Income Inequality, Sovereign Debt, and Public Investment

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Abstract

We develop a political-economic model of sovereign debt that shows that income inequality leads to popular pressures on the government to use foreign debt to finance a redistribution of income at the expense of productive public investment. Recognizing this fact international lenders impose credit ceilings with the consequence that developing country borrowers invest less and grow slower.

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1 Introduction

The literature on developing country debt has frequently noted the connection between risk on such debt and its use to finance redistributive policies. Thus, we read that the Mexican government under president Luis Echeverria (1970-76) “...attempted to reorientate policy to its populist origins...[e]xpenditure was expanded in the area of social welfare and other redistributive measures, such as the expansion of the basic food-distribution system (CONASUPO), were undertaken...Echevarria’s redistributive and investment programmes raised government spending substantially...In the light of the inability to carry out tax reform...a greater burden was placed on foreign debt.”¹

Similarly, for the period 1970-1982 Bolivian analysts² assert that “...it was through the mismanagement of public investment projects that the public foreign debt was diverted to private beneficiaries, often with political goals in mind.” Further, in this period “...a nonnegligible part of the support for the [General] Banzer government and the succeeding military regimes was the willingness to create employment in the public sector. The return to democracy in 1982 was also accompanied by a big spurt in the expansion of jobs in the most important public enterprises, particularly in COMIBOL.” State enterprises in Bolivia were asked to “...generate employment, frequently as a disguised scheme of unemployment compensation; to provide education and health services to workers plus their families; and to act as a retirement fund and as a means to channel subsidies to the general consumer.”³

Commenting on Brazilian foreign debt Cardoso and Fishlow note that “...access to foreign

saving...” enabled the Brazilian governments to correct “the lagging consumption standards of the poor by implementing a more liberal wage policy.”

It is, by now, not surprising to read that “...the rural-urban household income differential is unusually large in Turkey and a major source of overall inequality in the size distribution of income...[T]he heavy external borrowing of the mid 1970’s temporarily allowed an improved income distribution.”

The consequences of the use of sovereign debt to redistribute income is manifold. For one thing, public sector deficits caused by redistributive policies have been singled out as the primary cause of the foreign debt crisis of the mid 1980’s. For another, Berg and Sachs (1988) find that higher income inequality is a significant predictor of a higher probability of debt rescheduling and attribute this to the “difficulties of political management in economies with extreme inequality.” Furthermore, the terms of the further debt contracts signed are affected by the recognition of the tendency of the debtor sovereigns to redistribute.

In this paper we formalize this last aspect of the connection between sovereign debt and income inequality. We show, in what follows, how popular pressures to redistribute income in countries with pronounced inequalities lead to lower lending limits by international creditors.

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6 For instance, Wiesner, the director of the IMF’s Western Hemisphere Department in the 1980’s places the blame for the debt crisis of the period on the political struggle over income shares which led to rapidly rising public sector deficits financed by foreign debt. See Wiesner (1985).
7 It is instructive to note the contrast between the experiences of Latin American countries and Korea. As Collins and Park (1989) indicate Korea achieved a rapid and successful recovery everytime it faced a debt crisis. They also note that “[f]iscal policy in Korea is perhaps most notable for the role it did not play in the accumulation of external debt” [Collins and Park (1989), p. 324]. Given the by-now well-known and frequently remarked-upon equity of income distribution in Korea this should not be surprising.
8 Note that even those countries that ran into most difficulties during the highly-publicized periods of debt crises continue to borrow in international markets.
Thus, we focus exclusively on the characteristics of international debt contracts that can be written once creditors realize that the sovereign will, to some extent, be responsive to demands for using the funds, at least partially, to redistribute income.\(^9\) To make our point as simply as possible and to avoid the pitfalls of the previous literature we extend the two-period model of Obstfeld and Rogoff (1996) to incorporate public investment, redistributive policies and heterogeneous agents.\(^{10}\) Our story is basically as follows. Consider the government of a country which has access to the international capital market. Given any amount of debt that it can secure in that market, the government can use the funds for two purposes. It can invest in a public project that raises the productivity of the private sector and/or it can make transfer payments.\(^{11}\) At a future date when the debt (principal and interest) is to be paid back the government decides whether to repay or to default. If it defaults creditors impose sanctions proportional to the income of the country.\(^{12}\) In either case the sums that the government must pay are financed by the imposition of a proportional income tax.

