

# The Political Economy of IMF Voting Power and Quotas

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## Abstract

We explore the governance structure of the International Monetary Fund, wherein voting power is explicitly tied to the size of member countries' financial contributions, known as "quotas." By virtue of their large quotas, rich countries have the preponderance of voting power while developing countries are left to complain about a "democratic deficit" that leaves them with little influence over the IMF's policies and programs. We develop a model that recognizes the bifurcation of members into advanced-economy creditors and developing-country borrowers and treats the IMF as an international government that provides *collective insurance* against balance-of-payments shocks. We show that when the rate at which the IMF taxes an economy (via quotas) to fund this co-insurance scheme has an impact on voting power, there is an incentive for rich countries to support subsidizing the risks of poor countries, even when the poor have substantial political power. To test the model, we estimate the covariates of actual IMF quotas (and quota shares) over time, giving attention to the role of cross-country inequality and the political ideology of domestic governments. As our model implies a conditional relationship between inequality and right-wing ideology, we include an interaction term. We find that the impact of inequality is positive, as expected, and that this effect is smaller for right-wing governments.

## 1 Introduction

The International Monetary Fund's governance structure is based upon a system that links financial contributions from member governments to voting power in the organization. Unlike organizations with "one-member, one-vote" constitutions, voting power in the IMF is tied to contributions (quotas) which are, in turn, based upon a member's relative economic position in the world: larger and richer countries provide more resources and have more influence in the IMF than smaller, poorer members. In this paper, we investigate the political economy of this governance system. We focus on conflicts of interest between rich and poor member governments.

For the past 35 years, the most fundamental cleavage at the IMF has been between advanced economy "creditors" and developing country "borrowers." Advanced economy creditors, like the United States, provide the bulk of the IMF's financial resources but do not make use of its lending facilities - they are net creditors. By contrast, developing countries draw upon the Fund for financial assistance yet provide a small share of its usable (hard currency) resources - they are net borrowers, which makes them subject to IMF policy conditionality. This division creates tensions around governance issues because rich country creditors have different interests regarding the terms and conditions of IMF lending and other policies, and are skeptical about ceding greater control to developing country borrowers. Developing countries, by contrast, make up 85% of the total membership and believe they have an inappropriately small voice within the organization.

In this paper, we construct a simple model of IMF governance based upon the bifurcation of members into advanced economy lenders and developing country borrowers. We model a world composed of rich and poor countries in which an international government (the IMF) provides collective insurance for balance-of-payments risks by taxing economies. To close the model we introduce “political power,” which is a weighed index of vote shares in the international government and autonomous power (which equates to non-voting forms of international power). We examine two cases. In the first, political power is independent of taxation (the rate at which one taxes an economy has no impact on vote shares). In this case, when the rich are powerful, they under-invest in the insurance arrangement and impose high loan rates to maximize returns on their deposits (quotas). When the poor have all the political power, insurance is over-provided and low interest rates are charged on loans, causing a moral hazard. When political power is evenly divided, there are no stabilization loans.

The second case approximates the actual structure of governance at the IMF, where the rate of taxation of an economy increases that economy’s voting power. In this case, we show that there is an incentive for rich economies to insure the poor even when autonomous political power is equally divided between the two income groups. Hence, it is necessary for political power to depend upon vote shares, otherwise there would be little impetus for rich economies to support insuring the risks of the poor in international financial markets.

We also examine how changes in the global distribution of income influence taxation and hence quotas. Our results show that as power moves from poor countries to rich countries, then increasing inequality implies less insurance and higher returns to the rich on deposits; as power moves from rich to poor, increasing inequality implies more insurance and better terms on loans from rich to poor. One interpretation of this result is that as international income inequality has increased over time, the rich have been willing to provide more insurance support (via more quotas) to the poor even though the poor have substantial autonomous political power because the additional insurance has provided more voting rights to the rich. In other words, as rich creditor governments provide a greater share of the the IMF’s usable resources, they demand and obtain more control in order to limit moral hazard. This is consistent with Bird and Rowlands (2006:168), who note that if the rich are pressured to cede control to borrowers, the rich may simply withdraw their support for the IMF which relies on them for its resources.

Our results are consistent with the literature that shows the United States and other Group of 7 (G7) contributors use their influence at the IMF to advance their foreign policy interests.<sup>1</sup> The recent interest in this line of research stems from the work of Thacker (1999) and Barro and Lee (2005) who find that IMF lending programs tend to favor countries that are “well-connected” either because they are allies of powerful IMF member countries or because they are well-represented among the staff members of the IMF. In our terminology,

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<sup>1</sup>The G7, which the OECD calls the “Major Seven,” includes the United States, Japan, Germany, the United Kingdom, France, Italy, and Canada.

these developing country borrowers have “autonomous political power.” Other work by Stone (2011, 2004), Vreeland (2011), Dreher, Strum, and Vreeland (2009), Dehrer and Jensen (2007), Broz and Hawes (2006), Oatley and Yackee (2004) and Gould (2003) suggest others avenues of informal power.

Our model also contains a cost function for taxing the domestic economy (to provide insurance via the IMF) that partially reflects the ideology of the domestic government. This captures our assumption that ideology shapes domestic politicians’ attitudes toward international organizations like the IMF, with right-wing conservatives seeing the IMF as a remote and opaque bureaucracy whose interventions in the global economy are wasteful and harmful, due to the moral hazards they invoke (Milner and Tingley 2011, 2010; Broz 2007).<sup>2</sup> The costs of taxing the domestic economy to finance global stabilization is therefore higher for conservative governments than for liberal ones. As a result, we should observe more quota increases as the world gets more unequal but a decreasing share of quotas should go to more right-wing governments.

We test the implications of the model by estimating the determinants of actual IMF quota allocations over time, giving attention to the role of cross-country inequality (deviation in country income share relative to mean world income) and the political ideology of domestic governments (a dummy variable for right-wing governments). As our model implies a conditional relationship between inequality and political conservatism, we include an interaction term. Controlling for a battery of covariates, we find that the impact of inequality on quota is positive, and that this impact is smaller for conservative governments.

In the next section, we summarize the structure and functions of the IMF and the role of quotas in its governance system. Section 3 contains our political economy model of quota/vote/tax determination and Section 4 presents our empirical results. Section 5 concludes.

## 2 Quotas and IMF Governance

The IMF is a cooperative, international governmental organization that currently has 188 nation-states as members. Its mandate is to support global trade and economic growth by ensuring stability in the international financial system.<sup>3</sup> This entails the provision of financial assistance to members facing balance-of-payments difficulties, and monitoring member

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<sup>2</sup>To quote Newt Gingrich on the topic of the 1998 IMF quota increase: “This is a typical liberal foreign policy...we’re not turning over \$18 billion to a French Socialist to throw it away.” The “French Socialist” is Michel Camdessus, Managing Director of the IMF from 1987-2000. Speech before the Christian Coalition, September 18, 1998, Washington, DC. The Wall Street Journal Interactive Edition - September 21, 1998.

