Explaining Institutional Change: Policy Areas, Outside Options, and the Bretton Woods Institutions

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Abstract

I propose and test a theoretical framework that explains institutional change in international relations. Like firms in markets, international institutions are affected by the underlying characteristics of their policy areas. Some policy areas are prone to produce institutions facing relatively little competition, limiting the outside options of member states and impeding redistributive change. In comparison, institutions facing severe competition will quickly reflect changes in underlying state interests and power. To test the theory empirically, I exploit common features of the Bretton Woods institutions – the International Monetary Fund and World Bank – to isolate the effect of variation in policy area characteristics. The empirical tests show that, despite having identical membership and internal rules, bargaining outcomes in the Bretton Woods institutions have diverged sharply and in accordance with the theory.
Once established, international institutions often persist for a long time. As member states are added and institutional functions shift, initial agreements governing the allocation of benefits and decision-making rights often come under criticism for being incongruous with new realities. The structure of the United Nations (UN) Security Council is often singled out by non-permanent members as poorly reflecting the new world order (Voeten 2007). Similar criticisms have been leveled at major economic institutions, such as the IMF and World Bank.2

This article seeks to explain variations in *distributional* change across institutional settings. The dependent variable is the propensity for decision-making shares and influence over outcomes to be redistributed among institutional members according to underlying shifts in interests and capabilities. For a given shift in underlying factors, a distributionally rigid institution will exhibit comparatively little change compared to a distributionally flexible institution.

Much of the existing literature has approached the question of institutional change in dichotomous terms: do institutions respond flexibly to reflect underlying interests and power, or do they resist change? Early work on institutions split sharply along paradigmatic lines, with neorealists arguing on the one hand that institutions are epiphenomenal to state preferences and therefore malleable to underlying power shifts (e.g., Mearsheimer 1994/5; Glennon 2003; Oatley and Nabors 1998; Gruber 2000) and neoliberals on the other hand asserting that institutions exert an independent effect and oftentimes persist despite underlying changes (e.g. Krasner 1976; Gilpin 1981; Keohane 1984). This dichotomous debate left the literature largely devoid of generalizable theories about *variations* in institutional stability and change (Powell 1994; Martin 1997).3

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3 Some existing work does consider other aspects of institutional change, such as institutional death and the depending of cooperation over time. See among others, Haas, 1958; Lindberg, 1963; Garrett and Weingast, 1993; Kahler, 1995; Shanks et al, 1996; Kahler, 1999; Moravcsik, 1999; Ikenberry, 2000; Greif and Laitin, 2004.
More recently, institutional change has emerged as a critical subject of contention among historical institutionalist and rationalist approaches towards institutions. Historical institutionalists have emphasized the seeming inability of rationalist theories to explain institutional persistence in making the case for greater attention to historical antecedents and critical junctures (Pierson 1996; Pierson 2000). However, historical institutionalism has not offered a compelling theoretical framework to account for institutional change. In recent work, Jupille, Mattli, and Snidal (2013) argue that bounded rationality may offer a solution: policymakers tend to satisfice by opting for familiar solutions, and they sequentially proceed from the “use” of exiting institutions to “selection, change, and creation,” depending on the demonstrated inadequacies of existing arrangements.

This article offers an alternative solution to the conundrum of institutional change and persistence. I examine institutional change as a redistributive bargaining problem. The theory incorporates network effects – a key concept from the economic literature of path dependence – as a variable within a rationalist theory of institutional change. Rather than treating “use, select, change, and create” as a sequential choice of boundedly rational actors, I examine the interaction of these choices: how does the credibility of alternative institutions affect the propensity for existing institutions to persist or change? The theory illustrates how the stubborn persistence of existing institutional arrangements does not necessarily reflect bounded rationality: status quo bias can also arise when acting outside existing frameworks is unattractive for states seeking change. The theory fills a lacuna within the rationalist tradition towards international cooperation, which has focused on how various features of issue areas affect patterns and forms of cooperation, while largely neglecting how these factors might influence institutional change. In addition, the

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4 E.g., Jupille, Mattli and Snidal (2013) argue that an important limitation of rationalist approaches of institutions is that they predict “relatively frictionless movement from new problem to optimal institutional solution (15).”

5 As Peters, Pierre, and King (2005) argue: “…the [historical institutionalist] theory unfortunately has less to offer in terms of explanation, let alone prediction, for [institutional] changes. Further, historical institutionalism has no way of dealing adequately with the more gradual transformations we have demonstrated… (1296).”

theory generates testable, empirical predictions that are not foreshadowed by existing theories of institutions.

The central argument of this article is that variation in institutional change can be explained by examining policy area characteristics. Specifically, while some policy problems can be resolved diffusely, others are more effectively managed through universality and concentration of functions. Hence, policy areas vary in their propensity for competition, both among institutions and from bilateral, unilateral, and private sources. In turn, institutions differ in the attractiveness of available outside options for members. Where outside options are attractive, members can utilize the threat of exit to push for distributional change in line with their actual capabilities. In policy areas where outside options are unavailable or unattractive, such leverage is difficult to bring to bear. Hence, competition is associated with greater institutional flexibility, while concentration tends to produce path dependence.

I will test my theory empirically by taking advantage of a quasi-experiment offered by unique features of the Bretton Woods Institutions – the IMF and World Bank. These two institutions operate in different policy areas, but they are characterized by identical de jure rules governing changes in voting shares and essentially identical membership.\(^7\) This allows us to observe bargaining outcomes featuring the same set of actors simultaneously operating under the same set of rules, but in institutional settings featuring distinct outside options. The results clearly show that bargaining outcomes across the IMF and World Bank have diverged in a manner consistent with the theoretical predictions: World Bank voting shares are closely related to contemporaneous levels and changes in shares of world GDP; in contrast, IMF voting shares are primarily related to share distributions in earlier time periods and exhibit little change in response to shifts in the distribution of world GDP and other economic variables.

\(^7\) As I discuss below, the only exceptions are a handful of minor island states.
Theory: The Effect of Policy Areas and Outside Options on Institutions

In this section, I will present a theoretical framework that explains variations in distributive intuitional change based on policy area characteristics. I will begin by elaborating how network effects and barriers to entry affect patterns of cooperation and the availability of outside options for institutional members. I will then explain how the availability of outside options determines bargaining outcomes and the tendency for institutions to change.

Policy Area Characteristics and Outside Options

Since the 19th century, economists going back to Cournot have examined how market characteristics impact firm behavior, leading to a fruitful literature on industrial organization. Oft cited characteristics include increasing returns, network effects, product differentiation, barriers to entry, inter-firm principal-agent problems, market size, and rules of the game such as prohibitions against collusion or other forms of regulation. For example, scale economies tend to create natural monopolies and holdup problems facilitate vertical integration. The basic premise of my theory is that political institutions are analogously and generalizably affected by characteristics of their policy areas. In particular, *network effects* tend to encourage universalistic cooperation within a single institution, and *barriers to entry* restrict the scope for competing arrangements.

Network effects arise when the marginal utility of joining an activity increases with the total number of participating actors (Katz and Shapiro 1985; Liebowitz and Margolis 1995; Milner 2006). International policy areas exhibit varying degrees of network effects. On the lower end, military alliances do not necessarily benefit from the inclusion of ever more states due

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8 For a general overview, see Tirole, 1988.
9 For an early survey, see Hicks, 1935.
10 Among others, see Williamson, 1971.
11 We can think of network effects (often described as network externalities) as a specific form of externality in which spillovers are related to the number of participating actors. Network effects are distinct from other types of externalities, in which there is no tendency towards universality: e.g., security externalities (US global alliance network improves security even for non-alliance members) or environmental externalities (regional environmental agreement also improves extra-regional conditions).
to problems such as free riding, force integration, and commonality of strategic interests (Sandler, 1993). On the higher end, agreement on international standards such as the technical protocols for internet domain names benefits greatly from universal cooperation – a country attempting to implement an alternative scheme unilaterally would find itself cut off from the rest of the internet (Drezner 2004). However, other aspects of the internet, such as content regulation, do not feature the same network effects and are handled more diffusely (Drezner 2007, 95-101). The potential for cross-national spillover also affects potential network effects – financial contagion often spreads unpredictably and globally, necessitating greater participation and universal cooperation, whereas similar effects may be less salient in areas such as foreign direct investment and security cooperation. Legitimacy stemming from universality also represents a type of network effect, in which greater participation makes the cooperative venture more valuable for all participants. High network effects provide incentives for states to cooperate through a single, universalistic international institution. Once such institutions are formed, the costs of pursuing alternative forms of cooperation are high, and states face strong incentives to remain within the existing framework.

Second, barriers to entry represent hindrances to alternative forms of cooperation.12 Scholars of international relations have often pointed to high initial costs of institution-building (Keohane 1984). However, some institutions are more costly to build than others. Institutions requiring highly specialized legal, scientific, or policy-specific expertise and bureaucratic formalization are more difficult to replicate than informal institutions or institutions requiring only administrative functions, such as G8 and G20 meetings. By nature, some policy areas involve the sharing of sensitive strategic or economic information that may hinder the creation of alternative arrangements – e.g. intelligence, information related to nuclear programs, or information about sensitive economic data during crises.13 Some institutions may also involve

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12 The economics and legal literature on barriers to entry generally infers that such barriers exist when firms achieve high levels of concentration or abnormally high and sustained returns on capital. e.g., Bain, 1956; Stigler, 1968; Demsetz, 1968; Demsetz, 1982.

13 Barriers to entry may also be artificial. That is, member states of an existing institution may attempt to discourage competition by, for example, creating rules that prohibit the establishment of competing institutions, linking extraneous benefits to continuing participation in an institution, or by threatening punitive action against states that seek to exit. The feasibility of these artificial barriers will vary in direct proportion to the “natural”
scale economies in the traditional, financial sense. Although the salience of this factor for international institutions is mitigated by the lack of a profit motive, on the margin, high initial financial costs will deter states with limited economic resources.

Network effects operate at the level of individual states, creating incentives to pursue cooperation under a single cooperative arrangement. Barriers to entry affect the viability of alternatives. The presence of high network effects and high barriers to entry will be associated with institutions characterized by low viability of alternative arrangements. On the other hand, low network effects and low barriers to entry will tend to be associated with multiple institutions and/or the widely recognized feasibility of regional, bilateral, or private sector alternatives.\footnote{Theoretically, a policy area with high network effects but low barriers to entry could be characterized by one universalistic institution but also frequent efforts to supplant the existing institution, as is the case in private sector competition over products such as computer operating systems, browsers, and search engines. A policy area with low network effects but high barriers will not necessarily produce universality, but the existing configuration of institutions, once established, will tend to be stable. The effect of these alternative configurations on the attractiveness of outside options is more ambiguous, since alternatives have some prospect of viability. The \textit{combination} of high network effects and high barriers to entry should be associated with stable, monopolistic institutions, which results in the minimization of outside options for member states.}

\textit{Outside Options and Distributive Change}

Policy area characteristics affect the viability of alternatives vis-à-vis exiting institutions. In turn, the viability of alternatives determines the attractiveness of outside options – the key intervening variable in my theory. In the context of international institutions, the use of outside options most often involves reallocating resources to external venues rather than de jure forfeiture of membership. In policy areas characterized by low network effects and low barriers to entry, it
is possible for states to shift to or create alternative institutions structured more favorably, or cheaply pursue unilateral or bilateral means to achieve their ends.

This credible threat of exit (Hirschman 1970; Kato 1998; Gehlbach 2005) provides a source of leverage to redistribute influence within the existing organization. The logic is illustrated by the use of preferential trade agreements by states to secure greater bargaining leverage in the GATT/WTO process (Mansfield and Reinhardt 2003; Davis 2009) or by US threats to use force outside the Security Council to secure more favorable bargaining outcomes (Voeten 2001). I argue that attractive outside options make international organizations more malleable to distribution change – redistribution of national representation and influence among member states according to underlying geopolitical or economic realities.

I provide a formal model to establish this point in the appendix. Briefly, outside options affect bargaining outcomes by constricting the feasible bargaining range.\footnote{15} Comparatively speaking, equilibrium distributions of the gains from cooperation contained in small bargaining ranges (i.e. in the presence of attractive outside options) are more likely to be thrown out of equilibrium given an exogenous perturbation in underlying capabilities, such as a change in relative economic size. Ceteris paribus, assuming comparable shifts in underlying capabilities, institutions in policy areas with attractive outside options will experience more frequent renegotiations of bargaining outcomes and more rapidly reflect underlying shifts in relative power compared to institutions with unattractive outside options.\footnote{16}

It is important to note that the causal mechanism operates through the attractiveness of outside options across institutional policy areas, not among states within an institution. Existing work has focused primarily on the use of outside options by a subset of states for the purpose of obtaining preferred policy outcomes, such as trade liberalization or UN resolutions (Voeten 2001; Mansfield and Reinhardt 2003). Instead, my theory makes predictions about institutional change based on variation in the general attractiveness of outside options across institutions. In competitive institutions, both dissatisfied states and status quo states have attractive outside

\footnote{15 e.g., see Muthoo, 1999, 99-135; Voeten, 2001; Johns, 2007.}

\footnote{16 Alternatively, if an institution’s internal rules prove to be too rigid to accommodate such change, we may observe the actual exercise of outside options and the proliferation of alternative, effective forms of cooperation within the same policy area.}
options. Mutually attractive outside options narrow the range of acceptable bargaining outcomes for all states. This compels frequent, fluid institutional change when underlying shifts in power occur.

This leads to the following general hypothesis: Greater competition will tend to make distributional outcomes for political institutions more fluid, and outcomes will more closely approximate the distribution of underlying interests and capabilities.\(^ {17}\) The subsequent sections will develop more targeted hypotheses specific to the context of the Bretton Woods institutions.

**The IMF and World Bank: Predictions**

Traditionally, it has been challenging to study international institutions comparatively due to simultaneous variation in a range of potential explanatory variables – e.g., the UN Security Council and World Trade Organization not only perform distinct functions, but also have completely different voting mechanisms, rules governing change, headquarter locations, and membership compositions. Since these factors are all likely to influence bargaining outcomes, it is difficult to isolate the independent effect of a single characteristic. In this article, I address this problem by exploiting common de jure features of the Bretton Woods institutions – the International Monetary Fund and the International Bank for Reconstruction and Development (IBRD) of the World Bank.\(^ {18}\) The Bretton Woods institutions facilitate cooperation in different policy areas but share many commonalities, including location of headquarters, rules concerning voting and reform, and membership. This comparison therefore allows for these factors to be held constant while isolating the effect of policy area characteristics on institutional change.

