A Political Economy of International Organizations*

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Abstract

Powerful states exercise both formal and informal power over international organizations (IOs). Successful IO design limits the degree of this influence in order to maintain the participation of other member states. We explore the relationships between vote shares, cost shares, and agency expertise in a model of project finance, where projects have both developmental (public) value to the broader membership, and geopolitical (private) value to the hegemonic state. The IO secretariat biases its recommendations in favor of hegemonic powers, even though its incentives diverge from those of the powerful states. Greater IO expertise limits the degree to which the secretariat "shades" its recommendations, and reduces the political value of larger vote shares for the hegemon. Incentive-compatible IO participation requires that the secretariat's expertise be bounded.

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1 Introduction

Powerful states exercise significant influence within international organizations (IOs), leveraging both formal and informal power to achieve political objectives outside the institution's mandate (Vreeland 2019). Rank-and-file member states voluntarily participate in and contribute to these IOs, fully cognizant of the fact that the institutions are often manipulated to serve the interests of the powerful (Stone 2008). All the while, by working through international organizations, major powers and the broader membership alike cede some degree of authority to an international bureaucracy with its own independent interests (Vaubel 1996), raising the risk of considerable agency losses for the principals (Hawkins, Lake, Nielson, and Tierney 2006). How can this form of institutionalized cooperation be sustained in the face of such conflicting interests—and under what conditions does it fail?

We investigate these questions through a game-theoretic model of the formation, accession, evolution, and day-to-day functioning of an international organization. We examine the strategic interaction among two sets of principals—a hegemon and a collective of member states—and, most importantly, an agent—the IO secretariat— who each seek to advance their own independent interests within the institution. Consistent with existing research on international cooperation, we focus on the IO's ability collect and disseminate information as its core virtue, and a primary motivation for member states' participation (Keohane 1984, Rodrik 1996, Johns 2007, Fang and Stone 2012, Johnson and Urpelainen 2014).

Through this framework, we identify a fundamental tension between the informational value of an IO and its political utility to its most powerful stakeholders. A core insight of our analysis is that the hegemon's benefit from a larger vote share within the IO declines as the agency's expertise increases. This result follows from the agency's incentive to identify and recommend projects that can simultaneously satisfy the public-goods objectives sought by the broader membership, and the private political interests of the hegemon. With low expertise, the agency is reliant on support from both sets of stakeholders in order to get projects approved; the ambiguity in projects' developmental value provides the hegemon with a greater degree of leverage over the project approval process, which it exercises in service of its geopolitical interests. With high expertise, however, the secretariat becomes less dependent on the hegemon's support to achieve its bureaucratic goals. In the extreme case, the agency's expertise can render participation in the IO incentive-incompatible for the hegemon, who prefers exiting rather than remaining in an institution that fails to advance its interests. Accounting for the agency's strategic incentives also yields a number insights regarding the optimal allocation of vote shares and cost shares within the institution: most notably, we find that the member states will prefer ceding some power to the hegemon in order to induce the agency to be more forthcoming with its project recommendations.

Recent years have seen increasing challenges to global governance, from Brexit, to the Trump administration's withdrawal from various bodies of the United Nations[1] and de facto suspension of the World Trade Organization (WTO) appellate body, to a spate of withdrawals from international human rights bodies across the Global South (Von Borzyskowski and Vabulas 2019, Voeten 2020, Walter 2021). The tension between agency expertise and hegemonic influence provide a novel explanation for these challenges and withdrawals. Our theory also provides microfoundations for a number of recent empirical findings regarding the internal workings of IO bureaucracies: for instance, Honig's finding that political imperatives force managers in international development organizations to counterproductively restrain field agents from fully utilizing their expertise (Honig 2019); and Clark and Dolan's observation that IO bureaucrats implicitly internalize the preferences of their political principals (Clark and Dolan 2021). By focusing on the agency of the IO secretariat, as well as the need for IOs to elicit voluntary participation from member states with divergent interests, we uncover a previously unexamined source of tension inherent in global governance.

[1] Including UNESCO, the UN Human Rights Council, and the World Health Organization.

2 Hegemonic Influence and States' Participation

International organizations are widely recognized to be influenced, even captured at times, by powerful states.[2] Aid commitments and disbursements from the World Bank are larger and disbursed faster when the recipient country is aligned with the US (Andersen, Hansen, and Markussen 2006, Kersting and Kilby 2016). Loans from the International Monetary Fund (IMF) and World Bank commitments are larger when a developing country holds a temporary seat on the UNSC (Dreher, Sturm, and Vreeland 2015, Dreher, Lang, Rosendorff, and Vreeland 2022), and countries politically important to the US obtain IMF loan agreements (Dreher and Jensen 2007, Stone 2008, 2011) and World Bank loans (Clark and Dolan 2021) with fewer and less stringent conditions than others.[3] Allies of the US and other powerful states recognize this benefit, and may engage in riskier behavior—holding lower levels of international currency reserves and experiencing more frequent currency and banking crises (Lipscy and Lee 2019). Broz and Hawes (2006) offer evidence that the IMF is sensitive not just to US concerns, but specifically to the interests of US money-center banks.

This hegemonic influence extends beyond the World Bank and the IMF. The Dispute Settlement Body at the WTO, for instance, has at times chosen not to rule against the US, citing judicial economy or other devices, in order to avoid risking the approbation of a powerful state (Steinberg 2004, Garrett and Smith 2002). The dispute settlement process permits a number of opportunities for the powerful to affect the outcome—whether it is simply a matter of legal and bureaucratic capacity (Busch and Reinhardt 2003) or by selecting the members of appellate body (Steinberg 2004, Arias 2018). The European Court of Justice, Garrett and Weingast (1993, reprinted 2019) argue, similarly adjusts its decisions to accommodate outcomes preferred by the more powerful states.

Yet despite such hegemonic influence, other states persist in joining, legitimizing, and

[2]For a recent challenge to this conventional wisdom, see Copelovitch and Powers (2021).

[3]Dreher, Sturm, and Vreeland (2015) recount Zimbabwe's about-face at the UNSC in 1992 when threatened with new loan conditions from the IMF when it voted against a US-sponsored resolution on Iraq.

financially contributing to these international organizations. The World Bank has 189 members, each with a voting share roughly proportional to the fraction of the Bank's capital held by the member. For instance, Germany's 4.3% of Bank capital entitles it to a 4.1% vote share, which is vastly outweighed by the United States' 15.8% vote share.[4] A similar structure is adopted at the Inter-American Development Bank, where the US holds the lion's share of the votes (30%), but Argentina, for example, is limited to an 11.4% vote share.[5]

Why, then, do the Germanies and the Argentinas of the world participate if these IOs are so heavily captured by the US?

Some states (the "Argentinas") are direct beneficiaries of IO programs, in that they receive loans and bailouts which support their economic stability and development. While the conditions attached to these loans may present domestic political difficulties for the recipient governments (or opportunities; see Vreeland (2003)), this is a separate question from the one we take up presently; we take the recipient states' participation to be largely uncontroversial. The more puzzling behavior we investigate pertains to the incentives of those states (the "Germanies") that contribute to the IO's finances while expecting little or no private benefit in return.

For these less powerful, contributing member states, who are not net recipients of IO largesse, we take as given their desire for the IO to efficiently and effectively provide a global public good, namely economic development. These states, of course, can promote development independently, without channeling their resources through an institution which is susceptible to hegemonic capture. Thus a basic requirement for the survival of the IO is that it provide some value above and beyond what the members could achieve on their own. Our model highlights two such potential benefits: first, the opportunity to leverage "other people's money", particularly that of the financially flush hegemon; and second, the expertise of the IO bureaucracy in identifying projects of high developmental value which justify the members' financial investment.

[4] Specifically, in the IBRD: https://www.worldbank.org/en/about/leadership/votingpowers
[5] https://www.iadb.org/en/about-us/capital-stock-and-voting-power

We study a generic IO in which the members make contributions and vote on IO actions ("projects") according to an established voting rule. The IO undertakes a project, which provides both public goods (which we call "developmental" value) and private benefits ("political" value) to a powerful (hegemonic) state. We permit the IO secretariat (alternatively, the "agency") to acquire information about the developmental and private benefits, and if the secretariat recommends that the membership support a project, it also offers an assessment as to the developmental value of the project. The accuracy of this assessment is determined by the agency's *expertise*.

The three (sets of) players—agency, hegemon, and members—are assumed to have orthogonal interests with respect to the IO's performance. We adopt this approach not because we believe it to be a strictly empirically accurate representation of the actors' incentives, but rather because it elucidates the mechanisms by which a confluence or divergence of interests among the players emerges as an equilibrium phenomenon, rather than by assumption. In particular, we assume the agency to be purely "imperialist", in the tradition of Niskanen (1971): it wishes to maximize its budget and scope of activity, with no intrinsic concern for the political or developmental value of the projects it undertakes (Vaubel 1996). The members care only about the developmental value of a project. The hegemon, in contrast, has no interest in a project's developmental value, and is assumed to care only about its political value.

Through this framework, we derive a number of results regarding the design and operation of IOs. First, we find that the IO secretariat internalizes the interests of both the hegemon and the member states: that is, it acts as if it is concerned with advancing economic development as well as the hegemon's political objectives, even though it intrinsically cares about neither. The agency adjusts its recommendations strategically to accommodate the hegemon's interest, sometimes recommending hegemon-supported projects of relatively low developmental value which it would have rejected absent the hegemon's support. But it also recommends projects which provide no political benefit to the hegemon, when they are of sufficiently high developmental value.

Second, we show that funded projects include a mix of those with both high and low developmental value. Projects with low developmental value tend to be those of political value to the hegemon—not because the hegemon prefers to stymie economic development, but simply as an artifact of the selection rule that the agency applies when recommending projects. These first two results are consistent with a number of existing empirical findings from the IO literature, while the next three are novel implications that arise from our focus on the agency and expertise of a strategic IO secretariat.

Our third finding is that while the hegemon benefits from a larger share of the votes on the governing boards of IOs—effectively increasing its control over the choice of projects and the spending priorities—the benefit declines as the expertise of the IO secretariat increases. As the IO's expertise improves, and it becomes proficient at identifying high-value projects of broad appeal, contributing member states follow the IO's recommendations more frequently, which overwhelms the hegemon's ability to influence the outcomes. Increased expertise reduces the influence of the hegemon's vote share, and the hegemon is less able to get its preferred projects funded. While the agency and broad membership might be expected to embrace improved know-how, the hegemon may want to stifle such expertise.