Since every agent receives the same transfer payment but pays a tax proportional to her

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\(^9\) Thus, we do not address other problems such as debt rescheduling, debt buybacks, or negotiated debt reductions. There is a large and important literature dealing with these and other related issues impressively surveyed by Eaton and Fernandez (1995).

\(^{10}\) The formal literature on sovereign debt and investment is a minefield. In their textbook treatment of the subject Obstfeld and Rogoff (1996, p.386) warn readers to approach the published literature on the issue “with caution as much of it is incorrect.”

\(^{11}\) The conceptual distinction between public investment projects and redistribution of income is blurred in practice. As the quotes above make abundantly clear, public investments/projects are also used to redistribute income. For purposes of analytical clarity, though, it is useful to model these functions as separate.

\(^{12}\) The justification for the assumption of direct creditor sanctions is twofold. First, given the legal doctrine of sovereign immunity that exempts sovereign borrowers from the jurisdiction of the courts of lender nations, thereby curtailing the applicability of direct sanctions creditors can impose, the only other alternative that can sustain international capital markets is the reputational concerns of the defaulters. But the conclusion that emerges from the literature on the subject is that the scope for purely reputational lending is severely limited and needs to be buttressed by some sort of additional punishment mechanisms [see Eaton and Fernandez (1995) survey for this and other related points]. Second, after 1976 most developing country governments have explicitly waived sovereign immunity in their debt contracts (see Lindert and Morton (1989)).

See discussion below for the assumption of sanctions proportional to output.
income, agents with less than average incomes would prefer to implement transfer payments higher than the ones preferred by agents with more than average incomes. Since empirically median income is less than average income, the majority of the population would prefer that the government invest less and redistribute more. Such preferences would be stronger the more unequal the distribution of income is. The borrowing sovereigns’ tendency to use the foreign debt partially to redistribute income leads to reduced public investment and, thus, lower future income. This, in turn, by lowering the cost of sanctions, makes default by the sovereign more attractive. The recognition of this fact by the foreign lenders gives rise to limits on the amount the sovereign can borrow.

Our focus and, thus, argument concerning the link between income inequality and sovereign debt problems differs from that of Alesina and Tabellini (1989). In their model they take the lending limit of foreign banks as given and focus on the competition of different groups for political power. Since each group expects to remain in power for a short time it tends to over-borrow (relative to the amount it would were its grip on power longer lived) using the debt to finance government spending, contributing to a debt crisis. Our model should be viewed as complementary to that of Alesina and Tabellini (1989). Furthermore, our paper can be viewed as a contribution to the literature that establishes several channels through which

\[ \text{preferences of the median voter as indicating those of the majority of the populace and, as any ruler worth his salt knows, can only be consistently ignored at potential risk to life and limb. The Bolivian case discussed above constitutes a perfect example of dictators in search of political support through redistribution. This case also shows why it is a mistake to forget that the market for dictators is a contestible market. After all, one colonel’s coup d’état can be as efficient as the next one’s. See Alesina and Rodrik (1994) for support of this view. For a recent cross-country empirical study that finds strong and robust support for the median voter approach to redistribution through trade policy see Dutt and Mitra (2002).} \]
the interaction between income inequality and politics leads to slower economic growth.\textsuperscript{14}

The model presented below provides an alternative channel that links the distribution of income to growth: a more unequal distribution of income results in stricter limits on foreign borrowing, reducing public investment, and, thus, the rate of growth.\textsuperscript{15} The model is also compatible with another approach to be found in the growth literature (see, for instance Galor and Zeira (1993)) that argues that in the presence of credit constraints redistribution of income to the poor promotes growth by relaxing these constraints and, thereby, fostering increased investment. In our model an improvement in the distribution of income in the poor countries would increase their saving and investment levels and promote faster growth.\textsuperscript{16}

The rest of the paper is organized as follows. In section 2 we discuss the basic building blocks of the model. The benchmark case of a “social planner” is studied in section 3. We analyze the politico-economic decision making in section 4 and characterize the debt ceiling the creditors impose in section 5. Section 6 concludes the paper.

