ELSEVIER

Journal of Development Economics
Vol. 45 (1994) 305–324

JOURNAL OF
Development
ECONOMICS

Fiscal conservatism as a response to the debt crisis

Raúl Labán [a,b], Federico Sturzenegger [c,d,*,1]

[a] *Ministry of Finance, Santiago, Chile*
[b] *Catholic University of Chile, Santiago, Chile*
[c] *Department of Economics, University of California, 405 Hilgard Ave., Los Angeles, CA 90024, USA*
[d] *National Bureau of Economic Research, Cambridge MA, USA*

Received November 1992; final version received November 1993

Abstract

In this paper we develop a model in which social conflict and adjustment costs induce delayed inflation stabilization. We show that the longer this delay is the less demanding are the conditions that some groups will accept in order to stabilize. In the context of the Latin American debt crisis, our model gives a rationale for the time lag between the outset of the crisis and the implementation of reform programs as well as for the strongly conservative nature of those that are currently being implemented.

Keywords: Inflation; Stabilization; Reform; Debt crisis

JEL classification: E5; E6

1. Introduction

During the 1980s inflation in Latin America was to a great extent the product of the debt crisis which abruptly shut off all sources of voluntary external finance and imposed a need for costly adjustment processes. The postponement of these adjustments led to a decade of high inflation, as governments financed the

* Corresponding author.

[1] This paper was written while at CIEPLAN, Santiago, Chile. We thank Josef Perktold, Héctor Schamis and an anonymous referee for useful comments, and Michael Barnes for editorial assistance.

SSDI 0304-3878(94)00039-F

Table 1
Government spending and inflation [a]

Year	Argentina		Peru		Venezuela		Mexico	
	G	π	G	π	G	π	G	π
1980	13.36	101	11.72	50	11.74	21	10.40	29
1981	14.07	104	11.96	67	12.64	16	11.23	27
1982	12.22	165	13.06	80	12.76	10	11.30	57
1983	14.23	344	13.16	100	12.16	6	9.39	102
1984	12.00	641	11.59	111	10.67	12	9.98	65
1985	11.11	667	12.50	163	10.82	11	9.70	58
1986	12.86	87	12.04	78	11.46	12	9.63	86
1987	6.71	133	13.30	86	10.51	28	8.98	132
1988	6.21	343	10.00	666	10.84	30	8.69	114
1989	6.33	3079	9.91	3399	9.97	84	10.95	20
1990	4.45	2314	6.12	7481	8.81	41	11.69	27

[a] G denotes government spending/GDP. π denotes the inflation rate.
Source: World Tables, [1992]. Numbers are in percentages.

payments of interests on foreign debt through inflation taxation rather than through increases in legislated taxation or expenditure cuts.

In this paper we simultaneously address two issues. First, we explain why there was a delay in implementing the required adjustments needed to confront the debt crisis. Second, we characterize how the existence of such a delay affects the measures which the economy finds politically acceptable when stabilization is finally attempted. When faced with a shock which implies the need for fiscal adjustment, groups have to bargain over a fiscal reform package; while inflation is low and its costs are not so high, groups may decide to postpone the costs of such an inflation stabilization. If this happens some agents begin to evade the inflation tax, so that inflation imposes an increasing burden on agents without access to capital flight, financial adaptation and other means of inflation tax evasion. The economy suffers a period of high and accelerating inflation which leaves those agents with restricted access to the financial sector in an increasingly worse position. Eventually, these groups are willing to accept adjustment programs which impose on them a high share of the adjustment costs. Because low income groups are the ones most likely to have restricted access to the financial sector the inflation process will induce a fall in the amount of transfers to these groups, i.e. a process of increasing 'fiscal conservatism'.

Table 1 shows data on government consumption and inflation rates for Argentina, Peru, Venezuela and Mexico. The table shows a clear pattern in which an increase in the inflation rate is accompanied by a strong reduction in government spending. If government consumption is a measure of the provision of services to low income groups, the table indicates a decline in this group's (bargaining) power to sustain a given level of transfers as inflation accelerates.

Table 2
Change in real government expenditure per capita

	Education			Health		
	1970–80	1981–84	1985–87	1970–80	1981–84	1985–87
Late Adjusters						
Chile	3.1	−3.4	−3.4	2.2	−4.8	−2.9
Costa Rica	8.6	−9.7	7.3	117.6	−7.0	1.7
Mexico	11.4	−1.8	−13.8	1.4	−4.8	−9.0
Morocco	8.1	−2.1	−1.9	1.8	−6.7	0.5
Early Adjusters						
Korea	10.8	8.7	6.9	13.2	10.6	29.9
Turkey	10.0	2.6	3.8	5.7	−25.7	12.0

Source: Nelson (1992).

Table 2 provides additional evidence on the increasingly regressive nature of fiscal policies in those countries that delay stabilization. The table shows the annual percentage change in real government spending per capita on education and health services for four highly-indebted countries which delayed their adjustment – Chile, Costa Rica, Mexico and Morocco. It also shows data for two 'early adjusters', namely Korea and Turkey. The table suggests that delayed adjustment seems to be accompanied by a decline in spending.

It is only now, ten years after the onset of the crises, that adjustment programs are finally being implemented successfully in most of Latin America. (See Bruno and Fischer, 1991; Dornbusch and Edwards, 1994.) [2] Four main explanations are usually presented for why only now do we see programs of structural reform in Latin America: (a) That reforms are the pragmatic response to the exhaustion of a given economic model. (See Frieden, 1991; Vial, 1992.) (b) That swings in ideology induced by external events have affected the political landscape making adjustment programs politically viable. The collapse of the Soviet block, for example, may have been an important force in inducing or generating the political support for recent reforms. (c) That reforms in Latin America are largely due to the success of the adjustment programs in Chile and Mexico. This 'demonstration effect' may have convinced other policy makers that structural adjustment effectively works, and finally (d) that the role of the IMF or the World Bank has been important in inducing such a common pattern of adjustment (see Stallings, 1992; Kahler, 1992).

