

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 voting and cost shares, and agency expertise in a model of project finance, where projects have both developmental (public) value and benefit the hegemon's geopolitical (private) interests. IOs bias their recommendations in favor of hegemonic powers, even though their incentives diverge from those of the powerful states; the members tolerate this influence to a degree – they benefit from the larger contributions of the powerful, and the project expertise the IO provides. More IO expertise limits the degree to which IOs “shade” their recommendations, and reduces the beneficial effect of larger vote shares for the hegemon. IO expertise is bounded in equilibrium.

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1 Introduction

Powerful states exercise significant influence within international organizations (IOs), exercising both formal and informal power. Other member states participate within these institutions, benefiting from the monitoring and expertise the IOs offer, as well as the collective benefits associated with sharing the burdens of global public goods production. Successful IO design (and survival) rests on a knife-edge: the benefits to member states of coordination, cooperation and information generation and dissemination must outweigh the costs these members face when the IO adopts biased policies or undertakes projects that bend to the preferences of the powerful. Hegemonic states, cognizant of this fine balance, limit the influence they exert over IOs, in order to maintain other member states' participation. When this balance is threatened, the member states may seek to alter the formal rules – adjusting vote shares or financial contributions, for example – or may seek to exit the organization entirely.

We explore this fine balance, investigating the conditions for IO stability, and when they are violated, the conditions that lead to exit and collapse, or renegotiation of voting rules and financial contribution shares. We highlight the crucial role IO *expertise* plays in calibrating this system. Like [Rodrik \(1996\)](#) we identify a central role for the IO to collect and disseminate information which we summarize as the “expertise” of the IO or its staff.

We investigate the key relationships between voting shares or rules, cost sharing and agency expertise, consistent with some key stylized facts about IOs: powerful states influence IO behavior – sometimes the IO implements a policy biased towards the powerful state, while other times operates as if unbiased, serving the global public good. On occasion the IO adjusts its recommendations to conform with the interests of the powerful, and this is known and tolerated by the rest of the membership, in that there are no threats of exit. Overtime, as member states' fiscal capacity and relative power shift, there may be demands to adjust the voting rules or weights. For instance, a rising power might want

to increase its influence (vote share) and take on a larger share of the costs. However, such a reform is less likely to emerge if the IO has substantially increased its expertise since relative to its inception.

Furthermore, while member states delegate authority to IOs to leverage the expertise of IO staff in choosing among policies or projects, the stability of the cooperative regime requires that IO expertise be bounded. A novel (and policy relevant) finding is that high levels of agency expertise reduces the influence of a large voting share, so growth in expertise is likely to reduce a powerful state's satisfaction with the IO and diminish its willingness to participate. To keep powerful states engaged with the mission of the IO, secretariats cannot be too good at their jobs.

These results follow from a core intuition: If the IO can successfully distinguish between policies and projects that are of public value from those with private, perhaps domestic or geo-political benefit for the powerful states, then the ability of the hegemon to influence the IO is limited, and the utility of the IO to the hegemon is hampered. Of course if the quality of information the IO generates, and its ability to implement good policy is low, there are few gains to be had from delegation, and the states with developmental goals are unlikely to participate. IOs, we argue, produce information and implement policy with a degree of expertise enough to make the member states gain from participating, but not enough to frustrate a powerful state's desire to bend the IO in its direction.

There is a trade-off between a state's formal power – its vote share – and the expertise of the IO. Where the IO and its members operate in a low information environment, the power of a larger vote share in inducing IO policy is evident. But if the IO can inform the members more accurately, better separating biased from unbiased policies or projects, a larger vote share for a powerful state will not be enough to get its preferred projects approved. More expertise of the IO undermines the value of a larger vote share for a powerful state.

We note that none of these findings rely on standard stories regarding “agency slack”

familiar from principal-agent logics ([Hawkins, Lake, Nielson and Tierney 2006](#)). The behavior of IOs we model is not a result of the IO having its own preferences distinct from preferences over policy outcomes. Our approach simply relies on a bureaucratic logic – the IO secretariat wants to maximize the number of projects but dislikes being overruled by its members in a formal vote. This alone is sufficient to induce the IO to shade its recommendations to the membership in order to keep the powerful states participating, the money flowing, and the system working.

2 Hegemonic Influence and States' Participation

International organizations are widely recognized to be influenced, even captured at times, by powerful states. 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](#)). IMF loans 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 2021](#)), 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.¹ 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 experience more frequent currency and banking crises ([Lipsy 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 on occasion, chosen not to rule against the US, citing judicial economy or other devices, in order to avoid risking the approbation of a

¹[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.

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 selecting the members of appellate body (Steinberg 2004, Arias 2018). Of course, larger powerful states have less to risk from retaliation from poorer trading partners, and can more frequently abrogate their commitments (perhaps via escape clauses and the like) than can poorer states (Davis and Blodgett Bermeo 2009, Busch and Reinhardt 2003).

Further examples abound: the European Monetary System was essentially a delegation of monetary authority to the German Bundesbank by the other member states, privileging German and later France (in the EMU) over other member states. The European Court of Justice, Garrett and Weingast (1993, reprinted 2019) argue, adjusts its decisions to accommodate outcomes preferred by the more powerful states.

Yet other states persist in joining these international arrangements, and even contributing to the finances of the international organizations. The World Bank has 189 members, each with a voting share proportional to the fraction of the Bank's capital held by the member. While the US has close to 16% of the votes at The World Bank, Germany holds about 4.5% of the Bank's capital and has 4.26% of the votes. A similar structure is adopted at the Interamerican Development Bank, with 48 members, some with borrowing privileges and some not. Again the US holds the lion's share of the votes (30%), but Argentina, for example, owns 1,609,577 shares of the Bank's capital, entitling it to an 11.354% vote share.

Why then do the Germanys and the Argentinas of the world participate if these IOs are so heavily captured by the US? There are of course, other benefits to IOs that accrue to the less powerful states. IOs have been designed to achieve a multitude of objectives – they coordinate state behavior (Keohane 1984), they enhance the credibility of cooperative commitments (Abbott and Snidal 1998), they monitor compliance (Rosendorff 2005), they collect and disseminate relevant information to other states (Baccini 2010, Rodrik 1996) and domestic publics (Milner 2006, Rosendorff and Vreeland 2006), they resolve

disputes (Rosendorff 2015) and they leverage expertise (Clemens and Kremer 2016) – with the goal of improving economic welfare across the globe. Presumably, the benefits of these for ordinary members are large enough to make tolerating major power influence over the IO tolerable, and in turn their participation puts a limit on the degree of influence a major power has over the IO.

This manipulation of IOs by the powerful is perhaps simply an expression of power in an anarchic system. It requires, however, to some degree, the consent of other member states. Absent that consent, states can, and sometimes do, choose not to join and certainly not to contribute to them, financially and otherwise. Sometimes states choose to exit existing IOs. The expression of powerful interests must be constrained to the degree that it does not violate the participation constraints of other member states, and a failure to do so may induce exit or collapse.

In the context of IOs dedicated to aid and development that we study below, both the hegemonic and other member states benefit from IO participation – a member state’s development and economic goals are enhanced by the opportunity to use the funds and resources of the IO for those purposes. In the context of international development aid, for instance, by leveraging “other people’s money,” member states see projects that may have developmental and economic benefit (both locally and globally) more easily achieved. They also value the expertise that IO staff can provide in achieving those international objectives. These states trade these benefits in exchange for the costs of knowing that *sometimes* those IO resources and expertise are put to further the geopolitical and perhaps even private benefits of the powerful states.

This paper explores the conditions under which a system with these properties can be sustained: hegemonic influence combined with member state participation, in which an IO staff has access to information and expertise upon which the membership relies. The IO sometimes “shades” its recommendations towards the hegemon, and we observe projects with differing degrees of public (broad membership) vs. private (to the hegemon) benefit. Our explanations focus on the interactions of three exogenous design factors: the

voting rules that govern IO actions, the financial contribution shares, and the degree of IO expertise, and we explore the key relationships among these exogenous variables that sustain international cooperation.

We study a generic IO in which the members make contributions and vote on IO actions (“projects”) according to a pre-existing voting rule. An IO undertakes a project, which has both public goods characteristics (which we call “developmental”) and private benefits to a powerful (hegemonic) state (which we call “political”), if the project receives sufficient support among the membership. We permit the IO to acquire information about the developmental and private benefits, and if the IO recommends that the membership support a project, it also offers an opinion as to the developmental value of the project. The quality of this signal is a function of the expertise of the IO – the degree to which it can precisely estimate the developmental value of the project.

Our essential findings are these. Firstly, funded projects include those with both high and low public or developmental value. That is, at times, political projects, of private benefit to the hegemon, are funded together with projects with broad developmental value. Intuitively, member states value the availability of the hegemon’s financial contributions for sharing the costs of developmental projects, as well as the expertise of the IO secretariat in helping to choose good projects, and in return, they tolerate the occasional use of influence over the IO to fund projects with more political value.

Secondly, the IO adjusts its recommendations strategically to accommodate powerful states’ interests. We model the IO as a purely bureaucratic enterprise, eager to take on projects, but neutral with respect to which projects it funds. The IO recommends a mix of projects, some largely of public value, some of private benefit to the hegemon. Importantly, however, the IO sometimes adjusts its decision to recommend a project to further the hegemon’s goals. If the developmental value of a project is high, the IO makes an unbiased recommendation, and the membership obtains a high value public goods project. Alternatively, a project may have only moderate public benefit, but is of high value to the hegemon for political reasons. The IO may recommend the project – one

it would have rejected absent the political returns to the hegemon. The IO internalizes the interests of the hegemon, despite only caring about the size and number of projects approved by the membership at large. This is not a formal override of the IO by a hegemon with a large voting share; this is an exercise of informal influence over a bureaucrat inclined to adjust their recommendations and actions in order to please a large power even though the hegemon has made no request, explicit or implicit, to do so.