These differences in the desirability of agency expertise generate a fourth result: that in order to sustain voluntary participation among the hegemon and the broader membership, the IO secretariat cannot have too much, or too little, expertise. The latter point is intuitive: if the IO's ability to discern the developmental value of projects is low, then it may recommend projects of little value to the contributing members; the members may then find the benefit of membership too low to warrant the financial contribution, and may choose to exit or not participate. More interestingly, the level of the expertise of the IO also cannot be too high. With sufficiently high expertise, the agency can achieve its bureaucratic goals simply by serving the interests of the broader membership, and cannot credibly commit to appeasing the hegemon as well. Given the increased technical and scientific capacity of IO bureaucracies, and recent advances in the field of development economics, our results can help to explain a number of empirical phenomena—including the application of political pressure on IO bureaucrats to prevent them from fully utilizing the expertise they have available (Honig 2019), and the increased unwillingness on the part of some member states to continue participating in IOs that no longer serve their interests (Von Borzyskowski and Vabulas 2019, Voeten 2020, Walter 2021).

Our approach also yields some insights for the optimal design of IOs. Our fifth result explores the voting rules at IOs. One might intuitively expect that each state would like to have as large a share of the votes as possible, but this proves not to be the case. From the perspective of the contributing member states, retaining too large a vote share and limiting the hegemon's influence can make the agency reluctant to put forth its recommendations. Conversely, were the hegemon to retain too great a vote share for itself, the agency would not be incentivized to serve the developmental concerns of the contributing members, and the members may no longer see value in continued participation. The optimal design of the voting rule is to permit the hegemon a large vote share, but not *too* large a vote share—consistent with the view that the US sought to exercise "strategic restraint" in constructing the postwar order through the design of international institutions (Ikenberry 2019).

3 Empirical Referent: The World Bank

In what follows, it may be useful to keep as an empirical referent the procedures and structures of The World Bank (or more precisely the International Bank for Reconstruction and Development, IBRD), and the mechanism it uses to choose and approve projects in developing countries for which the WB provides funds and expertise.

The WB offers Investment and Development Project Financing (IPF and DPF), among other instruments available, to member states who wish to finance projects with the goal of promoting economic growth and sustainable poverty reduction.[6] IPF is used

[6] https://www.worldbank.org/en/what-we-do/products-and-services/financing-instruments

for specific development projects, such as infrastructure, agricultural development, and other capital-intensive investments. DPF may be focused more on policy and institutional development, such as funding improvements to public financial management, improving the investment climate, addressing bottlenecks to improve service delivery, and diversifying the economy.

Crucial to the process of project selection and approval is the project evaluation provided by the WB staff. World Bank "project teams" work with borrower governments to identify potential projects. The Bank undertakes an assessment of the project's developmental value and its consistency with WB objectives, and offers an analysis of the technical, economic, fiduciary, environmental, and social considerations and related risks.[7] Given this appraisal, the secretariat chooses whether or not to proceed with the project.

If the secretariat recommends the project, a proposal is submitted to the Board of Directors, who vote on whether or not to approve the proposed project for funding. This board consists of 25 Executive Directors, elected periodically from the 189 member countries, with each director representing a subset of the member states and casting votes on those states' behalf. While the major stakeholders—including the US, Japan, China, Germany, France and the UK—each have their own Executive Director, other countries are represented through a shared vote: for instance, the Director for India also represents Bangladesh, Bhutan and Sri Lanka. The vote shares of each member track closely to the share of the Bank's capital (that is, the cost share) held by each state. As of November 2022, the US's subscription of Bank equity amounts to 42.5 billion in 1944 US dollars, which is 16.48% of the total. This cost share entitles the US to 425,784 votes, which is 15.6% of the total vote share. By comparison, the United Kingdom and France each have below 4% of voting power, and Sweden and Denmark have less than 1%.[8]

[7] https://projects.worldbank.org/en/projects-operations/products-and-services/brief/projectcycle

[8] https://finances.worldbank.org/Shareholder-Equity/IBRD-Subscriptions-and-Voting-Power-of-Member-rcx4-r7xj

Motivated by this empirical referent, the model below presents an abstract representation of an IO which captures the essential features of project evaluation, secretariat recommendation, and weighted voting among the member states.

4 Model

We begin by presenting and analyzing a model of the day-to-day operation of the international organization, taking the institutional features as given. In Section 6 we examine how the IO's operation varies in response to changes in these institutional features, and in Section 7 we turn to questions of institutional design and evolution.

Consider a game with $2 + M$ players: the international organization, or agency, A; a hegemonic state H; and M (contributing) member states indexed $i = 1 \ldots M$. A project is a pair $(\theta, \omega) \in \mathbb{R}^2$, where θ is a measure of the developmental or public quality of the project, of interest to the members, while ω captures the political value of private benefit to the hegemon. We let these be stochastic and independent: $\theta \sim N\left(\mu, \frac{1}{\delta}\right)$ and $\omega \sim W(\cdot)$, where N refers to the normal distribution with mean μ and precision δ; W is any well-behaved cumulative distribution function such that $Pr(\omega \leq x) = W(x)$.

We endow the agency with a measure of expertise δ_A, the precision with which it acquires information about θ, the developmental quality of any particular project. That is, the agency observes a noisy signal centered on the true developmental value $s_A \sim N\left(\theta, \frac{1}{\delta_A}\right)$. Likewise, each individual member state i observes a noisy signal $s_i \sim N\left(\theta, \frac{1}{\delta_m}\right)$. We assume that all signals are conditionally independent (conditional on θ), and that a project's developmental and political values are independent.[9]

The stylized process of project approval proceeds as follows. Nature draws a project (θ, ω). H privately learns its political value ω for the project, and at the same time, each member i and the agency A receive private signals of the developmental value θ. H declares publicly whether it intends to vote for or against the project, $v_H \in \{0, 1\}$, which

[9]Formally, $s_i \perp\!\!\!\perp s_A \,|\, \theta$ and $s_i, s_A \perp\!\!\!\perp \omega$ for all i.

we represent as a cheap-talk message $d \in \{0,1\}$ (where $d = 1$ denotes intent to vote in favor).[10] Then A decides whether or not to recommend the project to the membership, $r \in \{0,1\}$. If a recommendation is made, then A reveals its knowledge, s_A and the members vote on whether or not to fund the project, $v_i \in \{0,1\}$.

Voting proceeds according to the rules of the institution, with each member's vote share weighted according to the exogenous weighting system: H's vote share is α, while the aggregate vote share of the membership is $1-\alpha$. We assume that each contributing member i has the same weight $\frac{1-\alpha}{M}$, and assume a simple (weighted) majority voting rule, so that a project is approved and funded if it receives at least one half of the votes.[11] Let $y \in \{0,1\}$ denote whether or not a project is funded:

$$y = \begin{cases} 1 & \text{if } \underbrace{\alpha v_H}_{H\text{'s vote}} + \underbrace{\frac{(1-\alpha)}{M}\sum_{i=1}^{M} v_i}_{i\text{'s votes}} \geq \frac{1}{2} \\ 0 & \textit{otherwise} \end{cases} \tag{1}$$

To focus attention on the interesting case, we assume that the hegemon holds less than half of the vote share ($\alpha < \frac{1}{2}$), meaning that it cannot pass any project unilaterally.[12]

Projects require funds. The share of the funds for any project contributed by H is $1-\kappa$; the balance, κ is borne by the other member states, and divided evenly among them for simplicity. When deciding to vote for or against a project, the members and the hegemon evaluate the cost of funding a project against the respective benefits they expect it to yield. Implicitly, each player is pre-committed to funding any projects that are approved, regardless of that player's individual preference over the particular project in question; the direct cost of approval can thus be thought of as a payment made from a collective pool of resources, which is replenished according to the contribution shares

[10]Whether the message d is sent publicly to A and all members i, or privately to A, makes no difference for our results.

[11]The assumption of secretariat proposal power and majority voting by the membership follows the general setup of Martin (2006). Our results generalize to approval thresholds other than one half, so long as H does not have unilateral passage or veto power.

[12]As we will see below, this is a necessary condition for member states' participation.

described above.

The hegemon's payoff is simply

$$U_H(v_H|\omega) = \begin{cases} \omega - (1-\kappa) & \text{if } y = 1 \\ 0 & otherwise \end{cases}$$

The hegemon earns the political value less its financial contribution if the project is approved, and zero if the vote fails.

The payoff for any member i of an approved project is its value of the project θ less each member's share of the financial contribution $\frac{\kappa\gamma}{M}$, where γ captures the financial capacity of the hegemon relative to the members. If the project is voted down, then members receive the zero payoff.

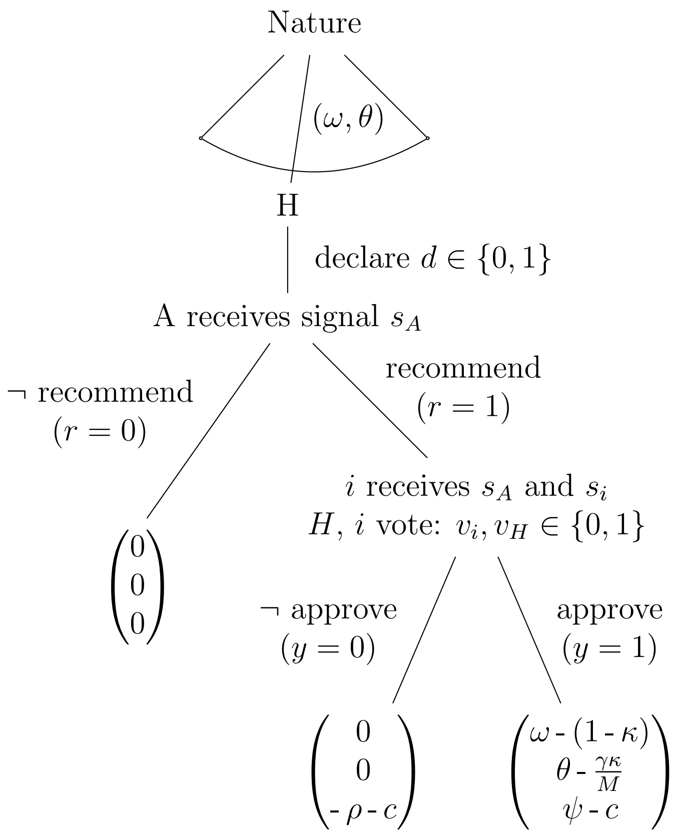
$$U_i(v_i|s_i, s_A) = \begin{cases} \theta - \frac{\kappa\gamma}{M} & \text{if } y = 1 \\ 0 & otherwise \end{cases}$$

The agency benefits by ψ if a recommended project is funded (regardless of the project's quality, θ or ω). Making a recommendation carries an expense c for the agency, representing the administrative and opportunity cost of developing a report and putting it forward for the members' consideration. If the project is recommended but fails to garner enough votes for approval, then on top of the administrative expense, the agency also incurs a reputational cost ρ; this can be thought of as a reduced-form representation of a long-term loss of trust or credibility in the eyes of the organization's stakeholders.[13]

$$U_A(r|s_A) = \begin{cases} r(\psi - c) & \text{if } y = 1 \\ r(-c-\rho) & otherwise \end{cases}$$

[13]All results hold for $\rho = 0$, so long as $c > 0$.

