Conditioning Sovereign Debt Relief On Democratic Decision Making

by

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Abstract

Organizational reforms stimulating democratic decision making are crucial for the economic effectiveness of debt relief. This claim is supported by a theoretic model illustrating the possible role of democratic decision making in increasing lending as well as in determining the effectiveness of debt relief. The proposed model suggests a novel explanation to the advantage of conditioning debt relief on organizational reforms.

Keywords: debt relief, lending, reforms, democracy, autocracy.
1. Introduction

Key debt relief programs condition aid on organizational reforms in the economy including organizational decision-making reforms (henceforth organizational reforms). A reform in the structure of the economy and its organizations contributes to the local population's social welfare as well as to increased transparency in decision making, which improves information availability, protection of rights and also lowers corruption in the economy. Ideological and welfare goals and, in particular, the enhancement of economic growth are, therefore, among the reasons for conditioning aid on such reforms. At the same time, growth is directly related to the flow of financial resources to government and to private projects. We examine whether organizational reforms that require greater democratization in decision making support the enhancement of project financing as intended by debt relief. Accordingly, we focus on the effect of such reforms on the flow of financial resources and introduce some novel insights to this relationship. A theoretic model is used to formalize the relationship between democratization of decision making and lending. Organizational reforms are shown to be crucial for the effectiveness of debt relief because the structure of decision making in an economy's organizations affects the likelihood that projects will be approved. The theoretic model demonstrates the mechanism through which democracy affects lending and, in particular, the effectiveness of debt relief suggesting a novel approach and explanation to the advantage of conditioning debt relief on democratization organizational reforms.

In our framework growth is interpreted as the product of projects that are implemented after receiving approval for funding. Our focus is on the decision process of loan approval required for financing projects in the presence of debt relief. The outcome of this process is compared under organizational regimes that vary in

1 A prominent example of conditional debt relief is the HIPC (Heavily Indebted Poor Countries) initiative which gives eligible countries debt reduction under the condition that governance is decentralized and democratic decision processes are imposed. The international community commits to a level of debt relief, such that countries must have achieved certain reforms and taken concrete steps to reduce poverty in order to receive the full amount of pledged debt relief. Consequently, this type of debt relief provides financial benefits while strengthening countries’ reform efforts. The HIPC initiative began in 1996 and has relieved $99 billion dollars in debt of 36 participating countries, 30 of them in Africa. The HIPC initiative reduces the debt of countries meeting strict criteria.(source: http://www.worldbank.org).

2 Burnside and Dollar (2000) show that aid increases growth in GDP per capita only when good economic policies exist in recipient countries. They also use institutional quality including property rights and the efficiency of government bureaucracy to explain growth in GDP per capita.
their level of democracy. In order to implement projects there is need for (international) funding that is at risk of declining following defaults on loans. Hence debt relief is vital in order to guarantee the continual flow of funds necessary for economic growth as demonstrated in Reinhart and Trebesch (2016) who find that per capita GDP increases when debt relief involves face value reduction. For the purpose of our theoretic model, we assume that conditional debt relief requires that democratic norms are applied by the decision-making institutions in the countries receiving debt relief instead of autocratic ones which may be preferred by the local leadership. Alternatively, the requirement of increased democratization can take the form of increased participation in decision making in countries where a low level of democratization exists in local organizations.

In light of the significance of the decision process applied by organizations in the debt relief receiving countries when making lending decisions, our theoretical framework is that of group decision making in a fixed size committee that is subject to human fallibility. This field of study has attracted a great deal of attention. Nitzan and Paroush (1982, 1985), Grofman et al. (1983) and Shapely and Grofman (1984) laid the theoretical foundations of the uncertain binary choice model. Following previous results, Ben-Yashar and Nitzan (1997) defined the optimal decision rule in an extended setting which allows asymmetric choice. In the debt relief application of this model, a decision committee can be interpreted as a group of decision makers who vote on project approval. The task of the committee is to approve or reject a project while trying to reach the correct decision. Each committee member has expertise in determining whether or not a project should be approved. The decisions of the committee members are aggregated by using a decision rule that yields a final decision regarding the approval or rejection of the requested loan. In our setting the international aid organization can use conditional debt relief as an effective tool to increase project approval while imposing a decision rule. We define autocracy as the rule where the decision is made by one decision maker. Democracy is defined as the