Thirdly, 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 bureaucrats increases. As the IO’s expertise improves, and it becomes proficient at identifying high value, broad appeal projects, member states follow the IO’s recommendations more frequently, which overwhelms the hegemon’s ability to influence the outcomes. The hegemon is less able to get its pet projects approved by the membership. Increased expertise reduces the influence of the hegemon’s vote share. While the agency and broad membership might be expected to embrace improved know-how, the hegemon may want to stifle too much expertise.

Fourthly, and perhaps counter-intuitively, IOs cannot have too much, or too little, expertise. If the IO’s ability to discern the developmental value of projects is low, then the IO may recommend projects of little value to the broad membership. The members 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 cannot be too high. A recommendation from the IO when it has high expertise is likely to indicate that indeed the project has high public goods value. Frequent high public value projects limits the available funding for political projects of private value to the hegemon. A powerful state, bearing the largest financial burden, finds itself unable to influence the IO’s allocations to more political projects, and may threaten to exit the IO.

We predict, therefore, that IOs display a moderate level of expertise – enough to keep the general membership participating, while permitting the IO on occasion to recom-

mend projects to the membership that may have private political value to the hegemon. Members get enough to join, and the hegemon gets enough to continue to participate.

Our approach also yields some insights for the optimal design of IOs. Our fifth result explores the voting rules at IOs. Intuitively, one might expect that each state would like to have as large a share of the votes as possible (holding fixed the share of funds they have to contribute). While this logic does characterize the hegemon's incentives, our theory shows that it may in fact be counter-productive for the members to maximize their vote share at the expense of the hegemon, as doing so may result in the secretariat being too restrictive in the projects it puts forward for a vote. Rather, the members have an incentive to cede a substantial portion of the vote share to the hegemon in order to encourage the agency to be more forthcoming in its recommendations.

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, DPF) among many types of financing instruments available to members that wish to borrow to finance projects that seek to promote growth and sustainable poverty reduction. IPF is used for specific development projects, such as infrastructure, other capital-intensive investments, agricultural development, etc. DPF may have a more policy and institutional focus, such as funding improvements to public financial management, improving the investment climate, addressing bottlenecks to improve service delivery, and diversifying the economy.

World Bank "project teams" and borrower governments identify projects; the Bank undertakes an assessment of the project's development objectives, its consistency with WB strategy, and it offers an analysis of the technical, economic, fiduciary, environmental,

and social considerations, and related risks of any project.

After a project has been appraised, a proposal is submitted to the Board of Directors. This board has 25 Executive Directors, elected periodically from the 189 member countries. The board votes on whether or not to approve proposed projects for funding. Each director represents a subset of the member states and casts the votes of those states. While the US, Japan, China, Germany, France and the UK each have their own Executive Director that may cast the votes of the member states they represent, the Director for India also represents Bangladesh, Bhutan and Sri Lanka, for instance. The vote shares of each member track closely to the share of the Bank's capital that is held by those states. That is the cost share and the vote shares are closely aligned. As of March 2021, the US's subscription of Bank equity amounts to 41.1 trillion US 1944 dollars which is 16.78% of the total. This cost share entitles the US to 412,250 votes, which is 15.88% of the total number of votes. By comparison, Netherlands has almost 2% of the votes, and Sweden 0.88%.

Crucial to this process is the project evaluation by the WB staff. These experts accumulate and evaluate the relevant information regarding the importance and value of the project, its attendant risks, its environmental, social and developmental impact etc. These experts are highly trained and collect and analyze complex information flows, and use their expertise in order to monitor member behavior and make recommendations to the membership about goals and objectives. These detailed recommendations, together with the financial structure (concessional or non-concessional rates), terms and conditions are brought before the Board for a vote ([Griffith-Jones 2002](#), [Hawkins et al. 2006](#)).

4 Model

Consider a game with $2 + M$ players: the international organization, or agency A , a hegemonic state H , and M member states indexed $i = 1 \dots M$.² A project is a pair

²The member states in this conceptualization are not potential recipients of development aid, but rather other donor states in the system.

$(\theta, \omega) \in \mathbb{R}^2$ 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 we allow the individual member states i to observe a noisy signal $s_i \sim N\left(\theta, \frac{1}{\delta_m}\right)$.³ We assume $s_i \perp s_A \mid \theta$ and $s_i, s_A \perp \omega$ for all i .

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 presents a hard case for the IO to function effectively and for participation to remain incentive-compatible among all stakeholders. With this setup, we can show how a confluence or divergence of interests among the players emerges not by assumption, but rather as an equilibrium phenomenon. 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. The members care only about the developmental value of a project θ . The hegemon, in contrast, has no interest in a project’s developmental value, and is assumed to care only about its political value ω . For example, the US may have been concerned about whether a project advanced its Cold War ambitions to forestall the spread of communism.

The stylized process of project approval proceeds as follows. Nature draws a project (θ, ω) . Immediately, 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

³As an alternative, s_i might be interpreted as member specific benefits that flow from the project.

value θ . H declares publicly whether it intends to vote for or against the project, $v_H \in \{0, 1\}$, which we represent as a cheap-talk message $d \in \{0, 1\}$ (where $d = 1$ denotes intent to vote in favor).⁴ 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 whether to fund the project, $v_i \in \{0, 1\}$.

Voting follows the features of the institution – each member’s vote share is 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 member i has the same weight $\frac{1-\alpha}{M}$. A project wins the vote and is funded if it receives more than a threshold share of the votes, $1/\beta$, for $\beta > 1$:

$$\underbrace{\alpha v_H}_{H\text{'s vote}} + \underbrace{\frac{(1-\alpha)}{M} \sum_{i=1}^M v_i}_{i\text{'s votes}} \geq \frac{1}{\beta}. \quad (1)$$

If $\beta = 2$ for example, the institution operates on a simple (weighted) majority rule. We assume that the hegemon cannot pass any project unilaterally, so its vote share is less than the fraction of the votes needed to approve the project, which is an exogenous feature of the institution, i.e. $\alpha < \frac{1}{\beta}$.

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 described above.

⁴ H always promotes its interests by having the agency know its intent, so H has a dominant strategy to reveal her interests. Whether the message d is sent publicly to A and all members i , or privately to A , makes no difference for our results.

The hegemon's payoff is simply

$$U_H(v_H|\omega) = \begin{cases} \omega - (1 - \kappa) & \text{if } r = 1 \text{ and } \alpha v_H + \frac{(1-\alpha)}{M} \sum_{i=1}^M v_i \geq \frac{1}{\beta} \\ 0 & \text{otherwise} \end{cases}$$

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

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 (or not put forward for a vote), then members receive the zero payoff.

$$U_i(v_i|s_i, s_A) = \begin{cases} \theta - \frac{\kappa\gamma}{M} & \text{if } r = 1 \text{ and } \alpha v_H + \frac{(1-\alpha)}{M} \sum_{i=1}^M v_i \geq \frac{1}{\beta} \\ 0 & \text{otherwise} \end{cases}$$

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.

$$U_A(r|s_A) = \begin{cases} r(\psi - c) & \text{if } \alpha v_H + \frac{(1-\alpha)}{M} \sum_{i=1}^M v_i \geq \frac{1}{\beta} \\ r(-c - \rho) & \text{otherwise} \end{cases}$$

A (perfect Bayesian) equilibrium is a set of strategies (d, v_H, r, v_i) for H , A , and $i = 1 \dots M$ 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.

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 $v_i(s_i, r s_A, d) \in \{0, 1\}$. At the same time, H chooses $v_H(\omega, d, r s_A) \in \{0, 1\}$.

The game tree is depicted in Figure 1, and the notation is summarised in Table 1 in the Appendix.

5 Analysis

We begin our analysis by characterizing the day-to-day functioning of the international organization, taking the institutional features $(\delta_A, \kappa, \alpha, \beta)$ as fixed. In Section 6 we examine how the organization's operation varies with changes in these institutional features, and in light of these results, in Section 7 we turn to the question of how the institution will be designed to begin with.

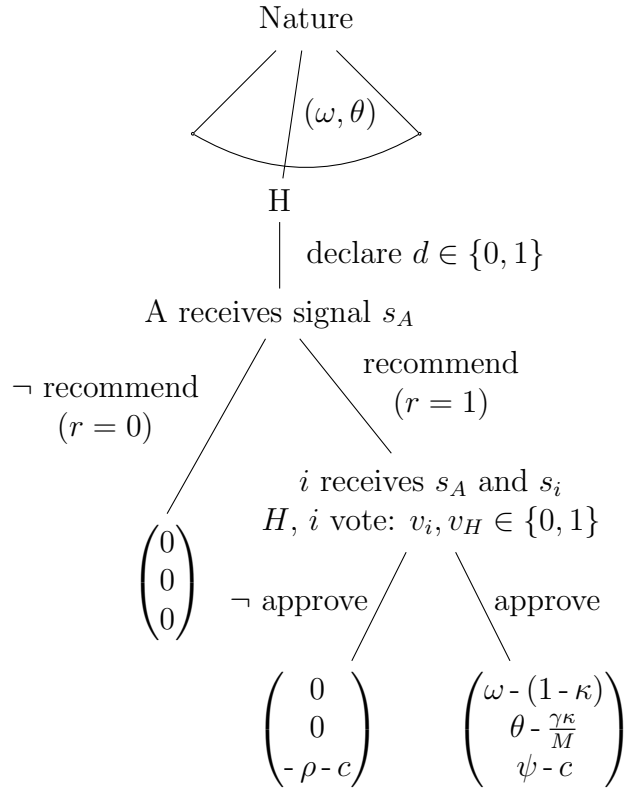
Before proceeding to the analysis, we impose the following simplifying assumption:

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. In the game 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 .⁵

⁵The assumption allows a simple characterization and we use it primarily for presentational purposes.

Figure 1: The IO Game



Note: Payoffs are listed, top to bottom, as (U_H, U_i, U_A) . Signals ω, s_i, s_A are observed privately by H, i, A respectively, and θ is unobserved by all players. Project approval is determined by Equation (1).

With this assumption in place, we can provide a general characterization of the routine operation of the IO, beginning with the stochastic emergence of a project.

