Simulation Gaming OnlineFirst, published on April 14, 2010 as doi:10.1177/1046878110365514

Simulation & Gaming
XX(X) 1–30

DOI: 10.1177/1046878110365514
http://sg.sagepub.com

Weighted Voting in the United Nations Security Council: A Simulation

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Abstract

Various observers have proposed weighted voting as part of an overhaul of the UN Security Council. This article employs game-theoretic methods to simulate the effects of weighting votes in the UN Security Council according to the ability of individual states, as well as on the ability of the Council to act. The authors first briefly review reform proposals. Drawing on recent proposals, they then calculate voting weights based on population, contributions to the UN, and a measure of sovereign equality. These component measures are assigned different weights in order to formulate three sets of weighted votes. After this, they define several measures of voting power that can be used to assess voting power in weighted voting systems. The measures used in this article assess the relative voting power of individual members as well as the probability the Council will engage in collective action to pass a resolution. Results of voting power simulations are then presented under both simple and qualified majority rules. The authors' simulations indicate that under weighted voting the capacity of the Council to act is likely to increase under most conditions unless high qualified majorities are required. The simulations also demonstrate that the main problem identified with weighted voting—large deviations between voting weight and voting power—are not present in the weighted voting systems analyzed here.

Keywords

ability to act, capacity to act, deviations, high qualified majority, qualified majority rule, reform proposals, simple majority rule, UNGA, United Nations General Assembly, United Nations Security Council, UNSC, voting power, voting power indices, voting weights, weighted voting

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The United Nations General Assembly (UNGA) and the United Nations Security Council (UNSC) employ two different methods, based on different underlying principles, for their members to make collective decisions. The UNGA's one-country, one-vote decision rule reflects the principle of the sovereign equality of states, as codified in the UN Charter (Chapter I, Article 2). The UNSC departs from this principle by providing a veto to each of its five permanent members, in recognition of their much greater power and influence. Each of these alternatives has serious shortcomings. In the UNGA, Vanuatu, with a population of just over 200,000, has the same formal influence as China, with a population of about 1.3 billion. In the UNSC, one permanent member, say France with a population of 59 million, can veto initiatives favored by all other UN members. The use of different decision rules in the two UN bodies reflects a compromise aimed at reconciling the two contradictory principles. The codification of sovereign equality was contested by great powers who were understandably concerned that members with smaller economies and populations would consistently outvote them in the UNGA. At the same time, the vast majority of lesser powers understandably did not want all decisions to rest with an oligopoly of great powers.[1] Over time, the results of this compromise have been far from optimal: few matters of consequence are decided in the UNGA, while numerous initiatives have been thwarted by great power veto in the UNSC.

During its 60-year existence, the UNSC's decision rules have been substantially changed only once. In 1963, the size of the Council was increased from 11 to 15 members in response to the accession of numerous newly independent states to the UN system.[2] As UN membership has increased by about 50% since that time, it is not surprising that the current composition of the Security Council is often criticized for not being representative of all UN members. The veto power afforded to the United States, Russia, the United Kingdom, France, and China is regularly characterized as reflecting the world system of 1945 rather than the 21st century. In 1993, the General Assembly created the Open-Ended Working Group (OEWG) to examine possible changes to the Security Council's structure and decision-making procedures.[3] The OEWG focused on two "clusters" of possible changes (UNGA, 2004). Cluster I issues include the size of the UNSC, increases in the number of permanent and nonpermanent members, and the veto power. Cluster II issues involve consideration of changes that would improve the interaction between the Assembly and the Council, examination of ways to increase the participation of nonpermanent members in Council deliberations, and ways to increase the UNSC's transparency and accountability.[4]

The ongoing work of the committee and proposals from outside the UN has focused attention on UN reform in general and Security Council reform in particular. Calls for comprehensive reforms to improve the effectiveness and legitimacy of the UNSC have become more numerous in the wake of the impasse between the Council and the United States over the latter's proposals and subsequent actions in Iraq during late 2002 and early 2003. More general perceptions of growing U.S. resort to unilateralism have added to these concerns. The rationale for reforming the Security Council is summarized by Sutterlin (1996), who contends that

> the effectiveness of the Security Council depends very heavily on the respect in which it is held by member states . . . If the interests of the majority of member states are not more adequately represented than is now the case, it is unlikely they will, over the long run, comply with the Council's decisions. (pp. 9-10)

Furthermore, as Dervis (2005) argues, "radical reform is needed so that council decisions be perceived to be much more legitimate than they are today" (p. 59). One observer who backs the Dervis proposals noted that "it is absurd that Japan and India—the world's second biggest economy and its second most-populous one—have less say in the Security Council than Russia, France or Britain" (Mallaby, 2007). Thus far, the OEWG's narrow mandate has not included consideration of weighted voting as an alternative decision method. Weighted voting proposals have been floated by a number of observers over the past 60 years. Some of these proposals have called for a complete overhaul of UN decision-making procedures (e.g., Newcombe, 1983). Others called for narrow and specific voting reform, such as the Kassebaum amendment—first proposed in 1985 and again as recently as 2006—that would have required the UNGA adopt weighted voting for making budgetary decisions.[5] Schwartzberg (2003) calls for substantial changes to the Charter in order to reallocate the distribution of influence of states within the UN by means of weighted voting: Members' votes would be weighted according to national contributions to the UN, population, and sovereign equality. Dervis (2005) offers a different weighted voting system in which votes are weighted based on population, national product, contributions to global public goods, and military capabilities. The appeal of weighted voting is, in part, because the component measures are seemingly apolitical and perceived as fair to all participants. Weighted voting systems are used in a variety of institutional settings, notably in the International Monetary Fund (IMF) and World Bank (Rapkin & Strand, 2006; Strand & Rapkin, 2005). Perhaps the most closely studied weighted voting system is the Electoral College in the United States.

This article addresses the question of how weighting votes would affect the relative influence of members of the Council, as well as the ability of the Council to act. We begin with a brief overview of proposals for the weighting of votes from which we define the voting weights we use in the simulations. The following section defines several simple games that are used to analyze voting systems, especially voting systems employing weighted voting. By applying them to the hypothetical voting weights, we are able to simulate the *relative* power of members of the Council under weighted voting. *Voting weights* are not the best proxies for relative *voting power* of members in weighted voting systems. Voting *power* is defined as a voter's ability to influence outcomes. Therefore, a particular voter's voting power is a function of its votes, the votes held by others, and the decision rule needed to pass a resolution. Our simulations assess the weighted voting formulas with regard to the relative influence of individual members of the Council. After this, we simulate how weighted voting affects the abilities of members to block resolutions and initiate resolutions. Finally, we simulate how the different weighted voting schemes would affect the capacity of the UN to act as a collective body.

Weighted Voting Schemes for United Nations Security Council Reform

There have been several proposals for and assessments of weighted voting in the UNSC and the UNGA (e.g., Dixon, 1983; Manno, 1966; Morrill, 1972; Newcombe, 1983; Newcombe, Wert, & Newcombe, 1971; Newcombe, Young, & Sinaiko, 1977; Stassen, 1991). Tadokoro (1997), for example, proposes that the council adopt a weighted voting system similar to that used by the IMF. While he does not provide specific details on how to apportion votes, he suggests that votes "could be calculated from such indicators as population, assessments, contribution of contingents to peacekeeping, and voluntary financial contributions" (p. 128). Permanent members' veto power would be replaced by adopting higher majority requirements. But as observed half a century ago by Rudzinski (1955), formulating

> a system of weighted voting which would do justice to differences in size and development, on the one hand, and on the other, prevent the crushing of the smaller powers by the sheer weight of numbers inherent in a combination of major powers represents a task of complexity and difficulty. (p. 370)

This task—balancing the interests of large and small states—requires the weighting of votes based on some agreed-on set of component factors that measure national size and power. In addition to assigning voting weights, Security Council reforms would also have to specify the majority decision rule (e.g., simple majority, 60%, 70%) and determine how members are to be selected for Council seats.

Recent proposals for reform of UN voting procedures have been made by Schwartzberg (2003, 2004) and Dervis (2005), who both maintain that the UN must reform its decision-making processes in order for it to adapt to the geopolitical realities of the 21st century.[6] In particular, the one-country, one-vote principle and the veto power undermine the ability of the UN to operate effectively. Accordingly, reform must begin with abandonment of the one-country, one-vote principle adhered to in the United Nations. As Dervis (2005) argues, a weighted voting system should "reflect the actual size, ability to act, and importance of the participating nation-states" (p. 59). These proposals also call for the entire membership of the Security Council to be selected recurrently from the overall membership of the UN.[7] Concomitantly, de jure veto power in the Council would also be abolished.