[2] As of 1992 most Latin American countries had inflation rates under 35%. The exceptions were Ecuador and Peru (with inflation rates under 100%), Uruguay (with an inflation rate of around 100%) and Brazil which continued to exhibit monthly rates above 15%.

In the real world, all elements play a role in explaining what happens, and while exogenous shocks to ideology have certainly occurred in recent years, we believe that what is politically acceptable is mainly the result of the endogenous evolution of the economic conditions in a given country. These economic conditions are what we want to analyze in this paper.

It has been argued that even though from an economic point of view an early stabilization may be preferred, at moderate levels of inflation there is not enough political support for adjustment since many individuals visualize the results as negative *for them.* [3] Early attempts to stabilize are often blocked by different interest groups. As inflation reaches higher levels, the total disruption of normal economic life may generate the required political support that will be the basis of a successful stabilization program. The importance of economic crisis in building up the necessary support for introducing major reforms are also discussed in Drazen and Grilli (1993), Hirschman (1985), Haggard and Kaufman (1992) and Cardoso and Helwege (1992). This line of argumentation suggests that an economic crisis (e.g., a hyperinflation) may in fact be necessary in order for stabilization to be attempted. [4]

But if inflation is increasing and stabilization will eventually take place, does there exist a rationale for delaying stabilization? Delayed stabilizations have been formalized in Alesina and Drazen (1991) using a war of attrition between two groups, where the agent that first agrees to the stabilization program pays a higher fraction of the stabilization costs. Delay arises because there is asymmetric information regarding the degree to which inflation affects each player so that each group waits in the hope that his opponent will give in first. Velasco (1992) derives a story for deficit financing and delays based on a dynamic game in which different government agencies obtain, at a cost, resources from a common pool of government funds. While the paper is written in terms of deficit financing it applies equally well to inflation stabilization. At low inflation rates the unique equilibrium is to extract resources from this common pool even though this increases inflation through time. Once inflation becomes high enough an equilibrium can be supported in which everybody agrees not to extract further resources from the common pool. [5] Labán and Sturzenegger (1994) use a dynamic framework with post-stabilization payoff uncertainty, risk aversion, costly policy rever-

[3] See, for example, Alesina and Drazen (1991) and Dornbusch et al. (1990).

[4] Maier (1975) discussing the German stabilization of the 20s recognizes the importance of the high welfare costs associated with extreme inflation in inducing different groups to agree upon stabilization. The same has been argued with respect to the Bolivian experience of the 50s (Eder, 1968), its hyperinflation episode of the 80s (Morales, 1991), and the Argentinean experience in the 80s (Heymann, 1991).

[5] For a related story that also allows for policy cycles see Mondino et al. (1992).

sion and distributional conflict to generate delays. In that model delays exist because, while inflation is low, agents may not be willing to incur the risk associated to the partially irreversible stabilization attempt.

An additional characteristic of many adjustment programs is that some of the groups end up accepting conditions that earlier they found unacceptable. For example, Israel's stabilization of mid-1985 was different from earlier failed attempts in that a heavier burden was placed on workers. In Argentina, during the second Peronist government, the successive stabilization attempts during 1974–76 were increasingly biased against the lower income classes (see DiTella, 1983). Alesina and Drazen (1991) emphasize the coincidence of stabilization with a political consolidation of the right. They refer to the Poincaré stabilization of 1926 and Italy's stabilization of 1922–24 to argue that the lower income classes suffer the largest burden of stabilizations. A similar pattern for the stabilization programs in the 1980s is documented in Geddes (1993). Our model, as will be discussed later, endogenizes the change in relative bargaining positions for different groups over time and accounts for this increased consolidation of the right.

In this paper, we emphasize the role played by the existence of stabilization costs in deciding when to stabilize. These costs may arise from a contractionary impact of stabilization on output (i.e., real wage cuts and/or employment losses) among other sources. In the presence of less than fully credible reforms, there may be uncertainty on how fast private investment (Rodrik, 1989; Dornbusch, 1991b) and/or net exports (Labán, 1991) would react to offset (at least partially) the negative impact on output induced by a fiscal contraction. Dornbusch (1991a) incorporates a cost of stabilization into the evaluation of the ex-ante benefits of stabilization or economic reform. Fernandez and Rodrik (1990) introduce costs at the individual level by assuming agents are not certain about their post-reform economic standing. We show that the interplay of stabilization costs and distributional conflict may generate delays as well as change the conditions of stabilization through time even in the presence of fully informed and rational agents. In the initial stages of the inflation episode it may be an equilibrium strategy for both groups not to reach an agreement to stabilize, since the costs of inflation may not compensate the benefits of postponing stabilization (these benefits arise from the fact that the delay shifts the stabilization cost to the future). The persistence of positive inflation will trigger a process of financial adaptation (i.e. a flight from money), which will increase the rate of inflation and therefore the incentives to stabilize for both groups but will also concentrate the burden of inflation on the poor (Cardoso, 1992; Nelson, 1992; Sturzenegger, 1992). This redistribution of costs induces them to accept conditions that they were not prepared to accept before. If the financial adaptation process is deep enough in that it leads to extremely high rates of inflation associated with high welfare costs stabilization becomes optimal. Thus, we formalize the two main findings of Tables 1 and 2: that stabilization will be delayed until 'things get really bad', and that extreme inflation will tend to reduce the level of government spending.

2. The model

We assume a discrete time economy, populated by two types of infinitely lived agents organized in two socio-political groups which maximize the expected utility of their representative agent. Each group is composed of a continuum of agents distributed on the unit interval with total aggregate unitary mass. We call these groups poor (p) and rich (r), as they differ in that the rich have access to a financial adaptation technology which allows them to evade a distortionary (inflation) tax. For the poor this technology is assumed not available or too costly to implement. [6]

Each poor and rich individual receives at the beginning of every period an endowment of size e. Agents are assumed to consume all their net endowment in each period. Prior to the debt crisis, we assume that the government finances a program of transfers to the poor by foreign borrowing. In addition, the interest on such debt is also paid through further external indebtedness. Thus, during this period the stock of public external debt evolves according to

$$b_t = (1+r)b_{t-1} + g, \tag{1}$$

where b_t is the stock of external debt at t, r is the (constant) interest rate on foreign borrowing, and g is the level of resources transferred to the poor in each period.