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3 Sah (1991) and Sah and Stiglitz (1986, 1988) applied the asymmetric model to study the architecture of economic systems and, in particular to compare the performance of hierarchies and polyarchies. Other studies analyzed the optimal decision rule under constraints, e.g., Ben-Yashar, Kraus and Khuller (2001) and Ben-Yashar and Kraus (2002), the optimal decision rule in polytomous choice, Ben-Yashar and Paroush (2001), and the optimal allocation of committee members, Ben-Yashar and Danziger (2011). Since the seminal work of Austen-Smith and Banks (1996), much attention has been also devoted to the role of strategic decisions, see for example, Ben-Yashar and Milchtaich (2007). Also see Dietrich and List (2013).
application of the majority rule. Although our focus is on the majority rule, we also study the consensus rule, which requires an extreme majority that assigns ultimate significance to avoidance of failure in the collective decision, viz, approving a bad project. Note that under these democratic rules every decision maker has an equal chance to be pivotal or decisive.

The theoretic model provides sufficient conditions ensuring that more democratic decision making in organizations displays greater lending to the private sector. It is shown that an increase in debt relief does indeed increase lending. We also compare the marginal effectiveness of increasing debt relief under different levels of democracy. The results imply that if the aid organization can control both the debt relief and the level of democratization in organizations, it can exploit its advantage and set the debt relief that induces the maximal increase in project approval. Organizational reforms that impose democratic norms in decision making are important therefore not only for promoting social values, but also, as we show, for increasing the effectiveness of debt relief. However, if the autocrat has sufficiently greater skills at making correct decisions than the remaining decision makers, debt relief effectiveness may decline when imposing democracy and a trade-off exists between debt relief and the organizational reform requirements.

2. The role of democratic decision making in lending and concessionary debt relief
The amount of credit provided and its destination are the product of market forces (supply and demand) and competition. The literature, however, has also linked private credit to institutional quality. Moreover, institutional quality has been linked to political institutions, specifically democratization. The relationship between institutional quality and the financial sector has been demonstrated by Acemoglu and Johnson (2005), where property rights are shown to positively affect economic growth, investments and financial development. Djankov, McLiesh and Shliefer (2007) find that improved legal rights of creditors and information sharing increase private credit. Similarly, Anyanwu, Gan and Hu (2017) find that better institutional quality increases private credit and Fan and Gao (2017) demonstrate how protection of creditor's rights affects private external debt. At the same time, there is a link between political institutions and economic institutions, as demonstrated by Kotschy and Sunde (2017) by showing that institutional quality increases with democracy when equality in
income is high. It is, however, difficult to establish a direct effect of political democratization on financial development due to omitted factors and causality. Thus, the question remains as to whether political democracy improves financial development. For example, Haber (2005) demonstrates for the US and Mexican banking systems that political competition determined the level of centralization in the banking system. However, the literature does not offer a large body of clear cut evidence on the nature of the relationship between political democracy and the financial market. Intuitively, in autocracies even if institutional quality is good in the sense of rule of law and property rights, markets will be centralized and controlled by the government. Moreover, political centralization relates to government control that extends to all parts of the economy and, in particular, to the financial sector in autocracies where the leader wishes to control resources and their allocation. Centralized governments that control resources affect growth in the economy. Apart from appropriation of resources in corrupt regimes, credit to government and state owned enterprises may have a crowding-out effect vs. private lending, since governments compete over the same limited resources (Ayanwuan, Gan and Hu, 2017). In addition, government credit affects interest rates in the economy, and may also suggest greater centralization in asset allocation in the economy. In democracies, however, there is greater freedom, political and otherwise. Yet China is a case where the political climate remained autocratic while economic markets were opened.

Hence, democratization can be viewed at two separate levels: First, the political democratization that relates to the government and its institutions and second, organizational democratization that relates to organizations in the economy. While the question of whether democratization at the political level is related to democratization at the organizational level, and the direction of causality is worthy of research, it is not discussed within the framework of this paper. In this paper we focus on democratization of decision making at the organizational level. At the micro level of lending, the decision making structure – centralized or decentralized – affects credit decisions in banks (Stein, 2000). Hence, credit is affected by decision making norms in lending institutions.4 This has particular importance in the context of debt relief

