

## Foreign Aid with Voracious Politics

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*Fractional domestic politics are at the root of continued poverty in some developing countries and pose a dilemma for donors and international financial institutions. This paper examines the effects of foreign assistance in countries with plentiful investment opportunities when interest groups compete for unproductive government transfers. We assess conditional and unconditional assistance (project and program aid, loans, and grants). We find that project conditionality alone may fail to spur growth. Official development loans channeled to investment may not increase the recipient's growth and welfare even if interest groups are unable to appropriate aid funds directly. Conditions must tackle the domestic drivers of inefficient fiscal policies. To improve the composition of government expenditure, increase growth, and improve welfare, tax rates must be kept constant and loan repayment be financed by cuts in unproductive transfers. Official development grants are superior to loans of the same net present value if donors cannot enforce conditions on assistance.*

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**T**he economic development of some countries is greatly hampered by international credit constraints and by fractious domestic politics. Lack of access to international capital causes under-provision of productive public investments in health, education, and infrastructure even in countries with perfect political systems. Flawed political institutions compound the problem.

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When central governments are weak and public spending decisions reflect the political influence of organized constituencies rather than the general public's interests, patterns of government spending are distorted and economic performance suffers. If excessive appetite for rents dominates public spending decisions, government resources are diverted from productive activity toward rent-seeking. In such circumstances, foreign transfers and other potentially favorable developments may actually cause recipient countries to be worse off—a phenomenon Tornell and Lane (1999) termed “the voracity effect.”

In this paper, we examine the economic effects of international assistance (loans and grants) to a credit-constrained country in which interest groups compete for government transfers as in Tornell and Lane.<sup>1</sup> We find that loans conditioned on public investment alone—that is, loans directed exclusively at investment—will not necessarily increase growth or welfare in the recipient country, even when conditions can be perfectly enforced. Thus project conditionality may fail to produce the desired results in countries ravaged by voracious politics. However, extending conditionality to take into account the underlying drivers of a country's fiscal policy can help reduce distortions in the composition of government spending and increase growth and welfare. This prediction is roughly consistent with the aid patterns historically. Broadly speaking, international development loans were initially conditioned on the implementation of individual projects. Over time, as the limits of project conditionality became apparent, multilateral and bilateral donors expanded the scope of their conditions. The budget support loans used by donors focus on reforms in the recipients' domestic fiscal policies, including of the level and composition of spending, public expenditure management systems, and reform of tax policies and administration.

In our application of Tornell and Lane's idea, organized interest groups devote time to “producing” transfers from a central government. These groups allocate their resources (time, effort, and money) to what Bhagwati (1980, 1982) and Bhagwati and Srinivasan (1982) have dubbed directly unproductive activities: protests, strikes and lobbying aimed at changing laws and regulations, generating unproductive government employment, and obtaining national funds for unproductive local projects.<sup>2</sup> These unproductive activities

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<sup>1</sup>Tornell and Velasco (1992) and Amador (2008) also set up economic environments in which domestic interest groups demand too much spending from the government because the costs of spending are spread over the entire economy. Interestingly, Amador shows that it is in the interest of an “over-spending” country to repay its foreign debt. In our paper, we simply assume that foreign debts are repaid. We then examine the consequences for debt repayment on rent-seeking and the productivity of investment project funded by the loans.

<sup>2</sup>In their analysis of how governance problems reduce economic growth, Kaufman, Mastruzzi, and Zarlita (2003) discuss the key sources of patronage politics, several of which relate to fractious political environments. In such environments, politicians face heightened incentives to maintain and expand support from opposing groups through offers of public jobs and other perks. Often coalition governments are formed based on explicit agreements for sharing state patronage. Patronage politics motivates the need for tax and expenditure and civil service reforms in many developing countries. See Agénor (2004, pp. 592–94).

lower current output and the future returns of public investments. We consider a country that is poor for these reasons and, additionally, because it is confronted with international borrowing constraints.

The presence of directly unproductive activities complicates the ability of international assistance to mitigate the effects of borrowing constraints. We show that development loans that firmly condition, dollar-for-dollar, on productive public spending on investment can fail to increase growth and welfare. A transfer paradox of sorts emerges: the weak central government faces pressure to maintain transfers to interest groups and to repay loans by raising future tax rates. In political equilibrium, interest groups have incentives to further divert time away from productive activity and toward the “production” of government transfers. The result is lower overall welfare in the economy, because the return on investment is lowered and may not even exceed loan repayment. A favorable exogenous policy shock, loans from international donors, results in lower welfare and growth!

One way to prevent the voracity effect is to extend the conditions of international loans to tackle the underlying distortions in the country’s public expenditure policies. The guiding principle is that the repayment of debt should not favor rent-seeking over productive activity. Toward this end, loan conditions should be extended to require that (1) *future* tax rates be maintained and (2) loan repayments be financed by cuts in those government spending categories that are particularly susceptible to corruption and rent-seeking. Reducing the incentive to seek rents will increase productive activity and guarantee that improvements in growth and welfare materialize. While this principle is clear in theory, identifying the appropriate cuts in government spending may not be obvious to the donors in reality. For example, corrupt public “investment” projects can be used as a vehicle for making transfers to favored groups (Keefer and Knack, 2007). Knowing which spending to cut requires detailed knowledge of the country’s politics. For this reason, we stress that the cooperation of the recipient country’s finance minister, backed by sound technical, cost-benefit analysis of projects, and with input from other stakeholders, is crucial in establishing the appropriate fiscal conditions.

In practice, detailed fiscal conditions of the sort advocated here have long formed an important part of the conditionality featured in programs of adjustment and reform supported by the International Monetary Fund (IMF) and the World Bank. Initially, the conditions imposed by the international financial institutions (IFIs) focused on broad macroeconomic, price and trade-related reforms, such as ceilings on the rate of expansion of domestic credit and the budget deficit, and liberalization of prices and trade. Detailed fiscal conditions reflect the reality that in many low-income countries, the composition of government spending is distorted, reflecting the political influence of powerful interest groups. In the absence of detailed fiscal conditionality, the composition of government spending in many low-income countries would be distorted away from productive spending, including much-needed investments in human and physical capital. A cap

on the overall budget deficit that did not take aim at the bias in favor of unproductive spending and transfers to politically connected interest groups might succeed in meeting short-run stabilization objectives but would fail to raise growth in the recipient. Empirical work finds that fiscal adjustments that require changes in the composition of spending in low income countries, toward investment and away from consumption, are important for growth (Baldacci, Clements, and Gupta, 2003, survey research on this topic).