Figure 1: The Project Approval Game



Note: Payoffs are listed, top to bottom, as (U_H, U_i, U_A). H and all members i vote simultaneously, and project approval is determined by Equation (1).

In summary, the sequence of the game is as follows. Nature chooses $(\theta, \omega) \in \mathbb{R}^2$. H observes ω and declares vote intention $d \in \{0, 1\}$. Then i and A receive private signals $s_A \sim N\left(\theta, \frac{1}{\delta_A}\right)$ and $s_i \sim N\left(\theta, \frac{1}{\delta_m}\right)$. Having seen its own signal s_A and H's announcement d, A chooses whether to recommend the project, $r(s_A, d) \in \{0, 1\}$. If A does not recommend $(r = 0)$, the game ends. If A recommends $(r = 1)$, it reports its observed s_A to the membership. Finally, having seen their own individual signal s_i, the agent's report s_A, and H's declaration d, the members simultaneously choose $v_i(s_i, s_A, d) \in \{0, 1\}$. At the same time, H chooses $v_H(\omega, d, s_A) \in \{0, 1\}$. The game tree is depicted in Figure 1, and the notation is summarized in Table A1 in the Appendix. A (perfect bayesian) equilibrium of the game is a set of strategies (d, v_H, r, v_i) for H, A, and $i = 1 \ldots M$ respectively, and posterior beliefs that satisfy Bayes' rule where possible, and such that each actor's strategy is a best response to the other strategies given their beliefs.

4.1 Comments on Modeling Assumptions

Our model makes a number of substantive assumptions which may warrant further consideration.

First, our model assumes an alignment of interests among the non-hegemonic member states. This assumption could be revised in a number of ways. Whereas we currently interpret the individual members' signals s_i as representing their private information about the project's developmental value, we could instead interpret s_i as member-specific benefits (or costs) that flow from a given project; as long as the members care about both their own individual benefits as well as the common developmental value θ (over which the agency has expertise), the qualitative insights of our model carry through. Alternatively, we might consider the possibility of multiple "hegemonic" member states, each having its own geopolitical concerns and a substantial vote share. The core dynamics of our model would characterize the multiple-hegemon setup, though we defer a formal analysis of this alternative model to future work.

Second, we impose some notable restrictions on the procedures for voting and project approval. We do not allow the hegemonic state to have unilateral authority to approve or block a given project. If the hegemon were to exercise such a veto, we would observe an extreme version of the behavior we characterize in the model (namely, the agency fully shading its recommendations in service of the hegemon's interest); and as a consequence, at the IO formation and accession stage, participation would not be incentive-compatible for the member states (except for in trivial cases, as discussed in Section 7 below). In addition (and related to the previous discussion on the alignment of members' interests), our model does not allow for the possibility of any sort of logrolling or horse-trading over votes, which we acknowledge to be an empirically relevant feature of states' behavior within international organizations. Such possibilities may be taken up in future research; for the present analysis, we focus on the strategic considerations that emerge from a one-shot game over a single project's evaluation and approval.

5 Analysis

Before proceeding to the analysis, we impose the following simplifying technical assumption:

Assumption 1 *M is large and the members vote sincerely.*

The assumption provides a clean characterization of the equilibrium and it permits a simple application of the Weak Law of Large Numbers. The agency needs to estimate the number of members who will vote for a project, which is binomially distributed. As M gets large, the share of votes for a project is characterized by A's beliefs about θ.[14]

[14] The assumption allows a simple characterization and we use it primarily for presentational purposes. For small M, the probability that at least n members vote yes is $\sum_{x=n}^{M} \binom{x}{m} p^x (1-p)^{m-x}$, where p is the probability that a member sees a sufficiently high signal that they vote yes given θ. A's belief that there are sufficient votes requires integrating this binominal probability across A's beliefs about θ. Although conceptually straightforward, this quantity is messy and provides no additional insight. The assumption that M is large provides simple equilibrium conditions.

With this assumption in place, we can provide a general characterization of the day-to-day functioning of the international organization, taking the institutional features $(\delta_A, \kappa, \alpha)$ as fixed and considering the game beginning with the stochastic emergence of a project.

Proposition 1 (Equilibrium) *There is a unique Perfect Bayesian Equilibrium with informative communication from the hegemon, characterized by the following set of strategies and beliefs:*

- *H declares truthfully:*
  - $d = 1$ *if* $\omega \geq (1 - \kappa)$
  - $d = 0$ *otherwise*
- *H votes similarly*
  - $v_H = 1$ *if* $\omega \geq (1 - \kappa)$
  - $v_H = 0$ *otherwise.*
- *Given H's declaration d, A recommends the project $(r = 1)$ if $s_A \geq s_d^*$, and otherwise does not recommend $(r = 0)$. That is,*
  - *if* $d = 1$, *then* $r = 1$ *if* $s_A \geq s_1^*$
  - *if* $d = 0$, *then* $r = 1$ *if* $s_A \geq s_0^*$
  - *otherwise* $r = 0$.
- *Members vote*
  - $v_i = 1$ *if* $s_i \geq \widehat{s_i(s_A)}$
  - $v_i = 0$ *otherwise.*
- *The agency's and members' beliefs are characterized by $E[\theta|s_A] = \frac{\delta\mu+\delta_A s_A}{\delta+\delta_A}$ for A, and by $E[\theta|s_i, s_A] = \frac{\delta\mu+\delta_m s_i+\delta_A s_A}{\delta+\delta_m+\delta_A}$ for all i.*

where

$$\widehat{s_i(s_A)} \equiv \frac{1}{\delta_m}\left[(\delta+\delta_m+\delta_A)\frac{\kappa\gamma}{M} - \delta\mu - \delta_A s_A\right] \tag{2}$$

$$s_0^* = -\frac{\delta\mu}{\delta_A} + \frac{\delta+\delta_A}{\delta_A}\frac{\kappa\gamma}{M} + \frac{\delta_m(\delta+\delta_A)}{(\delta+\delta_m+\delta_A)\delta_A}\left[\frac{1}{\sqrt{\delta+\delta_A}}\Phi^{-1}\left(\frac{c+\rho}{\psi+\rho}\right) + \frac{1}{\sqrt{\delta_m}}\Phi^{-1}\left(\frac{1}{2-2\alpha}\right)\right] \tag{3}$$

$$s_1^* = -\frac{\delta\mu}{\delta_A} + \frac{\delta+\delta_A}{\delta_A}\frac{\kappa\gamma}{M} + \frac{\delta_m(\delta+\delta_A)}{(\delta+\delta_m+\delta_A)\delta_A}\left[\frac{1}{\sqrt{\delta+\delta_A}}\Phi^{-1}\left(\frac{c+\rho}{\psi+\rho}\right) + \frac{1}{\sqrt{\delta_m}}\Phi^{-1}\left(\frac{1-2\alpha}{2-2\alpha}\right)\right] \tag{4}$$

The proofs of the propositions are provided the Appendix. Below we develop the intuition behind this proposition, and then discuss its implications for observed patterns of IO operation.

5.1 Learning and voting

Since the hegemon cares only about a project's political value, H has a dominant strategy: H votes Yes (and declares support) when the political value of a project exceeds H's share of the cost: $\omega \geq 1-\kappa$. The hegemon's interests are served by letting the agency know how it intends to vote so honest declaration is straightforward.

If the agency issues a recommendation to the membership (sets $r = 1$) and releases its information s_A, then by Bayes' rule, $E[\theta|s_i, s_A] = \frac{\delta\mu+\delta_m s_i+\delta_A s_A}{\delta+\delta_m+\delta_A}$: each member's posterior expectation of the project's value is a precision-weighted average of her own signal, the agency's signal, and the common prior μ. Then i votes Yes ($v_i = 1$) if the expected developmental value exceeds her share of the cost of the project, $E[\theta|s_i, s_A] = \frac{\delta\mu+\delta_m s_i+\delta_A s_A}{\delta+\delta_m+\delta_A} \geq \frac{\kappa\gamma}{M}$. Equation 2 solves for the minimum signal, $\widehat{s_i(s_A)}$, such that a member wants to vote Yes if $s_i \geq \widehat{s_i(s_A)}$ and No otherwise. Note that the members' voting strategy does not depend on the project's political value to the hegemon (or the members' beliefs thereof), which is orthogonal to their interest in the project's developmental value.

5.2 A's recommendation decision

When deciding whether or not to recommend a project, the agency is uncertain as to whether or not the project will secure enough votes for approval. Given Assumption 1, the empirical distribution of the members' signals converges on the true distribution (i.e. a normal distribution centered on θ with variance $\frac{1}{\delta_m}$); thus, in the limit, the members' voting behavior becomes perfectly predictable given θ. For A, however, the true value of θ is unknown.

Denote the equilibrium probability that a recommended project actually gets funded as $\Pr[funded|s_A]$. Then A will recommend a project for the members' consideration if and only if the value to A of the anticipated benefit outweighs the risk of being voted down:

$$\Pr[funded|s_A] \geq \frac{c+\rho}{\psi+\rho}. \tag{5}$$

Projects can be funded one of two ways: either with or without H's support. In the case where H supports the project, approval requires that the proportion of members who see a signal $s_i \geq \widehat{s(s_A)}$, and hence support the project, is at least $\frac{1-2\alpha}{2-2\alpha}$.