\textsuperscript{14} See the models of Bertola (1993), Alesina and Rodrik (1994), Persson and Tabellini (1994), Benabou (1996), and Benhabib and Rustichini (1996). Recent empirical work finds strong support for the link between income inequality and growth emphasized in this literature. The same cannot be said, however, about the structural link between income inequality and redistribution. As far as developing countries that borrow in international markets are concerned, our paper suggests two reasons for this: (i) the credit limits imposed restrict the ability of the governments in these countries to redistribute; (ii) empirical work can rarely detect redistribution disguised as public investment.

\textsuperscript{15} In a model of international lending where there is moral hazard in investment, Gertler and Rogoff (1990) show that greater wealth inequality leads to lower investment and growth. Their emphasis, however, is strictly on the effects of informational asymmetries that lead to imperfections in international capital markets. Political-economic mechanisms playing no role in their model. Neither do they play any role in Eaton and Gersovitz (1988) who otherwise share our concern with the nexus between public investment and foreign debt. Their model focuses instead on the connection between public and private investment on the one hand and capital flight on the other.

\textsuperscript{16} The strand of literature for which Galor and Zeira (1993) is a prominent example typically takes the level of credit constraints as parametric. Here we also provide the microfoundations for these constraints.
2 The Basics

2.1 Households

Consider a two-period economy inhabited by a continuum of heterogeneous agents whose mass is normalized to unity. Everyone has the same preferences over consumption in the two periods:

\[ U^i = u(c_1^i) + \beta u(c_2^i) \]  

(1)

where \( U^i \) denotes the lifetime utility of an agent type \( i \), \( c_1^i \) and \( c_2^i \) refer to consumption in periods 1 and 2 and \( \beta \) is the discount factor. On date 1 each agent receives an endowment \( y_1^i \) and, potentially, a lump-sum transfer payment in the amount of \( g \). The agent consumes part of his first-period income and saves and invests the rest: \( k^i \). On date 2 everyone has access to the same production technology that yields the output

\[ y_2^i = G(A, k^i) \]  

(2)

where \( G \) is a function increasing in public investment \( A \) and private investment \( k^i \). Agents consume the part of their second-period output that is left after paying a proportional income tax, \( \tau \). Thus, agents face the following budget constraints

\[ c_1^i + k^i \leq y_1^i + g \]  

(3)

\[ c_2^i \leq \tau y_2^i \]  

(4)

2.2 The government
In period 1, the government borrows $B$ in international capital markets and allocates this sum between transfers $g$ and public investment $A$. That is, it faces the budget constraint

$$B = g + A,$$

(5)

In period 2, the government imposes a proportional income tax and decides whether to pay back the interest and principal or to default on the international loan. If it pays back the loan, it must collect enough taxes to do that. If, on the other hand, it defaults the country faces creditor sanctions which, we assume, are proportional to the economy’s second period output.\(^{17}\) The government then chooses a tax rate that will ensure a tax revenue sufficient to cover the cost of these sanctions. Thus the government budget constraint is

$$\tau y_2 = \min[(1 + r)B, \eta y_2]$$

(6)

where $y_2$ denotes the mean output level in period 2, $r$ is the parametric world rate of interest, and $\eta$ is the fraction by which creditor sanctions reduce period 2 output in case of default.