The IMF and World Bank have virtually identical membership due to Article II, Section 1, Article B of the IBRD Articles of Agreement, which makes IMF membership a precondition for joining the World Bank. For this reason, it has been customary for states seeking membership to apply simultaneously to both of the Bretton Woods Institutions. Of the 187, fully overlapping

\(^ {17}\) Note that the prediction pertains to path dependence in distributive outcomes. Even in an institution that is distributionally path dependent, other dimensions – e.g. membership, scope, principal-agent relations etc. – may change with greater flexibility insofar as the impact on distributive outcomes is muted.

\(^ {18}\) I will use IBRD and World Bank interchangeably in the subsequent text.
current members of the IMF, 152 joined each institution on the same date. 35 joined each institution within a matter of months due to slight variation in the timing of membership approval. Only three countries – San Marino, the Seychelles, and St. Vincent and the Grenadines – joined the World Bank with a lag exceeding a year. These are tiny island states with negligible shares of voting power and therefore highly unlikely to have a meaningful stake in bargaining outcomes or bear on the empirical results presented below.

The IMF and World Bank also have identical de jure rules for the distribution of voting power. Voting power is predominantly determined according to the share of subscriptions held by each member state. In turn, subscription shares are to broadly reflect a country’s standing in the world economy, measured through indicators such as GDP, balance of payments, reserves, and the variability of current receipts. In both institutions, redistribution can occur as part of a general increase in capitalization or on an ad hoc basis for individual countries. Both institutions require a supermajority of 85% to approve any change in subscription shares.

However, the de facto process for redistributing shares involves a highly politicized bargaining process (Horsefield 1969; Garritsen de Vries 1985, 511-543; Rapkin et al 1997; Boughton 2001, 849-875; Blomberg and Broz 2007). While specific formulas are used as loose guidelines for calculating subscription shares, the formulas themselves have been the subject of much wrangling. In fact, the Bretton Woods formulas have been adjusted ex post facto to produce results consistent with politically determined bargaining outcomes. Officially, subscription shares in the IBRD are to be derivative of and parallel to those in the IMF. However,

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19 There is also a very small fixed component distributed equally to all members of 250 voting shares to each member.
20 The threshold was adjusted in the 1970s from 80% to 85% to maintain the veto of the United States as its voting share declined below 20%. See Garristen de Vries, 1985, 524.
21 The quota formulas used by the IMF during the relevant time period for this article are available in International Monetary Fund, “Financial Organization and Operations of the IMF,” Washington, D.C., 2001, 57.
22 For example, in 1963-1964, IMF staff revised the Bretton Woods formula by developing fifteen alternatives and settling on a five-formula solution that produced a reasonable approximation to existing quota distributions. As Garritsen de Vries notes, “The number of formulas for quota calculations indicated the difficulty of deriving a single formula that would produce reasonable quota calculations for all members, while account was still taken of the existing structure of Fund quotas and the desirability of proceeding slowly with shifts in that structure (Garritsen de Vries 1985, 516).”
significant discrepancies have developed over time due to divergent interstate bargaining outcomes. This discrepancy will be the focus of the empirical section of this article.

Policy Area Competition and Outside Options for the IMF and World Bank

Although the IMF and World Bank are characterized by identical rules and membership, they facilitate cooperation in different policy areas. Broadly speaking, the organizational policy area of the World Bank may be characterized as development lending and assistance. For simplicity, I will use “development aid” in the subsequent text. Analogously, the IMF’s policy area in recent years may be characterized as the maintenance of global financial stability through the prevention and resolution of financial crises and balance of payments difficulties, particularly through the use of conditional lending – for the sake of brevity, I will use “balance of payments lending” in the subsequent text.  

23 This is an oversimplification by any measure – prior to 1971, the IMF’s mandate also included managing the Bretton Wood system of fixed exchange rates. For this reason, during the 1970s, the IMF’s international role was contested and less clear than the period before and after. Hence, for the purposes of empirical examination, I will focus on the subsequent period during which the IMF’s role has been clearer. In addition, the de facto roles of the two institutions sometimes overlap, leading to criticism about “mission creep (Einhorn 2001; Stiglitz 2002).” However, the overlap is relatively small when considering the aggregate activities of each institution.  

24 For an overview of the IMF’s functions and history, see Vreeland 2007, particularly Chapter 1.

24 The IMF has provided concessional financing to the world’s poorest countries through the Trust Fund since 1977 and formally since 1986 through the Structural and Enhanced Structural Adjustment Facility and the Poverty and Growth Reduction Facility (PRGF). This financing overlaps to some degree with development aid, but the proportion of outstanding credit from these facilities to total outstanding credit has not exceeded 14% except for a brief period in 2006-2008 (which is outside the time period analyzed in this paper), when the IMF’s other lending activities declined sharply due to unusual global macroeconomic stability (IMF Annual Report, Various Years, Appendix II). The Bank has also occasionally provided supplementary financing, along with other bilateral and multilateral development agencies, towards major IMF bailout packages, but the IMF has acted as lead negotiator and exercised control over the terms of such lending (e.g., see Blustein, 2003, 103-104). In terms of the Bank’s routine activities, structural adjustment lending (now development policy lending), which has been provided since 1980, has some similarities to IMF lending, such as the use of conditionality to remedy structural problems. However, the primary focus
Is there a meaningful difference in competition and outside options available to states in the policy areas of the IMF and World Bank? I will rely on two pre-existing sources to classify institutions according to policy area. The IMF (2013) has published a report identifying multilateral financing arrangements that were “…established to avert financing instability and/or safeguard regional integration” or due to “…dissatisfaction with Fund conditionality and concerns about Fund governance (1).” Tierney et al (2011) have similarly compiled a database of multilateral development aid institutions including the World Bank. Based on these classifications, Table 1 presents proxies for competition among multilateral sources of balance of payments lending and development aid during the period 1978-2005. Like comparable measures used to measure competition in private markets, these measures should be considered informative but not necessarily definitive, as they only measure explicit competition (some evidence bearing on implicit competition is presented in Appendix II).25 The first column reports the number of multilateral institutions facilitating cooperation in each policy area: six for balance of payments lending and 28 for development aid.

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25 In Appendix II, I present case study evidence focusing on Japan that strongly suggests that lack of explicit competition against the IMF reflects difficulties associated with creating alternatives, not adequate accommodation. Beyond the types of measures presented in Table 1, economists and antitrust regulators generally infer the existence of implicit competition in concentrated markets by examining the observable consequences of potential entry on pricing and production patterns (e.g., Baumol 1982). The empirical section of this article can be considered an analogous exercise: if the IMF redistributes flexibly despite facing little explicit competition, we could infer that implicit competition is credible: i.e., states are capable of credibly threatening exit, but have chosen not to actually exit because they are sufficiently accommodated.
### Table 1: Proxies for Policy Area Competition and Outside Options, 1978-2005

<table>
<thead>
<tr>
<th>Policy Area</th>
<th>Number of Institutions</th>
<th>Disbursement Share of Leading Institution (IMF or WB)</th>
<th>Herfindahl–Hirschman Index of Distributions</th>
<th>Proportion of IMF or WB Disbursements to US Bilateral Disbursements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance of Payments Lending (IMF)</td>
<td>6</td>
<td>94.3%</td>
<td>87.9%</td>
<td>461%</td>
</tr>
<tr>
<td>Development Aid (World Bank)</td>
<td>28</td>
<td>31.1%</td>
<td>22.2%</td>
<td>86%</td>
</tr>
</tbody>
</table>

Note: Classification of institutions in relevant policy areas are based on IMF (2013) and Tierney et al (2011). See text for data sources.

The next two columns present measures frequently used to proxy for competition in private markets: market share of the largest player and the Herfindahl–Hirschman index, calculated according to the gross disbursements of institutions in each policy area. Many regional analogues to the World Bank are formidable operations: on a yearly basis, the Asian Development Bank and Inter-American Development Bank each disburse about 40% of the disbursements of the World Bank. In comparison, regional analogues to the IMF either disburse funds very sporadically (the Balance of Payments Facility of the European Union) or on a much smaller relative scale (the Arab Monetary Fund and Latin American Reserve Fund). The data indicates that the IMF faces less multilateral competition and accounts for a higher share of disbursements in its policy area compared to the World Bank, resulting in a markedly higher degree of policy area concentration.

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26 The numbers in the table are based on disbursements amounts collected directly from the annual reports of respective agencies as well as Henning 2002.

27 Asian Development Bank, *ADB Annual Report* (various years); Inter-American Development Bank, *Annual Report* (various years); World Bank, *World Bank Annual Report* (various years);
Besides multilateral organizations, the IMF and World Bank also face potential competition from bilateral sources. Unfortunately, comprehensive data on bilateral balance of payments lending is not publicly available.\(^{28}\) However, this data is available for one important bilateral source, the United States.\(^{29}\) This data likely exaggerates overall bilateral provision of balance of payments lending for two reasons: first, the US Treasury only provides data on the size of commitments drawn upon, while the IMF data is funds actually disbursed; second, the US has exercised an outsized global leadership role and financial preponderance (Simmons 2001), making it a more likely source of balance of payments lending compared to lesser states.\(^{30}\) The fourth column of Table 1 presents the ratio of IMF disbursements to US balance of payments lending disbursements and World Bank disbursements to US development aid disbursements.\(^{31}\) As the table shows, World Bank aid is exceeded by US bilateral aid, while IMF disbursements have dwarfed US bilateral balance of payments lending, despite the latter being overstated.

Why does institutional competition differ so starkly for the IMF and World Bank? Many of the core functions of the IMF are characterized by considerable network effects. Because of globalization and interconnected capital markets, balance of payments crises frequently produce contagion: e.g., the Asian Crisis of 1997-1998 affected seemingly unrelated countries such as Korea, Russia, and Brazil. As such, there are inherent and fundamental benefits associated with

\(^{28}\) E.g., the governments of Japan and UK do not release this data as a matter of policy. I thank Daniel McDowell for confirming this point as well as pointing me to the US ESF data source.

\(^{29}\) The US government has compiled and released data on its bilateral balance of payments lending activities, which have been principally conducted through the Exchange Stabilization Fund (ESF) and Federal Reserve’s System Open Market Account. The Treasury only provides information on ESF funding. However, it notes that “Historically, U.S. intervention has been jointly financed by both the ESF and SOMA, and the financing has been equally shared between the two accounts.” Hence, for the period in question, I double ESF commitments to obtain an estimate of total US bilateral balance of payments lending. (See “History, Exchange Stabilization Fund,” U.S. Department of the Treasury, http://www.treasury.gov/resource-center/international/ESF/Pages/history-index.aspx)

\(^{30}\) It should be noted that major balance of payments programs in the EU, such as the one for Italy in 1993, were conducted multilaterally and are already included in the calculations for multilateral disbursements. Although Japanese authorities do not formally release information on bilateral balance of payments lending, the author was told on a private basis that the bilateral program for Malaysia during the Asian Financial Crisis was the only instance in recent memory that Japan acted independently of the IMF.

\(^{31}\) US aid disbursements are economic aid provided by USAID. Including military aid would further inflate US disbursements vis-à-vis the World Bank.
global surveillance and universal coverage, a point highlighted by the IMF itself.\textsuperscript{32} In responding to a balance of payments crisis, the perception of credibility by private sector actors can be as important as the amount of lending provided.\textsuperscript{33} In the absence of a hegemon, individual states will find it more difficult to restore confidence acting alone – hence an institution such as the IMF, which represents virtually all major creditor states in the international system (Kindleberger 2000, 211-238).

Another network effect that the IMF benefits from is its ability to provide political cover by virtue of its universality. Because the IMF represents nearly every country in the international system, it can pursue international financial rescues without implicating specific creditor governments. Balance of payments lending involves severe moral hazard and agency problems, which necessitate the frequent use of conditionality (Williamson 1983; Haggard 1985; Haggard and Kaufman 1992; Drazen 2002; Stone 2002, 2004, 2008; Gould 2003; Vreeland 2003; Dreher and Vaubel 2004). It is more difficult for creditors acting within a bilateral or regional framework to sidestep these types of political sensitivities. This is well-illustrated by the decision of East Asian states to tie the plurality of Chiang Mai Initiative lending to IMF conditionality – the prospect of China or Japan being implicated for imposing harsh conditions on regional neighbors such as Korea was considered politically unacceptable. Similarly, after the United States entered into bilateral currency swap arrangements with several countries during the global economic crisis of 2008, the “…swap lines put the Fed in a politically uncomfortable position of having to choose which U.S. allies were good enough credit risks,” leading US financial authorities to seek a transfer of future decision-making over short-term foreign-exchange swaps operations to the IMF.\textsuperscript{34}

The political cover afforded by the IMF also enables countries to launder funds (Abbott and Snidal 1998), sidestepping domestic opposition to international bailouts. Like rescues of domestic financial institutions, foreign bailouts are often criticized for using public funds to

\textsuperscript{32} e.g. “In today's globalized economy, where the policies of one country typically affect many other countries, international cooperation is essential. The IMF, with its near-universal membership of 186 countries, facilitates this cooperation.” (IMF, “International Monetary Fund Factsheet: Surveillance,” 8-2006)

\textsuperscript{33} e.g., see Rubin, 2004, 215.

reward profligate behavior abroad. For example, the rescue package for Mexico in 1995 was opposed by 80% of the US public and came under heavy scrutiny from congressional Republicans (Morris and Passé-Smith 2001). The IMF not only allows countries to channel funds in a less overtly public manner, but the IMF’s universality and perceived independence can also reassure skeptical publics in creditor states that bailouts will be accompanied by tough conditions. This appears to be a critical reason why German Chancellor Angela Merkel insisted on IMF involvement during the Euro debt crisis of 2010-2011. Facing a skeptical German public, Merkel argued forcefully against a Europe-only bailout plan on the grounds that IMF involvement was the only way to credibly impose austerity on profligate member states such as Greece and deter additional requests for aid.35

The IMF also benefits from important entry barriers. The IMF collects sensitive data from member countries such as available reserves. Countries are often reluctant to offer such data bilaterally or to economically proximate countries with potentially subversive motivations, placing limitations on the surveillance capabilities of alternative arrangements. For example, Japan had to reject a bilateral bailout of Thailand early in the Asian Crisis because Thai authorities would only share crucial information regarding the status of their reserves to the IMF (Sakakibara 2000, 170). Similarly, a credible balance of payments organization needs to develop the capacity to mobilize a sizable pool of credit in the event of a major financial crisis. This will be difficult to achieve for incipient international institutions with limited membership, except in cases where members are well-endowed with reserve assets.