Proposition 1 (Equilibrium) *There exist thresholds $\widehat{s_i(s_A)}$, s_1^* and s_0^* where*

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

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

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

such that the following set of strategies and beliefs is a Perfect Bayesian Equilibrium to the game under Assumption 1:

- *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 .*

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 see a sufficiently high signal that they vote yes given θ . A's belief that there are sufficient votes requires integrating this binominal probability by A's belief about θ . Although conceptually straightforward, this quantity is messy and provides no additional insight. The assumption M large provides simple equilibrium conditions.

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, for all i , $E[\theta|s_i, s_A] = \frac{\delta\mu + \delta_m s_i + \delta_A s_A}{\delta + \delta_m + \delta_A}$. 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, s_i such that a member wants to vote Yes. 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:

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

Now 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 $\frac{1-\alpha\beta}{(1-\alpha)\beta}$.

Members' messages are (on average) increasing in θ and therefore we can find a minimum policy value θ_1 such that $\frac{1-\alpha\beta}{(1-\alpha)\beta}$ proportion of members get a sufficiently strong message that they vote Yes:

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

which rearranges to

$$\theta_1 = \frac{\gamma\kappa(\delta_A + \delta_\mu + \delta_m)}{M} - \frac{\delta_A s_A}{\delta_m} + \frac{\Phi^{-1}\left(\frac{1-\alpha\beta}{\beta-\alpha\beta}\right)}{\sqrt{\delta_m}} - \frac{\mu\delta_\mu}{\delta_m}$$

Given its message, the agency believes that the

$$\Pr(\theta \geq \theta_1|s_A) = \Phi\left(\sqrt{\delta + \delta_A}\left(\frac{\mu\delta + s_A\delta_A}{\delta + \delta_A} - \theta_1\right)\right) \quad (7)$$

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 A.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 A.3. In order for the vote to pass without H 's support A requires more of the members to approve of the project; in fact at least the proportion of members $\frac{1}{(1-\alpha)\beta}$ 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, $s_0^* - s_1^* = \frac{\sqrt{\delta_m}(\delta + \delta_A)}{(\delta + \delta_m + \delta_A)\delta_A} \left[\Phi^{-1} \left(\frac{1}{(1-\alpha)\beta} \right) - \Phi^{-1} \left(\frac{1-\beta\alpha}{(1-\alpha)\beta} \right) \right]$.

5.3 Value of funded projects

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. 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) *Compared to project the hegemon opposes, 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 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 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 (anticipated) 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. There may, however, be a “crowding out” effect (not shown explicitly here due to the single-shot nature of our model) whereby politically-motivated projects deplete a finite pool of IO resources, preventing other, more developmentally valuable projects from being undertaken.

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, but most importantly, on the behavior of the agency. How do changes in vote and cost share, and expertise affect the willingness of the agency to recommend projects?

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: $\frac{ds_i(\widehat{s_A})}{d\kappa} > 0$*
- *Conditional on either hegemon support or hegemon opposition, the agency is less willing to recommend projects: $\frac{ds_0^*}{d\kappa} = \frac{ds_1^*}{d\kappa} > 0$, $\frac{d\Pr[r=1|v_H=1]}{d\kappa} < 0$, $\frac{d\Pr[r=1|v_H=0]}{d\kappa} < 0$. However, the aggregate effect on the probability of agency recommendation is ambiguous.*

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, $\frac{ds_0^*}{d\kappa} > 0$ and $\frac{ds_1^*}{d\kappa} > 0$. Shifting the costs to the members reduces the likelihood of recommending any project, irrespective of the hegemon's support. This 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: $\frac{ds_0^*}{d\alpha} > 0$, $\frac{ds_1^*}{d\alpha} < 0$, $\frac{d\Pr[r=1|v_H=1]}{d\alpha} > 0$, $\frac{d\Pr[r=1|v_H=0]}{d\alpha} < 0$.*

Consider first any project that the hegemon approves of. As H 's power within the agency 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. The top panel of Figure 2 shows how the probabilities of recommendation vary with H 's vote share across levels of expertise.⁶ In both cases, $\Pr[r = 1|v_H = 1]$ (solid black curve) rises with α – making recommendation of projects the hegemon likes more likely, while their expected developmental quality declines (the blue curve, $E[\theta|r = 1, v_H = 1]$).

If the hegemon dislikes a project, then its large vote share means that to get enough member votes the project has to be of even better quality; and hence the agency is less likely to recommend such a project. Figure 2 shows how the probability that A recommends a project opposed by H declines with α (red curve ($\Pr[r = 1|v_H = 0]$)), while the average quality of projects that do get recommended rises (the brown curve, $E[\theta|r = 1, v_H = 0]$).

The bottom panel of Figure 2 also shows 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. The figure also suggests that the impact of a high vote share is more consequential for the hegemon at low expertise than high expertise. The figure also show that once H 's vote shares is relatively high, then further increases in H 's voter share decreases member welfare.⁷

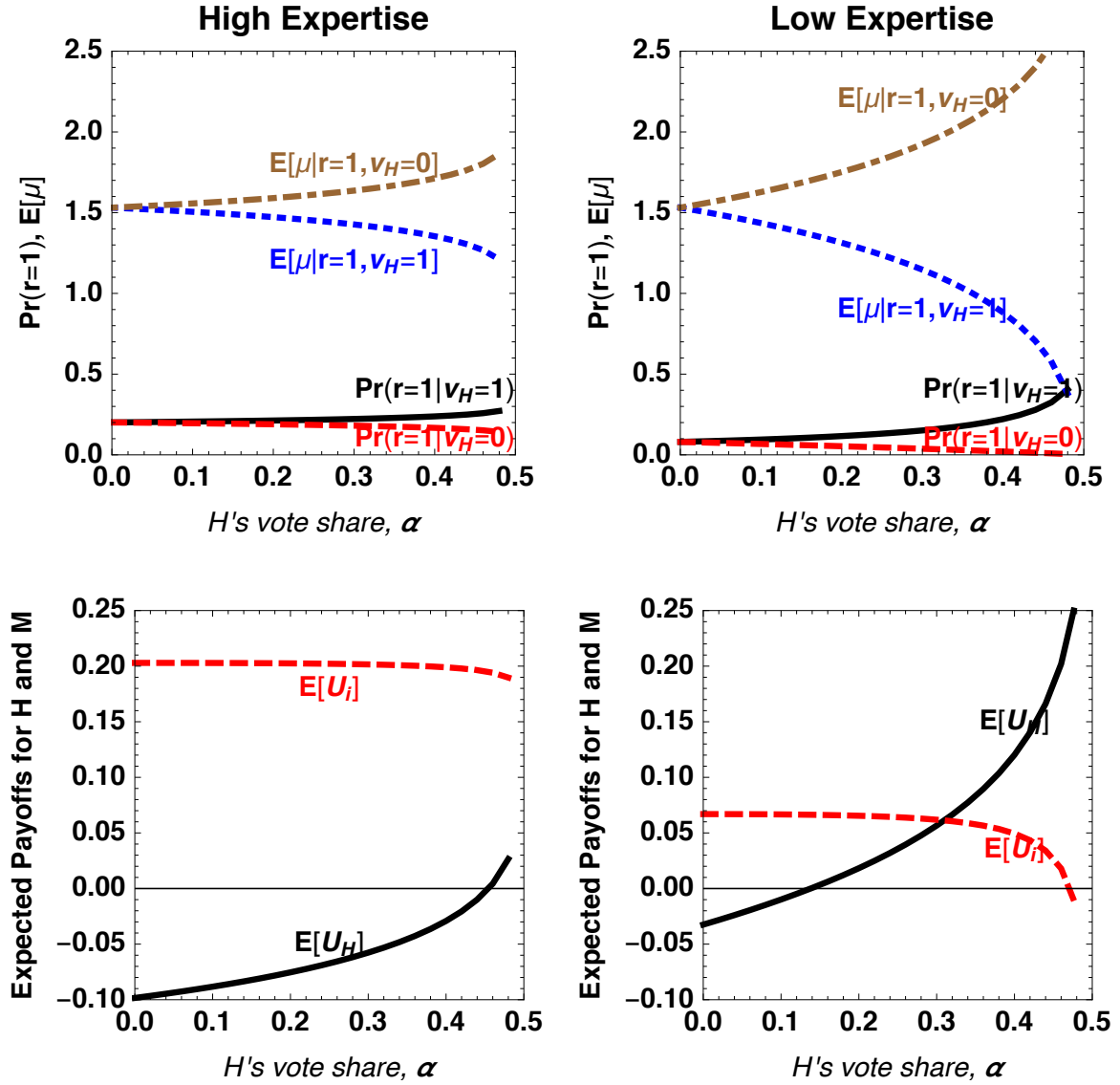
6.2 Expertise

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.

⁶The figures are all drawn for the case that $\beta = 2$, where voting follows a simple weighted majority rule, and hence we limit $\alpha < \frac{1}{2}$.

⁷At relatively low α the members payoffs can be non-monotonic in α . Particularly at low expertise, the agency can be reluctant to recommend projects. By ceding power to the hegemon, members increase the likelihood that the agency will make positive recommendation, which is beneficial to the members.

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



Note: Top panel plots the probability that A recommends and the development value of the projects. The lower panel plots the payoffs for H and M .

At low levels of expertise we cannot explicitly sign comparative statics with respect to δ_A as there are competing effects (this ambiguity can be seen later in the non-monotonicities shown in Figure 3 at low δ_A). The obvious direct effect of increased expertise is that A can better distinguish between good and bad projects and so A 's signal becomes more influential in encouraging members to vote Yes. That A 's recommendation becomes more influential 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. At high levels of expertise the comparative statics are unambiguous as the the first factor becomes dominant; the agency increasingly ignores H 's political concerns – beneficial to the members but not to the hegemon.