We will focus now on the more realistic and interesting case of the country not being able to commit to either repay or to an investment strategy. First, the inability to commit to repay implies that the country’s repayment can never exceed the cost of the sanctions:

$$(1 + r)B \leq \eta y_2.$$  

(7)

\(^{17}\) This assumption was first proposed and used by Sachs (1984). If, alternatively, lenders could impose sanctions that were proportional to the loan extended, there would not be a “Sovereign Risk” problem. To see why suppose that the sanctions imposed would be a proportion $\mu$ of the loan $B$. If $\mu \geq r \iff \mu B \geq rB$, then in case of default, lenders can ensure an amount at least equal to full repayment. Then the possibility of default would not present a problem for the lenders who do not thus face a “Sovereign Risk”. If, on the other hand $\mu < r \iff \mu B < rB$, then the cost of the sanction is always less than that of repayment and the sovereign will always default. In such a case no amount of debt can be supported by a loan contract.
Second, the absence of a commitment to an investment strategy implies that the country has the option of enjoying a first-period consumption binge and investing little. This lowers second-period output and reduces the cost of sanctions, weakening their power to deter default. Thus, potential competitive creditors have to determine how much they can lend to ensure a sufficient level of investment (public and private) that makes default more costly than repayment.  

3 The Social Planner

Suppose that decisions in the economy we just described are taken by a Benthamite social planner who maximizes the welfare of the average agent. As Obstfeld and Rogoff (1996) have shown the problem at hand is nonconvex and proves to be rather complex even in a world with homogeneous agents. It is, therefore, useful to simplify the problem by specializing the felicity and production functions to

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18 Since here we are assuming that lenders can control the amount lended, here it is useful to provide the context which justifies the assumption. The literature on sovereign debt has examined the conditions under which countries may (i) be able to achieve first-best level of borrowing, (ii) end up overborrowing or (iii) face credit rationing. Case (i) is obtained only when lenders can impose high enough sanctions and collect debt according to seniority. However, in practice “debt contracts have typically included pari passu clauses that require the debtor to treat all creditors as equals, giving any individual creditor the right to its pro rata share of any payment made to any other creditor” (Eaton and Fernandez, 1995, p.2052). Case (ii) may be obtained when there is the potential of partial repayment and competitive lenders can set the interest rate they charge without having the ability to control the amount borrowed. Here when setting interest rates lenders take into account that the borrower will borrow as much as it wants at the set rate. The borrower, on the other hand, does not take into account the effect of its borrowing on this rate. This externality leads to inefficient overborrowing. However, as Eaton and Fernandez (1995, p.2052) observe “…recently banks and official lending institutions seem to have been much better informed about total indebtedness, and to be coordinating their lending more carefully.” This leaves case (iii) as the more relevant case.

19 Note the following two points about the specification of production technology. First, it makes public investment indispensable for second-period output. Thus, decision makers that derive positive marginal utility from second-period consumption will always prefer to have some positive level of public investment. For the decentralized economy alternative specifications of the production technology may give rise to the possibility of multiple equilibria. One of these equilibria may have no public investment as in Eaton and Gersovitz (1988). Second, public and private investment display constant returns to scale. Karayalçın, McCollister, and Mitra (2002) show that with increasing returns to scale it is possible to have multiple equilibria with debt floors and ceilings alternating for different levels of debt. Given our focus in this paper we choose to focus on the analytically most convenient case.
\[ u(c^i) = \ln c^i \]  \hspace{1cm} (8)

\[ y^i_2 = G(A, k^i) = A^\alpha(k^i)^{1-\alpha}. \]  \hspace{1cm} (9)

The planner, thus, maximizes

\[ U = \ln c_1 + \beta \ln c_2 \]  \hspace{1cm} (10)

subject to

\[ y_1 + B \geq I_1 + c_1, \quad I_1 = k + A, \]  \hspace{1cm} (11)

\[ A^\alpha(k)^{1-\alpha} \geq c_2 + \Gamma, \]  \hspace{1cm} (12)

where

\[ \Gamma = \min[(1 + r)B, \eta A^\alpha(k)^{1-\alpha}], \]  \hspace{1cm} (13)

and the variables associated with the average agent are indicated by the absence of superscripts otherwise attached to them. Again the problem faced by international creditors is to choose a level of lending that will ensure repayment. That is, letting \( V^R_{SP} \) and \( V^D_{SP} \) denote the utility from repayment and default with the social planner making the consumption and investment choices, the problem for the creditors is to determine that \( B \) which yields \( V^R_{SP} \geq V^D_{SP} \).

