be rewarded for such assistance.

[20] See Organski (1958) and a useful overview by DiCicco and Levy (1999).

[21] The dramatic case is when a "rising challenger" confronts Hegemon, as Germany challenged British naval supremacy before World War I. But challenges can also be focused on specific and smaller issues, as when France opposed US hegemonic action in the Security Council over Iraq II.

[22] Thus R=0 corresponds to the benevolent hegemony view, while $\alpha, \Upsilon = 0$ corresponds to the coercive view. We can also distinguish between "hegemony without exploitation (R=0)" and absent or "lost hegemony" where $B(R) = b(R) = 0$. Finally, note that while Challenger can upset Hegemon we do not include the possibility of Challenger instituting an alternative hegemonic order of its own (with some $\alpha', \Upsilon' > 0$ etc.).

[23] For R^* being interior of [0,1] one of course has to impose $\varepsilon\alpha - \beta\gamma < 2\beta\varepsilon$.

[24] Seminal analyses include Gulik (1955) and Kaplan (1957). The Achilles' heel of the classic balance of power system is, of course, that prospective members of the counter-coalition have incentives to free ride in the hope that other prospective members of the coalition will bear the burden of countering Hegemon. The Congress of Vienna can be seen as an effort to slightly institutionalize the system of balancing to surmount this problem and it arguably worked well for over thirty years. Interestingly, the formal models of balancing (Wagner 1986; Niou et al. 1989) tend to solve this problem through "knife-edge" equilibria where the balancing coalition is

enforced by the prospect that if *any* member free rides then Hegemon can conquer the system. These equilibria are similar to the general problem being studied here where there is a clearly preponderant power (unlike the classical system) and the question is whether other states can contain its hegemony.

[27] See Gruber's (2000) analysis of "go-it-alone power" which provides a parallel discussion of how Hegemon has power in the international system through its ability to disrupt the status quo outcome. Note that this different aspect of hegemony in terms of control over the rules is likely secondary to other sources of hegemonic power discussed earlier.

[28] Note, though, that the assumption that there are only two possible agreements and no possible compromises between them has the implication that the Nash bargaining solution of the continuous game with all divisions of the pie is not actually reached. In effect, we are assuming that the rules of the international system place other restrictions on outcomes that limit the available solutions As a result, the actors are forced to settle for (and assumed to settle on) the agreement that is closer to the Nash solution, in terms of yielding the greater product of utility gains.

[30] So that due to $p_x=p=p_y$ the condition becomes $(\gamma/2)>\alpha+\beta-p>0$ which can be satisfied generically by choosing $\alpha+\beta-p$ small enough compared to $\gamma/2$.