Sovereign equality as the underlying principle of vote allocation would be replaced by a system of weighted votes. Recent proposals are based on three principles that authors argue need to be reflected in the weighting of votes. First, there should be a democratic and demographic element to weighted votes (Dervis, 2005; Schwartzberg, 2004).[8] Measures of democracy, civil rights, or population are often proposed for inclusion in weighted votes. A strong case can be made that the foremost international organization, and one that purports to be democratic, should somehow take population into account in the formal apportionment of influence.[9]

A second basis for weighting votes rests on the idea that the states that contribute the bulk of the UN's budget should have a greater say in the organization's operations. Schwartzberg (2003) rejects the use of direct measures of national product, advocating instead the use of assessments, that is, paid contributions to the UN, a yardstick that largely, but not entirely, derives from national product.[10] Dervis (2005), on the other hand, argues in favor of using both GDP and contributions to "global goods," which he measures as a state's contribution to the UN's regular budget. Assessments are not a direct function of GDP or other measures of national product. The most important divergence involves the United States: its contribution is capped by agreement at 22%, but the U.S. share of global GDP is over 30%. Also, though assessments largely reflect measures of national product, such as GDP, assessments for most developing countries are smaller than their shares of GDP, and assessments for developed countries are larger. Thus, any shift toward a closer correlation between GDP and assessments would shift votes toward developing countries. This shift would be even more favorable to developing countries if a measure of national product that adjusts for purchasing power parity (PPP) were used instead of exchange rate measures.

Finally, there is often mention of some measure of sovereign equality. Schwartzberg (2004) proposes use of a set proportion of the total weighted votes that would be divided equally among all members, regardless of size or power. In the nomenclature of the international financial institutions, he is advocating the use of "basic votes."[11] Thus, while weighted voting on the one hand reduces the prominence of sovereign equality in UN decision rules, using it in the determination of weighted votes would retain it, albeit in a significantly diminished form.[12]

Using the above proposals for guidance, we defined voting weights by additively combining the following component measures: percentages of the total population of UN members, paid regular contributions to the UN, and states' unit shares, that is, basic votes equivalents; each measure is assigned equal weight (33.3%).[13]

In our simulation, we develop a hypothetical Security Council in which members are elected by the General Assembly and then partitioned into voting groups determined partly on a geographical and partly on an ideological basis. (See Appendix)[14] For example, we use a "Central Europe" group consisting of Austria, Germany, and Liechtenstein. Other voting groups include the Arab League, the Commonwealth of Independent States, and a residual group of "non-bloc" members. This formulation of voting groups extends the UN practice of using regionalism as an organizing principle but adds to it the possibility that like-mindedness or other criteria may be useful for purposes of organizing member states and aggregating their preferences.[15] Moreover, voting groups are used in many other international institutions, where they provide selective representation within more general universal and regional organizations.[16]

Why should population, contributions, and basic votes (especially the latter) count equally toward the apportionment of votes and influence? Voting weights could just as

Table 1. Select Voting Weights Under VW Formulas

Country	Contributions	GDP	Population	VW1	VW2	VW3
United States	22.00	32.53	4.82	9.11	12.33	17.17
Japan	19.47	12.51	2.15	7.38	10.40	14.93
Germany	3.00	8.66	6.22	1.39	3.52	4.81
United Kingdom	11.00	6.13	4.90	1.00	2.55	3.44
France	17.00	6.03	4.48	1.00	2.52	3.39
China	2.05	3.97	21.49	8.02	6.53	4.29
Russia	1.80	1.08	2.45	1.59	1.64	1.72
India	0.42	1.60	17.44	6.13	4.70	2.56
Brazil	1.52	1.44	2.91	1.65	1.62	1.57
Nigeria	0.04	0.13	2.19	0.92	0.70	0.37

Note: VW = voting weights. Contributions are 2005 data; GDP and population are 2002 data. Values are expressed in percentage of world share.

easily be apportioned with alternative, asymmetrical weightings for the component factors. Furthermore, it is unlikely that the wealthier members who contribute most to the UN budget—especially the present permanent members, who would also be giving up this status as well as their veto—would agree to an arrangement in which basic votes are as important as contributions. Instead, they would insist greater weight be given to assessments. We therefore calculate three sets of voting weights derived from different weights of each of the three measures.

Our first set of voting weights (VW1) use equal weights for population, contributions, and sovereign equality.[17] The second set of weighted votes (VW2) is calculated with contributions weighted at 50% and population and basic votes 25% each. The third set (VW3) is calculated with contributions set at 75% and population and basic votes at 12.5% each. In Table 1, we present component measures and the voting weights for selected countries and include GDP for comparison purposes. These three formulations of weighted voting produce very different distributional outcomes. China, for example, has 8% of all votes in VW1, but this percentage falls to 6.5% and 4.3% in the two formulations that emphasize population and basic votes less and financial contributions more heavily. India, Nigeria, and Brazil likewise have more voting weight under the VW1 than VW2 and VW3. Not surprisingly, the United States has much more voting weight using the formulas that emphasize contributions (12.3% and 17.2%) than in the first formula (9.1%). Likewise, Japan has more voting power under VW3. For very small members, voting weights would be greater under the first formula than in the latter two. For example, Tuvalu (not presented in Table 1) would have almost three times more voting weight under VW1 (.17%) than under VW3 (.065%).

Prior analyses of international organizations that use weighted voting show that the actual influence a member has over electoral outcomes often deviates from the percentage of votes it holds (Dixon, 1983; Dreyer & Schotter, 1980; Leech, 2002b, 2002d;

Strand, 1999). This is due to the fact that *voting weights* fail to account for the overall number of members that can form winning (and blocking) coalitions and how voting weights are distributed among them. In other words, reference to voting weights alone does not fully describe the influence of actors. To illustrate this point, consider a committee composed of three actors that uses weighted voting and makes decisions using a simple majority. Two of the three members of the committee have two votes each, and the third has one vote. The first two members each have 40% of all votes, while the third has 20%, but it would be erroneous to infer from voting weights that the third actor has half as much influence or power than the other two. Since it takes three votes to pass a resolution there are three possible minimum winning coalitions.[18] Each member of the committee is part of the same number of potential winning coalitions. Put differently, they each can contribute just as much *voting power* to the passing or blocking of resolutions, so each has one third of the influence in the committee. For an even more striking example, consider a committee in which one member has 99 votes, the second 98 votes, and the third only 2 votes. A simple majority decision rule in this committee requires 100 votes to pass an initiative. Even though the third member has only a small fraction of the voting weight of the first two, it has an equal share of the influence over electoral outcomes because of the manner in which minimum winning coalitions can form. Recent proposals for weighted voting in the UN do not address this potential pitfall of weighted voting systems (Dervis, 2005; Schwartzberg, 2003)

Another important aspect of voting systems is whether a simple or special majority is required to pass an initiative. Currently, the Council employs a 60% majority requirement for both procedural and substantive decisions, with the additional requirement that no substantive resolution passes if a permanent member votes against it. In many international organizations, higher majority decision rules are common for sensitive decisions. In the IMF, for example, an 85% majority is required, inter alia, for constitutional reforms of its Articles of Agreement and for changes in the distribution of quotas and votes. In order to discuss the impact of special majorities, we provide analysis of four majority decision rules: simple, 60%, 70%, and 85%. The first two are presently used in the UN itself; the latter two are employed in the IMF and World Bank. Obviously, higher majorities make passing resolutions more difficult, but we want to assess how the decision rule can affect the likelihood of agreement *and* the impact on individual members' abilities to affect outcomes. Before presenting the results of the simulation, we first define several measures of voting power.

Voting Power and the Ability of the Collective to Act

In this section, we define measures of voting power. The first four assess the voting power of individual actors in probabilistic voting games. A fifth measure assesses the probability that a voting body will act (Coleman, 1971). These measures have been applied to a variety of institutional contexts, such as the IMF (e.g., Leech, 2002d). The two most frequently used measures of voting power are the Shapley and Shubik (1954) and the Banzhaf (1965) indices. The indices defined by Coleman (1971) have not been applied as extensively.