It is straightforward to show that the solution of this problem is similar to the one posed in Obstfeld and Rogoff (1996). To see this note that given the functional form for
second-period income, regardless of the payment decision in the second-period the planner will optimally choose public investment $A$ to be a fraction $\alpha$ of first-period investment $I_1$ letting $k$ to equal $(1 - \alpha)I_1$. As a result, second-period average income can be expressed as $y_2 = \alpha^\alpha (1 - \alpha)^{1-\alpha}I_1 \equiv \rho I_1$ (where $\rho$ is defined to be the rate of return on investment) yielding a formulation of the problem similar to that of Obstfeld and Rogoff (1996). The levels of $V_{SP}^R$ and $V_{SP}^D$ are then easily obtained by noting that $(c_1, c_2)^R = \arg \max \{U(c_1, c_2) | (c_1, c_2) \in \Theta, \Gamma = (1 + r)B\}$ and $(c_1, c_2)^D = \arg \max \{U(c_1, c_2) | (c_1, c_2) \in \Theta, \Gamma = \eta y_2\}$ with $\Theta$ denoting the feasible set defined by (11) and (12). The level of international lending $B$ that makes the planner indifferent at the margin between default and repayment then follows from $V_{SP}^R(\bar{B}) = V_{SP}^D(\bar{B})$

$$\bar{B} = \left[ \frac{\left(1 - \eta \right)^{\beta/(1+\beta)}}{1 - \left(1/\rho \right) \left(1 - \eta \right)^{\beta/(1+\beta)}} - 1 \right] y_1$$

Assuming that $(1 + r) > \eta \rho$ (i.e., higher debt makes default more attractive if all borrowing is invested) ensures that $\bar{B}$ is a positive number.\(^20\) This debt ceiling is illustrated in Figure 1 which shows both $V_{SP}^R$ and $V_{SP}^D$ to be increasing in $B$. For low levels of borrowing $V_{SP}^R > V_{SP}^D$ but as more and more funds are borrowed the cost of repayment rises, narrowing the difference between the payoffs from repayment and default. At the critical level $\bar{B}$ the payoffs are equalized. A slightly higher level of debt leads to a collapse of investment and a first-period consumption binge with the sovereign planner defaulting in the second period. The reader can easily check that improving the bite of the sanctions (a higher $\eta$), a higher rate of return $\rho$ on domestic investment, a higher first-period income $y_1$, and a lower rate of interest

\(^20\) To see this note that inequality $(1 + r) > \eta \rho$ holds if and only if $1 + r > \rho \eta \Leftrightarrow 1 - \rho/(1+r) < 1 - \eta \Leftrightarrow \frac{\rho}{\eta} < \frac{1}{1-\eta}$. Since $\beta/(1+\beta) < 1$, we have $1 - \eta < (1 - \eta)^{\beta/(1+\beta)}$.}
increase the debt ceiling for obvious intuitive reasons.

Having thus established the benchmark case of a social planner we now turn to the political economy of international debt.