<sup>3</sup>See the self-description drawn from the IMF’s constitution at <http://www.imf.org/external/about.htm>

behavior so as to reduce the moral hazard inherent in such an insurance arrangement.<sup>4</sup> The IMF, along with administering the pool of funds created for making loans to members, undertakes surveillance of borrowers to limit moral hazard in the system.

The IMF considers a country's circumstances on a case-by-case basis when establishing a financial arrangement. Fund officials and officials from the recipient country negotiate "conditions" for receiving IMF assistance that include a variety of changes in a country's fiscal, monetary, and structural policies. Over the course of the arrangement, IMF staff and country officials periodically review the program's status, and the staff determines whether or not the country has made satisfactory progress with respect to meeting the program's conditions. In addition, the Fund conducts surveillance and provides policy advice regarding members' economic policies, as they relate to their overall external payments position. In short, an IMF arrangement blends adjustment financing and policy conditionality. *Who controls* these functions is a matter of critical political economy importance for members.

The IMF's financial and governance structures resemble those of a credit union.<sup>5</sup> On joining the IMF, each member country subscribes a sum of money called its "quota". Members normally pay 25 per cent of their quotas out of their hard currency foreign reserves, the balance in their national currencies. A quota is like a deposit in a credit union; only a member may deposit money with the IMF or borrow money from it. As in a credit union, the IMF offers a mutual insurance benefit: countries experiencing a balance-of-payments crisis are entitled - upon meeting certain conditionality requirements - to draw down their quota and temporarily borrow from the IMF's common pool of resources. Like a credit union, the IMF exists because the sum of the membership's credibility reduces borrowing costs for members below what they would pay on their own.

In principal, each country's quota is supposed to reflect the relative size of its economy, based on formulas that weigh various measures of output and trade. These formulae, however, were "spurious" from the outset (Bird and Rowlands 2006: 155) and deviations from calculated quotas are commonplace and reflect political considerations.<sup>6</sup> The original quotas of the 39 founding members of the IMF were determined by negotiations, and members who have joined subsequently have undergone similar negotiations with existing members to set the size of their quotas (Mikesell 1994).

To assist in quota negotiations, the IMF uses non-binding formulas to provide the

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<sup>4</sup>When a country spends more abroad than it receives, it incurs a current account deficit. Selling assets or borrowing can finance this shortfall, and involves a private capital inflow into the deficit country (a capital account surplus). But when private sources do not cover the current account deficit, the government must cover it through the sale of foreign exchange (official reserves of foreign currencies). This is a balance-of-payments deficit. By insuring against such risks, the IMF creates a moral hazard: knowing they are insured may lead members to take more risks and, thereby, cause balance-of-payments problems.

<sup>5</sup>The "credit union" analogy is common in the literature on the IMF. See, for example, Boughton 2001, Boughton 2004, and Fischer 1998.

<sup>6</sup>Consider, for example, the quotas of the United Kingdom and France, which have been exactly equal since 1992.

basis for discussion. A multi-formula approach was introduced in 1962-3, when the original Bretton Woods formula was supplemented with four other formulas containing the same basic variables but with larger weights for trade and external variability. This series of five formulas used by the IMF since 1983 includes: GDP; foreign exchange and gold reserves; current receipts or payments; and variability of annual exports or current receipts (for more detail on existing quota formulas, see Section 4 below).<sup>7</sup>

Upon joining the IMF, a member must pay its quota in full, with a minimum of 25% in international reserve currencies (US dollar, euro, yen, etc., and SDR) and the remainder in the country's own national currency. As national currencies of countries with weak payments positions are not "useable" resources, reserve currency contributions are the primary source of financing for IMF lending. Thus, by virtue of their large quota allocations and their reserve currency contributions, industrialized countries contribute by far the greatest share of the IMF's resources.

Quotas are important beyond their resource role as they also determine a country's access to IMF loans. Members are normally held to an annual limit of 100% of their quota, with a total ceiling of 300%. However, access limits have been exceeded by significant amounts in recent crises and have become - like quota formulas - largely spurious.<sup>8</sup>

Beyond resource contributions and access limits, quotas also determine a country's voting power in the IMF's decision-making bodies and, thereby, the country's influence in the IMF. Each member has 250 "basic" votes plus one additional vote for each SDR 100,000 of quota.<sup>9</sup> While the 250 basic votes generate a slight bias in favor of small countries, this does nothing to alter the overwhelming dominance of large advanced economies in voting power. Reforms adopted in 2010 tripled basic votes to 750 but industrial countries remain dominant. For example, the United States, with its current quota of SDR 42,122,400 has 421,961 votes (421,221 + 750) and Tuvalu, with its quota of SDR 1,800,000 has 752 votes (2 + 750). As the total of all members' votes is 2,519,736 the U.S controls 16.75% of votes at the IMF while Tuvalu has just 0.03% of the votes.

The 24 member Executive Board is the IMF main decision-making body and countries with the five largest quotas - the U.S., Japan, Germany, France and the UK - have permanent seats on the Board. All other members are organized into regional groups, which elect a single member to the Executive Board to represent the regional consistency. The voting power of advanced countries is further enhanced by supermajority provisions for approval of certain

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<sup>7</sup>As part of the larger 2010 reform of IMF governance, the IMF conducted a comprehensive review of the quota formula. The review was completed in January 2013 but the IMF Executive Board failed to find a clear consensus on a reform proposal. The work will have to continue under the 15th General Review of Quotas, due to be completed by January 2014.

<sup>8</sup>In 2002, the IMF lent Turkey over 15 times its quota limit, and Argentina exceeded its access limit by 500%.

<sup>9</sup>The Special Drawing Right (SDR) is the unit of account of the IMF. Its value fluctuates daily and is based on a basket of key international currencies. On July 1, 2013, 1 SDR = US1.502.

important decisions. Changing quotas, for example, requires 85% approval, so a minority holding just over 15% of the votes can block these decisions. The United States has always held at least 16.75% of the votes so it alone can veto efforts to redistribute quotas and voting power. In short, the quota system is the basis of asymmetric power relations among member states in the IMF.

**Figure 1** shows the distribution of quotas by income groups over the history of the IMF. While the share going to developing countries has risen - primarily due to a decline in the share of the United States - advanced economies as a group remain the largest contributors to IMF resources and hold over 60% of the votes. The G7 accounts for less than 4% of the membership but controls 43% of votes. Advanced economies do not, however, make use of the IMF for loans.

During the 1960s and 1970s, the issue of control was muted, due to the fact that advanced economies and developing countries were equally likely to require an IMF arrangement (Boughton 2001). As in a credit union, most countries experienced periods when they were creditors and other periods as debtors - balance of payments problems were not restricted to any particular class of country. Indeed, from 1947 to 1978, the United Kingdom was the single largest recipient of IMF resources, accounting for over a quarter of all drawings, while Canada, Denmark, France, Italy all experienced periods as debtors. As a group, advanced economies made over 60% of all IMF drawings in this period (Bird and Rowlands 2006).

