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ESSAYS ON POLITICAL ECONOMY OF ECONOMIC REFORM

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ABSTRACT OF THE DISSERTATION

ESSAYS ON POLITICAL ECONOMY OF ECONOMIC REFORM

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This dissertation uses a game-theoretic approach to discuss positive and normative issues of economic reform in liberalyzing countries. Chapter 1 presents the approach followed and overviews the issues discussed in the following chapters.

Stabilization (and generally speaking economic reform) is often delayed, at the price of increasing pains. Chapter 2 explains this observation by considering the government actions as the outcome of an ongoing conflict among interest groups or "political parties." When each "party" favors a different reform program and one of the two has to concede for a program to be adopted, a war of attrition is likely to emerge if the parties involved have private information about how much they care about the reform. Unlike Alesina and Drazen (1991) seminal paper on delay of stabilization, uncertainty about the expected costs of reform is introduced, and asymmetric equilibria are explored.

In recent experiences of economic reform in Eastern Europe and Latin America, comprehensive and swift introduction of reforms seems to have lead to (presumably) larger than necessary adjustment costs. Chapter 3 purports to explain these observations within a political-economic framework. Once political sustainability

considerations are incorporated into the problem faced by policymakers, the optimal course of action may very well differ from the one that could be inferred from an "unconstrained" economic perspective.

Finally, Chapter 4 concentrates on the difficulties surrounding the process of opening credit markets, as a result of pervasive informational problems in the aftermath of liberalizing reforms. Accumulation of information capital is likely to be costly. (In the example presented, it requires to accept a large number of defaults when the market opens.) This could be part of the explanation of the recessive tendencies following large-scale economic transformations.

Chapter 1

Overview

The first part of these dissertation, comprised of chapters 2 and 3, uses a political-economic approach to economic reform issues. The term political economy refers to what has been called "new political economy" or "neoclassical political economy," which includes work done over the last decades under different names such as public choice or rent-seeking. Essentially, this approach is characterized by the application of common standards of analytical rigor to *both* economic and political behavior. Both in the economic and in the political sphere, agents are assumed to maximize welfare as they conceive it. Their behavior is assumed to be forward-looking and consistent, although they learn from past observations. Largely, then, the term political economy refers to the application of the economic method to a larger set of issues.

When applied to economic policy issues, this approach focuses not only on what policymakers should do if they were benevolent planners; it also tries to explain why policymakers do what they do. In doing so, it emphasizes the existence of *credibility constraints* and *political constraints* on the policymakers' optimization problem. Political constraints are originated in the fact that policymakers are restricted in their choices by the actions of other political actors. Credibility constraints are given by the fact that the public knows (even if imperfectly) that

the government pursues some objectives and that it does so subject to political and other constraints. It is important to notice that credibility constraints would arise even in the absence of divergent objectives between the different members of society, while political constraints can only be binding if political agents have conflicting objectives.

The experience of developing countries and former socialist countries with market-oriented reforms offers some salient topics for research under this approach. Questions about the rejection, delay, or reversal of welfare-improving reforms or its adoption in a economically suboptimal fashion have already motivated several recent papers (see the survey by Rodrik 1993). The varied fortune of countries experimenting with these reforms has made it clear that an understanding of the forces governing policymaking is necessary in order to devise policies with hope of success.

While the political economic literature in general postulates a framework of political institutions corresponding to that of the developed nations, approaching economic reform issues entails to recognize the peculiar political conditions prevalent in the reforming countries. While in the literature at large it is assumed that voting is the only or the most relevant form of participation with respect to macroeconomic policy issues (see, e.g., the text by Tabellini and Persson 1990), in developing countries electoral accountability can be less important as a political constraint than other forms of political involvement by the members of the public, such as lobbying by interest groups, public protests, and even violent actions, because democratic institutions are less common and tend to be fragile. In some cases, a veto game in which different groups have access to the decision making process in sets of issues can be a more appropriate representation of the institutional framework than a majority voting game. This has been the type of political

participation assumed in the next two chapters.

The first question addressed in the dissertation is why countries experiencing economic difficulties often delay the adoption of unavoidable reforms even at the expense of increasing pains, and how these reforms finally come about. Previous work has explained this delay as a result of a disagreement between powerful interest groups about who will end up bearing the cost of these reforms. The essay "Political Conflict and the Timing of Stabilization" (chapter 2) extends this work by introducing private information about the expected costs of reform to each group, and proposes some modeling alternatives that could be closer to the actual experience of delayed reform in recent years, in the sense that they emphasize the existence of asymmetries in the political conflict about stabilization.

The second question addressed is what are the constraints that political feasibility imposes on the design of economic reform, assuming that a government has the will to go in that direction. The essay "Sequencing of Economic Reforms in the Presence of Political Constraints" (chapter 3) interprets the apparent bias toward radical (i.e., comprehensive and speedy) reform in recent episodes as a by-product of time-consistency problems when the government actions are potentially subject to the veto power of interest groups at each step of the reform process.This hypothesis has to be contrasted in future work with the competing hypothesis, advanced in the literature, that the bias towards radical reform is a result of the need of the government to signal its commitment toward the reform process in circumstances in which the government faces a credibility problem.

Studying models with more complex forms of political interaction, including the possibility of negotiation and the transmission of information by means more efficient than mere delay will certainly illuminate other aspects of the issues raised by reform.

The second part of the dissertation, comprised by chapter 4, is concerned with why are processes of economic transition so costly in terms of lost output and unemployment. One possible answer is that massive political and economic transformations dislocate the cooperative agreements that are the basis of organizational performance of institutions and markets in which private information is important. Several recent papers have stressed the idea of the importance of the difficulties of the formation of information capital in the aftermath of large-scale economic reform. However, to the best of my knowledge, no formal paper has emphasized the role of imperfect information in new credit markets. Private information is particularly important in credit markets; it will take time for new credit markets to sort out good from bad borrowers and to foster cooperative behavior between potentially good borrowers and lenders. The essay "Reputation and Credit Terms in New Markets" (Chapter 4) presents a model in which trust develops slowly between borrowers and lenders, and stakes offered in each round of transactions behavior rise accordingly. The model is also a metaphor for other institutions and markets in which trust develops slowly.

Chapter 2

Political Conflict and the Timing of Stabilization

2.1 Introduction

It has often been observed that countries often delay the adoption of reforms, incurring in great pains as a result of this. This is true even in the cases in which reforms could benefit most segments of the society, as is the case in high inflation stabilization. A key to understand this puzzling observation is that government actions are commonly not the result of a single agent rational behavior, but rather the outcome of ongoing conflicts among interest groups or political movements. Indeed, the importance of distributive conflicts in delayed reform has been commonly stressed, at least in the case of Latin American countries. What has been lacking is a plausible account of economic mechanisms through which group politics translate into inflation and how political parameters affect the timing of stabilization. The new political economy literature has started addressing these issues formally. This chapter develops a politico-economic model that combines elements from different strands of this literature. In the model, different interest groups have *private information* about their regard for different policy alternatives, and impose delay costs on each other to convey information

about their willingness to concede. More specifically, the groups have private information about how much they fear will be the cost of stabilization for them. That is, there is *uncertainty about the future*. This can be due to uncertainty about the impact of the policy instruments to be employed in the stabilization or about the duration of the period of transitional costs. The model also lends some attention to the importance of *asymmetries* in the conflict, say in the current costs of inflation or in the expected costs of stabilization.

The seminal paper by Alesina and Drazen (1991) first stresses in the context of a formal model the importance of private information in a political conflict about inflation stabilization. There exist two groups (say, capital and labor), and each group incurs a rising cost as stabilization is delayed. The group that caves in first will have to assume a larger part of the post-stabilization taxes. The key feature of their model is that the magnitude of the cost of inflation borne by each group is unknown to the other group. Each group then has an incentive to wait and see if the other group gives up first. Stabilization takes place only when one of the groups realizes that it has more to gain by assuming the largest share of stabilization taxes than by waiting another instant to see if its rival does so instead.[1] Others papers such as Drazen and Grilli (1993) and Guidotti and Vegh (1991) follow essentially the same approach.

