The effect of payments standstills on yields and the maturity structure of international debt

*Benjamin Martin**
and
*Adrian Penalver***

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* International Finance Division, Bank of England.
E-mail: benjamin.martin@bankofengland.co.uk

** International Finance Division, Bank of England.
E-mail: adrian.penalver@bankofengland.co.uk

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Abstract

Payments standstills have been suggested as a tool for the resolution of financial crises in emerging markets economies. A simple model is developed here to examine the implications of standstills for yields and the maturity structure of debt. An emerging market country chooses to sell short and long-term debt to risk-neutral international investors. The key assumptions are that the level of short-term debt increases the probability of crisis, that crises have costs that spill over into the next period, and that the orderly resolution of financial crises will reduce the cost of crises. A standstill is depicted as an orderly rollover of short-term debt. Standstills have the benefit of reducing the proportion of short-term debt and so lower the probability of crisis. This comes at the cost of generally lower expected output.

Keywords: Standstills, international financial crises.

JEL classification: F34.

Summary

Financial crises appeared to become more prevalent and more severe over the 1990s. In response, policy-makers have sought mechanisms to reduce the probability of crises occurring and to limit the costs when they do occur. One such mechanism is the temporary suspension of debt payments: a standstill.

Standstills offer potential benefits in both liquidity and solvency crises. In a liquidity crisis, a standstill would play a role similar to a bank holiday in the domestic bank run case. As such, standstills could forestall a liquidity crisis, thus preventing a liquidity crisis from degenerating into a solvency crisis. In both liquidity and solvency crises, standstills pre-empt the creditor co-ordination problem by temporarily imposing a collective solution. A common criticism of standstills, though, is that they will lead creditors to lend over shorter maturities to be well placed for a 'rush to the exits' if there is a risk of a standstill being called. This would raise the proportion of short-term debt and so could increase vulnerability to a liquidity crisis rather than reduce it. It would also potentially, then, increase the cost of capital for emerging markets.

This paper develops a simple model to analyse the effects of standstills, using comparative statics between a regime with and without standstills. The three-period model comprises an emerging market debtor and risk-neutral international creditors. The debtor needs to borrow to finance production and can issue either short or long-term debt. The key assumptions of the model are that the probability of crisis increases in the level of short-term debt, that crises have costs that spill over into the next period, and that orderly crisis resolution through the use of standstills will reduce the cost of crisis. There is full information and a competitive market for funds. A standstill is depicted as an orderly rollover of short-term debt from the first period into the second period in the event of a crisis. Investors are impatient and so dislike being caught within a standstill, which is reflected in the interest rates they charge. The debtor can choose strategically to default, but this will reduce output in the following period because investors can distinguish between incapacity and unwillingness to pay. The debtor will maximise expected net output, by choosing the optimal level of short-term debt, from which the other variables are determined.

A numerical example is considered to demonstrate the intuition of the model. The level of short-term interest rates for a given level of lending is higher under standstills, reflecting investors' impatience if caught within a standstill. But long-term interest rates are initially lower under standstills, because the lower cost of crisis reduces the risk of investing in bonds. Faced with higher short-term interest rates and lower long-term interest rates, a debtor country will lengthen the maturity of its debt, which reduces the probability of crisis. This comes at a cost of lower output.

One of the main assumptions underlying the analysis in this paper is that standstills mitigate some crisis costs. Although the reason is not modelled here, this reflects a view that disorderly resolution of financial crises imposes costs on the economy through channels

such as loss of market access, reputational costs, a credit crunch, disruptions to the payments system and so on. If the crisis resolution effect is strong, standstills could raise expected output compared with the no-standstills regime. If the crisis resolution effect is weak, standstills cannot improve on the no-standstills regime, because the debtor is fully disciplined in taking risks through market prices. Expected output, however, may not be the appropriate welfare measure if crises have wider social costs than forgone output. If the national authorities were prepared to trade off expected net output and the probability of crisis, then standstills could still improve social welfare.

In summary, the model looks at the implications of standstills for yields and the maturity structure of international debt. The model suggests that creditors will not 'rush for the exits' by lending over shorter maturities. Creditors will charge interest rates that reflect the risks they face. As a result, debtor countries will tend to issue longer maturity debt if they face a tilting of the yield curve. Standstills have the benefit of reducing the proportion of short-term loans and so the probability of crisis will fall. But the cost generally is lower expected output. A country considering introducing a standstills regime would have to weigh up the welfare benefits against the potential output cost.