Members' messages are (on average) increasing in θ. Therefore, we can find a minimum policy value $\hat{\theta}$ such that $\frac{1-2\alpha}{2-2\alpha}$ proportion of members get a sufficiently strong message that they vote Yes:

$$Pr(s_i \geq \widehat{s(s_A)}|\hat{\theta}) = \Phi\left(\sqrt{\delta_m}\left(\widehat{s(s_A)} - \theta_1\right)\right) \geq \frac{1-2\alpha}{2-2\alpha} \tag{6}$$

and

$$\hat{\theta} = \frac{\gamma\kappa}{M}\frac{(\delta_A+\delta_\mu+\delta_m)}{\delta_m} - \frac{\delta_A s_A}{\delta_m} + \frac{\Phi^{-1}\left(\frac{1-2\alpha}{2-2\alpha}\right)}{\sqrt{\delta_m}} - \frac{\mu\delta_\mu}{\delta_m}$$

Given its message, the agency believes that

$$Pr(\theta \geq \hat{\theta}|s_A) = \Phi\left(\sqrt{\delta+\delta_A}\left(\frac{\mu\delta + s_A\delta_A}{\delta+\delta_A} - \hat{\theta}\right)\right) \tag{7}$$

Using equations 6 and 7, we can solve for s_1^*, the weakest signal that induces A to recommend a project that H supports, equation (4).

Analogously, we can calculate the minimum signal, s_0^*, that induces A to recommend a project that H has declared its opposition towards, equation (3). In order for the vote to pass without H's support, A requires more of the members to approve of the project; specifically, at least the proportion $\frac{1}{2-2\alpha}$ of members must support the project if it is to be funded. Hence the threshold signal of the quality of the project must be higher. That is s_0^* will be larger than s_1^*. In particular, $s_0^* - s_1^* = \frac{\sqrt{\delta_m}(\delta+\delta_A)}{(\delta+\delta_m+\delta_A)\delta_A}\left[\Phi^{-1}\left(\frac{1}{2-2\alpha}\right) - \Phi^{-1}\left(\frac{1-2\alpha}{2-2\alpha}\right)\right]$.

5.3 Hegemonic Influence over the IO

Proposition 1 immediately gives rise to a number of insights regarding the types of projects that get recommended and funded on the equilibrium path of play, and the informal influence the hegemon has over the behavior of the IO and the projects that get funded. We state these results formally, and then discuss them in greater depth.

Corollary 1 (Agency's induced preferences) *The projects that the agency recommends are of higher developmental value, $E[\theta|r=1] > E[\theta|r=0]$, and higher political value, $E[\omega|r=1] > E[\omega|r=0]$, than the projects it does not recommend.*

Corollary 2 (Agency "shades" its recommendations) *The agency is more likely to recommend a project that the hegemon supports, but expected developmental value of these recommended projects is lower: $Pr(r=1|v_H=1) > Pr(r=1|v_H=0)$ and $E[\theta|r=1, v_H=1] < E[\theta|r=1, v_H=0]$.*

Corollary 3 (Development value of "political" projects) *Among projects that get funded, those which the hegemon supports will be of lower expected developmental value than those which the hegemon opposes: $E[\theta|funded, v_H=1] < E[\theta|funded, v_H=0]$.*

The first corollary speaks to the agency's induced preferences with regards to the projects it recommends for funding. The agency is assumed have no intrinsic interest in either the political or developmental value of the projects it undertakes. Yet in equilibrium, it acts as if it cares about both. The agency's incentive to maximize the number of funded projects, while avoiding the costs (administrative or reputational) of recommending projects that ultimately get voted down, leads it to internalize both the political and developmental concerns of its principals. Thus the agency only recommends projects which it believes to be of sufficiently high developmental value (that is, when its private signal s_A is above a threshold s_d^*); and further, it is more likely to recommend projects that the hegemon supports than those that the hegemon opposes (that is, $s_1^* < s_0^*$).

Another way of interpreting this latter point is that the agency "shades" its recommendations according to the hegemon's political interests. Without the hegemon's support, the agency will be relying on favorable votes from a larger portion of member states for project approval; as such, it will impose a higher standard for such projects in terms of the anticipated developmental value needed for a recommendation. In contrast, when a project is of high political value to the hegemon, it can be passed with less support from the other member states. Consequently, the agency is willing to recommend hegemon-supported projects even when they appear to have fairly low developmental value. Projects of both high political and developmental value will of course be recommended, but on average, the pool of recommended projects that have the hegemon's backing will be developmentally inferior to those that the hegemon opposes.

Understanding these dynamics can inform our interpretation of the relationship between the developmental value of projects undertaken by international organizations in practice, and the political motives underlying them. An observed negative correlation between the political and developmental value of funded projects need not imply that the hegemon's political influence undermines a given project's developmental effectiveness, or that the hegemon prefers developmentally ineffective projects. Rather it can arise simply as an artifact of a selection mechanism which is designed to advance both objectives simultaneously.

6 Comparative Statics

There are three exogenous parameters of interest: the hegemon's vote share, α; the hegemon's cost share, $1-\kappa$; and the expertise of the agency, δ_A. We are interested in the effects of these parameters on equilibrium behavior, and particularly on the behavior of the agency—the quantity and quality of projects that it puts forward for the member states' consideration.

6.1 Cost- and vote-shares

We begin by considering κ and α.

Proposition 2 (Cost shares) *As H's cost share falls (i.e. as κ rises):*

- *members are less willing to vote in favor of projects:* $\frac{d\widehat{s_i(s_A)}}{d\kappa} > 0$
- *the agency is less willing to recommend both hegemon-supported and hegemon-opposed projects:* $\frac{ds_0^*}{d\kappa} = \frac{ds_1^*}{d\kappa} > 0$, $\frac{dPr[r=1|d=1]}{d\kappa} < 0$, $\frac{d\,\mathrm{Pr}[r=1|d=0]}{d\kappa} < 0$.

As the members pay a larger share of the cost they become more reluctant to vote in favor of projects, and require a stronger signal of its quality to be convinced to support it: $\frac{d\widehat{s_i}}{d\kappa} > 0$. In response (and because they are averse to recommending projects that fail to get enough votes) the agency needs to see a higher signal before it recommends a project, $\frac{ds_1^*}{d\kappa} > 0$ and $\frac{ds_0^*}{d\kappa} > 0$. Shifting the costs to the members reduces the likelihood of recommending any project, irrespective of the hegemon's support. This result captures the insight that the members value the opportunity to spend the hegemon's money, and when instead they bear a larger burden, they are more risk averse about how they spend their own contributions.

Proposition 3 (Vote shares) *As H's vote share α rises, A becomes more willing to recommend hegemon-supported projects, and less willing to recommend hegemon-opposed projects:* $\frac{ds_0^*}{d\alpha} > 0$, $\frac{ds_1^*}{d\alpha} < 0$, $\frac{d\,\mathrm{Pr}[r=1|v_H=1]}{d\alpha} > 0$, $\frac{d\,\mathrm{Pr}[r=1|v_H=0]}{d\alpha} < 0$.

Figure 2 provides a visualization of how project recommendation rates, project quality, and member and hegemon payoffs vary with the hegemon's vote share and with the agency's expertise. Consider first a project that the hegemon supports. As H's power within the institution increases (vote share α rises), fewer votes are needed from the general membership to approve any project the hegemon likes. This lowers the threshold for the quality of a project for the agency, and makes a recommendation more likely. So for projects the hegemon likes, the average developmental quality declines. In both plots on the lefthand side of the figure, $\Pr[r = 1|v_H = 1]$ (the solid black curve)) rises with α: recommendation of projects the hegemon likes becomes more likely. Consequently, the expected developmental quality of recommended projects (the solid red curve) declines as α increases.

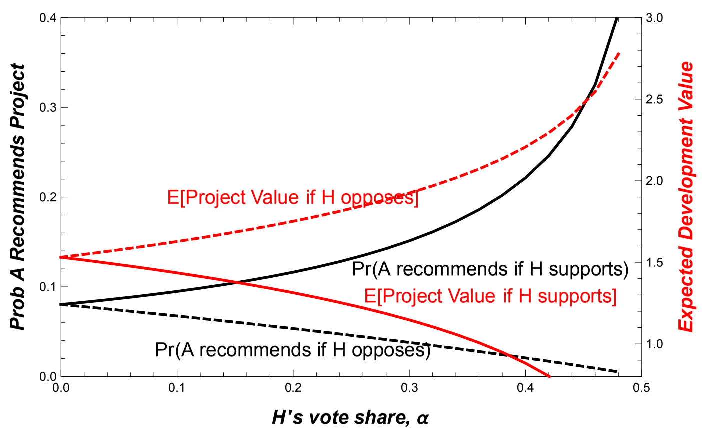
In contrast, if the hegemon dislikes a project, then a larger hegemon vote share means that a project has to be of increasingly high quality in order to receive enough member votes for approval. Hence the agency is less likely to recommend a hegemon-opposed project as α increases (dashed black curve), but the recommended projects are of increasingly high developmental value (dashed red curve).

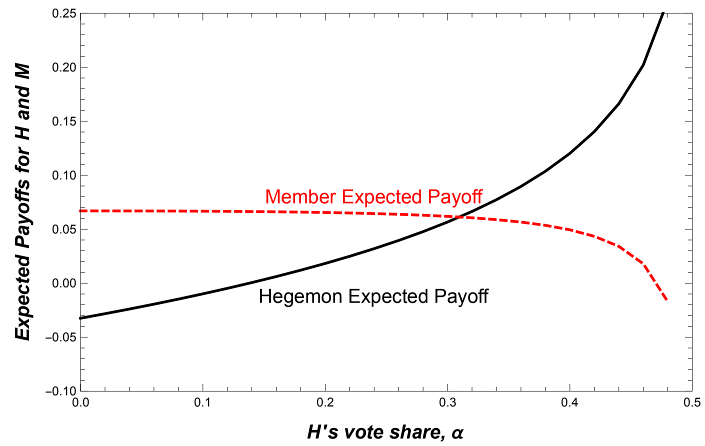
The two plots on the righthand side of Figure 2 also show how the payoffs of the hegemon and the members vary with the hegemon's vote share, α. It is not surprising to note that the hegemon's payoff rises with its vote share. A welfare gain for the hegemon, however, does not necessarily imply a welfare loss for the voters—suggesting the potential for Pareto-improving institutional design choices; in fact (and particularly under low agency expertise), the members' payoff may be non-monotonic in α, as we consider further below.