Let us assume that at the beginning of period T_0 the economy is subject to a (debt) shock, which abruptly shuts off all sources of external financing. Before there is political support for stabilization – tax reform and expenditure cuts which balance the budget – the government finances its interest payments and the pre-shock level of transfers through distortionary taxation levied on both agents. Thus, in the pre-stabilization economy the budget constraint for the government in each period is given by

$$rb_{T0} + g = \frac{\pi_t}{1+\pi_t}(2e - F_t) \tag{2}$$

under the assumption that no debt reduction takes place. F_t denotes the aggregate level of financial adaptation chosen by the rich group in period t, which represents the fraction of their endowment that is exempt of distortionary taxation. Thus, the tax rate π is endogenous and depends on the aggregate level of tax evasion. Even though ours is a non-monetary economy we interpret the tax as inflationary financing, where g represents seigniorage collection, π the inflation rate, and the

[6] If we allow this technology to be available, at higher cost, for the lower income group, the results of the paper will still hold. This assumption is made here only for simplicity of exposition.

tax evasion technology is interpreted as a process of financial adaptation or currency substitution. [7] Without loss of generality in what follows we assume that $b_{T0} = 0$.

At the beginning of each period, both groups decide whether or not to attempt stabilization and bargain on the conditions of the fiscal reform package to be implemented. Stabilization requires agreement between both groups.

While stabilization is not implemented the rich decide, every period, the share of their endowment to be protected against inflation taxation. The use of this financial adaptation technology is not without costs. We assume that each rich agent faces a cost of investing an amount f_t in this technology in period t equal to $c(f_t, K_t)$, where $K_t = \Sigma_{z=0}^{t-1} F_z$ denotes the aggregate level of knowledge regarding financial adaptation accumulated at the beginning of period t. This stock of know-how increases with the use of these technologies. This learning process may represent either a process of 'learning by doing' or the development of a wider menu of financial and transaction institutions. An increase in the stock of experience on how to use these technologies is assumed to reduce the marginal cost of engaging in this process. Additionally, we assume that for any given stock of knowledge, an increase in the holdings of tax-free assets faces convex costs. Thus, the previous setup is captured by assuming that: $c_f > 0$, $c_{ff} > 0$, $c_{fff} > 0$, $c_K < 0$ and $c_{fK} < 0$. We also assume that $c(0, K_t) = c_f(0, K_t) = c_K(0, K_t) = 0$. Even though any individual agent cannot affect the aggregate level of financial adaptation in equilibrium we must have $f_t = F_t$ for all t.

In the absence of stabilization the poor pay a proportion θ_t of the distortionary taxation in period t and the rich bear a fraction $(1 - \theta_t)$, where

$$\theta_t = \frac{e}{2e - F_t}. \tag{3}$$

Inflation also has distortionary effects which generate welfare losses. These effects have been emphasized in the literature since Bailey (1956), but may include changes in the overall efficiency of the economic system as formalized by Tommasi (1992). Here, we assume these costs can be represented by an additive reduction in the endowment for each agent equal to $\phi(\pi)$, with $\phi'(\pi) > 0$ and $\phi''(\pi) > 0$.

In sum, pre-stabilization, the flow of utilities for poor and rich in period t are given by

$$U_t^{\mathrm{p}} = e - \phi(\pi_t) + (1 - \theta_t) g, \tag{4}$$

$$U_t^{\mathrm{r}} = e - \phi(\pi_t) - (1 - \theta_t) g - c(f_t, K_t), \tag{5}$$

[7] The setup we have in mind is that of a cash-in-advance constraint economy with two imperfect substitutes assets. Rich agents decide on the optimal portfolio of these two assets to carry their wealth between the moment they receive their endowment and the moment consumption takes place.

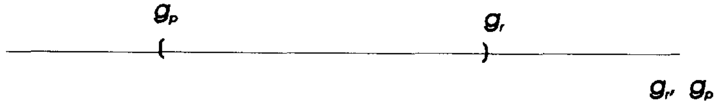

Fig. 1. The bargaining process.

i.e. the endowment minus the costs of inflation plus net transfers. The rich in addition pay the real cost of financial adaptation. If stabilization is implemented, we assume for simplicity that legislated taxes fall completely on the rich. The level of post-stabilization redistribution of income g^s is the result of a bargaining between the two groups, so flow utilities will equal $U_t^p = e + g^s$ and $U_t^r = e - g^s$ for poor and rich, respectively.

If stabilization is implemented a cost Q has to be paid by both groups. This cost is motivated, as discussed in the introduction, by the contractionary effects or fall in real wages induced by the stabilization. We assume that Q is a constant and that both groups pay an equal share of the stabilization costs. [8]

Fig. 1 helps to build intuition regarding the bargaining process which takes place during a stabilization. The real line represents all possible transfers which may be agreed upon. The poor will accept all post-stabilization transfers which give them a higher utility level than that attained by not stabilizing this period and behaving optimally ever after. Thus if we denote that value by g^p in Fig. 1 the poor will accept all transfers greater or equal to this amount. The rich, on the contrary, will only accept making transfers lower or equal to those which give a utility level equal to waiting, i.e. they will accept all post- stabilization transfers of g^r or less. The position of these cutoff demands will depend on time, the costs of inflation and the extent of the financial adaptation process. The difference between both values will depend on the benefits of stabilization versus the benefits of delaying. In the figure, we have assumed that $g^r \geqslant g^p$. In this case we say that there are gains to trade or that a mutually beneficial arrangement between both groups can be achieved. Stabilization is delayed whenever both groups cannot reconcile their demands, i.e. whenever $g^p > g^r$. In what follows we prove two propositions which build up to our main result regarding the existence of delays. Only then do we turn to an evaluation of how the optimal agreements change through time.

