Policy inconsistency and external debt service

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In this paper it is argued that the willingness of debtors to make external debt-service payments reflects, in part, their inability to credibly and permanently default. The benefits of a credible default would include increased private investment. But this would, in turn, tend to create conditions in which it would then be optimal for the government to resume payments. Thus, debt remains a threat even after the announcement of repudiation. It follows that the expected benefits of such an action are limited and may be offset by penalties imposed by creditors. (JEL F34).

A fundamental question about the behavior of debtor countries has been their willingness to make substantial net transfers to creditors in the face of very difficult economic circumstances. Fischer (1989) argues, for example, that 'the most remarkable feature of the debt strategy followed since 1982 is that the heavily indebted developing countries have been transferring real resources of close to five per cent of their income to the developed creditor countries. A solution of the debt crisis will either reverse the direction of this resource flow or at least significantly reduce it.' Although it is common for debts to be renegotiated, debtor countries have, for the most part, reached contractual agreements to finance remaining debt-service obligations. For problem debtors real debt-service payments to private creditors from 1983–89 were sufficiently large so that the entire real interest expense was paid; additional interest payments resulted in a fall in the real value of debt to private creditors of about four per cent.2 Despite debtors' efforts to make payments, market prices for sovereign credits in secondary markets fell through 1990 when a combination of falling international interest rates and debt reduction generated a recovery in the market value of these credits.3

Sachs (1989) provides several plausible explanations for debtors' apparent reluctance to default. One possibility is that debtor governments may have underestimated the economic costs associated with a debt overhang because they accepted arguments that the crisis would be quickly resolved. Sachs also

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emphasized the political costs of default that might be imposed on debtor governments by creditor governments as well as costs imposed on the debtor government by residents of debtor countries that depend upon friendly relations with foreign creditors. An unresolved issue is whether or not a more pessimistic and perhaps accurate assessment of the costs of the debt overhang by debtor governments will lead to more unilateral defaults in the future.

A substantial literature has explored the possibility that forgiveness, or an equivalent partial default, would be in the interests of both the debtor and creditors. The familiar debt Laffer curve summarizes the argument by relating the market value of debt to the stock of debt. A country on the ‘wrong side’ of the curve could partially default on its debt and presumably earn the gratitude of its creditors. This literature has not addressed the question of the conditions under which additional partial default would injure creditors but benefit debtors accounting, of course, for the apparently mild penalties imposed by creditors.

In this paper it is assumed that the level of debt is reduced by creditors if this is in their collective interests. We are interested in the decisions of debtor governments to make considerable sacrifices in order to avoid defaults on remaining debt. One possibility is that efficiency gains similar to those associated with forgiveness would occur but would be more than offset by sanctions imposed by creditors. However, as discussed in some detail in the next section, historical experience and theoretical arguments suggest that penalties imposed on defaulting countries by creditors are likely to be small and temporary.

Another possibility is that unilateral default would not provide efficiency gains similar to those provided by ‘additional’ forgiveness. One reason why default might be ineffective is that in the absence of a binding bankruptcy proceeding, old creditors could intercept payments to new creditors. Thus, the interdependence among old and new creditors is not, in fact, broken. This interpretation seems strained, however, particularly if the new creditors include residents of the debtor country. In this paper, we offer a more compelling argument. Even if the debtor would be better off by defaulting on existing loans and even if new creditors could be protected from legal claims of existing creditors, the debtor government might not be able to credibly commit to the default. It follows that the inefficiencies generated by the debt overhang may be the dominant, but indirect, penalty imposed by creditors that accounts for the willingness of debtor countries to service their debts on contractual terms.

In this paper, a plausible example of such behavior is provided. The debtor government is expected to ‘default on the default’ because, at higher levels of domestic income, the marginal costs of resuming payments are lower as compared to the benefits of avoiding penalties. Thus, the debtor government’s announced policy of default may not be ‘time consistent’ and, therefore, not credible to private investors.

I. The costs of default

If the benefits from default are limited, it follows that even mild penalties might be sufficient to explain the reluctance of debtors to adopt this policy. The theoretical literature and historical analysis of the costs of default suggest that penalties are indeed likely to be both temporary and mild.