Finally, we can observe that each of the above patterns is more pronounced under low agency expertise than under high expertise, as we explain in the following section.

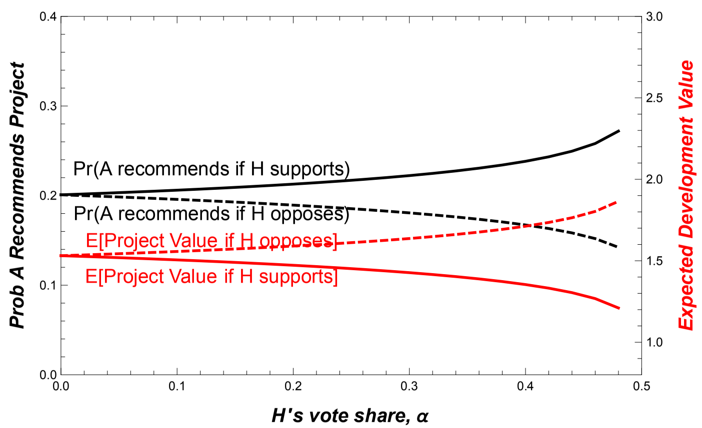
Figure 2: Effect of Vote Share and Expertise on Equilibrium Outcomes

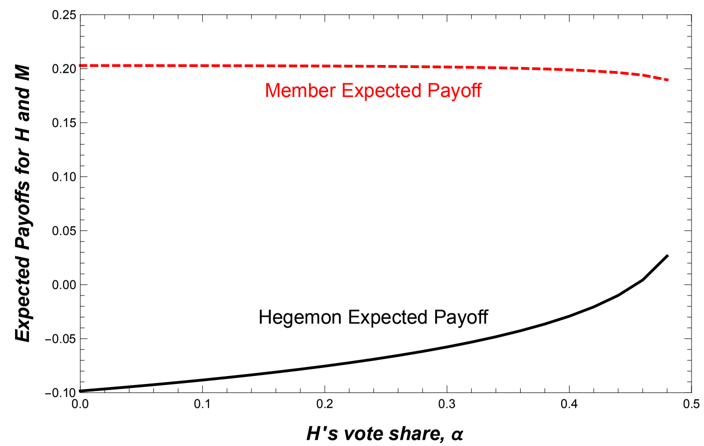
Low Agency Expertise





High Agency Expertise





Note: Figures are constructed with $\delta = .25$, $\delta_M = .1$, $\mu = -1$, $\frac{c+\rho}{\Psi+p} = \frac{1}{2}$, $\gamma/M = 1$, $\kappa = .5$, and $\omega = 2$ with probability 1/2 and $\omega = -2$ with probability 1/2. The precision values of the agency's signals, δ_A, are 0.1 in the lower panel and and 1 in the upper panel.

6.2 Expertise

Turning next to the impact of agency expertise, δ_A, we find the counter-intuitive result that improving the quality of the agency is not always in everyone's interest.

At low levels of expertise, changes in δ have competing effects, which prevent us from being to provide unambiguously signed comparative statics. (This ambiguity can be seen in the non-monotonicities shown in Figure 3 at low δ_A). The direct effect of increased expertise is that A can better discern a project's developmental value, and so A's signal becomes more influential in encouraging members to vote Yes. The fact that A's recommendation becomes more influential then induces a series of secondary effects. First, A becomes less dependent on H's vote to get proposals funded and so discounts political considerations as δ_A increases. This effect harms H's interests. Second, A's increased influence affects the rate at which A recommends projects, which can be in H's interest: rather than leaving some marginal projects on the table (out of concern for the costs of recommending and then being voted down), the agency now recommends those projects, some portion of which are politically valuable to H. At high levels of expertise the comparative statics are unambiguous, as the former factor becomes dominant; the agency increasingly ignores H's political concerns—beneficial to the members but not to the hegemon.

Now suppose the agency's expertise becomes arbitrarily high, $\delta_A \to \infty$: that is, the agency knows exactly the developmental value of the project, and if the agency recommends the project, the members learn its true value with certainty (because the recommendation comes with the agency's report of the value). In this case, the members ignore their own private signals, which offer no value above the (perfectly accurate) agency signal shared through the agency's recommendation. Each member votes in favor as long as the reported value of the project exceeds its share of the costs, irrespective of the hegemon's preference. The agency's ceases to differ across the hegemon's vote: that is, $s_1^* \to s_0^*$, and both approach the member's share of the costs of the project, $\frac{\kappa\gamma}{M}$. In this case, A does not recommend anything below this value, and H's political concerns are ignored by A.

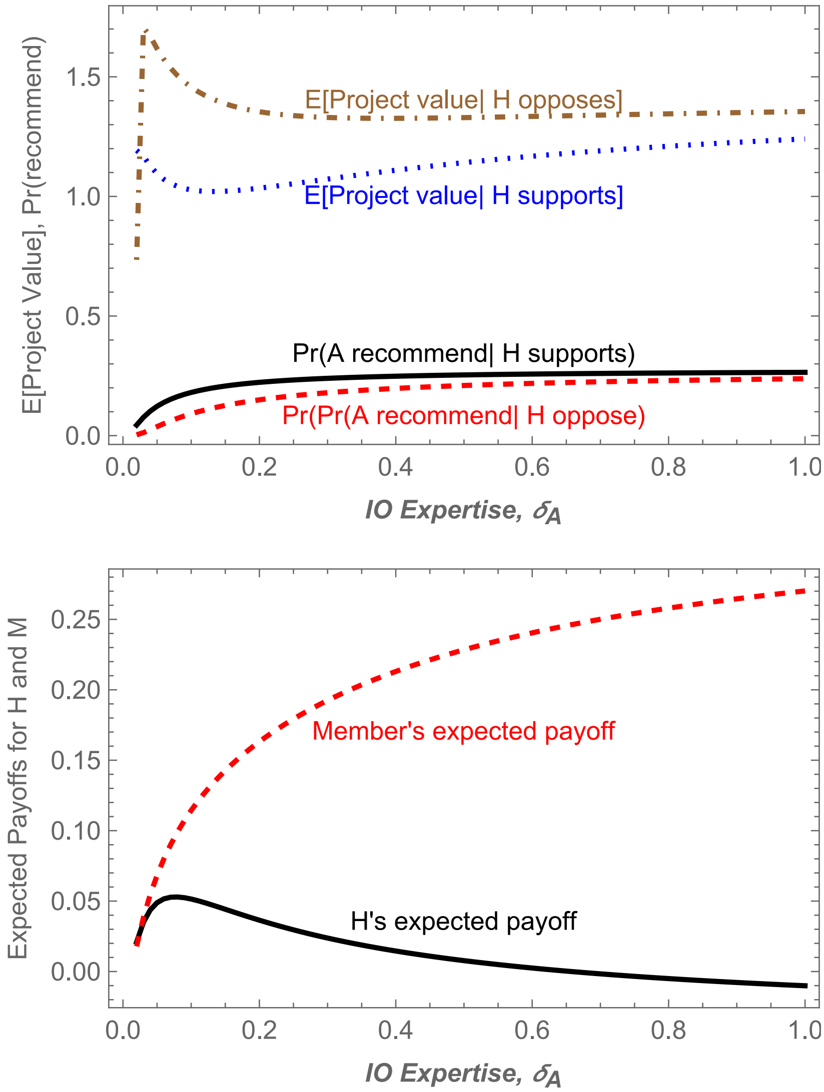
The top panel of Figure 3 shows that as expertise increases, the probabilities of recommending hegemon-supported and hegemon-opposed projects converge, as do the expected values of those projects conditional on being recommended. At low expertise, the hegemon's view of a project matters greatly, and political projects are substantially more likely to be recommended than projects that the hegemon objects to. However, as agency expertise rises, the agency increasingly discounts the hegemon's view ceases to "shade" its recommendations.

The lower panel of Figure 3 plots the expected payoff of the hegemon (solid line) and the members (dashed line). The members gain by increased agency expertise as the agency becomes better able to identify the high value development projects that members want to fund. The impact of agency expertise on the hegemon's welfare is more complicated. At low levels of expertise, an improvement in expertise makes the agency more willing to recommend projects. This increased willingness to make recommendation means more of the political projects that the hegemon wants funding get recommended and ultimately funded. However, as the solid line in the lower panel shows, beyond a certain point further increases in expertise hurt the hegemon's welfare because the agency stops shading its recommendations and project are increasingly funded based on development value rather than their political value to the hegemon. As the agency becomes highly expert, the hegemon's influence over the choice of project diminishes. Few political projects are funded, and the hegemon may ultimately want to exit the IO.

6.3 Importance of Vote Share declines with Expertise

Recall from Proposition 3 that as H's vote share increases, A's recommendations are more responsive to H's political interests. That is, the development quality threshold that a hegemon-supported project must overcome in order for A to recommend it declines with α (while the threshold for a hegemon-opposed project increases with α): $\frac{ds_1^*}{d\alpha} < 0$ and $\frac{ds_0^*}{d\alpha} > 0$. The next proposition tells us that the extent to which the agency shades its

Figure 3: Effect of Expertise on Equilibrium Outcomes



Note: Top panel plots the effect of expertise on the likelihood of recommendations and the expected development value of recommended programs; the bottom panel pots the effects of expertise on the expected payoffs of the hegemon and the members.

recommendation diminishes as the agency becomes more expert.

Proposition 4 (Hegemonic influence declines with expertise) *A's responsiveness to H's political interests is moderated by the precision of A's private information:*

$$\frac{d^2 s_1^*}{d\alpha d\delta_A} > 0 \quad \textit{and} \quad \frac{d^2 s_0^*}{d\alpha d\delta_A} < 0$$

And in the limit, as $\delta_A \to \infty$, $s_0^* \to \frac{\kappa\gamma}{M} \leftarrow s_1^*$.

Given the signs of the first derivatives as given in Proposition 3, Proposition 4 indicates that the relationship between the hegemon's vote share and the agency's recommendation thresholds shrinks towards zero as the agency becomes better informed. In other words, the benefit of a larger vote share for the hegemon declines with agency expertise. IO expertise limits the bias of the recommendation towards the interests of the hegemon. The effect is seen by comparing the red and black lines in the two plots on the lefthand side of Figure 2. When expertise is low, there is considerable divergence in the probability of agency recommendation between the cases where the hegemon approves or does not; with high expertise, the divergence shrinks. The effect is also apparent on the righthand side of Figure 2: the hegemon's payoff is higher, and more responsive to increases in his own vote share, in the low-expertise case than in the high-expertise case.