[8] Nevertheless, it is possible that the cost of stabilization may be related among other things to the level of inflation. As inflation accelerates the costs of stabilization may increase. As we approach a hyperinflation these costs may fall, as all prices become indexed to the exchange rate. It is also possible to allow one group to pay a higher fraction of the stabilization costs or for the costs of inflation to affect both groups differently. These extensions in no way jeopardize the results of the model.

Proposition 1. *Provided that the assumptions on U(.) and c(f, K) are satisfied, for the stable monetary equilibrium while stabilization is not achieved we find:*

(*a*) $f_t^* > 0 \; \forall \; t$ (*positive equilibrium level of financial adaptation*),
(*b*) $f_t^* > f_{t-1}^*$ (*increasing equilibrium level of financial adaptation*),
(*c*) $\pi_t > \pi_{t-1}$ (*inflation endogenously increases*),
(*d*) $\theta_t > \theta_{t-1}$ (*regressive impact of financial adaptation*).

Proof. See appendix. □

The monetary equilibria for this economy are depicted in Fig. 2. The individual level of financial adaptation depends positively on the aggregate level because a higher aggregate level of financial adaptation induces a higher inflation rate. This relation is depicted as curve *f-f* in Fig. 2. Monetary equilibria are defined as those points where individual and aggregate decisions coincide, i.e. where *f-f* crosses the 45° line. Depending on the size of the pre-stabilization transfers and the stock of financial adaptation know-how, the economy may have zero, one, or two equilibria. The dual monetary equilibria in Fig. 2 are a reflection of the Laffer curve – the same amount of seigniorage collection may be obtained at either a low or high inflation rate. Contrary to Bruno and Fischer (1990), the low inflation equilibrium is stable while the high inflation equilibrium is unstable. If the amount of investment on the financial innovation technology by the rich were equal to zero our problem would be stationary and thus delays would not be possible. But in choosing the optimal level of financial adaptation (f^*), the agent equalizes the marginal benefits of investing in this technology (given by the inflation rate) to its marginal cost. Because this cost is low for small increases in financial adaptation (recall that $c_f(0, K) = 0$) the agent always finds it optimal to invest a strictly positive amount. Over time the economy experiences a process of learning due to the simultaneous use of financial adaptation technology by many agents in previous periods (graphically this shifts the *f-f* curve upwards) which induces additional investments in this technology. This, for the stable equilibrium, increases the rate of inflation.

Proposition 1 allows to compute the inflation path while stabilization is not implemented. This path is necessary in order to compute the optimal strategies for both groups. We first derive the maximum amount the rich are willing to pay (g_t^{r}) and the minimum the poor are willing to receive (g_t^{p}) at the beginning of each period in order to support the implementation of a stabilization program. Using these cutoff demands we derive the conditions that must be satisfied in order for there to be an area of possible agreement ($g_t^{\mathrm{r}} \geqslant g_t^{\mathrm{p}}$). We then characterize this area over time and determine the precise moment when stabilization is actually implemented.

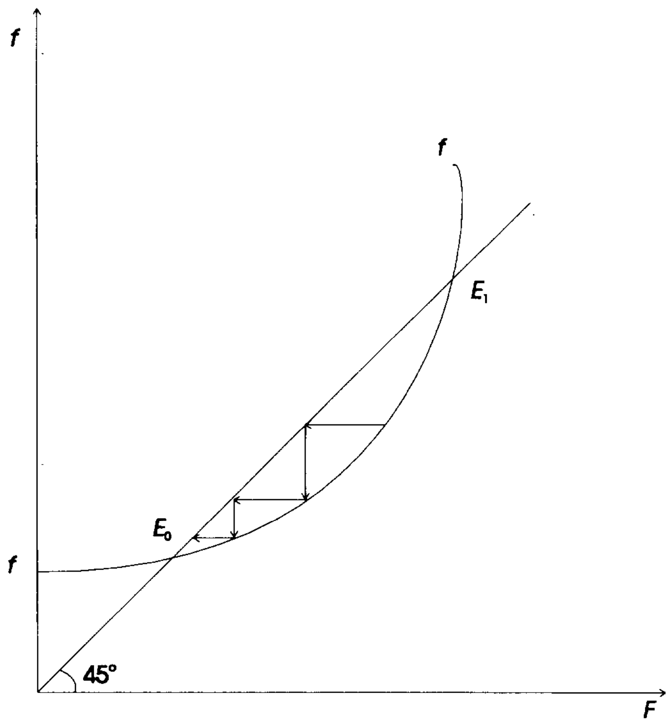

Fig. 2. Stable and unstable monetary equilibria.

In order to characterize this area consider the amount of transfers the rich and the poor are willing to accept in order to avoid delaying stabilization by J periods. For the rich this amount g_t^r is defined by

$$\sum_{i=t}^{t+J-1} \delta^{i-t}\{e-(1-\theta_i)g-\phi(\pi_i)-c(f_i^*,K_i)\}$$
$$+\sum_{i=t+J}^{\infty} \delta^{i-t}\{e-g_{t+J}^{s}\}-Q\delta^{J}=\sum_{i=t}^{\infty}\delta^{i-t}\{e-g_t^{r}\}-Q, \tag{6}$$

where g_t^s represents the level of government transfers agreed upon if stabilization is implemented in period t. The first term in the left-hand side represents the present discounted value of utility during the $J-1$ initial inflationary periods. The second term is the present discounted value of utility thereafter, and the last term represents the present discounted value of the stabilization cost. This must equal the present discounted value of utility, net of stabilization costs, obtained by stabilizing in period t. Similarly for the poor the amount g_t^{p} is defined by

$$\sum_{i=t}^{t+J-1} \delta^{i-t}\{e+(1-\theta_i)g-\phi(\pi_i)\}+\sum_{i=t+J}^{\infty} \delta^{i-t}\{e+g_{t+J}^{\mathrm{s}}\} - Q\delta^J=\sum_{i=t}^{\infty}\delta^{i-t}\{e+g_t^{\mathrm{p}}\}-Q. \tag{7}$$