Suppose the agency's expertise is perfect, $\delta_A \rightarrow \infty$. That is, the agency knows exactly the developmental value of the project, and if the agency recommends the project, the members learn, with certainty, its value – because the recommendation comes with the agency's report of the value. Their private signal is of no importance and is ignored. Any member will vote in favor as long as the reported, true value of the project exceeds its share of the costs, and this is true irrespective of whether the hegemon has already agreed to vote in favor or against. The threshold values of the signal – actually the true value of the project – that determines whether the agency recommends ceases to differ across the hegemon's vote. That is $s_1^* \rightarrow s_0^*$ and both approach the member's share of the costs of the project, $\frac{\kappa\gamma}{M}$. In this case, A doesn't 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 expected developmental value of projects funded with and without hegemon support converge, as do the probabilities of the agency recommending supported vs. opposed projects. At low expertise the hegemon's view of a project matters greatly and political projects are much more likely to be recommended than project that the hegemon objects to. However as agency

expertise rises, the agency increasingly discounts the hegemon’s view and the agency no longer “shades” 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 to fund do 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, few political projects are funded and the hegemon might want to exit the IO.

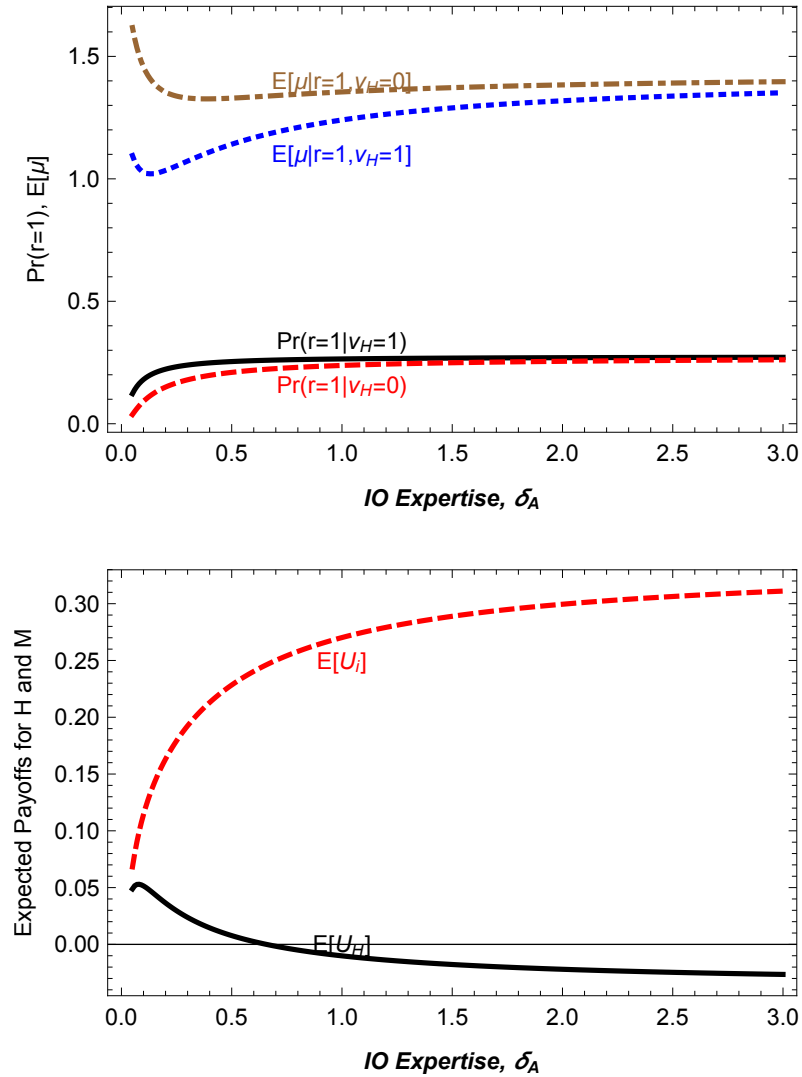
The members, of course, value expertise very highly – in the limit, they receive a perfect signal of the developmental quality of the project, and can perfectly control the agency. The payoff to any member rises as $\delta_A \rightarrow \infty$ (see Figure 3).

When projects are ex ante valuable, and expertise is very high, the interests of the hegemon are ignored. In fact the influence that the hegemon’s vote share has over the agency and its recommendations declines with expertise.

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 of 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 plots 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:*

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

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

Given the signs of the first derivatives as given in Proposition 3, the second derivatives in Proposition 4 indicate 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 upper panels of Figure 2. When the expertise is high, there is relatively little divergence in the probability the agency recommends the project between the cases where the hegemon approves or does not; in the low expertise case, the divergence is larger. The effect is also apparent in the lower panels of Figure 2: in the high expertise case, the payoff for the hegemon only reaches positive values when its vote share is very high; in the low expertise case, its payoff is everywhere higher and reaches positive values at relatively low vote share levels.

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

Moreover, with the rise of the fiscal capacity of the member states, the relative US vote share declines over the post-war period. Figures 4 and 5 shows the steady decline in US vote shares at the IBRD and the IMF since 1950.⁸

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 expertise and the fiscal capacity of the member states rises, the US vote share continues to decline.

⁸We are grateful to [Clark \(2017\)](#) for sharing his data on IMF and IBRD voteshares.

Figure 4: IBRD Vote Shares, 1950 - 2010

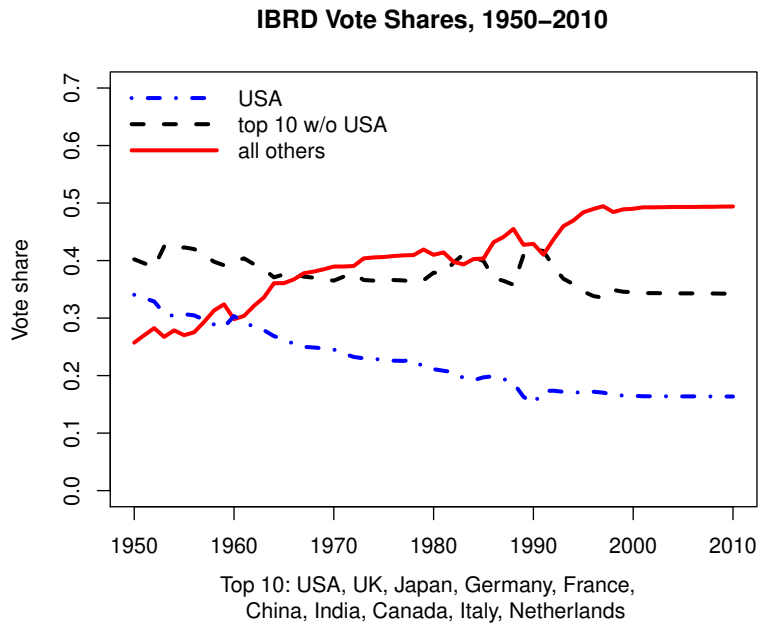
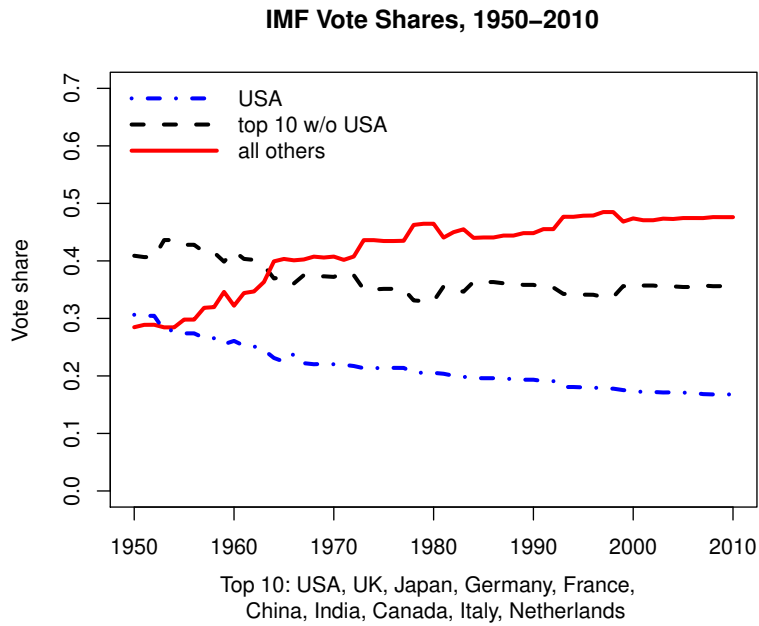


Figure 5: IMF Vote Shares, 1950 - 2010



In what follows, we consider the formation of the IO, and in particular, the choice a hegemon might make ex ante over what have been until now considered as exogenous parameters, vote share α , 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, $Pr(\omega \leq x) = W(x)$. We introduce now more structure on this distribution of political projects, consistent with an emergent cold war competition with a geopolitical rival:

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

Under this assumption, H supports λ proportion of projects (friends) and opposes the rest (foes). 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 $\mu < \chi_M$, that is the ex ante expected value of any development project μ is less than the member's reservation value; If the agency simply randomly selected projects

(equivalently, $\delta_A \rightarrow 0$ such that the agency has no expertise), then the members would prefer not to participate.⁹

We start our analysis by examining some important limiting cases.

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

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

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

$$U_M(\alpha, \kappa, \delta_A \rightarrow \infty) = \Phi \left(\sqrt{\delta} \left(\mu - \frac{\kappa\gamma}{M} \right) \right) \left[\mu - \frac{\kappa\gamma}{M} + \frac{1}{\delta_\mu} \frac{\phi \left(\mu - \frac{\kappa\gamma}{M} \right)}{\Phi \left(\sqrt{\delta} \left(\mu - \frac{\kappa\gamma}{M} \right) \right)} \right]$$

and the hegemon's payoff converges to

$$U_H(\alpha, \kappa, \delta_A \rightarrow \infty) = \Phi \left(\sqrt{\delta} \left(\mu - \frac{\kappa\gamma}{M} \right) \right) [\eta(2\lambda - 1) - (1 - \kappa)].$$

- If the member's payoff $U_M(\alpha, \kappa, \delta_A \rightarrow \infty) > \chi_M$ then the members benefit from participation when expertise is high, while
- If $U_H(\alpha, \kappa, \delta_A \rightarrow \infty) < \chi_H$, then H will not join the IO
- This hegemon non-participation condition is always satisfied if $\lambda \leq \frac{1}{2}$.