1 Introduction

In November 2001, the Deputy Managing Director of the IMF, Anne Krueger, launched a proposal to reform the way in which international sovereign debt is restructured.[(1)] A key element is the temporary suspension of payments by sovereign debtors with unsustainable debt positions. The debtor would be given legal protection from its creditors for a short period during which it could negotiate a debt restructuring. Calls by the official sector for debt standstills, though, are not new. In a report following the Mexican and Asian financial crises in the 1990s, the Group of 22 recommended the imposition of standstills in extreme circumstances when 'it is clear that, even with appropriately strong policy adjustments, the country will experience a severe fiscal, financial or balance of payments crisis and the government or a substantial portion of the private sector will be unable to meets its contractual obligations on time and in full'.[(2)]

These financial problems can occur because of a steady drain on reserves due to unsustainable policy choices or a crisis of confidence amongst creditors. In practice, any crisis is likely to be a combination of both and reflect interlinkages between the two effects. Concerns about solvency can trigger a creditor run and an unresolved liquidity crisis can degenerate into a solvency crisis because of the effect on the economy's fundamentals, particularly through the financial and payments systems. Korea is often cited in this regard: its firms were considered solvent at an exchange rate around 1,000 won/$ in November 1997, but a month further into the crisis, Korean firms were largely insolvent when the exchange rate had fallen to 1,800 won/$.[(3)] Solvency and liquidity crises can cause considerable deadweight losses through the forced liquidation of positive net present value existing projects or the inability to finance profitable ventures in the future. For example, Hoggarth and Saporta (2001) estimate the cost of the Korean crisis at 13% of GDP in foregone output.

Despite such potential deadweight losses from financial crises, the case for public policy intervention is not clear cut. Dooley (2000) argues that in the presence of sovereign immunity and strategic incentives for default, only the deadweight losses associated with crises make it incentive compatible for debtors to repay and suggests that mitigating these deadweight losses could curtail lending to developing countries. Gai, Hayes and Shin (2001), however, suggest that the presence of a sufficiently accurate neutral umpire (say the IMF), who can distinguish between strategic and 'bad luck' defaults, could overcome this problem. Nevertheless, they show that there is a trade-off between the effectiveness of the

(1) Krueger (2001). See Krueger (2002) for a more comprehensive explanation of the proposal.

(2) Group of 22 (1998, page 28). The academic literature has not considered the issue of standstills in detail. Important exceptions are Miller and Zhang (2000) and Lipworth and Nystedt (2001). Buiter and Sibert (1999) propose a universal debt rollover provision which is a variant of standstills. The debate on standstills has largely taken place in policy circles (eg King (1999), Clementi (2000), Geithner (2000), IMF (2001), Krueger (2001) and Truman (2001)). See Frankel and Roubini (2000) for a comprehensive discussion of the policy context within the international financial architecture debate.

(3) From Frankel and Roubini (2000, page 45).

umpire's crisis management ('fire-fighting') and the accuracy of the umpire in distinguishing crises ('whistle-blowing').

Although Gai *et al* suggest that, under certain circumstances, crisis management frameworks can be welfare enhancing, they do not consider explicit policy measures. In particular, what effects might a standstill have in crisis resolution? Haldane and Kruger (2001) argue that standstills could play a beneficial role in the resolution of both liquidity and solvency crises. In a liquidity crisis, the motivation for a standstill is analogous to a bank holiday to prevent a bank run in the domestic setting. Diamond and Dybvig (1983) show that a bank holiday can provide a fully efficient mechanism for crisis resolution. Knowledge that a standstill would be introduced in the event of a crisis can help to forestall crisis. If a crisis nevertheless occurs, a standstill could limit the damage and prevent degeneration into a solvency crisis. In both liquidity and solvency crises, standstills can 'buy time' while policies aimed at improving investor confidence are introduced or while a debt restructuring is negotiated. So standstills pre-empt the creditor co-ordination problem by temporarily imposing a collective solution.

Standstills, though, are not without their critics. A common criticism is that the threat of standstills will create the crisis they are intended to avoid with creditors 'rushing for the exits'. Lipworth and Nystedt (2001) present three arguments supporting this view. First, as the threat of non-payment increases, creditors will be unwilling to rollover existing long-term debt, so the average residual maturity falls. Second, if creditors are prepared to lend over a longer period, they will charge a higher interest rate. Facing a steeper yield curve, the debtor will prefer to issue at shorter maturity. Third, if the debtor defaults on debt amortisation (but remains current on interest payments), cross-default clauses may be triggered and other creditors may decide to accelerate their claims. If these arguments are valid and standstills result in a higher proportion of short-term borrowing, this may leave countries even more vulnerable to liquidity crises. In short, a policy designed to limit crises may actually make them more likely.

In considering these arguments it is important to distinguish between reaction to the financial crisis and the impact of standstills. First, if a country has an emerging liquidity problem, then it faces the choice of either calling a standstill or defaulting when it eventually runs out of money. It is the underlying liquidity problem rather than the standstill *per se* that determines the probability of non-payment and creates the disincentive to rollover debt. It is arguable whether the threat of standstills increases the incentive for creditors to run relative to the threat of default, particularly once any effect on recovery values is taken into account (see the whistle-blower effects in Gai *et al*). Second, much depends on whether standstills alter the original maturity structure of debt. If standstills limit the damage of financial crises, then creditors may be more prepared to lend over longer maturities before a financial crisis occurs. This may not only make liquidity crises less likely, but any shortening of maturities would occur from a longer average maturity structure.