7 Institutional Design: Foundation and Evolution

International institutions are often products of their particular time, and the Bretton Woods institutions, particularly so. Having emerged from WWII with much of the capital base of Europe destroyed, the hegemonic US led a series of negotiations forming the WB to manage European reconstruction and development, and the IMF to facilitate exchange rate stability, to smooth balance of payments flows, and to facilitate growth and trade. The primary designers were Great Britain and the US, represented by John Maynard Keynes, adviser to the British Treasury, and Harry Dexter White, Assistant Secretary of the Treasury of the US.

Traditional accounts of this period emphasize debates over how the WB would be funded, the merits of a new international currency vs. a stabilization fund, and the nature of the limits on short-term lines of credit for IMF member states. Less attention has been paid to the particular rules that were agreed upon regarding vote and cost shares at the time of their founding. The IMF began operations in 1947 with 40 member states. The US provided the bulk of funds, approximately 60%, and agreed to limit its vote share to 30%. The chief US negotiator, Harry Dexter White, recognized clearly that while the US continued to provide the bulk of the funds, participation of the smaller states hinged closely on limiting the voting power of the hegemonic states. White is quoted directly on this question:

> "To accord voting power strictly proportionate to the value of the subscription would give the one or two powers control over the Fund. To do that would destroy the truly international character of the Fund, and seriously jeopardize its success. Indeed it is very doubtful if many countries would be willing to participate in an international organization with wide powers if one or two countries were able to control its policies."[15]

Moreover, with the rise of the fiscal capacity of the member states, the relative US vote share declined over the post-war period. Figures 4 and 5 show the steady decline in US vote shares at the IBRD and the IMF since 1950 (Clark 2017).

The model presented above squares well with the facts and the history of the IMF and the WB. The original US vote share could not be too high in order to ensure the participation of the member states; and over time, as both agency expertise and the fiscal capacity of the member states has risen, the US vote share has continued to decline.

In what follows, we consider the formation of the IO, and in particular, the choice that a hegemon might make ex ante over what have been until now considered as exogenous

[15] Gold (1972, 19), cited in Woods (2006, 23)

Figure 4: IBRD Vote Shares, 1950 - 2010

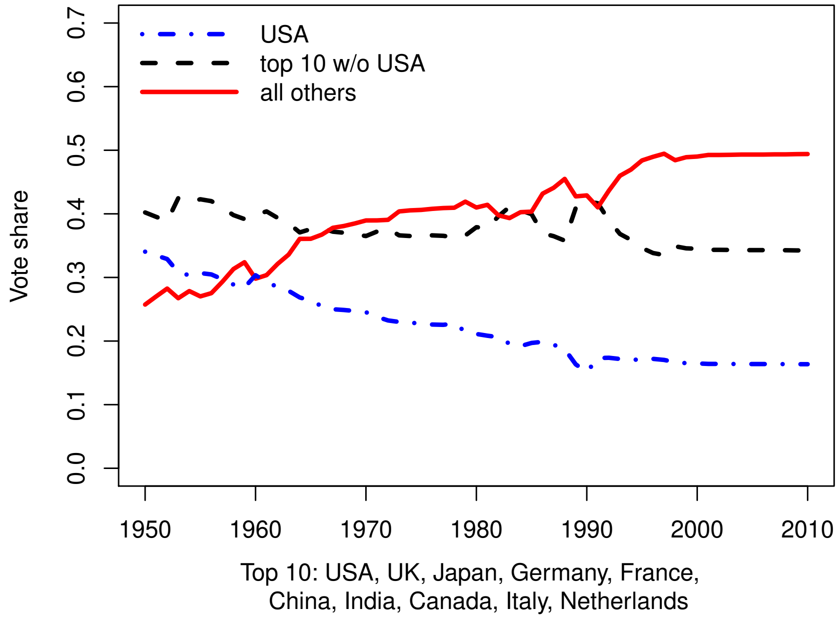
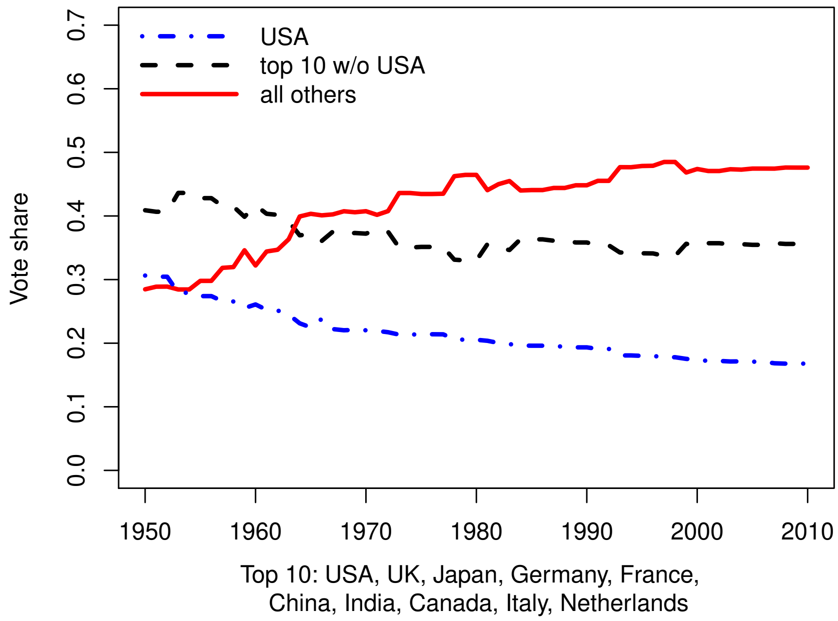


Figure 5: IMF Vote Shares, 1950 - 2010



parameters—the vote share α, and cost share κ—for any given value of agency expertise, δ_A which we take as determined by available knowledge and technology.

Recall that until now, we had characterized the hegemon's geopolitcal interest in projects as simply satisfying $Pr(\omega \leq x) = W(x)$. We now introduce more structure on this distribution of political projects, consistent with an emergent Cold War competition:

Assumption 2 *(Friend-Foe Political Preferences) With probability λ, $\omega \geq 1$ and for these projects $E[\omega|\omega \geq 1] = \eta$. With the complementary probability, $\omega < 0$ and for these projects $E[\omega|\omega < 0] = -\eta$.*

Under this assumption, H supports λ proportion of projects (friends) and opposes the rest (foes), regardless of the cost share that it has to bear. The parameter η provides a measure of the intensity of H's political preferences.

7.1 Formation

We model the formation of the IO as H proposing a set of rules, (α, κ), continuing to take δ_A as exogenous . If the members accept, then the agency is formed and the player's payoffs are as in the day-to-day operation of the IO described above. We represent these payoffs (which are formally derived in the appendix) as $U_H(\alpha, \kappa, \delta_A)$ and $U_M(\alpha, \kappa, \delta_A)$ under an IO with characteristics α, κ and δ_A. If the IO does not form, then the hegemon receives $\chi_H \geq 0$ and the members receive their reservation value, $\chi_M \geq 0$. These reservation values might represent how nations could unilaterally foster development or how funds might be spent at home.

To avoid trivial cases, we focus our attention to situations in which the agency needs to add informational value, without which members would not participate. That is, we assume that $\mu < \chi_M$: the ex ante expected value of any development project μ is less than the member's reservation value. In this case, if the agency were simply to randomly select projects for recommendation (equivalently, $\delta_A \to 0$ such that the agency has no expertise), then the members would prefer not to participate.[16] Thus the challenge that the hegemon faces at the design stage is how to maximize his own value from the institution, while also ensuring that it provides informational value to the other members so as to incentivize their participation as well.

We start our analysis by examining some important limiting cases.

Proposition 5 (Limiting Cases) *1.* ***Limits on Hegemon's vote:*** *As $\alpha \to \frac{1}{2}$, M's expected payoff converges to $\lambda\left(\mu - \frac{\kappa\gamma}{M}\right)$ and H's expected payoff converges to $\lambda\left(\eta - (1-\kappa)\right)$.*

- *Given that $\mu < \chi_M$, the members would not agree to join the IO.*

2. ***Expertise and H's willingness to participate:*** *As $\delta_A \to \infty$, the members' payoff converges to*

$$U_M(\alpha, \kappa, \delta_A \to \infty) = \underbrace{\Phi\left(\sqrt{\delta}\left(\mu - \frac{\kappa\gamma}{M}\right)\right)}_{Pr(funded)}\left[\underbrace{\mu + \frac{1}{\sqrt{\delta}}\frac{\phi\left(\sqrt{\delta}\left(\mu - \frac{\kappa\gamma}{M}\right)\right)}{\Phi\left(\sqrt{\delta}\left(\mu - \frac{\kappa\gamma}{M}\right)\right)}}_{E[\theta|funded]} - \underbrace{\frac{\kappa\gamma}{M}}_{cost\,share}\right]$$

and the hegemon's payoff converges to

$$U_H(\alpha, \kappa, \delta_A \to \infty) = \underbrace{\Phi\left(\sqrt{\delta}\left(\mu - \frac{\kappa\gamma}{M}\right)\right)}_{Pr(funded)}\left[\underbrace{\eta(2\lambda - 1)}_{E[\omega|funded]} - \underbrace{(1-\kappa)}_{cost\,share}\right].$$

- *If the members' payoff $U_M(\alpha, \kappa, \delta_A \to \infty) > \chi_M$ then the members benefit from participation when expertise is high, while*
- *If $U_H(\alpha, \kappa, \delta_A \to \infty) < \chi_H$, then H will not join the IO. If $\lambda \leq \frac{1}{2}$, then H will never participate.*

The first part of the proposition states simply that the hegemon's vote share cannot be too large or the members will not agree to join the institution. It offers a formal exposition

[16]Formally, as $\delta_A \to 0$ and $\delta_m \to 0$, then the members' expected payoff from the IO is μ.

of the intuition expressed by White in the quote above. For the IO to be attractive to the member states, it must provide value in the form of expertise over developmental projects; if the hegemon can simply aways have its way, there is little value to the members of this institutional expertise, and they would decline to participate.

The second part of the proposition considers what happens as agency expertise becomes perfect. When the member states value the expertise of the agency, the benefit of joining the IO is clear. If at the same time, the hegemon's payoff falls below its reservation value, it will choose not to join. When expertise is high, a sufficient condition for the hegemon to decline to participate is when the geopolitical value of most projects is negative ($\lambda < 1/2$)—as would be the case in a bipolar world.