Following the breakdown of the Bretton Woods system, advanced economies' use of IMF resources tapered off. In fact, with the exception of the Republic of Korea in 1997 - which joined the OECD in 1996 - not a single advanced economy drew a new loan from the IMF between 1978 to 2008.<sup>10</sup> For this set of countries, exchange-rate flexibility and international capital markets replaced the role of the IMF in balance of payments adjustment (Bordo and James 2000; Van Houtven 2002).

**Figure 2** tracks IMF loans outstanding from 1948 to 2012 for the two income groups and shows the sharp transformation in borrower type that took place in the late 1970s. Before 1978, IMF lending oscillated between advanced and developing countries with no clear trend. But after IMF arrangements with the United Kingdom and Portugal were retired in the early 1980s, the IMF became almost exclusively a lender to developing countries. When IMF lending to advanced countries resumed with the onset of the Great Recession in 2008 and the Eurozone debt crisis in 2010, it was qualitatively different than before. Unlike the period prior to 1980, when G7 countries like the U.K. often found they needed IMF support, the borrowers in 2008-2012—Greece, Hungary, Iceland, Ireland, and Portugal—were neither major contributors to the IMF nor members of the G7.<sup>11</sup> They were small countries on the

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<sup>10</sup>During the Asian financial crisis of 1997-98, Korea briefly became the IMF's largest debtor, with a debit position of nearly 17 times its quota in 1998. Korea repaid all of its debts to the IMF by 2001 and regained its status as a net creditor. See Boughton (2005).

<sup>11</sup>Greece, Hungary, Iceland, Ireland, and Portugal comprise just 1% of the OECD's total Gross Domestic

periphery of Europe experiencing problems similar to those that plague developing countries when they find themselves in need of IMF support.

Hence, the IMF's membership is now divided into two blocs: rich country "creditors" that provide the lion's share of IMF resources, and poor country "debtors" that draw upon the Fund for financial assistance and are subject to its policy conditionality. This bifurcation of the membership has weakened the "credit union" character of the IMF (Boughton 2004). In the 1950s and 1960s, most large advanced countries experienced periods as creditors and other periods as debtors, when they used IMF resources to help resolve external payment imbalances. However, by the 1980s advanced economies had begun to rely exclusively on private capital flows, and the IMF membership became divided into creditor and debtor groups. The underlying commonality of interests among members in the credit union ended at that point, and recent IMF loans to Greece, Hungary, Iceland, Ireland, and Portugal - countries that have more in common with the IMF's debtors than with its creditors - have not revived it.

The division creates tensions around governance issues and voting power because rich country creditors have different interests regarding the terms and conditions of IMF lending, and are skeptical about ceding greater control and resources to developing country borrowers.<sup>12</sup> To simplify, developing countries favor quota increases, lower interest rate, and less conditionality since they are more dependent on the IMF for payments financing and more vulnerable to financial crises. Industrial countries resist quota increases and favor higher loan rates increased conditionality and surveillance since they fund IMF lending, have access to private credit markets to finance deficits, and do not rely on the IMF for support (as was the case in the 1960s and 1970s).

This conflict of interests plays out in challenges to the IMF's governance structure. Developing countries argue that the IMF's "democratic deficit" undermines the legitimacy of the IMF and its conditional lending programs because the interests of debtor countries are not adequately represented in policymaking (Buria 2003, 2005; Kapur and Naím 2005; Kelkar, Yadav, and Chaundhry 2004). But creditor governments fear that a more egalitarian voting system would lead to the IMF becoming an insurance agency without sufficient control for moral hazard, taxing rich countries and transferring the proceeds to developing countries that mismanage their economies. If increasing the voting power of developing countries means that developing countries have greater assurance of IMF help when they experience balance of payments problems, they would be less likely to undertake measures that would prevent such problems. As former British Prime Minister Thatcher expressed it, "There was no way in which I was going to put British deposits into a bank which was totally run by those on overdraft" (cited in Bakker, 1996: 52).

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Product (GDP) while the G7 account for over 67% of it.

<sup>12</sup>The theoretic literature on credit unions has consistently recognized the possibility of conflict between members that are borrowers (and naturally prefer low interest rates to be charged on loans) and members that are savers (who prefer an objective of high rates paid on deposits). See, for example, Taylor 1971, Smith et al. 1981, and Smith 1984.



In the following section, we develop a model that hinges on this bifurcation of members into rich country creditors and poor country borrowers. This allows us to conceive of the IMF as a mutual insurance arrangement in which conflict between rich and poor countries drives quota outcomes and generates insights into the nature of the organization’s voting rules and governance structures.

### 3 The Model

Consider a world comprised of  $n$  types of economies, rich  $r$  or poor  $p$ , with each  $i = r, p$  economy endowed with income  $y^i$ .<sup>13</sup> To economize on notation, the population is normalized to 1 with half the economies characterized as rich or poor. To focus on distributional issues, let  $\theta$  denote the total share of income accruing to the rich. Hence,

$$y^p = \frac{(1 - \theta)}{1/2} \bar{y}$$

$$y^r = \frac{\theta}{1/2} \bar{y}$$

where  $\bar{y}$  denotes average income. Since  $y^r > \bar{y} > y^p$ , then  $\theta > \frac{1}{2}$ .

For simplicity, we motivate the redistribution of income from rich to poor (i.e. creditor to debtor) vis a vis taxation, with the tax rate  $\tau$  akin to the interest rate charged to distribute income.<sup>14</sup> Consider an international government budget constraint that provides transfers from rich to poor by taxing economies at a rate  $\tau$ :

$$T = \frac{1}{n} \left( \sum_{i=1}^n \tau y^i - C(\tau) n \bar{y} \right) = (\tau - C(\tau)) \bar{y}$$

where  $n = 2$  in our special case and  $C(\cdot)$  represents a cost function for taxing the domestic economy to finance international transfers. We assume  $C : [0, 1] \rightarrow \mathbb{R}_+$ , where  $C(0) = 0$  so that there are no costs where there is no taxation;  $C'(\cdot) > 0$  so that costs are increasing in the level of taxation;  $C''(\cdot) > 0$  so that these costs are strictly convex — that is, they increase faster as tax rates increase (thus ensuring that the second-order condition of the maximization problem is satisfied);  $C'(0) = 0$  and  $C'(1) = 1$  so that an interior solution is ensured; and finally  $C_c(\cdot) > C_l(\cdot)$  so that the cost function exhibits second order stochastic

<sup>13</sup>Our model is adapted from Acemoglu and Robinson’s (2005) to fit the international context.

<sup>14</sup>Alternatively, we could have motivated the redistribution through credit markets. In that case, the tax rate  $\tau$  is equivalent to the opportunity cost of money when participating in the IMF. For debtor countries then,  $\tau$  represents a transfer of income (even though they are paying interest) because it is given at below market rates. For creditor countries  $\tau$  represents a transfer of income to debtors because they are loaning at rates below what could be received in domestic credit markets.

dominance when the domestic government is conservative rather than liberal.<sup>15</sup> This is necessarily satisfied assuming:

$$C = \alpha_i \tau^2$$

with  $\alpha_c > \alpha_l$ .