In recent weighted voting proposals, only *voting weights* are considered not the relative *voting power* of states in the UN (Dervis, 2005; Schwartzberg, 2003). As discussed above, consideration of voting weights does not account for the manner by which coalitions may form. If the voting power of an actor can be defined as its ability to influence outcomes, then a particular actor's voting power is a function of its votes, the votes held by other actors, and the decision rule needed to pass a resolution. This is why measures of voting power, and not just voting weight, are needed to simulate the effects of weighted voting in the UNSC.

A simple weighted voting game with n players as is conventionally defined as

$$\left[q\colon w_1, w_2, \ldots, w_n\right]$$

There are n players each with voting weight $w_i\left(i = 1, \ldots, n\right)$ The number of votes needed to pass a resolution is q. Coalition S is defined as a nonempty subset of the players where

$$S \subseteq \{1, 2, \ldots, \mathrm{n}\},$$

where S is winning coalition if and only if

$$\sum_{i \in S} w_i \geq q$$

Furthermore, we assume there cannot be disjoint winning coalitions. In other words,

$$q > \frac{1}{2} \sum_{i=1}^{\mathrm{n}} w_i.$$

The voting weight of S is expressed as

$$w(S) = \sum_{i \in S} w_i.$$

In 1954, Shapely and Shubik published what is generally regarded as the first game-theoretic article in the *American Political Science Review*. The measure of voting power they defined became known as the Shapley-Shubik index (SSI). This measure assesses actors based on their abilities to serve as "pivotal" (sometimes called swing) members of winning coalitions. In short, a pivotal actor, by joining, turns a losing coalition into a winning coalition. This ability to serve as the pivotal voter is considered a form of voting power. SSI denotes the number of times (i.e., orderings) a player is pivotal divided by the total number of possible orderings.[19] Formally, the SSI for player i is defined as

$$SSI_i = \sum_{\substack{\mathrm{i} \in S \\ S \subset N}} \frac{(n-s)!(s-1)!}{n!} \left[v(S) - v(S - \{i\})\right],$$

where n is the number of players in the game, and s is the number of players in the winning coalition, S. $[v(S) - v(S - \{i\})]$ represents the weight added to coalition S as pivotal player i becomes a member of the winning set of players.

The Banzhaf index (BPI) considers the number of winning coalitions where, for player i in coalition S:

$$w(S) - w_i < q \leq w(S) + w_i$$

Player i is considered *critical* to S, and S is considered a vulnerable winning coalition. For a vulnerable coalition S, let $V(i)$ denote the number of players critical to S. BP_i is the total number of times player i is a critical member:

$$BP_i = \sum_{i=1} V(i).$$

This equation is an absolute measure generally referred to as the Banzhaf value. To obtain a relative measure of voting power we normalize as follows:

$$BPI_i = \frac{BP_i}{\sum_{k=1}^{n} BP_k}\cdot$$

A player's Banzhaf voting power value is the number of times it is a critical player in vulnerable winning coalitions divided by the total number of times all players are critical in such coalitions. Values of the SSI and the normalized BPI sum to 1 and can be interpreted as percentages.

Coleman (1971, 1986) defined three measures of voting power in response to what he considered shortcomings of the SSI. The first two considered here are the power of a player to initiate action (PTI) and the power of a player to block action (PTB) in a voting system. (Note that among the three Coleman indices, PTI most closely corresponds in meaning to the SSI and BPI.) In the context of the UNSC, PTI means the capability to initiate a passing substantive or procedural resolution. Estimating PTI and PTB entails identifying swing players. The PTI for player i is defined as

$$PTI_i = \frac{\eta_i}{(2^n - \varpi)}\cdot$$

PTI for player i denotes the proportion of times it is a swing member to the number of nonwinning coalitions.

Following Leech (2002a, 2002c), we define the number of times player i is the swing player in the formation of a blocking coalition as η_i. The power to block for player i is defined as

$$PTB_i = \frac{\eta_i}{\varpi},$$

where ϖ is the number of winning coalitions. If player i can always block action by the voting body, that is, it is a veto player, then its PTB is 1.0. Note that PTB and PTI values are the same for player i if a simple majority decision rule is used. Also, unlike BPI and SSI, PTB and PTI values cannot be interpreted as percentages because they are absolute rather than relative measures of influence. For a given game, they range from 0 to 1 but do not sum to 1.

Whereas the indices discussed so far generate estimates of each member's voting power, the third Coleman index estimates the capacity of a voting *body* to act, that is, the probability that a collectivity will vote in favor of taking action. The power to act (PTA) is simply the total number of winning coalitions divided by 2 raised to the nth power where n is the number of actors:

$$A = \frac{\varpi}{2^n}.$$

And where ϖ again denotes the total number of coalitions where $w(S) \geq q$. The denominator represents the total possible number of coalitions. The Coleman PTA is best thought of as the probability that a voting body will pass a resolution—its "decision probability." When the required majority is increased, the number of possible winning coalitions decreases; therefore, we expect higher decision rules to have lower decision probabilities. The PTA is an important consideration in discussion of reforms as any alteration of Security Council rules should increase rather than decrease the probability of collective action. It would make little sense to institute reforms that diminished the capacity of the UNSC to act. Hence, we employ Coleman's PTA index to evaluate the impact of reforms on the likelihood that the resulting UNSC would be able to take action. This measure should be especially useful in assessing the impact of special majorities and of alternative ways to weight votes on the likelihood of the Council passing a resolution.

The next section reports voting power estimates generated by the SSI and BPI, followed by results for the Coleman PTI and PTB, and then for the PTA index.

Simulating Weighted Voting in the UNSC

Relative Voting Power: The Shapley-Shubik and Banzhaf Indices

Previous studies on voting power in the UNSC have confirmed that the nonpermanent members have substantially less voting power than the permanent members. For example, O'Neill (1996) applies the SSI and finds that the permanent members each hold 19.6% of the voting power while the nonpermanent members each hold merely .019%.[20] O'Neill (1996) dismisses the BPI because it assesses all mathematically possible minimum winning coalitions regardless of the order in which the coalitions form. He states that, "[k]nowing that most members will vote for a resolution should increase our expectation that a further member will vote for it" (p. 221). Dixon (1983), in his application of the Banzhaf voting power index to potential weighted voting schemes (in the General Assembly), takes the opposite position—because the SSI depends on the order in which coalitions form, it is "the least attractive"[21] (p. 299). This expectation, however, defeats the purpose of a priori measures of voting power. In view of the fact that both the SSI and BPI approaches to voting power are contested—generally and specifically in application to the UN—we report results for both for purposes of comparing how they perform across the different voting weights and majority requirements examined.

What then can we expect voting power indexes to tell us about how the distribution of power within the UNSC would be affected if weighted voting was implemented? How are these results altered when we simulate changes to the weighted voting formulas? What effects do different majority requirements have on the relative power of member states? To address these questions, we use the three sets of voting weights defined above to analyze the distribution of voting *power*. The three tables discussed in this section have nine columns of data.[22] The first column presents the voting weight for each member of the reformed Council. The other columns present voting power results for the BPI and SSI under four different majority decision rules. Values are reported in decimals, but since columns sum to 1, the data can be discussed in percentage terms.

Table 2 displays results for the first set of voting weights. The voting group that controls the most votes is the one in which Canada is the largest member; it holds about 9.6% of all the votes. This number is very close to its voting power—9.9% and 10%, respectively, as measured by the BPI and SSI under a simple majority decision rule. At higher majority thresholds, the two indices diverge: at the 85% level, the SSI values for the larger voting groups in the Council are very close to their voting weights, while their BPI values are significantly lower. The U.S. BPI value, for example, falls by more than one fifth (.93 to .73) when we shift from a simple majority to an 85% majority. The smaller voting groups gain BPI voting power, while their SSI values are essentially unchanged. Overall, the simulation demonstrates that the distribution of votes resulting from the weighed voting do not confer decisive voting power advantages to any member or group of members.