4 The Political Economy of International Debt

We now study a setup where each agent \( i \) treats as parametric the levels of the transfer \( g \), of the public investment \( A \), and the tax rate \( \tau \), and chooses her consumption in the two periods and her private investment to maximize her lifetime utility depicted in (1) and (8) subject to (3) and (4) (with (9) defining second-period income). The solution to this maximization problem yields

\[
c_i^1 = \frac{1}{1+\gamma} (y_i + g), \quad \gamma \equiv (1-\alpha)\beta
\]

\[
c_i^2 = (1-\tau)A^\alpha \left( \frac{\gamma}{1+\gamma} (y_i + g) \right)^{1-\alpha}
\]

\[
k_i = \frac{\gamma}{1+\gamma} (y_i + g)
\]

The indirect utility function of agent \( i \) defined over the policy variables can be derived from (15) and (16) as

\[
V^i(g, \tau, A) = \max \left[ \ln c_i^1 + \beta \ln c_i^2 \right] = V(g, \tau, A) + (1+\gamma) \left[ \ln(y_i + g) - \ln(y_i + g) \right]
\]

where the indirect utility function \( V(g, \tau, A) \) of the average agent is given by
\[ V(g, \tau, A) = \omega + (1 + \gamma) \ln(y_1 + g) + \beta \ln[(1 - \tau)A^\alpha], \quad \omega \equiv \gamma \ln \gamma - (1 + \gamma) \ln(1 + \gamma). \] (19)

What would be the policy preferences of any agent \( i \)? This will depend on whether the sovereign defaults or repays its international debt. We thus have, as before, two cases to consider.

4.1 Default

If the sovereign defaults the second-period finance constraint (6) implies that the tax rate \( \tau \) has to equal the fraction \( \eta \) of second-period income that can be captured by the creditors. Using also the first-period finance constraint (5) in (18) we can easily determine, for a given level of debt \( B \), the utility of an agent \( i \)

\[ V^{iD}_i(g, \eta, B - g) = V^{iD}_i(g) = V^{D}_i(g) + (1 + \gamma) \left[ \ln(y_1^i + g) - \ln(y_1 + g) \right] \] (20)
as a function of the single policy variable \( g \). (20) enables us to determine the level of transfers preferred by any agent \( i \). In what follows we will focus on a particular agent \( i \), namely the median voter which we will denote by superscript \( m \). We have two reasons for our focus. First, in a democracy with majority voting, the specification of our problem meets the requirements of the median voter theorem. Thus, it is both analytically convenient and politically reasonable to study the preferences of the median voter in a democratic setting. But, secondly, even in a nondemocratic environment the preferences of the median voter reflect those of the majority. We will take these preferences to represent the indirect pressures that the populace can place on the policy makers. Such pressures can at times be
quite influential since, as the Bolivian case discussed above indicates, even dictators need some degree of popular support for survival.

Now it is straightforward to obtain from (20) the level of transfers preferred by the median voter (the agent with median income) as

$$g^D = \frac{(1 + \gamma)B - \alpha \beta y^m_1}{(1 + \beta)}.$$  \hfill (21)

(21) shows that the level of first-period transfers preferred by an agent rises with the debt $B$, and falls with the agent’s endowment income. Since we assume that the median value of income $y^m_1$ is less than its mean $y_1$, this implies that the median voter would prefer a higher level of transfers and, thus, a lower level of public investment than the average agent if the sovereign is to default on its international obligations.

4.2 Repayment

If the sovereign meets its international obligations the second-period finance constraint (6) implies the tax rate

$$\tau^R(A, g) = (1 + r)BA^{-\alpha} \left[\frac{\gamma}{1 + \gamma}(y^i_1 + g)\right]^{-(1-\alpha)}.$$ \hfill (22)

Using (22) together with the first-period finance constraint $A = B - g$ makes the tax rate depend only on the level of transfers and yields the indirect utility for agent $i$

$$V^{iR}(g) = V^R(g) + (1 + \gamma) \left[\ln(y^i_1 + g) - \ln(y_1 + g)\right].$$ \hfill (23)

If the second-order conditions are fulfilled, the transfers preferred by the median voter would satisfy
\[ V_{g}^{mR} = V_{g}^{R} + \left[ \frac{1 + \gamma}{(y_{1} + g)(y_{1}^{m} + g)} \right] (y_{1} - y_{1}^{m}) = 0. \]  