This paper considers the second issue by modelling the effect of standstills on the yields and the original maturity structure of debt. The model has three features. First, higher short-term borrowing increases the risk of financial crisis. Second, a financial crisis in one period has a spillover effect onto the following period and can affect the capacity to repay longer-term debt. This reflects the observation that financial crises are generally quite costly in terms of forgone output in emerging market countries beyond the immediate crisis period (see Hoggarth and Saporta (2001)). Third, the orderly nature of a standstill reduces the cost of crisis. This reflects the view that disorderly crisis resolution is more costly than orderly resolution, through reputational costs and heightened uncertainty for example.

The paper is organised as follows. Section 2 sets out the structure of the model economy with and without standstills. Section 3 explores the comparative static results by means of a simple numerical example. Section 4 considers two policy issues resulting from this analysis. Section 5 concludes.

2 The model

2.1 Set-up common across regimes

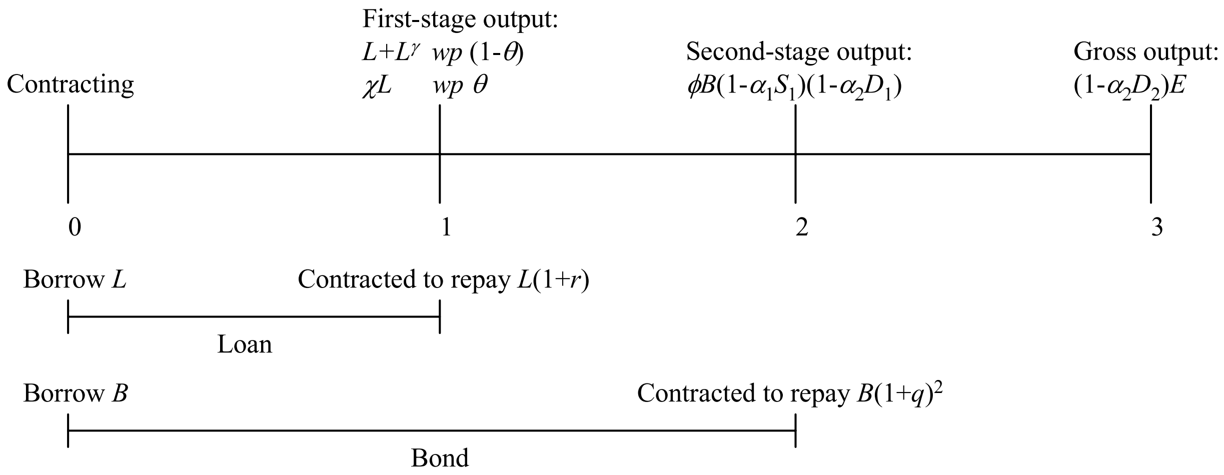
As illustrated in Chart 1, the model has four dates: date 0 (initial contracting period), date 1, date 2 and date 3 ('forever'). The debtor country has no resources of its own and so must borrow through one-period loans and two-period zero-coupon bonds to finance production. The debtor can borrow loans (L) at date 0, contracting to repay $L(1+r)$ at date 1, to finance date 1 production. The debtor can also borrow bonds (B) at date 0, contracting to repay $B(1+q)^2$ at date 2, to finance date 2 production. The interest rate on loans is given by r and the yield on bonds is given by q. Risk-free interest rates are assumed to be zero. We assume the country receives an endowment E in the forever period.(4) The level of loans, bonds and their respective interest rates are determined in the initial contracting period. The country can choose to default strategically in both periods but it is assumed, contrary to Dooley (2000), that investors can distinguish strategic default from incapacity to pay. Specifically, there is full information and a competitive market for funds between the country and risk-neutral investors during the contracting period.

Financial crises occur at date 1 with probability θ which is increasing in the level of one-period loans L according to a logistic function

$$\theta = \frac{e^{\lambda(L-C)}}{1+e^{\lambda(L-C)}} \tag{1}$$

(4) The endowment ensures that it is incentive compatible to repay bonds at date 2. It can be considered as the value of the future repetition of the game.

Chart 1: Timeline of events



where C is a scaling constant. This formulation is arbitrary, but reflects both theoretical arguments and empirical observations. Theoretically, Chang and Velasco (1998) argue that more short-term debt magnifies vulnerability to illiquidity, and so raises the probability of crisis. Empirically, Frankel and Rose (1996) find some evidence that a higher proportion of short-term debt in total debt is a leading indicator of crisis, and Bussiére and Mulder (1999) have shown that the level of short-term debt (as a proportion of reserves) is a good indicator of illiquidity, which raises the probability of crisis.