The theoretical literature has focused on the loss of access to credit and losses
in gains from trade as the likely costs of default. In some circumstances access to credit markets is valuable in order to smooth consumption (Kletzer and Wright, 1990). However, as Bulow and Rogoff (1989a) point out, a debtor country could divert debt-service payments to accumulate assets that could subsequently be drawn down and replenished in order to smooth consumption. At some point in time the debtor will face the choice of making a large payment in order to preserve access to credit markets or acquiring an asset that would provide a large and growing amount of insurance against a temporary fall in income. Looking forward it would be difficult to rule out the self-insurance option, and it follows that a loss of access to credit markets may not be an effective penalty.

A recent collection of papers examining the experience of defaulting countries in the 1930s casts further doubt on the hypothesis that default results in loss of access to credit markets. Eichengreen and Lindert (1989) conclude that ‘there is remarkably little evidence that defaulting countries acquire a reputation for unwillingness to pay, which in turn hinders their ability to borrow.’

The logical case for trade restrictions is also suspect. Clearly, trade restrictions injure residents of creditor countries as well as residents of the debtor country. While it is rational for the government of the creditor to threaten trade sanctions in the event of default, it may not be rational to actually carry out the threat. Moreover, important interest groups in creditor countries that depend upon trade can only lose by supporting sanctions favored by creditors. Eichengreen and Portes (1986), for example, conclude that efforts by creditors to restrict trade or trade credit for defaulting countries in the 1930s were generally successfully resisted by residents of creditor countries.

In this note, small but positive costs for default are taken as a working hypothesis. It is argued, however, that debtor countries have not necessarily made payments that exceed what would be consistent with this cost structure. Even these relatively low costs can be sufficient to deter debtors from announcing defaults because time consistency considerations tend to limit the gains from default.

II. An example

The literature on external debt issues has generally favored a game theoretic approach to modeling negotiations between debtor governments and their creditors. In this paper it is assumed that strategic behavior is of secondary importance in understanding an equilibrium value for external debt and the value of investment in new capital. This is a strong assumption but one that may provide a useful model in a world where creditors have access to a great deal of information about the debtor country and its political system. Thus asymmetric information, one of the most compelling reasons to adopt a game theoretic approach, does not seem to be an important element of the problem. Although there are many other reasons why a concept of equilibrium more complex than simple intertemporal optimization might be appropriate, our conjecture is that the simple optimization problem worked out below provides a useful basic model. Sensible extensions of the basic framework presented here may well involve more complex models of behavior and equilibrium.

In part the choice of a modeling strategy is based on the view that debtor governments’ room for strategic behavior is constrained by the political process.
It is assumed that the government sets tax rates in order to maximize the value of residents’ utility. If it does not do so it is quickly replaced by a competitive government. Creditors do not simply threaten to impose costs in each time period but do impose costs that are proportional to the default experienced in each time period. Creditors are assumed to maximize the market value of their claims, if necessary by forgiving debt. Finally, new investors make irreversible purchases of capital. Their forecast of taxes is simply a calculation of the optimal tax rate for the government conditional on the costs and benefits of default. All information about preferences and technologies are known to both debtors and creditors and new investors.

To illustrate the argument, suppose the debtor government maximizes utility, \( U(y) \), from income after debt repayment, \( y \), less costs, \( C(x) \), of the amount of default, \( x \). (We assume positive and decreasing marginal utility, and positive and increasing marginal cost. \( U_x > 0, U_{yy} < 0, C_x > 0, \) and \( C_{xx} > 0 \).

Income after taxes used for debt repayment equals \( y - (1 - \tau)\alpha I \), where \( \tau \) is the tax rate, \( I(0 < I < \bar{I}) \) is investment, \( \alpha \) is the constant output capital ratio, and \( \alpha I \) is income after investment. The production technology is hence assumed linear up to a maximum possible investment level \( \bar{I} \).

The amount of default is \( x = R\bar{D} - \alpha \tau I \), where \( \bar{D} \) is the given debt level, \( R \) is the contracted gross interest rate (one plus the real interest rate), and \( \tau \alpha I \) is debt repayment.

