

# A Appendix: Axel Dreher, Jenny Simon and Justin Valasek, Optimal Decision Rules in Multilateral Aid Funds, *Review of International Organizations*.

## A.1 Empirical Appendix

Table A1: Decision-making Rules in International Organizations

| International Organization                          | Decision Rule | Consensus Encouraged | Details                                                                                                                                                                                                                                                                                | Source       |
|-----------------------------------------------------|---------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Adaptation Fund 2020                                | majority      | yes                  | Decisions of the Board are taken by consensus whenever possible. If all efforts to reach a consensus have been exhausted and no agreement has been reached, decisions are taken by a two-thirds majority (of the members present at the meeting on the basis of one member, one vote). | URL          |
| African Development Bank 2016                       | weighted      | no                   | All matters before the Board of Directors are in general decided by a sixty-six and two-thirds percent majority of the voting power represented at a meeting. Important issues require a majority of seventy percent.                                                                  | URL          |
| Arab Bank for Economic Development in Africa (2009) | majority      | no                   | The Board of Directors' decisions shall be taken by a majority of votes of the members present. Each member has one vote.                                                                                                                                                              | URL          |
| AsDB Special Funds 1965, 2016                       | weighted      | no                   | Includes all special funds, including the ADF. Decisions are made by the Asian Development Bank.                                                                                                                                                                                       | URL 1, URL 2 |
| Asian Development Bank (1965)                       | weighted      | no                   | The Board of Directors decides by a majority of the voting power represented at a meeting.                                                                                                                                                                                             | URL          |
| Caribbean Development Bank (2007)                   | weighted      | no                   | The Board of Directors decides by a majority of the voting power represented at a meeting.                                                                                                                                                                                             | URL          |

|                                                            |           |     |                                                                                                                                                                                                                                                                                             |              |
|------------------------------------------------------------|-----------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Climate Investment Funds (2010)                            | unanimous | yes | All decisions are taken by consensus, with no provision for voting.                                                                                                                                                                                                                         | URL          |
| Commission of the European Communities (CEC, 2011)         | majority  | no  | Annual limits on appropriations are set in a multiannual financial framework that is agreed upon by the European Parliament, Council, and Commission.                                                                                                                                       | URL          |
| Council of Europe Development Bank (CEB, 2020)             | weighted  | no  | Members of the Administrative Council have a number of votes equal to the number of participating certificates subscribed by the member they represent. Decisions are taken by a majority vote.                                                                                             | URL          |
| European Bank for Reconstruction and Development (2002)    | weighted  | no  | Decisions on general policy issues are taken by a majority of not less than two-thirds of the total voting power of the member countries participating in the vote. All other operations need only a majority of the voting power of the member countries participating in the vote.        | URL          |
| European Development Fund (EDF, 2002)                      | weighted  | no  | The EDF Committee decides with a qualified majority (based on contributions to the EDF).                                                                                                                                                                                                    | URL          |
| European Investment Bank (EIB, 2019)                       | majority  | no  | The Management Committee takes decisions with a simple majority of the votes cast by members present. Each member of the Management Committee has one vote.                                                                                                                                 | URL          |
| Food and Agriculture Organization (FAO, 2017)              | majority  | no  | Decisions of the Conference are taken by a majority of the votes cast.                                                                                                                                                                                                                      | URL          |
| Global Alliance for Vaccines and Immunization (2008, 2020) | majority  | yes | A quorum shall be a majority of all voting Board members (or their permitted alternates). The Board will use all reasonable efforts to make decisions by consensus. If no consensus can be reached, any decision of the Board requires a two-thirds majority of members present and voting. | URL 1, URL 2 |