A different strand of the literature is represented by Fernandez and Rodrik (1991), who show that it is not enough for a policy action to represent a positive sum game for it to be undertaken. This is due to risk aversion and uncertainty about who will end up benefiting from the reform, that is, uncertainty about the post reform period. Although Fernandez and Rodrik are explicitly concerned with trade reform, their argument applies for the case of any reform such as stabiliza-

[1]This type of model is known in game theory as a war-of- attrition model with imperfect information. A classic reference to the war-of-attrition game is Maynard Smith (1982).

tion. Laban and Sturzenegger (1992) also consider post reform uncertainty, but they introduce an additional element by considering that one of two groups in conflict has access to a financial adaptation technology that reduces for them the costs of inflation.

This model combines elements of those two strands of the politico- economic literature by introducing uncertainty about the future and potential asymmetries in the costs of inflation and stabilization in the context of a model of delay with imperfect information. Formally, the model is one of war of attrition such as the one presented by Alesina and Drazen (1991). Alesina and Drazen focus their attention on the case in which the groups have identical beliefs about the costs that delaying stabilization impose on each other, in the spirit of the model of Bliss and Nalebuff (1984). After finding a symmetric equilibrium, they are able to solve for the expected time of stabilization as a function of several political and economic variables. This is not completely satisfactory because, as emphasized by other authors, uncertainty seems to be mainly about the costs of stabilization itself, and because, in general, rival political groups are not expected to be similarly affected by pre-stabilization distortions or by the costs of stabilization. For instance, inflation is known to be a regressive tax. Then, ex-ante, political groups representing in average lower income constituencies are likely to be the more affected by delaying the stabilization. In a symmetric equilibrium, as shown by Drazen and Grilli (1990), an increase in the cost of waiting makes political agreement come sooner. However, in a more general setting, changes in the cost of waiting for the different interest groups could have different effects on the delay of political agreement. We could expect that, if distortions become less costly for the (apparently) stronger side, political agreement will come sooner because the weaker side will become more willing to concede. (An example, provided by La-

ban and Sturzenegger (1992), could be the more extensive use of foreign currency by one of the two sides, reducing the cost of inflation for them.)

To explore these intuitions, I go to an asymmetric version of the war-of-attrition model. Results due to Fudenberg and Tirole (1986) and Nalebuff and Riley (1985) allow to derive a plausible equilibrium. The equilibrium obtained is complicated to manipulate algebraically, and, as have been observed in similar models, comparative static results are hard to come by. Some results are however clear. There is in general a positive probability that a political agreement will be achieved immediately, because the "more pessimistic" party will concede at time zero with nonnegligible probability. Stabilization will be more likely to be delayed the more similar are the beliefs that the parties involved have about the costs that stabilization will impose on each other, and the more similar are the costs of inflation for the two groups.

These results may serve to qualify the assertions of Alesina and Drazen (1991) and Drazen and Grilli (1990) about the effects of indexation on the likelihood of a political agreement: If it reduces the cost of inflation for the two parties alike, then both parties become more willing to wage a longer conflict, but if one of the two parties is particularly benefited, then the other may consider conceding immediately. An empirical question that comes immediately to mind is whether the extent of indexation has shielded from inflation the politically enfranchised groups more uniformly in Brazil (with an unending story of frustrated stabilization proposals) than dollarization did it in Bolivia (where stabilization was accompanied by a major political realignment, including the demise of the organized labor movement).

Out of the completely symmetric case, the model does not lend itself to obtain an expression for the expected time of stabilization, and the effect of parametric

changes on this expected time is unclear. For instance, when the share of the new tax burden that the conceding party will have to assume increases, the probability of immediate concession increases but, immediately after time zero, both parties wait longer times to concede. To make more precise statements probably requires to introduce more structure into the model. After all, the model is pretty abstract: For instance, it imposes no restrictions on the timing of stabilization. Stabilization could occur at any time, or be delayed forever, which is clearly unrealistic. (Brazilians may disagree, as Argentineans before Menem might have.) In reality, certain moments, such as the changing of a cabinet, act as focal points to strike a political agreement; these focal points are of course sensible to institutional factors. A further lesson of this exercise is that results based on the symmetric case should not be taken too seriously as the only ones compatible with rational behavior. In order to obtain more precise results while considering potential asymmetries we have to take into account institutional restrictions. The fear of a forced renewal of the political elite, for instance, could put a deadline to a conflict about stabilization, forcing one of the parties involved to concede before a drastic change in political conditions, even at the expense of a worsening of economic conditions for their constituency.

This framework presented is consistent with several common features of stabilization crises: Crises occur in countries experiencing distributive struggle. (For instance, Europe in the 1920's or Latin America in the 1980's.) Things tend to get worse before decisive actions are taken to stabilize the economy. And stabilization, when successful, usually coincides with political consolidation. This point is reinforced when considering recent (successful and unsuccessful) experiences with inflation stabilization. Reviewing a sample of middle-income countries that have gone through (low to high) inflation and attempts at stabilization, Haggard and

Kaufman (1992) find that price stability has been affected by the political security of government elites and their independence from short term pressures. Countries characterized by party fragmentation have tended to be driven by "bidding wars" among political elites competing for support. This bidding wars, expressed, for instance, through the budget allocation, have reinforced cleavages among social groups and undermined the efforts to achieve price discipline by making it harder to adopt measures of fiscal austerity. Conversely, inflation has tended to be low in countries with authoritarian or catch all parties muting conflicts between social forces. Relatively well organized political groups temporarily mobilize in settings of party fragmentation or polarization and government with strong redistributive orientation.

A case in point is Peru. In the seventies and eighties, Peru went through severe budgetary problems after the withdrawal of external financing. Domestic politics clearly played a role in the response to this changing international environment. Political mobilization and redistributive conflicts grew in the seventies, as did inflation. Later on, labor and business protests against austerity derailed stabilization program under Belaunde (1980-1985). The Apra government in 1985-1990 was severely fractionalized and the tactics of President Alan Garcia further polarized the political system, making it impossible to achieve a consensus needed for a painful stabilization (Haggard and Kaufman 1992, Gonzales 1991). Stabilization did not come about until radical changes occurred in the political scene.

The evidence presented by Haggard and Kaufman from a sample of stabilization episodes shows that high inflation episodes have been hard to control under fragmented party systems, until they have been substituted by authoritarian regimes or until civil liberties were greatly reduced. The relative capacity of different regimes to stabilize seems to be a function of political dynamics underlying

inflationary pressure in the first place.

Section 2.2 describes the model; the political-economic game has been highlighted. Macroeconomic details have been eschewed although they can be reintroduced following the lines of Drazen and Grilli (1990), Alesina and Drazen (1991), or Guidotti and Vegh (1992) without essentially altering the game. Section 2.3 describes the equilibria. Section 2.4 offers an example. Section 2.5 proposes an equilibrium selection criterion. Section 2.6 discusses the role of asymmetries and section 2.7 discusses the results and some modeling alternatives. Proofs of the Propositions have been relegated to section 2.8.

2.2 The model

Consider an economy composed of two different groups organized as political parties ($i, j = 1, 2$). At $t = 0$ a shock hits the economy reducing tax revenues. From $t = 0$ until the date of stabilization, government expenditure (τ) has to be covered by distortionary taxation (for instance, inflation tax). (I am ignoring here the issues associated with the possibility of accumulating foreign debt. As it becomes clear in Alesina and Drazen (1991), the explicit consideration of debt accumulation does not affect the results other than establishing a deadline for stabilization.) Before the stabilization, each group pays half the taxes. In addition, due to the distortions associated with pre-stabilization government finance, each group suffers a welfare loss c_i.