For a given tax rate and a given investment level, the government’s net utility level can be written

\[
V(\tau, I) = U((1 - \tau)\alpha I) - C(R\bar{D} - \tau\alpha I).
\]

Investment is determined on a competitive world capital market. Investors require an after-tax rate of return, \( 1 - \tau \alpha \), at least equal to the given world rate of return, \( R^* \). As a consequence, equilibrium investment is a function, \( I(\tau) \), of the tax rate, such that

\[
I(\tau) = \begin{cases} 
I & \text{for } \tau \leq \tau^*, \text{ and} \\
0 & \text{for } \tau > \tau^*, 
\end{cases}
\]

where the critical tax rate \( \tau^* \) equals \( 1 - R^*/\alpha \) (assumed positive). (For \( \tau = \tau^* \), investors are indifferent to the level of investment. For simplicity, we assume that they then choose the maximum level \( \bar{I} \).)

The government chooses the tax rate so as to maximize the net utility level \( V(\tau, \bar{I}) \), given that investment by \( (2) \) depends on the tax rate.

Suppose the government chooses a tax rate larger than \( \tau^* \). Then investment and income after tax will be zero, \( y = 0 \), and the amount of default will be maximal, \( x = R\bar{D} \). The net utility will be minimal, and the outcome for the government is the worst possible. Therefore, the government will restrict the tax rate to be less than or equal to \( \tau^* \), so that the investment equals its maximum, \( \bar{I} \).

Hence the government chooses \( \tau \) to maximize \( V(\tau, \bar{I}) \) subject to \( \tau \leq \tau^* \). A first-order condition for an optimum \( \tau = \hat{\tau} \) is

\[
U_x((1 - \hat{\tau})\alpha \bar{I}) = C_x(R\bar{D} - \hat{\tau}\alpha \bar{I}), \quad \hat{\tau} \leq \tau^*.
\]

with equality if \( \hat{\tau} < \tau^* \). If the constraint on the tax rate is not binding, marginal utility of income after taxes equals the marginal cost of default. If the constraint is binding, marginal utility of income falls short of the marginal cost of default.
The first-order conditions are illustrated in Figure 1. As the tax rate falls, after-tax income rises, and the marginal utility of consumption, $U_y$, falls so that $U_y$ has a positive slope. As the tax rate falls, the amount of default rises. Then the marginal cost imposed on the debtor increases so that $C_x$ has a negative slope.

Marginal utility and marginal cost are equal for $\tau = \tau^1$. If the critical tax rate $\tau^*$ exceeds $\tau^1$, $\hat{\tau} = \tau^1$ is the optimum. Suppose, however, as in Figure 1, that the critical tax rate falls short of $\tau^1$. Then the optimal tax rate is $\hat{\tau} = \tau^*$, and marginal utility falls short of marginal cost.

Suppose now that we allow the government to re-optimize after international investors have committed themselves to $I$, which, of course, depends on their belief that the government will set $\tau = \tau^*$. What will the government do? After international investors have committed themselves, the constraint $\tau \leq \tau^*$ is no longer relevant. The government will simply choose $\tau = \tau^1$ so as to equalize marginal utility and marginal cost. The after-tax rate of return on investment will now fall below the world rate of interest, but investors have committed to $I$, and it may be costly or impossible to reverse the investment.

The lesson is that, even if the government promises to increase the amount of default (promises to set a low tax rate), they will be tempted to reverse this decision (raise the tax rate) once the investment is in place. This is a simple application of the familiar time-consistency argument. Rational investors will anticipate the increase in tax rate ex post, and choose not to invest at all. The government is caught in the worst possible outcome, zero investment and maximum default.

While simple, this example has the obvious problem that forgiveness will always be in the interest of creditors. They will immediately forgive debt which shifts $C_x$ to the left until $\tau^* = \tau^1$. To examine the case where the debtor is not always on

![Figure 1. First-order conditions.](image-url)
the wrong side of the debt Laffer curve a slightly more complicated example is needed.

In this example we can show that the low investment equilibrium might involve very high tax rates and be preferred by existing creditors. It is assumed that a minimum level of income, \( \bar{Y} \), is generated in the debtor country and that investment adds to that level. Then income after tax is \( y = (1 - \tau)(\bar{Y} + \alpha I(\tau)) \) and the amount of default is \( x = R\bar{D} - \tau(\bar{Y} + \alpha I(\tau)) \). Utilizing the same framework as above, the government would set the optimal tax rate to maximize net utility defined as

\[
V(\tau, I) = U(1 - \tau)(\bar{Y} + \alpha I) - C(R\bar{D} - \tau(\bar{Y} + \alpha I)).
\]