4 Stein (2002) discusses the effect of two specific (centralized vs. decentralized) such designs on the share of small business lending. Canales and Nanda (2012) studies the organizational structure that provides better lending terms for small businesses finding that decentralized banks provide larger loans to small businesses. These findings are further supported by Cotugno et al (2013) where hierarchical distance is shown to be negatively related to credit availability. However, the decision structure not
programs that increase the amount of resources in the economy with the aim that their allocation will create growth in the economy. On the effectiveness of aid and debt relief, Burnside and Dollar (2000) show that aid increases growth in GDP per capita only when good economic policies exist in recipient countries. They also use institutional quality including property rights and the efficiency of government bureaucracy to explain growth in GDP per capita. Asiedu (2003) links institutional quality to the success of debt relief programs. For the effects of corruption on the efficiency of aid on growth, see Aidt (2003), and Hillman and Krausz (2007) and Jalles (2011). In this paper we study whether debt relief conditional on reforms should include greater democratization in decision making at the organizational level to increase aid effectiveness.

Countries that are unable to repay debt may be eligible for concessional debt relief that allows them to borrow fresh funds at reduced interest rates. The World Bank gives the following definitions of concessional debt "Concessional debt to total external debt stocks. Concessional debt is defined as loans with an original grant element of 25 percent or more "Concessionality". The degree of concessionality of a loan is measured by its “grant element”. The grant element is defined as the difference between the loan’s nominal value (face value) and the sum of the discounted future debt-service payments to be made by the borrower (present value), expressed as a percentage of the loan’s face value. Whenever the interest rate charged for a loan is lower than the discount rate, the present value of the debt is smaller than its face value, with the difference reflecting the (positive) grant element of the loan".

Some central debt relief programs such as the HIPC initiative, condition debt relief on reforms that include greater decentralization in the economy and improved decision processes. While this is important from the social welfare point of view, the theoretic model presented below, suggests a mechanism through which the level of democracy in decision making processes at the organizational level affects lending decisions and hence determines the effectiveness of this type of debt relief.

only affects the likelihood of loan approval, but also determines the quality of the loan decision. Liberti and Mian (2009) find that greater hierarchical distance between the agent who collects information and the loan officer who makes the loan decision leads to less reliance on subjective information and more reliance on objective information. Meissner (2005) studied the effect of the number of votes needed to approve loans using historical data from New England focusing on the approval of loans with private gains and emphasizing the effect on good lending practices. Graham, Harvey and Puri (2015) examines the decision process and use of information as it is reflected in the delegation of financial decisions within firms.
3. The model
Local entrepreneurs in the receiving country have projects that they wish to carry out. Decisions are made by a credit disbursing organization (private or government owned) that decides on allocation of resources between entrepreneurs on behalf of the economy. The entrepreneurs, who have no wealth, can apply for funding in the amount of 1 unit, which if granted, allows them to proceed with their project that requires 1 unit of investment. The funding can be used only for the purpose of investing in the project. A project returns either \( Y \), which is fully observable, with probability \( P_y > 0 \) or zero with probability \( (1 - P_y) \). The entrepreneur knows the characteristics of his project, so from his point of view, the expected return from his proposed project is \( P_y Y \). The probability \( P_y \) represents the project's risk level whereby a low risk project is associated with a high \( P_y \).

The success of the projects (and hence of the economy) depends on the realization of the return \( Y \) on the project, that is, on the probability \( P_y \). However, a project's \( P_y \) is unknown to the credit disbursing organization. For the organization it is a random variable that varies according to a commonly known distribution function.

