caótica, o fueron elaborados (como un fin en y de sí mismos), que sólo ayudaron a estimular políticas populistas contraproducentes. Sin embargo, hay ahora indicios de mayor sofisticación. Muchos países parecen darse cuenta que, para ser un instrumento exitoso en la recuperación económica, una moratoria transitoria debe surgir desde un programa económico coherente diseñado para corregir en forma vigorosa los desequilibrios internos y externos. El límite sobre los pagos también debe ser de naturaleza conciliatoria; se deben mantener líneas de comunicación abiertas con los acreedores y se les debe ofrecer propuestas constructivas con el fin de resolver el problema en un contexto compatible con un programa económico orientado hacia el crecimiento de los países deudores. Si el pago de deudas es enérgicamente reencauzado en un programa económico coherente y sostenible, y si se evita conflictos injustificados, el país mejora las posibilidades de conseguir eventualmente un pago realista de la deuda pendiente.

V. Conclusiones

Hemos visto que la transferencia de recursos al exterior en Latinoamérica impide el crecimiento y la reestructuración económica a través de la agravación, ya sea de la restricción de divisas, o de la restricción ahorro/fiscal, o ambas. En ausencia de garantías de pago sistemáticas por parte de los gobiernos acreedores, las opciones voluntarias del mercado (enfoque de menú), prometen sólo reducir en forma gradual la carga de la transferencia y con un alto grado de incertidumbre en lo que se refiere a la cantidad y al momento en que se proporciona la ayuda, así como su distribución entre los deudores. Entretanto, el volumen de financiamiento externo, necesario para apoyar programas macroeconómicos de crecimiento y reestructuración, sigue siendo insuficiente. Es por ello que no nos sorprende que los países latinoamericanos que han sido capaces de mantener un proceso adecuado de crecimiento con estabilidad de precios continúen siendo los "casos especiales".

Una estrategia de crecimiento y reconstrucción en la cual sólo algunos deudores problemáticos son capaces de maniobrar en forma exitosa, es claramente una política pública internacional indiferente. Más aún, una política de este tipo no puede garantizar más que un respiro transitorio de las crecientes tensiones existentes entre países deudores y acreedores. Latinoamérica debe, claramente, redoblar sus esfuerzos por controlar los desequilibrios internos y externos. Pero en vista del inexorable peso de las transferencias y de la existencia de responsabilidad compartida en la crisis, los países se ven en la necesidad de forzar a los acreedores a compartir el costo de la reestructuración y del crecimiento económico, a través de la imposición de moratorias formales o informales de varios tipos. No obstante los recientes acontecimientos en Brasil, la mitad de los países de la región han agregado a su propio menú de opciones esta alternativa unilateral. A medida que los costos del estancamiento aumentan en la región, es posible que también aumente el uso de esta alternativa del "menú de opciones de los deudores".

La historia y el sentido común sugieren que la pregunta no es si la transferencia de recursos al exterior se acabará, sino cuándo y cómo. Podría ser reducida de una manera ordenada y socialmente eficiente a través de una iniciativa de política pública más ambiciosa que reconozca la naturaleza colectiva del problema de la deuda latinoamericana. (Salvo que se acabara mediante un incremento de la combatividad de las negociaciones entre acreedores y deudores, precedidas a menudo por frecuentes interrupciones de variable duración en los pagos de la deuda). La primera solución es preferible por el bien colectivo de países deudores y acreedores. Cuán realista sea tal opción dependerá en gran medida del espíritu público de nuestros nuevos líderes políticos en los países acreedores.

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SOVEREIGN DEBT CONVERSION IN A DYNAMIC PORTFOLIO FRAMEWORK*

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Abstract:

This paper analyzes the dynamics of secondary market prices of sovereign debt under alternative market-based debt conversion schemes. In the framework of a portfolio model for rational forward-looking asset holders, the trajectories of secondary market prices are shown to be very sensitive to debtor country welfare (wealth) gains derived from the debt swaps. These gains will arise if debt conversion is (partially) foreign financed or if the debtor country's cost of the debt exceeds the secondary market price.

1. Introduction

In recent years a few developing debtor countries have started programs of debt conversion as a partial response to their continued debt-servicing problems and in view of the development of an international secondary market for debt paper. Among the Latin American countries participating in debt conversion schemes, Chile has been by far the most active. Since the program's inception in 1985, around a quarter of Chilean foreign debt has been exchanged at a discount for domestic equity and unofficial foreign assets held abroad by private national residents. Other highly indebted Latin American econo-

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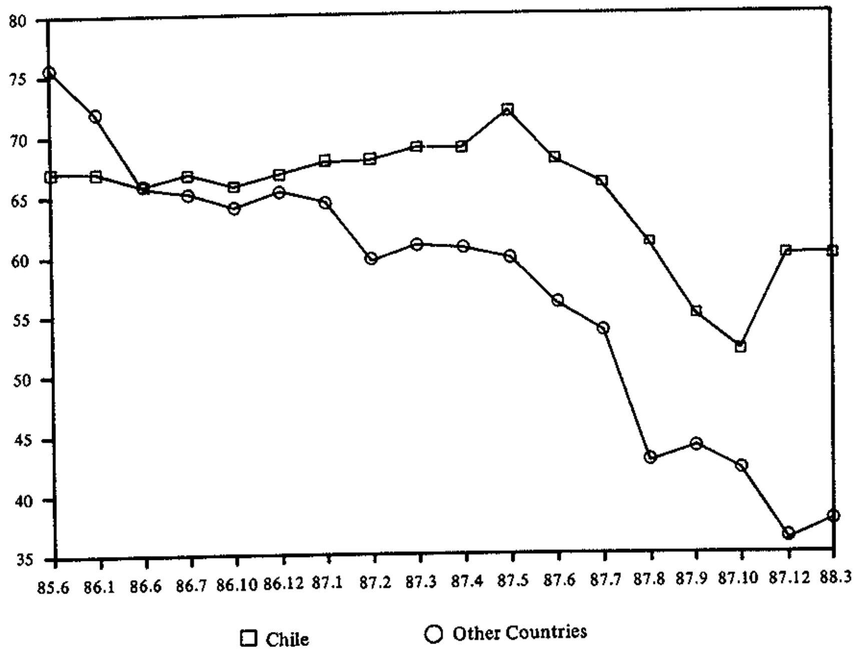
mies such as Argentina, Bolivia, Brazil, Mexico, and Venezuela have started (and sometimes reversed) debt conversion programs at a smaller scale[1].