For stabilization to occur, one of the two groups (which becomes the *loser*) has to agree to bear a fraction $\alpha > 1/2$ of the new, nondistortionary taxation required to replace distortionary taxes. The other group (the *winner*) will bear a fraction $1 - \alpha$ of the new taxes. Additionally, stabilization will have some additional stabilization costs to each group. Due to uncertainty about the poststabilization

period, these costs are not known with certainty, but each political group has an estimate value for these costs given by θ_i. The actual value of θ_i is known only to group i, but it is common knowledge that θ_i is drawn from the distribution function $F_i(\theta_i)$. That is to say, each group knows only probabilistically how much the other group fears the pains associated with the stabilization period.[2]

Flow utility is linear in after-tax income. Before stabilization, flow utility for group i is equal to: $U_i^D = y_i - c_i - 1/2\tau$, where y_i is the gross level of income, assumed to be constant. After stabilization, flow utility for the loser or conceding party becomes: $U_i^L = y_i - \alpha\tau - \theta_i$. Flow utility for the winner becomes: $U_i^W = y_i - (1-\alpha)\tau - \theta_i$.[3]

Groups are infinitely lived and discount the future according to r. The problem of each party is to maximize its expected lifetime utility by choosing a time to concede if the other party has not yet conceded. Obviously, concession times will be affected by the fear of stabilization costs. Formally, group i strategy is a function T_i from the support of $F_i(\theta_i)$ to $[0, \infty]$, specifying for each possible value of θ_i the time at which group i concedes if the other group has not yet given up. If it plans to concede at time t, and its opponent behaves according to $T_j()$, group i's expected lifetime utility is:

$$\begin{array}{l} V_i(t, T_j(); \theta_i) = \Pr\{T_j(\theta_j) \geq t\} \times \left[\int_{x=0}^{x=t} U_i^D e^{-rx}\, dx + \int_{x=t}^{x=\infty} U_i^L e^{-rx}\, dx\right] \\ + \int_{\{\theta_j : T(\theta_j) < t\}} \left[\int_{x=0}^{x=T_j(\theta_j)} U_i^D e^{-rx}\, dx + \int_{x=T_j(\theta_j)}^{x=\infty} U_i^W e^{-rx}\, dx\right] F_j'(\theta_j)\, d\theta_j. \end{array} \tag{2.1}$$

The first term in brackets is group i's utility if group j remains fighting at time t; the second term in brackets is group i's utility if group j concedes at some time $T_j(\theta_j)$ before t. It is convenient to state the following assumptions:

[2]Since it is going to be assumed that the parties are risk neutral, the only relevant piece of private information is the expected cost of stabilization for each group, and the function $F_i(\theta_i)$ refers to the commonly known prior distribution of *expected* costs of stabilization.

[3]For simplicity, it is assumed that the costs of stabilization are suffered during all the post-stabilization period. Nothing important will change if they are assumed (more realistically) to be just temporary.

(A1) $F_1(\theta_1)$ and $F_2(\theta_2)$ have the same support $[\underline{\theta}, \bar{\theta}]$.

(A2) $F_1(\theta_1)$ and $F_2(\theta_2)$ are continuously differentiable and strictly increasing over the interval $[\underline{\theta}, \bar{\theta}]$.

(A3) $c_i + \frac{1}{2}\tau > \bar{\theta} + \alpha\tau$.

(A1) and (A2) are adopted for simplicity. (A3) simply means that $\Pr\{U_i^L > U_i^D\} = 1$; that is, with probability one, even the conceding party expects to be better off after the stabilization (Incomplete information is "small" in the sense that it common knowledge that both groups are interested in stabilizing the economy.) However, since θ is, after all, just an estimate of what is going to happen in the future, this formulation does not exclude the possibility that a given group ends up being a net loser after the stabilization, due to an underestimation of the true costs of the adjustment.

2.3 Equilibrium

In the context of the model, a (Bayesian) Nash equilibrium will be a couple of strategies $\{T_1(\theta_1), T_2(\theta_2)\}$ such that, if group 1 behaves according to $T_1(\theta_1)$, group 2 finds it optimal to behave according to $T_2(\theta_2)$ and viceversa. Unlike Alesina and Drazen (1991), I allow $F_1(\theta_1)$ to differ from $F_2(\theta_2)$. This implies that, in general, $T_1(\theta_1)$ is different from $T_2(\theta_2)$. We have:

Proposition 2.1 *For $\{T_1(\theta_1), T_2(\theta_2)\}$ a Bayesian equilibrium,*

i) $T_i(\theta_i) = 0$ for all $\theta_i \in [\underline{\theta}, m_i]$ for some $m_i \geq \underline{\theta}$,

ii) $T_i'(\theta_i) > 0$ for all $\theta_i \in [m_i, \bar{\theta}]$, and

iii) $\lim_{\theta_i \uparrow \bar{\theta}} T_i(\theta_i) = \infty$.

Proposition 2.1 establishes that, in equilibrium, a group that expects to lose very little after stabilization will tend to concede immediately. If the costs of

adjustment is feared by a group (large θ_i), this group will wait longer to concede. In the terminology of Fudenberg and Tirole (1991), there is "perpetual selection."

It is convenient to define the inverse functions $\{\Phi_1(t), \Phi_2(t) : \Phi_i(t) = T_i^{-1}(t)\}$ which represent the type of each group which in equilibrium concedes at time t. (Types of each group are indexed by θ_i, that is, the expected cost of stabilization.)

Proposition 2.2 *If* $\{\Phi_1(t), \Phi_2(t)\}$ *is a solution to:*

$$\left[\frac{F_j'(\Phi_j(t))}{1 - F_j(\Phi_j(t))}\Phi_j'(t)\right] \frac{(2\alpha - 1)\tau}{r} = c_i - \Phi_i(t) + (\frac{1}{2} - \alpha)\tau \tag{2.2}$$

$(i, j = 1, 2$ *and* $i \neq j)$ *such that:*

$$\min\{\Phi_1(0), \Phi_2(0)\} = \underline{\theta}, \tag{2.3}$$

then $\{\Phi_1(t), \Phi_2(t)\}$ *is a Bayesian equilibrium.*

Proposition 2.2 generalizes Proposition 1 in Alesina and Drazen (1991). Equation (2.2) is a standard result in the war-of-attrition literature (see, for instance, Fudenberg and Tirole (1986)). The RHS of equation (2.2) is the cost for group i of waiting another instant to concede $(U_i^L - U_i^D)$. The LHS is the expected gain for i from waiting another instant to concede, which is the product of the conditional probability that group j concedes at time t (the term in brackets), multiplied by the gain for i if j concedes $(\int_{x=t}^{x=\infty}(U_i^W - U_i^L)e^{-r(x-t)}\,dx\,)$.

Equation (2.3) has an antecedent in Nalebuff and Riley (1985). In terms of Proposition 1, equation (2.3) can be rewritten as: $\min\{m_1, m_2\} = \underline{\theta}$. That is, at least for one of the two groups m_i has to be equal to $\underline{\theta}$. It must be clear that this allows for many different solutions to equation (2.2). For instance, if m_1 is set to be equal to $\underline{\theta}$, m_2 becomes a free parameter. We could set m_2 very close to $\bar{\theta}$, and then group 2 concedes at time zero with very high probability (From Proposition 2.1, $\Pr\{T_2(\theta_2) = 0\} = \Pr\{\theta_2 \in [\underline{\theta}, m_i]\}$. Or we could set $m_2 = \underline{\theta}$,

and then stabilization would be delayed with probability one. (This is the case analyzed by Alesina and Drazen 1991.)