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 of the intuition expressed by White in the quote above. For the IO to be attractive to the member states, they must benefit from the added information the IO provides in the form of expertise over developmental projects; if the hegemon can simply always have its way, there is little value to the members of this institutional expertise, and given that joining is costly, 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

⁹Formally, as $\delta_A \rightarrow 0$ and $\delta_m \rightarrow 0$, then the members' expected payoff from any approved IO project is $\mu - \frac{\kappa\gamma}{M}$.

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. A sufficient condition for the hegemon to decline to participate when expertise is high, 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

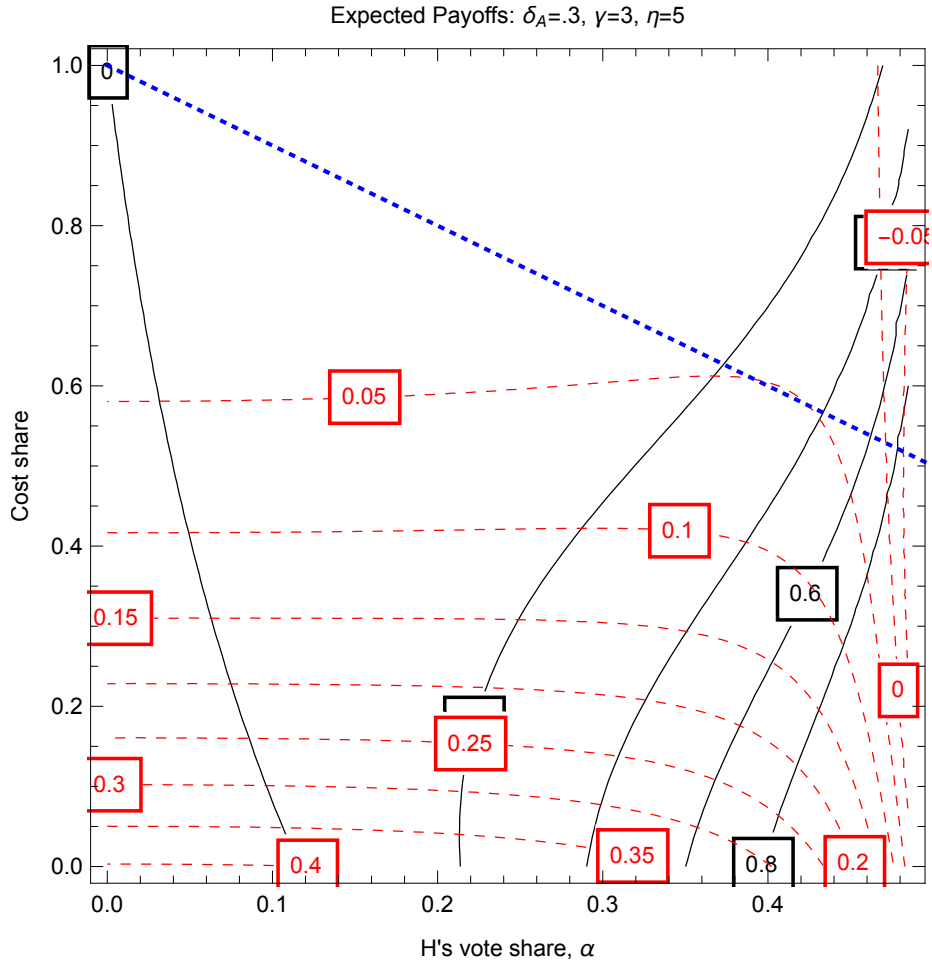
The hegemon wants to propose the vote shares and cost shares (given a level of expertise) that maximize its expected payoff conditional on the members agreeing to join the IO. Formally,

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

An interior solution to this problem lies at the set of points where the indifference curves of the two players have the same slope: $\frac{dU_H(\alpha, \kappa, \delta_A)}{d\alpha} / \frac{dU_M(\alpha, \kappa, \delta_A)}{d\alpha} = \frac{dU_M(\alpha, \kappa, \delta_A)}{d\kappa} / \frac{dU_H(\alpha, \kappa, \delta_A)}{d\kappa}$

An interior solution however, may be unavailable for some values of the exogenous parameters, and the hegemon's preferred IO design may be a corner solution, that is to say H is 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 it is useful to turn to an illustration.

Figure 6: Contour Plot of Expected Payoffs for Hegemon and Members Over Vote and Contribution Shares Given Low Expertise



Note: Solid black lines indicate indifference curves for the hegemon; red dashed lines indicate indifference curves for the members. The numbers in the boxes index the indifference curves, with larger numbers indicating higher payoffs. The dotted blue line restricts the vote and cost shares to be the same, $\kappa = 1 - \alpha$. Simulations computed at $\delta_A = 0.3, \gamma = 3, \eta = 5, \beta = 2, \frac{c+\rho}{\psi+\rho} = \frac{1}{2}, \delta_m = 0.05, \mu = -1, \delta_\mu = 0.1, M = 1,$ and $\lambda = \frac{1}{2}$.

Figure 6 show a contour plot of expected payoffs for H and M under different institutional rules – hegemon’s vote share (α) on the horizontal axis, and the member’s contribution share (κ) on the vertical axis – with moderate expertise. The solid lines correspond to the contours of the hegemon’s welfare function, and the red-dashed lines correspond to the members’ indifference curves; the numbers in the boxes index the indifference curves, with larger numbers indicating higher payoffs. The graphic shows that H prefers high α and (at least at high values of α) would also prefer to pay much of the costs. While the high vote share enables H to get political projects approved, H also wants to pay much of the costs as this makes it more likely that members will back its preferred projects (and, as a result, A will recommend such projects). For the members, their most preferred IO design is that the hegemon pays everything and has no political control ($\alpha = \kappa = 0$) and the members payoffs generally decline as cost share or vote share increase.

The hegemon will, under these conditions, choose an institution where it bears much of the costs (near zero on the vertical axis), and as large an α (along the horizontal axis) as the members will tolerate. If, for instance, the member’s reservation utility is 0.3, the US would propose paying the majority of the costs and take a vote share of about 0.4. This fits of course with the decision the US made at the time of the inception of both the WB and the IMF.

Overtime, the member states developed a greater fiscal capacity and a norm emerged in which the vote shares corresponded more closely with the contribution shares. We indicate this relationship with the downwards sloping dotted blue line on Figure 6 – which correspond to IO designs where votes and costs are functionally related ($\alpha = 1 - \kappa$).

7.2 IO Evolution: Member fiscal capacity and the end of the cold war

Recall from Figures 4 and 5 the steady decline in vote and cost shares for the US. Two significant changes in the world system have affected the design of IOs over this period: the capacity of members to contribute has increased (γ declined) and, with the end of the Cold War, political projects are less salient (η declines). Given that H is less concerned with geopolitical benefits from projects and the members can more easily pay, there is the possibility of IO reform, with H surrendering some of its influence in exchange for reducing its share of the cost. Such a trade could potentially improve the welfare of both members and the hegemon.

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

7.3 Improved Expertise and the Evolution of IOs

Arguably, the science of development economics was in its infancy post-war; over time development economics has become the terrain of well-trained technocrats, with knowledge and experience about what works. This technological improvement is captured in our model as an improvement agency expertise, δ_A .

Improved expertise has two, potentially counter-intuitive, effects. First, it has muted calls for reforms to the IO voting and contribution rules by the members. Second, while increased expertise leads to the greater member satisfaction with the IO, the hegemon becomes less satisfied with the IO and might find benefit in threatening to, or actually exiting from, the international institution.

In the following discussion of the impact of improved expertise we restrict attention to the case where the vote share and the cost share are the same – which reflects the current norms within both the WB and the IMF. It helps too, that this restriction reduces the dimensionality of the problem, making simple illustrations available.

Figure 7 shows a contour plot of H and M 's indifference curves as precision, δ_A , and the hegemon's vote share, α , vary. Again the black solid lines represent the hegemon's indifference curves and the red dashed lines show the members' indifference curves. The figure shows two clear patterns that explain the evolution of IOs. The members' welfare is clearly improved by increased agency expertise – as expertise rises for any vote/cost share, the member's utility rises. The hegemon however has a more complex relationship with respect to agency precision.

In the previous section we suggested that at the time of formation, H proposes the largest vote share for itself that still permits the members to be willing to join. If at that moment, agency expertise was also low, we can visualize the point in the parameter space that corresponds to this initial IO formulation: in terms of Figure 7, that starting point will be towards the bottom of the figure, as far to the right as the members will allow, perhaps close to the point $(0.3, 0)$ reflecting the reality of the post-war compact, in which the US takes the lion's share of votes and assumes responsibility for a third or more of the contributions, in an environment of low technical expertise.

As agency expertise improves from its low start point all parties are initially happy. As seen in Figure 7, as δ_A starts to increase both H and M 's payoffs improve. The members benefit from the agency's improved ability to identify good development projects; the hegemon benefits, since A 's improved expertise means it proposes more projects such that the IO ends up funding more of the political projects that H likes. However, as agency expertise continues to grow, a wedge is driven between the hegemon and the members.

Consider Figure 7 at vote shares fixed say at 0.3 for the hegemon. As expertise increases (up the vertical arrow in the figure), the members experience monotonic improvement in their payoffs, as indicated by the indifference curves indexed with higher values. The small graph inserted in the figure demonstrates how the member's payoffs (the red dashed curve) monotonically increase with expertise at a given vote/cost share which is similar to the lower panel of Figure 3 above.

For the hegemon however, the effect of more expertise is not monotonic. As we move up the vertical arrow on the figure, at first higher indifference curves for the hegemon are reached, and hegemonic welfare improves. Beyond some point, however, further improvements in expertise cause hegemonic welfare to start to decline. This non-monotonicity is sketched by the black curve in the inset graph (also observed in the lower panel of Figure 3 above).