The magnitude of the Chilean program probably contributed significantly to the growing difference between Chilean and other debtors' secondary market prices for debt paper (see figure 1). This empirical correlation between debt conversion and secondary market prices is one of the main hypotheses explored at a theoretical level in this paper.

FIGURE 1

Secondary market prices for chilean and other countries foreign debt: 1985-1988 (cents per US$ of foreign debt face value)



Note: Other countries' foreign debt prices are weighted averages of secondary prices for the debt of Argentina, Brazil, Colombia, Ecuador, Peru, Mexico and Venezuela.
Source: Merrill Lynch International Bank.

Not surprisingly, there is a growing body of literature addressing the various positive and normative, macro and microeconomic, theoretical and empirical issues related to the operation of secondary markets for sovereign debt paper and market-based debt reduction schemes. One strand of the literature focuses on the macroeconomic effects of debt

1 For detailed studies of Latin American debt conversion experiences see Lamdany (1989) for Bolivia and Mexico, Bodin de Moraes (1988) and De Freitas (1988) for Brazil, and Larraín (1988) for Chile.

reduction programs, as the papers by McNelis and Nickelsburg (1989) and Velasco (1988). Looking at the empirical evidence, Vatnick (1988) presents econometric results for the determination of secondary market prices of debt paper issued by five Latin American debtors.

On the other side, a growing number of authors analyzes the welfare analytics of different voluntary or market-based debt conversion schemes. Among them are the recent studies by Bulow and Rogoff (1988), Held (1988), Helpman (188), Sachs (1988), Williamson (1988), Diwan and Claessens (1989), Dooley (1989), Dornbusch (1989a, 1989b), and Krugman (1989). A first conclusion which emerges quite strongly from most of these studies is that debtor-financed debt conversion programs have negative effects on the debtor's welfare in the absence of efficiency gains and externalities. However, the presence of transaction and efficiency gains obtained by the debtor from debt reduction can alter drastically this result.

The purpose of this paper is to address analytical and welfare aspects of debt conversion schemes by linking explicitly creditworthiness and debtor welfare to debtor and creditor portfolio optimizing behavior. Its specific aim is to analyze the trajectory of secondary market prices under different debt conversion programs, using a dynamic rational-expectations portfolio model. Although the focus is on the behavior of financial markets, it is shown that the debtor's welfare gains (or losses) due to debt conversion are a crucial determinant of secondary market prices.

Section 2 presents the portfolio framework and the features of long-run equilibria in the relevant financial markets before a debt or creditworthiness crisis erupts. The emergence of discounts on foreign debt paper in the aftermath of a debt crisis is the subject of the next section. Here the impact and long-run effects of alternative debt buyback programs on secondary market prices are analyzed in a framework of forward-looking rational domestic and foreign portfolio holders. A crucial element is the explicit distinction between the secondary market price and the unit cost of the debt for the debtor country. Section 4 extends the analysis to debt buybacks financed by unofficial foreign assets held abroad by private residents of the debtor country. This form of debt conversion brings the parallel exchange rate into the picture (which is the relevant variable under restrictions on private capital outflows), to analyze jointly its behavior and that of the secondary market price, Section 5 concludes.

2. Portfolio composition and long-run asset market equilibria

The simple portfolio framework presented in this section distinguishes between two groups of agents: foreigners and private residents of the domestic debtor country[2]. Foreigners – the aggregate of foreign creditors and investors – hold four financial assets (foreign debt issued by nationals, foreign debt issued by a third unspecified aggregate comprised by other debtor countries, equity issued by domestic firms, and other financial assets net of the nationals official foreign reserves) and one financial liability (foreign assets hold unofficially by private nationals). Total foreign financial wealth is defined by the corresponding adding-up constraint:

$$(1) \quad W^* = p\,D + \bar{p}\,\bar{D} + \frac{pa}{e}A^* - FA + OA$$

2 The "domestic" and "national" adjectives are refered to the debtor economy throughout the paper.

where W^* is foreign net financial wealth, p is the unit price of the domestic country's foreign debt (defined in units of other assets, OA), D is the stock of foreign debt, $\bar{p}$ is other debtors' unit value of foreign debt (in units of OA), $\overline{D}$ is the other debtors' foreign debt, pa/e is the price of domestic equity in foreign currency units (pa is the price in domestic currency units and e is the nominal exchange rate), a^* is the stock of domestic equity hold by foreigners, FA is the stock of unofficial foreign assets hold by nationals, and OA is other financial assets hold by foreigners.

The foreigners' long-run asset demands and liability supplies depend on asset/liability returns and total financial wealth as in any standard portfolio model[3 4]:

(2) $$p\,D = D^d\left(s + \hat{p}^e, \bar{p}, d + \left(\frac{\hat{pa}}{e}\right)^e, i^*, CW, \overline{CW}, W^*\right)$$

(+) (+) (–) (–) (+) (–) (+)

(3) $$\bar{p}\,\overline{D} = \overline{D}^d\left(s + \hat{p}^e, \bar{p}, d + \left(\frac{\hat{pa}}{e}\right)^e, i^*, CW, \overline{CW}, W^*\right)$$

(–) (–) (–) (–) (–) (+) (+)

(4) $$\frac{pa}{e}A^* = A^{*d}\left(s + \hat{p}^e, \bar{p}, d + \left(\frac{\hat{pa}}{e}\right)^e, i^*, CW, \overline{CW}, W^*\right)$$

(–) (+) (+) (–) (–) (–) (+)

(5) $$FA = FA^s\left(s + \hat{p}^e, \bar{p}, d + \left(\frac{\hat{pa}}{e}\right)^e, i^*, CW, \overline{CW}, W^*\right)$$

(+) (–) (+) (–) (+) (+) (–)

(6) $$OA = OA^d\left(s + \hat{p}^e, \bar{p}, d + \left(\frac{\hat{pa}}{e}\right)^e, i^*, CW, \overline{CW}, W^*\right)$$

(–) (+) (–) (+) (–) (–) (+)

where s is the rate of return on foreign debt (international interest rate plus spread, d is the rate of distributed profits paid on domestic equity, i^* is the international interest rate paid on foreign assets and received from holding other assets, CW is an index of creditworthiness of the domestic country as perceived by foreigners, and $\overline{CW}$ is an index of creditworthiness of other debtors as perceived by foreigners. Tildes above variables denote percentage rates of change, the supraindex e denotes an expected variable, and supraindeces d and s denote an asset demand function and a liability supply fuction, respectively. Sign-dependencies of asset demands are indicated below the corresponding right-hand side variables

3 The following aggregation of foreigners' demands assumes away heterogeneity in preferences and debtor creditworthiness assessments. However, as Williamson (1988) points out, differing interests (or preferences) between creditors present unexploited opportunities for gains from debt conversion.