To stabilize in period t, given that otherwise stabilization will be attempted J periods hence, we must have $g_t^{\mathrm{r}} \geqslant g_t^{\mathrm{p}}$ or equivalently that $A(t,J)=g_t^{\mathrm{r}}-g_t^{\mathrm{p}} \geqslant 0$. Manipulating Eqs. (6) and (7) we find that

$$A(t,J)=\sum_{i=t}^{t+J-1} \delta^{i-t}[2\phi(\pi_i)+c(f_i^*,K_i)]-(1-\delta^J)2Q, \tag{8}$$

where the function $A(t,J)$ denotes the welfare gain from stabilization in period t instead of in period $t+J$. It depends positively on the costs of inflation incurred by both agents, $2\phi(\pi)$, and the deadweight costs of financial adaptation, $c(f_i^*,K_i)$. It depends negatively on the returns to delaying stabilization, which are represented by the reduction in the cost of adjustment induced by discounting.

The solution to the problem of timing the stabilization can be obtained by evaluating the function $A(t,J)$ when J takes its equilibrium value J^*. For notational ease we define the function $\psi(t)=2\phi(\pi_t)+c(f_t^*,K_t)$, which is assumed to be an increasing function of the inflation rate.

Proposition 2. Assume that there exists a T such that $A(T,J)>0$ $\forall J$. Then $A(t,J^*)$ is an increasing function for all $t<T$.

Proof. See the appendix. □ [9]

The proposition shows that the gains to stabilization are monotonically increasing over time and, therefore, that there exists a unique T^* for which the gains from stabilization become positive. Stabilization takes place for the smallest integer t such that $t \geqslant T^*$, where T^* solves

$$2\phi(\pi_{T^*})+c(f_{T^*}^*,K_{T^*})=(1-\delta)2Q, \tag{9}$$

and corresponds to the time period in which the agreement area becomes nonnegative. An important feature of equation (9) is that it does not depend on the

[9] The assumption indicates that there exists a level of financial adaptation (hence inflation) large enough that stabilization is always an equilibrium. Because high inflation can induce high levels of welfare costs this is not a restrictive assumption.

distributional parameter θ, the decision to stabilize depending only on the aggregate costs and benefits of delaying the adjustment. [10]

Eq. (9) delivers several intuitive results regarding the stabilization date. First, that the larger the stabilization costs the longer will be the delay. Second, that the greater the discounting (small δ) the longer will be the delay. These two terms appear jointly on the right-hand side of (9) because the benefits of delaying are given by the fall in the real cost of stabilization induced by transferring the stabilization cost towards the future. If there is no discounting nothing is gained by waiting and therefore there will be no delays. Third, that the more costly is inflation or financial adaptation the shorter will be the delay. These two terms add up to the costs of delaying stabilization.

The existence of delay looks strikingly counter-intuitive. If everybody knows the future evolution of the economy and anticipates that stabilization will be implemented, it seems natural to think that stabilization will be undertaken right away as doing so would avoid all the inflation costs incurred during the delay. The intuition for delay in this model relies on the fact that discounting affects the relative costs of stabilizing today versus tomorrow. As time goes on, the process of financial adaptation increases inflation if no agreement is reached, therefore the burden of not stabilizing increases. Eventually, the costs of inflation are not compensated by further delays.

We now ask the question of how the path of inflation would look like in the presence of a central planner. Given a path for the process of financial adaptation a central planner who appropriately weighs the utility of the two groups would also delay stabilization, as benefits and costs are the same as for the individual groups. The main difference relies on the fact that a central planner would never engage in the process of financial adaptation as it only redistributes income between the groups in addition of inducing net deadweight losses. Once the dynamics of money demand are eliminated the inflation rate will be constant and delays are not possible – either stabilization is implemented in the first period or never.

It is common in political rhetoric to hear that tough measures are never implemented since no policy maker wants to pay the costs of stabilization without enjoying the benefits. In part we have captured this intuition, as in our setup a high discount factor makes it very attractive to shift the stabilization costs to the future. Finally, we find that stabilizations are implemented only when things get out of hand, i.e. when inflation has reached very high levels. In this sense we formalize the idea that governments react only when things have gotten 'really bad', or when no alternatives are left.

[10] On the contrary, as will be shown in Section 3, the level of post stabilization transfers will depend critically on the distributional parameter θ.

3. Conservative governments

In this section we discuss the increasingly conservative nature of stabilization efforts in the presence of delays. The existence of such a regressive bias in the stabilization programs as shown in Tables 1 and 2 is interesting, because even though it is anticipated by the poor, i.e. they know that the delay will 'hurt' them in the long run, they are still unwilling to reduce their demands to make them compatible with those of the other group. [11]

In order to show how the stabilization agreement depends on the length of the delay, suppose, just to fix ideas, that two economies differ in their stabilization costs Q so that they will stabilize at different dates. In this section we ask how this affects the fiscal arrangement agreed upon. [12] We show that the longer the delay, and consequently the higher the inflation rate attained before stabilization, the smaller the level of transfers that groups will agree upon when stabilization is implemented.

Consider that stabilization takes place in period t. From (6) and (7) we have [13]

$$g_t^{\mathrm{p}} = (1-\delta)\big[(1-\theta_t)g - \phi(\pi_t)\big] + \delta g_{t+1}^{\mathrm{s}} + (1-\delta)^2 Q, \tag{10}$$

and

$$g_t^{\mathrm{r}} = (1-\delta)\big[(1-\theta_t)g + \phi(\pi_t) + c(f_t^*, K_t)\big] + \delta g_{t+1}^{\mathrm{s}} - (1-\delta)^2 Q. \tag{11}$$

Due to the linearity of the utility functions, the Nash bargaining outcome is given by the average of both group's demands,

$$g_t^{\mathrm{s}} = \frac{g_t^{\mathrm{r}} + g_t^{\mathrm{p}}}{2}. \tag{12}$$

It is easy to see from (10), (11) in (12) that

$$g_t^{\mathrm{s}} = (1-\delta)\left\{(1-\theta_t)g + \frac{c(f_t^*, K_t)}{2}\right\} + \delta g_{t+1}^{\mathrm{s}}, \tag{13}$$

and similarly for g_{t+i}^{s} $\forall_i > 0$. Note that the post-stabilization level of transfers depends on the net transfers observed in the pre-stabilization economy and that the term between brackets in (13) is an average of the transfers received by the poor,

[11] They will be 'hurt' in the sense that the long-run level of transfers will be lower than what would have been obtained under an earlier stabilization. Nevertheless, because agents choose their cutoff demands, they must still be better off by delaying stabilization.