The second set of voting power calculations estimates voting power when the distribution of votes are determined by an alternative formula in which contributions are weighted 50%, and population and basic votes are each weighted 25%. Using this formula, the larger members, as expected, gain voting weight as compared with the first set of voting weights: the United States has the highest voting weight (.122), followed by Japan's (.103) and Canada's voting groups (.09). The SSI again proves insensitive to changes in majority requirements, as all UNSC voting groups have approximately the same SSI voting power across the 50%, 60%, 70%, and 85% majority levels. The BPI, however, consistently estimates that the three largest

Table 2. Voting Weight and Relative Voting Power With Formula 1

Country/Voting Group (VG)	Voting Weight	Simple Majority		60% Majority		70% Majority		85% Majority	
		BPI	SSI	BPI	SSI	BPI	SSI	BPI	SSI
VG18 (Canada)	.096	.099	.100	.097	.100	.090	.099	.073	.093
United States	.090	.093	.093	.091	.093	.087	.093	.073	.089
China	.080	.081	.081	.080	.081	.078	.082	.072	.084
Japan	.073	.073	.073	.073	.074	.073	.076	.069	.081
India	.061	.061	.061	.061	.061	.060	.059	.063	.068
VG1 (Egypt)	.056	.056	.056	.056	.055	.056	.055	.059	.060
VG2 (Ethiopia)	.054	.054	.053	.054	.053	.054	.053	.055	.052
VG9 (Mexico)	.053	.053	.053	.053	.053	.054	.052	.055	.051
VG16 (Nigeria)	.053	.053	.053	.053	.053	.053	.052	.055	.051
VG14 (Indonesia)	.048	.048	.048	.048	.048	.049	.048	.051	.046
VG13 (Italy)	.048	.048	.048	.048	.048	.049	.047	.051	.046
VG11 (United Kingdom)	.048	.048	.047	.048	.047	.049	.047	.051	.045
VG12 (Brazil)	.047	.047	.046	.047	.047	.048	.046	.050	.044
VG17 (France)	.047	.046	.046	.047	.046	.048	.046	.050	.044
VG3 (Germany)	.042	.041	.041	.042	.041	.043	.041	.046	.040
VG10 (Pakistan)	.039	.039	.038	.038	.038	.040	.038	.044	.037
VG6 (Poland)	.036	.036	.035	.036	.035	.038	.036	.044	.037
VG5 (Russia)	.029	.027	.027	.028	.028	.031	.028	.040	.031

Note: BPI = Banzhaf index; SSI = Shapley-Shubik index.

voting groups lose voting power as the majority requirement is increased; this loss is slight until we reach the 85% level, at which the United States, for example, loses one third of its BPI voting power compared with the simple majority case (.122-.81). For all other members, BPI values are essentially unchanged, except at the 85%, level at which their voting power increases; this increase is not substantial for each voting group individually but could be important in terms of their ability to form winning coalitions (see Table 3).

Table 4 presents results of the simulation using the third formula for voting weights: contributions are weighted 75%, and population and basic votes are weighted 12.5% each. Note that the United States and Japan, with 17.6% and 15.3% of the voting weight, respectively, would have de facto vetoes on decisions made with an 85% majority rule. The difference between the largest vote holder and the smallest vote holder is, as anticipated, the largest using this third formula. Again, there is much less variation in SSI values across the four majority levels. BPI values decrease for the United States and Japan as the majority requirement increases; at the 85% level, the United States loses almost half of its BPI voting power (.192 to .098), and Japan's falls by 38% (.157 to .098). All others gain voting power; for the 11 smallest voting groups, the gains range between 25% and 40%.

Table 3. Voting Weight and Relative Voting Power With Formula 2

Country/Voting Group	Voting Weight	Simple Majority		60% Majority		70% Majority		85% Majority	
		BPI	SSI	BPI	SSI	BPI	SSI	BPI	SSI
United States	.122	.130	.131	.125	.131	.110	.130	.081	.135
Japan	.103	.106	.107	.104	.107	.099	.107	.078	.101
VG18 (Canada)	.090	.091	.092	.091	.092	.089	.092	.077	.089
China	.065	.064	.065	.065	.065	.065	.064	.067	.070
VG17 (France)	.060	.060	.060	.060	.060	.061	.060	.063	.063
VG11 (United Kingdom)	.059	.059	.059	.059	.059	.060	.059	.062	.058
VG13 (Italy)	.057	.056	.056	.057	.056	.058	.056	.061	.056
VG3 (Germany)	.055	.054	.054	.055	.054	.056	.055	.060	.055
India	.047	.046	.046	.046	.046	.048	.046	.052	.044
VG1 (Saudi Arabia)	.046	.046	.045	.046	.045	.048	.045	.052	.043
VG9 (Mexico)	.045	.044	.044	.045	.044	.047	.044	.051	.042
VG12 (Brazil)	.043	.042	.042	.043	.042	.045	.042	.049	.040
VG2 (Ethiopia)	.040	.040	.039	.040	.039	.042	.039	.047	.039
VG16 (Nigeria)	.040	.039	.039	.040	.039	.041	.039	.047	.039
VG14 (Indonesia)	.039	.038	.038	.039	.038	.041	.038	.047	.038
VG10 (Pakistan)	.031	.030	.029	.030	.029	.032	.030	.038	.032
VG6 (Poland)	.030	.029	.029	.030	.029	.031	.029	.037	.030
VG5 (Russia)	.026	.025	.025	.026	.025	.027	.025	.033	.025

Note: BPI = Banzhaf index; SSI = Shapley-Shubik index.

The findings from the simulations thus far can be summarized as follows:

- *Comparing indexes:* BPI and SSI track voting weights rather closely.[23] SSI values are almost invariant across different majority requirements.
- *Comparing majority requirements:* High majority requirements make it easier for one member (or a group) to block initiatives it opposes, but, since it also facilitates others forming blocking coalitions, it becomes more difficult to pass initiatives that it favors. Using BPI, this generalization is supported for the larger members or voting groups. Groups with less voting weight would register voting power gains, especially at the 85% level. In this application, SSI is of little use for assessing the effects of different majority requirements because of its lack of variation.
- *Comparing weighted formulas:* The equal weights (33.3% for each component factor) in the first formulation are the most egalitarian with regard to the distributional effects of weighted voting with different majority decision rules. As the weight assigned to assessments/contributions increases (from one third to 50% to 75%), and that accorded to population and basic votes correspondingly decreases, larger contributors gain voting power.

Table 4. Voting Weight and Relative Voting Power With Formula 3

Country/Voting Group	Voting Weight	Simple Majority		60% Majority		70% Majority		85% Majority	
		BPI	SSI	BPI	SSI	BPI	SSI	BPI	SSI
United States	.176	.192	.195	.187	.195	.159	.194	.098	.208
Japan	.153	.157	.164	.160	.164	.150	.164	.098	.208
VG18 (Canada)	.085	.083	.083	.083	.084	.088	.084	.090	.082
VG11 (United Kingdom)	.079	.078	.078	.077	.078	.082	.077	.086	.075
VG3 (Germany)	.077	.076	.076	.076	.076	.080	.076	.086	.074
VG13 (Italy)	.073	.071	.071	.071	.071	.075	.071	.083	.071
VG17 (France)	.048	.047	.046	.047	.046	.050	.047	.061	.041
China	.044	.042	.042	.043	.041	.045	.041	.055	.035
VG12 (Brazil)	.039	.037	.036	.037	.036	.040	.036	.051	.031
VG9 (Mexico)	.034	.033	.032	.033	.032	.035	.032	.045	.029
VG1 (Saudi Arabia)	.033	.032	.031	.032	.031	.034	.031	.044	.028
India	.026	.025	.025	.026	.024	.027	.025	.034	.020
VG14 (Indonesia)	.026	.025	.024	.025	.024	.027	.025	.034	.020
VG5 (Russia)	.023	.022	.021	.022	.021	.024	.021	.030	.017
VG2 (Ethiopia)	.021	.020	.020	.021	.020	.022	.020	.028	.016
VG16 (Nigeria)	.021	.020	.020	.021	.020	.022	.020	.028	.015
VG6 (Poland)	.021	.020	.020	.020	.019	.022	.020	.027	.015
VG10 (Turkey)	.019	.018	.017	.018	.017	.019	.017	.024	.014

Note: BPI = Banzhaf index; SSI = Shapley-Shubik index.

We now turn to results for the Coleman measures of the power of individual players to block and to initiate action.