In the field of development aid, there is a relatively limited rationale for universality or concentration of functions in a single institution. The World Bank surely benefits from the sharing and combining of expertise among member states. However, there is no need for global surveillance or coverage when implementing aid projects. Political cover is less salient for development lending: actual motives aside, development aid is often associated with generosity.

and responsible global citizenship, something donors prefer to publicize rather than conceal.\textsuperscript{36} Only a subset of development lending benefits from political cover – e.g. structural adjustment lending – and even there, the need is comparatively mitigated by the fact that negotiations can occur over long time horizons outside the politically charged atmosphere created by financial crises or balance of payments difficulties. Finally, barriers to entry in development aid are considerably lower than balance of payments lending. Development organizations do not need to establish high levels of credibility or the ability to mobilize resources early on: small organizations can and do focus on small-scale projects.

These factors have led to considerable competitive pressures among development institutions. Klingbiel (1999) documents intense competition between the United Nations Development Programme (UNDP) and the World Bank in securing funds from donors and providing aid to recipients. Core resources available from donor states to UNDP have deteriorated sharply during the past several decades due to “UNDP’s growing competition with the World Bank for [technical cooperation] resources (296).” Similarly, Galvani and Morse (2004) point out that UNDP has “taken on a more ‘aid business’ orientation which recognises that its [developing country] clients can move their funds elsewhere if their demands are not satisfied (317).” The widespread availability of alternatives enables member states to frequently and credibly threaten to reallocate their activities to other multilateral or bilateral agencies.\textsuperscript{37}

Several caveats should be considered. Aside from multilateral and bilateral sources of funding, countries may also tap private capital markets to fund development projects and routine balance of payments needs. Private capital is inherently fungible, and access largely depends on country-specific factors (Tomz 2007). However, in relative terms, it is clear that the credibility of private sources as outside options is more limited for balance of payments lending compared to development aid. Conditional lending from the IMF is most valuable precisely when private

\textsuperscript{36} For example, the UN has promoted the norm that developed countries should contribute 0.7% of GDP towards official development assistance. For a detailed description, see Botcheva and Martin, 2001.

\textsuperscript{37} For example, during negotiations over the International Fund for Agricultural Development (IFAD) in the 1980s, US representatives threatened to reallocate funding to their own bilateral aid program if an increase in voting rights was not granted, arguing that “We like IFAD…but we also think we spend money very well through the Agency for International Development.” (“Agriculture: U.S. Blames OPEC for Deadlock in IFAD,” IPS-Inter Press Service, May 20, 1985). Also see Appendix II.
funding dries up and reserves are depleted due to a major shock such as a financial crisis. Even for borrowers that routinely tap private capital markets and rely minimally on development aid, access can cease abruptly as illustrated in 1997-98 and 2008. Furthermore, states that are able to fully rely on private sources for their own balance of payments needs, such as advanced industrialized countries (Blomberg and Broz 2007) still have an interest in the determination of when and how conditional lending is provided to other states, particularly in the presence of close economic, financial, or security ties (Thacker 1999; Oatley and Yackee 2004; Dreher and Jensen 2007; Stone 2008; Copelovitch 2008). The unattractiveness of bilateral and multilateral alternatives means that these countries cannot credibly threaten exit from the IMF on account of their access to private capital: they would be giving up something not easily replicable, i.e. the ability to shape the terms and conditions of international conditional lending to other states. As I discuss in Appendix II, the difficulty of providing such lending without IMF involvement was a major constraint on Japan’s ability to secure its objectives during the Asian Financial Crisis.

The IMF also frequently relies on other sources of funding – public and private – during major international crisis episodes, such as the Mexican Crisis of 1994 and the Asian Crisis of 1997/1998, and hence relies on other actors for the funding of rescue programs. In theory, such instances may provide opportunities for the contributors of ad hoc funds to exercise influence and push for redistributive gains within the institution as a quid pro quo for providing funds. The 1998 IMF quota redistribution favoring East Asia, although limited in magnitude, is consistent with such a possibility. However, both primary and secondary accounts indicate that both the World Bank and Japan, which contributed heavily to rescue packages in East Asia, found themselves largely shut out from the IMF’s decision-making process.38

Empirically, factors such as those cited above, which potentially make the IMF more subject to redistributive forces, will be associated with a bias against finding empirical results consistent with my hypotheses. For example, if states can secure greater leverage over the IMF by threatening to hold up funding during a large bailout operation, distributive outcomes in the

38 e.g., Blustein, 2003, 159; Sakakibara, 2000, discussion with various relevant officials.
IMF will be more fluid and more closely resemble those in the World Bank. Hence, the direction of bias is such that my empirical tests will understate, not overstate, the true difference in policy area effects between the two institutions (King, Keohane, and Verba 1994).

Table 2: The IMF and World Bank: Policy Areas and Path Dependence

<table>
<thead>
<tr>
<th>Network Effects</th>
<th>Barriers to Entry</th>
<th>Outside Options</th>
<th>Distributive Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Balance of Payments Lending (IMF)</strong></td>
<td><strong>Higher</strong></td>
<td><strong>Higher</strong></td>
<td></td>
</tr>
<tr>
<td>- Political Cover</td>
<td>- Sufficient Credit Availability in Crisis</td>
<td>- Coverage over More Banks for Bail-ins Less Attractive</td>
<td>- Access to Sensitive Information More Rigid</td>
</tr>
<tr>
<td>- Laundering</td>
<td></td>
<td>- Credibility Arising from Broad Membership</td>
<td></td>
</tr>
<tr>
<td>- Information Sharing (Contagion Risk)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Credibility Arising from Broad Membership</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Development Aid (World Bank)</strong></th>
<th><strong>Lower</strong></th>
<th><strong>Lower</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Pooling Funds</td>
<td>- Bureaucratic Expertise More Attractive</td>
<td>- Pooling Information</td>
<td>- Bureaucratic Expertise More Flexible</td>
</tr>
</tbody>
</table>

Table 2 summarizes the observations and empirical predictions regarding the IMF and World Bank. It is worth emphasizing that these two institutions are chosen for the purpose of causal inference: they offer variation in external policy area features while allowing other factors to be held constant. They do not necessarily lie at extremes in terms of policy area competition, and that is not necessary for present purposes. In this section, I have argued that, for member states, outside options vis-à-vis the IMF are generally less attractive or more limited than those vis-à-vis the World Bank. This variation in the attractiveness of outside options leads to the prediction that the World Bank will be comparatively more prone to redistributive institutional change.
Empirical Examination: Quantitative Analysis of Subscription Shares

Subscription shares in the IMF and World Bank are the predominant determinants of voting shares.\(^{39}\) Although most formal votes in the Bretton Woods institutions are taken by consensus, voting shares matter immensely for several reasons. Formally, voting shares determine the composition of the boards of each institution. In addition, initiatives opposed by large voting blocs generally do not make it onto the agenda, and voting shares are taken into account informally when weighing the opinions of the representatives of member countries.\(^{40}\) The shares are therefore a simple and reasonable way to quantify distributional change in each institution. More informal indicators of influence are considered in Appendix II.

In this section, I will provide analysis based on two datasets. The first dataset was obtained directly from the IMF and includes all member states as of 2004, with information on subscriptions, economic variables used as inputs in the IMF formulas, and the IMF formula outputs.\(^{41}\) I added World Bank subscription shares for 2004 as well as subscription information from prior years from the relevant Annual Reports. I use this data to test the following hypothesis:

\[ H1. \] The distribution of subscription (voting) shares in the IMF, compared to the World Bank, should be more greatly affected by the distribution of shares in previous time periods, i.e. the institution will be characterized by greater path dependence in distributional outcomes. World

---

\(^{39}\) Voting shares are calculated by adding a small fixed component (250 shares) to subscriptions. Hence, running the analysis using voting shares produces nearly identical substantive results. The discussion in this section does not reflect the most recent quota reforms, which are in the process of implementation and fall outside of the time period analyzed.

\(^{40}\) Among others, see Griffith-Jones (2002) and Woods (2008). One illustration of the importance of voting power in the Bretton Woods institutions despite the operation of consensus is the disposition of China and Taiwan in the 1970s/1980s. Compared to most UN agencies, which operate on a one-country-one-vote basis, the Bretton Woods institutions resisted replacing Taiwan in favor of China for nearly a decade, reflecting the preferences of the US and Japan, which held outsized voting shares and the ability to exercise a veto.

\(^{41}\) Data was obtained from International Monetary Fund: Quotas, Updated Calculations, International Monetary Fund Report Prepared for the Finance Department, 2006.
Bank shares should more readily reflect underlying economic power as measured by economic variables, primarily GDP.

In order to test this hypothesis, I first averaged the countries’ shares across the two institutions in 2004 to rank all countries by combined average voting share. I then restricted the sample to the top forty countries. The combined average allows me to use the same set of countries for both institutions to make sure the results are not driven by the particular set of countries chosen. I restrict the number of countries to exclude countries whose positions are so small as to make bargaining over voting shares unlikely.42 As a point of reference, the IMF granted ad hoc quota increases to China, Korea, Mexico and Turkey in 2006. In terms of rank in the dataset, these countries were respectively number 8, 22, 17, and 35. It therefore seems reasonable to include member states in this range as countries large enough to have an independent stake in their voting share. Including all member states or using alternative cutoffs such as the top thirty or fifty states does not alter the substantive conclusions in the subsequent analysis.

Also included in the models are economic variables used by the Bretton Woods institutions to indicate a country’s position in the world economy – nominal GDP (average of 2002-2004), reserves (twelve month average for 2004), current receipts (average of 2000-2004), current payments (average of 2000-2004), and variability of current receipts (average of 1992-2004). Throughout, I keep the statistical models sparse, reflecting the fact that the empirical strategy holds constant the set of countries and time periods included for each institution. This effectively controls for country- or time- specific factors that have common effects across the

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42 As indicated earlier, subscriptions may be adjusted ex post to legitimize bargaining outcomes among large member states – smaller states often experience a shift in their relative shares as an externality. For the smallest members, proportional shares frequently shift due to extraneous factors – e.g., in the Eighth General Review of IMF quotas, Maldives received an 11% increase in its shares relative to other members due to rounding of its shares to the next 0.1 millionth Special Drawing Right (Boughton 2001, 859).
institutions. It is still necessary to consider factors that might affect bargaining leverage asymmetrically between the two institutions, an issue I will return to in the robustness checks.

The dependent variable is the share of subscriptions in each institution in 2004. The key independent variable is share of subscriptions in 1984, i.e. the dependent variable lagged by twenty years. I use the twenty year lag in light of the fact that the IMF’s mandate was contested in the 1970s after the collapse of the Bretton Woods System – the period thereafter offers a more relevant test of my theoretical propositions. The results of the analysis are robust to the selection of alternative lag periods such as 15 years and 25 years. My predictions about path dependence imply that World Bank shares lagged by twenty years should have less predictive power over World Bank shares in 2004 than the same for IMF shares. All variables are log transformed.\footnote{This is done to avoid potential bias caused by correlation between the variance of errors and the magnitude of predicted subscription shares.}
Table 3: Path Dependence in IMF and World Bank Subscription Shares (OLS)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>0.77* (0.13)</td>
<td>0.99* (0.12)</td>
<td>0.05 (0.04)</td>
<td>0.72* (0.15)</td>
<td>0.05 (0.04)</td>
</tr>
<tr>
<td>Reserves</td>
<td>-0.23* (0.08)</td>
<td>-0.19* (0.07)</td>
<td>0.03 (0.01)</td>
<td>-0.13* (0.04)</td>
<td>0.00 (0.02)</td>
</tr>
<tr>
<td>Current Receipts</td>
<td>0.44 (0.58)</td>
<td>0.08 (0.61)</td>
<td>0.32* (0.11)</td>
<td>-0.08 (0.46)</td>
<td>0.22* (0.10)</td>
</tr>
<tr>
<td>Current Payments</td>
<td>-0.83 (0.50)</td>
<td>-0.80 (0.52)</td>
<td>-0.25* (0.10)</td>
<td>-0.53 (0.41)</td>
<td>-0.35* (0.13)</td>
</tr>
<tr>
<td>Variability Of Receipts</td>
<td>0.55* (0.19)</td>
<td>0.59* (0.19)</td>
<td>0.07 (0.04)</td>
<td>0.43* (0.16)</td>
<td>0.01 (0.06)</td>
</tr>
<tr>
<td>Dependent Variable</td>
<td>0.81* (0.04)</td>
<td>0.35* (0.12)</td>
<td>0.79* (0.05)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1984)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMF Formula</td>
<td>0.28 (0.17)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-7.33* (0.59)</td>
<td>-6.90* (0.55)</td>
<td>-7.76* (0.17)</td>
<td>-7.20* (0.47)</td>
<td>-4.73 (1.82)</td>
</tr>
<tr>
<td>n</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

Note: Numbers in parenthesis are Huber-White standard errors. All variables are logged. Star denotes a coefficient at least two standard errors removed from zero.
The OLS results are presented in Table 3. For reference, the first two specifications are run with only the economic control variables. It appears that GDP most reliably predicts subscription shares in each institution. The next two specifications include the dependent variable lagged by twenty years. The result is consistent with H1. For the IMF, shares from twenty years prior are a strong predictor of contemporary subscriptions – a one percentage point increase in 1984 shares is associated with a 0.81 percentage point increase in contemporary shares with a 95% confidence interval from 0.73 to 0.89. After controlling for 1984 subscription shares, the key economic variable, GDP, has no relationship with contemporary IMF shares. In comparison, the twenty-year lagged dependent variable is more weakly associated with contemporary World Bank shares, and even after controlling for the lagged variable, GDP remains a strong predictor of World Bank subscriptions.44

The last column of Table 3 repeats the analysis for the IMF including the IMF Quota Formulas as calculated by Fund staff. The results demonstrate that once historical subscriptions are controlled for, the IMF formulas have no predictive power over current subscriptions.45 This result is consistent with the stylized fact that IMF quota formulas are used as loose guidelines at best.46

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44 I also reran the empirical results using several alternative model specifications. Since subscription shares are compositional variables, I reestimated the empirical models following the centered log ratio and additive log ratio transformations recommended by Aitchison (1986). This produced substantively similar results. Since the errors in the IMF and World Bank equations are very likely correlated, I also used Zellner’s (1962) seemingly unrelated regression model to reestimate the results in Table 3. This again produced very similar results and confirms that the coefficients for GDP, as well as the coefficients for lagged shares, are meaningfully different between the two equations: a Wald test of significance indicates p < 0.001 in both cases (The coefficient for GDP was about 9.6 times greater in the World Bank equation compared to the IMF equation, and the coefficient for lagged shares about 2.2 times greater in the IMF equation).