(24)

To understand (24) note the following. If the distribution of income were symmetric so that \( y_1 = y_1^m \), then \( V_{g}^{R} = 0 \), an equality which would yield the transfer level \( g \) (thus the level of public investment \( A \) by (6) and the tax rate \( \tau \) by (22)) preferred by a sovereign maximizing average welfare.\(^{21}\) Given our assumption that \( y_1 > y_1^m \), (24) implies that \( V_{g} < 0 \). That is, provided that requisite second-order conditions are fulfilled, the concavity of \( V \) in \( g \) implies that the median voter would choose a transfer level \( g^R \) higher than the one chosen by the sovereign maximizing average welfare.

The more important question we need to answer at this stage is that of the comparison between the transfer levels preferred by the median voter under default and repayment. To answer this question observe that one can express the condition (24) \( V_{g}^{mR} = 0 \) alternatively as

\[ V_{g}^{mR} = V_{g}^{mD} - \beta(1 - \tau)^{-1}\tau_g = 0 \]  

(25)

which yields

\[ V_{g}^{mD}(g^{R}) = \beta(1 - \tau)^{-1}\tau_g > 0 \]  

(26)

provided that \( \tau_g > 0 \).\(^{22}\) What equation (26) implies is that, given the concavity of \( V^{mD} \) in \( g \), the level of transfers preferred by the median voter in case of default, \( g^D \), is greater

\(^{21}\) This solution will not necessarily coincide with the one chosen by the social planner. To see this note that the sovereign in question here is restricted to use distortionary taxes and the decentralized economy may, consequently, not achieve the first-best level of public investment \( A \).

\(^{22}\) See Appendix 1 for the proof that \( \tau_g > 0 \).
than the same level \((g^R)\) in the case of repayment. Thus, the median voter prefers to have a higher level of public investment if the country is to repay its international debt. This is intuitive. If one is to default, it pays to reduce the cost of sanctions by taking measures that lower second-period income, a fraction of which will be lost to sanctions. Reducing public investment helps accomplish this goal. It also enables the agents to boost first-period consumption by increasing the transfers received.

What do our results heretofore imply with regards to the amount the creditors are willing to lend? We now turn to a discussion of this issue.

5 The debt ceiling

The easiest way to think about the question posed above is to note again that, as in the case of the social planner above, the relevant indirect utility functions are continuous in the amount of foreign debt \(B\). The relevant indirect utility functions here are those of the median voter as the representative of the preferences of the majority.

To see that there exists a debt ceiling in the present case as well, observe figure 1 again, which shows the two curves \(V^{mD}\) and \(V^{mR}\) as functions of foreign debt \(B\), together with the expressions for the slopes of the two curves:

\[
V_B^{mD} = \frac{\alpha \beta}{A_D}, \tag{27}
\]

\[
V_B^{mR} = \frac{\alpha \beta}{A_R} - \frac{\beta}{1 - \tau} \tau R_B. \tag{28}
\]

For there to be a debt ceiling it has to be the case that at their point of intersection the
slopes of the two curves must be such that $V_B^{mD} > V_B^{mR}$ as shown in the figure so that for $B < \bar{B}$ the sovereign chooses to repay, but for $B > \bar{B}$ it defaults. To see that this is the case first recall that $A^R > A^D$. Further, $\tau^R_B > 0$ as appendix 2 shows. Thus, we do indeed have $V_B^{mD} > V_B^{mR}$ and, thus, there exists a debt ceiling.

How does the distribution of income in the borrowing country affect the level of this ceiling? To answer this question we look at the effects of an increase in median income with unchanged average income so that the country has a more equal distribution of income. Figure 2 shows that this increase in median income shifts both of the curves $V^{mD}$ and $V^{mR}$ up with the vertical shift in the latter being larger (i.e. $V_{y_1}^{mD} = (1 + \gamma)/(y_1^m + g^D) < V_{y_1}^{mR} = (1 + \gamma)/(y_1^m + g^R)$ since $g^D > g^R$ as established above). Consequently, the debt ceiling for the country with a more equal distribution of income is higher. The intuition for this result should, by now, be familiar: a country with a more equitable income distribution tends to redistribute less and, thus, invests more, raising the costs of sanctions in case of default, thereby lowering the attraction of default for the median voter and the sovereign.