Absolute Voting Power: Coleman's Power to Initiate and Power to Block Indices

As defined above, PTI and PTB are related measures of control over voting outcomes. Since the values generated by the two indices are inversely related, PTB and PTI are especially useful to demonstrate the trade-off that players face between being able to pass resolutions they favor and ensuring they can block resolutions they oppose. Both measures are sensitive to the majority decision rule employed. As we will discuss in this section, using higher decision rules can increase members' PTB values but correspondingly decrease their ability to initiate resolutions. If members of the UNSC under weighted voting seek to minimize the likelihood of their worst-case policy outcomes passing, they may very well insist on decision rules that maximize their blocking power. But such a "minmax" strategy is not cost free because it results in reduced PTI. Currently five members of the Council—the five veto holders—have

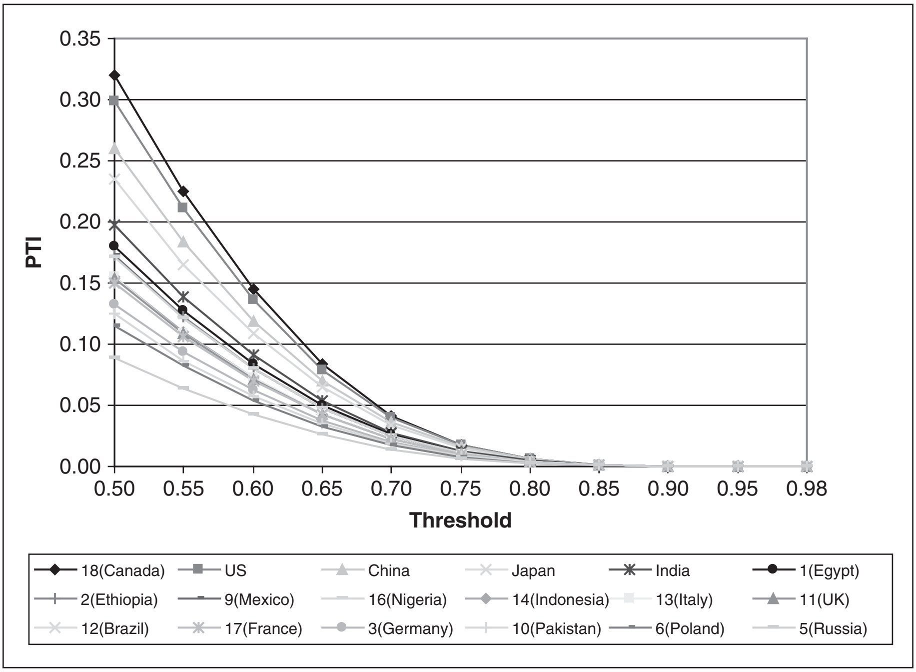

Figure 1. Power to initiate action under VW1
Note: VW1 = first set of voting weights.

PTB values of 1, denoting their veto player status. The nonpermanent members of the Council presently hold a PTB value of .099 each.[24]

Operating under the current rules, the PTI for permanent members is .0266, and for nonpermanent members it is .0026. The PTI using the first set of weighted votes is displayed in Figure 1. Even using a simple majority decision rule, the highest PTI value is about .32. At the 60% threshold, even the smallest vote holder has a PTI value that is several times larger than under current rules. For the United States, its ability to initiate action would be higher under this scenario than it is currently as long as the decision rule remains under 72%. Put differently, the United States would have more influence in forming winning coalitions than it does at present. PTI values quickly converge to near zero as the decision rule is increased.

In Figure 2 (based on a 50%, 25%, 25% weighting), the PTI values again indicate that all members of the Council would have more influence in initiating resolutions than at present. The range between the PTI values of the higher and lower vote holders is wider under this weighted voting formula.

When Figure 2 is compared with Figure 5, the trade-off between PTI and PTB is quite apparent. If, for example, the United States insisted on a 70% majority level to

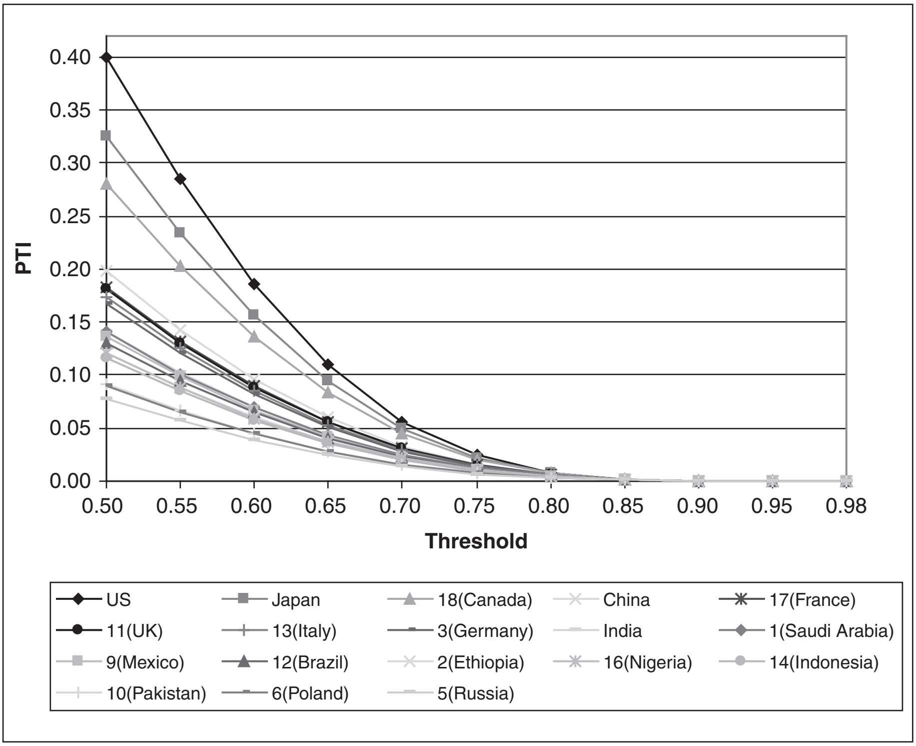

Figure 2. Power to initiate action under VW2
Note: VW2 = second set of voting weights.

provide it with ample blocking power, it would have a PTI value much smaller than if a simple majority was used.

Figure 3 reports PTI values for a weighted voting formula that weights contributions much higher than population and basic votes (75%, 12.5%, 12.5%). Japan and the United States have the highest values. In fact, their PTI values converge around the 70% threshold. When there are higher thresholds, the PTI of all members converge toward zero. Moving from a simple majority to a 60% majority almost halves the PTI of all members.

Figure 4 presents members' power to block action under the first weighted voting formula and continuous majority decision rules. As expected, each member of the Council has greater power to block as the majority decision rule increases. The four largest vote holders—the Canadian voting group, the United States, China, and Japan—reach higher PTB values at lower thresholds than other members. Under a simple majority rule, PTB values range from .09 to .32. This range widens as the threshold increases to about the 85% threshold, beyond which PTB values for all members converge on 1 as the threshold nears 100%. In short, the decision rule has an obvious and

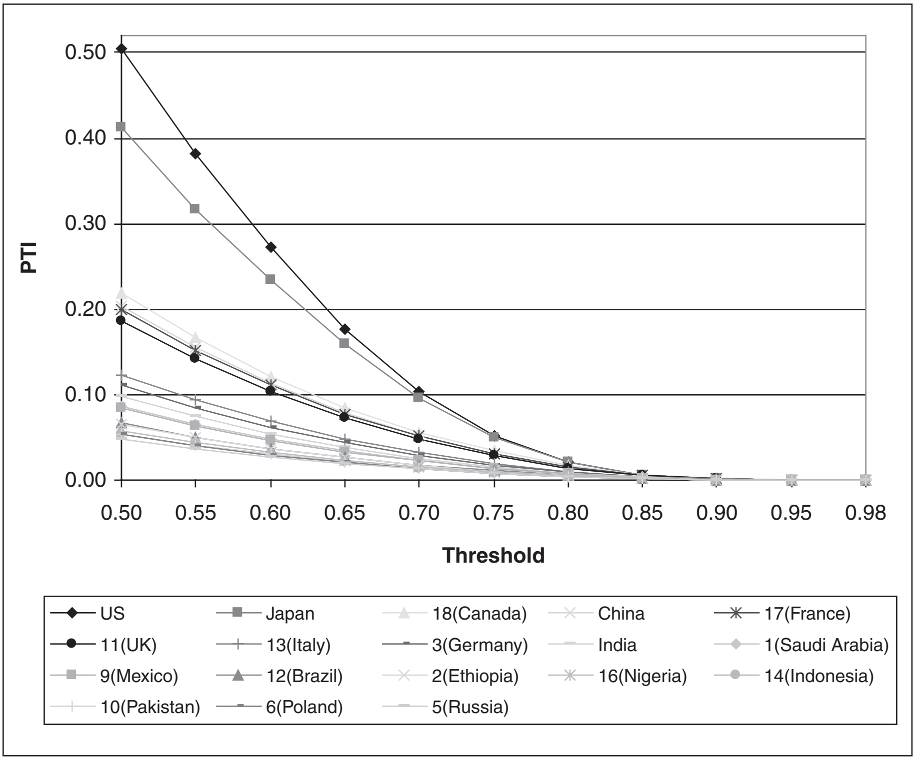

Figure 3. Power to initiate action under VW3
Note: VW3 = third set of voting weights.

significant influence on the ability of members to block action. Comparing the PTB values in Figure 4 with the PTI values in Figure 1 reveals that there is an unmistakable trade-off between being able to block proposals and being able to successfully initiate proposals.