Such multiplicity of equilibria is an undesirable result because it strips the theory from almost any predictive power. In section 2.5 this problem is discussed. But before, a numerical example is offered with the purposes of illustrating the equilibrium of the model.

2.4 An example

A very flexible functional form satisfying assumptions (A1) and (A2) is given by $F_i(\theta_i) = 1 - (1 - \theta_i)^{\lambda_i}$ with support [0,1] and $\lambda_i \in \Re^+$. For $\lambda_i = 1$, a uniform distribution obtains. For $\lambda_i < 1$, a growing density obtains, and the opposite happens for $\lambda_i > 1$.

Using this distribution function, equation (2.2) becomes:

$$\lambda_1 \frac{\Phi_1'(t)}{1 - \Phi_1(t)} \frac{(2\alpha - 1)\tau}{r} = c_2 - \Phi_2(t) + (\frac{1}{2} - \alpha)\tau, \tag{2.4}$$

$$\lambda_2 \frac{\Phi_2'(t)}{1 - \Phi_2(t)} \frac{(2\alpha - 1)\tau}{r} = c_1 - \Phi_1(t) + (\frac{1}{2} - \alpha)\tau. \tag{2.5}$$

Equations (2.4)-(2.5) give us a system of nonlinear differential equations. If we substitute v for $1 - \Phi_1(t)$ and w for $1 - \Phi_2(t)$, the system looks like:

$$\begin{aligned} v' &= Av + Bvw, \\ w' &= Cw + Dvw. \end{aligned}$$

Comparative static results for $\Phi_1(t)$ and $\Phi_2(t)$ do not seem feasible without numerical simulations, but the system has a solution for $\Phi_1(t)$ and $\Phi_2(t)$ given values for $\Phi_1(0)$ and $\Phi_2(0)$ satisfying $\min\{\Phi_1(0), \Phi_2(0)\} = 0$. The perfectly symmetric case, with $\lambda_1 = \lambda_2$ and $c_1 = c_2$, on the contrary, can be solved analytically.

2.5 Equilibrium selection

As mentioned earlier, the multiplicity of equilibria is undesirable in this context. However, small perturbations in the beliefs of both parties can be enough to pin down one equilibrium. If both parties expect the other to be "irrationally unwilling to fight" with some arbitrarily small positive probability, no "rational" group will concede at time zero and delay will occur wit probability one.

Another sensible way of selecting an equilibrium, inspired by Nalebuff and Riley (1985), assumes exactly the opposite. Suppose that each party believes that, with an arbitrarily small probability, its opponent is "irrational" and is committed to never give up. After some time, a rational group will become convinced that its opponent is irrational and it will decide to concede even if its cost is the highest possible ($\bar{\theta}$). Using the last time of concession we can go backwards and establish $\{m_1, m_2\}$.

Proposition 2.3 *Suppose that, with probabilities $p_1\epsilon$ and $p_2\epsilon$ (where ϵ is arbitrarily small) group 1 and group 2, respectively, are irrational and will never give up. Then, the concession time for a rational group with cost $\bar{\theta}$ will be finite and the same for both parties. Moreover, the equilibrium will be unique.*

Since ϵ is arbitrarily small, we can let it go to zero and obtain an additional condition "at infinity" to select one equilibrium in the "unperturbed" model. It must be clear that the perturbation is needed only because $c_i + \frac{1}{2}\tau > \bar{\theta} + \alpha\tau$. (With "large uncertainty," that is, if $c_i + \frac{1}{2}\tau < \bar{\theta} + \alpha\tau$, a rational group that fears that the costs of stabilization will go above $c_i + (\frac{1}{2} - \alpha)\tau$ would never consider giving up, and the "irrational" type of party would be redundant.) Let define M as:

$$M \equiv \int_{x=\underline{\theta}}^{x=\bar{\theta}} \ln \frac{1 - F_1(x)}{1 - F_2(x)}\, dx.$$

Proposition 2.4 *For ϵ close to zero, $c_1 = c_2$ and $p_1 = p_2$, if M is positive (negative), then $m_2 > \underline{\theta}$ ($m_1 > \underline{\theta}$), that is, group 2 (group 1) concedes at time zero with positive probability. If $M = 0$, $m_1 = m_2 = \underline{\theta}$, and stabilization will be delayed with probability one.*

An interesting property of the equilibrium, as it is clear from Proposition 2.3, is that, in general, one party will concede at time zero with positive probability. This suggests that even in a polarized society, the delay of stabilization will not necessarily be the likely outcome of distributive struggle. Let assume from now on, without loss of generality, that party 2 is the one conceding at time zero (the "pessimistic" party).

2.6 Asymmetries in the conflict

$|M|$ is a measure of the asymmetry introduced in the conflict by the differences in the expected costs of stabilization for the two parties. If $|M|$ is close to zero, the costs of stabilization are "very close" in stochastic terms for the two interest groups. In that case, it becomes more likely that stabilization will be delayed. The opposite is the case if $|M|$ is far from zero.

This result is similar to Hillman and Riley's (1989) finding that asymmetric valuations reduce the dissipation of politically contestable rents and transfers. In a similar vein, Hirshleifer (1989) shows that, depending on the technology linking the effort of the conflicting parties to the distribution of a prize, asymmetries in the valuation of the prize can give place to "one-sided submission." One-sided submission corresponds to a group investing no effort in the contest. The differences between the analysis in this paper and the mentioned results is that here symmetry of valuations is defined in stochastic terms, and that the "investment" in the contest consists simply of waiting the other party out of the political conflict.

A more general framework would certainly need to include as a choice variable a measure of the effort invested by each party during the political conflict over stabilization proposals.

How about asymmetries in the cost of inflation for the groups involved in the conflict?

Consider the system given by equations 2.2 and assume that there is perfect symmetry, so that the equilibrium strategy $\Phi(t)$ is the same for both groups. Then, a small increase in c_1 will have as a result that group 1 tends to concede earlier than group 2. (A more formal statement requires some additional work.)

2.7 Discussion and concluding remarks

Summarizing the results, we have that the equilibrium has the form of a system of differential equations (2.2) plus a boundary condition. (If the two parties are in a perfectly symmetric footing, the system reduces to one equation.) To obtain clear results about the effect of different variables seem to require of numerical simulations, as illustrated by a simple example.

Adopting the equilibrium selection criterion proposed in the previous section, there is in general a positive probability that a political agreement will be achieved immediately, because the party less concerned about what will happen after the reform will concede at time zero with nonnegligible probability.

Stabilization will be more likely to be delayed the more similar are the beliefs that the parties involved have the costs that stabilization will impose on each other.

It is important to point out at least two lines of research that can be relevant both in term of building better models as in terms of motivating empirical research.

While it is difficult to generalize, even for countries within the same region,

in some Latin American episodes the political conflict about stabilization has followed more or less the same pattern: Organized labor and segments of the population have opposed stabilization proposals by different governments, and their resistance has finally subsided when a government with populist antecedents commits to stabilize the economy. May be a better story to fit these episodes should emphasize uncertainty in groups opposing the stabilization about the government motives and capabilities. Could the imperfect information bargaining models developed to understand strikes and other labor conflicts at the micro level serve to understand (some) macropolitical conflicts surrounding processes of policy reform?

This paper, as virtually all of the literature on the subject I have referred to, concentrates on the conflict side of the issue. Each party is assumed to know how badly it is hurt by pre-stabilization distortions and how it is going to fare in the aftermath of stabilization. In a sense, they only need to learn about each other. In conflicts at the macro level, however, things are far from being that clear. To make matters worse, policy positions are a public good for members of political groups, and they can rationally prefer to remain ignorant about the effects of macroeconomic policy choices, unless they perceive that too much is at stake. These line of argument is consistent with the common observation that "things get really bad" before attempts at reform get significant popular support.