Gross output at date 1 depends on whether there has been a crisis

$$\begin{array}{rcl} \text{No crisis:} & L + L^{\gamma} & \text{with probability } (1-\theta) \\ \text{Crisis:} & \chi L & \text{with probability } \theta. \end{array} \qquad \textbf{(2)}$$

We assume that $\chi < 1$, so the country will be unable to pay interest and principal on its loans in the event of a crisis.(5) We also assume that $\gamma < 1$, so there are declining returns to scale in date 1 output. We assume that there will not be complete voluntary rollover (due to creditor co-ordination problems for example), because this would replicate the case of a standstill. Gross output at date 2 depends on whether there has been a crisis during date 1, which costs α_1 of date 2 output, and on whether the country strategically defaulted during date 1, which costs α_2 of date 2 output, according to(6)

$$\phi B(1-\alpha_1 S_1)(1-\alpha_2 D_1) \qquad \textbf{(3)}$$

(5) This specific functional form was chosen for expositional expediency, but the key feature is that the country is unable to repay interest plus principal in a crisis. If the country were able to repay principal and interest even in a crisis, there would be multiple equilibria because a loan at zero interest rate would be risk free in both a crisis and non-crisis world.

(6) A standstill is different from strategic default because the debtor makes a commitment to repay in period 2. It is incentive compatible to make this payment in period 2.

where

$$S_1 = \begin{cases} 0 & \text{when no crisis} \\ 1 & \text{when crisis} \end{cases}$$

$$D_1 = \begin{cases} 0 & \text{when no default at date 1} \\ 1 & \text{when default at date 1} \end{cases}$$

and ϕ is a constant marginal return on capital.[7] The reduction in output in period 2 if there was a crisis in period 1 reflects the observation that crises have effects beyond the immediate crisis period.[8] Gross output thereafter depends on whether the country strategically defaulted during date 2, which costs α_2 of date 2 output, according to

$$(1 - \alpha_2 D_2)E \tag{4}$$

where

$$D_2 = \begin{cases} 0 & \text{when no default at date 2} \\ 1 & \text{when default at date 2.} \end{cases}$$

2.2 No standstills regime

Since the debtor can choose to default strategically at date 1 or date 2, we must check that it is incentive compatible for it to repay the loans and bonds as contracted. At each date, the gain from defaulting must be less than the loss of output next period. The incentive compatibility constraint (ICC) for the repayment of bonds is

$$(1+q)^2 B \leq \alpha_2 E \tag{5}$$

Since the return on investment in date 2 output is linear, the country will want to invest up to this constraint so

$$B = \frac{\alpha_2 E}{(1+q)^2} \tag{6}$$

Similarly, the ICC for the repayment of loans is

$$\left.\begin{array}{rr} \text{No crisis:} & (1+r)L \leq \alpha_2 \phi B \\ \text{Crisis:} & \chi L \leq (1-\alpha_1)\alpha_2 \phi B \end{array}\right\} \Longrightarrow L^* \leq \min\left[\frac{\alpha_2 \phi B}{(1+r)}, \frac{(1-\alpha_1)\alpha_2 \phi B}{\chi}\right] \tag{7}$$

(7) The assumption of constant returns to scale in period 2 output is used to make the analysis tractable.

(8) For example, real GDP in Korea fell by 7% between 1997 Q3 and 1998 Q1 (when the restructuring was completed) and did not recover to its pre-crisis level until 1999 Q2.

Since it is incentive compatible to repay the loans in full, the debtor country will repay all that it can (that is, gross output) in the event of a crisis and therefore receives nothing itself. To determine the interest rate r on loans and the yield q on bonds, we assume that a risk-neutral investor will equalise expected returns on the loan or bond and a storage asset.[9] So for loans, this equilibrium condition will give

$$(1-\theta)(1+r)+\theta\chi = 1 \Longrightarrow r = e^{\lambda(L-C)}(1-\chi) \qquad \textbf{(8)}$$

For some parameterisations, gross output at date 2 will exceed debt repayments even if a crisis occurs at date 1. This would make bonds risk free. Reflecting a focus on emerging market economies, we will consider circumstances where crises are quite costly in terms of forgone output and assume that a crisis in the first period has a material effect on the capacity to repay in the second period. In other words, the debtor suffers a net loss following a crisis so $\phi(1-\alpha_1) < (1+q)^2$, but earns a net profit if there is no crisis so $\phi \geq (1+q)^2$. For bonds, the equilibrium condition and these constraints give

$$(1-\theta)(1+q)^2+\theta(1-\alpha_1)\phi = 1 \Longrightarrow q = \sqrt{1+e^{\lambda(L-C)}(1-\phi+\phi\alpha_1)}-1 \qquad \textbf{(9)}$$

For the moment, we assume the objective of the debtor country is to maximise expected net output subject to the ICCs and equations **(6)**, **(8)** and **(9)**

$$\max E[P] = (1-\theta).\left[L+L^{\gamma}-(1+r)L\right]+\theta.0+(1-\theta)\left[\phi B-(1+q)^2B\right]+\theta.0 \qquad \textbf{(10)}$$

which is a function of L and exogenous parameters, so we can solve for optimal L^* then work backwards to obtain θ^*, B^*, r^* and q^*.[10]

2.3 Standstills regime

A standstill is defined here as an orderly rollover of loans into date 2 in the event of a crisis at date 1.[11] In terms of the model, no payments are made to investors at date 1 if there is a crisis but χL is rolled over into date 2 output. In 'return' for this orderly rollover, the cost of crisis α_1 is lowered to $\hat{\alpha}_1$ (where ˆ refers to the standstills case). This lower output loss in the second stage is not modelled explicitly here but reflects an assumption that

(9) Including a non-zero rate of time preference complicates the analysis without adding insight.