In response to lackluster growth in some countries receiving IFI assistance, the focus of conditionality gradually shifted away from short-term macro-economic, trade and price adjustment, to encompass more complex structural fiscal, financial, and corporate sector issues. In particular, starting in the mid-1980s, IFIs began to routinely sponsor comprehensive public expenditure reviews (PERs) that scrutinized the efficiency of various components of public spending against the marginal cost of raising funds, including through borrowing. These PERs typically advocate reallocation of spending away from categories favoring powerful interest groups and toward deserving but under-represented constituencies. The most important recommendations of these reviews eventually become conditions of IFI loans.<sup>3</sup> In recent years, governments and the international community have redoubled their efforts to improve the mix of public spending in order to meet the United Nations Millennium Development Goals (MDGs) by 2015. With aid flows projected to increase markedly, and with many aid recipients still falling short of achieving several of the MDGs, there has been increased analytical scrutiny of the level and efficiency of different categories of public spending. At issue is the appropriate level, composition, and phasing of aid-financed spending between investment in basic infrastructure (such as roads, energy, and irrigation) and spending on social sectors. Quantitative models, such as the World Bank's Maquette for MDG Simulations (MAMS) focus on this distinction, as do econometric examinations of the impact of different types of aid.<sup>4</sup>

Our paper formalizes the mechanism through which public spending gets distorted and provides a welfare justification of the need for detailed fiscal conditions. In our model, as well as in practice, detailed conditions aim at improving the composition of government spending and reducing the resources devoted to directly unproductive activities. Such detailed conditions may have a powerful effect on policies so long as the domestic political economy is not too adverse. In some situations, however, the

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<sup>3</sup>Examples are the public sector reform loans of the World Bank and the loans granted under the IMF's Poverty Reduction and Growth Facility. See, for example, World Bank (2006).

<sup>4</sup>On the evolving focus of World Bank conditions, see Koeberle and Malesa (2005, p. 52). On the trends in structural conditionality in IMF-supported programs, see IMF (2001, pp. 8–13). On the appropriate level and mix of different types of aid-financed spending to meet the MDGs, see Sundberg and Lofgren (2006, pp. 147–50). See also Clemens, Radelet, and Bhavnani (2004). Again, the sensible strategy of encouraging public infrastructure investment is subject to the proviso that corrupt “investment” projects can also be the sources of pure transfers to interest groups and of unproductive government consumption.

domestic political system is so configured that external carrots and sticks cannot have decisive impact. In such environments, lending and aid selectivity is the appropriate response of altruistic donors.

### I. The Environment

There are  $m$  groups of households. As in Tornell and Lane (1999), the groups may be provincial governments, unions, industry advocates, or communities that have political connections with government officials. Each group is represented by a single household-type. For notational simplicity, we assume that there is just one household per group. While the households representing the different groups differ politically and compete with each other over government transfers, they are identical in terms of preferences, productivity, and the ability to generate transfers.<sup>5</sup>

Each household lives for two periods and is endowed with one unit of time each period. The productivity of household time ( $h$ ) is determined by public investments carried out by the central government (roads, communications infrastructure, schools, and public health provisions). Productivity in the current period ( $h_1$ ) is given (based on past investments), but future productivity ( $h_2$ ) is determined by current period investment decisions made by the central government ( $x$ ). We assume  $h_2 = x^\theta$ , with  $\theta < 1$ . In each period, households choose how much time to devote toward productive activity ( $n$ ) and how much to devote toward procuring government transfers ( $1-n$ ), which for convenience we shall call “rent-seeking.”<sup>6</sup> Time devoted to work generates net income equal to  $(1-\tau)whn$ , where  $\tau$  is the income tax rate and  $w$  is the rental rate for human capital.<sup>7</sup>

<sup>5</sup>Our setup is similar to Tornell and Lane (1999) in that there are  $m$  different interest groups that compete in a Nash game for public funds. Beyond this basic assumption the details of the two approaches are different. Tornell and Lane focus on taxing physical capital to finance transfers. Agents have the option to avoid the tax by investing in less productive, but untaxed, nonmarket firms. In equilibrium the net-of-tax return to market and nonmarket investments must be equated. The voracity effect results because any increase in the productivity of market investments must be met by a perfectly offsetting rise in taxes and government transfers, so as to maintain equality in rates of return across market and nonmarket sectors.

<sup>6</sup>One could generate similar results with a model of labor-leisure choice, rather than focusing on the choice between productive work and rent-seeking. However, rent-seeking activity seems to be a more important source of poverty in low-income countries, where output *per worker* is very low, than is leisure demand. For a given level of recorded employment, the greater the fraction of the employment that is allocated to unproductive activities, the lower would be average worker productivity. The rent-seeking model also produces sharper predictions because it is a pure time allocation model (between two income generating activities) and therefore includes no wealth effects that make predictions about the labor-leisure choice theoretically ambiguous.

<sup>7</sup>Many poor countries have difficulty collecting taxes on wages and instead rely on taxing physical capital. However, introducing capital would not add any new insights to the analysis. In a small open economy, all capital taxes are passed on to labor in the form of a lower pre-tax wage rate. For our purposes, this is equivalent to taxing wages directly.

We assume that the economy is small and open to private physical capital flows, but that international private loans for human capital investment are unavailable. Goods are produced in a single sector with a Cobb-Douglas technology and factor markets are competitive. The economy's rental rates on human and physical capital are  $w = (1-\gamma)k^\gamma$  and  $r = \alpha k^{\alpha-1}$ , where  $\gamma$  is the capital share,  $k$  is the ratio of physical to human capital in production, and  $r$  is the international rental rate on physical capital.

Activities that generate government transfers are lobbying, legal actions, unproductive government employment, and efforts to obtain national funds for unproductive local projects. We assume the technology for generating transfers ( $T$ ) is  $T = \phi(1-n)^\phi h$ , where the parameters satisfy  $0 < \phi_0$  and  $0 < \phi < 1$ . There is diminishing marginal productivity associated with devoting time to rent-seeking, but human capital raises productivity in work and in rent-seeking proportionally. We make this assumption because we know of no evidence, casual or otherwise, suggesting that education affects the productivity of work differently from the productivity of rent-seeking.<sup>8,9</sup> Even when interpreting rent-seeking as unproductive public employment, education "credentials" could increase the size of the transfer ("wage") or more educated local official could better secure national government funding for local public works employment.

The period budget constraint of the household is given by

$$c = (1 - \tau)whn + T \quad (1)$$

Household preferences are given by

$$\ln c_1 + \beta \ln c_2 \quad (2)$$

where  $\beta > 0$  is the household's constant time discount factor. Households also take account of the government budget constraint in period  $i = 1, 2$ ,

$$\sum_{j=1}^m (T_{ij} + e_{ij}) = \tau wh_i \sum_{j=1}^m n_{ij}, \quad (3)$$

where  $e_{ij}$  represents public expenditures per group member,  $T_{ij}$  is the transfers to group  $j$ , and  $n_{ij}$  is the productive work effort of group  $j$ . We

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<sup>8</sup>A more general specification would allow rent-seeking to be a function of the size of the government's budget. Here we focus on the case where international assistance is allocated, dollar for dollar, to raise public investment, which implies that the discretionary budget is unaffected by outside loans. We show that even in this idealized setting, development loans may fail to improve welfare.

<sup>9</sup>Easterly (2001, p. 82) argues that increased education will not lead to increased production when the incentives are not right. "One clue as to why education is worth little more than hula hoops to a society that wants to grow comes from what educated people are doing with their skills. In an economy with extensive government intervention, the activity with the highest returns to skills might be lobbying the government for favors. In an economy with many government interventions, skilled people opt for activities that redistribute income rather than activities that create growth."

assume that the central government has the authority to choose  $e$  (or, equivalently, that all groups can agree and coordinate on some basic public expenditures).