4 The following foreigners' asset demands as well as the nationals' demand below are assumed to satisfy gross asset substitutability and the cross equation restrictions on parameters consistent with the Brainard-Tobin adding-up constraints (Brainard and Tobin (1968), Tobin (1969)).

Creditworthiness indices for the domestic country's debt and the other countries' debt reflect the foreign creditors' perception of the debtors' present and future ability and willingness to service their foreign debts. Here we specify creditworthiness as dependent on two variables: the debtors' net national total wealth and the foreigners' subjective perception of present and future debt servicing willingness ($U, \overline{U}$):

(7) $$CW = CW\left(VY + R - p\,D - \frac{pa}{e}A^*, U\right)$$

(+) (+)

(8) $$\overline{CW} = \overline{CW}\left(\overline{VY} + \overline{R} - \bar{p}\,\overline{D} - \left(\frac{\overline{pa}}{\bar{e}}\right)\overline{A}^*, \overline{U}\right)$$

(+) (+)

where net national total wealth is the sum of real adjusted national wealth (VY, the present value of current and future GDP flows adjusted by terms of trade gains and foreign net transfers) and net national financial wealth comprised by international reserves (R) less the values of foreign debt and equity hold by foreigners[5]. Net national financial wealth excludes unofficial foreign assets hold by private nationals (FA), which do not enhance the foreign position of the debtor countries, because debtor governments (and to a lesser extent foreign creditors) are not able to secure these assets for debt servicing purposes.

Now let's focus on the domestic private sector comprised by residents of the domestic debtor country. Private nationals hold three financial assets (domestic money, domestic outside assets and unofficial foreign assets) and two liabilities (foreign debt and domestic equity held by foreigners). Unofficial or unrecorded foreign asset holdings are the result of past unofficial capital flight from the domestic economy, circumventing restrictions on capital ouflows. Total financial wealth of the domestic private sector in domestic currency units is defined accordingly:

(9) $$W = M + B + eb\,FA - e\,p\,D - pa\,A^*$$

where W is private financial national wealth, M is the domestic money stock, B is the stock of outside domestic financial assets (government bonds), and eb is the parallel market exchange rate relevant for unofficial foreign asset transaction banned from official foreign exchange markets.

Long-run national asset demands and liability supplies are specified as follows:

(10) $$M = M^d\left(i, i^*, (\hat{eb})^e, s + \hat{p}^e, d + (\hat{pa})^e, W\right)$$

(–) (–) (–) (–) (–) (+)

5 This particular stock creditworthiness indicator is only far related to widely used flow creditworthiness indicators such as the debt service, debt-exports and debt-GDP ratios. These latter indeces present two drawbacks: first, they exclude other assets and liabilities incorporated into CW, and second, they value debt stocks at face values even when discounts enter the scene, which is avoided by CW as shown below.

$$(11)\quad B = B^d\,(i\,,\, i^*\,,\, (\hat{eb})^e,\, s + \hat{p}^e\,,\, d + (\hat{pa})^e,\, W)$$
$$(+)\,(-)\,(-)\quad (-)\quad (-)\quad (+)$$

$$(12)\quad eb\; FA = FA^d\,(i\,,\, i^*\,,\, (\hat{eb})^e,\, s + \hat{p}^e\,,\, d + (\hat{pa})^e,\, W)$$
$$(-)\,(+)\,(+)\quad (-)\quad (-)\quad (+)$$

$$(13)\quad e\; p\; D = D^s\,(i\,,\, i^*\,,\, (\hat{eb})^e,\, s + \hat{p}^e\,,\, d + (\hat{pa})^e,\, W)$$
$$(+)\,(+)\,(+)\quad (-)\quad (+)\quad (-)$$

$$(14)\quad pa\; A^* = A^{*s}\,(i\,,\, i^*\,,\, (\hat{eb})^e,\, s + \hat{p}^e\,,\, d + (\hat{pa})^e,\, W)$$
$$(+)\,(+)\,(+)\quad (+)\quad (-)\quad (-)$$

Long-run asset equilibria are obtained by equating the corresponding asset demands and supplies introduce above, from where equilibrium asset returns and prices are obtained. Long-run equilibrium in the market for foreign debt involves equating the long-run foreign debt paper demand (eq. 2) and supply (eq. 13). Note that either the return on the debt s (i.e., the spread component of it) or p, the unit price of debt paper, or both (assuming an additional relation between them) is the adjusting variable to ensure market equilibrium.

For small changes in country risk as those assessed to be taking place before the eruption of the debt crisis, and for instantaneously maturing and recontracted debt, the adjusting variable is the return on debt, and particularly the spread level. Under these circumstances the market price of the debt is equal to one, the face value of the debt. Hence a small deterioration in creditworthiness is instantaneously reflected by a higher spread, giving rise to a process of high-speed reduction of the debt via swaps, traded at debt face value (see figure 2).

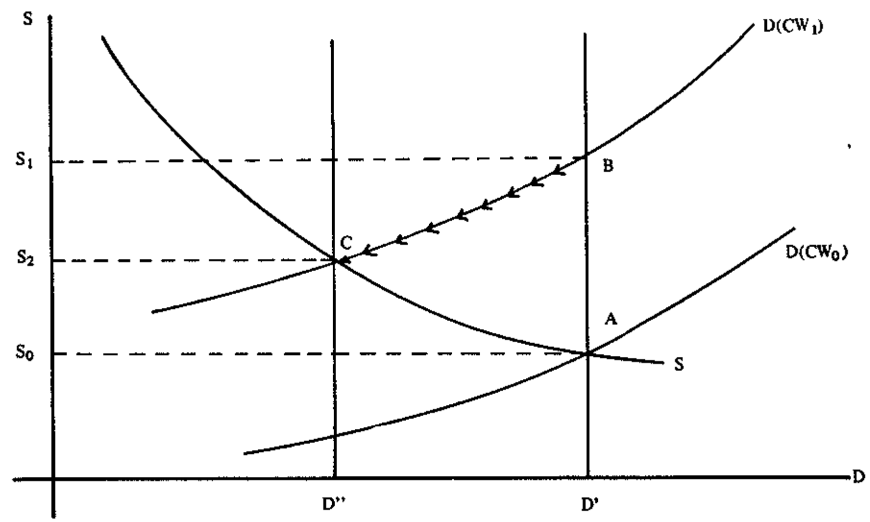
This peaceful realm of voluntary lendig is deeply disturbed by significant changes in perceived country risk. Discrete negative changes in creditworthiness will not be reflected by higher spreads. They might even fall in order to enhance creditworthiness as actually has been observed and explained after 1982. Therefore the brunt of the adjustment is born by the market price of sovereign debt paper. In fact, after a period of shock and uncertainty (1983-1984), debt paper starts to be quoted and traded at secondary market prices. Let's turn next to the behavior of secondary market prices and debt reduction in a world disturbed by unvoluntary holding of massive stocks of undesired foreign debt paper.