(10) The debtor does not have to borrow. If $E[P] < 0$, the debtor will choose not to participate in the game.

(11) This is equivalent to the UDROP proposal of Buiter and Sibert (1999) but without the penalty rate.

orderly resolution of financial crises has a lower cost than disorderly default. We also assume that the loanholder is impatient. Because repayment will be delayed for a period when a standstill is introduced, the loan investor will discount returns more heavily, according to an impatience parameter ε. The bondholder receives the remainder of date 2 output, once the rolled over loans have been paid.[(12)]

As before, it is important to check that it is incentive compatible for the debtor to repay debts as contracted. The only difference in the standstills case is that it must now be incentive compatible for the debtor to repay both the bonds *and* the rolled over loans at date 2. Employing the same rationale as before, we find that

$$\hat{B} = \max\left[\min\left\{\frac{\alpha_2 E}{(1+\hat{q})^2}, \frac{\alpha_2 E}{\phi(1-\hat{\alpha}_1)} - \chi\hat{L}\right\}, 0\right] \tag{11}$$

The ICC for the repayment of loans does not change, so is still given by equation **(7)** above.

As before, to determine the interest rate on loans and the yield on bonds, we suppose that a risk-neutral investor will equalise expected returns on the loan or bond and a storage technology giving

$$(1-\hat{\theta})(1+\hat{r}) + \hat{\theta}(1+\hat{r})\frac{1}{1+\varepsilon} = 1 \Longrightarrow \hat{r} = \frac{\hat{\theta}\left(1-\frac{1}{1+\varepsilon}\right)}{1-\hat{\theta}\left(1+\frac{1}{1+\varepsilon}\right)} \tag{12}$$

$$(1-\hat{\theta})(1+\hat{q})^2\hat{B} + \hat{\theta}\left[[\phi(\hat{B}+\chi\hat{L})(1-\hat{\alpha}_1) - (1+\hat{r})\hat{L}\right] = 1\hat{B} \Longrightarrow$$
$$\hat{q} = \sqrt{\frac{1-\hat{\theta}\phi(1-\hat{\alpha}_1)}{1-\hat{\theta}+\frac{\hat{\theta}L}{\alpha_2 E}[\phi\chi(1-\hat{\alpha}_1)-(1+\hat{r})]}} - 1 \tag{13}$$

The model is then solved in exactly the same way as the regime with no standstills.

3 A simple numerical example

Analytical solutions to the two optimisation problems cannot be found. But for a parametric example, the problem can be solved numerically quite easily. The parameters presented in this example satisfy all the constraints in the model and ensure the bond yield is not risk free. Appendix A shows that the results found are not particularly sensitive to the specific parameter values chosen. Charts 2 and 3 show interest rates and yields as a function of short-term lending under a no standstills regime and a standstills regime (bold).[(13)]

(12) Debt re-negotiation is ruled out here—the holders of short-term loans that rolled over have seniority. This is the least standstill-friendly assumption, as any option of re-negotitation which gives longer-term creditors a greater share would only exaggerate the results found.

(13) In this example, the parameter values are $\lambda = 0.01$, $C = 350$, $\gamma = 0.85$, $\chi = 0.7$, $\phi = 1.2$, $\alpha_1 = 0.7$, $\hat{\alpha}_1 = 0.55$, $\alpha_2 = 0.75$, $\varepsilon = 1$, $E = 500$ and $\psi = 400$.