## II. Autarky

We assume throughout that the central government (1) chooses first period public investment to maximize the welfare of each household and (2) *might* like to borrow funds at the international interest rate ( $r$ ), but cannot do so without going through official creditors or IFIs that have the power, via penalties at their disposal, to enforce repayment. In this section we assume official creditors extend no loans to the country, so that investment and consumption in the first period are constrained by current resources. In this setting, first period public investment is  $e_1 = x$  and, with no international borrowing and no second period loan repayment,  $e_2 = 0$ .

### Cooperative Solution

If groups coordinate, perhaps through the facilitation of a strong central government, then each group understands that there is no way to obtain transfers at the expense of the other groups. In other words, it is understood that transfers per group will equal taxes per group. This recognition removes all incentives to divert resources to competitive rent-seeking, making it optimal to set  $n = 1$ .

The central government then chooses  $x$  to maximize the representative household's utility. The solution is  $x^* = \theta\beta wh_1/(1 + \theta\beta)$ . This assumes that the country is sufficiently poor that  $x^*$  is less than the productively efficient choice of  $x$ , which is found by equating the marginal product of  $x$  to  $1 + r$ , or  $[\theta w/(1 + r)]^{1/(1-\theta)}$ .

### Noncooperative Solution

If the groups do not coordinate their decisions, then each chooses its level of rent-seeking effort taking the other groups' behavior as given. Households act under the belief that some of the tax burden of raising their transfers can be passed off to other groups. The central government and the different interest groups play a noncooperative Nash game, where all actions are taken simultaneously.<sup>10</sup>

We treat each group symmetrically, so the first-order conditions for the common choice of  $n$  in each period  $i$  is

$$\left(1 - \tau_i \left(1 - \frac{1}{m}\right)\right) w = \phi_0 \phi (1 - n_i)^{\phi-1} \left(1 - \frac{1}{m}\right). \quad (4)$$

<sup>10</sup>See Appendix I for derivations of group behaviors in the noncooperative Nash equilibrium.

The left-hand side is the marginal benefit of allocating human capital to production, the after-tax rental rate on human capital. This expression is adjusted for the fact that when a group increases its productive work, the tax base increases and tax rates can be lowered. However, the lower taxes are spread across the entire economy so that the individual group only enjoys  $1/m$  of the tax saving. The right-hand side is the opportunity cost of allocating time to productive activity, the forgone net transfers that would result from further rent-seeking. Marginal increments in rent-seeking yield positive net transfers because each group views the tax price of a dollar of transfers as  $1/m$ . Again, this is because the tax increase needed to raise transfers to just *one* group will be spread over  $m$  groups via a higher income tax rate.

In general equilibrium, one must account for the effect of all household decisions, and public investments, on the economy's income tax rate. Since all households are identical, the government budget constraint can be written as

$$\tau_i w h_i = \frac{e_i + \phi_0(1 - n_i)^\phi h_i}{n_i}. \quad (5)$$

Note that, in the end, taxes must cover transfers for each group so that no group actually gains from rent-seeking.

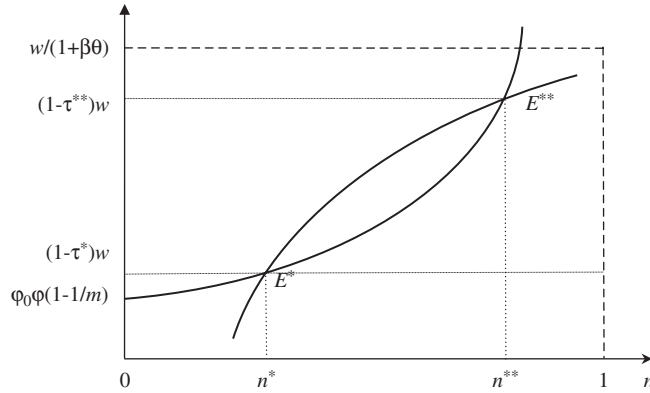
In period 1, the central government's choice of  $x$  is  $e_1 = \bar{x} = \beta \theta w h_1 n_1 / (1 + \theta \beta)$ . Note that rent-seeking further reduces investment by lowering first period income (since  $n_1 < 1$ ). In equilibrium, the economy's level of investment is lowered by borrowing constraints and by rent-seeking. Substituting the expression for public investment into equation (5) and then substituting equation (5) into equation (4), gives

$$\begin{aligned} w \left[ 1 - \frac{\beta}{1 + \theta \beta} \left( 1 - \frac{1}{m} \right) \right] - \frac{\phi_0(1 - n_1)^\phi}{n_1} \left( 1 - \frac{1}{m} \right) \\ = \phi_0 \phi (1 - n_1)^{\phi-1} \left( 1 - \frac{1}{m} \right). \end{aligned} \quad (6a)$$

The left-hand side now accounts for the fact that the tax rate is decreasing in the common value of  $n$  chosen by all groups (both because transfers fall and the tax base rises with  $n$ ), causing net-of-tax wages to rise with  $n$ . The fact that net wages increase with  $n$  at a decreasing rate creates two possible equilibrium outcomes (see Figure 1). Because rent-seeking unambiguously lowers income and welfare, the  $**$  equilibrium with higher  $n$  *Pareto dominates* the  $*$  equilibrium with lower  $n$ .

In period 2, we have  $e_2 = 0$ , but the configuration from Figure 1 remains the same, so we once again have two equilibria. Appendix II gives a numerical example of the equilibria under autarky. While there are other possibilities, we focus on the situation where if a country starts in the  $*$  equilibrium in period 1, it remains there in period 2, and likewise for an economy starting in the  $**$  equilibrium.

Figure 1. General Equilibrium of Rent-Seeking Game



An important comparative static question concerns the effect on productive work of an increase in the number of interest groups. To address this question, multiply both sides of equation (6a) by  $\mu \equiv (1 - 1/m)^{-1}$ , leading to

$$w \left[ \mu - \frac{\beta}{1 + \beta\theta} \right] - \frac{\phi_0(1 - n_1)^\phi}{n_1} = \phi_0\phi(1 - n_1)^{\phi-1} \quad (6b)$$

Now the graphic configuration of equation (6b) takes the same form as equation (6a) in Figure 1. An increase in the number of interest groups ( $m$ ) will lower  $\mu$ , decrease the left-hand side and cause a downward shift in the analogue to the concave net wage function in Figure 1. Thus, an increase in  $m$  will have different effects on productive work effort and rent-seeking across the two equilibria. In the  $*$  equilibrium productive work effort will increase with  $m$  and in the  $**$  equilibrium productive work effort will decrease.