3. Secondary market prices and debt reduction

Let's consider now the emergence of differences between actual and desired asset holdings in the market for foreign debt, in face of a discrete decline in the demand for foreign debt paper, due to a significant decline in creditworthiness. For economic and legal reasons creditors are not able to adjust rapidly their foreign debt holdings to lower desired levels. As discussed above, the entire adjustment falls on market prices, implying the emergence of discounts on foreign debt at initially unchanged debt stocks. This

FIGURE 2

Spread and debt adjustment to a small change in creditworthiness



short-run equilibrium is characterized by the following expression, which equates the total market value of the debt to the foreign demand for debt paper, consistent with equation (2):

$$(15)\quad mp\; D = D^d\,[\, s + \hat{mp}^e\,,\, \overline{mp}\,,\, d + (\frac{\hat{pa}}{e})^e,\, i^*\,,\, CW\,(VY + R - c\,D - \frac{pa}{e}A^*,$$
$$(+)\quad (+)\quad (-)\quad (-)\,(+)\quad (+)$$
$$U),\, \overline{CW}\,,\, W^* - mp\; D\,,\, mp\; D]$$
$$(+)\,(-)\quad (+)\quad (-)$$

where secondary market prices for foreign debt (mp, $\overline{mp}$) substitute long-run equilibrium prices (p, $\overline{p}$). Secondary market prices for foreign debt are the fractions of long-run or face prices p consistent with the market discounts on foreign debt. Equation (15) is an implicit short-run equilibrium equation for mp, for a given stock of debt, D[6].

[6] Note that secondary market prices of other countries' debt paper ($\overline{mp}$) also determine the short-run asset demand in (15) – in accordance to portfolio substitution consistent with equation (2), and to geographical "contamination" factors deemed to be relevant in determining discounts on Latin American debt paper, as pointed out by Dornbusch in his discussion of Bulow and Rogoff (1988).

A central feature of (15) is the distinction between the debtor's cost of the debt and the secondary market price. The unit cost of foreign debt for the domestic debtor economy is defined as c, which is lower than (or at most equal to) unit face value p. We postulate that because of institutional restrictions, dead-weight losses from default (embargoes and other limitations on the access to foreign markets which impose a cost to the defaulting debtor not captured by the foreign creditors) and from the debt overhang (because of disincentives for economic reforms in debtor countries which increase debt service capacities), and the net valuation of future access to world financial markets, the domestic country's cost of the debt is normally higher than (and always at least equal to) the secondary market price. Introducing a distinction between the debtor's cost of the debt and the secondary market price is an essential feature of our analysis, which conditions profoundly the behavior of secondary markets for debt paper and the welfare implications of debt conversion schemes[7]. It implies a strong departure from other analyses, as for example Bulow and Rogoff's (1988), which assume implicity that secondary market prices reflect both the value and the cost of sovereign debt for creditors and debtors, respectively[8]. However, we will consider in our analysis below three different cases: c > mp and c independent of mp, c > mp and c dependent of mp, and c = mp.

In order to derive the conditions for debt reduction assume a dynamic rational expectations – perfect foresight equilibrium, implying that expected rates of change are substituted by actual values. Also to derive a reduced-form equation for secondary market prices consistent whith the short-run requilibrium condition (15), which is an implicit equation for mp, assume the following constant elasticity functional form for the debt demand in equation (15):

$$(15') \quad mp\,D = s^{\alpha}\left(\frac{mp}{mp}\right)^{\alpha} (\overline{mp})^{\beta} \left(d + \left(\frac{p\dot{a}}{e}\right)\right)^{-\gamma} (i^*)^{\delta} \left(VY + R - \frac{pa}{e}A^*\right)^{\epsilon}$$

$$(cD)^{-\epsilon}\, U^{\delta}\, (\overline{CW})^{\rho}\, (W^* - mp\,D)^{\lambda}\, (mp\,D)^{\lambda}$$

where all coefficients are non-negative.

The reduced-form demand equation for the domestic country's foreign debt paper derived from (15) is the following:

$$(16) \quad mp = D^{-[(1-\lambda+\epsilon)/(1-\lambda+\alpha)]}\, (\dot{mp})^{[\alpha/(1-\lambda+\alpha)]}\, c^{[-\epsilon/(1-\lambda+\alpha)]} \ldots$$

7 Creditworthiness depends on the debtor country's net national wealth, which in equation (15) is a negative function of the stock of foreign debt valued at c, the debtor's debt cost. Therefore, if c=mp, debt swaps involving exchanges of D and R or A* at corresponding prices mp (=c), 1 and $\frac{pa}{e}$, do not affect the debtor's net wealth and its creditworthiness as perceived by foreign creditors. This feature has significant implications for secondary market prices under debtor-financed debt conversion when c=mp, as will be shown below.

8 For further arguments contributing to explain a positive difference between c and mp see Sachs (1988) and the criticisms by J. Williamson, G. de Menil, J. Sachs, and A. Wojnilower to the implicit c = mp assumption made by Bulow and Rogoff (1988).

This demand specifies the reduced-form secondary market price for given values of the debt, the price change ($\dot{mp}$), the country's debt cost (c), and all other variables specified in (15'), denoted here by dots.

The elasticity of the reduced-form demand for debt paper with respect to the secondary market price, $\eta_{D,mp}$, consistent with (16), is the following:

$$(17) \quad \left| \frac{\delta mp}{\delta D}\frac{D}{mp} \right| = \frac{1}{\eta_{D,mp}} = \frac{1-\lambda+\epsilon}{1-\lambda+\epsilon} \lesseqgtr 1 \Leftrightarrow \epsilon \lesseqgtr \alpha$$

Its value is not unambiguously bigger than 1. If the improved creditworthiness effect of lower debt on the debt paper demand is smaller than the price-elasticity of the structural demand (i.e., if $\epsilon < \alpha$), then the reduced-form price elasticity ($\eta_{D,mp}$) is bigger than 1. In that case unilateral debt reduction or concerted debt forgiveness would not increase the total market value of the debt. This case, which corresponds to being on the "right side" of the Laffer curve for debt relief (see Krugman, 1989), seems to be the empirically relevant one.