Chart 2: Loan interest rates

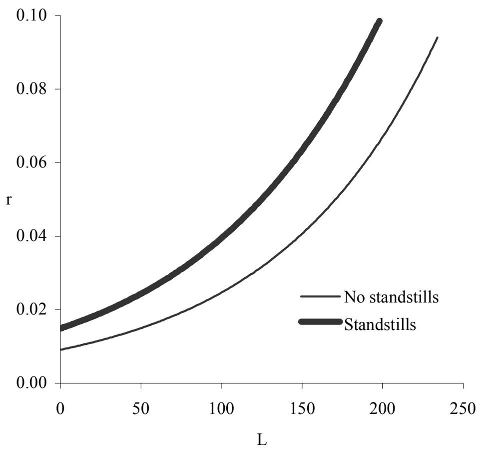


Chart 3: Bond yields

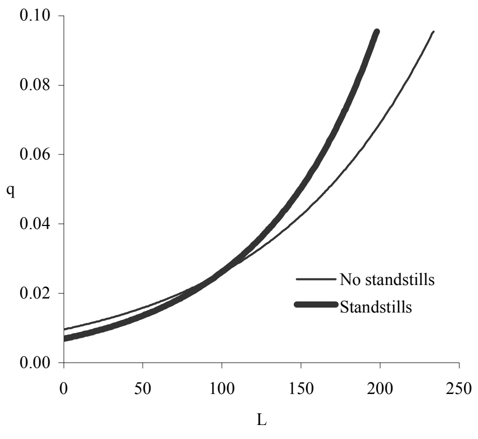


Chart 2 shows that under the baseline parameterisation in both regimes, short-term interest rates are rising in the level of loans, reflecting the higher probability of crisis. With this parameterisation short-term investors require a greater return for a given level of lending with standstills than without. The difference between the two curves reflects the net effect of two offsetting influences. On the one hand, standstills avoid the loss to the investor of $(1 + r)L - \chi L$ caused by a financial crisis at date 1, while on the other hand, investors require compensation for the delay in repayment following a standstill. The baseline parameterisation has been chosen so that the latter effect outweighs the former, reflecting a view that short-term investors strongly dislike being caught in a standstill.[14]

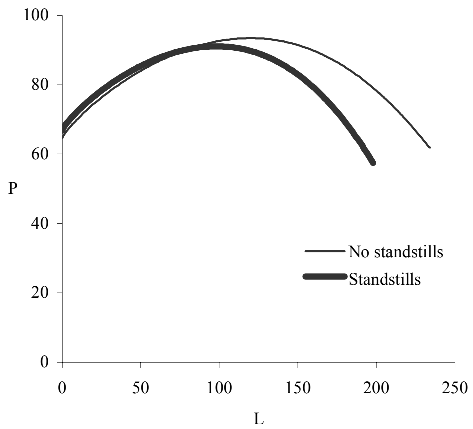
Note from equation **(6)** that there is an inverse relationship between bond yields and the level of bond financing because it is the total repayment amount that is binding in the date 2 incentive compatibility constraint. The level of risk associated with lending bonds, though, is determined by the amount of L through its effect on the probability of crisis. Therefore, there is a bond yield relating to any value of L (as illustrated in Chart 3) which in turn determines B. Bond yields are lower in the standstills regime at small amounts of L because of the loss mitigation effect on date 2 output ($\hat{\alpha}_1 < \alpha_1$). Yields rise more sharply as L increases in the presence of standstills because an increasing proportion of gross output in date 2 is allocated to repaying the rolled over loans, reflecting the seniority of rolled over money, leaving a smaller amount available for bondholders.

Chart 4 illustrates the expected return to the debtor under the two regimes. At zero short term borrowing, there is positive expected return to the debtor because of borrowing for date 2 output. The expected return to the debtor is rising in L initially because of higher returns to investing in date 1 output than date 2. Two factors cause net returns to flatten out and then decline. First, there are declining returns to date 1 output. Second, both loan interest rates and bond yields are rising in L, reducing marginal returns and lowering the level of bonds issued. Because there is full information and a free market, the debtor is properly disciplined for the risks it takes by the interest rates charged. The borrower facing these interest rates then chooses the level of short-term lending (from which everything else follows). In effect, the borrower is trading off higher returns in date 1 against the potential loss of output in date 2. Standstills only make a difference because they overcome the creditor co-ordination problem and mitigate the effect of a crisis. More output can be shared by creditors in the event of a crisis.

Standstills change the nature of the debtor's trade-off between date 1 and date 2. Each unit of short-term borrowing is more expensive reflecting the delay premium and, although bond yields are initially lower due to the smaller cost of crisis, each marginal unit of short-term borrowing increases bond yields by more in the standstills regime. Both effects work to increase the marginal cost of short-term borrowing and, in general, reduce the level of loans taken out. This result is contrary to the suggestion by opponents of standstills that they

(14) To assume the opposite would not be compatible with the assumption that standstills are involuntary; if creditors are indifferent about delay and can receive payment in full next period, they are unlikely to have to be forced to rollover.

Chart 4: Return to debtor



will shorten the maturity of debt. As long as debtors get to choose the maturity of debt they issue, investor 'dislike' of being caught in a standstill translates into a longer rather than shorter duration of debt.

As a result of the crossing over of bond yields, there is no general result on the direction of bond yields and therefore the volume of bonds. However, for two reasons bond yields will generally be lower and the volume of bonds higher. First, a lower level of short-term loans pushes down bond yields because of the lower probability of crisis (under both regimes). Second, the lower level of short-term loans also makes it more likely that the crisis mitigation effect dominates the repayment effect (because repayments would be lower). As a consequence of these two effects on yields, the volume of bonds is likely to be higher. In summary, the yield curve is liable to tilt upwards at the short end and, as a consequence, debtors will lengthen the maturity of their debt under a standstills regime.