It is now straightforward to show additionally that a higher average income, $y_1$, or a higher discount factor, $\beta$ increases the debt ceiling by raising investment and future income, thus increasing the cost of sanctions in case of default. A greater bite $\eta$ for the sanctions has the same effect.

6 Conclusion

We have shown that an unequal distribution of income by creating popular pressures to redistribute income leads to stricter borrowing limits for governments in international capital markets. The mechanism we have emphasized that leads to this result is as follows. Foreign
borrowing by a sovereign can be used to finance either public investments, which raise the future productivity of the private sector or transfer payments to the populace. The sovereign has the option of repaying the debt it incurs or defaulting. In case of default foreign creditors can extract a fraction of the country’s income as a punishment. The government finances its repayment of debt or the burden of the sanctions imposed against it by levying a proportional income tax. Since everyone receives the same transfer payment but pays a tax proportional to income, agents with less than average incomes would prefer to receive higher transfer payments. Thus, in countries with unequal distributions of income there would be pronounced demands for redistribution (higher current transfers) and lower public investment, leading to lower incomes in the future. Governments responsive to such demands lower the cost of sanctions that creditors can impose in case of default and will, thus, face lower borrowing limits.

By concentrating on the political economy link between income distribution and credit limits we have necessarily ignored other aspects of the sovereign debt issue. As the Berg and Sachs (1989) empirical study illustrates for the case of debt rescheduling however, the distribution of income and its political economy consequences need to be taken into account to explain differences across countries in regard to other issues associated with sovereign debt.

**Appendix 1**

In this appendix we prove that \( \tau_g > 0 \). To see this note that (24) can be alternatively expressed as
\[ V_m^R = \frac{1}{1 - \tau} \left[ \frac{(1 - \tau)}{(y_1^m + g)} - \frac{\beta}{\tau g} \right]. \]  

(A1)

Now observe from (A1) that if \( \tau_g < 0 \) then \( V_m^R > 0 \) for all \( g \). If this were the case then the median voter would prefer to have the maximum \( g \) possible, that is \( g = B \) with the implication that \( A = 0 \). But, \( A = 0 \) implies that \( y_2^m = A^\alpha (k^m)^{1-\alpha} \) and, thus, \( c_2^m = 0 \). Since \( u'(0) \to \infty \) with \( c_2^m = 0 \), this would never be preferred by the median voter. We thus have a contradiction. Hence \( \tau_g > 0 \).

Appendix 2

We now prove that \( \tau_B^R > 0 \). First observe that given the government’s finance constraint in case of repayment \( \tau y_2 = (1 + r) B \), we can express \( \tau_B^R \) as

\[ \tau_B^R = \frac{1}{y_2} \left[ (1 + r) - \tau \frac{dy_2}{dB} \right]. \]  

(A2)

Using this expression with the following three inequalities yields the required result:

1. \( \frac{dy_2}{dB} < \frac{(dy_2/dB)_{I=B}}{I} = \rho \) (This follows from the observation that the total investment \( (I = A + k) \) chosen by private agents in a political economy framework is less than what the social planner investing all borrowing would choose.)

2. \( \eta y_2 \geq \tau y_2 \) (This follows from (6) and (7) which, intuitively use the fact that what the sovereign pays can never exceed the cost of sanctions.)

3. \( (1 + r) > \eta \rho \) (Recall that this is the assumption made above for the case of the social planner, ensuring that there is a positive debt limit.)
References


Sachs, Jeffrey, 1984, Theoretical issues in international borrowing, Princeton Studies in International Finance 54 (July).