However, if the domestic country's cost of the debt (c) is dependent on the secondary market price (mp), the condition for being on the right side on the debt Laffer curve is altered. Assume for the moment that c is a geometric weighted average of the debt face value (assumed to be 1) and the market price, as reflected by: $c = mp^{\psi}$, with $0 < \psi < 1$. Then the price, elasticity of the reduced-form debt demand is $\eta_{DD,mp} = (1-\lambda+\alpha+\psi\epsilon)/(1-\lambda+\epsilon)$, and the condition for its value exceeding 1 is: $\epsilon < \alpha/(1-\psi)$.

Figure 3.1 reflects the simple comparative statics of a discrete reduction in the foreign demand for domestic country debt paper in response to a significant decline in perceived creditworthiness. This demand shift corresponds to the case of no subsequent debt reduction, therefore implying a zero expected and realized secondary market price appreciation (mp = 0).

To analize the dynamic trajectory of secondary market prices and quantities under debt reduction, let's introduce the laws of motion for the secondary market price and the stock de foreign debt.

Reduced-form demand equation (16) is easily re-written as an explicit differential equation in mp:

$$(18) \quad \dot{mp} = mp^{[(1-\lambda+\alpha)/\alpha]}\, D^{[(1-\lambda+\epsilon)/\alpha]}\, c^{\epsilon/\alpha} \ldots$$

The rate of foreign debt conversion or reduction is set by the domestic country's authorities (at least for the public debt and a significant fraction of the private, public-guaranteed debt) or its private sector (at least for a part of the private, public-guaranteed debt and most of the private, non-public guarantee debt). A simple and realistic specification of public policy and private behavioral rules is the following differential equation for a process of continued debt reduction or transformation[9]:

$$(19) \quad \dot{D} = \underset{(+)\ \ (-)}{\dot{D}(mp\,,\,D)}$$

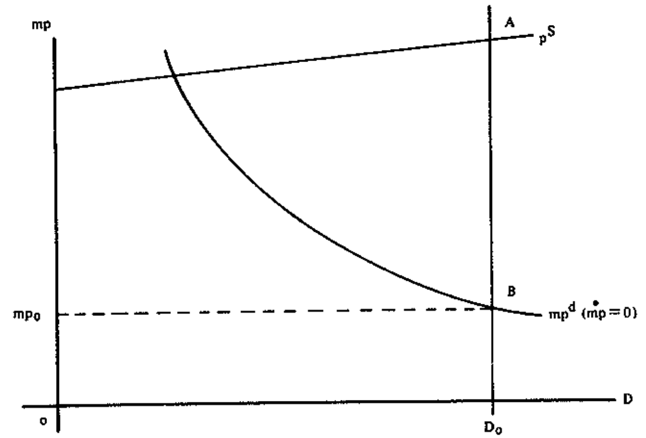
9 Continuity of debt reduction is emphasized here as opposed to discrete or instantaneous changes in D, which are analyzed below.

which states that the rate of debt reduction ($\dot{D} < 0$) rises with lower market prices and with higher debts stocks.

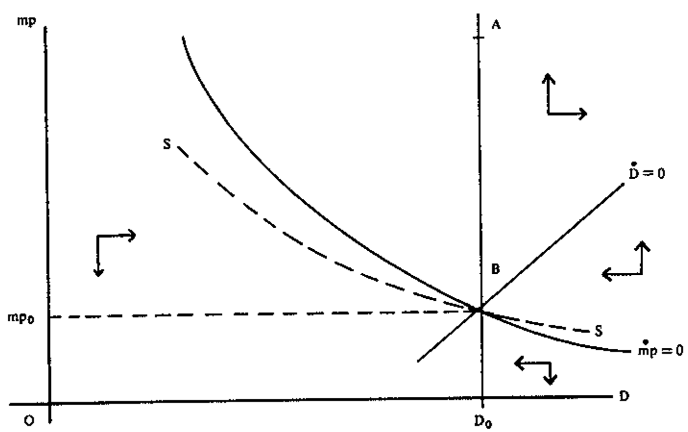
Steady-state equilibrium at point B in Fig. 3.2 results from the intersection of the steady-states equilibrium conditions $\dot{mp} = 0$ and $\dot{D} = 0$, consistent with equations (18) and (19). A saddle-path dynamic trajectory upon stable arm SS is ensured if the steady state is disturbed.

FIGURE 3

Decline in creditworthiness and steady-state equilibrium without debt conversion



3.1 Decline in creditworthiness



3.2 Steady-State equilibrium without debt conversion

A central question to be addressed now refers to how debt reduction is financed or, in more general terms, which is the portfolio swap which allows debt transformation. In addition, the discount at which the debt reduction or transformation takes place and the net benefit obtained by the debtor country have to be specified. To these issues we turn now.

To keep the analysis simple assume that debt reduction is attained by debt buybacks financed by unilateral capital grants from abroad (T)[10]. Net national financial wealth of the domestic country (FW) is therefore the sum of net national total wealth defined in equation (8) and the capital transfer:

$$(20) \qquad FW = R - c\,D - \frac{pa}{e}A^* + T$$

Continuous debt reduction ($\dot{D} < 0$) via buybacks is assumed to take place at secondary market prices[11]:

$$(21) \qquad \dot{T} = mp\,\dot{D}$$

The net transaction gain obtained by the domestic debtor country from the debt buyback (without considering the wealth gain corresponding to the foreign capital grant) is reflected by the change in its financial wealth, obtained from differentiating (20) and substituting (21) into this expression:

$$(22) \qquad \dot{FW} = -c\,\dot{D} + \dot{T} = -[c - mp]\,\dot{D} \geqslant 0 \Leftrightarrow c \geqslant mp$$

Hence transaction gains will be reaped by the debtor economy if its cost of the debt exceeds the market price. However, the result on the total gain in (22) is conditional on c being independent of the market price or the stock of debt. If for instance c is a weghted average of the market price and the face value, as specified above ($c = mp^{\psi}$), then the debtor country's change in the total value (i.e., cost) of its foreign debt is not unambiguously negative if the debt is reduced. To see this, differentiate totally the debtor's total cost of the debt:

$$(23) \qquad d(c\,D) = d(mp^{\psi}\,D) = mp^{\psi}\,(1 - \frac{\psi}{\eta_{DD,mp}})\,dD$$

Therefore if c depends on mp, the ratio of the marginal cost for the debtor and the market price of the debt is not unambiguously bigger than 1:

$$(24) \qquad \frac{d(cD)/dD}{mp} = mp^{(\psi-1)}\,(1 - \frac{\psi}{\eta_{DD,mp}})$$

10 This is precisely the case of the 1988 Bolivian debt buyback analyzed by Bulow and Rogoff (1988) and Sachs (1988).

11 The assumption that the debtor country captures 100% of the market discount is a simplifying but extreme case unfrequently observed in actual debt conversion experiences, where foreign traders tend to have an active participation and a corresponding return.