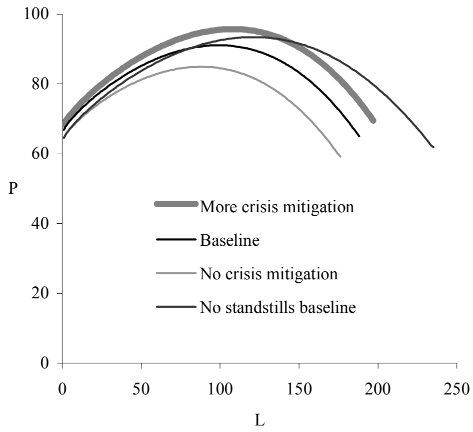
4 Policy issues

The equilibrium outcomes of this model will vary according to the calibration, although the endogenous variables L, r, B, q and θ will generally behave under the standstills and no standstills regime as in the benchmark case. So it is worth considering in more detail where the judgments of a policy-maker lie in contemplating the move to a standstills regime.

4.1 Crisis mitigation effect

One of the key assumptions of the model is that an orderly rollover of debt lowers the cost of crisis in the second period. This reflects a view that a disorderly resolution of financial

Chart 5: Expected output as crisis mitigation changes



crisis imposes costs on the economy through channels such as loss of market access, reputational costs, a credit crunch, disruption to the payments system, and so on. The choice of whether to introduce standstills as a crisis resolution mechanism depends, in part, on how much better an orderly process is over a disorderly one. The effect of reaching a different judgment on the relative costs is illustrated in Chart 5.[15] If the crisis mitigation effect is very large, then standstills could raise expected output above the level in the no standstills case and still lengthen the maturity structure of debt. At the other end of the spectrum, if standstills have no effect on the cost of crisis in the second stage, then expected output will always be lower for each level of loans chosen. Here the debtor is already fully disciplined in taking risk, as a result of the full information and competitive markets in this model. If the crisis resolution effect is weak, standstills cannot improve on this. The baseline scenario sits between these extremes—generally, expected output is lower in the standstills regime than the no standstills regime.

4.2 Welfare

The welfare implications of standstills in this model are obviously dependent on the welfare measure chosen. If expected output is the sole welfare criterion, then welfare is only higher under standstills if the crisis mitigation effect is particularly strong (see Chart 5). Expected output, however, may not be an appropriate measure of welfare because financial crises have much wider social costs than foregone output. We could think of the results in Section 3 as reflecting the behaviour of private firms in the borrowing country interacting with international lenders. Within the system, each firm and lender makes an individually rational choice which takes into account the output cost of crisis, through α_1, but does not

(15) The parameter values used are as given earlier in the paper except $\hat{\alpha}_1 = 0.35$ in the more crisis mitigation case, $\hat{\alpha}_1 = 0.55$ in the baseline case, and $\hat{\alpha}_1 = 0.7$ in the no crisis resolution case.

take into account the wider social costs. But national authorities may want to take this social cost into account when choosing a standstills regime. They might, for example, be willing to trade net output for a reduction in the probability of crisis. By considering a wider welfare metric, standstills could be welfare enhancing if the social externality is high, even when the crisis mitigation effect is low.

5 Conclusion

This paper presented a simple model to assess the implications of standstills as a crisis resolution mechanism for emerging market economies. In particular, it examines the claim that introducing a standstills regime would encourage investors to shorten original maturities in order to position themselves for a quick exit. The model presented here suggests that this will not generally be the case. Lenders will change the interest rates they charge for debt of differing maturities to reflect the risks they face. Borrowing countries faced with a downward-sloping yield curve will tend to issue longer maturity debt, thereby reducing the probability of crisis. Debt standstills perform the dual function of reducing the deadweight output losses of financial crises and lowering the likelihood of crisis. The cost, however, could be lower expected output, depending on the strength of the crisis mitigation effect. But even here, standstills can be welfare enhancing if policy-makers consider the social effects of financial crises. A country considering introducing a standstills regime would have to weigh up the welfare benefits of lower crisis risk against potentially lower expected returns.

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Appendix A: Parameter sensitivity

As a check that the results were not just an artefact of the particular parameterisation used in the numerical example, the model was tested using a range of parameterisations. The results found in the numerical example are fairly general, although some constraints do bind if parameters are taken a long way from the baseline case.

For the assumption that the orderly nature of standstills reduces the output cost of crisis, the sensitivity of L, r and q to the wedge $\alpha_1 - \hat{\alpha}_1$, is shown in Charts 6, 7 and 8.(16) Chart 6 illustrates that short-term lending will generally fall in the presence of standstills. Charts 7 and 8 together show that the equilibrium yield curve tilts up at the short end, particularly as the crisis mitigation effect gets larger.