The first-order conditions are more complicated in this case. For tax rates less than the critical rate \( \tau < \tau^* \) investment is maximal, and we have

\[
U_{\tau}((1 - \tau)(\bar{Y} + \alpha I)) \leq C_s(R\bar{D} - \tau(\bar{Y} + \alpha I)),
\]

with equality if the constraint is not binding. For tax rates above the critical rate, \( \tau > \tau^* \), investment is zero, and we have

\[
U_{\tau}((1 - \tau)\bar{Y}) = C_s(R\bar{D} - \tau\bar{Y}).
\]

The left-hand side of (5a), marginal utility with high investment, is shown on the top panel in Figure 2, as the curve \( AB\alpha' \). Only the portion left of \( \tau^* \) is relevant, \( AB \). The right-hand side of (5a), marginal cost with high investment, is curve \( EFE' \), where only \( EF \) is relevant. The middle panel shows investment, equal to \( I \) to the left of \( \tau^* \), equal to zero to the right of \( \tau^* \).

The left-hand side of (5b), marginal utility with low investment, is shown as \( D'C'D \). It lies above \( ABA' \) since marginal utility is higher with lower investment and lower income. Only the portion \( CD \) is relevant. The right-hand side of (5b), marginal cost with low investment, is shown as \( H'G'H \), where the position \( GH \) is relevant. It lies above \( EFE' \) since marginal cost is higher with low investment and higher default.

The total marginal utility curve is \( ABCD \), with a vertical portion \( BC \). The total marginal cost curve is \( FFGH \), with a vertical portion \( FG \). The total net utility curves for high and low investment are shown in the bottom panel. \( V(\tau, I) \) is at a maximum rate at \( \tau^1 \) and is above \( V(\tau, 0) \) which is at a maximum of \( \tau^2 \). As drawn in Figure 2 the optimal tax rate in the low investment equilibrium \( \tau^2 \) is higher than the optimal tax rate in the high investment equilibrium. This need not necessarily be the case since the income elasticity of marginal cost and marginal utility depends on factors that appear to depend upon circumstances in each debtor country. As in the earlier example, it is assumed that the critical value of the tax rate is below both of these optimal tax rates.

If the government could commit to \( \tau^* \), investment would be set at \( I \) and utility \( V^* \) would result. However, once the investment was in place, the government would want to increase the tax rate to \( \tau^1 \), increasing utility to \( V^1 \) but also reducing the after-tax rate of return to a level below the world interest rate. In this example, the fact that the government will be tempted to raise taxes slightly will lead to a low investment equilibrium. Given the low investment the government will find it optimal to set an even higher tax rate \( \tau^2 \) and will be forced to accept a much lower level of utility \( V^2 \).

Positive investment, and the associated payoff for the debtor country, is
attainable if the high investment curve $EFE'$ in Figure 2 could be shifted to the left so that $\tau^1$ was less than or equal to $\tau^*$. The most direct way to accomplish this would be to reduce $\bar{D}$. But existing creditors have no incentive to do so. Creditors would forgive debt if the value of the remaining debt was higher in the high income equilibrium as compared to the low income equilibrium. Clearly, starting from the low income equilibrium forgiveness reduces the equilibrium tax rate as $HGH'$ shifts to the left. As long as $\tau^1$ remains above $\tau^*$ income is unchanged and tax revenue and the value of debt falls. When the critical value $\tau$ is reached, income will increase to $\bar{v} + \alpha I$. But the rise in income might be more than offset by the decline in the tax rate. Thus, creditors may or may not find it in their interest to forgive debt in order
to move to a high income equilibrium. Our assumption is that the initial debt already reflects optimal debt forgiveness by creditors.

In this case the debtor cannot reduce its contractual obligations except by making debt service payments or through a debt buyback. The debtor can only suspend debt-service payments; it cannot extinguish debt except by agreement with the creditor. Over time the decision to pay partial interest limits the growth in debt. In fact, this is what most debtor countries have done. At the same time growth in income would tend to shift the high investment $U_e$ curve to the left. This would be similar to a growing out-of-debt scenario, but the potential growth in the high investment equilibrium would have to occur in the low investment equilibrium. A complementary action would be for a third party to force the creditors to forgive debt or buy them out at market prices.