Indirect utility for an individual country  $i$  is therefore

$$V(y_i|\tau) = (1 - \tau)y^i + T.$$

To close the model, we introduce political power  $X$  for  $i = r, p$  as a weighted index of autonomous power  $\chi$  and voting which depends proportionally on  $\tau$  which allows for greater voting power in the international government.<sup>16</sup> So for the rich, we have

$$X = \chi(1 + (1 - \chi)\gamma\tau)$$

where  $X : [0, 1] \rightarrow \mathbb{R}_+$  describes the weight associated for the rich and  $1 - X$  describes the weight associated for the poor with  $\gamma : [0, 1] \rightarrow \mathbb{R}_+$  indicating the significance of taxation in the political power process for economy  $i$ .<sup>17</sup>

Then, the equilibrium tax rate would be that which maximizes:

$$\max_{\{\tau:[0,1]\}} [(1 - X(\cdot))(1 - \tau)y^p + (\tau - C(\tau))\bar{y}] + [X(\cdot)((1 - \tau)y^r + (\tau - C(\tau))\bar{y})] \quad (1)$$

which has the first-order condition (with complementary slackness)

$$-((1 - X(\tau))(1 - \theta) + X(\tau)\theta) + \frac{1}{2}((1 - C'(\tau))) - X'(\tau)(1 - \tau)(1 - 2\theta) = 0$$

if  $\tau > 0$ . Rearranging and solving for  $\tau$  yields:

$$\tau^* = \frac{1}{2[\alpha - 2(1 - 2\theta)[\chi(1 - \chi)\gamma]]} [1 - 2[(1 - \chi)(1 - \theta) + \chi\theta + \gamma\chi(1 - \chi)(1 - 2\theta)]] \quad (2)$$

Alternatively we could rewrite (2) as

$$\tau^* = \frac{[\omega - (1 - 2\chi)(1 - 2\theta)]}{2[\alpha + \omega]}.$$

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<sup>15</sup>Once again, if the model is motivated through credit markets, we are assuming that conservative governments would be less likely to provide subsidized loans to poorer countries than liberal governments, *ceteris paribus*.

<sup>16</sup>Our conception of autonomous power is equivalent to informal or “soft power,” i.e. power of a form other than voting power. Argentina, Brazil, and Turkey appear to have autonomous power since they, as a group, account for close to two-thirds of all IMF lending, including concessional lending, despite having small quotas/vote shares.

<sup>17</sup>Thus, when  $\gamma > 0$ , the tax rate has a direct influence on the weight of power: more taxes leads to more vote shares, which leads to more power.

with  $1 > \omega = -2(1 - 2\theta)[\chi(1 - \chi)\gamma] > 0$

It is instructive to examine equation (2) under various conditions. First, consider the case in which political power is independent of taxation so that  $\gamma \rightarrow 0$ . This case is one in which the rate in which one taxes an economy has no influence in the size of voting for international affairs.<sup>18</sup>

Suppose the rich enjoy all the political power in the international economy, so that  $\chi \rightarrow 1$ . In this case, equation (2) reduces to

$$\tau = \frac{1}{2\alpha} [1 - 2\theta]. \quad (3)$$

Since, by definition  $\theta > \frac{1}{2}$ ,  $\tau < 0$  so that the rich transfer income from the poor even though they are endowed with more income.

Now consider the case in which the poor own all the political power so that  $\chi \rightarrow 0$ . In this case, equation (2) reduces to

$$\tau = \frac{1}{2\alpha} [1 - 2[1 - \theta]]. \quad (4)$$

Since, by definition  $\theta > \frac{1}{2}$ , then  $\tau > 0$  so that the rich transfer some of their income to the poor.

Finally, consider the case in which political power is evenly divided so that  $\chi \rightarrow \frac{1}{2}$ . In this case, equation (2) reduces to  $\tau = 0$  so that there is no income transfers.

Hence, in a world in which taxation has no influence on political power, income transfers to the poor (analogous to IMF insurance for crisis-prone debtors) occur provided there is at least as much political power as there are poor in the international economy.

Now consider a world in which taxation influences political power much in the same manner as it does in IMF quotas. In this case  $\gamma > 0$ . Consider the same exercise as above, but begin with the case when  $\chi \rightarrow \frac{1}{2}$ . In this case, equation (2) reduces to

$$\tau = -\frac{1}{2[\alpha - \frac{1}{2}(1 - 2\theta)\gamma]} \left[ \frac{1}{2}\gamma(1 - 2\theta) \right] \quad (5)$$

Since  $\theta > \frac{1}{2}$  then  $\tau > 0$  even when autonomous political power is equated to the size of each income group. Hence, it is necessary for political power to depend on quotas otherwise, there would be little impetus for rich economies to support income transfers (via IMF lending) to poor economies.

It is also worthwhile to implicitly differentiate (2) to examine how changes in the distribution of income influences taxation and therefore quotas. In the ordinary case, we

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<sup>18</sup>This would be equivalent to the case in which quota size does not impact vote share.

have

$$\begin{aligned}\frac{d\tau}{d\theta} &= -8\gamma\chi(1-\chi)BA^{-2} + [2(1-2\chi) + 4\gamma\chi(1-\chi)]A^{-1} \\ &= A^{-1} [2(1-2\chi) + 4\gamma\chi(1-\chi)[1-2\tau^*]]\end{aligned}\quad (6)$$

where  $A = 2[\alpha - 2(1-2\theta)[\chi(1-\chi)\gamma]] > 0$  and  $B = [1 - 2[(1-\chi)(1-\theta) + \chi\theta + \gamma\chi(1-\chi)(1-2\theta)]]$ .

Once again, if  $\gamma \rightarrow 0$ , then

$$\frac{d\tau}{d\theta} = [2(1-2\chi)]A^{-1}.\quad (7)$$

The sign of equation (7) has an inflection point when  $\chi = \frac{1}{2}$  so that as power moves from the poor to the rich, then increasing inequality implies more transfers from poor to rich; as power moves from the rich to the poor, then increasing inequality implies more transfers from rich to poor. Note further that as  $\gamma > 0$ , then the inflection point occurs at a larger value of political power for the rich provided the optimal tax rate  $\tau^*$  is sufficiently small.

One interpretation of this result is that as income inequality has increased over time, the rich have been willing to transfer more income to the poor even with substantial political power because the transfer has provided more voting rights to the rich.

We have modeled the IMF function of providing balance-of-payments support to nations that cannot “self insure” for this risk as system for transferring income from rich to poor. This transfer of income is seen in the large increase in lending from developed creditor countries to developing debtor countries as seen in **Figure 2**. Following the breakup of Bretton Woods, the IMF has played the role of redistributing income to poorer countries, as the poor do not have easy access to private finance in times of stress. This is especially true of middle income developing countries, who usually borrow from the IMF in response to a financial crisis, when private capital is not available to them (Kapur and Naím 2005).