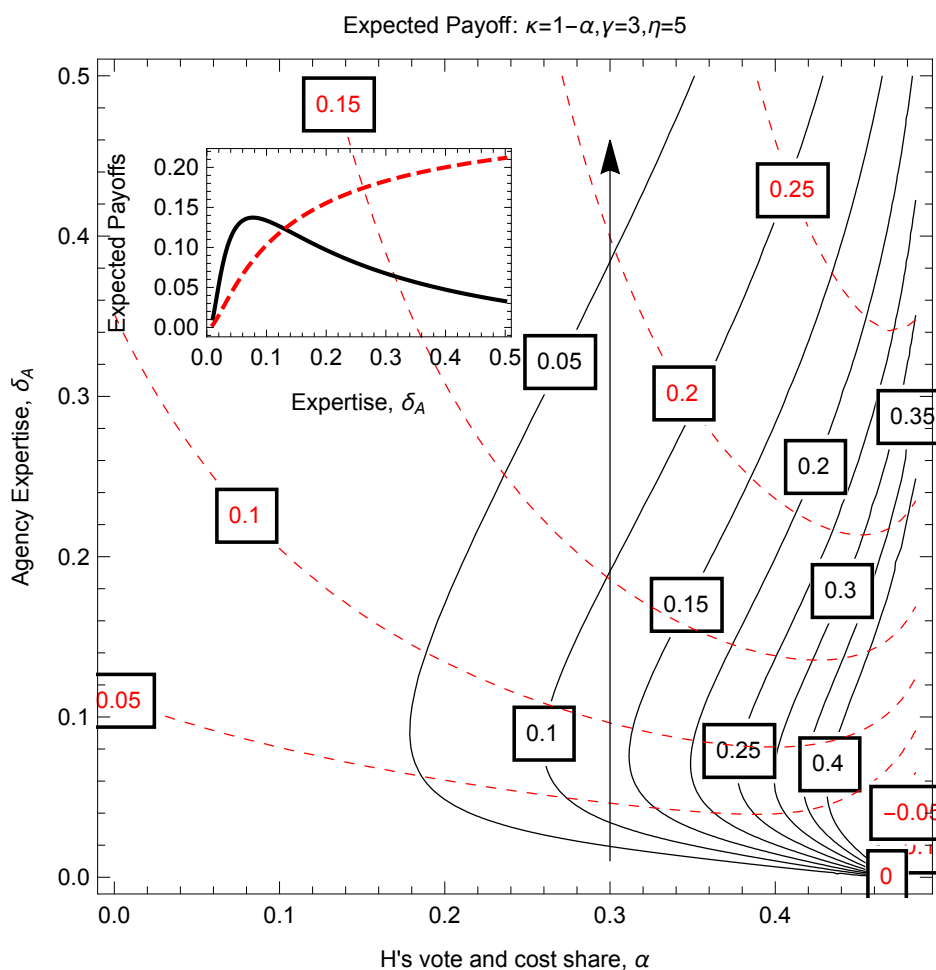
As expertise rises, the hegemon is unable to get as many of its preferred projects approved at the voting stage. The utility of the IO is diminished for the hegemon. In this case, the hegemon may complain about the the cost share it incurs while experiencing diminished influence over the IO; it may threaten to withhold its contributions or demand higher vote shares. The members however are not amenable to more votes and lower contributions for the hegemon, and the stability of the system is at risk. The hegemon may threaten to or actually exit.

8 Some Predictions

The model makes several novel predictions. As expertise increases (which happens over time), the proportion of funded projects that are political projects declines and the proportion of funded projects that are development projects increases.

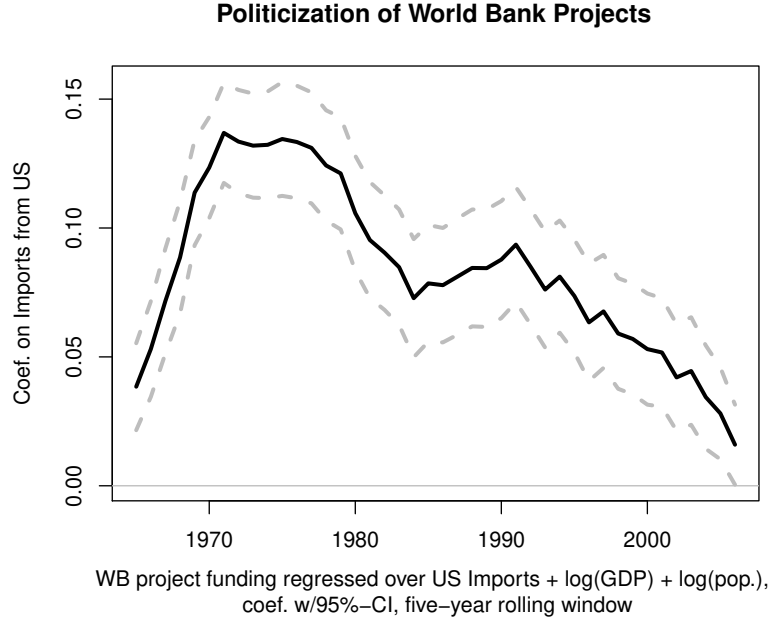
A quick check of this prediction relies on data drawn from [Vreeland and Dreher \(2014\)](#). If expertise rises with time, we would expect the projects approved by the WB to be less “politica” and more “develomental”. That is, te recipients of these projects are less likely to be allies of the US, or major trading partners. OLS regressions at the country year level reveal patterns consistent with this prediction. Consider the following specifications:

Figure 7: Contour Plot of Expected Payoffs for Hegemon and Members by Vote Share and Expertise



Note: Solid black lines indicate indifference curves for the hegemon; red dashed lines indicate indifference curves for the members. The numbers in the boxes index the indifference curves, with larger numbers indicating higher payoffs. The restriction that votes are in proportion to cost shares is applied here: $\alpha = 1 - \kappa$. The insert shows the payoffs along the trajectory shown by the vertical arrow.

Figure 8: Politicization of World Bank Projects: Imports

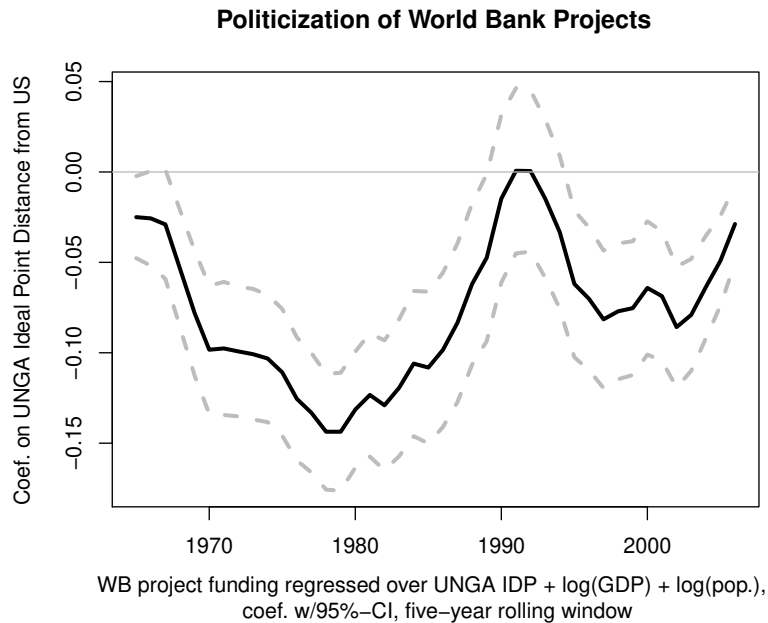


$$\begin{aligned} \text{Any WB project approved}_{i,t} = & \beta_1 (\text{UNGA Ideal Point Distance from US})_{i,t-1} \\ & + \beta_2 \log GDP_{i,t-1} + \beta_3 \log POP_{i,t-1} + \epsilon_{i,t} \end{aligned}$$

$$\begin{aligned} \text{Any WB project approved}_{i,t} = & \beta_1 \log (\text{Imports from US})_{i,t-1} \\ & + \beta_2 \log GDP_{i,t-1} + \beta_3 \log pop_{i,t-1} + \epsilon_{i,t} \end{aligned}$$

We can plot the coefficients on imports from the US (Figure 8) and on UNGA ideal point distances (Figure 9) – and we expect to see the influence of the US decline over time. After 1970 this is evident in the Imports plot, and later 1980 for the UNGA plot.

Figure 9: Politicization of World Bank Projects: UNGA



9 Conclusion

We have presented a formal model of IO design consistent with several stylized facts. Member states benefit from delegation of authority to an international organization to investigate and recommend projects to the membership, and both powerful and less powerful states benefit from this institutional structure. Powerful states can influence the recommendations that the IO makes to the membership, shading its recommendations in favor of hegemonic interests. It does so, not because the IO shares the hegemon's preferences, but instead it internalizes the preferences of the powerful state out of bureaucratic concerns. The rest of the membership are aware that this influence is going on, 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 of shading its advice in favor of the powerful, and tolerated by the membership depends on the key relationship between the hegemon's vote share and the expertise of the IO. While a powerful state may value a large vote share, giving it sig-

nificant formal influence over the IO, 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. In general the powerful state’s formal influence is limited.

Instead, the powerful state can exert informal influence. Eager to get sufficient support among the membership for any project the hegemon may like, the IO adjusts its recommendation. This adjustment is understood by the membership to be happening on occasion; this cannot happen too much before the members object. There are, therefore limits on the degree to which the IO leans in favor of the hegemon.

The limits on the hegemon’s informal influence are conditioned by the expertise of the IO. 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 IO becomes better at identifying *ex ante* the good projects, and the flexibility of the IO 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.

IO 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 quick insights as to the formation and evolution of IOs. Consider the postwar 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

the 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). In the recent period we have heard more about exit from IOs by the US and other states than has been usual.

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 the IOs 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.