45 Although not reported in the table, the results for World Bank subscription shares are the same – the IMF formulas are not significant predictors of contemporary subscription shares after controlling for the economic variables and the lagged dependent variable.

46 As a robustness check, I also ran these regressions including the key independent variables from Blomberg and Broz (2007): θ (deviation in income share relative to the median), R (right wing government), and the interaction term R*θ. These variables have the expected relationship with shares in both the IMF and World Bank prior to inclusion of the lagged dependent variables (negative for R*θ, positive for θ). However, these variables are not significant predictors of shares after the lagged dependent
One alternative way to test $H1$ is to consider changes in subscriptions over time as a function of changes in GDP over time. If the World Bank more readily reflects underlying changes in economic power compared to the IMF, shifts in GDP should be more clearly associated with shifts in subscriptions. In this analysis, the dependent variable is the percentage change in subscriptions for each country from 1984 to 2004. The key independent variable of interest is the percentage change in GDP over the same time period. As controls, I include analogous percentage changes for reserves, current payments, and current receipts.\textsuperscript{47} The results are presented in Table 4. Consistent with $H1$, ceteris paribus, there is no statistically significant relationship between changes in GDP and changes in IMF subscriptions between 1984 and 2004. On the other hand, changes in GDP are strongly associated with changes in World Bank subscriptions.

Shifts in economic power have translated into greater voting power in the World Bank over time. In the IMF, on the other hand, the shadow the past has proven remarkably resilient. Consistent with my theory, despite identical de jure rules, voting shares in the IMF have exhibited greater path dependence.

\textsuperscript{47} Variability of current receipts is dropped from the analysis as there is too much missing data for 1984.
Table 4: Percentage Changes in IMF and WB Subscriptions (OLS)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>%Δ GDP</td>
<td>-0.02 (0.02)</td>
<td>0.46* (0.09)</td>
</tr>
<tr>
<td>%Δ Reserves</td>
<td>0.00 (0.00)</td>
<td>-0.00 (0.01)</td>
</tr>
<tr>
<td>%Δ Current Receipts</td>
<td>0.03 (0.09)</td>
<td>0.53 (0.57)</td>
</tr>
<tr>
<td>%Δ Current Payments</td>
<td>0.07 (0.10)</td>
<td>-0.90 (0.73)</td>
</tr>
<tr>
<td>Constant</td>
<td>1.02* (0.08)</td>
<td>1.78* (0.30)</td>
</tr>
</tbody>
</table>

n = 40

Note: Numbers in parenthesis are Huber-White standard errors. Variability of Current Receipts is dropped from the analysis due to missing data for 1984. Star denotes a coefficient at least two standard errors removed from zero.
To provide an additional test of my theory, I examine a different data set, which contains time series information on the relevant variables from 1975-1999.\textsuperscript{48} I use this data to test the following hypothesis:

\textbf{H2. IMF subscription shares are more autoregressive compared to World Bank shares.}

On a year-by-year basis, an institution that is relatively “sticky” should experience less change in the variable of interest and therefore greater correlation across time periods. For this test, I restrict the sample to a set of large countries comparable to the previous analysis – countries that had subscriptions shares averaged across the IMF and World Bank in excess of 0.5% at any point in time.\textsuperscript{49} All variables are log transformed as in the previous analyses. The models are estimated with country fixed effects.

The results are presented in Table 5. The variable of interest is the lagged dependent variable. The first two columns run the model for subscription shares, and all control variables are expressed in terms of shares of world totals. The results are consistent with \textbf{H2}. A one percentage point increase in lagged IMF shares is associated with a 0.70 percentage point increase in IMF shares (95% confidence interval of 0.63-0.77), while the same for lagged World Bank shares are only associated with a 0.10 percentage point increase in World Bank shares (95% confidence interval of 0.01-0.19).

\textsuperscript{48} Excluding the 1970s from this data does not alter the substantive conclusions that follow. The economic variables in this dataset are not necessarily the same ones used by Fund staff in original quota calculations, as they were collected independently. Part of this data was collected by Brock Blomberg and Lawrence Broz, whom I thank for making their data available.

\textsuperscript{49} There were 46 such countries. As in the previous analysis, the precise cutoff does not change the substantive conclusions that follow.
Table 5: IMF and WB Subscriptions with AR(1) (OLS with Country Fixed Effects)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shares for All Variables</td>
<td>Shares for All Variables</td>
<td>Shares for All Variables</td>
<td>Shares for All Variables</td>
</tr>
<tr>
<td>GDP</td>
<td>-0.01 (0.01)</td>
<td>0.07 (0.05)</td>
<td>-0.04 (0.03)</td>
<td>0.15* (0.06)</td>
</tr>
<tr>
<td>Reserves</td>
<td>-0.00 (0.01)</td>
<td>0.02 (0.05)</td>
<td>-0.01 (0.02)</td>
<td>0.04 (0.03)</td>
</tr>
<tr>
<td>Current Receipts</td>
<td>0.06 (0.04)</td>
<td>-0.17 (0.17)</td>
<td>0.29* (0.11)</td>
<td>-0.17 (0.19)</td>
</tr>
<tr>
<td>Current Payments</td>
<td>0.01 (0.04)</td>
<td>0.30 (0.18)</td>
<td>0.13 (0.12)</td>
<td>0.32 (0.20)</td>
</tr>
<tr>
<td>Variability Of Receipts</td>
<td>-0.00 (0.01)</td>
<td>-0.10* (0.05)</td>
<td>-0.09* (0.03)</td>
<td>0.08 (0.05)</td>
</tr>
<tr>
<td>Dependent Variable(t-1)</td>
<td>0.70* (0.04)</td>
<td>0.10* (0.05)</td>
<td>0.66* (0.04)</td>
<td>0.50* (0.04)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.32* (0.07)</td>
<td>0.84 (0.29)</td>
<td>-0.52* (0.26)</td>
<td>0.60 (0.46)</td>
</tr>
<tr>
<td>n</td>
<td>483</td>
<td>483</td>
<td>483</td>
<td>483</td>
</tr>
</tbody>
</table>

Note: Numbers in parenthesis are standard errors. All variables are logged. The models include country fixed effects. Star denotes a coefficient at least two standard errors removed from zero.
The next two columns present similar results where subscription amounts and economic variables are entered as absolute amounts rather than shares. Again, the results support $H2$. A one percentage point increase in lagged IMF quotas is associated with a 0.66 percentage point increase in IMF quotas (95% confidence interval of 0.58-0.74), compared to 0.50 percentage points for the same in the World Bank (95% confidence interval of 0.42-0.57). This difference is less pronounced compared to the results for shares due to the fact that share changes are often implemented by holding the absolute subscription amounts of relative losers constant while increasing amounts for winners. In this specification, GDP is positively associated with increases in World Bank subscriptions, but not IMF quotas, after controlling for the lagged dependent variable.\(^{50}\)

One contributing factor to the results in Table 5 is the prevalence of ad hoc subscription increases outside of general reviews in the World Bank. In the time period analyzed, meaningful IMF voting share changes occurred in about 9% of country years, while World Bank share changes occurred in about 21% of country years.\(^{51}\) While institutional rules allow both institutions to grant ad hoc increases in subscriptions at any time subject to approval by a supermajority, the World Bank has concluded a far greater number of such increases in the time period analyzed. A review of minutes from the IMF/World Bank Annual Meetings reveals that World Bank subscriptions have been increased frequently on an ad hoc basis during years where no general review of subscriptions was taking place. For example, in 1987 alone, 19 countries were granted such ad hoc increases. On the other hand, the IMF provided ad hoc increases

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\(^{50}\) Again, I performed a robustness check by running these regressions including the key independent variables from Blomberg and Broz (2007). These variables are not significant predictors of subscriptions once the lagged dependent variables are controlled for, and the substantive results are virtually identical to what is reported in Table 5.

\(^{51}\) To eliminate trivial changes in voting shares occurring due to the entry of new members, I only count voting share changes that exceed 1% year-on-year. Additional descriptive statistics are available in Appendix III.
outside of general reviews on only three occasions during the time period analyzed.\textsuperscript{52} Consistent with my theoretical predictions, ad hoc share redistributions in the IMF have been fewer in number and smaller in cumulative magnitude.

\textbf{Alternative Explanations and Robustness Checks}

I have argued that the IMF and World Bank provide conditions approximating a quasi-experiment that allow us to isolate the effect of external factors on institutional change. One general objection to the empirical strategy outlined in this article is that although the comparison of the IMF and World Bank allows us to control for some of the most salient alternative explanations for institutional change – variation in actors, rules, time periods, geographic location of headquarters, etc. – there may be some sources of variation aside from outside options that remain unaccounted for. This is a common limitation of quasi-experiments in the social sciences.\textsuperscript{53} To address this concern, I will consider several remaining sources of potential variation in this section. I will also provide an additional test of the causal mechanism by examining subscription shares in the immediate post-World War II period, when the aftermath of the war limited the outside options for the World Bank. Finally, in Appendix II, I include a detailed case study of Japan, the most important underrepresented state in the Bretton Woods institutions during the time period analyzed. The case study provides further support for the proposed causal mechanisms and also illustrates how informal influence over the policy output of each institution evolved in ways consistent with voting share changes.\textsuperscript{54}

\textsuperscript{52} China in 1980 (change in representation from Taiwan to PRC), Saudi Arabia in 1981 (to bolster fund liquidity and conclude borrowing arrangement), and Cambodia in 1994 (resumption of fund relations).

\textsuperscript{53} For example, Posner’s seminal work on cultural cleavages in Malawi and Zambia takes advantage of cross-border ethnic divisions to demonstrate the salience of differences across borders, but the research design is less helpful for identifying which specific cross-border difference accounts for variations in the political salience of cleavages (Posner 2004).

\textsuperscript{54} Even if voting shares were not closely related to policy outcomes, they could still be a reasonable proxy for redistributive outcomes, given the symbolism and status attached to them by country representatives.
One possible source of remaining variation across the IMF and World Bank is underlying power asymmetries in the respective policy areas. A neorealist may argue that underrepresented states, such as developing countries and East Asian states, exert greater influence over the World Bank because they have greater relative power in development aid, while overrepresented, primarily West European countries, have relatively greater power in balance of payments lending (note that the US has not been formally overrepresented in the IMF and is generally not the primary opponent to redistribution). However, this claim is difficult to square with the evidence. East Asian states such as Japan, China, and Korea, are among the top holders of foreign exchange reserves in the world, far exceeding the reserve holdings of West European countries. If international balance of payments lending were simply a matter of capacity, East Asian countries ought to be in a commanding position to “go it alone” through bilateral and regional mechanisms and exert significant pressure on the IMF. More broadly, the quantitative analysis includes variables such as GDP and international reserves, which should correlate closely with a country’s unilateral capacity to discharge balance of payments lending, but these variables are not strongly associated with bargaining outcomes in the IMF once prior share distributions are controlled for.

As a related robustness check, I reran the empirical models including bilateral foreign aid as a control variable to account for the possibility that large foreign aid donors exert greater influence in the World Bank. Across the specifications, foreign aid was not a meaningful predictor of voting shares once lagged shares and GDP were included.

It is possible that some countries, such as the United States, the United Kingdom, France, and Germany, exhibit power in international finance not captured by the variables included in the models due to factors such as hegemony, status as international financial centers, or role in

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55 The US does hold a unilateral veto over important decisions and exercises informal influence over the IMF that is out of proportion with its formal voting shares, e.g. see Stone (2011).
56 Data was obtained from OECD statistics on Official Development Assistance.
regional monetary arrangements. These factors may make the shares of these countries particularly resistant to change in the IMF. I therefore performed robustness checks by omitting these countries from the statistical analyses.\(^{57}\) Along similar lines, I reran the models including financial sector share of GDP as a control variable.\(^{58}\) In both cases, the substantive conclusions were unchanged across the specifications. It is also possible that countries form blocs with these influential countries, gaining an advantage in bargaining over representation. I therefore reran the models including a common measure of political affinity: proximity of voting profile in the UN General Assembly to the United States, United Kingdom, France, or Germany (Gartzke, 2010). The substantive results were again unchanged.

Although the institutional rules governing change in the IMF and World Bank are the same, IMF subscriptions have an additional function that could potentially lead to divergent bargaining outcomes. In addition to determining voting shares, a country’s IMF quota is formally tied to its ability to draw on the institution’s resources – for example, a country can draw on 25% of its quota without conditionality for the purposes of minor fluctuations in its balance of payments (Vreeland 2003, 26-27). In theory, this factor may lead states to bargain more aggressively to resist a loss in IMF subscriptions, impeding a redistributive agreement.

There are several reasons why this alternative explanation is unlikely to account for the observed variation presented in this article. In both the IMF and the World Bank, it is extremely unusual for any country’s absolute subscription level to decline. Share redistributions have almost always accompanied a general increase in capitalization or taken the form of selective ad hoc increases for member states.\(^{59}\) Hence, an increase in one country’s relative subscription share is generally achieved without consequence for another country’s ability to draw on IMF resources. This is particularly true if the country receiving the increase is a creditor state that is unlikely to

\(^{57}\) I also sequentially omitted individual countries and, for the time series analysis, individual years, to make sure that the results are not unduly influenced by any particular country or year.

\(^{58}\) Data from Timmer and de Vries 2009 and O’Mahoney and Timmer 2009.

\(^{59}\) e.g., See Boughton 2001, 861.
borrow from the IMF, such as Japan in the 1980s (Appendix II). In addition, underrepresented countries such as Japan and China have frequently contributed to IMF special funds in a manner that does not affect their quota (one of the arguments made for greater voting rights stems from this “taxation without representation”). As such, concerns about potential drains on IMF resources could have been mitigated by simply tying increases in quota shares to additional non-quota contributions to fund resources.