Lending resources are obtained from either private or public external lenders, creating external debt. The credit disbursing organization must decide whether to approve or reject the entrepreneur's funding application, taking into account that the gross cost of borrowing 1 unit from external lenders is equal to \( R \geq 1 \). Debt relief is represented by \( g \), where \( g \) is the amount of debt that is relieved by multinational lenders. \( R \) reflects the risk adjusted return and \( g \) is the grant component of debt relief. It is set such that, \( 0 \leq g \leq R \). Consequently, the expected income from a project that has borrowed funds is: \( P_y Y - (R - g) \). There are two types of projects, good projects (1) and bad projects (-1). From the perspective of the credit disbursing organization a correct decision is to approve (1) a good project and to reject (-1) a bad project where a good project has a probability of success \( P_y > \tau \), where \( \tau \) is the threshold probability of success that determines what is a correct decision from the credit disbursing organization's standpoint, i.e., there is a positive expected income from a project. The threshold probability \( \tau \) is determined by the parameters known to the government, \( g \), and \( R \), such that for cases where \( P_y > \tau \), \( \tau = \frac{R - g}{Y} \), a project
provides positive expected income, \( P_y (R - g) > 0 \). Hence, given the distribution function \( f(P_y) \) of \( P_y \), the a-priori probability of a good project, \( \alpha \), is determined as follows: 
\[
\alpha = \int_{-g}^\infty f(P_y)dP_y.
\]
Since \( \frac{\partial \tau}{\partial g} < 0 \), it follows that \( \frac{\partial \alpha}{\partial g} > 0 \). That is, an increase in the size of debt relief lowers the threshold for good projects resulting in a larger a-priori probability that the credit disbursing agency faces a good project. We assume that a candidate project that is presented for an approval decision has greater a-priori probability that it is good than bad. This is a plausible assumption since the credit disbursing agency can apply effective initial screening of projects so that valuable decision-making resources are not wasted on projects that are more likely to be bad than good. Alternatively, the existence of such favorable candidate projects can be justified by assuming that \( g \) is sufficiently high.

Since the probability \( P_y \) is unknown to the credit disbursing agency, it appoints a committee of \( n \) members whose task is to approve or reject a project application by assessing whether \( P_y > \tau \) or not. The common objective of all the committee members is to make the correct decision concerning project approval. Each member's decision regarding the type of project (good or bad) is based on his specific information, such as past experience in approving the entrepreneur's projects, the entrepreneur's leverage and other attributes of the entrepreneur and of the project application. The decisional skill of committee member \( i \), is better than a random decision and is represented by \( p_i \), \( \frac{1}{2} < p_i < 1 \), which represents his probability of approving a good project and rejecting a bad one. We assume that the committee members' decisional skills are statistically independent across committee members. Specifically, we refer to the homogeneity assumption when committee members' skills are identical, i.e., \( p_i = p_j \) for all \( i \neq j \).

A final decision is reached by applying a decisive decision rule, which is a function that assigns 1 (approval) or -1 (rejection) to any set of decisions made by the members of the committee. We focus on three organizational systems. First, democracy, which is represented by the majority rule; That is, the committee's

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5 Formally, \( \alpha > (1 - \alpha) \).

6 In our setting, we can disregard the typical problems that arise in a classical social choice setting where preferences are heterogeneous (e.g., the difficulty of attaining a social compromise, (Young 1988, 1995) and the problem of majority tyranny, (Baharad and Nitzan, 2002).
decision is 1, if and only if the number of the credit committee members who support approval is larger than 50% of the committee members. Clearly, the larger the number of members in the committee, the more democratic the system is. Second, autocracy, where the decision is 1 if and only if the autocrat supports approval. The autocrat's skills are denoted by \( p_i \), and we assume that \( p_i > p_1 \) for all \( i \neq 1 \). Finally, we compare our results to those obtained under the consensus rule whereby the approval of all the committee members is required to approve a project.

In our setting, the applied decision rule by the credit disbursing organization may initially be an autocracy that acts according to the dictates of an autocratic government. Debt relief \( g \), is awarded under the condition that reforms are adopted resulting in democratic decision making, corresponding to the application of the majority rule. Alternatively, the initially applied decision-making rule may be democratic, which corresponds to a majority rule. In such a case the debt relief \( g \) may be conditioned on increased democratization, namely an increase in the size of the decision committee. In our model the credit disbursing organization is the agent in the economy who implements the reforms with respect to the decision making process. In the following results we examine the conditions under which organizational reforms increase the efficiency of debt relief.

4. The effect of debt relief on project approval
Let us denote the probabilities that the committee approves a good project and rejects a bad project by, \( T(1) \) and \( T(-1) \), respectively. Hence, the probability that a request is approved by the committee is denoted by \( \Pr(1) \) where \( \Pr(1) = \alpha T(1) + (1 - \alpha)(1 - T(-1)) \). Note that \( 1 - T(-1) \) is the probability that the approved decision is incorrect. Note that \( \alpha \), the a priori probability that a project is good depends on two factors, the distribution of good and bad projects in the population and the level of debt relief, \( g \).