The result in the  $**$  equilibrium is more intuitive. The cost to any one interest group of demanding additional transfers declines as the number of interest groups increases (because their tax share is smaller). The lower relative cost of rent-seeking results in less productive work, more rent-seeking, more transfers, and higher tax rates. However, the  $*$  economy is in an initial position with low levels of  $n$ , and high tax rates. In fact, the tax rates are so high that the economy is on the wrong side of the Laffer curve—an increase in tax rates will reduce tax revenue. From this position, a drop in productive work effort, greater rent-seeking, and greater spending cannot be financed by higher tax rates. Instead, equilibrium can only be restored if tax rates are cut, and cut enough to encourage more work effort.

In sum, an increase in the number of groups in our voracity model of special interest politics leads to a reduction in productive work and an intensification of rent-seeking in the equilibrium where the country is on the right side of its Laffer curve. This is in contrast to the Grossman-Helpman

model of special interest politics. In that model, as the number of interest groups increases and the entire population is represented in some group, competition among interest groups leads to positive amounts of political contributions but has no effect on the government's choice of policies. In the limit, policies revert to the first-best, distortion-free equilibrium choices of either tariffs or subsidies (see Grossman and Helpman, 1994; Dixit, Grossman, and Helpman, 1997).

### III. Foreign Assistance

We now consider the impact of loans extended to the developing country by its international donors. We assume that the government uses each dollar borrowed for productive public spending, which is here identified with government investments in human capital. Donor enforcement of these conditions is perfect and costless. The investment condition keeps the proceeds of international assistance out of the "common pool" of resources that interest groups compete over for transfers. However, as we shall see below, this is not enough to guarantee that international assistance generates good outcomes.

#### Project Conditionality

Suppose the donors extend loans equal to  $ml$  under the condition that the proceeds are used to augment existing investment,  $ml = m(x - x^*)$ . This gives us  $e_1 = x - l = x^*$  and  $e_2 = (x - x^*)(1 + r)$ . Since  $e_1$  and taxes are unchanged in period 1, the solution for  $n_1$  remains unchanged. However, the increase in taxes needed to pay back the debt in period 2 results in a shift of the net wage rate curve downward (see Figure 2), creating mixed results.

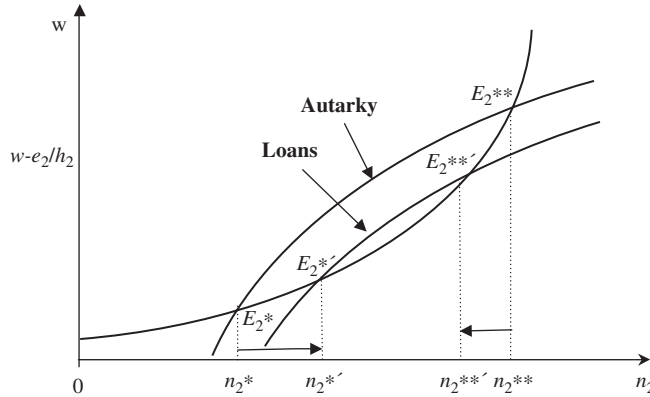
Countries starting in the  $*$ equilibrium will experience an increase in productive work. The obligation to pay off debt creates a need for additional tax revenue. Recall that the  $*$ economy is on the wrong side of the Laffer curve. From this position, tax revenue can be raised only by *lowering* tax rates and thereby encouraging additional work.

The opposite is true if the economy starts in the  $**$ equilibrium. Here, the need for additional revenue requires that tax rates be increased. This discourages work and gives rise to additional rent-seeking.<sup>11</sup> Even if the period 2 work level is held constant, public investment may not generate enough additional earnings to both pay the debt and increase consumption (since the initial level of rent-seeking may lower the return to investment below  $1 + r$ ). Moreover, since productive work declines further when taxes rise to repay debt, there is a greater likelihood that income will not increase

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<sup>11</sup>Higher taxes would also hit the wages paid to those in unproductive government employment. However, interest groups would work to protect their after-tax wages by lobbying for higher before-tax wages, so that their net transfer from the government remains the same. Thus, taxes will primarily lower the reward to productive work.

Figure 2. A Transfer Paradox: Repayment Equilibrium with International Loans



by enough to cover the debt obligations and the recipient country may end up being worse off. Appendix II provides a numerical example of this possibility.

This result amounts to a transfer paradox of sorts: an apparently favorable event such as providing investment loans to a credit-constrained country can make it worse off. Excessive rent-seeking lowers the return to investment other things constant. While  $wh'_2$  might be relatively high, a lack of productive work can make  $wh'_2n_2$  quite low. Thus, the central government of the recipient country may actually be reluctant to consider international borrowing. The reluctance is stronger if the government realizes that the higher taxes needed to repay the loans will generate further attempts to avoid taxes by allocating even more labor away from productive work and toward rent-seeking. Putting pressure on the country to accept loans may lead to adverse economic outcomes in this situation.

### Program Conditionality: Extending Conditions to Fiscal Policy

We now seek conditions that could reasonably be imposed by donors that would lead to an increase in second-period work, and thereby guarantee welfare improvements, from *either* initial equilibrium position. One set of conditions that works is the following:

- (a) every dollar loaned must be invested (as above);
- (b) second period tax rates must remain fixed at pre-loan levels ( $\bar{\tau}_2$ );
- (c) loan repayment must be financed by cuts in transfer spending.

Let  $\alpha$  denote the uniform cut in transfers needed to balance the budget (a policy parameter). Conditions (a)–(c) have the following effect on the recipient government's budget constraint:

$$\bar{\tau}_2 wh_2 \sum_{j=1}^m n_{2j} = me_2 + (1 - \alpha) \sum_{j=1}^m T_{2j}. \quad (7)$$

The first-order condition for  $n_2$  becomes

$$\left(1 - \bar{\tau}_2\left(1 - \frac{1}{m}\right)\right)w = (1 - \alpha)\phi_0\phi(1 - n_i)^{\phi-1}\left(1 - \frac{1}{m}\right). \quad (8)$$

Note that the marginal cost of productive work is lower than under autarky, given in equation (4), by the factor  $1 - \alpha$  (compare equations (8) and (4)). The loan conditions maintain the marginal benefit of productive work independent of  $n_2$  (as the tax rate is fixed at  $\bar{\tau}_2$ ) but reduce the marginal cost of productive work (by implicitly “taxing” transfers to pay back the debt). This is sufficient to increase  $n_2$  from either equilibrium position (see Figure 3). Appendix II gives a numerical example of this outcome.

### The Key Role of the Finance Minister

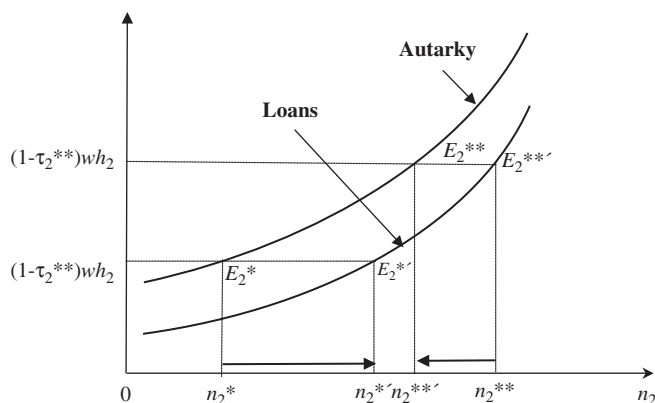
Program conditionality can be implemented only by the central government of the recipient country. The combination of foreign financing and conditionality enable the central government to enact spending cuts that are in the national interest but which the government would not be able to enforce in the absence of foreign financing. In effect, the international community’s provision of conditional finance helps to “steel” the back of the finance minister and his technical staff to implement needed expenditure reforms. Krueger (1990, pp. 18–20) argues that, among government officials, finance ministers in developing countries are the most likely to be focused on the national interest. As she writes, “Spending ministers will tend to become advocates of programs and policies falling within their domain. By contrast, finance ministries tend to be public interest agencies to a greater degree...Typically, each spending ministry will want to increase spending, believing it in the social interest that those activities within its particular domain are the most important. The finance ministry, by contrast, will be more concerned about raising revenue, and is therefore less likely to represent special interest.”