Figure 5 reports PTB values for votes based on weightings of 50% for assessments and 25% for both population and basic votes. The three largest vote holders (United States, Japan, and China) clearly have more blocking power than the other members. In the case of an 85% majority requirement, these three have PTB values higher than .9. At this high threshold, even the smallest voting groups have considerable power to block UNSC action. If the Council were to require a two-thirds majority, the U.S would have a PTB value higher than .75, while the Council seat with the lowest voting weight would have a PTB value of only about .17. Members who want a higher majority rule to ensure they could block resolutions to which they are strongly opposed would pay the price of making it easier for initiatives they favor to be blocked by other members.

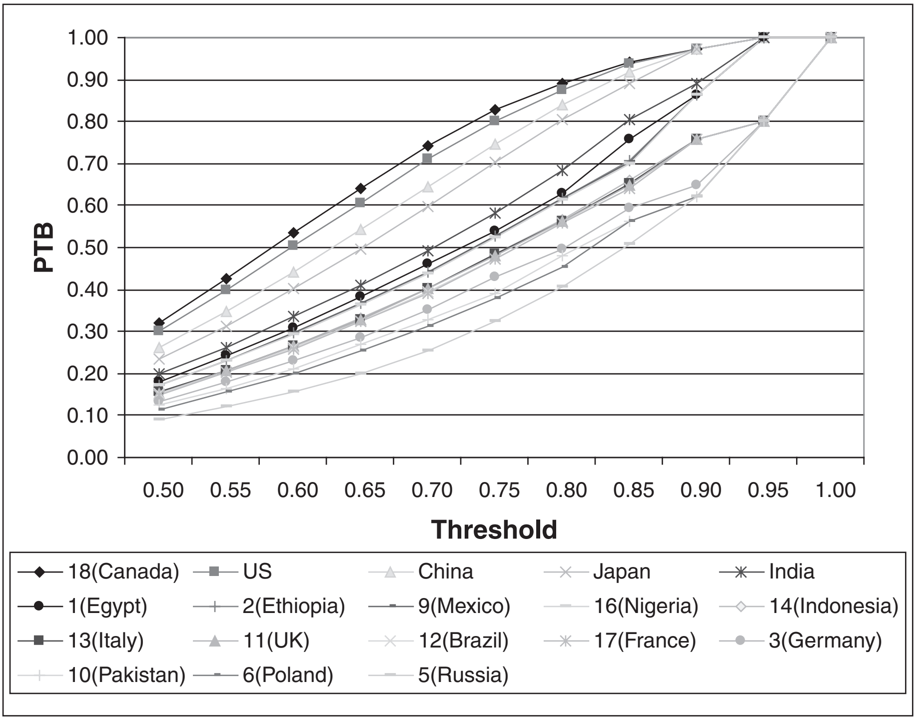

Figure 4. Power to block under VW1
Note: VW1 = first set of voting weights.

Under the third set of voting weights (75%, 12.5%, 12.5%), the power of the United States and Japan to block action is much greater than that of the other Council members (see Figure 6). These two large vote holders' PTB values quickly converge on 1 as the threshold is raised. The smaller vote holders have significantly less power to block at the lower majority decision rules.

Figures 4, 5, and 6 clearly indicate that the threshold chosen will make considerable difference to individual members' abilities to block action by the Council. The current veto holders in the Council would have less overall ability to block action than they have under current rules. The other members would for the most part have more than their current PTB value of .099. In other words, under weighted voting the capacity to block action will be more evenly distributed across members of the Council.

The trade-off between PTI and PTB is consistent across the three weighted voting formulas. Moreover, the above analysis demonstrates how sensitive individual PTI and PTB values are to majority decision rules. Using a weighted voting scheme, the current permanent members would see a decline in their individual

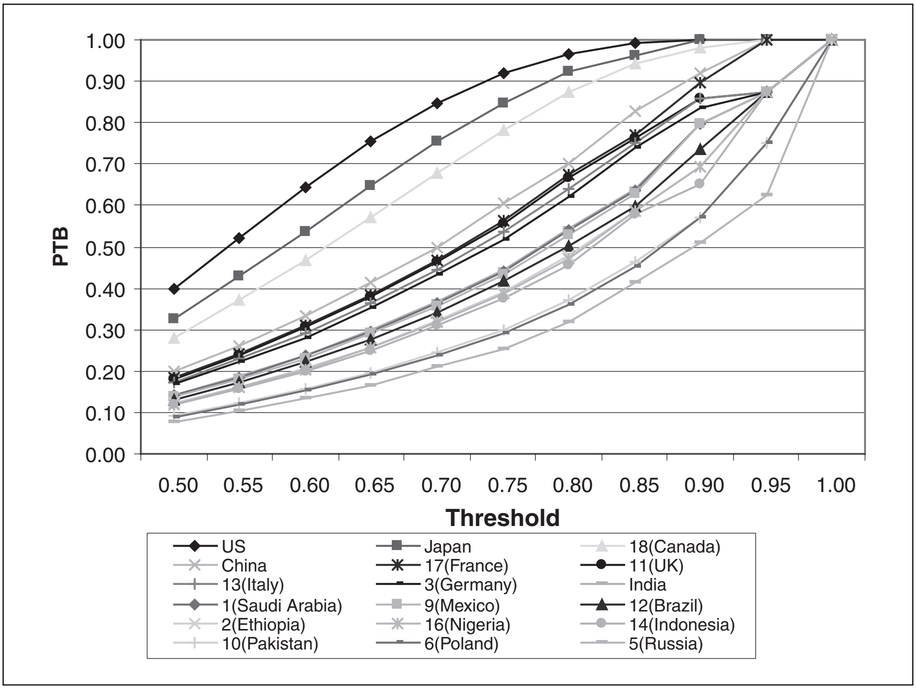

Figure 5. Power to block under VW2
Note: VW3 = second set of voting weights.

abilities to obstruct decision making. Nonetheless, depending on the threshold required for passage, the largest vote holders would retain considerable blocking power. For most thresholds, and for each of the weighted voting formulas, individual members of the Council would have more power to initiate action. The next section, rather than considering the position of individual members of the UNSC, analyzes the probability that the Council as a collective body will pass a resolution under weighted voting.

The Power of the Collective to Act

Figure 7 reports the probabilities that the Council will be able to pass resolutions for each of the weighted voting formulas and for all four majority decision rules. Note that for the simple majority case the PTA is .5, and this probability drops precipitously as the threshold is increased. Under current rules the PTA of the Security Council is .0259. If we read PTA values as strict probabilities, then the Council presently has less than a 3% chance of passing a resolution. At the 60% majority decision rule, the PTA values for the Council are .212, .225, and .264,

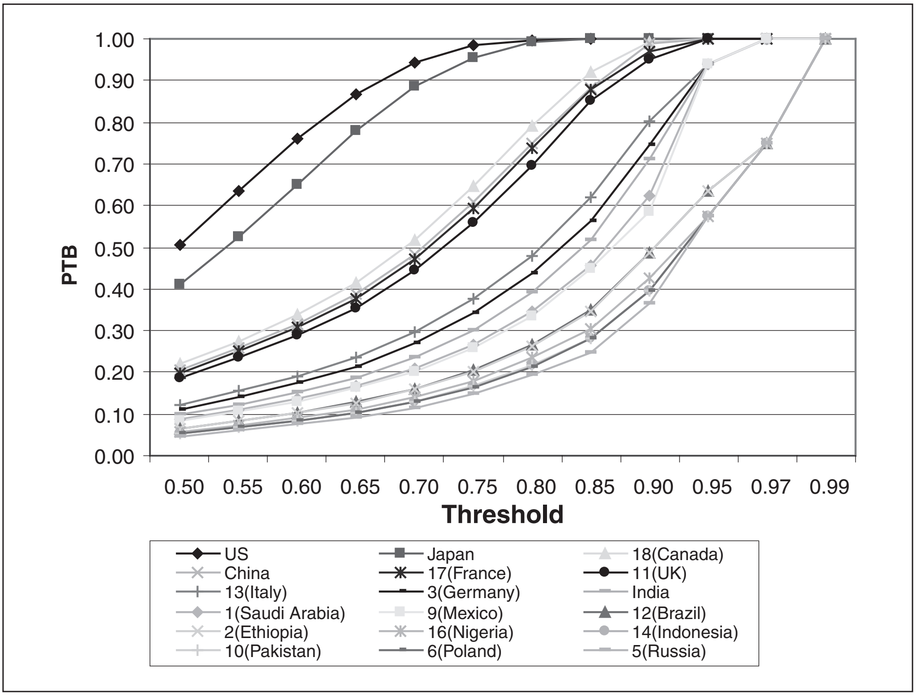

Figure 6. Power to block under VW3
Note: VW3 = third set of voting weights.

respectively, for the three weighted voting formulas. Put differently, there is an 8 to 10 times higher likelihood under weighted voting that the Council will be able to pass a resolution. PTA values drop to near zero at the 85% majority level. Weighted voting can significantly increase the likelihood the Council will be able to pass resolutions, but the PTA index is very sensitive to the majority decision rule. Interestingly, the third weighted voting formula, which provides more voting weight to larger contributors, would result in a slightly higher PTA value at most majority levels. Put differently, a more unequal distribution of votes would facilitate collective action.