A Appendix

A.1 Notation

Table 1: Notation

Variable	Interpretation	Detail
Key State Variables		
α	Vote share in IO for hegemon	$\alpha \in (0, 1)$
β	Inverse of vote share needed to pass	$1 < \beta < \frac{1}{\alpha}$
κ	Share of cost paid by members	$\kappa \in (0, 1)$
θ	Development value of the project	$\theta \sim N(\mu, \frac{1}{\delta})$
ω	Political value of the project to H	$Pr(\omega \leq z) = W(z)$
Strategies		
r	A 's recommendation	$r \in \{0, 1\}$
v_i	Vote to fund by member i	$v_i \in \{0, 1\}$
v_H	Vote to fund by H	$h \in \{0, 1\}$
Signals and Prior		
s_i	member i 's signal of development value	$s_i \sim \left(\theta, \frac{1}{\delta_m}\right)$
s_A	A 's signal of development value	$s_A \sim \left(\theta, \frac{1}{\delta_A}\right)$
μ	Prior on development value	$\theta \sim N(\mu, \frac{1}{\delta})$
Payoffs		
ψ	Bureaucratic value of project	$\psi > 0$
ρ	Reputational cost to A	$\rho > 0$
c	Operating cost to A	$c > 0$
Parameters		
M	Number of members	$M > 1$
γ	Financial capacity of H relative to M	$\gamma > 0$
μ, δ	Prior mean and precision on θ	$\mu \in \mathbb{R}, \delta \in \mathbb{R}_+$
δ_m	Precision of member i 's signal	$\delta \in \mathbb{R}_+$
δ_A	Precision of A 's signal	$\delta_A \in \mathbb{R}_+$

A.2 Some Definitions and an Assumption

Definition 1 Define $\bar{\theta} = \frac{\kappa\gamma}{M}$, $\Delta = (\delta + \delta_m + \delta_A)$ and $\widehat{s_i(s_A)} = \frac{1}{\delta_m} [\Delta\bar{\theta} - \delta\mu - \delta_A s_A]$.

A.3 Proofs

Proof of Proposition 1:

The members' and hegemon's best-response voting strategies were derived in the main

text, and restated here:

$$v_H = \mathbb{1}[\omega \geq 1 - \kappa]$$

$$v_i = \mathbb{1}[s_i \geq \widehat{s}_i(s_A)], \quad \text{where } \widehat{s}_i(s_A) = \frac{1}{\delta_m} \left[(\delta + \delta_m + \delta_A) \frac{\kappa\gamma}{M} - \delta\mu - \delta_A s_A \right]$$

For notational convenience, let $\tau \in \{0, 1\}$ denote whether a project is funded. Aggregating the members' and the hegemon's votes, we have that

$$\tau = \mathbb{1} \left[v_H \alpha + \frac{(1 - \alpha)}{M} \sum_{i=1}^M v_i \geq \frac{1}{\beta} \right]$$

as per Equation (1). Also for notational convenience, let $\widehat{s}_i = \widehat{s}_i(s_A)$. Applying Assumption 1, and considering a large M , we can apply the Weak Law of Large Numbers to show that empirical distribution of the members' signals converges to the population distribution, and thus that the fraction of members that vote yes converges to $Pr(s_i > \widehat{s}_i|\theta)$, which is equal to $\Phi(\sqrt{\delta_m}(\theta - \widehat{s}_i))$. Thus we can rewrite the vote aggregation and project approval decision as follows:

$$\tau = 1 \iff \alpha v_H + (1 - \alpha) Pr(s_i > \widehat{s}_i|\theta) > \frac{1}{\beta}$$

Given $Pr(s_i > \widehat{s}_i|\theta) = \Phi(\sqrt{\delta_m}(\theta - \widehat{s}_i))$, and substituting for \widehat{s}_i and rearranging, we have that $\tau = 1$ if and only if

$$\theta > \frac{1}{\delta_m} [\Delta\bar{\theta} - \delta\mu - \delta_A s_A] + \frac{1}{\sqrt{\delta_m}} \Phi^{-1} \left(\frac{1 - \beta\alpha v_H}{(1 - \alpha)\beta} \right) \equiv \theta_{v_H} \quad (\text{A.1})$$

Given this voting behavior, we now consider the decision of the IO to recommend the project or not.

To begin, recall that A 's recommendation decision is made before H 's vote is cast, but after H has declared its vote intention. Let $\widehat{v}_H \in \{0, 1\}$ denote a conjecture by A as to whether or not H will vote yes. A 's conjecture implies that, given θ , a recommended project will be approved iff

$$\theta > \theta_{\widehat{v}_H} = \frac{1}{\delta_m} [\Delta\bar{\theta} - \delta\mu - \delta_A s_A] + \frac{1}{\sqrt{\delta_m}} \Phi^{-1} \left(\frac{1 - \beta\alpha\widehat{v}_H}{(1 - \alpha)\beta} \right)$$

Of course A also does not know θ when she makes her recommendation decision. Rather, she has a posterior belief of θ given her private signal and the common prior, which is distributed

$$\theta|s_A \sim N \left(\frac{\delta\mu + \delta_A s_A}{\delta + \delta_A}, \frac{1}{\delta + \delta_A} \right)$$

Thus given conjecture \widehat{v}_H , she believes that the probability that the project will be funded,

if recommended, is

$$Pr(\tau = 1|r = 1, s_A, \widehat{v}_H) = Pr(\theta > \theta_{\widehat{v}_H}|s_A) = \Phi\left(\sqrt{\delta + \delta_A}\left(\frac{\delta\mu + \delta_A s_A}{\delta + \delta_A} - \theta_{\widehat{v}_H}\right)\right) \equiv \Phi(y_{\widehat{v}_H})$$

Restating Equation (5) in terms of A 's conjecture \widehat{v}_H , we can express A 's decision to recommend a project as:

$$r = 1 \iff Pr(\tau = 1|r = 1, s_A, \widehat{v}_H) > \frac{c + \rho}{\psi + \rho}$$

Substituting, we have $\sqrt{\delta + \delta_A}\left(\frac{\delta\mu + \delta_A s_A}{\delta + \delta_A} - \theta_{\widehat{v}_H}\right) > \Phi^{-1}\left(\frac{c + \rho}{\psi + \rho}\right)$, and with some simplification this reduces to

$$s_A > -\frac{\delta\mu}{\delta_A} + \frac{\delta + \delta_A}{\delta_A}\bar{\theta} + \frac{\delta_m(\delta + \delta_A)}{\Delta\delta_A}\left[\frac{1}{\sqrt{\delta + \delta_A}}\Phi^{-1}\left(\frac{c + \rho}{\psi + \rho}\right) + \frac{1}{\sqrt{\delta_m}}\Phi^{-1}\left(\frac{1 - \beta\alpha\widehat{v}_H}{(1 - \alpha)\beta}\right)\right] \equiv s_{\widehat{v}_H}^*$$

So altogether, given conjecture \widehat{v}_H , A 's recommendation strategy is given by

$$r = 1 \iff s_A > s_{\widehat{v}_H}^* \tag{A.2}$$

Noting that

$$s_0^* = -\frac{\delta\mu}{\delta_A} + \frac{\delta + \delta_A}{\delta_A}\bar{\theta} + \frac{\delta_m(\delta + \delta_A)}{\Delta\delta_A}\left[\frac{1}{\sqrt{\delta + \delta_A}}\Phi^{-1}\left(\frac{c + \rho}{\psi + \rho}\right) + \frac{1}{\sqrt{\delta_m}}\Phi^{-1}\left(\frac{1}{(1 - \alpha)\beta}\right)\right] \tag{A.3}$$

$$s_1^* = -\frac{\delta\mu}{\delta_A} + \frac{\delta + \delta_A}{\delta_A}\bar{\theta} + \frac{\delta_m(\delta + \delta_A)}{\Delta\delta_A}\left[\frac{1}{\sqrt{\delta + \delta_A}}\Phi^{-1}\left(\frac{c + \rho}{\psi + \rho}\right) + \frac{1}{\sqrt{\delta_m}}\Phi^{-1}\left(\frac{1 - \beta\alpha}{(1 - \alpha)\beta}\right)\right] \tag{A.4}$$

we can see that

$$s_1^* < s_0^* \tag{A.5}$$

meaning that $Pr(r = 1|\widehat{v}_H = 1) > Pr(r = 1|\widehat{v}_H = 0)$.

Now we turn to H 's declaration strategy. Let $\chi(d)$ denote the probability that A assigns to H playing $v_H = 1$ given H 's announcement $d \in \{0, 1\}$. Given belief χ , A will play a threshold strategy of $r = 1 \iff s_A > s_\chi^*$, where s_χ^* is a convex combination of s_0^* and s_1^* when $\chi \in (0, 1)$. If $s_{\chi(d')}^* = s_{\chi(d'')}^*$ for $d' \neq d''$, then A is ignoring H 's message, and H can do no better than to randomize his messages independently of ω (i.e. babbling). If on the other hand $s_{\chi(d')}^* > s_{\chi(d'')}^*$, then we have that $Pr(r = 1|d'') > Pr(r = 1|d')$. Since H unambiguously prefers to encourage A 's recommendations when $\omega > 1 - \kappa$ and to discourage otherwise, it follows that H will send message d'' if $\omega > 1 - \kappa$, and send message d' otherwise. This is of course the same rule governing H 's voting decision given a recommendation. The meaning of the messages is arbitrary, so we can assign $d = 0$ to the message that decreases the probability of recommendation, and $d = 1$ to the message that increases it. In equilibrium, H 's vote matches his announcement and A 's conjecture is always correct: $\chi(d) = \widehat{v}_H = v_H = d$ for $d = 0, 1$. ■

Proof of Corollary 1, : For the first inequality: by A 's recommendation strategy, $E[\theta|r = 1] = E[\theta|s_A > s_{\widehat{v}_H}^*]$ and $E[\theta|r = 0] = E[\theta|s_A < s_{\widehat{v}_H}^*]$. Given that $E[\theta|s_A]$ is increasing in s_A it follows immediately from standard properties of truncated distributions that $E[\theta|r = 1] > E[\theta|r = 0]$.