In practice, rather than imposing across-the-board cuts in unproductive government consumption and transfers, the finance minister is likely “negotiate” cuts with the donors in the areas where spending is believed to be particularly ineffective. Behind the scenes, it is very much the case that the finance minister “owns” the policy agreements with the donor community.<sup>12</sup> A clear example of how conditional finance strengthens the authorities’ ownership of reforms that promote the general interest is documented by Mallaby (2004). He describes the difficult job faced by Uganda’s Finance Minister, Emmanuel Tumusiime-Mutebile, in controlling the country’s

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<sup>12</sup>In stressing the importance of cutting government consumption to repay loans, we do not deny that in many developing countries productive public officials are paid too little, and unproductive ones are paid too much. Although difficult to implement, the best policy would be to cut government consumption overall and reallocate spending to productive government employees.

Figure 3. Equilibrium: International Loans with Fiscal Policy Conditions



fiscal spending. Tumusiime-Mutebile saw the political advantage of having the World Bank and the IMF place conditions designed to limit spending.

In the same way, controlling government spending has involved constant battles with the cabinet, so Tumusiime was delighted to have the Bank and the IMF mandate spending discipline. In sum, the lesson from Uganda was quite subtle. It might be true that conditionality cannot force reform upon an unwilling country. But that did not make conditionality useless. Where you have strong reformers, conditions can make them even stronger. (Mallaby, 2004, p. 229)

#### IV. Subnational Governments

The interest groups may be interpreted as subnational (state and local) governments that compete for national funds to finance transfers and unproductive government employment. Under this interpretation, one may ask if it would be better to make conditional loans directly to subnational governments rather than working through the central government. Since the late 1990s, the World Bank has been making conditional loans to state governments in Brazil, Argentina, India, Mexico and other countries. These loans have achieved some success but are generally viewed as riskier than loans to central governments. While it may be difficult to enforce repayment of loans extended directly to the states, it is worthwhile to consider the possibility in order to think through other advantages and disadvantages of the strategy.

One advantage of making loans to state governments is that higher state taxes may not be distortionary if they are clearly earmarked for the repayment of state loans. Taxes viewed as “loan repayment” avoid the negative distortionary effect on productive work associated with higher

national taxes. This argument is similar to the claim that social security taxes would not be distortionary under a fully funded system, since workers would view them as contributions to their individual accounts.

Assuming that state taxes are not distortionary implies that loans made directly to the states would not tilt the allocation of labor toward rent-seeking, an improvement over the policy of making loans with project conditions through the central government.<sup>13</sup>

However, by not extending loans through the central government, one *forgoes the opportunity to reduce rent-seeking* by imposing broader conditions on unproductive national fiscal policy. As we demonstrated in Section III, if it is possible to restrict the central government to repay loans by cutting transfer spending or government consumption, then rent-seeking can be reduced.<sup>14</sup> Thus, loans to the central government are preferred if broader conditions can be successfully imposed, otherwise loans to state and local governments would lead to better outcomes.

## V. Grants

Our analysis has some implications for the debate whether development grants produce better outcomes than development loans. Pure grants are clearly a more expensive way to assist developing countries in the short run (since loans are, at most, only partially subsidized). However, if grants induce better economic performance in developing countries than do loans, then the long-run cost of supporting these countries may be reduced.

One advantage of grants is that they avoid the accumulation of large debt burdens from being passed from one political regime to another (a particularly difficult case is odious debt contracted by unrepresentative governments). However, our analysis suggests that loan repayment is not necessarily a burden. In a country with excessive rent-seeking activity, loan repayment can be a blessing. Whether repayment is a burden or a blessing depends on how the funds for repayments are obtained.

If the funds needed for repayment are obtained by raising tax rates, then the burden of the debt will exceed the direct loss of funds. Higher tax rates will punish productive activity in favor of rent-seeking and national output will fall. The recipient country's losses exceed the loan repayment in this case.

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<sup>13</sup>Note that central government taxes would not change under the loans to subnational governments. There is not even an indirect effect on tax rates from the increased human capital in the second period because higher human capital would increase the tax base and the transfer expenditures proportionally.

<sup>14</sup>Such a policy has the potential to strengthen the hand of weak central governments in their attempt to resist spending initiatives by local governments. For example, in Argentina the initiative for public spending comes from the provinces, while responsibility for raising revenue is often passed off to the central government (Mussa, 2002, p. 14). A decentralized fiscal policy with soft subnational budget constraints is considered to be a general problem in Latin America (Stein, 1999).

Grants could potentially avoid the excess burden of lost output since no repayment is required.<sup>15</sup>

However, this ignores the strategic use of loan repayment to strengthen the hand of finance ministers over the “spending” ministers and subnational authorities. If broad conditions require loan repayment to be financed by general cuts in unproductive transfer programs or government consumption, then repayment becomes a blessing. “Forcing” the finance minister to cut noninvestment spending will “tax” rent-seeking and increase national output. Thus, when rent-seeking is a major issue, whether to favor grants of loans will depend on the particulars of the country. If the finance minister and the central government are committed to increasing national output and are looking for leverage to cut transfer spending, then loans with the right broad conditions can be an advantage.

We can conduct a formal comparison of grants and loans in our model. To make the comparison meaningful, we examine the effects of grants and loans of *equal* present value to donors. Suppose that the interest rate on the loan to the developing country is subsidized. The forgone interest income due to the subsidy implies that there is a “grant component” to the loan. Instead of a subsidized loan, consider giving the country a pure grant in the first period that is equal to the present value of the loan subsidy. Furthermore assume that the grant is conditional—that is, it is used to increase investment spending dollar-for-dollar, as we assumed in the analysis of a loan. Would the grant make the recipient country better off than the loan? As mentioned above, the answer depends on whether or not donors are able to impose broad conditions successfully on the recipient.