As a related robustness check, I considered the possibility that the quantitative results are affected by the inclusion of likely IMF borrowers. Following along the logic above, the results may be biased if a subset of states is perceived as particularly risky and therefore persistently prevented from obtaining greater subscriptions in the IMF, but not in the World Bank. I therefore reran the analyses, separately omitting developing countries, which have dominated IMF borrowing since the 1980s\(^{60}\) and countries that participated in an IMF program at any point during the years analyzed.\(^{61}\) In no case did the removal of these countries alter the substantive results reported in Tables 3-5.\(^{62}\) Hence, the statistical findings are not driven by countries that are likely to require access to IMF resources.

Finally, I exploit over-time variation in the policy area of the World Bank to test an additional observable implication of the theory. Although the World Bank faces widespread competition in its activities in the current period, this was less true during its earliest years. Immediately after World War II, the ability of major economies aside from the United States to engage in development aid had been decimated, and large regional development banks, such as the Inter-American Development Bank (est. 1959) and Asian Development Bank (est. 1966), had yet to come into existence. Hence, the conditions of the immediate postwar period temporarily

\(^{60}\) e.g., Blomberg and Broz, 2007. I restricted the sample to “advanced economies” as identified by the IMF.

\(^{61}\) I thank James Vreeland for making the data on IMF participation available from Vreeland, 2003 and Vreeland, 2007.

\(^{62}\) i.e., the coefficients related to GDP and lagged shares continued to exhibit the expected hypothesized relationships and with statistical significance at the 95% level.
suppressed the general attractiveness of outside options for member states of the World Bank. If the causal mechanism proposed in this article is correct, World Bank share distributions during this period should have exhibited greater rigidity compared to the contemporary period. Table 6 replicates the analysis from Table 3 using subscription shares in 1950-1960. The results show that, in the 1950s, World Bank voting shares were indeed more rigid and closely resembled those of the IMF – i.e., share distributions responded primarily to prior distributions rather than GDP. Over subsequent decades, World Bank share distributions became more flexible and responsive to GDP, while there was no comparable trend for IMF shares.
Table 6: Path Dependence in IMF and World Bank Subscription Shares, 1950-1960 (OLS)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>0.70* (0.14)</td>
<td>0.66* (0.11)</td>
<td>-0.03 (0.14)</td>
<td>-0.14 (0.08)</td>
</tr>
<tr>
<td>Reserves</td>
<td>-0.21* (0.11)</td>
<td>-0.22* (0.11)</td>
<td>0.06 (0.10)</td>
<td>0.06 (0.06)</td>
</tr>
<tr>
<td>Current Receipts</td>
<td>0.40 (0.25)</td>
<td>0.29 (0.20)</td>
<td>0.52* (0.17)</td>
<td>0.21* (0.08)</td>
</tr>
<tr>
<td>Current Payments</td>
<td>0.31 (0.31)</td>
<td>0.28 (0.28)</td>
<td>-0.57* (0.22)</td>
<td>-0.37* (0.11)</td>
</tr>
<tr>
<td>Dependent Variable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1950)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-16.43* (0.94)</td>
<td>-14.87* (0.79)</td>
<td>-0.03 (2.82)</td>
<td>2.52 (1.34)</td>
</tr>
<tr>
<td>n</td>
<td>52</td>
<td>52</td>
<td>37</td>
<td>37</td>
</tr>
</tbody>
</table>

Note: Numbers in parenthesis are Huber-White standard errors. All variables are logged. Star denotes a coefficient at least two standard errors removed from zero. Variability of receipts is omitted from this analysis due to availability of data.
Conclusion

In this article, I have proposed and tested a rationalist theoretical framework that endogenizes the tendency for institutions to change. My theory predicts that international institutions that face extensive competition offer attractive outside options to member states, limiting the possibility of distributive outcomes that poorly reflect underlying state capabilities. On the other hand, path dependent distributive outcomes are more sustainable among institutions with limited outside options. In order to test these claims, I compared outcomes in the Bretton Woods institutions, which facilitate cooperation in different policy areas but have identical membership and de jure rules governing distributive change.

Although I compared the Bretton Woods institutions in this article for empirical reasons, the theory has applicability to a much wider range of international and domestic contexts. In other work, I consider the validity of the theory through applications to the UN Security Council, internet governance, satellite telecommunications, regional integration projects, and other foreign aid institutions. The theory could also be extended beyond the international realm to institutional arrangements characterized by analogous features at the domestic level, such as ministerial appointments in developing countries, parliamentary committees, and other types of institutional arrangements potentially subject to contestation. The following conjecture follows from the theory outlined here: ceteris paribus, institutions that primarily pertain to activities that are easily replicable by other institutions or actors will be more prone to distributional fluidity among constituents, versus those that engage heavily in activities subject to few outside options.

This study has several additional implications that provide grounds for further research. First, if an institution is predicted to be highly persistent and resistant to distributional change, initial bargaining will be more intense, implying greater difficulty of regime building (Fearon 1998). Hence, institution building in policy areas with high network effects and barriers to entry may be particularly difficult in the absence of special circumstances such as a hegemonic moment.
Second, distributionally sticky institutions can extend the “afterglow” of initial conditions (Krasner 1976; Keohane 1984; Ikenberry 2000) – if institutional stickiness varies by policy area, underlying power shifts in the international system will feed through at different rates. Understanding such tendencies will better inform our study of international power transitions and conflict over international institutions. Third, this study provides guidelines for proper levels of analysis. In policy areas where institutions are expected to exhibit resistance to change based on underlying characteristics, the rules and structure of the institution will be crucial and should be examined in detail. On the other hand, where institutions are expected to unproblematically reflect underlying power, a greater focus on national interests and capabilities is warranted. Fourth, competition among international institutions is likely to have additional effects beyond those addressed in this study – for example, among development aid institutions, excessive competition over projects may give leverage to recipient states, reducing accountability and diluting the effectiveness of programs.

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63 This is akin to the distinction between “strong” and “weak” institutions as discussed by Gourevitch, 1999.
Appendix

I first begin with analysis of a two-player extensive form game, and then extend to an n-player setting.

Two-Player Game

There are two players, 1 and 2, that bargain over potential cooperative agreements in a policy area. Each player makes a contribution to the cooperative arrangement, \( x_i \) (\( i = 1, 2 \)) (\( x_i > 0 \)), which is also the maximum payoff the player can receive if it chooses not to pursue cooperation with the other player. One can think of \( x_i \) as an indicator of each player’s material resources or power – a high \( x \) implies that a player brings a large contribution to the cooperative arrangement but also has the ability to obtain a fairly large payoff from opting out and going it alone. I assume non-negative and non-zero gains from cooperation, such that the total payoff from cooperation is defined as \( x_1 + x_2 + g = \pi_0 \), where \( g > 0 \) represents the gains from cooperation and \( \pi_0 \) represents the total payoff from cooperation. An agreement on partition \( \alpha \) is defined as a division of the total payoff from cooperation such that player \( i \) receives payoff \( \alpha_i \). In the two player game, player \( j \) (\( i \neq j \)) will receive the total payoff from cooperation remaining after \( \alpha_i \) is subtracted. Any \( \alpha \) in the game is greater than or equal to zero and less than or equal to \( \pi_0 \).

At the first stage of the game, the two players operate under a pre-existing cooperative arrangement that partitions \( \pi_0 \) according to exogenously given weight \( \alpha_{\text{SQ}} \), where \( \alpha_{\text{SQ}} \) represents the share of total cooperative payoffs received by player 1 and \( \alpha_{\text{SQ}} = \pi_0 \alpha_{\text{SQ}} \) represents the payoff received by player 2.\(^{64}\) Player 1 is potentially dissatisfied with the status quo. I define dissatisfaction as a status quo partition such that \( \alpha_{\text{SQ}} \alpha_{\text{SQ}} < x_1/x_2 \), or \( \alpha_{\text{SQ}} < x_1 \). That is, player 1 is dissatisfied if the status quo partition gives player 1 a smaller proportion of total gains than its proportion of contributions to the cooperative arrangement or if the status quo partition gives player 1 a smaller payoff than it can obtain by opting out. Only one of the two players can be dissatisfied by assumption, and I assume player 1 is the only potentially dissatisfied player.\(^{65}\)

In the initial stage of the game, 1 can choose to abide by the status quo (SQ), initiate a challenge (CH) to renegotiate the existing partition, or pursue exit (X). If 1 chooses to abide by the status quo, the game ends and the players receive the status quo payoffs \( (\alpha_{\text{SQ}}, \pi_0 - \alpha_{\text{SQ}}) \). If 1 chooses to exit, the game ends and the players receive their outside option payoffs, \( (x_1, x_2) \). If 1 chooses to challenge, 2 has an opportunity to opt out or make a new offer. If 2 chooses to make an offer, the game continues to the next stage, which is modeled as an alternating-offers Rubinstein bargaining game with outside options.

I assume that initiating a challenge entails some cost, \( c \) (\( c \geq 0 \)), such that in subsequent stages the total payoff from cooperation is reduced to \( \pi = \pi_0 - c \). One can interpret \( c \) as any costs incurred as the result of bringing a challenge to the status quo. Such costs might include lobbying efforts if a challenge requires approval of third parties in order to be placed on the agenda, bureaucratic and diplomatic costs involved in gathering and disseminating relevant information,  

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\(^{64}\) One way to interpret \( \alpha_{\text{SQ}} \) is as an equilibrium outcome of this game in a prior time period when some parameter, such as the relative \( x \)’s, were of a different value.

\(^{65}\) Note that both states cannot be dissatisfied simultaneously by assumption. There are four possible cases of mutual dissatisfaction: 1. If \( \alpha_{\text{SQ}} < x_1 \) and \( \alpha_{\text{SQ}} < x_2 \), \( x_1 + x_2 + g > \pi_0 \) (i.e. \( x_1 + x_2 + g \neq \pi_0 \), which is a violation of an assumption) since \( g > 0 \). 2. If \( \alpha_{\text{SQ}}/\alpha_{\text{SQ}} < x_1/x_2 \), \( \alpha_{\text{SQ}}/\alpha_{\text{SQ}} > x_2/x_1 \), i.e. both states cannot be dissatisfied with their proportions simultaneously. 3. If \( \alpha_{\text{SQ}} < x_1 \) and \( \alpha_{\text{SQ}}/\alpha_{\text{SQ}} < x_2 \), which implies \( \alpha_{\text{SQ}} < x_2 \), which is a violation of assumptions as in the first case. 4. If \( \alpha_{\text{SQ}} < x_2 \) and \( \alpha_{\text{SQ}}/\alpha_{\text{SQ}} < x_1/x_2 \), which implies \( \alpha_{\text{SQ}} < x_1 \), which is a violation of assumptions as in the first case.
and the resources expended on coordinating a challenge if the players represent a group of states acting as a unit.

Assuming 1 has initiated a challenge and 2 has chosen not to exit, 2 responds by proposing a new partition \( \alpha_2 \). 1 can respond by accepting 2’s proposal (A), in which case the payoffs are \((\pi - \alpha_2, \alpha_2)\). 1 can also choose to exit at this stage, in which case both players receive their outside option payoffs, \((x_1, x_2)\). Finally, 1 can reject 2’s proposal and make a counteroffer (CO), in which case the game moves to the next stage.

If 1 chooses to make a counteroffer, it will offer a new partition, \( \alpha_1 \). 2’s choices are akin to 1’s in the previous stage. Payoffs are discounted by the player-specific discount factor \( \delta_i (0 < \delta < 1) \) in this stage, by \( \delta^2 \) in the subsequent stage, by \( \delta^3 \) in the subsequent stage, and so on.

Equilibria are derived using subgame perfection and stationarity. Once a challenge occurs, there are four types of possible equilibrium outcomes depending on the relative magnitude of each player’s outside options. Intuitively, if both players have attractive outside options, 1 will receive and accept an offer equivalent to its outside option, and 2 will receive the remaining cooperative payoff. The outcome is analogous if only 1 has an attractive outside option. If only 2 has an attractive outside option, 1 will receive a payoff decreasing in 2’s outside option and increasing in 1’s discount factor, and 2 will receive the remainder. Finally, if both have unattractive outside options, the equilibrium solution is equivalent to the standard Rubinstein bargaining model – payoffs will depend on relative discount factors, with the more patient player tending to receive a greater share of total payoffs.

The structure of payoffs gives rise to the following proposition:

Proposition 1: consider the unique subgame perfect equilibrium of the game in which a challenge occurs and a new partition is accepted. In this equilibrium, ceteris paribus:

1. Equilibrium payoffs are not a function of outside options when outside options are small compared to total cooperative payoffs, such that \( x_1/\pi \leq \delta_1 \mu_1 \) and \( x_2/\pi \leq \delta_2 \mu_2 \).
2. Payoffs are a function of the outside options of one of the players when outside options are large as a proportion of total cooperative payoffs, such that \( x_1/\pi > \delta_1 \mu_1 \) and \( x_2/\pi > \delta_2 \mu_2 \).
3. If \( c = 0 \), as the gains from cooperation, \( g \), approach zero, the equilibrium partition \( \alpha_1/\alpha_2 \) approaches \( x_1/x_2 \).