This ratio reaches negative values if the marginal cost of the debt has that sign, which is the case when ψ, the geometric share of mp in determining c, exceeds $\eta_{DD,\,mp}$.

The distinction between market (or "average") prices and marginal values (or "marginal prices") was first introduced by Bulow and Rogoff (1988). However, they do not distinguish between market prices and the debtor's cost of the debt. In terms of our equations (23) and (24), this is equivalent to impose $\psi = 1$.

If c depends on mp as specified above, the net transaction gain for the debtor country is modified from the level given by equation (22) as follows, which is obtained by using equation (23):

$$(22') \quad \dot{FW} = -(\dot{c}D) + \dot{T} = -\left[mp^{\psi}\left(1 - \frac{\psi}{\eta_{DD,mp}}\right) - mp\right]\dot{D}$$

Hence, even if there are apparent transaction gains to be made ($c = mp^{\psi} > mp$), the net wealth gain of a foreign-financed debt buyback has ambiguous sign if c exceeds but is dependent on mp, as shown by eq. (22').

Let's consider now different debt reduction processes for the case of having the domestic country's foreign debt cost independent of the market price when the former exceeds the latter. I.e., to keep the analysis simple, we will consider either c = mp or c > mp, and c independent of mp in the latter case. As before, debt reduction is financed by foreign capital grants.

Continuous reduction of the total stook of undesired[12] debt is represented by figure 4. Asuming no transaction gains (c = mp, see figure 4.1), the steady-state condition $(\dot{mp} = 0)^I$ is not altered by the debt buyback. The debt reduction program is reflected by the shift of the debt transformation schedule to $(\dot{D} = 0)^I$. This implies an instantaneous appreciation of the secondary market price (from mp_0 to $\overline{mp}_1$) and a subsequent dynamic trajectory for market prices and debt stock along the saddle-path trajectory S_1S_1. Note that the initial impact effect on market prices is consistent with a shift in the foreign demand for debt paper from mp_1^d to $\overline{mp}_1^{-d}$, caused by an increase in the rate of market price appreciation from $\dot{mp} = 0$ to $\dot{mp} > 0$ at point B^I. Once debt conversion proceeds toward the new steady-state position C^I, the rate of market price appreciation converges back to zero, implying continuous shifts of the mp^d demand curve back to mp_1^d along the S_1S_1 dynamic path. Final stationary equilibrium is reached when the market price is brought back to 100% of the face value.

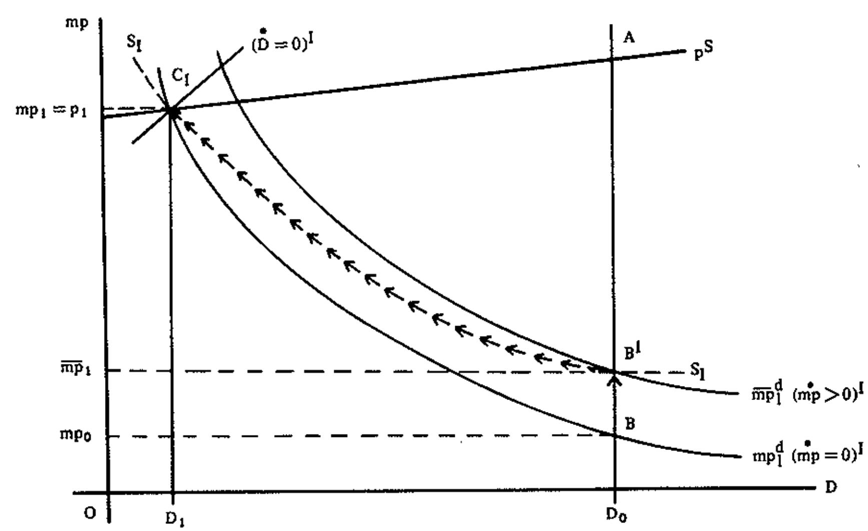
Recall that the debtor's net wealth may have deteriorated as a consequence of the debt buyback even if it is entirely transfered via foreign grants. This will be the case when the price-elasticity of the relevant debt demand ($\eta_{DD,\,mp}$) is lower than 1, as discussed above.

The wealth effect will change significantly if the debt cost is higher than and independent of mp. Then the debtor country obtains transaction benefits whose present value constitute a wealth gain, which will be reflected in an improvement of its credit-worthiness position. This causes an additional shift in the debt demand schedule from $\overline{mp}_1^d$ to $\overline{mp}_2^d$ in figure 4.2. After a corresponding higher market price appreciation (to

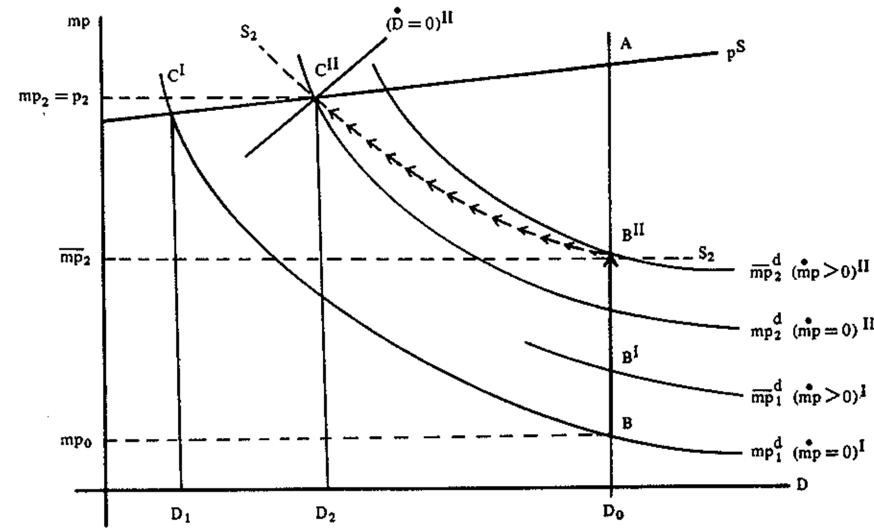
12 Undesired in the sense of debt paper unwillingly held by foreign creditors. When secondary market prices reach 100% of face valves, the total undesired debt stock has been eliminated.