We consider two cases of organizational structure in receiving countries. One in which the country receiving debt relief is an autocracy where all decisions are dictated by a central authority. The second case is that of a country that applies democratic decision making in its economic organizations using the majority rule. The conditional debt relief program requires increased democratization either by adopting the majority rule or by adding decision makers to the decision committee.
Under the homogeneity assumption, we can establish that increasing democratization results in an increase in the probability of loan approval, which is in line with our empirical results. Let \( \Pr(1: \text{democracy}) \) and \( \Pr(1: \text{autocracy}) \) denote the probability of approval for democracy and autocracy, respectively.

**Proposition 1:**

*Under the homogeneity assumption,*

(a) \( \Pr(1: \text{democracy}) \geq \Pr(1: \text{autocracy}) \)

and

(b) \( \frac{\partial \Pr(1: \text{democracy})}{\partial n} > 0 \)

**Proof:**

(a) Under democracy and autocracy, \( T(1) = T(-1) \).

Hence, \( \Pr(1) = \alpha T(1) + (1 - \alpha)(1 - T(1)) = T(1)(2\alpha - 1) + (1 - \alpha) \).

The probability of approval therefore depends only on the probability of making a correct decision \( T(1) \) and on \( \alpha \). As is well known, under the homogeneity assumption, this probability increases with the committee size (Condorcet, 1785). Since, by assumption, \( \alpha > \frac{1}{2} \), \( (2\alpha - 1) \) is positive. It therefore follows that increased democratization, that is, a move from autocracy to the democracy increases the probability of approval, \( \Pr(1: \text{democracy}) \geq \Pr(1: \text{autocracy}) \). A similar argument can be used to prove (b).

Q.E.D.

We now establish that the debt relief enables the receiving country to increase the probability that a loan is approved. Namely, the probability of approval increases with the magnitude of the debt relief, \( g \), that is: \( \frac{\partial \Pr(1)}{\partial g} > 0 \).

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7 Under these two rules the requirements for decision 1(accept) are identical to the requirements for the decision -1(reject). That is, under democracy there is need for a majority vote to accept a project and a majority vote to reject a project. Similarly, under autocracy, the autocrat must be in favor of a project for it to be accepted and against a project for it to be rejected.
**Proposition 2:**

*Under democracy and autocracy*, $\frac{\partial \Pr(1)}{\partial g} > 0$.

**Proof:**

As already established in Proposition 1, $\Pr(1) = \alpha T(1) + (1 - \alpha)(1 - T(1)) = T(1)(2\alpha - 1) + (1 - \alpha)$. Hence, $\frac{\partial \Pr(1)}{\partial g} = \frac{\partial \alpha}{\partial g} (2T(1) - 1)$ which is positive since $\frac{\partial \alpha}{\partial g} > 0$ and $T(1) > 0.5$ under our assumption that $i$ for all $p_i > \frac{1}{2}$

Q.E.D.

The probability of approving a project increases with debt relief due to the fact that the a-priori probability that a project request is good increases when the threshold of good projects is reduced. The lower threshold is achieved by the debt relief that reduces the cost of borrowing. The implication is that, from the point of view of the decision committee members there is a larger proportion of good projects. Hence, some projects that would have been rejected before the introduction of debt relief are now approved.

Notice that the marginal effectiveness of debt relief on the probability of loan approval depends only on the probability of making a correct decision $T(1)$ and on $\frac{\partial \alpha}{\partial g}$. Note that $T(1)$ is increasing with decision makers' skills and, under the homogeneity assumption increases with the number of decision makers. When the autocracy is changed to democracy with homogeneous decision makers, the probability of making a correct decision is again increased. It is straightforward to obtain the following two corollaries.

**Corollary 1:**

Under the homogeneity assumption, increased democratization increases the marginal effect of $g$ on the probability of approval.

**Corollary 2:**

The higher the skills of the committee members, the larger the marginal effect of debt relief on the probability of loan approval.
Let $\frac{\partial \Pr(1: \text{democracy})}{\partial g}$ and $\frac{\partial \Pr(1: \text{autocracy})}{\partial g}$ denote the marginal change in the probability of approval following an increase in debt relief for the democracy, and autocracy respectively. In the following proposition we compare the marginal effectiveness of $g$ in increasing the probability of approval under democracy and autocracy.\(^8\)

**Proposition 3:**

$$\frac{\partial \Pr(1: \text{democracy})}{\partial g} \geq \frac{\partial \Pr(1: \text{autocracy})}{\partial g} \text{ if and only if } \prod_{i=2}^{n} \frac{p_i}{1-p_i} \geq \frac{p_1}{1-p_1}.$$

**Proof:**

$\frac{\partial \Pr(1: \text{democracy})}{\partial g}$ and $\frac{\partial \Pr(1: \text{autocracy})}{\partial g}$ depend only on $T(1)$ (see proof of Proposition 2). However, $T(1)$ under democracy is not less than $T(1)$ under autocracy if and only if $\prod_{i=2}^{n} \frac{p_i}{1-p_i} \geq \frac{p_1}{1-p_1}$ as shown by Nitzan and Proush (1982).