Our theoretical result suggests that as political power has shifted away from developed countries (as seen in **Figure 1**), developing countries are more likely to receive transfers from developed countries. This is what has occurred over the past several decades. Note that the success of this arrangement depends critically on ensuring that recourse to IMF transfers does not create too much moral hazard in the system. Developed countries have therefore obtained more control over IMF lending (in exchange for providing more insurance for the poor) to prevent policymakers in poor countries from slackening their efforts to make their economies more resistant to shocks, or postponing necessary adjustment when crises do occur.

It is also interesting to note how the equations differ across different types of domestic governments. Notice that the magnitude of equation (6) depends critically on the size of  $\alpha$ . As  $\alpha_c > \alpha_l$ , then  $\frac{d\tau}{d\theta} \text{RIGHT} < \frac{d\tau}{d\theta} \text{NOTRIGHT}$ . In this case, we should observe more quota increases over time but a decreasing share of the quotas should go to more conservative governments.

This is what we wish to test in our empirical section.

## 4 Empirical Results

Our theory has several predictions that can be used to examine the political component of IMF quotas and vote shares. First, countries with higher shares of GDP are more likely to request more voting power (higher quotas) provided there is sufficient political power among poorer countries ( $\frac{d\tau}{d\theta} > 0$ ). We also predict that these effects are smaller for right-wing governments such that ( $\frac{d\tau}{d\theta}\text{RIGHT} < \frac{d\tau}{d\theta}\text{NOTRIGHT}$ ). We therefore construct measures of  $\hat{\theta}$  and interact it with right-wing governments  $R \hat{*} \theta$  included in the following regression:

$$\text{Quota}_{it} = \beta_0 + \beta_1 \hat{R} + \beta_2 \hat{\theta} + \beta_3 R \hat{*} \theta + \mu_{it}$$

where our theory predicts  $\beta_2 > 0, \beta_3 < 0$ .

Our main dependent variable is a country’s actual IMF quota (in millions of SDRs). All data are taken from the largest cross-section of countries, sampled every year a “General Review of Quotas” took place between 1975 to 2003. The IMF conducts general reviews of quotas about every five years and these reviews have produced eight quota changes since 1946.<sup>19</sup> Our panel draws country/year observations only for years in which general reviews produced quota changes. The actual quota data are drawn from the IMF’s *International Financial Statistics*.

Our variable of interest  $\hat{\theta}$  is measured as the deviation in the income share relative to the mean ( $\frac{Y_i - \bar{Y}}{\bar{Y}}$ ). These data are from the IMF’s *International Financial Statistics* and the World Bank’s *World Development Indicators*. We experimented with other measures of the share of income going to the rich, such as ( $\frac{Y_i}{\bar{Y}}$ ) with similar results. For the interaction  $R \hat{*} \theta$  we measure  $R$  as a dummy variable for right-wing governments. Data are from the World Bank’s *Database on Political Institutions*.

For controls, we look to the economic criteria and formulas that the IMF uses to calculate quotas. Although there are major deviations between actual quotas and calculated quotas, there is still a rough correspondence and, because we are interested in the effects of politics on quotas, we need to control for these economic covariates. The IMF formulas estimates the following equations:

$$Q_1 = (0.01Y + 0.025R + 0.05P + 0.2276VC)(1 + C/Y) \quad (8)$$

$$Q_2 = (0.0065Y + 0.0205125R + 0.078P + 0.4052VC)(1 + C/Y) \quad (9)$$

$$Q_3 = (0.0045Y + 0.03896768R + 0.07P + 0.76976VC)(1 + C/Y) \quad (10)$$

$$Q_4 = 0.005Y + 0.042280464R + 0.044(P + C) + 0.8352VC \quad (11)$$

$$Q_5 = 0.0045Y + 0.05281008R + 0.039(P + C) + 1.0432VC \quad (12)$$

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<sup>19</sup>Our analysis does not include quota reform that resulted from the Fourteenth General Quota Review in December 2010.

where  $Q_1, Q_2, Q_3, Q_4, Q_5$  are calculated quotas for each formula;  $Y$  is GDP, converted to a common SDR base with market exchange rates, given as a three-year average would be used to smooth possible large cyclical and exchange rate fluctuations.  $R$  is twelve-month average of gold, foreign exchange reserves, SDR holdings and reserve positions in the IMF, for a recent year;  $P$  = annual average of current payments (goods, services, income, and private transfers) for a recent five-year period;  $C$  = annual average of current receipts (goods, services, income, and private transfers) for a recent five-year period; and  $VC$  = variability of current receipts, defined as one standard deviation from the centered five-year moving average, for a recent 13-year period.

The calculated quota of a member is the higher of the Bretton Woods calculation ( $Q_1$ ) and the average of the lowest two of the remaining four calculations, that is  $Q_c = \max(Q_1, \text{mean of lowest 2 of } Q_2, \dots, Q_5)$ . For the latest reviews, we employ the actual data reported in IMF documents. For earlier reviews, we select values for  $R, P, C, Y, VC$  from IMF's *International Financial Statistics* or the World Bank's *World Development Indicators*.

Many authors have argued that the IMF's approach to calculating quotas,  $Q_c$ , is ad hoc at best and politically-driven at worst.<sup>20</sup> Much of the research suggests employing different measures for GDP and weighting external exposure in a different manner. To address this concern, we employ alternative measures of  $Q_c$  using factor analysis. We construct a synthetic measure of  $Q_c$  from the principle components of the underlying factors  $R, P, C, Y, VC$ . Such a method has been used in other contexts in cross-country analysis such as Kaufman *et al* (2000). Specifically, we create a measure of **FACTOR** that is obtained from the largest principal component from a principal components model that is a linear combination of **Y, R, P, C** and **VC**. Formally, let **FACTOR** represent  $it$ 's unobserved level of quota from  $j$  factors **Y, R, P, C** and **VC**, so that:

$$\text{FACTOR}_{it} = \alpha_1 \cdot Y_{it} + \alpha_2 \cdot R_{it} + \alpha_3 \cdot P_{it} + \alpha_4 \cdot C_{it} + \alpha_5 \cdot VC_{it} + \epsilon_{it} \quad (13)$$

Therefore, using this principle components model, we estimate **FACTOR** by employing information from our four different measures of conflict **Y, R, P, C** and **VC**. The model optimally selects one factor with the relevant output given below. From this analysis, the factor **FACTOR** is given as

$$\text{FACTOR}_{it} = .9355 * N(Y_{it}) + .9774 * N(P_{it}) + .9534 * N(VC_{it}) + .9816 * N(C_{it}) + .7442 * N(R_{it}) \quad (14)$$

where  $N(\cdot)$  standardizes the variable **Y, R, P, C, VC** to be standard normal.<sup>21</sup> Hence, we have two proxies to control for the economic covariates of IMF quotas: one based on IMF methodology and one based directly on the underlying data itself. We employ these measures as information used by IMF voting members to calculate expected quotas. We assume voting

<sup>20</sup>See International Monetary Fund (2000) for an analysis sponsored by the IMF and headed by Richard Cooper that makes some of these points.

<sup>21</sup>We then multiply the **FACTOR** by 1000 for scaling in the regression.

members efficiently use these as proxies for expected quotas ( $\bar{Q} = Q_c, \text{FACTOR}$ ), implying that

$$Q_{it} = \bar{Q} + \varepsilon_{it}$$

where  $\varepsilon$  is a white noise error term with mean zero.