---

As in the standard Rubinstein bargaining model, the initial proposer will have a bargaining advantage in equilibrium. The main substantive conclusions of this article do not change if 1 were able to offer the initial proposal, although challenges are more likely and 1 is much less likely to remain dissatisfied in equilibrium. Modeling 2 as the initial proposer produces equilibrium outcomes more easily reconciled with empirical facts. First, from a casual survey of the evidence, it appears much more common for institutional renegotiation to result in dissatisfied states remaining dissatisfied rather than previously satisfied states becoming dissatisfied with the new outcome, which is a likely equilibrium outcome if 1 proposes. Second, allowing 2 to make initial proposals is attractive for the sake of stability of outcomes, which is a common feature characterizing redistributive outcomes in international organizations. When 2 proposes first, 2 never finishes the game as a dissatisfied state in equilibrium. If the game were to be replayed with the equilibrium partition as the new status quo partition, and all parameters remained the same, 1 will abide the status quo. Hence, the equilibrium partition is stable to a repeated challenge by 1 in the meta-game in the absence of an exogenous shock such as a change in \( x_i \). This does not necessarily hold if 1 is the initial proposer. When 1 is the initial proposer, 2 may finish the game dissatisfied. If 2 were then able to initiate a challenge as the dissatisfied state and make a proposal, a new equilibrium may be possible in which 1 is dissatisfied even given the same parameters, and so on. Such frequent challenge-counterchallenge cycles are not a common feature of institutional renegotiation.
Proof:

I use subgame perfection and stationarity to derive the equilibrium conditions. I start with the subgame after 1 has initiated a challenge. The equilibrium conditions are akin to those found in Binmore, Shaked and Sutten (1989) and Muthoo (1999). Let 1 and 2’s optimal offers in equilibrium at any stage of the game be denoted respectively by \( \alpha_1^* \) and \( \alpha_2^* \). Given stationarity, 1 (2) chooses an optimal offer in any subgame that makes 2 (1) indifferent between accepting 1 (2)’s offer and the greater of exiting or receiving the discounted payoff from making its optimal offer in the following stage. Hence, 1’s optimal offer \( \alpha_1^* = \pi - \max\{\delta_2 \alpha_2^*, x_2\} \). Likewise, \( \alpha_2^* = \pi - \max\{\delta_1 \alpha_1^*, x_1\} \). Solving for these conditions yields the following equilibrium offers:

\[
\begin{align*}
\alpha_1^* &= \mu_1 \pi & \text{if } x_2 \leq \delta_2 \mu_2 \pi \text{ and } x_1 \leq \delta_1 \mu_1 \pi \\
&= \delta_2 x_1 + (1- \delta_2) \mu_1 \pi & \text{if } x_2 \leq \delta_2 (\mu_2 - \pi-x_1) \text{ and } x_1 > \delta_1 \mu_1 \pi \\
&= \pi - x_2 & \text{if } x_2 > \delta_2 \mu_2 \pi \text{ and } x_1 \leq \delta_1 (\pi - x_2) \\
&= \mu_2 \pi & \text{if } x_1 \leq \delta_1 \mu_1 \pi \text{ and } x_2 \leq \delta_2 \mu_2 \pi \\
&= \delta_1 x_2 + (1- \delta_1) \mu_2 \pi & \text{if } x_1 \leq \delta_1 (\mu_2 - \pi-x_2) \text{ and } x_2 > \delta_2 \mu_2 \pi \\
&= \pi - x_1 & \text{if } x_1 > \delta_1 \mu_1 \pi \text{ and } x_2 \leq \delta_2 (\pi-x_1) \\
&= \mu_2 \pi & \text{if } x_1 > \delta_1 (\mu_2 - \pi-x_2) \text{ and } x_2 > \delta_2 (\pi-x_1),
\end{align*}
\]

where each player i always makes the optimal offer, always accepts offer \( x_j \) iff \( x_j^* \geq x_j \), and exits iff \( x_j^* < x_j \) and \( \delta x_j x_j^* \leq x_i \). \( \mu_i = (1- \delta_i) / (1- \delta_i \delta_j) \). Since player 2 moves first in the repeated subgame, 2’s optimal offer is accepted in equilibrium, assuming no exit. The associated payoffs are depicted in Figure Y. The first two conditions of Proposition 1 follow immediately from the equilibrium conditions.

The proof of Condition 3 of Proposition 1: As \( g \to 0 \), \( x_1 + x_2 \to \pi_0 \). If \( c = 0 \), \( \pi_0 = \pi \). Hence, \( x_1 + x_2 \to \pi, \pi - x_2 \to x_1 \) and \( \pi - x_1 \to x_2 \). Since \( \delta_i < 1 \) for \( i = (1, 2) \), \( x_1 > \delta_1 (\pi - x_2) \) and \( x_2 > \delta_2 (\pi - x_1) \). Therefore, in equilibrium \( \alpha_2 \to x_2 \) and \( \alpha_1 \to x_1 \). Hence, \( \alpha_1 / \alpha_2 \approx x_1 / x_2 \).

By backward induction, 1 will challenge when the payoffs obtained in the repeated subgame are equivalent to or exceed the payoffs obtained from abiding by the status quo or existing, i.e. \( \pi - \alpha_2^* \geq \max\{\alpha_{\text{ISQ}}, x_1\} \). In addition, for 2 to make an offer rather than pursue exit, \( \alpha_2^* \geq x_2 \). Hence, a successful redistribution will occur in equilibrium when:

\[
\begin{align*}
\max\{\alpha_{\text{ISQ}}, x_1\} &\leq (\pi_0 - c)(1- \mu_2) \quad \text{and} \quad \pi_0 - c \geq x_2 / \mu_2 \quad \text{if } x_1 \leq \delta_1 \mu_1 \pi \text{ and } x_2 \leq \delta_2 \mu_2 \pi \\
\max\{\alpha_{\text{ISQ}}, x_1\} &\leq \delta_1 (\pi_0 - c - x_2) \text{ and } \pi_0 - c \geq x_2 \quad \text{if } x_1 \leq \delta_1 (\pi - x_2) \text{ and } x_2 > \delta_2 \mu_2 \pi \\
\alpha_{\text{ISQ}} &\leq x_1 \text{ and } \pi_0 - c \geq x_1 + x_2 \quad \text{if } x_1 > \delta_1 \mu_1 \pi \text{ and } x_2 \leq \delta_2 (\pi - x_1) \\
\alpha_{\text{ISQ}} &\leq x_1 \text{ and } \pi_0 - c \geq x_1 + x_2 \quad \text{if } x_2 > \delta_2 (\pi - x_1) \text{ and } x_1 > \delta_1 (\pi - x_2)
\end{align*}
\]

Discussion:

If a challenge to redistribute shares is successful, the degree to which the new shares reflect outside options is contingent on the overall attractiveness of outside options. In other words, in cooperative settings where attractive outside options are available, those outside options will have a direct effect on the ex post distribution of cooperative payoffs. In cooperative settings where attractive options are unavailable, the distribution of payoffs is not a function of outside options, and hence share distributions will not necessarily reflect underlying capabilities or contributions.
*n*-player game

Assume an *n* player game similar to the two player game described above. The players bargain over potential agreements, each contributing \(x_i > 0\), \(i \in \{1, 2, 3, \ldots, n\}\), where the total payoff from cooperation is \(x_1 + x_2 + x_3 + \ldots + x_n + g = \pi_0\), \(g > 0\). Also assume the existence of a status quo partition \(\alpha_{SQ} = (\alpha_{1SQ}, \ldots, \alpha_{nSQ})\) of \(\pi_0\). By some procedure, a new partition \(\alpha = (\alpha_1, \ldots, \alpha_n)\) of \(\pi = \pi_0 - c\), \(c > 0\), will be offered.

In any extensive form of the game, assume each player has the opportunity to exercise its outside option before accepting \(\alpha\). If so, in any subgame perfect equilibrium resulting in redistribution, \(\alpha_i \geq x_i\) and \(\alpha_i \leq \pi - \sum x_j\), \(i \neq j\), for all *i*.

Assume \(c = 0\). As \(\sum x \to \pi_0\), i.e., \(g \to 0\), for any subgame perfect equilibrium resulting in redistribution, \(\alpha_i \to x_i\) for all *i*. In the extreme, as outside options become maximally attractive, the only partition that can be supported redistributes cooperative payoffs according to each player’s outside option. Any exogenous shift in a player’s outside option will result in a redistribution of cooperative payoffs. On the other hand, as \(x_i \to 0\) for all *i*, i.e., \(g \to \pi_0\), then for any \(q > 0\), since \(x_i \to 0\) then at some point \(x_k < q\) so theoretically \(\alpha_k\) can equal \(q\) and still satisfy the constraint \(\alpha_i \geq x_k\).

Hence, as outside options become maximally unattractive, bargaining procedures producing any new partition \(\alpha\) can be theoretically supported. In the intermediate range, the feasible range for \(\alpha\), \(x_i \leq \alpha_i \leq \pi_0 - \sum x_j\), strictly expands as each \(x_i\) decreases and contracts as each \(x_i\) increases. Hence, a greater theoretical range of partitions can be supported as the attractiveness of outside options diminishes.

Now assume \(c > 0\), such that bargaining entails some cost. As \(c \to \pi_0\), no challenges are likely to occur regardless of the status quo distribution of payoffs. However, the equilibrium outcome will vary according the attractiveness of outside options. As \(\sum x \to \pi_0\), \(\alpha_i \to x_i\). However, since \(\pi < \pi_0\), \(\alpha_i < x_i\) for at least one *i*. Hence, unless the status quo distribution perfectly reflects the distribution of outside options, only exit can be supported as a subgame perfect equilibrium. On the other hand, as \(x_i \to 0\) for all *i* and \(c \to \pi_0\), only the status quo can be supported in equilibrium.
Appendix II: Japan in the Bretton Woods Institutions

In this appendix section, I will examine Japan’s attempts to secure greater voice in the Bretton Woods institutions in order to: 1. Further establish the plausibility of the causal mechanisms associated with the proposed theory; 2. Examine how voting share changes relate to more informal dimensions of influence over policy outcomes in the Bretton Woods institutions. Japan is illustrative for several reasons. First, Japan’s rapid economic growth in the mid-to-late 20th century opened up a large gap between its perceived economic status and its position in the Bretton Woods institutions. At the beginning of the 1980s, the magnitude of change needed to close this gap was comparable across institutions and the widest among member states in absolute terms. Second, Japanese officials undertook a diplomatic campaign in the early 1980s to obtain greater representation and voice in the Bretton Woods institutions, and officials indicate that each institution was accorded equal priority. Finally, by the early 1980s, Japan had become the second largest economy in the world, making it the most important underrepresented state.

In the early 1980s, Japanese policymakers initiated a campaign for greater representation and voice in the Bretton Woods institutions. Japanese representatives made it clear that they felt the existing distribution of shares failed to reflect underlying economic reality. In particular, Japan pushed for unambiguous number two status in terms of voting shares – commensurate with the size of its economy – with an unofficial target set at around 8% of shares (Rapkin et al 1997, 178). Simultaneously, Japan sought greater representation of its nationals as employees and greater ideological recognition for the merits of the “Asian Development Model.”

Japanese officials pursued an aggressive bargaining strategy, threatening to withhold financial contributions to the institutions and deploy them elsewhere if its objectives were not met. As its economy grew and generated large surpluses, Japan had made contributions to both institutions above and beyond amounts required by its quotas. These included financing for the soft-loan windows of the World Bank and capital-recycling plans and special funds for the IMF, which were considered irregular contributions and therefore did not count towards formal voting shares. Japan threatened to withhold these irregular contributions unless it received an increase in voting shares commensurate with its global standing. Japanese officials emphasized that domestic political conditions made it imperative for Japan’s voice in these institutions to be increased in order to maintain public support for expanded contributions. Finance Minister Ryutaro Hashimoto issued a statement in 1989 that Japan would find it difficult to finance the IMF unless given “the proper ranking to reflect our economic power.”

A simple comparison of Japan’s shares in the IMF and World Bank makes it clear that Japan’s objectives were met more rapidly and meaningfully in the World Bank. Figure S2-1 shows the ratio of Japan’s shares of world GDP and subscriptions compared to the United States – this ratio is used to omit exogenous changes in subscription shares caused by the entry of new member states. After it initiated its diplomatic campaign for greater representation in the early 1980s, Japan’s share in the World Bank increased considerably from a level comparable to its IMF share.

68 Personal interview, Ministry of Finance Officials, 2006. Also see discussion in Rapkin, Elston and Strand 1997, 177-178.
69 Rapkin, Elston, and Strand 1997, 178
70 Ogata 1989, 11; Rapkin, Elston, and Strand 1997, 178
71 Ogata 1989, 10
73 Nominal GDP is used rather than PPP as this is the input used by the IMF in its quota formulas.
By the late-1980s, Japan’s shares in the Bank had increased to a level where Japanese officials considered their primary objective accomplished. In comparison, IMF shares consistently lagged behind – by 1989-1990, policy statements from Japanese officials clearly reflect dissatisfaction with Japan’s position in the IMF but not in the World Bank. As indicated earlier, one of Japan’s major foreign policy goals was securing unambiguous number two status in each institution. The timing of Japan’s attainment of unambiguous number two status is indicated by the grey dots. This goal was attained in 1985 for the IBRD but not until 1998 for the IMF, a lag of thirteen years. Japan’s experience also illustrates the sharp difference in policy area features characterizing development aid and balance of payments lending. Specifically, in development aid, Japan has formidable outside options, principally its bilateral development aid program, which is one of the world’s largest, and the ADB, which is a regional institution dominated by Japan (Yasumoto 1983; Lim and Vreeland 2011). These options gave Japan leverage vis-à-vis the World Bank that was unavailable in the context of the IMF. In securing its objectives, Japan repeatedly threatened to withhold funding from other World Bank programs if its demands were not met. During the 1983-1984 negotiations, during which Japan secured unambiguous number two status in the World Bank, the primary bargaining strategy of Japanese financial authorities was to make its IDA contributions contingent on a boost in IBRD voting shares. This threat of exit was highly credible in light of the country’s own development lending capacity and alternative institutions.

Japan’s leverage also brought it a measure of ideological influence in the World Bank. In the early 1990s, Japan pressured the World Bank to move away from its traditional neoclassical approach that emphasized economic liberalization and “shock therapy” for the new post-Soviet Republics. A formal statement of this criticism came in 1991 with the issuance of “OECF Occasional Paper No. 1,” which emphasized government-oriented growth measures and sharply criticized the World Bank orthodoxy. Around this time, Japan’s economic success had led to revisionist accounts touting the merits of the Japanese and Asian models – Japan’s criticism of the World Bank followed these lines. The significance of the OECF paper is demonstrated by the fact that it prompted a response, albeit a negative one, from then World Bank chief economist Lawrence Summers.

Japan took the further step of funding the “The East Asian Miracle” study, which examined the rapid growth of Asian economies and conceded that state intervention can facilitate rapid, egalitarian growth under certain conditions. While the Miracle Report provided many caveats, including the probable inapplicability of the Asian model to countries lacking an efficient bureaucracy, Japan exerted considerable leadership by proposing and getting the World Bank to carry through with the study. These initiatives also had a subtle impact on subsequent Bank policies, as Wade notes:

“…the Bank’s softening of its stand against directed credit, as of 1995, owes something to the wider Japanese pressure on the Bank. Compared to the 1980s, the Bank is now less likely to insist that directed credit and interest rate subsidies should always be avoided. It is more likely to insist simply that the onus must be on the proposer to explain the special circumstances justifying

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75 For example, in the early 1990s, Japan’s bilateral ODA disbursement averaged about $11 billion, while total IBRD lending averaged about $16 billion (World Bank Annual Report and Japan ODA Annual Report, various years.
76 Ogata 1989 ; Rapkin, Elston, and Strand 1997 ; also interviews with various current and former Japanese Ministry of Finance Officials.
77 World Bank, 1993.
78 Awanohara,1995, 166-177.
directed credit in a given case. The shift is small but not trivial, and gives the Bank more flexibility in responding to Japan’s continued use of directed credit.”