One can hope that further political-economic modeling will help us to achieve a better understanding of the forces that drive policy making during critical episodes of stabilization and, in the end, will also be useful for policy design. (For an argument about this "normative" role of political economy, see Rodrik 1993.) In any event, one can fear that fragmented party systems that block national consensus for reform will exhibit poor prospects for prompt stabilization under

democracy.

2.8 Proofs

A rigorous demonstration for most of the content of Propositions 2.1 and 2.2 can be found, in a more general setting, in Fudenberg and Tirole (1986); here the proof is only sketched. The proof of Proposition 2.3 follows Nalebuff and Riley (1985) rather closely.

Proof of Propositions 2.1 and 2.2:

T_i is nondecreasing because decreasing θ_i does not change the payoff to keep fighting but increases the payoff to conceding. T_i must also be gapless: If there is a gap $[\beta', \beta]$ in T_i (that is, an interval over which group i does not find optimal to concede for any possible θ_i), then there must be a gap (β', β) in T_j because for any θ_j it would be preferable to concede at time β' than at (β', β). But then the type of group i planning to concede at β would be better off conceding at time $\beta/2$. Furthermore, T_i must be atomless (except possibly at time zero): If there is some nonnegligible probability of group i conceding at time $\eta > 0$ (a mass of types θ_i conceding at time η), then there will be some interval $(\eta - \epsilon, \eta)$ such that in that interval group j will prefer to wait for the discontinuous jump in the probability of group i conceding. But this would create a gap.

From the previous discussion follows that T_i must be continuous, decreasing and differentiable over the subset of $[\underline{\theta},\bar{\theta}]$ which give up in finite time. This (partially) proves Proposition 2.1.

From the given properties of T_i if follows that its inverse Φ_i must be continuous, strictly increasing and differentiable. (See Lemma 1(iv) in Fudenberg and Tirole 1986.) Equation (2.2) then follows from differentiating $V_i(t, T_j(); \theta_i)$ with respect to t and making the derivative equal to zero at $T_i(\theta_i) = t$ (or $\Phi_i(t) = \theta_i$). Where

this derivative positive, group i would prefer to wait longer to concede, while were it negative, group i would prefer to concede before $T_i(\theta_i)$.

Equation (2.3) can be proved by contradiction. If both groups were conceding at time 0 with positive probability, any group would be better off by waiting infinitesimally to see if its rival concedes immediately.

Finally, notice that the maximum concession time $\bar{T}$ must be the same for both parties: If group i is not expected to concede after time $\bar{T}$, group j is not going to wait until $t > \bar{T}$ to concede. Either (I) $\bar{T} < \infty$ or (II) $\bar{T} = \infty$. Assume (II) and imagine that there is an interval $[\tilde{\theta}_j, \bar{\theta}]$ such that if $\theta_j \geq \tilde{\theta}_j$ then $T_j(\theta_j) = \infty$. Now, $F_j(\tilde{\theta}_j) < 1$ for $\tilde{\theta}_j < \bar{\theta}$, and, as Φ_j is monotone and strictly increasing, $\lim_{t\to\infty} \Phi_j'(t) = 0$. Thus there exists t such that the LHS of equation (2.2) becomes zero, and group i should stop conceding earlier. Unless $\tilde{\theta}_j = \bar{\theta}$, as in Proposition 2.1, we get a contradiction. Similarly, assume (I). Then $T_j(\underline{\theta}) = \bar{T}$ is finite. But since $1 - F_j(\bar{\theta}) = 0$ and $\Phi_j'(\bar{T}) > 0$, the LHS of equation (2.2) becomes infinite at time $\bar{T}$, and group i should wait to concede later.

Proof of Proposition 2.3:

Under the assumption of the Proposition, the probability that group i concedes before time t becomes: $G_i(\Phi_i(t)) = (1 - p_i\epsilon)F_i(\Phi_i(t))$. Using G_i instead of F_i we can rewrite equation (2.2) as:

$$\left[\frac{G_i'(\Phi_i(t))}{1 - G_i(\Phi_i(t))}\right] \frac{(2\alpha - 1)\,\tau r^{-1}}{c_i - \Phi_j(t) + (\frac{1}{2} - \alpha)\tau} \frac{\partial \Phi_i(t)}{\partial t} = 1. \tag{2.6}$$

Changing variables and integrating in θ_i:

$$T_i(\bar{\theta}) = \int_{x=\underline{\theta}}^{x=\bar{\theta}} \left[\frac{G_i'(x)}{1 - G_i(x)}\right] \frac{(2\alpha - 1)\,\tau r^{-1}}{c_i - \Phi_j(T_i(x)) + (\frac{1}{2} - \alpha)\tau}\, dx$$

$$< \int_{x=\underline{\theta}}^{x=\bar{\theta}} \left[\frac{G_i'(x)}{1 - G_i(x)}\right] \frac{(2\alpha - 1)\,\tau r^{-1}}{c_i - \bar{\theta} + (\frac{1}{2} - \alpha)\tau}\, dx = \ln(p_i\epsilon) \times \frac{(2\alpha - 1)\,\tau r^{-1}}{c_i - \bar{\theta} + (\frac{1}{2} - \alpha)\tau}.$$

That is, $T_i(\bar{\theta}) < \infty$. Now, $T_j(\underline{\theta}) = T_i(\underline{\theta})$, because if group i will not concede after

some finite time, then group j has nothing to gain by waiting any longer, and vice versa.

From (2.6):

$$\begin{array}{c}\left[\frac{G_2'(\Phi_2(t))}{1-G_2(\Phi_2(t))}\right]\left(c_2-\Phi_2(t)+(\frac{1}{2}-\alpha)\tau\right)\frac{\partial\Phi_2(t)}{\partial\Phi_1(t)}= \\ \left[\frac{G_1'(\Phi_1(t))}{1-G_1(\Phi_1(t))}\right]\left(c_1-\Phi_1(t)+(\frac{1}{2}-\alpha)\tau\right).\end{array} \tag{2.7}$$

This implicitly defines a first order differential equation for θ_2 as a function of θ_1. Consider the following, strictly decreasing function:

$$H_i(\theta_i)=\int_{x=\theta_i}^{x=\sigma}\left[\frac{G_i'(x)}{1-G_i(x)}\right]\left(c_i-x+(\frac{1}{2}-\alpha)\tau\right)dx. \tag{2.8}$$

Then, integrating in (2.7), we obtain a mapping from the type of group 1 that concedes at a given time to the type of group 2 that concedes at the same time:

$$H_2(\theta_2)=H_1(\theta_1)+k. \tag{2.9}$$

where k is an integration constant. Since the last concession time is the same for both groups, k is given by:

$$k=H_2(\bar{\theta})-H_1(\bar{\theta}). \tag{2.10}$$

Proof of Proposition 2.4:

Let define $M(\epsilon)$ as:

$$M(\epsilon)\equiv H_1(\bar{\theta})-H_1(\underline{\theta})-H_2(\bar{\theta})+H_2(\underline{\theta}). \tag{2.11}$$

From (2.8), integrating by parts:

$$H_i(\theta_i)=\left[\left(c_i-x+(\frac{1}{2}-\alpha)\tau\right)\ln(1-G_i(x))\right]_{x=\theta_i}^{x=\sigma}-\int_{x=\theta_i}^{x=\sigma}\ln(1-G_i(x))\,dx.$$

In (2.11), assuming $c_1=c_2=c$,

$$M(\epsilon)=\left(c-\bar{\theta}+(\frac{1}{2}-\alpha)\tau\right)\ln\left[\frac{1-p_1\epsilon}{1-p_2\epsilon}\right]+\int_{x=\underline{\theta}}^{x=\bar{\theta}}\ln\left[\frac{1-G_1(x)}{1-G_2(x)}\right]\,dx.$$