For the assumption that the creditors are impatient, the sensitivity of L, r and q to the parameter ε, is shown in Charts 9, 10 and 11.(17) Charts 9, 10 and 11 illustrate that even when the impatience parameter is small, short-term lending still falls, although the yield curve tilt would be reversed.

(16) The parameter values used are as given earlier in the paper except the wedge is created by lowering $\hat{\alpha}_1$ with $\alpha_1 = 0.7$ in all cases.

(17) The parameter values used are as given earlier in the paper except that ε takes the value given on the x-axis.

Chart 6: Difference in level of loans implied by the standstills and no standstills regimes as crisis mitigation effect changes

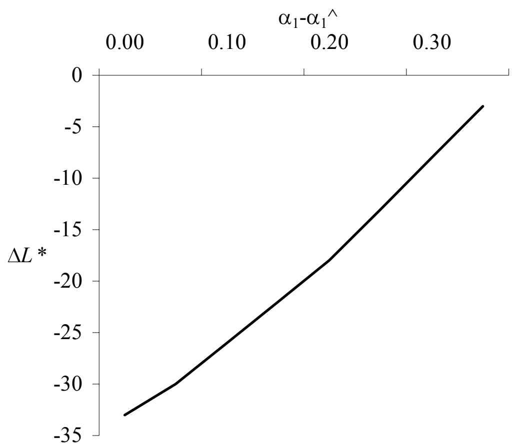

Chart 7: Difference in loan interest rates implied by the standstills and no standstills regimes as crisis mitigation effect changes

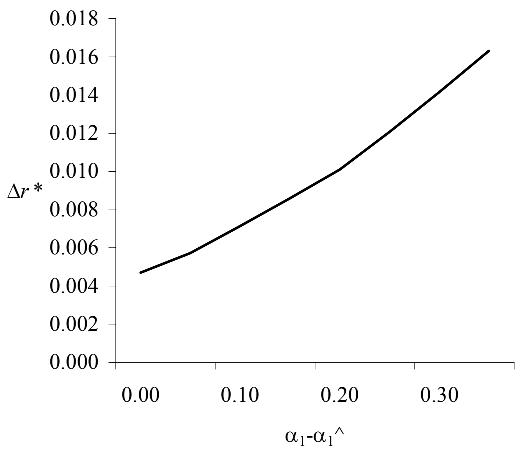

Chart 8: Difference in bond yields implied by the standstills and no standstills regimes as crisis mitigation effect changes

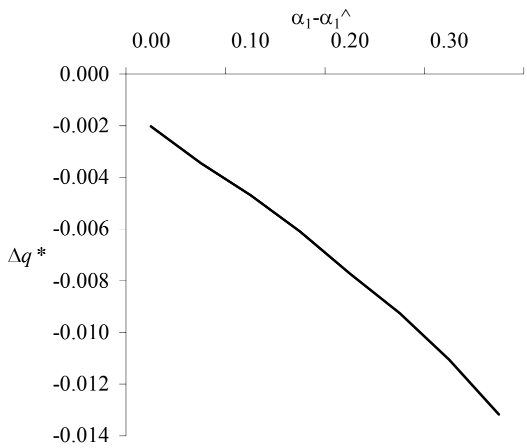

Chart 9: Difference in level of loans implied by the standstills and no standstills regimes as impatience parameter changes

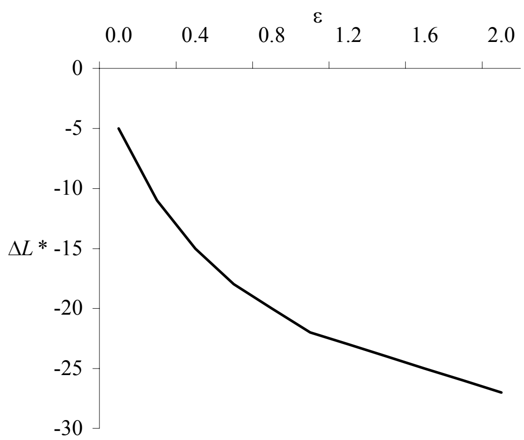

Chart 10: Difference in loan interest rates implied by the standstills and no standstills regimes as impatience parameter changes

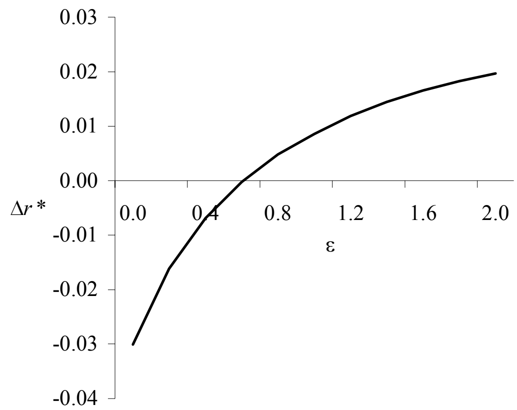

Chart 11: Difference in bond yields implied by the standstills and no standstills regimes as impatience parameter changes