[12] The same result holds for comparative statics on any of the elements which affect the optimal stopping time.

[13] From Proposition 2 we know that, because the costs of delaying are monotonically increasing, the optimal cutoffs are computed by assuming that if stabilization does not take place in this period it will take place in the following one (i.e. that $J^* = 1$).

$(1-\theta_t)g$, and the transfers plus costs of financial adaptation paid by the rich, $(1-\theta_t)g + c(f_t^*, K_t)$. The larger the amount of transfers received by the poor in the pre-stabilization economy the larger the post-stabilization transfer obtained under a Nash bargaining solution. Integrating (13) forward we obtain [14]

$$(g_{t+1}^s - g_t^s) = \frac{(1-\delta)}{2}\sum_{i=t}^{\infty}\delta^{i-t}\{c(f_{i+1}^*, K_{i+1}) - c(f_i^*, K_i) - 2g(\theta_{i+1} - \theta_i)\}\ \forall t. \tag{14}$$

We now show that the level of transfers in a Nash bargaining solution, g_t^s, decreases over time.

Proposition 3. For the economy described in Section 2, and for g_t^s defined by (12) we have that $g_{t+1}^s - g_t^s < 0\ \forall t$.

Proof. See the appendix. □

Proposition 3 results from the fact that the net transfers received by poor agents fall steadily if inflationary financing of transfers is maintained. Inflation induces financial adaptation, and because financial adaptation shifts the burden of the inflation tax towards them, poor agents find that the net transfers they receive fall over time. Rich agents choose how much to financially adapt (though at cost $c(.)$) so it is natural to believe that they will engage in financial adaptation only if this increases their welfare. As long as the costs of financial adaptation do not increase too much in equilibrium, the rich agents' *relative position* will improve. Proposition 3 shows that this is always the case. This change in relative bargaining positions induces a steady decline in the level of transfers in the post stabilization agreement, thus formalizing the outcomes observed in Tables 1 and 2. [15]

4. Conclusions

This paper shows that it is possible to understand delays in policy implementation as the result of distributional conflict between different interest groups in the presence of costly stabilization. Initially inflation is moderate and the costs of inflation are small. Groups cannot match their relative demands, and stabilization

[14] The transversality condition is automatically satisfied as both cutoff demands converge to zero as inflation increases.

[15] Note that g^s does not depend on the costs of inflation, $\phi(\pi)$. This derives from the assumption that inflation affects both groups equally. If this were not the case the increase in the inflation rate would have effects on the post-stabilization level of transfers in addition to those induced through financial adaptation. We leave these extensions to the reader.

is not agreed upon. As time goes by, the use of financial innovation increases the equilibrium rate of inflation and redistributes the burden of inflation taxation to the poor. The increase in the level of inflation raises the costs of not reaching an agreement and stabilization is therefore more likely to occur.

Two well-recognized stylized facts concerning delayed stabilizations are accounted for by our model. First, that things have to get 'bad' before any action is taken. Hyperinflation, wars and political crises are usually a catalytic for change. Our model provides a very simple framework which allows an understanding of why this may be so without having to rely on irrational behavior of economic agents or imperfect information. Secondly, that as the rate of inflation increases, the relative position of the poor worsens. They are willing to accept progressively less favorable conditions in order to stabilize. The contribution of this paper is to show that the knowledge of the future deterioration in their relative position may not be strong enough to change their present demands to a point in which stabilization is immediately achieved. The model therefore gives a rationale for economic policies in Latin America since the outset of the debt crisis. Initially the economies resorted to inflation financing, as no consensus for reform existed. After a decade of high and increasing inflation the economies implemented strongly conservative stabilization programs.

In the political debate we often hear comments regarding the delay such as: *nobody wants to pay the costs if the benefits come in the future*, and *adjustment is only attempted by governments which have long horizons*. We believe that the role of the discount factor in (9) captures the intuition behind these statements. The timing of stabilization is essentially a decision as to when to pay the adjustment cost. Policymakers (or economies) which heavily discount the future find very beneficial to shift this cost into the future and will thus delay adjustment more. Regarding the current implementation of structural reform programs, the political rhetoric includes statements like: *the reforms today are the consequence of the exhaustion of an economic model*, or that, *reforms today take place because governments have no alternatives*. The exhaustion of an 'economic model' takes place in our setup when inflation has increased to such levels that further delays are no longer optimal.

A central planner would never experience delays, as he would never engage in the process of financial adaptation, thus removing time dependency from the model and ruling out delays. The centralized economy could get stuck in a low inflation equilibrium with the central planner not risking stabilization, but where things do not worsen through time. The decentralized economy would, on the other hand, through the financial innovation process increase the rate of inflation, perhaps to the point where stabilization is finally implemented. While the process of extreme inflation may then be beneficial for the economy because it triggers the political support for radical reform, it is also true that it will have lasting and important income distribution effects.

An obvious extension includes the possibility of understanding inflation cycles.

Kiguel and Liviatan (1991) document the fact that inflation may be highly variable, with periods of high inflation superseded by transitory stabilization attempts. Our model has potential for explaining these facts. Assume for example that the stabilization cost Q is an unknown random variable. After each stabilization attempt, agents update their beliefs about this stabilization cost. If there is the possibility of reversing the stabilization attempt, then agents may decide to backtrack if the cost of stabilization turned out to be higher than initially expected. While this would explain the possibility of a collapse, it can also explain why inflation will have to increase to higher levels until stabilization is once again implemented: agents will now update upwards their beliefs on the stabilization costs and therefore for stabilization to be an equilibrium inflation will have to reach even higher levels. Furthermore, as the economy retains, at least to some extent, the expertise in the use of alternative financial instruments, inflation acceleration in the wake of the failed stabilization attempt takes place more rapidly.