When ϵ goes to zero, G can be replaced by F in $M(\epsilon)$ (except at the limit $x = \bar{\theta}$). Using this and $p_1 = p_2$, we can define M :

$$\lim_{\epsilon \downarrow 0} M(\epsilon) = \int_{x=\underline{\theta}}^{x=\bar{\theta}} \ln \frac{1 - F_1(x)}{1 - F_2(x)} \, dx \equiv M.$$

(The integrand is bounded at the endpoint $x = \bar{\theta}$ under the assumption that $F_i'(\bar{\theta}) \notin \{0, \infty\}$.) Now, if $m_2 > \underline{\theta}$, then $\Phi_1(0) = \underline{\theta}$. Using equations (2.9) and (2.10):

$$H_2(m_2) = H_1(\bar{\theta}) + H_2(\underline{\theta}) - H_1(\underline{\theta})$$

or:

$$H_1(\bar{\theta}) - H_1(\underline{\theta}) - H_2(m_2) + H_2(\underline{\theta}) = 0.$$

Using the definition of $M(\epsilon)$ (equation (2.11)):

$$M(\epsilon) + H_2(\bar{\theta}) - H_2(m_2) = 0.$$

Since H_2 is decreasing:

$$M(\epsilon) > 0.$$

Chapter 3

Sequencing of Economic Reforms under Political Constraints

3.1 Introduction

In recent years, a number of countries in Eastern Europe and Latin America have embraced a wide range of market-oriented reforms, sometimes during macroeconomic crisis of unprecedented proportions. Some examples are the Bolivian package of 1985, and the Polish Balcerowicz plan, the Menem reforms in Argentina, the Plano Collor in Brazil, and the Fujimori reforms in Peru, all in 1990. (Comprehensive attempts at reform have also being pursued in Mexico and Venezuela, and, following Poland, throughout Eastern Europe.)

The radicalism of these programs stands in striking contrast with the recommendations of the economic literature on the timing and sequencing of reforms. While there is no consensus on the optimal ordering of reforms, many (maybe most) authors agree that a carefully phased gradualist approach minimizes the costs of transition. For instance, it is typically stated that measures oriented to restore state solvency and insure macroeconomic stabilization should precede full liberalization.

The strategy followed in the cases mentioned has been, instead, to introduce

reforms as swiftly as possible. Such "bitter pill" reform strategies have indeed been painful, seemingly giving the reason to those advocating a more paused stance. The question posed by these experiences is, in Rodrik's (1992) words: "If a period of macro instability is the worst time to undertake a trade reform, why are so many countries doing it?" More generally, why do countries attempt to initiate all sort of reforms simultaneously?

This chapter proposes an answer to that question: Political constraints motivate governments to go for comprehensiveness and speed in implementing reforms, even when this strategy entails some additional costs.

Section 3.2 reviews the arguments in favor of gradualism given in the economic literature. Most of the literature assumes that the objective of a reforming government is to maximize social welfare. This suggests a first best strategy of removing all existing distortions simultaneously. Hence, formal arguments in favor of gradualism follow the logic of second-best: Given a distortion that cannot be removed, reform cannot simply consist in getting ride of all other distortions simultaneously. More recently, some authors have given an additional formal argument in favor of gradualism in the existence of externalities arising during the adjustment process itself. In the presence of those externalities, the private sector cannot be trusted to choose the socially optimal pace of adjustment to the new conditions if all preexisting distortions are removed at once.

Section 3.3 presents the politico-economic objections against gradualism. Some of these objections relate to *credibility* problems, while some others to *political sustainability* difficulties of step-by-step strategies. Some simple examples are provided to illustrate how these considerations can remove the advantage of a gradualist approach even when economic reasoning alone calls for it.

The argument rests on the distributive consequences of reform. By widening

the scope of efficiency improving reforms, the government is more likely to gain the support of larger segments of the population, particularly if the losers of each particular measure are beneficed by other measures. If the government needs to pass a threshold of popular support at each step, a gradual process risks being stopped at each stage by the group being hurt at that point. Hence, the government may need to implement all reforms simultaneously even if this entails some aggregate costs. Credibility and political sustainability are clearly intertwined.

The argument itself is hardly new (practitioners seem to be keenly aware of it); the purpose of this chapter is to show its validity in the context of familiar economic models. This is pertinent since some authors (notably Rodrik 1989) have advocated reforms that are "large in magnitude but narrow in scope." Section 3.4 presents some evidence (of admittedly anecdotal character) that suggests that wide-scope reforms have indeed been implemented, in spite of severe economic difficulties. Section 3.5 contains some concluding remarks.

3.2 The literature on gradualism

The early literature on timing and sequencing of economic reforms was spurred by the experience of the Southern Cone of Latin America in the late 1970s and early 1980s. The attempted liberalizations under military rule in Chile, Argentina, and Uruguay led to a series of bank panics and financial collapses. Several authors attribute these difficulties to mistakes in the order of liberalization (Diaz Alejandro 1985, Corbo and de Melo 1985, and Edwards and Edwards 1987). It was commonly emphasized the need to balance the central government finances before undertaking other reforms. The debate centered on the order of liberalization of the trade and capital accounts, with the majority of authors favoring the opening of the former before the liberalization of the latter in order to avoid undesirable

capital flows. (See, e.g., McKinnon 1991. For a dissenting view, see Lal 1987.)

Most of the early literature was informal; the emphasis was in giving policy advice to avoid the difficulties that plagued efforts at economic reform in Latin America. Subsequent research has been more precise in making statements about welfare gains or losses associated with different sequences (Edwards 1992).

Clearly, under competitive equilibrium assumptions, welfare maximization is obtained by removing all distortions simultaneously. As long as the perceived private costs and benefits correspond to the true social costs and benefits, private economic agents will chose the socially correct pace of adjustment following a full scale liberalization. It is important to make the distinction between economic reform and economic restructuring. In economies that have been highly distorted, economic restructuring is certain to take a long time, even if economic reform (a collection of policy decisions) occurs all of a sudden. "Radical reform" is the *first best* reform strategy, as was argued by Mussa (1982) early on in the debate about gradualism. Hence, arguments for gradualism must rely on the presence of distortions during the adjustment process or on distributive concerns. In this section we will focus on the former; distributive considerations will be discussed in the next section.

One possible argument for gradualism is the presence of preexisting distortions in one or several markets that can not be removed at the time the reform plan is announced. Potential candidates are labor market interventions, domestic capital market imperfections , and limits to foreign debt that are not perceived as binding by individual private agents (See, for instance, Edwards and Van Wijnberger 1986 and Edwards 1992). In all these cases, one can imagine circumstances in which the *second best* reform strategy will involve some degree of gradualism, for instance, in the speed of trade liberalization.

A related argument, put forward by Calvo (1989), emphasizes the equivalence of imperfect credibility to an intertemporal distortion. In one of Calvo's examples, if the public wrongly believes that a trade liberalization will be reverted in the future, quantitative control of the capital account may be called for. The problem with this type of argument is that, in its simplest form, it assumes that credibility problems arise because the government "knows better" than the public what is going to happen in the future. A closer look at the source of the credibility problem is necessary to assess the right policy response. For instance, if imperfect credibility arises because the public is unsure about the "true preferences" of the government, overshooting can act as a signaling device (Rodrik 1989a). Or, as argued in the next section, if credibility problems are related to political sustainability of the reforms, a big bang can be the only way of cutting through the Gordian knot of implicit rents generated by government interventions.

Another argument in favor of gradualism is the nonexistence or precariousness of a "safety net" to smooth the effects of massive redundancies of labor during the process of economic transformation.This safety net is to be understood as a public good needed to reduce costs such as losses of human capital. Both Latin American and Eastern European countries have had fragmentary and rudimentary systems for income maintenance and welfare delivery (Przeworski 1991).