Together these limiting cases make clear the boundaries of any feasible IO. Firstly the vote share of the hegemon cannot be too large, and secondly, the expertise of the IO cannot be too high, especially in a world riven by geopolitical conflict. If we grant much of the design authority to the hegemon, what vote and contribution shares, given a level of IO expertise, does the hegemon choose?

7.1.1 Hegemon's IO Design Problem

The hegemon wants to propose the vote shares and cost shares (given a level of expertise) that maximize its expected payoff conditional on the members agreeing to join the IO. Formally,

$$max_{\alpha,\kappa} U_H(\alpha, \kappa, \delta_A) \text{ subject to } U_M(\alpha, \kappa, \delta_A) \geq \chi_M \tag{8}$$

A standard economic solution to this design problem would be to equate the ratio of marginal costs and benefits for the hegemon and members (such that the indifferences curves are tangent):

$$\frac{dU_H(\alpha, \kappa, \delta_A)}{d\alpha} / \frac{dU_M(\alpha, \kappa, \delta_A)}{d\alpha} = \frac{dU_H(\alpha, \kappa, \delta_A)}{d\kappa} / \frac{dU_M(\alpha, \kappa, \delta_A)}{d\kappa}$$

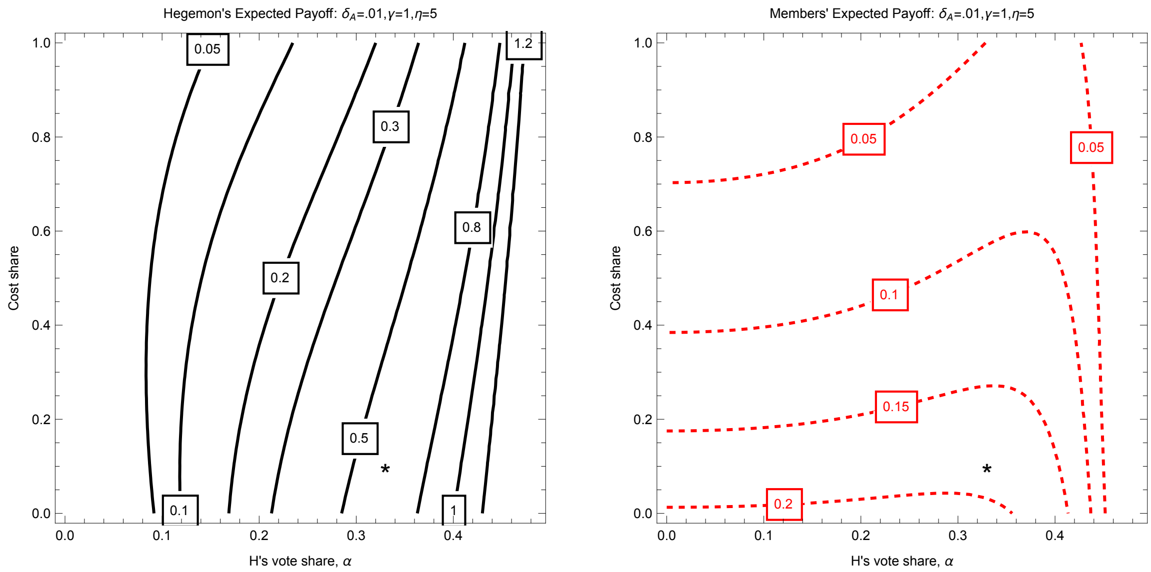
However, such a solution may be unavailable for some values of the exogenous parameters, and the hegemon's preferred IO design may have a corner solution— H may be willing to pay the entire cost and take the largest vote share that the members will agree to. Moreover, under some conditions (generally low expertise), H and M's preferences are aligned with respect to IO design: H might prefer to pay a larger cost share (at fixed α) because it increases the likelihood that the members will support H's political projects. Members can also prefer to cede additional power to the hegemon because it enhances the likelihood that the agency will propose projects. To see how these corner solutions may apply to IO design, we turn to the conditions that confronted the US and the potential members of what became The World Bank at the end of WWII.

At the time, Europe had been ravaged by war and its financial capacity was lower than that of the US, suggesting a relatively high value of γ (a larger cost to members for funding programs). Moreover, development economics was still in its infancy, and the new agency would be limited with respect to its expertise (a low δ_A). The Cold War loomed, making the US particularly keen to fund development projects that aided its political allies, suggesting a high value for the hegemon's salience, η.

The left panel of Figure 6 shows a contour plot of the hegemon's preferences (the hegemon's indifference curves) over vote share and cost shares under the conditions that describe this period.[17] The horizontal axis shows the hegemon's vote share α and the vertical axis represents the share of the cost paid by the members, κ. The numbers on the indifference curves index the hegemon's utility. The hegemon's utility is rising as we move from the top-left of the figure towards the bottom-right, reflecting that under these conditions, the hegemon actually prefers to bear a larger burden of the cost share (given the weak financial condition of the members), as well as having a larger vote share in order to better influence the recommendations of the agency. The larger cost share it is willing bear makes the members less reluctant to vote against projects the hegemon endorses. This incentive pushes any negotiated solution towards the bottom-right of the

[17]The figure assumes $\frac{\gamma}{M} = 1$, $\frac{c+\rho}{\psi+\rho} = \frac{1}{2}$, $\mu = -1$, $\delta_A = .01$, $\delta_M = .05$, $\delta = .1$, $\lambda = \frac{1}{2}$ and $\eta = 5$.

Figure 6: Origin of IO



Note: Vertical axis is the members' cost share, κ; horizontal axis is the hegemon's vote share α; lines in the figures represent indifference curves for the hegemon's expected payoff (left panel) and the members' expected payoff (right panel); the star positioned at $(\alpha = .33, \kappa = .1)$ represents a likely outcome in initial bargaining.

figure.

The right panel show the preferences of the members, under the same conditions of low financial capacity (large γ) and low agency expertise (low δ_A). The members' utility rises as their cost share falls. The members' preferences over vote share, however, are more complicated. If H has very few votes, then A will recommend few projects. By ceding power to H, the members induce A to recommend more projects. So starting on the lefthand side of the figure, the members' payoff initially increases as H's vote share increases. However, at very high α, projects are funded without regard to their developmental value, which the members oppose. For any given cost κ, the figure shows that the members' preferences regarding vote share are non-monotonic, with their most preferred vote share lying on the ridge shown by the kinks in the members' indifference curves. The star positioned at $\alpha = .33$ and $\kappa = .1$ in figure 6 represents a possible outcome in initial bargaining. The hegemon is willing to pay most of the expenses and takes as many votes as the members are willing to agree to.

Next we turn to the evolution of the IO, and particularly the impact of improving agency expertise on the willingness of the members and the hegemon to continue to participate.

7.2 Improved Expertise and the Evolution of IOs

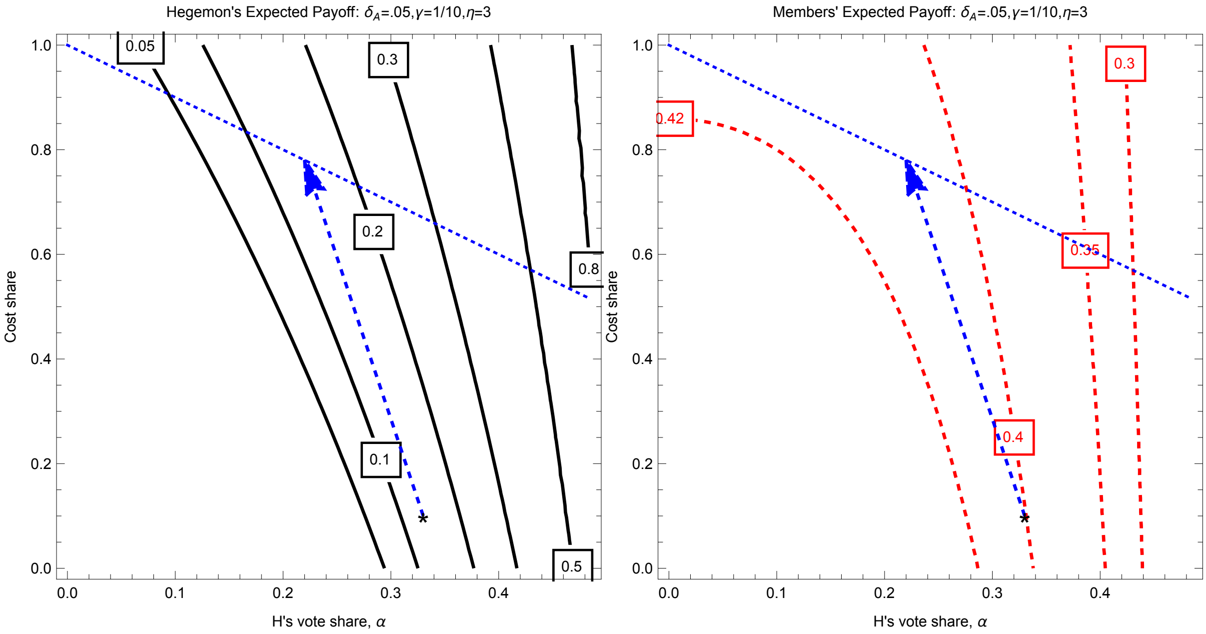
At formation, the hegemon structured the agency to best fulfill its objectives, subject to the members being willing to join. Circumstances change, and as a result, so too do the preferences of the hegemon and members with respect to the design of the agency. Figures 4 and 5 show that the US vote share declined steadily throughout the second half of the 20th century, to about 16% percent today. Moreover, a norm has emerged whereby a member's vote share has become more aligned with its cost share. These emergent stylized facts are consistent with shifts in underlying parameters of the model.

We focus on three substantial changes that shaped the evolution of IOs through the second half of the 20th century. First, the capacity of the members to pay greatly increased after the post-war reconstruction. In terms of the model, this is to say γ decreased. Second, the salience of political projects for the hegemon diminished (corresponding to a decrease in η), especially after the end of the Cold War. Finally, advances in development economics increased agency expertise (increasing δ_A) such that the agency is better able to assess the development value of projects.