|  |                                                                 |           |     |                                                                                                                                                                                                                                                                                                                                                                                                                        |     |
|--|-----------------------------------------------------------------|-----------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
|  | Global Environment Facility (2009)                              | weighted  | yes | Decisions of the Assembly and the Council are taken by consensus. Decisions requiring a formal vote by the Council require an affirmative vote representing both a 60 percent majority of the total number of participants and a 60 percent majority of the total contributions.                                                                                                                                       | URL |
|  | Global Fund (2019)                                              | majority  | yes | The Board Chair and Vice-Chair shall use best efforts to facilitate decisions by consensus, confirmed by a formal vote of the Board. If all practical efforts by the Board and the Board Chair and Vice-Chair have not led to consensus, motions require a two-thirds majority of those present of both: a) the Donor Voting Group; and b) the Implementer Voting Group. (Same procedure for the Governing Committee.) | URL |
|  | Global Green Growth Institute (2015)                            | majority  | yes | If all efforts at consensus have been exhausted, and no consensus reached, decisions are as a last resort adopted by a simple majority of the members present and voting.                                                                                                                                                                                                                                              | URL |
|  | Green Climate Fund (n.d.)                                       | unanimous | yes | The GCF is governed by a 24-member Board. It makes decisions based only on the consensus agreement of all Board members.                                                                                                                                                                                                                                                                                               | URL |
|  | Humanitarian Aid Office of the European Commission (ECHO, 1996) | majority  | no  | Emergency action for an amount not exceeding ECU 10 million is decided by the European Commission.                                                                                                                                                                                                                                                                                                                     | URL |
|  | IDB Invest (2014)                                               | majority  | no  | The Executive Committee of the Board of Executive Directors decides on loans and investments with majority.                                                                                                                                                                                                                                                                                                            | URL |
|  | IDB Special Fund (1996)                                         | weighted  | no  | All decisions are adopted by a three-fourths majority of the total voting power of the member countries.                                                                                                                                                                                                                                                                                                               | URL |

|                                                              |          |          |     |                                                                                                                                                                                                                                                                                                                      |              |
|--------------------------------------------------------------|----------|----------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| IMF Concessional Trust Funds (2002)                          |          | weighted | yes | The rule of consensus decision-making is adopted.                                                                                                                                                                                                                                                                    | URL          |
| Inter-American Development Bank                              | Devel-   | weighted | no  | All decisions are adopted by a three-fourths majority of the total voting power of the member countries.                                                                                                                                                                                                             | URL          |
| International Atomic Energy Agency (1989)                    | Atomic   | majority | no  | Each member of the Board of Governors has one vote. Decisions on the amount of the Agency's budget shall be made by a two-thirds majority of those present and voting. Decisions on other questions are made by a majority of those present and voting.                                                              | URL          |
| International Bank for Reconstruction and Development (2012) |          | weighted | no  | The Bank decides with a majority of the voting power cast.                                                                                                                                                                                                                                                           | URL          |
| International Development Association (1960)                 | Devel-   | weighted | no  | The Bank decides with a majority of the voting power cast.                                                                                                                                                                                                                                                           | URL          |
| International Finance Corporation (2020)                     | Finance  | weighted | no  | The Bank decides with a majority of the voting power cast.                                                                                                                                                                                                                                                           | URL          |
| International Fund for Agricultural Development (IFAD, 2019) | Fund for | weighted | yes | The Executive Board formally decides with a majority of three-fifths of the votes cast, provided that such majority is more than one-half of the total number of votes of all members of the Executive Board. The Executive Board normally works by consensus rather than voting (Encyclopedia of the Nations n.d.). | URL 1, URL 2 |
| International Organisation of Labour (ILO, 2019)             | Labour   | majority | yes | The Governing Body usually takes decisions by consensus.                                                                                                                                                                                                                                                             | URL          |