A similar "capacity constraint" is given by the limited availability of loyal and qualified technocrats to carry on the process of reforms. It is true that capacity constraints of the economic team can be important in some cases, as in the process of privatization, where some "learning by doing" is likely to occur. According to Krueger (1992), the most sensible procedure, given the limitations of the economic team, is to emphasize the swift removal of distortions that inhibit the creation of new sources of income instead of focusing in the disposal of old public assets.

More recently, Gavin (1993) has focused on inefficiencies inherent in the adjustment process itself. The private sector response to reform may be suboptimal (too fast) if there is a congestion externality in the form of a limited capacity of absorption of the labor market.[1]

In sum, economic arguments in favor of gradualism are of a second-best nature. In the next section it will be argued that, even in cases where some of the arguments above apply, a big-bang may still be the best *feasible* policy given political constraints.

3.3 The political economy case for radical reform

Though far from conclusive, the evidence presented in the next section seems to suggest that radical reforms are costly, particularly when the urgency to "get things done" leads to the adoption of bad designs. Comprehensive reform packages, however, not only have been adopted by a number of countries but they have also enjoyed considerable initial support. For an explanation, we turn now to political-economic arguments.

Rodrik (1989a) has argued that overshooting a reform may be useful for a government that wants to signal its seriousness to a jaded public that has lived through too many failed reforms. This reasoning compelling, although, when they are not due to plain policy inconsistencies, credibility problems are linked to political sustainability of economic policies.[2] Countries adopting radical reforms

[1] Aghion and Blanchard (1993) have also built a model of large- scale economic reforms with limited private job creation. They conclude that there is a maximum speed at which the state sector can be closed. However, voluntary closing and restructuring of state firms by their own workers might fall below the optimum speed.

[2] In a paper that takes precisely this point of view, Van Wijnbergen (1992) argues against gradualism in the removal of price controls, on the grounds that resulting hoarding can lead the median voter to subestimate the efficiency benefits from the reform. (Van Wijnbergen's argument relies, however, in the public disregarding the occurrence of hoarding.)

have been characterized, for the most, by weak states, vulnerable to pressures from large firms and organized interests. In this circumstances, policy actions with distributive consequence can be effectively blocked by the groups being hurt (if they have time to organize). Lal (1987) and Krueger (1992) have emphasized the need for speed in the transition: A longer transition enables pressure groups to organize and oppose successfully the reforms.

To this reasoning in favor of speed in the process of reforms, it is possible to add one in favor of comprehensiveness. By widening the scope of efficiency-improving reforms initiated simultaneously, the government is more likely to gain the support of larger segments of the population. For many agents, losses from one reform can be more than compensated by gains from the others. For instance, putting an end to a near hyperinflationary situation is going to benefit (almost) everybody. Hence, linking the fate of the reforms can be a way of weakening the opposition to them.[3] That is to say, if the government is not able to credibly commit to a certain course of action, it may need to implement all reforms simultaneously, even when economic reasoning calls for a second-best gradualist approach. Even if high, the costs involved in a radical reform can be smaller than the costs involved in a truncated reform.

In 3.3.2, a simple general equilibrium example to illustrate how political-economic considerations can revert the second-best argument in favor of gradualism in the presence of preexisting distortions that cannot be removed at the time the reform plan is announced.. In 3.3.3 another example is sketched to show how political-economic considerations could revert the argument in favor of gradualism when there are congestion externalities in the process of adjustment. But

[3]A similar idea underlies the discussion about economic reform in Buchanan (1991). A slightly different version of the same argument is made by Rodrik (1992b). He shows that an agenda-setter may be able to sneak-in a reform with distributive consequences alongside with one with across-the-board benefits by packaging the two together.

before, in 3.3.1, a sequential move game structure is used to show the logic of the argument in the most transparent way.

3.3.1 The argument

Consider a government trying to implement reforms F (e.g., a fiscal reform needed to successfully stabilize prices) and T (e.g., a trade reform). Besides the government, there are two interest groups: f and t. Reform F, if carried alone, will hurt group f and will benefit group t. Reform T, on the other hand, will hurt group t and will benefit group f. It is assumed that, on optimality grounds, reform T should be carried over after F is secure. One example could be a trade reform that needs macroeconomic stability to minimize transition costs.

If the gradualist approach is pursued, that is, if T is undertaken after F is completed, both f and t end up being better off than in the initial situation. However, group t would prefer the reform process to be truncated after reform F is accomplished.

Alternatively, the government can start both reforms simultaneously. The payoffs of following this radical approach are higher for f and t than those from the initial situation, but lower than those obtained after a gradualist reform process.

The government is modeled as an *agenda-setter* who holds the initiative to offer reform plans at several points in time.[4] For simplicity, the example assumes a utilitarian government, that is, a government interested in maximizing the sum of the utilities of the groups. The same results, however, can be obtained from a number of different specifications of the government's objective. A predator government that takes a percentage of the total pie is also consistent with the payoff specification.

[4]See Romer and Rosenthal (1979) for a discussion of the agenda setter game, and Dewatripont and Roland (1992) for another application to the problem of economic reform.

	Government	**Group f**	**Group t**
Status quo	0	0	0
Truncated reform	1	-1	3
Gradualist reform	2	2	2
Radical reform	1	1	1

Table 3.1: Payoffs to the different agents.-

Pressure groups have no capacity to articulate counterproposals, but can effectively veto any reform plan. In deciding a sequence of proposals, the government must take into account not only economic considerations (the payoffs associated with the final point) but also the possibility of pulling off the reforms. Neither the government nor the different interest groups have the capacity to precommit their actions.

Figure 3.1 shows schematically the extended form of this game. For illustration purposes, the payoff structure presented in table 3.1 has been chosen.

These payoffs reflect the following assumptions: 1) There is a need for reform (low payoff of status quo); 2) If feasible, a gradual reform is preferable to a radical reform due to its lower costs; and 3) A partial or truncated reform will favor one group and will hurt the other.

The government has three choices at the initial node: Proposing a gradual path (starting by reforming sector F), doing nothing, or proposing a big-bang (reforming both sectors simultaneously). If the government makes a proposal, each group will either accept it or reject it. The opposition of any group is enough to paralyze the government's proposal.

Imagine for a moment that the government proposes F and that this is accepted by both groups. When T is proposed in the next period, group t will veto, since it prefers 3 over 2. Knowing that this path will lead to a payoff of -1, group

f will veto the original proposal. Hence gradual reform is not a subgame perfect equilibrium. (A subgame perfect equilibrium requires rational choice by every decision making at every node, even in those that are not reached in equilibrium.) Moreover, it is not even a Nash equilibrium: It can be sustained only by the belief by group f that group t will not act to truncate the reforms. The government, understanding that a gradual reform is not feasible, will propose a radical reform, which will be accepted by both groups, constituting the unique subgame perfect equilibrium to this game. Hence, even though gradualism is preferred to the radical reform outcome by everybody, it is not going to be proposed. Notice that if group t could commit to accepting the second stage proposal, everyone would be better off. In this sense, the problem is analogous to well known time consistency problems in games between the government and a unified general public.

For simplicity, the strategy of starting reform T before reform F has been ignored. This strategy could also be credible for certain payoff structures. That is, political considerations could even lead to a reversal of the economically optimal reform path. Introduction of political feasibility considerations may reverse "technocratic" economic prescriptions. Of course, if the government had the power (and will) to change the rules of the game in order to make other outcomes feasible, that would be the recommended course of action.

In 3.3.2, a simple example is used to show that payoff structures as those assumed in table 3.1 can be obtained from familiar general-equilibrium settings in which the existence of temporary distortions would call, on pure welfare theoretical grounds, for a second-best gradualist path. In 3.3.3 another example is sketched in a setting in which congestion externalities would call for a gradualist path. The examples are not chosen by its realism by rather by its simplicity.