Q.E.D.

Proposition 3 shows the conditions concerning skills under which marginal effectiveness of debt relief is greater under democracy. In particular, the following corollaries are obtained.

**Corollary 3:**

Under the homogeneity assumption, $\frac{\partial \Pr(1: \text{democracy})}{\partial g} \geq \frac{\partial \Pr(1: \text{autocracy})}{\partial g}$.

**Corollary 4:**

If $p_1$ is sufficiently larger than the skills of all other committee members, then $\frac{\partial \Pr(1: \text{democracy})}{\partial g} < \frac{\partial \Pr(1: \text{autocracy})}{\partial g}$.

\(^8\) In Ben-Yashar, Krausz and Nitzan (2018), the marginal effectiveness of a loan guarantee is analyzed in a different setting and a more simple framework where skills are homogenous and the discussion is confined to anonymous qualified majority rules.
These results reveal that there could be a trade-off between the two components of debt relief whereby in certain cases, which are determined by the insufficient skills of the decision makers, forcing democratization reforms on the organizations in the country receiving debt relief reduces the marginal effectiveness of debt relief.

We now turn to the marginal effectiveness of $g$ in increasing the probability of approval under the consensus rule and to its comparison to the marginal effectiveness of $g$ under autocracy and democracy. Let $\frac{\partial \Pr(1: \text{consensus})}{\partial g}$ denote the marginal change in the probability of approval under the consensus rule following an increase in debt relief. Then

**Proposition 4**

$$\frac{\partial \Pr(1: \text{consensus})}{\partial g} > 0.$$

**Proof:**

Under consensus, $T(1) = \prod_{i=1}^{n} p_i$ and $T(-1) = 1 - \prod_{i=1}^{n} (1 - p_i)$. Hence,

$$\frac{\partial \Pr(1: \text{consensus})}{\partial g} = \frac{\partial}{\partial g} \left( \prod_{i=1}^{n} p_i - \prod_{i=1}^{n} (1 - p_i) \right).$$

This term is positive because

$$\frac{\partial}{\partial g} > 0 \quad \text{and} \quad \prod_{i=1}^{n} p_i - \prod_{i=1}^{n} (1 - p_i)$$

is positive, since according to our assumptions,

$$p_i > \frac{1}{2},$$

which is equivalent to $p_i > 1 - p_i$ for all $i$.

Q.E.D.

Proposition 4 shows that debt relief, $g$, increases the probability of approval under consensus. However the marginal effectiveness of $g$ might be less than in the case of autocracy.

**Proposition 5**

$$\frac{\partial \Pr(1: \text{consensus})}{\partial g} \leq \frac{\partial \Pr(1: \text{autocracy})}{\partial g} \iff \frac{1 - \prod_{i=2}^{n} (1 - p_i)}{1 - \prod_{i=2}^{n} p_i} \leq \frac{p_i}{1 - p_i}.$$
Proof:

\[
\frac{\partial \Pr(1: \text{consensus})}{\partial g} = \frac{\partial \alpha}{\partial g} \left( \prod_{i=1}^{n} p_i - \prod_{i=1}^{n} (1 - p_i) \right).
\]

\[
\frac{\partial \Pr(1: \text{autocracy})}{\partial g} = \frac{\partial \alpha}{\partial g} (2p_1 - 1). \text{ Hence,}
\]

\[
\frac{\partial \Pr(1: \text{autocracy})}{\partial g} \geq \frac{\partial \Pr(1: \text{consensus})}{\partial g} \iff (2p_1 - 1) \geq \left( \prod_{i=1}^{n} p_i - \prod_{i=1}^{n} (1 - p_i) \right) \iff
\]

\[
(2p_1 - 1) \geq p_1 \prod_{i=2}^{n} p_i - (1 - p_1) \prod_{i=2}^{n} (1 - p_i) \iff
\]

\[
(1 - p_1) \left( \prod_{i=2}^{n} (1 - p_i) - 1 \right) \geq p_1 \left( \prod_{i=2}^{n} p_i - 1 \right) \iff \frac{p_1}{1 - p_1} \geq \frac{\prod_{i=2}^{n} (1 - p_i) - 1}{\prod_{i=2}^{n} p_i - 1} = \frac{1 - \prod_{i=2}^{n} (1 - p_i)}{1 - \prod_{i=2}^{n} p_i}.
\]

Q.E.D.