Japanese Ministry of Finance officials in charge of relations with multilateral development agencies perceive Japan’s contemporary voting shares and influence over World Bank lending policies as reasonably commensurate with Japan’s economic standing, particularly in areas such as donor coordination and policies related to infrastructure and industrial development. In comparison, Japan’s leverage vis-à-vis the IMF has been severely limited. This was particularly evident during the Asian Financial Crisis of 1997-1998. The crisis occurred in a region where Japanese financial authorities felt they had considerable expertise and where core Japanese economic interests were at stake. Japanese officials generally argued that the crisis was a short-term liquidity problem that did not require harsh conditionality or structural reform (Sakakibara 2000; Amyx 2002; Lipscy 2003; Lee 2006; Grimes 2008). For example, then Vice Minister for International Affairs Eisuke Sakakibara recounts negotiations with the IMF over Indonesia as follows:

“At the time, the main issue at stake was whether to construct a ‘large package’ dictating large-scale reform of the Indonesian economy and exceeding the $17.2 billion Thai package, or a ‘small package’ focusing on stabilization of the exchange rate… It is true that Suharto’s regime was corrupt, and we also believed that the National Car Project should be eliminated – however, we were opposed to the IMF sticking its nose into these sorts of political or structural problems.”

Sakakibara and his deputy, Tatsuro Watanabe, engaged in a two-hour heated argument with the IMF mission chief, at one point threatening that “If you ignore the opinion of the Japanese government to this extent, we will have to consider our options…” However, despite this overt intervention and threats of unilateral action by the highest-level Japanese international financial authorities, IMF policy remained dismissive of Japan’s position.

Japanese officials proposed an Asian Monetary Fund during the crisis, but this failed due to divided support within East Asia, particularly Chinese ambivalence, and active US opposition. After the crisis, Japanese financial authorities took an active role in the creation of the Chiang-Mai Initiative (CMI), later upgraded to the Chiang-Mai Initiative Multilateralization (CMIM), a currency-swap network designed to provide balance of payments lending to Asian economies in crisis. Some Japanese officials view its continued development as a mechanism to apply pressure vis-à-vis the IMF to take East Asian interests into account – i.e., an outside option.

However, Japan’s experience with the CMIM clearly illustrates the dilemmas associated with pursuing balance of payments lending outside of the IMF. Creditor states in the CMI, most prominently China and Japan, are hesitant to provide access to their reserves without any conditions whatsoever (Sakakibara 2001). However, if the CMIM were to impose conditionality, it would be difficult for China or Japan to escape blame – in the CMIM, the two countries are slated to account for 64% of funds and probable voting shares. The regional framework,

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79 Wade, 1996.
81 Sakakibara, 2000, 196.
82 ibid.
83 Lipscy 2003
because of its limited membership and skewed economic power, does not provide sufficient political cover for China and Japan to provide balance of payments lending in an effective and credible manner independent of IMF conditionality. For this reason, Japanese policymakers have generally sought to make CMI and CMIM financing contingent on IMF conditionality, and 80-90% of its bilateral currency swaps are tied to the presence of an IMF program. Strikingly, despite considerable need from countries such as Korea and Singapore, the CMI disbursed no funds during the global turbulence associated with the 2008 US subprime crisis – the prospect of having to initiate an IMF program to access CMI funds was deemed politically unacceptable (Grimes 2011). Hence, the utility of the CMIM as a credible outside option vis-à-vis the IMF remains marginal despite over a decade of development and participation by some of the largest holders of foreign exchange reserves in the world.

As this case study shows, there is a significant asymmetry in the attractiveness of outside options vis-à-vis the IMF and World Bank. Despite its deep dissatisfaction with the IMF and formidable economic resources – Japan was the number two economy and number one holder of foreign reserves during the time period analyzed – Japan has had little choice but to grudgingly rely on the IMF. In development aid, Japan has leveraged its credible outside options to achieve a satisfactory level of representation and influence in the World Bank.

Figure S2-1:

Relative Shares: Japan vs. USA

Note: Grey dot indicates attainment of unambiguous number two status by Japan. Relative shares (i.e., the ratio of Japan's share of world GDP and subscriptions compared to the United States) are presented to eliminate variation in shares due to membership changes in each institution.

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Informal Influence over World Bank and IMF Lending

Japan’s experience is also a useful case study to examine the interaction of formal and informal influence over the policy output of the Bretton Woods institutions. Did Japan’s gains in formal standing in the World Bank, along with a measure of ideological recognition, correspond to an increase in material influence over the lending policies of the institution? As Stone (2011) points out, informal influence can substitute for the exercise of formal power. As such, it is possible that Japan was “bought off” with higher voting rights and some acknowledgement of the merits of its development model without any substantive influence over Bank policymaking.

To assess Japan’s informal influence over the Bank, I replicate and extend a statistical model used by Fleck and Kilby87 to measure US influence over the institution. The panel dataset covers 110 countries that received lending from the World Bank during the period 1968-2002. The key dependent variable is a country’s share of total World Bank lending during a given year. In order to measure US influence, Fleck and Kilby include variables that proxy for US interests and economic exposure. Share of total bilateral US aid is used as measure of revealed preference: the US would presumably prefer the Bank also support countries that the US already supports through its foreign aid program. Shares of total US exports and imports and commercial financial flows (inward and outward) are included as proxies for countries in which the US has a strong economic interest. Fleck and Kilby find that these variables are strongly correlated with World Bank lending outcomes, implying that the US exerts considerable influence over the institution’s lending activities, though the nature of US interests appears to vary across presidential administrations.88

I obtained the data, successfully replicated the original results, and extended the dataset to include equivalent proxies for Japanese interests over the distribution of World Bank lending. For the purposes of comparison, I also collected equivalent information for three large European donors – France, Germany, and the United Kingdom – and averaged their shares to generate a proxy for European interests in Bank lending outcomes. Unlike the original study, we are not interested in which particular measure of economic activity motivates influence over Bank lending. Hence, I combine the economic indicators into a single measure of economic exposure. The combined measure represents the average share of total Japanese/European/American trade volumes (import+export) and commercial flows (inflows+outflows) to the country in question.

As with the original analysis, I estimate a feasible generalized least squares model with an AR1 error structure.89 I also retain several control variables that are likely to have some impact on determining where Bank lending flows: population, population2, annualized population growth rate, per capita GDP, per capita GDP2, annualized per capita GDP growth rate, and region dummies. For consistency, I also include a combined measure of world economic exposure, which represents the average share of world trade volumes and commercial flows.

In order to test how Japan’s influence over Bank lending has varied over time, I separate the dataset into two periods based on the year Japan successfully attained unambiguous number two status in the Bank in terms of voting shares: 1985. This year also conveniently divides the data into seventeen year segments with roughly the same number of observations. Hence, the data is split into two time periods: 1968-1985 and 1985-2002. Alternative splits of the data using any year during the 1980s do not alter the substantive results. If Japan meaningfully increased its influence over policymaking at the World Bank as its economy grew, we should observe a greater association between proxies for Japanese interests over Bank lending and outcomes during the second period. If, on the other hand, Japan was bought off using formal voting rights without a

87 Fleck and Kilby 2006
88 Ibid., 230-237
89 Additional details are available in Ibid.
material increase in influence over policy outcomes, this should be reflected in a weak association between the variables across both time periods.

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Note: Numbers in parenthesis are standard errors. Star denotes a coefficient at least two standard errors removed from zero. Variables included in the model but omitted from the table for the sake of presentation: population, population², annualized population growth rate, per capita GDP, per capita GDP², annualized per capita GDP growth rate, and region dummies.
The substantive results of interest are presented in Table S2-1. For the sake of presentation, I only include coefficients and standard errors for the key variables of interest. The first two columns show the results from the full model. As the results show, neither Japanese foreign aid allocations nor economic exposure was strongly related to World Bank lending allocations during the period 1968-1985. In contrast, during the period 1968-1985, both Japanese foreign aid allocations and economic exposure are positively associated with World Bank lending, suggesting that Japanese interests were being reflected in Bank policymaking. Consistent with existing research, US economic exposure is positively and meaningfully associated with World Bank lending across time periods, suggesting that US influence in the Bank has been considerable over the years. The results for Europe are more ambiguous, but they are consistent with the premise that European countries have exercised a measure of influence over Bank lending during both time periods. Interestingly, Bank lending appears to have become more responsive to economic exposure for all three of Japan, the US, and European countries over time. For both the US and Europe, the association between bilateral foreign aid allocation and Bank lending has weakened during the more recent time period.

Since bilateral foreign aid programs are highly likely to be influenced by bilateral economic interests, there may be some concern that including both aid and economic exposure in the model could bias the coefficient on exposure: there is a danger that we would be controlling for a variable that is the effect of a key variable of interest. In addition, it is possible that countries allocate bilateral foreign aid strategically, treating bilateral aid and influence over Bank lending as substitutes. Hence, in the third and fourth columns of Table 1, I rerun the analysis omitting foreign aid from the models. The results closely mirror those from the first two columns.

This analysis shows that World Bank lending became more responsive to indicators of Japanese interest at roughly the same time Japan secured greater voting rights and ideological recognition within the institution. This is consistent with the subjective assessment of Japanese policymakers regarding their position in the Bank: Ministry of Finance officials indicate that they are satisfied overall with the degree of influence their country exercises within the institution. In particular, Japanese officials note that the Bank accords significant recognition to their development priorities, which in recent years have emphasized investment in infrastructure projects that facilitate rapid industrialization, particularly in East Asia and sub-Saharan Africa. As this section illustrates, Japan’s successful renegotiation of the status quo in the Bank was not simply a matter of status: the country has secured a measure of influence over Bank lending that it did not previously exercise.

**Informal Influence over IMF Lending**

In this section, I use data on IMF lending to examine Japanese informal influence over outcomes in the institution. As I will show, in contrast to the World Bank, there is very little evidence that Japanese policymakers have been able to influence the substance of IMF policy regardless of the time period in question. As with the Bank, informal influence over policy outcomes in the IMF closely mirrors the patterns observed in formal voting rights and qualitative case study evidence.

In order to assess informal influence over the IMF, I replicate and extend data originally used by Barro and Lee, which analyzes IMF lending (Standby Agreements and Extended Loan Facilities) from 1975-2000. The data contains information on 130 countries in five year increments. There are three dependent variables of interest – the size of IMF loans as a share of the receiving country’s GDP averaged over each five year period, the fraction of months during

90 Personal interview, Ministry of Finance (Japan) Official responsible for handling relations with multilateral development institutions, 2005, Tokyo Japan.
91 Barro and Lee 2005
each five-year period that a country operated under an IMF loan program, and a dichotomous variable indicating an approval of any new IMF programs during the five year period. Standard economic controls for determinants of IMF lending are included in all statistical models, measured at the beginning of each five year period. These are international reserves as a proportion of imports, per capita GDP, logged absolute GDP, the lagged GDP growth rate, and a dummy variable indicating membership in the OECD. As noted by Barro and Lee, other economic variables such as magnitude of current account deficits and inflation are not meaningful predictors of IMF lending once lagged GDP growth and international reserves are included. The squares of per capita and absolute GDP are included to account for the possibility of a nonlinear relationship between those variables and IMF lending. The models also include dummy variables for each five year period.

I also include as controls several variables that have been identified in previous studies as indicators of potential political influence by the recipient of IMF lending. First, a country’s quota/voting shares may provide a measure of formal leverage to secure lending. Second, a country may be able to exert informal pressure if its nationals comprise a large percentage of IMF employees. Hence, I control for the share of recipient state nationals among IMF professional staff.

The key independent variables of interest for this study are indicators of creditor state ties with the potential recipient of IMF lending. I include such variables for the United States, Japan, and averages for three major European states – France, Germany and the UK. I collected data on three sets of economic indicators. First, data on total foreign claims on individual countries by creditor state banks was obtained from the Bank for International Settlements Consolidated Banking Statistics. This proxies for the level of financial sector exposure to the recipient state. Second, I include a measure for intensity of trade between each creditor and potential recipient of IMF lending. This is measured as the value of bilateral trade divided by the countries’ GDP. Third, I include a measure of foreign direct investment stocks by country as another indicator of potential non-financial private sector exposure.

For all explanatory variables, values from the first year of the five year period are used to avoid endogeneity problems, and values are logged to avoid undue influence of outliers.

Following previous studies, I also include affinity scores based on UN General Assembly voting with the US, Japan, and European states. This variable ranges from one to zero based on the fraction of General Assembly votes for which the relevant creditor state and the potential recipient voted identically during each five year period. High scores can be interpreted as a sign of diplomatic affinity and may therefore proxy for private benefits attainable from supporting a friendly state using IMF resources.

I construct an index variable that proxies for economic exposure by combining bank lending, trade, and FDI between each creditor state and potential IMF borrower. The variable is constructed by normalizing the log of each variable to vary between zero and one based on empirical minimum and maximum values and taking a simple average. Alternative specifications

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92 e.g. if a country had an IMF program for the entire period, this variable would be 1. If it had a program for 57 out of 60 months, the a variable would be 57/60 = 0.95, etc.
93 i.e., for the previous five year period.
94 I combine the variables for the European states as they are not the main focus of the study. Including the countries separately does not have any meaningful impact on the substantive results concerning the US and Japan.
95 Running the statistical analyses instead with absolute levels of bilateral trade does not alter the substantive conclusions.
96 This data was obtained from the OECD. As there were a considerable number of missing cells in this data, I used multiple imputation (King et al. 2001) to avoid potential bias.
97 For the BIS bank lending data, years prior to 1983 are unavailable. Hence, I use the value for 1983 for the 1980-1985 period. Dropping this period from the analysis does not alter the substantive conclusions.
of this variable, such as a simple average, produce similar substantive results. I also ran an alternative specification by using factor analysis to obtain the largest principal component from a principal components model that is a linear combination of the economic variables. Using this variable produces coefficients in the same direction as the reported results but with larger standard errors. Using a more conventional measure, bank lending, by itself, also produces substantively similar results.