If the broad conditions on fiscal policy *can* be imposed, then subsidized loans are preferred to grants for two reasons. First, under the broad conditions, loan repayment is used as a way of taxing and reducing rent-seeking in the second period. Conditional grants, by contrast, would not require any fiscal adjustment in the second period and therefore rent-seeking will be unaffected (recall that any increase in second-period human capital has no effect on the decision to seek rents or work productively). Second, for a given present value, loans always provide more funds for first-period investment because the grant is equal to the present value of the *subsidized portion* of the loan. The increase in

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<sup>15</sup>We say potentially, because we are assuming that grants are used exclusively to finance public investments, as are loans, and the other features of public expenditures and taxes remain fixed. However, in practice, grants have been associated with a decline in tax revenue collection (Clements and others, 2004). Thus, at least some of the grants are used to lower taxes. Because grants are not permanent sources of revenue, it is unlikely that taxes are lowered by a legislated cut in tax rates, which would reduce rent-seeking in favor of productive spending. Instead, the loss in tax revenue may be due to special tax exemptions or lack of tax enforcement that favors particular interest groups and which are transfers that reward rent-seeking. These considerations caused Clements and others to recommend that broad conditions be placed on grants to prevent losses of tax revenues. This is equivalent to requiring that grants funds be used dollar-for-dollar to increase investment (as we have assumed here).

second-period investment income is unambiguously greater than the additional interest expense if the recipient country was credit constrained in autarky (see Appendix III).

However, if the broad conditions cannot be imposed on the country, grants may be superior to a subsidized loan. A subsidized interest rate reduces the likelihood that the recipient country will be made worse off by the loan but does not eliminate it. Taxes will have to be raised in the future to pay off the principal and the subsidized interest charges. If the decline in productive work is sufficiently great, then the country could be made worse off. However, the grant *must* make the country better off, even when the loan will not. There is greater human capital and greater income in the second period due to the grant. There is no need to raise taxes and therefore the level of productive/rent-seeking is unchanged. Thus a grant can outperform a subsidized loan of equal present value (when the rent-seeking response to higher taxes is sufficiently high).

## VI. Optimal Loans

We have shown that loans to the central government can improve welfare in recipient countries racked by voracious politics provided that conditions can be imposed on these countries' fiscal policies. This raises the question of what the *optimal* loan looks like under these assumptions.

Suppose the donor community chooses the loan quantity to maximize the recipient country's welfare subject to the broad conditions (a)–(c) stated in Section III. The optimal loan quantity solves

$$\max_l \{ \ln[(1 - \tau_1)wh_1n_1 - x^*] + \beta \ln[(1 - \bar{\tau}_2)wh_2n_2 + (1 - \alpha)T_2] \},$$

subject to the government budget constraint

$$\bar{\tau}_2wh_2n_2 = l(1 + r) + (1 - \alpha)T_2.$$

This problem is equivalent to solving  $\max_l \{ wh_2n_2 - l(1 + r) \}$ , that is, it is equivalent to maximizing second period consumption of the representative household. The first-order condition for the optimal loan is

$$wh_2' n_2 + wh_2 \frac{\partial n_2}{\partial \alpha} \frac{\partial \alpha}{\partial l} = 1 + r. \quad (9)$$

The left-hand side can be interpreted as the marginal benefit of the loan. The first term is the marginal return to human capital investments for a given level of productive work. The presence of rent-seeking lowers this return, because  $n_2 < 1$ . The second term is the indirect effect of the loan on fiscal policy and productive work. Appendix III shows that larger loans raise the implicit tax on transfers ( $\partial \alpha / \partial l > 0$ ) and that this raises productive work ( $\partial n_2 / \partial \alpha > 0$ ). Thus, voracious politics lowers the marginal returns to investment by lowering productive uses of human capital but also raises the marginal benefit of loans if repayment comes through cuts in transfers to rent seekers.

The right-hand side is the marginal cost of a loan, the repayment of principal and interest. If the marginal benefit is decreasing in the loan quantity the first-order conditions are also sufficient conditions. Our numerical analysis produced no examples where the marginal benefit was increasing in the loan quantity.

To create a reference point, define a *first-best* loan to be the loan that would remove the credit market imperfection and generate the efficient amount of human capital in *absence of voracious politics*. We find that optimal loans in the presence of voracious politics can be greater than the first best loan. Greater loans to countries with bad politics! This surprising result is obtained because conditional loans can be used to reduce rent-seeking (the addition of the second term in the marginal benefit expression), which more than offsets the fact that rent-seeking lowers the return to human capital investment (the appearance of  $n_2 < 1$  in the return to human capital investment expression).

Whether or not the optimal loan exceeds the first-best loan quantity depends on whether rent-seeking is eliminated at a loan quantity that is less than the first-best quantity. When rent-seeking is eliminated,  $n_2 \equiv 1$ , the marginal benefit of loans converges to the first-best case. If productive work is responsive to the implicit tax on rent-seeking, then as the loan and the tax increases it becomes more likely that rent-seeking is eliminated before the first-best quantity is obtained. If rent-seeking is less responsive to the implicit tax, then the optimal loan will exceed the first-best because of the additional political advantage of further raising loans and the implicit tax on rent-seeking.

Figure 4 depicts the situation. We plot the declining marginal benefit of loans (the left-hand side of equation (8)) against the constant marginal cost (the right-hand side of equation (8)). If  $\phi$  is high, then the diminishing returns associated with rent-seeking are modest. As the implicit tax on rent-seeking is increased, large changes in productive work are needed to raise the “after-tax” marginal benefit of rent-seeking to the (constant) after-tax marginal benefit of productive work. A low  $\phi$ , on the other hand, results in small  $n_2$  responses to changes in  $\alpha$ . Numerical examples are provided in Appendix II to support this interpretation.<sup>16</sup>

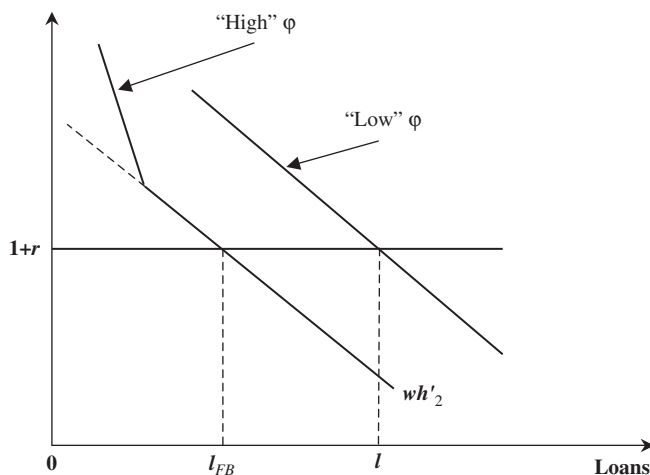
## VII. Concluding Remarks

Countries with voracious politics divert large amounts of public resources to unproductive transfers to powerful interest group. This is a source of poverty, because resources devoted to such redistribution reduce the efficiency of resource allocation and lower national welfare. Fractious politics also makes it more difficult for the international community to assist developing countries. Loans conditioned on public investment alone may not improve welfare in countries with voracious politics. The higher taxes needed

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<sup>16</sup>Our numerical analysis only produced outcomes where the optimal loan was at least as large as the first-best loan.

Figure 4. Voracious Politics and the Size of the Optimal Loan



to pay back foreign debt may further increase rent-seeking, which could lower the returns to public investment below the cost of debt repayment.