Conclusions

This article has simulated the voting power of members of the UNSC under three different weighted voting schemes applying multiple measures of both relative and absolute power. In addition, we have analyzed the capacity of the Security Council to act. We first calculated voting weights and then offered three weighted voting

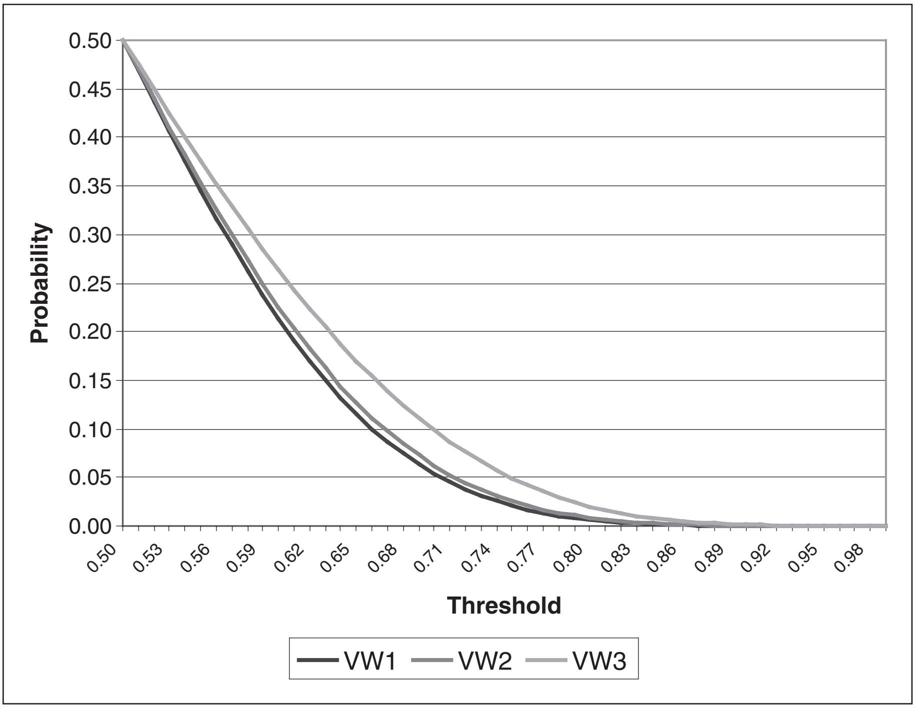

Figure 7. Decision probability

formulas. We then calculated several measures of voting power, including the power of the Council to act, taking into account different majority decision rules. Overall our results demonstrate that the selection of a majority decision rule is a critical factor for both individual voting power and the probability that the Council will be able to pass a resolution.

The relative voting power of Council members would differ slightly under the three formulas. In general, there is little difference between voting weights and voting power as defined by the BPI and SSI when using the formula where population, contributions, and sovereign equality are equally weighted. For voting weights based on higher weightings for contributions, some differences emerge. In summary, the disparities between voting weight and voting power found other weighted voting schemes are not systematically present. Overall, implementation of this voting weight scheme for the UNSC would result in relative voting power that is roughly equivalent to voting weights, although the more the weighted voting formula emphasizes contributions, the greater the disparities between power and weight.

The evaluation of the power of individual members to block action or to initiate action unambiguously demonstrates the trade-off between these two types of power. Moreover, the PTB and the PTI are very sensitive to the majority decision rule. The higher the threshold required, the easier it is for actors to block action. Conversely, the higher the threshold, the more difficult it is for actors to initiate action. This is true for each of the three weighted voting power formulas. It is conceivable that several levels of special majorities might be employed in any reform of UNSC voting rules that involves weighted voting, especially on the most sensitive and important issues (e.g., such as use-of-force authorizations under Chapter VII of the Charter). The implication of our analysis for such a scenario is clear: the higher the majority decision rule, the greater the PTB for all members.

Finally, our results for the decision probability of the Council being able to act under weighted voting show that its PTA decreases as the required threshold is increased. If a system of special majorities were adopted by the Council to accompany weighted voting, it is possible that the likelihood of the Security Council passing a resolution would be just as low—or lower—than it presently is, a result that would defeat one of the goals of such a change in decision rules.

We have not addressed the political feasibility of adopting weighted voting. Instead, we have provided a simulation of voting power under the type of system several observers have recommended over the years. Our aim has been to explore some of the logical possibilities for reforming UNSC decision procedures by means of weighted voting, without consideration of the political prospects for such reforms. That said, we readily acknowledge that the likelihood of a move to weighted voting in the short to medium term is low. We agree with Dervis (2005) that reform "efforts should not be deterred simply because it is probably not possible to find a perfect weighted scheme for Security Council votes that all members would accept as optimal" (p. 60). The simulation of voting power presented here demonstrates that a weighted voting system derived from a proposal such as Schwartzberg (2003) or Dervis (2005) could serve as an effective mechanism to apportion influence in the UNSC. Weighted voting, while giving more influence to great powers, could also increase the probability that the Council will act collectively to pass resolutions and address global problems. Any structural change and change to voting rules will require a two-thirds majority in the General Assembly and a 60% majority in the Security Council, with no veto holder in opposition. Obviously, the primary limiting factor is obtaining the consent of all veto holders. In addition, countries with smaller contributions and populations may well resist any modification that results in their loss of influence. As the results of our simulations indicate, the way votes are weighted and the use of special majorities can affect the influence members wield and the ability of the Council to act. Certainly devising and implementing a weighted voting formula for the UN would be an intensely political process, subject to manipulation by powerful members both within and outside of the formal negotiating process.

Rudzinski's (1955) observation that this would be a "complex and difficult task" is indeed an understatement.

Appendix

Voting Weights and Voting Groups (in Percentages)

Country/Group	Contributions	GDP	Population	VW1	VW2	VW3
Voting Group 1: Algeria, Bahrain, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, UAE, Yemen	1.79	2.13	4.78	5.64	4.68	3.23
Voting Group 2: Angola, Botswana, Burundi, Comoros, Democratic Republic of Congo, Eritrea, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Rwanda, Seychelles, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe	0.08	0.29	5.28	5.41	4.08	2.08
Voting Group 3: Austria, Germany, Liechtenstein	9.55	6.89	1.53	4.21	5.54	7.54
China	2.05	3.97	21.49	8.02	6.53	4.29
Voting Group 5: Armenia, Belarus, Georgia, Moldova, Russia, Ukraine	1.86	1.28	3.66	2.88	2.62	2.24
Voting Group 6: Albania, Bosnia, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Poland, Romania, Serbia, Slovak Republic, Slovenia	1.08	1.61	2.17	3.67	3.02	2.05
India	0.42	1.60	17.44	6.13	4.70	2.56
Japan	19.47	12.51	2.15	7.38	10.40	14.94

(continued)

Appendix (continued)