Since this data is only available for the period after which Japan initiated its diplomatic campaign for influence in the Bretton Woods Institutions, I focus on the period 1985-2000. As the previous subsection demonstrated, during these years, there is evidence that suggests Japan exerted considerable informal influence over the World Bank’s lending profile. In contrast, my expectation is that Japan’s influence over IMF lending should be limited.
Table S2-2: Determinants of IMF Loan Size, 1980-2000

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<td>(0.0063)</td>
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\[ n = 435, 435, 435, 435 \]

Note: Control variables included in the models and not shown in the table: panel dummies. Standard errors in parentheses. Star denotes a coefficient at least two standard errors removed from zero.
Table S2-3: Determinants of IMF Program Participation, 1985-2000

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</table>

n = 435

Note: Control variables included in the models and not shown in the table: per capita GDP growth rate, real GDP per capita and its square, log real GDP and its square, international reserves per months of imports, US UN Affinity, Europe UN Affinity, Japan UN Affinity, OECD dummy, and panel dummies. Standard errors in parentheses. Star denotes a coefficient at least two standard errors removed from zero.

Table S2-4: Determinants of IMF Program Approval, 1985-2000

<table>
<thead>
<tr>
<th></th>
<th>Probit</th>
<th>Probit RE</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Economic Ties</td>
<td>2.275 *</td>
<td>2.165 *</td>
</tr>
<tr>
<td></td>
<td>(0.909)</td>
<td>(1.053)</td>
</tr>
<tr>
<td>Europe Economic Ties</td>
<td>2.247*</td>
<td>2.550*</td>
</tr>
<tr>
<td></td>
<td>(1.127)</td>
<td>(1.300)</td>
</tr>
<tr>
<td>Japan Economic Ties</td>
<td>-1.535</td>
<td>-1.449</td>
</tr>
<tr>
<td></td>
<td>(0.833)</td>
<td>(1.000)</td>
</tr>
</tbody>
</table>

n = 435

Note: Control variables included in the models and not shown in the table: per capita GDP growth rate, real GDP per capita and its square, log real GDP and its square, international reserves per months of imports, US UN Affinity, Europe UN Affinity, Japan UN Affinity, OECD dummy, and panel dummies. Standard errors in parentheses. Star denotes a coefficient at least two standard errors removed from zero.
In Tables S2-2, 3, and 4, I run several model specifications to account for features of the data that may bias the empirical results. The size of IMF lending and participation in IMF programs are continuous variables. I therefore begin with a simple OLS specification with robust standard errors. I also run a random effects specification to account for the possibility that unexplained factors may lead the IMF to favor specific countries across time periods. As the dependent variables are bounded, I also use Tobit and random effects Tobit specifications to avoid potential bias from censoring. For the dichotomous approval variable, I use probit and random effects probit. The substantive results are generally consistent across all specifications.

Tables S-2, 3, and 4 suggest that Japanese informal influence over IMF policies remained weak even after 1985. While economic ties with the US and European countries are generally positively and meaningfully associated with both IMF program participation and program approval, economic ties with Japan are either unassociated or negatively associated with both outcomes. The substantive effects are quite large. Holding other variables constant, a country with strong economic ties to the US – such as Brazil or Mexico in 1995-2000 – is expected to receive an IMF loan about 4% of GDP greater than a country with minimal ties to the US. In comparison, a country with strong economic ties to Japan – e.g. Thailand in 1995-2000 – is expected to receive and IMF loan about 2% of GDP smaller than a country with minimal ties to Japan. Similarly, controlling for all other factors, a country with strong economic ties to the US analogous to the previous example is predicted to receive loan approval 53% more often and participate in IMF programs on average about 75% more of the time than a country with minimal ties, while a country with strong economic ties to Japan is predicted to receive loan approval 26% less often and participate about 48% less of the time than a country with minimal ties.

In this appendix section, I have addressed two potential concerns related to the results presented in the main body of the article. First, I illustrated the plausibility of the proposed causal mechanisms by showing that the experience of the most important underrepresented state, Japan, was consistent with the proposed mechanism: the asymmetrical attractiveness of outside options was an important factor in Japan’s relative success in securing greater voice in the World Bank. Second, I presented evidence that informal influence over World Bank and IMF policies evolved in ways consistent with patterns observed in voting shares. Based on existing empirical models of informal influence over policy outcomes in each institution, Japan’s increase in voting shares in the World Bank corresponded to an increase in informal influence, while there was no comparable increase in informal influence in the context of the IMF.

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98 I used Hausman tests to confirm the consistency of this modeling choice against fixed effects specifications.
99 Tobin 1958; Amemiya 1984
100 e.g., IMF lending is bounded by zero at the lower limit. Hence, the Tobit specification is:

\[ L_{it}^* = \alpha + \beta X_{it} + \delta^* t + u_{it}, L_{it} = \max \{0, L_{it}^*\} \]

whereas program participation is bounded between zero and one, hence the specification is:

\[ P_{it}^* = \alpha + \beta X_{it} + \delta^* t + u_{it}, P_{it} = \min\{1, \max(0, P_{it}^* )\} \]

where \( L_{it} \) and \( P_{it} \) are the relevant dependent variables, the vector \( X_{it} \) denotes country specific independent variables as shown in the regression tables and footnotes, and \( u_{it} \) is a random error term. “time,” denotes period dummies to control for common external factors such as world macroeconomic conditions.
101 i.e.:

\[ A_{it}^* = \alpha + \beta X_{it} + \delta^* t + u_{it}, A_{it} = 1 \text{ if } A_{it}^* > 0 \text{ and } A_{it} = 0 \text{ if } A_{it}^* \leq 0. \]

Variable definitions are analogous to the previous footnote.
102 This effect is not statistically indistinguishable from zero. All other reported substantive results have 95% confidence intervals that exclude zero.
### Appendix III: Additional Robustness Checks and Descriptive Statistics

Table S3-1: Path Dependence in IMF and World Bank Subscription Shares (OLS)  
All Economic Variables Entered as Shares and GDP and Trade Included as Control Variables (Compare to Table 3, Columns 3 and 4)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP/World GDP</td>
<td>0.00 (0.04)</td>
<td>0.70* (0.15)</td>
</tr>
<tr>
<td>Trade/World Trade</td>
<td>0.05 (0.04)</td>
<td>-0.65* (0.18)</td>
</tr>
<tr>
<td>Reserves/World Reserves</td>
<td>0.04 (0.02)</td>
<td>-0.12 (0.04)</td>
</tr>
<tr>
<td>Variability of Receipts/World VofR</td>
<td>0.11 (0.04)</td>
<td>0.48* (0.15)</td>
</tr>
<tr>
<td>Dependent Variable</td>
<td>0.83* (0.04)</td>
<td>0.36* (0.12)</td>
</tr>
<tr>
<td>(1984)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-0.06* (0.02)</td>
<td>0.16* (0.07)</td>
</tr>
<tr>
<td>n</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

Note: Numbers in parenthesis are Huber-White standard errors. All variables are logged. Star denotes a coefficient at least two standard errors removed from zero.
Table S3-2: IMF and WB Subscriptions with AR(1) (OLS with Country Fixed Effects) All Economic Variables Entered as Shares and GDP and Trade Included as Control Variables (Compare to Table 5, Columns 1 and 2)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP/World</td>
<td>-0.02</td>
<td>0.05</td>
</tr>
<tr>
<td>GDP</td>
<td>(0.01)</td>
<td>(0.05)</td>
</tr>
<tr>
<td>Trade / World</td>
<td>0.01</td>
<td>-0.01</td>
</tr>
<tr>
<td>Trade</td>
<td>(0.01)</td>
<td>(0.07)</td>
</tr>
<tr>
<td>Reserves / World Reserves</td>
<td>0.00</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.03)</td>
</tr>
<tr>
<td>Variability Of Receipts/World VofR</td>
<td>-0.01</td>
<td>-0.13*</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.04)</td>
</tr>
<tr>
<td>Dependent Variable(t-1)</td>
<td>0.74*</td>
<td>0.10*</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>(0.05)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.26*</td>
<td>0.58</td>
</tr>
<tr>
<td></td>
<td>(0.09)</td>
<td>(0.41)</td>
</tr>
<tr>
<td>n</td>
<td>483</td>
<td>483</td>
</tr>
</tbody>
</table>

Note: Numbers in parenthesis are standard errors. All variables are logged. The models include country fixed effects. Star denotes a coefficient at least two standard errors removed from zero.
Table S3-3: IMF Subscriptions with Different Lag Structures (OLS with Country Fixed Effects) (Compare to Table 5, Column 1)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shares for All Variables</td>
<td>Shares for All Variables</td>
<td>Shares for All Variables</td>
<td>Shares for All Variables</td>
</tr>
<tr>
<td>GDP</td>
<td>-0.01 (0.01)</td>
<td>-0.01 (0.01)</td>
<td>-0.01 (0.01)</td>
<td>-0.01 (0.01)</td>
</tr>
<tr>
<td>Reserves</td>
<td>-0.01 (0.01)</td>
<td>-0.01 (0.01)</td>
<td>-0.01 (0.01)</td>
<td>-0.00 (0.01)</td>
</tr>
<tr>
<td>Current Receipts</td>
<td>0.05 (0.04)</td>
<td>0.06 (0.04)</td>
<td>0.05 (0.04)</td>
<td>0.06 (0.04)</td>
</tr>
<tr>
<td>Current Payments</td>
<td>0.02 (0.04)</td>
<td>0.01 (0.04)</td>
<td>0.01 (0.04)</td>
<td>0.00 (0.04)</td>
</tr>
<tr>
<td>Variability Of Receipts</td>
<td>-0.01 (0.01)</td>
<td>-0.01 (0.01)</td>
<td>-0.01 (0.01)</td>
<td>-0.01 (0.01)</td>
</tr>
<tr>
<td>Dependent Variable(t-1)</td>
<td>0.52* (0.06)</td>
<td>0.49* (0.06)</td>
<td>0.49* (0.06)</td>
<td>0.49* (0.06)</td>
</tr>
<tr>
<td>Dependent Variable(t-2)</td>
<td>0.21* (0.06)</td>
<td>0.15* (0.07)</td>
<td>0.14* (0.07)</td>
<td>0.14* (0.07)</td>
</tr>
<tr>
<td>Dependent Variable(t-3)</td>
<td>0.08 (0.06)</td>
<td>0.05 (0.06)</td>
<td>0.05 (0.06)</td>
<td>0.03 (0.07)</td>
</tr>
<tr>
<td>Dependent Variable(t-4)</td>
<td>0.05 (0.05)</td>
<td>0.03 (0.05)</td>
<td>0.03 (0.05)</td>
<td>0.03 (0.05)</td>
</tr>
<tr>
<td>Dependent Variable(t-5)</td>
<td></td>
<td>0.05* (0.04)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.29* (0.07)</td>
<td>0.29* (0.07)</td>
<td>0.29* (0.07)</td>
<td>0.29* (0.07)</td>
</tr>
<tr>
<td>n</td>
<td>479</td>
<td>475</td>
<td>471</td>
<td>466</td>
</tr>
</tbody>
</table>

Note: Numbers in parenthesis are standard errors. All variables are logged. The models include country fixed effects. Star denotes a coefficient at least two standard errors removed from zero.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>0.08 (0.05)</td>
<td>0.08 (0.05)</td>
<td>0.08 (0.05)</td>
<td>0.08 (0.05)</td>
</tr>
<tr>
<td>Reserves</td>
<td>0.02 (0.03)</td>
<td>0.02 (0.03)</td>
<td>0.02 (0.03)</td>
<td>0.03 (0.03)</td>
</tr>
<tr>
<td>Current Receipts</td>
<td>-0.19 (0.17)</td>
<td>-0.19 (0.17)</td>
<td>-0.19 (0.17)</td>
<td>-0.17 (0.17)</td>
</tr>
<tr>
<td>Current Payments</td>
<td>0.31 (0.18)</td>
<td>0.31 (0.18)</td>
<td>0.31 (0.18)</td>
<td>0.28 (0.19)</td>
</tr>
<tr>
<td>Variability Of Receipts</td>
<td>-0.11 (0.05)</td>
<td>-0.11 (0.05)</td>
<td>-0.11 (0.05)</td>
<td>-0.11 (0.05)</td>
</tr>
<tr>
<td>Dependent Variable(t-1)</td>
<td>0.10* (0.05)</td>
<td>0.10* (0.05)</td>
<td>0.10* (0.05)</td>
<td>0.10* (0.05)</td>
</tr>
<tr>
<td>Dependent Variable(t-2)</td>
<td>-0.05 (0.04)</td>
<td>-0.04 (0.04)</td>
<td>-0.04 (0.04)</td>
<td>-0.04 (0.05)</td>
</tr>
<tr>
<td>Dependent Variable(t-3)</td>
<td>-0.02 (0.04)</td>
<td>-0.02 (0.04)</td>
<td>-0.02 (0.04)</td>
<td>-0.03 (0.04)</td>
</tr>
<tr>
<td>Dependent Variable(t-4)</td>
<td>0.01 (0.04)</td>
<td>0.01 (0.04)</td>
<td>0.01 (0.04)</td>
<td>0.01 (0.04)</td>
</tr>
<tr>
<td>Dependent Variable(t-5)</td>
<td>-0.01 (0.04)</td>
<td>-0.01 (0.04)</td>
<td>-0.01 (0.04)</td>
<td>-0.01 (0.04)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.29* (0.07)</td>
<td>0.29* (0.07)</td>
<td>0.29* (0.07)</td>
<td>0.29* (0.07)</td>
</tr>
<tr>
<td>n</td>
<td>479</td>
<td>475</td>
<td>471</td>
<td>466</td>
</tr>
</tbody>
</table>

Note: Numbers in parenthesis are standard errors. All variables are logged. The models include country fixed effects. Star denotes a coefficient at least two standard errors removed from zero.
Note: To omit trivial variation caused by the entry of new members and the adjustment of the shares of other countries, changes are counted as meaningful when year-on-year share changes exceed 1%. Note that while IMF share changes occur within close proximity to General Quota Reviews, which took place in 1978, 1983, and 1990, and 1998, World Bank share redistributions occur with greater regularity.
Figure S3-2

Magnitude of Share Changes Year on Year, IMF and World Bank, 1976-1999

Note: Magnitude is measured as the percentage of total shares that shifted hands during a given year. The figure shows that World Bank share changes are not only more frequent, but also larger in terms of magnitude compared to IMF share changes.
References