|                                                                   |           |     |                                                                                                                                                                                                                                             |              |
|-------------------------------------------------------------------|-----------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Islamic Development Bank                                          | weighted  | no  | The approval of any decision met in the Board of Governors and the Board of Executive Directors requires a simple [weighted] majority (Hernandez and Vadlamannati 2014).                                                                    | URL          |
| Joint United Nations Programme on HIV / AIDS (UNAIDS, 2011)       | majority  | yes | The Programme Coordinating Board endeavors to adopt its decisions and recommendations by consensus. Should decisions by voting or other procedural advice be necessary, decisions are made by a majority of the members present and voting. | URL          |
| Nordic Development Fund (2011)                                    | unanimous | yes | Decisions of the Board require that no one present and entitled to vote oppose the decision.                                                                                                                                                | URL          |
| OPEC Fund for International Development (OFID, 1980)              | weighted  | no  | Decisions require a two-thirds majority of the members representing seventy percent of the contributions to the Fund's resources.                                                                                                           | URL          |
| OSCE (n.d.)                                                       | unanimous | yes | OSCE participating states enjoy equal status and take decisions by consensus.                                                                                                                                                               | URL          |
| United Nations Children's Fund (UNICEF, 1994)                     | majority  | no  | Decisions of the Board are made by a majority of the members present and voting.                                                                                                                                                            | URL          |
| United Nations Development Programme (UNDP, 2011)                 | majority  | yes | Consensus is encouraged. In case of a vote, the rules of procedure for the Economic and Social Council apply.                                                                                                                               | URL          |
| United Nations Economic Commission for Europe (UNECE, 2009, 2016) | majority  | yes | Decisions of the Commission are made by a majority of the members present and voting. As a general rule, within UNECE and its subsidiary bodies, decisions are made by consensus.                                                           | URL 1, URL 2 |
| United Nations Environment Programme (UNEP, 2016)                 | majority  | no  | The Assembly decides with a majority of the members present and voting.                                                                                                                                                                     | URL          |

|                                                                             |           |     |                                                                                                                                                                                                                                                                                                                                                    |     |
|-----------------------------------------------------------------------------|-----------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| United Nations High Commission for Refugees (UNHCR, 2016)                   | majority  | yes | The Chairperson will in the ordinary course of business ascertain the sense of the meeting in lieu of a formal vote. If the Committee proceeds to a vote, each representative has one vote. Decisions of the Committee are made by a majority of the members present and voting.                                                                   | URL |
| United Nations Peacebuilding Fund (UNPBF, 2006)                             | majority  | yes | The UNDP Multi-donor Trust Fund Office serves as the administrative agent responsible for the administration of the Peacebuilding Fund, the receipt of donor contributions, and the disbursement of funds.                                                                                                                                         | URL |
| United Nations Population Fund (UNFPA, 2011)                                | majority  | yes | Consensus is encouraged. In case of a vote, the rules of procedure for the Economic and Social Council apply.                                                                                                                                                                                                                                      | URL |
| United Nations Relief and Works Agency for Palestine Refugees (UNRWA, 2006) | unanimous | yes | The Advisory Commission and Sub-Committee strive to undertake its work by consensus.                                                                                                                                                                                                                                                               | URL |
| World Food Programme (WFP, 2000)                                            | majority  | yes | In the Board every effort shall be made to arrive at its decisions by consensus. If the President determines that every effort to achieve a consensus on any matter has been exhausted, that matter may be put to a vote. Each member of the Board has one vote. Decisions of the Board are taken by a majority of the members present and voting. | URL |
| World Health Organization (WHO, n.d.)                                       | majority  | no  | Decisions by the Board on important questions are made by a two-thirds majority of the members present and voting.                                                                                                                                                                                                                                 | URL |
| World Tourism Organization (2016)                                           | majority  | no  | Decisions of the Council are made by a simple majority of members present and voting except on budgetary and financial recommendations which shall be approved by a two-thirds majority of members present and voting.                                                                                                                             | URL |