When confronted with a highly contentious political environment in recipient countries, donors may require additional conditions to guarantee that their loans will increase the recipient's national welfare. One guiding principle for the donor community is to develop conditions that shift the burden of debt repayment away from the taxation of productive work and toward the taxation of rent-seeking. This may be accomplished by insisting that debt be repaid by cuts in programs susceptible to rent-seeking. Because the susceptible programs are likely to vary from country to country, it is critical that the recipient country's finance minister, and similar officials are involved in establishing the appropriate conditions in partnership with donors. In working with recipient country officials, donors should help weak central governments reduce the incentives to engage unproductive rent-seeking.

Consistent with our analysis, donors have sought to place conditions on their assistance to developing countries that aim at increasing government investment and reducing government consumption (which may also include corrupt public "investment" projects). Empirical evidence suggests that lowering government consumption raises economic growth (see, for example, Barro, 1997, Chapter 1; and Baldacci, Clements, and Gupta, 2003). Our analysis offers a new supporting argument for loan conditions that require cuts in government consumption, rather than increases in taxes, to finance loan repayment.

## APPENDIX I

## Noncooperative Behavior

*Autarky*

In the first stage of the noncooperative game, each interest group chooses  $(n_1, n_2)$  to maximize its representative agent's utility taking other groups and the central government's investment decision as given. Recall that everyone in the recipient country is credit-constrained, that is, they would like to borrow but cannot without the support of official donors and creditors. Thus, their choice of financial assets is constrained to be zero. Group  $k$  solves

$$\max_{(n_1, n_2)} \{\ln c_{1k} + \beta \ln c_{2k}\},$$

subject to

$$c_{ik} = (1 - \tau_i)wh_i n_{ik} + T_{ik}$$

and

$$\sum_{j=1}^m T_{ij} + me_i = \tau_i wh_i \sum_{j=1}^m n_{ij},$$

for  $i = 1, 2$ . Note that each group takes into account how its decisions affect the spending levels and the tax base in the government budget constraint (given others' behavior). To solve the problem, note that the choice of  $n$  is a purely static decision in each period; that is, choose  $n$  to maximize income and consumption possibilities in each period. Substituting the government budget constraint into the group's budget constraint, we get

$$c_{ik} = wh_i n_{ik} - \frac{me_i + T_{ik} + \sum_{j \neq k}^m T_{ij}}{n_{ik} + \sum_{j \neq k}^m n_{ij}} n_{ik} + T_{ik}.$$

Differentiating with respect to  $n$  and setting the expression to zero gives

$$\frac{dc_{ik}}{dn_{ik}} = (1 - \tau_i)wh_i + \frac{dT_{ik}}{dn_{ik}} + \left( \tau_i wh_i - \frac{dT_{ik}}{dn_{ik}} \right) \frac{n_{ik}}{\sum_{j=1}^m n_{ij}} = 0. \quad (\text{A.1})$$

The first term is the effect of greater productive work on after-tax wages (holding the tax rate constant). The second term is the (negative) effect of greater productive work on transfer income. The third term is the net effect of greater productive work on the group's tax burden. Greater productive work lowers their tax burden because the tax base increases and government spending falls. However, this benefit is spread over all groups, and group  $k$  only receives a share of it.

Because the economic fundamentals of all groups are identical, their choices of  $n$  will be the same. Thus, the  $k$ -subscript can be dropped and  $\sum_{j=1}^m n_{ij} = mn_i$ . The first-order condition for  $n$  can then be written as equation (4) in the text.

In the second stage, the central government takes the rent-seeking choices of the groups as given and chooses  $x$  to maximize household utility. Again, we assume the government cannot borrow on behalf of its households without the intermediation of official international donors and creditors. The government solves  $\max \{\ln c_1 + \beta \ln c_2\}$  subject to  $c_i = (1 - \tau_i)wh_i n_i + T_i$  and  $\tau_i wh_i n_i = e_i + T_i$ ,  $e_1 = x$ ,  $e_2 = 0$ . The solution to this problem gives  $e_1 = x^* = \beta \theta wh_1 n_1 / (1 + \beta \theta)$ .

## Investment Project Conditionality

By design, the conditions require that tax-financed investments in the first period be kept at the same level as in autarky. Therefore, in the first period, behavior is unaltered. In the second period, we now have  $e_2 = l(1+r) > 0$ . This raises  $\tau_2$  but otherwise does not change the form of equation (A.1).

## Extending Conditionality to Fiscal Policy

Because the broad conditions also require that tax-financed investments in the first period be kept at the same level as in autarky, behavior in the first period is, again, unaltered. However, under program conditionality, tax rates in the second period must be frozen, and the repayment of debt must be financed by spending cuts. This leads to the government budget constraint, equation (7), under which an interest group's second period problem generates the first-order condition

$$(1 - \bar{\tau}_2)w + (1 - \alpha) \frac{dT_{2k}}{dn_{2k}} + \frac{d\alpha}{dn_{2k}} T_{2k} = 0. \quad (\text{A.2})$$

Differentiating equation (7) gives

$$\frac{d\alpha}{dn_{2k}} = \frac{(1 - \alpha)(dT_{2k}/dn_{2k}) - \bar{\tau}_2 wh_2}{\sum_{j=1}^m T_{2j}} \quad (\text{A.3})$$

Substituting into equation (A.2) and evaluating in the symmetric equilibrium gives equation (8) in the text.

## APPENDIX II

### Numerical Equilibria

We think of each period as lasting 30 years. The international interest rate is set to an annualized rate of 7 percent, a common value used for the return to capital in developed economies. If we assume a Cobb-Douglas production technology with a physical capital share of one-third, then our interest rate assumption yields a corresponding value for the rental rate on human capital,  $w$ , from the standard factor-price frontier.

We assume, unless otherwise specified, that  $\phi = \theta = 0.5$ . The implicit rate of time preference that defines  $\beta$  is set to an annualized value of 7 percent. The number of interest groups is set to 5 and the fraction of time spent on productive work in the first period is 0.75. These assumptions imply a value for  $\phi_0$  (to be consistent with an optimal choice of  $n_1 = 0.75$ ), a first period tax rate of 0.54 (to balance the budget), and a level of  $x$  under autarky that is half the efficient level in a first-best world.

### *Equilibria under Autarky*

To find the multiple equilibria in period 2 under autarky, we plot the Figure 1 corresponding to our numerical example and locate the approximate positions of the two equilibrium values of  $n_2$ . We then numerically solve for the two values of  $n_2$  that approximately equilibrate the values of the convex and concave functions depicted in Figure 1 by altering the initial guesses of the iterative search. The two equilibrium solutions for  $n_2$  in our example were 0.65 and 0.85.

### Loans with Investment Project Conditionality

We next demonstrate that bad outcomes are possible from loans with simple investment conditions, that is, we provide a numerical example that corresponds to the outcome in the \*\*equilibrium of Figure 2. We increased the loan by an amount sufficient to cover 10 percent of the financing gap between initial investment and first-best level (if the loans are much larger, the country would be unable to pay them back, that is, second period taxes would be driven to 100 percent). We computed the new \*\*equilibrium with the tax rate endogenously increasing to balance the government budget in the second period. The new level of work effort falls from 0.85 to 0.82. The *social* or *pre-tax* rate of return on the human capital investment is only 1.2 percent. Thus, the rise in second period earnings is not nearly sufficient to cover the principal and interest (at 7 percent) repayment, and second period consumption in the recipient country must fall.