FIGURE 4

Continuous total debt reduction via foreign-financed buybacks



4.1 Continuous total debt reduction without transaction gains (c = mp)



4.2 Continuous total debt reduction with transaction gains (c > mp)

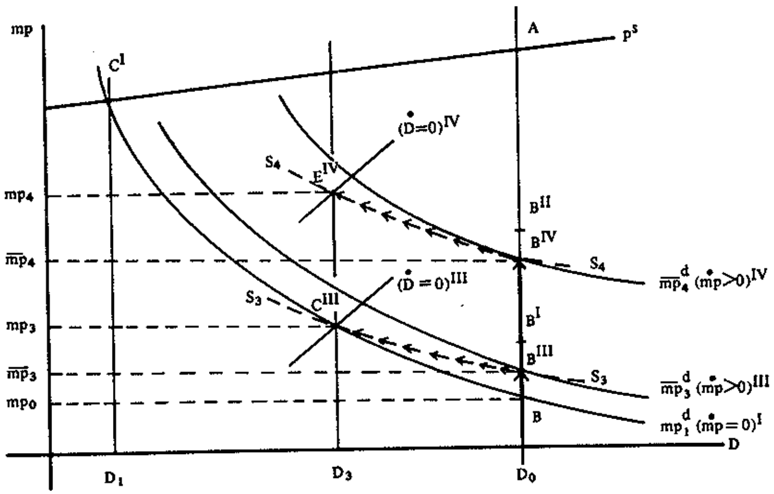
$\overline{mp}_2$), dynamic convergence from B^{II} to C^{II} proceeds upon S_2S_2. The final result is lower total debt reduction required for restoring creditworthiness, as compared to the c = mp case depicted in figure 4.1, due to positive welfare gains from transactions made by the debtor.

An intermediate case of those considered in figures 4.1 and 4.2 is when c exceeds mp and the former is dependent on the latter as reflected by $c = mp^{\psi}$. Then the impact and steady state effects are in between those discussed above, and the sign of the total wealth effect is ambiguous.

Let's turn now to partial debt reduction (figure 5). If debt is continuously reduced (from D_0 to D_3 in figure 5.1), the impact effects on market prices are weaker than those obtained if the total amount of undesired debt is reduced. This is valid with and without transaction gains, because it reflects that final steady-state market prices (mp_4 and mp_3, respectively), will be at levels lower than face values.

FIGURE 5

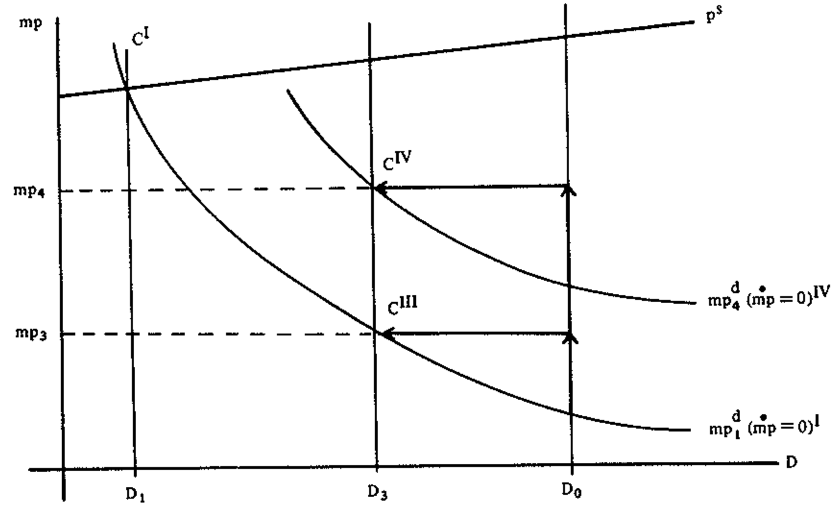
Partial debt reduction via foreign-financed buybacks



5.1 Continuous partial debt reduction with and without transaction gains

Finally, figure 5.2 represents the effects of a discrete of instantaneous debt reduction policy, with and without transaction gains. Both cases imply an immediate appreciation of secondary market prices to post-buyback steady state levels at the moment this policy is announced. This reflects precisely the Bolivian 1988 buyback experience. While the new steady state at C^{III} is consistent with Bulow and Rogoff's (1988) implicit symetry assumption (c = mp), C^{IV} corresponds to the case of transaction gains obtained when having c > mp.

The analysis can be easily extended to consider debt/international reserve swaps or buybacks. Under this alternative the debtor's wealth is reduced by the amount of the foreign grants (T) considered above, which now has to be financed from foreign reserves.



5.2 Discrete partial debt reduction with and without transaction gains

If c = mp, the post-buyback secondary market price is unchanged from its pre-buyback level, because the debtor's net national wealth remains unaltered, as already noted in footnote 7. Assuming a partial, self-financed debt buyback, the decline in wealth and creditworthiness due to lower international reserves causes now an inward shift of the mp_1^d debt demand curve depicted in figure 5.1, which offsets exactly the initial secondary market price increase obtained under foreign-financed buybacks. Also note that this stems from having rational foreign creditors considering the national wealth definition in equation (15) as the relevant country risk indicator. However, if they base their creditworthiness assessment on traditional indicators such as the debt-output or debt service ratios (as discussed in footnote 6), the decline in international reserves would not be registered by these ratios, implying market prices would increase.

If self-financed buybacks proceed when c exceeds and is independent of mp, debtor net wealth will improve according to equation (22) and secondary market prices will increase improve according to equation (22) and secondary market prices will increase. Smaller wealth gains will be reaped if c exceeds but depends on mp. Debtor rationality should limit the welfare gains to a lower bound of zero by refraining from self-financed debt conversion when the wealth gains shown by equation (22') are negative.

4. Debt / foreign asset conversion and the parallel exchange rate

As a straightforward extension of the preceding section consider now foreign debt buybacks financed by private unofficial foreign assets, i.e., by rapatriating flight capital. Our focus will be on the interaction between secondary market prices and the parallel exchange rate along a process of debt / private unofficial foreign asset conversion. A central assumption of the analysis is that the stock of unofficial foreign assets is changed only by this swap. This avoids considering the effects of the parallel exchange rate on capital flight and hence on foreign asset accumulation over time. This issue of "round-tripping", which seems to be empirically quite serious, is left for future extensions.