Table 1 reports the results from our exercise. The first column describes the variables included in our model. Column (1) reports the results from our baseline model with  $\bar{Q} = Q_c$  from 1983 to 2003. Column (2) reports the results in the latest years, i.e. after 1992. Column (3) reports the results in 1999. Column (4) reports the results in 2003. Columns 5-7 do analogous exercises with  $\bar{Q} = \text{FACTOR}$  with Columns 5-6 estimating the cross-sections in 1999 and 2003 respectively and Column 7 doing the exercise for only the richest countries.

The results in Table 1 confirm what one might anticipate for the impact of  $\bar{Q}$  on  $Q$ . In each case, the proxies are positive and statistically significant implying constructed quotas are good approximations for actual quotas. The results in Table 1 also provide evidence to support our model. The impact of  $\hat{\theta}$  and  $R \hat{*} \theta$  have the expected theoretical sign and are statistically significant in each case. Hence, it appears that countries with higher shares of income are those that request higher quotas and these impacts are dampened with right-wing governments are in power *even after controlling for the estimated quota  $\bar{Q}$* .

Table 2 conducts a similar exercise using vote share and calculated vote share rather than quotas as proxies for  $Q$  and  $Q_c$ . In this case, we see no qualitative change in the results from Table 1. The impact of  $\hat{\theta}$  and  $R \hat{*} \theta$  have the expected theoretical sign and are statistically significant in each case. So countries with higher shares of income obtain higher quotas and more voting power but this effect is reduced for right-wing governments, even controlling for calculated quota by way of  $\bar{Q}$ .

Table 3 continues the exercise by conducting a sensitivity analysis. Column (1) is the same as Column (1) in Table 1. Column (2) estimates the baseline model using a random effects estimator. Column (3) estimates the baseline model using a year effects estimator. Column (4) estimates the baseline model including both random and year effects. Columns (5)-(6) re-estimate the models including both random and year effects using different proxies for  $\bar{Q}$ , calculated vote share and FACTOR respectively. Again, we find more support for our theory. The impact of  $\hat{\theta}$  and  $R \hat{*} \theta$  have the expected theoretical sign and are statistically significant in each case. Again, countries with greater income shares have higher quotas but those with right-wing governments in power have smaller quotas, even controlling for the economic determinants of quotas  $\bar{Q}$ .

Taken together Tables 1-3 provide strong empirical support for our theory. Before we conclude, however, we do one more exercise.

We can actually identify the underlying parameters of our model  $\chi$  and  $\alpha$  in the case

that  $\gamma = 0$ . In this case, we could rewrite (2) as

$$\tau^* = -\frac{(1 - 2\chi)(1 - 2\theta)}{2\alpha}.$$

Since  $\theta = 2y^r/\bar{y}$  and  $1 - \theta = 2y^p/\bar{y}$ , we can substitute these values into the equation to extract  $\frac{(1-2\chi)}{\alpha}$  using a simple OLS estimator. We assume that  $y^r$  is the United States and all other countries by definition are not  $y^r$ . In this case, we can rewrite (2) as

$$\tau_{it} = \delta \frac{y_{it} - y_{US t}}{\bar{y}_t}.$$

where  $\delta = -\frac{(1-2\chi)}{\alpha}$ . Knowing that  $\alpha_R > \alpha_L$ , we can therefore rewrite (2) and estimate it as

$$\tau_{it} = \delta_0 + \delta_1 R_{it} + \delta_2 R * \frac{y_{it} - y_{US t}}{\bar{y}_t} + \delta_3 \frac{y_{it} - y_{US t}}{\bar{y}_t} + \varepsilon_{it}.$$

Our theory predicts  $\delta_0 = \delta_1 = 0, \delta_2 > 0$  and  $\delta_3 < 0$ .

Table 4 reports the results from our exercise. The first column describes the variables included in our model. Column (1) reports the results from our baseline model from 1983 to 2003. Column (2) reports the results in the latest years, i.e. after 1992. Column (3) reports the results in 1999. Column (5) does the exercise for only the richest countries. Notice in each case we find support for our theory that  $\delta_2 > 0$  and  $\delta_3 < 0$ . In each case, we also include F tests testing our model's strong predictions that  $\delta_0 = \delta_1 = 0$ . These are given at the bottom column. Notice that we fail to reject the null each each case, providing further support for our model.

## 5 Conclusion

Our exploration into the political economy of IMF governance recognizes that the IMF's membership is sharply divided along income lines: rich countries provide the financial resources and developing countries use these resources to finance balance-of-payments deficits and development.<sup>22</sup> This division creates tension over who controls the the IMF. Creditors and debtors have opposing interests over policies and these differences translate into opposing interests over the structure of governance institutions, which determine policy outcomes.

We develop a model that treats the IMF as a political system that taxes and transfers income across countries of distinct income types: rich and poor. Our approach is inspired by models of domestic redistribution that employ a political system to redistribute between rich and poor *citizens* (e.g. Acemoglu and Robinson 2005; Boix 2003; Meltzer and Richard

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<sup>22</sup>Concessional transfers via the Poverty Reduction and Growth Facility (PRGF) now make up more than half the IMF's total lending.



1981). In these models, the political system determines a decisive (median) voter whose preference for tax and transfers is determined by this voter's income relative to the average income in society. The institutions of the political system determines who is allowed to vote and thus determines where the decisive voter lies within the income distribution.

International political systems like the IMF also have institutions to determine the decisive voter - which is a member *country* as distinct from a representative citizen. These institutions are both formal, as in voting rules, and informal as with the underlying power relationships that characterize international politics. We capture "political power" in our model with the parameter  $X$  which is a weighted index of informal power  $\chi$  and formal voting power  $\gamma$ . Our results suggest that tying taxation (quota contributions) to voting power encourages contributions from rich countries even when poor countries have substantial informal power ( $\chi \rightarrow \frac{1}{2}$ ). In other words, by ensuring that rich countries are able to influence the policies of the IMF in ways that serve their interests - such as requiring conditionality and surveillance - this political institution provides incentives for the rich to contribute.

Our approach and results are consistent with the large literature that shows the United States and other G7 contributors use their formal and informal power at the IMF to advance their foreign policy interests (Stone 2011, Vreeland 2011, Dreher, Strum, and Vreeland 2009, Dehrer and Jensen 2007, Broz and Hawes 2006, Oatley and Yackee 2004, Gould 2003, Barro and Lee 2005, Thacker 1999). Our contribution is to illustrate how the IMF's governance structure sustains this international political system. Our main conclusion is that by imbuing rich countries with voting power, the IMF's quota system provides incentives for the rich to tax themselves to finance the organization's insurance operations. As we have shown, when taxes and voting power are linked, increases in the income gap between rich and poor members implies more transfers-qua-insurance from the rich to poor, as power moves toward the poor.