Country/Group	Contributions	GDP	Population	VW1	VW2	VW3
Voting Group 9: Antigua and Barbuda, Bahamas, Barbados, Belize, Costa Rica, Dominica, Dominican Republic, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, St. Lucia, St. Kitts and Nevis, St. Vincent and Grenadines, Suriname, Trinidad and Tobago	2.09	2.45	2.69	5.39	4.59	3.33
Voting Group 10: Afghanistan, Azerbaijan, Iran, Kyrgyz Republic, Maldives, Pakistan, Tajikistan, Turkey, Turkmenistan, Uzbekistan	0.61	1.26	5.93	3.91	3.08	1.85
Voting Group 11: Denmark, Finland, Iceland, Ireland, Norway, Sweden, the United Kingdom	9.44	7.61	1.47	4.85	5.99	7.72
Voting Group 12: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, Venezuela	3.21	2.86	5.88	4.76	4.37	3.79
Voting Group 13: Andorra, Greece, Italy, Malta, Monaco, Portugal, San Marino, Spain	8.43	6.57	2.02	4.87	5.76	7.09
Voting Group 14: Brunei, Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Sri Lanka, Thailand, Vietnam	1.11	1.96	8.33	4.88	3.93	2.52
United States	22.00	32.53	4.82	9.11	12.33	17.17

(continued)

Appendix (continued)

Country/Group	Contributions	GDP	Population	VW1	VW2	VW3
Voting Group 16: Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Republic of Congo, Cote d'Ivoire, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone, Togo	0.10	0.33	4.59	5.36	4.05	2.07
Voting Group 17: Belgium, France, Luxembourg, the Netherlands, Switzerland	10.06	7.47	1.57	4.74	6.07	8.07
Voting Group 18: Australia, Bangladesh, Bhutan, Canada Cuba, Cyprus, Fiji, Israel, Kazakhstan, Kiribati, South Korea, Marshal Islands, Micronesia, Mongolia, Myanmar, Nauru, Nepal, New Zealand, Palau, Papua New Guinea, Samoa, Solomon Islands, South Africa, Timor-Leste, Tonga, Tuvalu, Vanuatu, Democratic People's Republic of Korea	7.40	6.80	7.07	9.66	9.09	8.24

Acknowledgments

For useful comments on prior drafts, we thank Mark Boyer, Courtney Smith, Alexander Thompson, and two anonymous reviewers. For research assistance, we thank Patrick W. Scales.

Declaration of Conflicting Interests

The author(s) declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research and/or authorship of this article:

Support for this research was provided by the Department of Political Science at the University of Nevada Las Vegas.

Notes

1. These concerns were reflected in an early proposal to weight the votes in an international assembly based on population, production, and trade (Sohn, 1944). Proposals for weighted voting in the General Assembly surfaced again in the 1950s and 1970s (Newcombe et al., 1971).
2. There have been other important changes in composition and operations of the Council, perhaps most importantly the replacement of the Republic of China by the People's Republic of China and the transfer of the Soviet seat to the Russian Federation.
3. The complete title of the working group is the "Open-Ended Working Group on the Question of Equitable Representation On and Increase in the Membership of the Security Council." For an overview of the OEWG's work, see UNGA (2004), Fassbender (1998; Chapter 9), and Daws (1997).
4. One of the issues it is researching is the question of increasing the transparency of the Council, yet ironically the OEWG's meetings and research are not in the public domain.
5. Under this proposal, votes would be weighted based on financial contributions to the UN and a two-thirds majority would be needed to approve the budget. The then president of the UN Association, Edward Luck, observed, "[g]etting two-thirds of the nations to agree to weighted voting would be like trying to make the Pope a Marxist" (as cited in Sciolino, 1985, p. 22).
6. For his much earlier ideas on the subject, see Schwartzberg (1973), where he was responding to Morrill's (1972) proposal for the adoption of weighted voting. In his 1973 commentary, Schwartzberg is decidedly skeptical of the political prospects for the adoption of Morrill's (1972) proposal. In his 2003 proposal, Schwartzberg does not call for weighted voting within the UNSC. In our adaptation of Schwartzberg (2003) and Dervis (2005), we assume weighted voting on the council will be used in lieu of the veto power.
7. Dervis (2005) leaves open the possibility that some members will be permanent, at least during a transition period.
8. For a brief but compelling perspective on why the UN or other international organizations are highly unlikely to adopt democratic decision methods, see Russett (1997). For a more detailed skeptical argument, see Dahl (2003). Another useful review of UN reform is found in Archibugi (1993).
9. For a useful overview of demographic factors, see McNicoll (1999). Schwartzberg (2003) avers that ideally his proposed system would assign a majority of the voting power to democratic states but acknowledges that this desideratum is problematic because it is "difficult to draw a clear line between democratic and non-democratic regimes" (p. 94).
10. Assessments are not a direct function of GDP or other measures of national product. The most important divergence involves the United States: its contribution is capped by agreement at 22%, but the U.S. share of global GDP is more than 30%. Also, though assessments largely reflect measures of national product, such as GDP, assessments for developing countries are smaller than their shares of GDP, and assessments for developed countries

are larger. Thus, any shift toward a closer correlation between GDP and assessments would shift votes toward developing countries. This shift would be even more favorable to developing countries if a measure of national product that adjusts for purchasing power parity (PPP) were used instead of exchange rate measures.

11. For example, the IMF, World Bank, African Development Bank, and Inter-American Development Bank all provide members "basic" votes in addition to the weighting of votes on the basis of economic criteria.
12. Manno (1964) suggests a similar three-factor basis for the allocation of voting weights but she recommends per capita contributions. Manno also suggests that different factors could be weighted differently based on the type of decision being made. Dervis (2005) adds to the above three a measure of military capabilities that he considers to be a way to assess the ability of a member to contribute troops to peacekeeping and peace enforcement missions. Given the way such missions are organized and that most peacekeepers are from developing countries, we have doubts about including military capabilities in the weighting of votes. Consider, for instance, that the United States contributes only a handful of personnel for peacekeeping missions, yet its voting weight would increase enormously were a measure of military capability included. We would favor a direct measure of contributions to UN peacekeeping.
13. For alternative variables and formulas for weighting UN votes, see Newcombe (1983), who considers no less than 25 options, including contributions, population, square root of population, cube root of population, and more elaborate formulas incorporating basic votes.
14. Judging by the campaigns waged to gain nonpermanent seats in the UNSC (see Malone, 2000), the alignment of states into voting groups, on whatever grounds, can safely be expected to be an intensely political process.
15. Newcombe (1983) suggests a similar type of selective representation, including the end of permanent Security Council membership. She also considers the possibility that the veto power could be retained for certain sensitive decisions and the possibility of using a special majority vote to *override* a veto.
16. Selective representation in other international organizations, however, has proven to be problematic when used in conjunction with weighted voting. For instance, in the Inter-American Development Bank, there are voting groups in which the largest vote holder in the group can elect itself as the group's representative.
17. We obtained population data from the World Bank's *World Development Indicators*. Population data are from 2002, and the scale of UN assessments data are from 2005. For countries whose data are missing in the World Development Indicators, we estimated values based on the most recent CIA Factbook.
18. There are four winning coalitions in the example (100, 99, 98, 2). The members can form winning coalitions as 99:98, 99:2, 98:2, and 99:98:2. The last coalition, however, contains a superfluous member, and hence the coalition is not a vulnerable coalition.
19. The SSI has been described by Felsenthal and Machover (2004) as "a voter's expected relative share in a fixed prize available to the winning coalition, seen in the guise of a simple TU [transferable utility] cooperative game" (p. 9). Power as a prize, P-power, is a relative

measure of power in that it is the expected utility to an individual player for being a member of the winning coalition. BPI measures a different aspect of voting power: power over electoral outcomes, I-power (Felsenthal & Machover, 1998, 2004; Chapter 3). I-power is closest to the common interpretation of power as influence in the literature.

20. One of O'Neill's (1996) main contributions is his analysis of the concept of satisfaction. As applied by O'Neill, a member's satisfaction depends on "the probability that the Council would pass a resolution the member wants passed or reject a resolution the member wants rejected" (p. 225). His notion of satisfaction is somewhat similar to Coleman's (1986) measures of individual voting power.
21. Dixon (1983) clearly favors the Banzhaf voting power index; though he defines Coleman's (1971) indices he does not apply them.
22. Results for SSI, BPI, and PTA used Bräuninger and König's (2003) program, which they have modified slightly for our application. PTB and PTI values were obtained using the program written by Leech (2001).
23. Dubey and Shapley (1979) have demonstrated that there is no unproblematic way to calculate one from the other, yet SSI and BPI often produce similar results. While this is generally true, as Straffin (1994) has established, there are instances where these two measures of power diverge (as they do in this article at the 85% level).
24. The 1963 increase in membership of the Council increased the PTB for nonpermanent members from .088 to the present value. Prior to the 1963 reform, the PTI value for permanent members was .0286 and for nonpermanent members it was .0025. See Coleman (1986).

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