Because the possibility of collapses will depend on the realization of the costs of stabilization, we may see similar countries with very different inflation experiences. Some will fall into a pattern of inflation–stabilization cycles. Some will have a successful initial stabilization and some will be able to stabilize only after several failed attempts. What our model suggests is that the dynamics of money demand are such that all economies eventually stabilize. Not surprisingly, the periods of high monetary instability are relegated to brief spans of time where several countries experience extreme inflation at the same time. Such was the case of Central Europe in the 1920s and of Latin America in the 1980s. The early 90s show that the transformation of the Latin American economies had reached a point where further inflationary financing was neither politically acceptable nor economically viable.

Appendix

Proof of Proposition 1

To decide on the optimal level of financial adaptation, the rich maximize the following objective function:

$$\max_{\{f_t\}_{t=0}^{\infty}} \sum_{t=0}^{\infty} \delta^t \left\{ e - \frac{\pi_t}{1+\pi_t}(e - f_t) - \phi(\pi_t) - c(f_t, K_t) \right\}, \tag{A.1}$$

taking π_t and K_t as given and $\delta < 1$ the discount factor. The first-order conditions are

$$\left[\frac{\pi_t}{1+\pi_t} - c_f(f_t, K_t) \right] \leqslant 0, \quad \text{and} \quad = 0 \text{ if } f_t > 0 \ \forall t > 0. \tag{A.2}$$

For $f_t = 0$ to be a solution to this maximization problem, the first-order condition should be non-positive. Thus (a) follows from the fact that $\pi_t > 0\ \forall t$ and $c_f(0, K_t) = 0$.

Eq. (A.2) defines the optimal level of tax evasion chosen by a rich agent in each period as a function of the aggregate level of financial adaptation for a given stock of knowledge and seigniorage collection. This relationship is represented by the locus *f-f* in Fig. 2, which from Eq. (2) and (A.2) is upward sloping $(\mathrm{d}f/\mathrm{d}F = (g/(2e-F)^2 c_{ff}^2) > 0)$ and convex $(\mathrm{d}^2 f/\mathrm{d}F^2 = g[(2(2e-F)c_{ff} + c_{fff}/c_{ff})/(2e-F)^4 c_{ff}] > 0)$. Equilibrium will be attained when $f = F$.

As from (A.2) we have $\mathrm{d}f/\mathrm{d}K = -c_{fK}/c_{ff} > 0$, an increase in the level of financial adaptation know-how will shift the locus *f-f* upwards. Computing the change in the *equilibrium* level of financial adaptation as a consequence of a change in K, we have $\mathrm{d}f^*/\mathrm{d}K = -c_{fK}/[g/((2e-F)^2 - c_{ff})]$, which proves (b) for the stable equilibrium where $\mathrm{d}f/\mathrm{d}F = g/(2e-F)^2 c_{ff} < 1$.

Finally, since $f_t^* = F_t^* > f_{t-1}^* = \mathrm{F}_{t-1}^* > 0\ \forall t$ from (a) and (b), (c) follows from (2) and (d) follows from (3). □

Proof of Proposition 2

We work the solution backwards from T. From the fact that $A(T, J) > 0\ \forall t$ we know that in period $T-1$ we will have $J^* = 1$; therefore, the optimal strategy is derived by computing the value of $A(T-1, 1)$, which from (8) equals

$$A(T-1,1) = \psi(T-1) - (1-\delta)2Q. \tag{A.3}$$

From (A.3) it is evident that two cases arise, one in which $A(T-1,1) > 0$ and the other in which $A(T-1,1) < 0$. Consider the case in which $A(T-1,1) > 0$. This implies that when evaluating $A(T-2, J)$, the equilibrium J in period $T-2$ is again equal to 1 (because stabilization is an equilibrium in period $T-1$). But then

$$\begin{aligned} A(T-2,1) &= \psi(T-2) - (1-\delta)2Q < \psi(T-1) - (1-\delta)2Q \\ &= A(T-1,1), \end{aligned} \tag{A.4}$$

which is true from the fact that ψ is increasing in inflation which, in turn, is increasing through time from Proposition 1.

In the case in which $A(T-1,1) < 0$ we must show that this implies that $A(T-2,2) < A(T-1,1)$, as in period $T-2$ agents realize stabilization will only come in two periods if it is not implemented in the current one. Using the definition for $A(.)$, we must show that

$$\begin{aligned} A(T-2,2) &= \psi(T-2) + \delta\psi(T-1) - (1-\delta^2)2Q \\ &< \psi(T-1) - (1-\delta)2Q = A(T-1,1), \end{aligned} \tag{A.5}$$

but the above inequality can be rewritten as

$$\psi(T-2)-\psi(T-1)+\delta[\psi(T-1)-(1-\delta)2Q]$$
$$=\psi(T-2)-\psi(T-1)+\delta A(T-1,1)<0, \tag{A.6}$$

which is satisfied from ψ being increasing in time and $A(T-1,1)<0$. The result now follows for previous periods by induction. □

Proof of Proposition 3.