For the second inequality: Denote $\hat{\omega} = 1 - \kappa$, so that $v_H = \mathbb{1}[\omega > \hat{\omega}]$. From A 's

recommendation strategy and H 's declaration strategy as given in Proposition 1, we have:

$$r = \begin{cases} 1, & s_A > s_0^* \\ 1, & s_A \in (s_1^*, s_0^*) \text{ and } \omega > \hat{\omega} \\ 0 & \text{otw} \end{cases}$$

By the law of total expectation we have that

$$E[\omega|r = 1] = (1-\pi_1)E[\omega|s_A > s_0^*] + \pi_1 E[\omega|s_A \in (s_1^*, s_0^*), \omega > \hat{\omega}] = (1-\pi_1)E[\omega] + \pi_1 E[\omega|\omega > \hat{\omega}]$$

and

$$E[\omega|r = 0] = (1-\pi_2)E[\omega|s_A < s_0^*] + \pi_2 E[\omega|s_A \in (s_1^*, s_0^*), \omega < \hat{\omega}] = (1-\pi_2)E[\omega] + \pi_2 E[\omega|\omega < \hat{\omega}]$$

for some $\pi_1, \pi_2 \in (0, 1)$. It follows that

$$E[\omega|r = 1] - E[\omega|r = 0] = \pi_1(E[\omega|\omega > \hat{\omega}] - E[\omega]) + \pi_2(E[\omega] - E[\omega|\omega < \hat{\omega}])$$

From standard properties of truncated distributions, we know that this quantity is strictly positive. ■

Proof of Corollary 2 : By A 's recommendation strategy, and by independence of s_A and ω , we have $E[\theta|r = 1, v_H = 1] = E[\theta|s_A > s_1^*]$ and $E[\theta|r = 1, v_H = 0] = E[\theta|s_A > s_0^*]$. Given that $E[\theta|s_A]$ is increasing in s_A , and given that $s_1^* < s_0^*$, it follows from standard properties of truncated distributions that $E[\theta|s_A > s_1^*] < E[\theta|s_A > s_0^*]$. ■

Proof of Corollary 3: By Equation (A.1), and by independence of ω and θ , we have that $E[\theta|funded, v_H] = E[\theta|\theta > \theta_{v_H}]$, and that $\theta_1 < \theta_0$. Again by standard properties of truncated distributions it follows immediately that $E[\theta|\theta > \theta_1] < E[\theta|\theta > \theta_0]$. ■

Proof of Proposition 2: $\frac{ds_i(s_A)}{d\kappa} > 0$ follows directly from differentiation of (2). $\frac{ds_0^*}{d\kappa} = \frac{ds_1^*}{d\kappa} > 0$ follows directly from differentiation of (A.3) and (A.4), which in turn implies $\frac{dPr[r=1|v_H=1]}{d\kappa} < 0$ and $\frac{dPr[r=1|v_H=0]}{d\kappa} < 0$, because $Pr[r = 1|v_H] = Pr(s_A > s_{v_H}^*)$. ■

Proof of Proposition 3: Differentiating equations (A.3) and (A.4) with respect to α gives

$$\frac{ds_{v_H}^*}{d\alpha} = \frac{\sqrt{\delta_m}(\delta + \delta_A)}{\Delta\delta_A} \frac{1}{\phi\left(\Phi^{-1}\left(\frac{1-\beta\alpha v_H}{(1-\alpha)\beta}\right)\right)} \frac{(1-\beta v_H)}{(1-\alpha)^2\beta} \quad (\text{A.6})$$

Since $1 < \beta < \frac{1}{\alpha}$, we have that $\frac{ds_0^*}{d\alpha} > 0$ and $\frac{ds_1^*}{d\alpha} < 0$. The derivatives $\frac{dPr[r=1|v_H=1]}{d\alpha} > 0$, $\frac{dPr[r=1|v_H=0]}{d\alpha} < 0$ follow immediately from the fact that $Pr(r = 1|v_H) = Pr(s_A > s_{v_H}^*)$. ■

Proof of Proposition 4: Follows directly from differentiation of Equation (A.6). ■

Proof of Proposition 5: Coming soon. ■

A.4 Expected Value of Different IOs

To assess expected payoffs of H and M under different institutional configurations we calculate the expected payoffs for both H and M under assumption 2. A direct approach to assessing the these expected payoff is the product of the probability that a project is recommended, the probability that a project is funded given recommendation and the expected value of a project given it is recommended and funded. However, an indirect approach is more efficient.

Suppose that H supports a project. From our earlier analysis, A recommends a project if and only if $s_A > s_1$. Next we derive $\sigma_1(\theta)$ as the smallest agency signal that will result in a project being funded given a recommendation given that the true state is θ .

To be funded, a proposal requires that $\frac{1-\alpha\beta}{(1-\alpha)\beta}$ proportion of the members vote Yes; and if A reports signal σ and the state is θ the proportion of members who vote Yes is $\Phi\left(\sqrt{\delta_m}\left(\theta - \left(-\frac{\sigma\delta_A}{\delta_m} - \frac{\mu\delta_\mu}{\delta_m} + \frac{\kappa\gamma(\delta_A+\delta_m+\delta_\mu)}{M}\right)\right)\right)$. Equating these terms,

$$\sigma_1(\theta) = \Phi^{-1}\left(\frac{1-\alpha\beta}{\beta-\alpha\beta}\right)\frac{\sqrt{\delta_m}}{\delta_A} - \frac{\theta\delta_m}{\delta_A} - \frac{\mu\delta_\mu}{\delta_A} + \frac{\gamma\kappa(\delta_A+\delta_m+\delta_\mu)}{M\delta_A}$$

is the smallest agency report that would result in project funding given θ .

In order that a project is recommended and funded requires that $s_A \geq s_1$ and $s_A \geq \sigma(\theta)$. We define $\theta_{\sigma_1} = \Phi^{-1}\left(\frac{1-\alpha\beta}{\beta-\alpha\beta}\right)\frac{\sqrt{\delta_m}}{\delta_A+\delta_m+\delta_\mu} - \Phi^{-1}\left(\frac{c+\rho}{\rho+\psi}\right)\frac{(\sqrt{\delta_m}\sqrt{\delta_A+\delta_\mu})}{\delta_A+\delta_m+\delta_\mu} + \frac{\kappa\gamma(\delta_A+\delta_m+\delta_\mu)}{M\delta_A+\delta_m+\delta_\mu}$ as the state such that $s_1 = \sigma_1(\theta)$.

We define analogous $\sigma_0(\theta)$ and θ_{σ_0} corresponding to projects opposed by the hegemon.

A member's *ex ante* payoff is

$$\begin{aligned} E[U_i(\alpha, \kappa, \delta_A)] &= \lambda \int_{-\infty}^{\theta_{\sigma_1}} \underbrace{\sqrt{\delta_\mu}\phi\left(\sqrt{\delta_\mu}(\theta - \mu)\right)}_{\text{density of } \theta} \underbrace{\left(\theta - \frac{\kappa\gamma}{M}\right)}_{\text{net project value}} \underbrace{\Phi\left(\sqrt{\delta_A}(\theta - \sigma_1(\theta))\right)}_{Pr(s_A \geq \sigma(\theta))} d\theta \\ &+ \lambda \int_{\theta_{\sigma_1}}^{\infty} \underbrace{\sqrt{\delta_\mu}\phi\left(\sqrt{\delta_\mu}(\theta - \mu)\right)}_{\text{density of } \theta} \underbrace{\left(\theta - \frac{\kappa\gamma}{M}\right)}_{\text{net project value}} \underbrace{\Phi\left(\sqrt{\delta_A}(\theta - s_1)\right)}_{Pr(s_A \geq s_1)} d\theta \\ &+ (1 - \lambda)\text{analogous integral correspond to projects H opposes....} \end{aligned}$$

Figure 10 shows this integral conceptually. The contours represent the density of (θ, s_A) . The lighter shaded area corresponds to pairs of (θ, s_A) such that $s_A \geq a_1$ and $s_A \geq \sigma_1(\theta)$ —the set of states and signals that are recommended and funded given H's support. The smaller darker area corresponds to the analogous set of states and messages that result in projects being recommended and funded if H is opposed. The *ex ante* expected value of projects for the Hegemon, $E[U_H(\alpha, \kappa, \delta_A)]$, has a similar structure with the substitution that the net project value is $\eta - (1 - \kappa)$ for projects that H supports and $-\eta - (1 - \kappa)$ for projects that H opposes.

Figure 11 show a contour plot of the welfare of H and M at low precision $\delta_A = .01$. Discuss how M like to pay and cede power to H in order to incentivize A to propose projects.

Figure 10: The Combination of States and Agency Signal that Result in Projects Being Recommended and Funded.

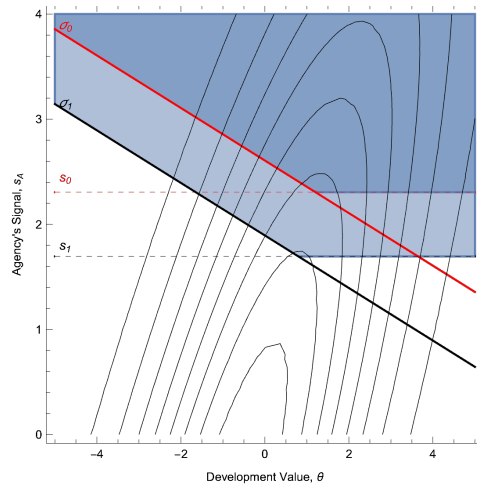
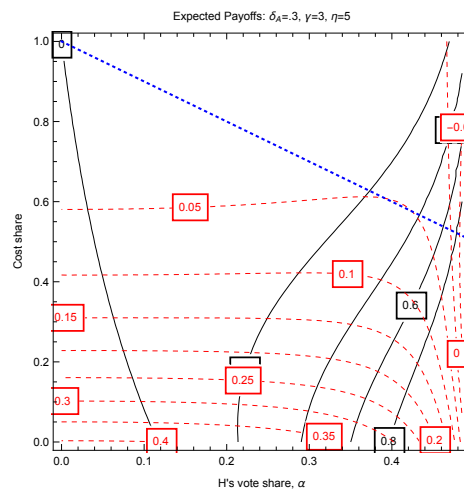


Figure 11: Contour Plot of Expected Payoffs for Hegemon and Members of Different IO Rules



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