Figure 7 shows how these three changes affect the hegemon's and the members' preferences over agency design.[18] The left panel shows the hegemon's indifference curves over institutional structure. Given the members' increased capacity to pay, H prefers that they pay a larger cost share: the indifference curves are downwards sloping compared to those in Figure 6. Further, given the reduced salience of political projects, H places less value on control over the agency's decisions—reflected by the fact that H's utility at the starred point is lower than in Figure 6. Notice now that H's utility rises as we move towards the top-right corner of the figure. H can achieve an improvement in its payoff (reaching a higher indifference curve) by reducing its vote share, and having the members

[18]The figure assumes $\delta_A = .05$, $\frac{\gamma}{M} = \frac{1}{10}$ and $\eta = 3$.

Figure 7: Evolution of IO



take on a larger burden of financing (increasing the cost share). The blue dotted arrow indicates a utility improvement for H.

An increased capacity to pay and a small improvement in agency expertise increases the value of the IO to its members and affects how they evaluate the tradeoff between votes and cost shares, as seen in the right panel of Figure 7. With increased capacity to pay and the agency better able to identify good projects, the members are willing to assume a greater share of the cost burden in order to have a greater say in which projects are funded. The members can reach a higher indifference curve by moving along the same blue arrow.

This shift in institutional design moved voting shares to be more closely aligned to cost shares. The downward-sloping blue dotted line in the figure denotes the points in (α, κ) space such that $\alpha = 1 - \kappa$. As member financial capacity and institutional expertise rose, cost and vote arrangements shifted towards reduced cost and vote shares for the hegemon, and increasing those for the member states.

7.3 Hegemonic Dissatisfaction or Potential Collapse?

Improvements in development economics have substantially increased agency expertise. Today, World Bank staff are much better able to assess the development value of a project than was the case in the 1950s and 60s, and this expertise undermines the value of the US vote share. Figure 8 illustrates how increases in agency expertise affects the value of IO participation for the hegemon and the member states.[19] The figure considers the case where cost and votes are proportional ($\alpha = 1 - \kappa$), and the lines in the figure correspond to different levels of agency expertise.

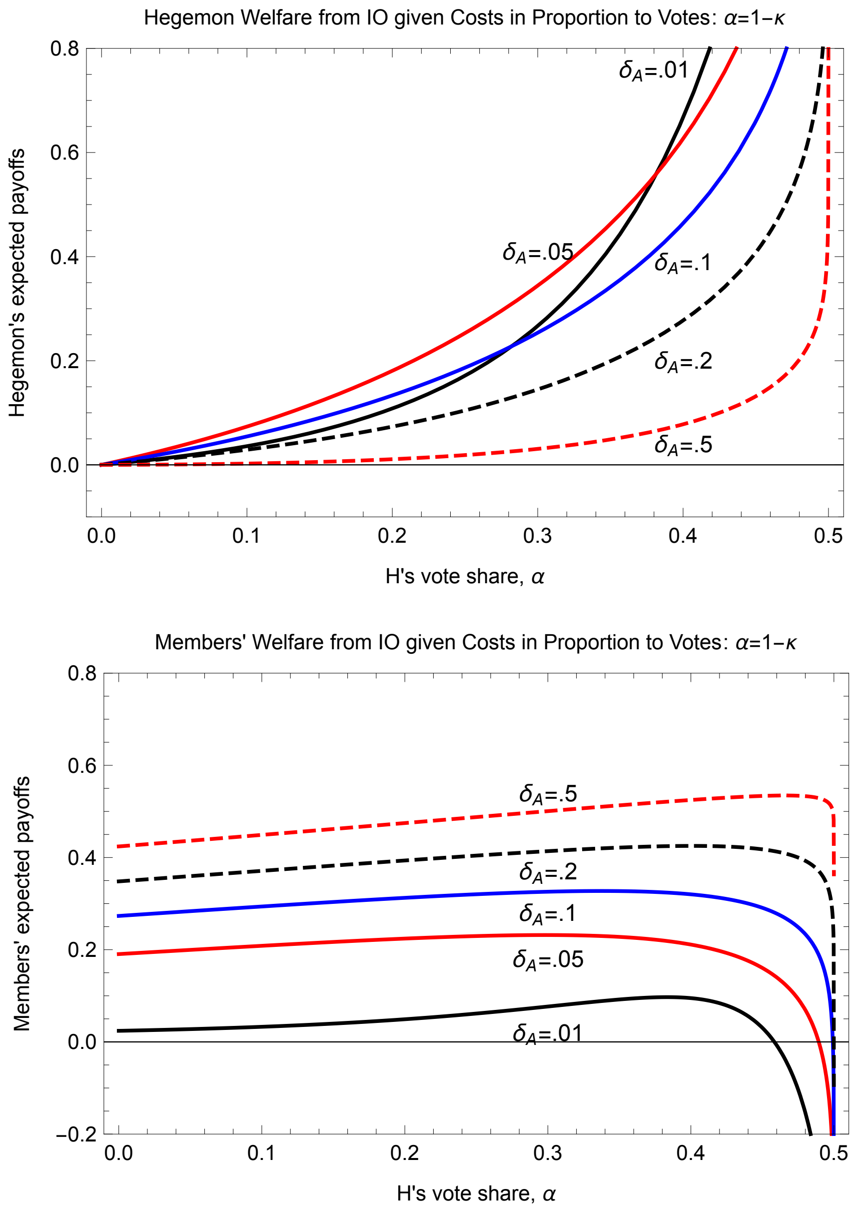
As the agency's ability to discern the development value of a project improves, the members' welfare increases as the agency increasingly ignores the hegemon's political evaluation for the project and recommends only projects that the members support. In the lower panel, the payoffs for the members strictly increase as expertise improves.

The hegemon, however, has a different view. Firstly, of course, the hegemon prefers a higher vote share, even if this comes with a higher cost share—this follows from the increased likelihood that the agency recommends projects the hegemon wants. The hegemon's preference for agency expertise, however, is non-monotonic. At low levels of expertise, improvements in expertise do indeed meet with hegemonic approval. The top panel of Figure 8 shows that the hegemon's payoffs do rise as expertise increases at first—see the improvements in the payoffs as we move from solid black to solid red to solid blue. But after that, hegemonic payoffs start to decline with increased agency expertise. High levels of expertise diminish the hegemon's influence over the IO, and this is reflected in declining payoffs to the hegemon.

Consider the participation constraint for the hegemon. As expertise rises, at any cost/vote share, the hegemon's payoffs begin to decline. If it declines enough to hit the participation constraint, the hegemon might demand a higher vote share (or start threatening to withhold its contribution) to compensate. As we described earlier, over

[19] The figure assumes $\frac{\gamma}{M} = 1$, $\frac{c+\rho}{\psi+\rho} = \frac{1}{2}$, $\mu = -1$, $\delta_M = .05$, $\delta = .1$, $\lambda = \frac{1}{2}$, $\eta = 5$ and show δ_A at .01, .05, .1, .2 and .5.

Figure 8: Professionalization of the IO and the Hegemon's Growing Dissatisfaction



the period in which expertise of the agency has increased, the capacity of the members to contribute to agency funds has risen too, and with that their demands for a larger vote share. Both demands cannot be satisfied. It is clear that the concurrence of increased agency expertise and increased fiscal capacity by the members has led to significant tensions within these IOs. The hegemon has found itself less satisfied with IO performance and has threatened to exit. Similarly, other members, unhappy with the lack of vote share within theses IOs, have themselves threatened to exit, or to set up alternatives (the AIIB, for instance) where they may have more influence.

8 Conclusion

We have presented a formal model of IO design consistent with several stylized facts. The IO agency shades its recommendations in favor of hegemonic interests, not because the agency intrinsically shares the hegemon's political preferences, but rather because it internalizes those preferences out of bureaucratic concerns. The rest of the membership are aware that this hegemonic influence is being exercised, and tolerates the bias; in return, the membership benefits both from the expertise of the IO in identifying valuable projects, and the opportunity to make use of the powerful state's relatively larger contributions for funding the IO's activities.

This pattern burden-sharing by the hegemon, advice-shading by the agency, and tolerance by the membership depends on the key relationship between the hegemon's vote share and the expertise of the agency. While a powerful state may value a large degree of formal influence over the IO's operation (in the form of a larger vote share) its vote share cannot be too large—the IO would simply follow the bidding of the powerful and the rest of the members would prefer not to participate.

Instead, the powerful state can exert informal influence. Eager to get sufficient support among the membership for any project the hegemon may like, the agency adjusts its recommendation. This adjustment is understood by the membership to be happening on occasion; but it cannot happen too much before the members object.

The limits on the hegemon's informal influence follow from the expertise of the agency. IOs are staffed by well trained, highly educated people tasked with collecting detailed information about any potential project, subjecting it to scrutiny, and making a recommendation to the membership. It is this expertise that is highly valued by the member states, and is the reason the members tolerate the informal influence of the hegemon in the first place. As expertise improves, the agency becomes better at identifying *ex ante* the good projects, and the flexibility of the agency to adjust its recommendation towards the interest of the hegemon declines. More expertise undermines the informal power and influence of the powerful states. The value of the hegemon's larger vote share in the IO is eroded by improved expertise.

The agency's expertise, therefore, can not be too large or too small. It must be large enough for the membership to value its advice; it must be small enough so that the influence of the powerful states at the IO is not undermined. IO expertise must be moderate in any incentive compatible institutional arrangement.

The model offers some insights as to the formation and evolution of IOs. At the post-war negotiations that formed the WB (among other IOs), vote shares were apportioned across the founding members, and staff appointed to the secretariat. Over time the expertise of the agency improved and the Bank and its professionals learned from experience, and became more adept at project evaluation. The effect was to undermine the benefits of larger vote shares for powerful states. Increasing dissatisfaction within those countries over IO membership emerges, where threats of exit are associated with revisions in the vote shares across countries, as well as demands by the powerful for adjustments to the internal procedures of the IO.

The rise of a more powerful China has emerged as a challenge for several of the international development institutions. China's demand for greater vote shares comes as IO expertise advances—only moderate adjustments to vote shares can be tolerated by the US and other traditional major powers. China itself also sees that the degree of influence it might have within a mature and experienced institution like the WB is bounded; instead it seeks to design alternative structures, such as the Asian Development Bank, where it has both a dominant vote share, and perhaps where the expertise of the IO has yet to mature, effectuating a larger informal influence.

International organizations bend to the will of the powerful; but they cannot bend too much. Professionalization of the bureaucratic class undermines the informal influence of the powerful states while IOs still manage to perform their core mission—to advance international cooperation in an anarchic world.

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