Rewrite the expression between brackets in (14) as

$$L=c(f_{i+1}^{*},K_{i+1})-c(f_i^{*},K_i)-g(\theta_{i+1}-\theta_i)-g(\theta_{i+1}-\theta_i). \tag{A.7}$$

We want to show that $L<0\ \forall t$. Add and subtract g to rewrite (A.7) as

$$L=\left[c(f_{i+1}^{*},K_{i+1})+(1-\theta_{i+1})g\right]-\left[c(f_i^{*},K_i)+(1-\theta_i)g\right]$$
$$-\left[(\theta_{t+1}-\theta_t)g\right], \tag{A.8}$$

which represents the difference in the net change in the costs of inflation paid by the rich and the poor. Because (A.8) is expressed in differences we can approximate it by computing how the total cost of inflation for the rich and for the poor change with K. I.e. we need to show that $\partial L'/\partial K<0$ where

$$L'=c(f,K)+(e-f)\frac{\pi}{1+\pi}-e\frac{\pi}{1+\pi}.$$

Similarly we need to show that

$$\partial[c(f,K)+(e-f)\pi/(1+\pi)]/\partial K<\partial[e\pi/(1+\pi)]/\partial K. \tag{A.9}$$

Computing these derivatives at equilibrium values (when $f=F$) and using the first-order conditions of the maximization problem of Proposition 1, (A.9) reduces to

$$c_K+(e-f)\frac{\mathrm{d}\pi/(1+\pi)}{\mathrm{d}f}\frac{\mathrm{d}f}{\mathrm{d}K}<e\frac{\mathrm{d}\pi/(1+\pi)}{\mathrm{d}f}\frac{\mathrm{d}f}{\mathrm{d}K},$$

or

$$c_K<f\frac{\mathrm{d}\pi/(1+\pi)}{\mathrm{d}f}\frac{\mathrm{d}f}{\mathrm{d}K}.$$

But from (2) and the result of Proposition 1, the right-hand side is positive. Therefore the inequality is true. □

References

Alesina, A. and A. Drazen, 1991, Why are stabilizations delayed? American Economic Review 81, no 5, 1170–1188.

Bruno, M. and S. Fischer, 1990, Seigniorage, operating rules, and the high inflation trap, Quarterly Journal of Economics CV, 353–374.

Bruno, M. et al., eds., 1991, Lessons of economic stabilization and its aftermath (MIT Press, Cambridge, MA).

Cardoso, E., 1992, Inflation and poverty, Working paper no. 4006 (NBER, Cambridge, MA).

Cardoso, E. and A. Helwege, 1992, Latin America's economy: Diversity, trends and conflicts (MIT Press, Cambridge, MA).

DiTella, G., 1983, Argentina's experience under a labour based government (Macmillan, New York).

Dornbusch, R., 1991a, Credibility and stabilization, Quarterly Journal of Economics CVI, 837–850.

Dornbusch, R., 1991b, From stabilization to growth, World Bank Review.

Dornbusch, R. and S. Edwards, 1994, Stabilization, economic reform and growth, NBER conference volume (University of Chicago Press, Chicago, IL).

Dornbusch, R., F. Sturzenegger and H. Wolf, 1990, Extreme inflation: Dynamics and stabilization, Brookings Papers on Economic Activity 2, 1–84.

Drazen A. and V. Grilli, 1993, The benefits of crisis for economic reforms, American Economic Review 83, no. 3, 598–607.

Eder, G.J., 1968, Inflation and development in Latin America: A case history of inflation and stabilization in Bolivia (The University of Michigan Press, Ann Arbor, MI).

Fernandez, R. and D. Rodrik, 1990, Why is trade reform so unpopular? On status quo bias in policy reforms, American Economic Review 81, no. 5, 1146–1155.

Frieden, Jeffry, 1991, Debt, democracy and adjustment in Latin America (Princeton University Press, Princeton, NJ).

Geddes, B., 1993, Democracy, labor and structural adjustment, Mimeo. (UCLA, Los Angeles, CA).

Haggard S. and R. Kaufman, 1992, The political economy of inflation and stabilization in middle-income countries, in: S. Haggard and R. Kaufman, eds., The politics of economic adjustment (Princeton University Press, Princeton, NJ).

Heymann, D., 1991, From sharp disinflation to hyperinflation, twice: The Argentina experience 1985–1989, in: M. Bruno et al. (1991).

Hirschman, A., 1985, Reflections on the Latin America experience, in L. Lindberg and C. Maier, eds., The politics of inflation and economic stagnation, Theoretical Approaches and International Studies (The Brookings Institution, Washington).

Mahler, M. 1992, External influence, conditionality, and the politics of adjustment, in: S. Haggard and R. Kaufman, eds., The politics of economic adjustment (Princeton University Press, Princeton, NJ).

Miguel, M. and N. Liviatan, 1991, The inflation–stabilization cycles in Argentina and Brazil, in: M. Bruno et al. (1991)

Labán, R., 1991, Coordination failures and the costly transition from stabilization to growth, Mimeo. (MIT, Cambridge, MA).

Labán, R. and F. Sturzenegger, 1994, Distributional conflict, financial adaptation and delayed stabilizations, Economics and Politics 6, no. 3, 255–274.

Maier, C., 1975, Recasting bourgeois Europe: Stabilization in France, Germany, and Italy in the decade after World War I (Princeton University Press, Princeton, NJ).

Mondino, G., F. Sturzenegger and M. Tommasi, 1992, Recurrent and high inflation: A dynamic game, Mimeo. (UCLA, Los Angeles, CA).

Morales, J.A., 1991, The transition from stabilization to sustained growth in Bolivia, in M. Bruno et al. (1991).

Nelson, Joan, 1992, Poverty, equity and the politics of adjustment, in: S. Haggard and R. Kaufman, eds., The politics of economic adjustment (Princeton University Press, Princeton, NJ).

Rodrik, D., 1989, Policy uncertainty and private investment in developing countries, Working paper no. 2999 (NBER, Cambridge, MA).

Stallings, B., 1992, International influence on economic policy: Debt, stabilization, and structural reform, in: S. Haggard and R. Kaufman, eds., The politics of economic adjustment (Princeton University Press, Princeton, NJ).
Sturzenegger, F., 1992, Inflation and social welfare in a model with endogenous financial adaptation, Working paper no. 4103 (NBER, Cambridge, MA).
Velasco, A., 1992, A model of fiscal deficits and delayed fiscal reforms, RR 92.06 (C.V. Starr Center for Applied Economics, New York University, New York).
Vial, 1992, Hacia donde va Latino-America? (CIEPLAN eds., Santiago, Chile).