Note that as compared to foreign-financed debt reduction, this swap has no additional effect on the debtor country's net wealth definition relevant for creditworthiness assessment, because unofficial private foreign assets do not enter that definition. However, domestic private wealth holders are obviously negatively affected by their delivery of unofficially-held foreign assets.

To keep the analysis simple, consider again that the debt cost exceeds the secondary market price (c > mp), with the former being independent of the latter. Let's also assume there are no secondary effects from induced changes in other asset/liability quantities or prices held by the domestic private sector, to rule out the corresponding substitution and wealth effects.

From the domestic demand for unofficial foreign assets (eq. 12) obtain the following expression for the change in the parallel exchange rate:

$$\dot{cb} = \dot{cb}\,(\underset{(+)}{eb}\,,\ \underset{(+)}{FA}\,,\ \underset{(+)}{i}\,,\ \underset{(-)}{i^*}\,,\ \underset{(+)}{s}\,,\ \underset{(+)}{d} + (\frac{\dot{pa}}{e}),\ \underset{(-)}{W - eb\,FA + e\,c\,D_1} - \underset{(-)}{c\,c\,D}) \tag{25}$$

Debt / foreign asset conversion proceeds at a rate which reflects the following policy or behavioral rule:

$$\dot{FA} = \dot{FA}\,(\underset{(+)}{eb}\,,\ \underset{(-)}{FA}\,,\ \underset{(+)}{mp}\,,\ \underset{(-)}{D}) \tag{26}$$

which generalizes the debt conversion rule of equation (19) to consider both sets of prices and quantities affected by debt / unofficial foreign asset conversion, which proceeds at the secondary market price for debt:

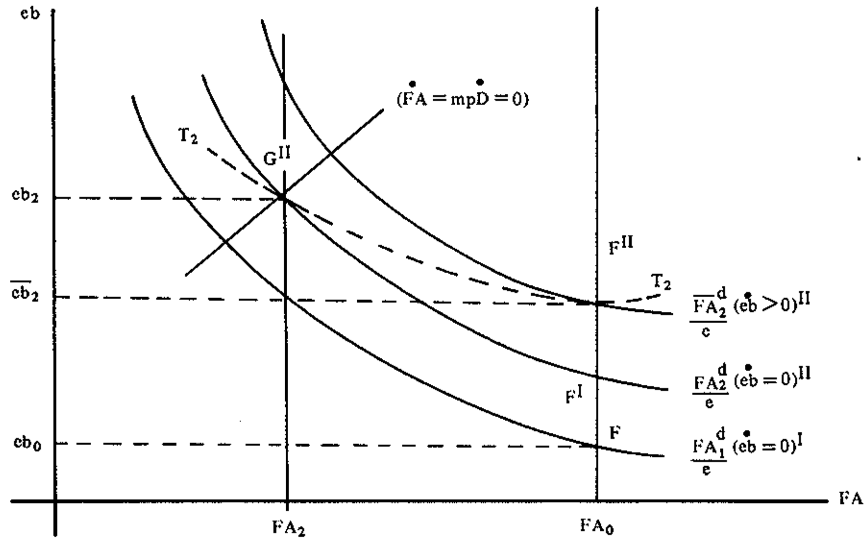
$$\dot{FA} = mp\,\dot{D} \tag{27}$$

The dynamics of continuous foreign asset decumulation for debt buyback purposes, consistent with imposing the corresponding stationary conditions on the dynamic demand for foreign assets (eq. 25) and the foreign asset decumulation rule (eq. 26) are represented in figure 6. It is the analogue of figure 4.2, which represents the corresponding debt decumulation process.

The initial equilibrium at point F in figure 6 (point B in fig. 4.2) is disturbed by the start of the debt/foreign asset conversion process, which generates an instantaneous rise in the parallel exchange rate and the secondary market price. Because of the transaction gains made by the debtor country, the parallel rate (the secondary market price) increases to F^{II} (B^{II}). Dynamic adjustment proceeds upon the stable arm T_2T_2 (S_2S_2). If the entire stock of undesired foreign debt is swapped, the final steady state at G^{II} (which corresponds to C^{II} in figure 4.2) involves a higher parallel exchange rate consistent with lower foreign asset holdings and a higher stock of total private wealth.

FIGURE 6

Continuous debt-foreign asset conversion with transaction gains



Again a crucial assumption for obtaining a positive welfare effect for the domestic private sector is that c exceeds mp. If this is not the case, the position of the final steady-state demand for foreign assets would be at the left of the initial schedule, impying that the final parallel exchange rate could be lower than its initial stationary value.

5. Conclusions

The main conclusions drawn from the analysis carried out in the preceding sections are the following:

(i) To evaluate the impact of debt conversion programs on secondary market prices, a central issue to be addressed is how the debtor country's welfare (wealth) is affected by the programs.

(ii) Traditional country risk or creditworthiness indicators, such as debt-GDP, debt service, and debt-export ratios, could seriously bias the evaluation of the impact of debt conversion on secondary market prices. Their shortcomings stem from their exclusion of other foreign assets (such as international reserves and foreign-owned equity) affected by market-based debt reduction schemes, and from attaching face values instead of the debtors' debt costs to foreign debt stocks.

(iii) A crucial distinction has to be drawn between market prices (mp) and unit costs of the debt for the debtor country (c). The latter could exceed the former due to the presence of institutional constraints, dead-weight losses from default and from the debt overhang, and net benefits from future access to foreign lending. The bigger is the wedge between c and mp and the more independent the former variable is from the latter, the stronger will be the impact of debt conversion on debtor wealth and secondary market prices.

(iv) The credible announcement of a debt conversion program causes an instantaneous secondary market price appreciation if the debtor obtains a wealth gain from conversion.

(v) The higher is the debtor's wealth gain, the stronger are the effects of debt conversion on both the instantaneous adjustment and the dynamic trajectory values of secondary market prices.

(vi) However if $c = mp$ and the conversion is entirelly financed by the debtor country, neither debtor welfare (wealth) nor secondary market prices are affected by debt conversion.

(vii) A faster or higher rate of debt conversion increases both the instantaneous adjustment and the dynamic trajectory values of secondary market prices.

(viii) Debt swaps at high discrete amounts imply financial costs (benefits) for the debtor (creditor) as compared to continuous marginal conversion, because secondary market prices adjust to their ex-post buyback levels before the transactions take place.

(ix) The start of a debt / unofficial private foreign asset swap program causes an instantaneous discrete appreciation of both the secondary market price and the parallel exchange rate, and subsequent continuous price rises (consistent with portofolio demands), along an optimal trajectory which leads to their new stationary values.

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