Will recent IMF lending to advanced economies on the European periphery disrupt these incentives? We don't think so. When countries such as Portugal and Greece find themselves in payments trouble, as they did in 2010, they take on the essential attributes of debtor nations in our model. So when Germany lends to Portugal and Greece, it gets soft power concessions from them, in the same way that it does when it lends to a more traditional emerging market nation. By the same token, emerging market nations will continue to have incentives to avoid the IMF, so as to escape the influence and conditions that creditor nations impose upon them via the IMF. The ongoing build-up of international reserves by emerging market nations, particularly in Asia, can be understood as an alternative to the IMF in which nations try to "self-insure" against sudden stops in private capital markets.<sup>23</sup> Our model sheds light on these recent events.

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<sup>23</sup>According to Wyplosz (2007:10), "The intention [of accumulating large reserves] is clearly to rule out the need to apply to the IMF for emergency loans as happened during the 1997-8 Asian crisis. Many Asian countries consider that the conditionality associated with these loans was ill-designed and even violated their sovereignty...Fear of the IMF instilled by the recent crisis, therefore, may explain why the Asian countries are "buying" more self-insurance than other countries."

We also find that political ideology correlates with IMF quotas and governance structures. Since conservative governments are loathe to support social transfers domestically or internationally, we demonstrate that quotas increase as the world gets more unequal, but a decreasing share of quotas go to more right-wing governments. This interesting result reflects our assumption that ideology influences the costs of taxing members, which is supported by both anecdotal and systematic evidence.

Anecdotally, debates about the IMF in the United States and elsewhere do seem to reflect ideological cleavages. For example, reactions to the Meltzer Commission Report, produced in 1998, by the International Financial Institution Advisory Commission (or the “Meltzer Commission”, named for its chair, economics professor Allan Meltzer) illustrate the point. The Commission was established by Congress as part of legislation authorizing \$18 billion of U.S. funding for the IMF to aid in resolving the Asian crisis. Instructed to consider the efficacy of the IFIs, the right-wing majority on the Commission, led by Meltzer, won the day over the left-leaning minority, as pointed out in dissenting statements by C. Fred Bergsten and Jerome Levinson. Right-wing proponents of the Commission’s recommendations supported a reduced role for the IMF, noting that banks and borrowing countries use the IMF to bail them out of economic crises, thereby creating a moral hazard. The left-leaning minority took a negative view of the Report, finding the recommendations extreme, ill-grounded in theory and history, and cast prejudicially against the IMF. They argued that the IMF has a necessary and important place in the world economy, due to market failures in international finance, and that the approach taken by Commission’s right-leaning majority effectively “eviscerated” it.

More systematic evidence is available from Broz (2008) who uses the first dimension measure of ideology from Poole and Rosenthal’s “Nominate” score (1997) to estimate the effect of right-wing beliefs on voting in the House of Representatives on legislation to increase the U.S. quota contribution to the IMF.<sup>24</sup> His findings suggest a very important role for ideology: a 1 standard deviation increase in right-wing beliefs decreases the likelihood that a member will vote to support the IMF by giving it more funding by 38 percentage points, on average (32 points for Democrats; 44 points for Republicans), controlling for other covariates. The implication is that right-wing governments are a greater hurdle to financing the IMF than liberal ones - which is consistent with the findings of this paper.

Overall, our model and empirical results suggest there are both normative and positive reasons to support the IMF’s current governance structures. Inasmuch as redistribution reduces global inequality and supports international trade and investment, efforts to pressure the rich to give up control may be counterproductive, as the rich may simply withdraw their financial support for the IMF.

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<sup>24</sup>See also Milner and Tingley (2011, 2010) who find that ideology has an important influence on congressional voting on U.S. foreign aid policy more generally.

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**Table 1: Estimating Political Quota Equation<sup>†</sup>**

$$\text{Quota} = \alpha_0 + \alpha_1 Qc + \alpha_2 \theta + \alpha_3 R * \theta + Z + \varepsilon$$

	1	2	3	4	5	6	7
	Baseline	Latest	1999	2003	1999	2003	High Inc
$Qc$	0.113*** [0.016]	0.112*** [0.015]	0.136*** [0.019]	0.078*** [0.015]			
FACTOR					0.212*** [0.036]	0.036* [0.019]	0.154*** [0.038]
R	-0.535 [0.697]	-0.756 [0.867]	-0.094 [1.115]	-0.124 [1.446]	0.304 [1.088]	1.344 [1.534]	-2.204** [1.071]
$R * \theta$	-0.017*** [0.006]	-0.019*** [0.005]	-0.031*** [0.005]	-0.029** [0.013]	-0.047*** [0.007]	-0.063*** [0.012]	-0.023** [0.009]
$\theta$	7.112*** [0.844]	7.120*** [0.755]	5.953*** [0.902]	10.330*** [1.979]	6.179*** [1.055]	17.010*** [1.773]	8.116*** [1.356]
Observations	440	339	166	168	166	168	264
R-squared	0.95	0.95	0.96	0.95	0.95	0.95	0.94

<sup>†</sup>1975-2003 annual quota (Quota), calculated quota in millions of current SDRs ( $Qc$ ), common factor generated from: GDP in millions of current SDRs, reserves in millions of current SDRs, current payments in millions of SDRs calculated as a 5 year average, variance of current receipts in millions of SDRs calculated as a 13 year moving average and current receipts in millions of SDRs calculated as a 5 year average (FACTOR), GDP divided by average GDP for a given country year ( $\theta$ ), Dummy variables for right wing government ( $R$ ) multiplied by ( $R * \theta$ ). Column (1) reports the coefficients for the baseline model. Column (2) reports the coefficients for the baseline model since 1992. Column (3) reports the coefficients using our baseline model in 1999. Column (4) reports the coefficients using our baseline model in 2003 Columns (5 -6) reports the coefficients using our baseline model in 1999 and 2003 using FACTOR as a covariate. Column (7) reports the coefficients for the baseline model using high income countries.

Table 2: Estimating Political Vote Equation<sup>†</sup>

$$VOTE = \alpha_0 + \alpha_1 VOTEc + \alpha_2 \theta + \alpha_3 R * \theta + Z + \varepsilon$$

	1	2	3	4	5	6	7
Baseline	Latest	1999	2003	1999	2003	2003	High Inc
VOTEc	0.561*** [0.026]	0.565*** [0.035]	0.573*** [0.085]	0.385*** [0.072]	0.572*** [0.033]	0.630*** [0.054]	1.004*** [0.173]
FACTOR							
R	-4.127 [4.568]	-4.878 [4.779]	-0.748 [5.354]	0.301 [6.762]	-10.948 [6.668]	-3.647 [5.376]	1.442 [5.161]
R * $\theta$	-0.038** [0.016]	-0.043*** [0.016]	-0.144*** [0.023]	-0.151*** [0.057]	-0.041** [0.020]	-0.111*** [0.018]	-0.224*** [0.034]
$\theta$	26.522*** [2.184]	26.374*** [2.641]	25.616*** [5.035]	49.742*** [9.136]	26.055*** [2.663]	41.383*** [2.349]	29.319*** [5.007]
Observations	446	341	166	168	269	339	166
R-squared	0.94	0.95	0.96	0.95	0.95	0.93	0.95

<sup>†</sup>See table 1.