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## A.2 Proofs for Section 4

*Proof Lemma 1:* First note that the formateur will always select herself to the majority coalition, since the payoff of belonging to the majority coalition is strictly positive and utility transfers are restricted to the majority coalition. Since NB prescribes an equal split of the utility surplus, the utility of the formateur is equal to  $1/2S$ , where  $S = \sum_{i \in \mathcal{M}} q_i \sqrt{a_i^{NB}}$ . And since NB results in the set of  $\{a_j\}$  that maximizes  $S$ ,  $S(\{q_F, h\}) > S(\{q_F, l\})$ , this implies that  $F$  has a strictly dominant best response of selecting  $\mathcal{M} = \{F, i\}$  with  $q_i = h$  over  $\mathcal{M} = \{F, i'\}$  with  $q_{i'} = l$ . Lastly, by assumption,  $F$  randomizes  $i \in M, i \neq f$  if the maximal element of  $\{q_i\} \setminus q_F$  is not unique. ■

*Proof of Lemma 2:* Since reforms are costly and do not change the allocation of aid, recipient countries choose  $\delta_j = 0$ . ■

*Proof Lemma 3:* Each recipient country sets  $\delta_j$  to maximize its expected utility given that the other recipient countries invest  $\delta^u$ . We repeat the expression for the expected level of aid spending under Unanimity here for convenience:

$$\begin{aligned} E[a_j | \delta_j, \delta^u, \delta^u]^u = & p(Q_j = 0 | \delta^u) \left[ \delta_j a(h, l, l) + (1 - \delta_j) a(l, l, l) \right] \\ & + p(Q_j = 1 | \delta^u) \left[ \delta_j a(h, h, l) + (1 - \delta_j) a(l, l, h) \right] \\ & + p(Q_j = 2 | \delta^u) \left[ \delta_j a(h, h, h) + (1 - \delta_j) a(l, h, h) \right], \end{aligned}$$

Taking the first-order conditions of  $E[a_j | \delta_j, \delta^u, \delta^u]^u - \delta_j^2$  and simplifying gives the following equation, which implicitly characterizes an interior solution for  $\delta^u$ :

$$2\delta^u = (1 - \delta^u)^2 (a(h, l, l) - x) + 2(1 - \delta^u)\delta^u (a(h, h, l) - a(l, l, h)) + (\delta^u)^2 (x - a(l, h, h)). \quad (14)$$

After substituting in the values of  $a_j(\{q\})$  into Equation (14) and simplifying, we find that  $\delta^u$  is characterized by:

$$\delta^u = \min \left\{ 1, \frac{(h^2 - 1)(2h^2 + 1)x}{2 + 5h^2 + 2h^4 + (h^2 - 1)^2 x} \right\}. \quad (15)$$

■

*Proof Lemma 4:* We repeat the expression for the expected level of aid spending under Majority, given that other recipient countries invest  $\delta^m$ , here for convenience:

$$\begin{aligned}
E[a_j|\delta_j, \delta^m, \delta^m]^m = & p(Q_j = 0|\delta^m) \left( \frac{1}{3} \left[ \delta_j a(h, l) + (1 - \delta_j) a(l, l) \right] + \frac{2}{3} \left[ \delta_j a(h, l) + (1 - \delta_j) \frac{1}{2} a(l, l) \right] \right) \\
& + p(Q_j = 1|\delta^m) \left( \frac{1}{3} \left[ \delta_j a(h, h) + (1 - \delta_j) a(l, h) \right] \right. \\
& \quad \left. + \frac{2}{3} \left[ \frac{1}{2} (\delta_j a(h, h) + \frac{1}{2} (1 - \delta_j) a(l, h)) + \frac{1}{2} \delta_j a(h, h) \right] \right) \\
& + p(Q_j = 2|\delta^m) \left( \frac{1}{3} \left[ \delta_j a(h, h) + (1 - \delta_j) a(l, h) \right] + \frac{2}{3} \left[ \frac{1}{2} \delta_j a(h, h) \right] \right).
\end{aligned}$$