Proposition 5 shows that autocracy is more beneficial for debt relief than consensus provided that the skills of the autocrat are sufficiently greater than those of the other decision makers. The reason is that in an autocracy, we assume that the autocrat has greater skills than the other decision makers and under the consensus rule, it is sufficient for any decision maker (who does not necessarily have greater skills than the others) to reject the project and impose his choice.

**Corollary 5:**

Under the homogeneity assumption, \( \frac{\partial \Pr(1: \text{autocracy})}{\partial g} \geq \frac{\partial \Pr(1: \text{consensus})}{\partial g} \).

**Proof:**

Under the homogeneity assumption,

\[
\frac{\partial \Pr(1: \text{autocracy})}{\partial g} \geq \frac{\partial \Pr(1: \text{consensus})}{\partial g} \iff \frac{p}{1 - p} \geq \frac{1 - (1 - p)^{n-1}}{1 - p^{n-1}}, \text{ which holds when}
\]

\[
p - p^n \geq 1 - p - (1 - p)^n \iff 2p - 1 \geq p^n - (1 - p)^n.
\]

This condition holds for \( n=1,2 \).
Let us assume that it holds for \( n \), that is, \( 2p - 1 \geq p^n - (1 - p)^n \), and show that it holds for \( n+1 \), i.e., that \( 2p - 1 \geq p^{n+1} - (1 - p)^{n+1} \). To complete the proof, we need to prove that \( p^n - (1 - p)^n \geq p^{n+1} - (1 - p)^{n+1} \). This inequality holds because it is equivalent to

\[
\left( \frac{p}{1-p} \right)^n \geq \frac{p}{1-p},
\]

which holds.

Q.E.D.

Corollary 3 and Corollary 5 show together that under the homogeneity assumption,

\[
\frac{\partial \Pr(1: \text{democracy})}{\partial g} \geq \frac{\partial \Pr(1: \text{autocracy})}{\partial g} \geq \frac{\partial \Pr(1: \text{consensus})}{\partial g}.
\]

Hence, in the case of homogeneous decisional skills, not all forms of democratization are beneficial for debt relief programs. In particular, the form of democratization that requires a full consensus for approval of projects and hence extreme caution in loan approval is the least beneficial in terms of the effectiveness of debt relief in increasing loan approval.

5. Conclusions

Our theoretic model combines decision-making aspects of democracy and debt relief to expose the mechanism by which these two factors are related demonstrating conditions ensuring that democratization reforms increase lending. In the model, democratization is discussed in two cases. In one case, the receiving country is an autocracy that must adopt the majority rule in its organizations in order to receive debt relief. In the other case, the country has democratic decision making in its organizations but must increase democratic participation by increasing the size of the decision committee in its organizations in order to receive debt relief. In both cases it is shown that increasing democratization increases lending under the homogeneity assumption. We clarify the mechanism through which debt relief increases lending. Such an increase is obtained because debt relief increases the a-priori probability that a project is good. We also provide sufficient conditions for democratization to increase the marginal effectiveness of concessionary debt. In this way we reveal the theoretic underpinnings of the relationship between three crucial factors: democratization in decision making, loan approval and debt relief exploring the justification of debt relief that is conditional upon organizational reforms that require greater democratization in decision making at the organizational level.
Our theoretic model also shows that in the case of converting autocratic decision making to democracy, the importance of democracy in increasing debt relief effectiveness is dependent on skills. For democratic decision making to be most effective, the decision makers' skills must be high. Otherwise, that is, if these skills are low while the autocrat has considerably greater skills, debt relief is more effective under autocracy. In this latter case, there is a trade-off between debt relief and democratization reforms. We therefore point to education as a crucial factor for the effectiveness of debt relief programs. Namely, it is not sufficient to demand organizational reforms without enabling decision makers to have the necessary skills to make correct decisions.

**References**