**Table 3: Sensitivity Analysis: Estimating Political Quota Equation<sup>†</sup>**

$$\text{QUOTA} = \alpha_0 + \alpha_1 Qc + \alpha_2 \theta + \alpha_3 R * \theta + Z + \varepsilon$$

	1	2	3	4	5	6
	Baseline	R.E.	Y.E.	BOTH	FACTOR	VOTE
$Qc$	0.113*** [0.016]	0.100*** [0.006]	0.113*** [0.006]	0.099*** [0.006]		
FACTOR					0.120*** [0.008]	
VOTE <sub>c</sub>						0.396*** [0.023]
R	-0.535 [0.697]	-0.102 [0.633]	-0.462 [0.848]	-0.11 [0.624]	-0.311 [0.630]	-1.433 [2.992]
$R * \theta$	-0.017*** [0.006]	-0.010*** [0.002]	-0.017*** [0.003]	-0.010*** [0.002]	-0.009*** [0.002]	0.005 [0.008]
$\theta$	7.112*** [0.844]	6.754*** [0.403]	7.079*** [0.440]	6.765*** [0.413]	7.971*** [0.364]	12.578*** [1.590]
Observations	440	440	440	440	440	446

<sup>†</sup>See table 1



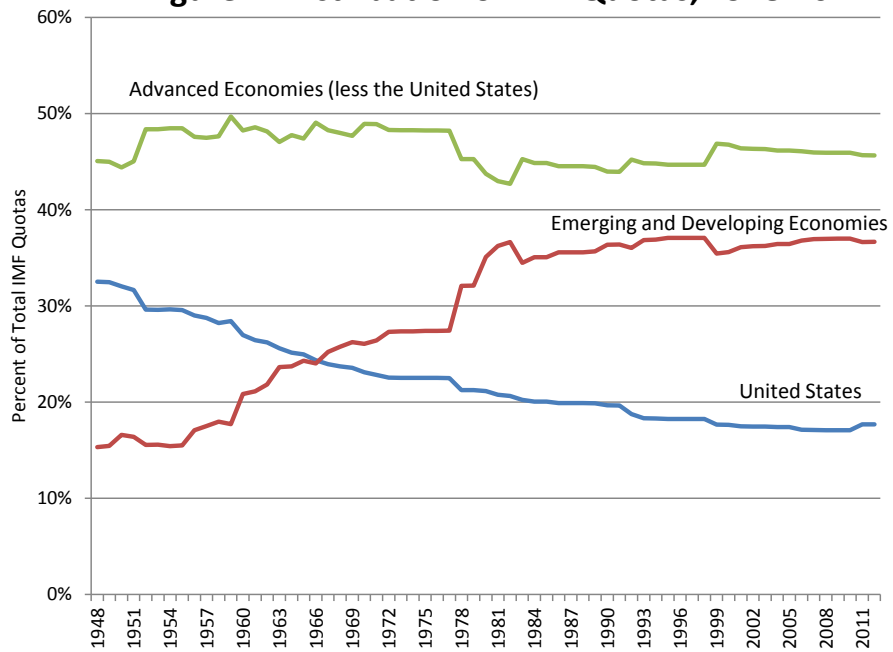
Table 4: Estimating Political Quota Equation Directly<sup>†</sup>

$$\tau_{it} = \delta_0 + \delta_1 R_{it} + \delta_2 R * \frac{y_{it} - y_{US,t}}{\bar{y}_t} + \delta_3 \frac{y_{it} - y_{US,t}}{\bar{y}_t} + \varepsilon_{it}.$$

	1	2	3	4	5	6
	Baseline	Latest	1999	2003	High Inc	
$\frac{y_{it} - y_{US,t}}{\bar{y}_t}$	-0.108*** [0.013]	-0.107*** [0.016]	-0.132*** [0.032]	-0.082*** [0.008]	-0.065*** [0.004]	
$R * \frac{y_{it} - y_{US,t}}{\bar{y}_t}$	0.046* [0.025]	0.048 [0.030]	0.064 [0.058]	0.033** [0.015]	0.015** [0.007]	
$Prob > F$	0.9744	0.9681	0.9359	0.142	0.1546	
Observations	446	341	166	168	269	

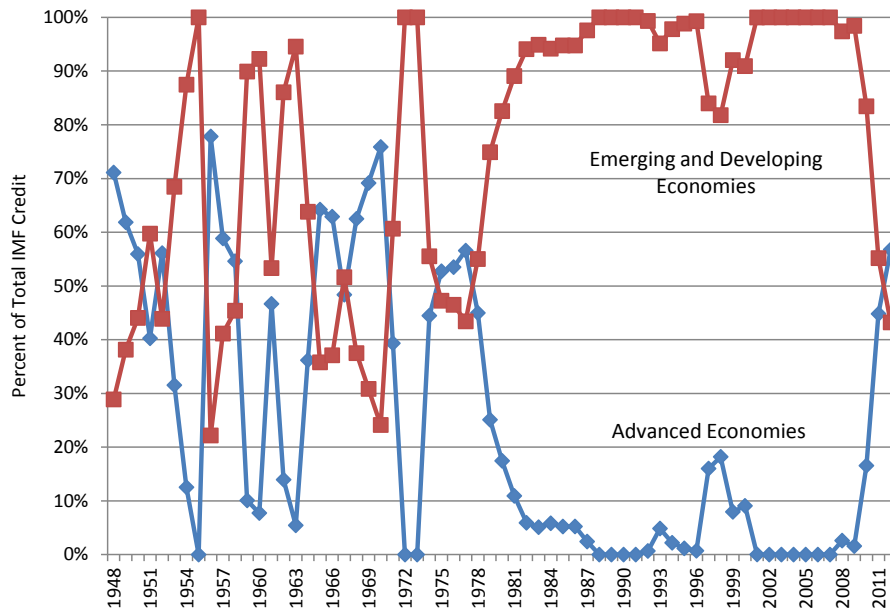
<sup>†</sup>See table 1.

**Figure 1: Distribution of IMF Quotas, 1948-2012**



*Notes:* Quota subscriptions are the main source of the IMF’s financial resources. Each IMF member country is assigned a quota, based broadly on its relative position in the world economy. A country’s quota determines its maximum financial commitment to the IMF and its voting power. The United States remains the largest single contributor to the IMF although emerging and developing economies have grown in importance over time. Data are from the IMF’s International Financial Statistics (IFS).

Figure 2: Use of IMF Credit, 1948-2012



Notes: Use of IMF credit includes purchases and drawings under Stand-By, Extended, Structural Adjustment, Enhanced Structural Adjustment, and Systemic Transformation Facility Arrangements as well as Trust Fund loans. The only “advanced economies” to draw on the IMF in recent years are Korea (1997-2000), Greece (2010-12), Hungary (2008-2011), Iceland (2008-2012), Ireland (2011-2012), and Portugal (2011-2012). Data are from the IMF’s International Financial Statistics (IFS).