As above, after taking the first-order conditions of  $E[a_j|\delta_j, \delta^m, \delta^m]^m - \delta_j^2$  and simplifying, we get the following equation, which implicitly characterizes an interior solution for  $\delta^m$ :

$$2\delta^m = (1 - \delta^m)^2 \left( a(h, l) - x \right) + 2(1 - \delta^m) \delta^m \left( \frac{1}{6} a(h, l) + x - \frac{1}{2} a(l, h) \right) + (\delta^m)^2 \left( x - \frac{1}{3} a(l, h) \right). \quad (16)$$

After substituting in the values of  $a(q_j, q_k)$  into Equation (16) and simplifying,  $\delta^m$  is characterized by:

$$\delta^m = \min \left\{ 1, \frac{(2h^2 - 1)x}{2 + 2h^2 + (h^2 - 1)x} \right\}. \quad (17)$$

■

*Proof Proposition 1:* First, note that, trivially, the level of investment is higher under Multilateral relative to Bilateral, since investment levels are zero under bilateral aid allocation.

Second, we compare the relative level of investment under Majority and Unanimity when investment is interior:

$$\delta^m - \delta^u = \frac{(2h^2 - 1)x}{2 + 2h^2 + (h^2 - 1)x} - \frac{(h^2 - 1)(2h^2 + 1)x}{2 + 5h^2 + 2h^4 + (h^2 - 1)^2 x}. \quad (18)$$

Deriving an analytical proof that Expression (18) is positive for interior values is intractable. However, the result is easy to verify numerically (code available on request).

■

*Proof Proposition 2:* The result follows from the first order conditions of the maximization problems solved in Lemmas 3 and 4 and from Proposition 1.

Specifically, note that Expressions (14) and (16) derive the equilibrium values of investment under each decision rule by characterizing the level of investment at which the marginal benefit of investment,  $\partial E[a_j|\delta_j, \delta', \delta']/\partial \delta_j$ , is equal to the marginal cost of investment,  $2\delta_j$ .

Therefore, at the equilibrium values of  $\delta^u$  and  $\delta^m$ , it follows that:

$$\begin{aligned}\partial E[a_j|\{\delta^u\}]^u/\partial \delta_j &= 2\delta^u, \\ \partial E[a_j|\{\delta^m\}]^m/\partial \delta_j &= 2\delta^m.\end{aligned}$$

And by Proposition 1,  $\delta^u < \delta^m$ , which implies the result that:

$$\partial E[a_j|\{\delta^u\}]^u/\partial \delta_j < \partial E[a_j|\{\delta^m\}]^m/\partial \delta_j.$$

■

*Proof Proposition 3:* Define  $\delta^d(h)$  as:

$$\delta^d(h) = \delta^m(h) - \delta^u(h).$$

Since both equation (15) and equation (17) are continuous at  $h = 1$ , it follows that  $\lim_{h \rightarrow 1} \delta^d(h) = \delta^d(1)$ , which simplifies to  $\delta^d(1) = x/4$ . Moreover, as  $h \rightarrow 1$ , the NB allocations,  $a(j, k_1, k_2)$  and  $a(q_j, q_k)$ , approach  $x$  and  $3/2x$ , respectively, regardless of  $\{q_j\}$ .

Together, these two results imply that the difference in the donor country's expected utility under Majority and Unanimity, as  $h \rightarrow 1$  is equal to:

$$E[u^d]^m - E[u^d]^u = -\left[x^{\frac{1}{2}} - \frac{2}{3}\left(\frac{3}{2}x\right)^{\frac{1}{2}}\right] + g\left(\frac{x}{4}\right),$$

where the first term reflects the utility loss from allocating  $X$  over two projects only, and the second term reflects the indirect utility benefit of the higher investment under Majority (the direct benefit approaches zero as  $h \rightarrow 1$ ). Donors' expected utility is therefore greater under Majority in a neighborhood of  $h = 1$  if, and only if:

$$g > \frac{4\left[1 - \frac{2}{3}\left(\frac{3}{2}\right)^{\frac{1}{2}}\right]}{x^{\frac{1}{2}}}.$$

■