If a more conventional investment technology is assumed, the same result emerges. Suppose that income is a continuous function of investment

$$y = Y(I).$$

where $Y_1 > 0$ and $Y_2 < 0$. The international capital market equilibrium condition is:

$$\langle 7 \rangle \quad (1 - \tau)Y_I(I) = R^*$$

For a given level of investment and hence income $y$, and for a given level of $D$, the government chooses a tax rate $\tau$ to maximize

$$\langle 8 \rangle \quad V(\tau, y; D) = U((1 - \tau)y) - C(RD - \tau y).$$

This results in a tax rate $\tau(y, D)$ which is a function of $y$ and $D$. In an equilibrium this tax rate and income must be consistent with $\langle 7 \rangle$; this finally determines the equilibrium tax rate $\tau(D)$, a function of $D$ only.

Figure 3 illustrates the different choices facing creditors and the debtor. The value of debt to the creditor, $\tau y(\tau)$, depends on the tax rate chosen by the debtor and the endogenous level of income. The top left quadrant shows $\langle 7 \rangle$, the relationship between the tax rate and income, $y = y(\tau)$. In the top right quadrant $\langle 8 \rangle$ is used to show the equilibrium tax rate $\tau(D)$. Clearly, for any level of debt the creditor can calculate the value of debt as $\tau(D)y(\tau(D))$ or the area under the curve in the top left quadrant. This is shown in the bottom right quadrant as a conventional debt Laffer curve. In this case creditors would forgive debt if initial debt was greater than $D_0$.

This is the equilibrium when the government cannot commit to a given tax rate, $\tau$. If it could commit, it would like to lower the tax rate below $\tau_0$ and exploit $\langle 7 \rangle$. Lowering $\tau$ slightly below $\tau_0$ has no first-order effect on $V$ for given $y$, but now $y$ will increase and increase $V$.

The problem with this strategy, as discussed above, is that once the new investment is in place the debtor can squeeze out a higher level of utility by raising taxes in order to make higher debt payments. This has to be true because the marginal utility of income has fallen and the marginal cost of penalties has risen. Since investors will anticipate this default on the default, the proposed equilibrium unravels and the apparently favorable tradeoff between penalties and income cannot be exploited by the debtor.
III. Conclusion

A suspension of debt-service payments to external creditors may not allow a debtor country to break out of a low growth, low investment equilibrium. Such a policy accelerates the growth of external debt as interest arrears are added to the stock of debt. Moreover, the debtor government may not be able to credibly insulate new domestic investment from taxation. The dilemma is that if new investors believe the debtor government’s promise not to tax their returns in order to service existing debt, the new investment can create the conditions under which it will be optimal for the government to break that promise.

The potential benefits of moving to the high investment and growth equilibrium are substantial. Policies that improve the probability that such a move will be possible include improved economic performance as well as policies that limit the growth in debt. The latter include interest payments as well as debt reduction operations. An extension of this analysis might consider the option value of current debt-service and debt-reduction expenditures. Such expenditures may be valuable to the debtor because they increase the debtor’s ability to move to a high investment equilibrium.
Notes

1. The 65 countries described as countries with recent debt-service problems in the IMF's World Economic Outlook, April 1988.
2. See Corden and Dooley (1989) for a discussion of the inflation accounting and the data.
3. A market price index for 28 developing countries fell from 0.56 in 1986 to 0.32 in 1989. See Stone (1991) for a discussion of these prices. See Dooley (1993) for an analysis of the factors that contributed to the recovery of secondary market prices and the return of private capital inflows to many debtor countries.
5. See Kydland and Prescott (1977) and Calvo (1987) for other examples of the problem of time inconsistency in government policies.
7. The issue is whether or not point $L$ is to the left of point $K$ in Figure 2. No obvious general result seems to be available.

For a given income $y$, let $\tau(y)$ fulfill $U_t((1 - \tau(y))y) = C_t(RD - \tau(y)y)$. Then the issue is whether or not $\tau$ is decreasing in $y$. Taking the derivative with respect to $y$ results in

$$\tau_y = \frac{-U_{yy} + \tau(C_{xx} - U_{yy})}{y(C_{xx} - U_{yy})},$$

where $U_{yy} < 0$ and $C_{xx} > 0$. Hence $\tau_y < 0$ if and only if

$$\tau > \frac{-U_{yy}}{C_{xx} - U_{yy}}.$$  

References

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