### Loans with Extended Fiscal Policy Conditionality

Here we assume the same loan quantity as above, but now we fix second period taxes and make up the lost revenue by cutting transfer payments (raising  $\alpha$ ). The equilibrium  $\alpha$  is 0.06 and  $n_2$  rises to 0.87. The rate of return on the investment financed by the loan is now 8.8 percent. Thus, the recipient country's earnings rise more than enough to repay the loan and it is made better off.

## APPENDIX III

### Grants versus Loans

In this appendix, we establish the conditions under which a subsidized loan will increase the welfare of the recipient country more than a grant with the same present value as the loan subsidy.

For simplicity, begin with the special case of full interest subsidy (that is, consider an interest-free loan). It is also convenient to write the human capital production function more generally than in the text, as  $h(x)$ . Finally, let a superscript "0" denote the initial, or pre-policy, value of a variable.

Since we are considering conditional loans (that is, first period funds are used for increased investment dollar-for-dollar), no other first period variables are affected by either policy. Any welfare change for the representative household is due to a change in its second period after-tax income.

Second period income under a loan is  $n_2 h(1 + x^0) - l$  and second period income under a grant is  $n_2^0 h(r l / (1 + r) + x^0)$ . Note that, as argued in the text, work effort may differ from its pre-policy value under a loan but not under a grant. Also note that the grant is  $r l / (1 + r)$ , the present value of the loan subsidy. Now consider the effect of an increase in the loan (grant) on second period income,

$$\text{Loan : } \frac{dn_2}{dl} h(x^0) + n_2^0 h'(x^0) - 1.$$

$$\text{Grant : } n_2^0 h'(x^0) \frac{r}{1 + r}.$$

We show first that with the initial level of work effort held constant, loans will increase second period income more than grants,

$$n_2^0 h'(x^0) - 1 - n_2^0 h'(x^0) \frac{r}{1+r} = \frac{n_2^0 h'(x^0)}{1+r} - 1 > 0,$$

provided that the developing country is actually credit constrained initially (that is, the rate of return to investment exceeds the market interest rate at the initial levels of investment and work effort).

To see that this result extends to less than full-interest subsidies, imagine reducing the interest subsidy by a dollar. The country loses  $1/(1+r)$  in present value under the loan policy. Under an equal present value grant, the first-period grant and first-period investment fall by  $1/(1+r)$  and thus second period income falls by  $n_2^0 h'/(1+r) > 1 > 1/(1+r)$ , or by more than under the loan. Thus, interest subsidies that are less than complete only strengthen the result that loans outperform grants whenever (1) work effort is constant; and (2) the developing country is credit-constrained in the pre-policy position. In summary, when the recipient is credit-constrained it would rather pay more in interest costs than lose the present value of the interest cost in investment (since the investment return on the present value of that cost will raise second period income more than the cost will lower it). Grants save interest expense but reduce investment income by even more.

When the broad conditions are also imposed on the country, the case for loans is strengthened since  $(dn_2/dl) h < 0$ . However, if the broad conditions cannot be imposed then  $(dn_2/dl) h < 0$ , since taxes will have to increase to pay back the loan. In this case, if the disincentive effect of tax on work is strong enough, then second period income may rise more under grants. In particular, when loans lead to a drop in second period income, grants can be nevertheless be guaranteed to increase second period income.

## APPENDIX IV

### Optimal Loans

In this appendix, we examine the properties of the optimal loan made under the assumption that the extended conditions from Section III are met.

### *Comparative Statics under Extended Fiscal Policy Conditionality*

With tax rates fixed, the amount of time devoted to productive work can be explicitly solved for as

$$n_2 = 1 - \left[ \frac{(1-\alpha)\phi_0\phi\left(1 - \frac{1}{m}\right)}{(1-\tau_2)w} \right],$$

which implies  $\frac{\partial n_2}{\partial \alpha} = (1-n_2)((1-\phi)(1-\alpha)) \geq 0$ , with a strictly positive value if there is some rent-seeking.

Implicitly differentiating the government budget constraint under extended conditions with respect to  $l$  gives

$$\begin{aligned} \tau_2 wh'_2 n_2 + \tau_2 wh_2 \frac{\partial n_2}{\partial \alpha} \frac{\partial \alpha}{\partial l} &= 1 + r - \frac{\partial \alpha}{\partial l} T_2 \\ &\quad - \frac{1 - \alpha}{1 - \phi} \phi_0 \phi (1 - n_2)^{\phi-1} h_2 \frac{\partial n_2}{\partial \alpha} \frac{\partial \alpha}{\partial l} \\ &\quad + (1 - \alpha) \phi_0 (1 - n_2)^{\phi} h'_2. \end{aligned}$$

Using the first-order condition for the optimal choice of  $n_2$ , and after some tedious but straightforward algebra, one can get

$$1 + r > wh_2 \frac{\partial n_2}{\partial \alpha} \frac{\partial \alpha}{\partial l} = (1 + r) \left[ \frac{\left(1 - \frac{\theta}{1+\frac{\theta}{\tau_2}}\right)}{\frac{1-\tau_2}{1-\frac{1}{m}} + \frac{(1-\phi)(1-\tau_2)}{\phi(1-\frac{1}{m})}} \right] > 0,$$

since  $\theta < 1$  and  $\tau_2 \leq 1$ .

### Numerical Examples of Optimal Loans

Note that the results in Appendix II confirm that  $wh_2 \frac{\partial n_2}{\partial \alpha} \frac{\partial \alpha}{\partial l}$  is decreasing in  $l$  when there is some rent-seeking and is zero otherwise. One cannot guarantee that the expression  $wh'_2 n_2$  is decreasing in  $l$  because while  $wh'_2$  is decreasing in  $l$ ,  $n_2$  is increasing in  $l$  (via  $\alpha$ ). Thus  $n_2$  cannot increase too fast in order to guarantee a declining marginal benefit. As mentioned, we found the marginal benefit declined in all cases we examined.

Second, note that  $\alpha$  may reach 1 before  $l$  reaches  $l_{FB}$ . In this case the marginal benefit converges to  $wh'_2$  (the marginal benefit in a first-best world) before  $l$  reaches  $l_{FB}$ , and thus the optimal loan is  $l_{FB}$ . This is the outcome for the calibration used to produce the numerical examples in Appendix II.

However, if we make rent-seeking less responsive to the implicit tax on rent-seeking then we can generate the second type of outcome depicted in Figure 4 of the text. For  $\phi = 0.5$  rent-seeking is sufficiently unresponsive to changes in  $\alpha$  that the optimal loan exceeds  $l_{FB}$ . When  $\phi$  is increased to 0.75, then  $n_2$  is driven to 1 at loan levels that are less than  $l_{FB}$ . In this case the optimal loan is equal to  $l_{FB}$ .

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