3.3.2 A general equilibrium example

Consider a two-sector economy in which each sector produces a distinct good, X (exports) or Y (importables), using one factor of production (L). The technology for producing exports is given by: $X = L_x^{1/2}$. We can think of the export industry as consisting of a number n of firms using the production function: $x_i = (l_{x_i}/n)^{1/2}$. Similarly, the technology for producing importables is given by: $Y = L_y^{1/2}$, and we can think of the importables industry as consisting of a fixed number of firms. Labor is supplied inelastically; the quantity of labor available in the economy is normalized to one. There are three different types of agents in this economy: Workers, who supply labor, owners of the export firms, and owners of the importables firms. Their (aggregate) income is given, respectively, by the total payroll, profits of the export industry, and profits of the importables industry. The exchange rate and the international prices of exports and importables are equal to one; agents in this economy only consume importables. Finally, in the initial situation, there is a tariff τ on imports and a subsidy s on exports. A fraction L_b of the labor force is employed in a bureaucracy whose objective is to administer tariffs and subsidies. (This captures the "cross-hauling" view that policy interventions that cancel each other in a distributive sense, imply extra losses due to directly unproductive activities, as in Magee et al. 1989.) The initial level of bureaucratic employment is assumed to be above the level required for such administration. Public deficit (surplus) results in lump-sum taxes (transfers) to the workers.

Notice that profit-maximization under the price-taking assumption implies that:

$$L_x = \left(\frac{1+s}{2w}\right)^2,$$
$$L_y = \left(\frac{1+\tau}{2w}\right)^2. \tag{3.1}$$

The equilibrium condition in the labor market is:

$$L_x + L_y + L_b = 1. \tag{3.2}$$

From (3.1) and (3.2) we can get:

$$w = \left[\frac{(1+s)^2 + (1+\tau)^2}{4(1-L_b)}\right]^{0.5}. \tag{3.3}$$

From (3.1) we can also obtain the production of exports and importables:

$$\begin{aligned} X &= \left(\frac{1+s}{2w}\right), \\ Y &= \left(\frac{1+\tau}{2w}\right). \end{aligned} \tag{3.4}$$

Profits in the export and importables industries are, respectively,

$$\begin{aligned} \pi_x &= \frac{(1+s)^2}{4w}, \\ \pi_y &= \frac{(1+\tau)^2}{4w}. \end{aligned} \tag{3.5}$$

Since agents spend all their income in importable goods, real income of workers, exporters, and owners of the importable firms is, respectively,

$$\begin{aligned} I_l &= \frac{w}{1+\tau} - \frac{T}{1+\tau}, \\ I_x &= \frac{(1+s)^2}{4(1+\tau)w}, \\ I_y &= \frac{1+\tau}{4w}. \end{aligned} \tag{3.6}$$

The term T represents lump-sum taxes to cover the fiscal deficit, and it is given by:

$$T = (s-\tau)X + wL_b. \tag{3.7}$$

Equation (3.7) closes the model. In (3.7) it is implicitly assumed that exports equal imports. (Even though we will consider different periods, we will neglect

	O	**Ia**	**Ib**	**IIa**	**IIb**	**IIc**
s	0.2	0.2	0.2	0	0	0
τ	0.2	0.2	0	0.2	0	0
L_b	0.2	0.1	0.1	0.1	0	0.1
I_l	0.6325	0.6708	0.5952	0.7187	0.7071	0.6708
I_x	0.3162	0.3354	0.4373	0.2531	0.3536	0.3354
I_y	0.3162	0.3354	0.3037	0.3644	0.3536	0.3354
I	1.2649	1.3416	1.3362	1.3362	1.4143	1.3416

Table 3.2: Payoffs under different policy scenarios.-

intertemporal links, so that the trade balance will be assumed to be in equilibrium at all times.) It is straightforward (though tedious) to verify that:

$$I_l + I_x + I_y = X + Y.$$

Let $I \equiv I_l + I_x + I_y$. This represents the total consumption of importables by the economy (and total production evaluated at international prices). Table 3.2 illustrates the real income or payoffs for the different agent types that obtain from different combinations of s, τ, and L_b.

The purpose of this example is to show that there are circumstances in which a radical reform strategy will be pursued in lieu of a gradualist strategy, even if, due to some transitory distortion, it entails lower aggregate payoffs.

Suppose the initial situation (period 0) was given by the column O in table 3.2. Clearly, the *first-best* strategy would be to eliminate all distortions (that is, to set $s = \tau = L_b = 0$), leading the economy during period 1 to the position given by column IIb, where social welfare is maximized.

The following are the institutional rules:

(a) The government is the agenda-setter. During period 1, it can propose contemporaneous changes in τ and L_b and it can decide changes in s to be effective

in period 2. During period 2, it can propose contemporaneous changes in τ and L_b. (Export subsidies are decided one period ahead, so that $s = 0.2$ during period 1; this is the distortion that introduces the second-best optimality of gradualism.)[5]

(b) At least $L_b = 0.1$ is necessary to administer any tariff or subsidy.

(c) Each group of agents (workers, producers of importables, and exporters) has the power to block any policy initiative. In case of blockage, the resulting outcome is the status quo. (The veto assumption could be replaced with majority voting, and the same result would obtain under appropriate assumptions.)[6]

(d) The objective of the government is to maximize aggregate income.

(e) There are no side payments.

Given that $s = 0.2$ is fixed during period 1, the *second-best* reform strategy consists clearly of: (a) During period 1, lower L_b to 0.1, keep $\tau = 0.2$, and decide to eliminate subsidies during the next period. (b) When period 2 arrives, eliminate all remaining distortions. This strategy lead us from column O in period 0, to column Ia in period 1, to column IIb in period 2. This strategy can be called *gradualism*.

The problem with *gradualism* is the following. Suppose that everybody agrees with the prescribed decisions in period 1. When period 2 arrives, producers of

[5]This particular distortion is assumed for simplcity. As noted before, the purpose of the example is not to explore the advantages odf a gradualist stance in any specific case. Rather, it is to point out the political-economic difficulties of carrying out such a strategy even when it is desirable on some other grounds.

[6]Policy making at this frequency (specially in Latin America) seems to be better modeled as the outcome of a (perhaps nested) pressure group game, than as the outcome of a "western style" voting game.

importable goods and workers will not find convenient to support a move towards free trade any longer: Vetoing any government proposal leads them to column IIa (tariffs-cum-bureaucratic employment), where they are better off than under column IIb (free trade). However, under column IIa exporters are worse off than in the initial situation. Anticipating that, exporters will not find it advantageous to support the prescribed decisions in period 1 in the first term. Gradualism is not credible because it is politically unsustainable.

Now consider the strategy of removing policy interventions as soon as it is possible. That is, in period 1 lower L_b to 0.1, reduce τ to zero (Ib), and decide to eliminate subsidies during the next period. In period 2, it only rests to disband the bureaucracy that served to pay subsidies during period 1. This strategy can be called *radical reform*. Even though it entails lower payoffs than gradualism during period 1 (in fact, it introduces a distortion by making tariffs to differ from export subsidies for a while), it is politically sustainable. Notice that vetoing the reform during period 2 would lead the economy to column IIc, where everybody is worse off than under IIb.

While radical reform is credible (i.e., constitutes a subgame perfect equilibrium), it is not the welfare maximizing credible strategy. The government could keep in period 1 a positive tariff (to reduce distortions associated with export subsidies) low enough to make producers of importables to prefer it to be removed together with bureaucratic employment in period 2. But in this way we get further and further following a second-best logic. Even if the strict case for radical reform fails, it may very well end up being the lesser evil among possible alternatives when considering the amount of resources that can end up being consumed in lobbying activity identifying sectors that should be subject of "temporary" protection from the transition process.

3.3.3 An example with a congestion externality

Recently, Gavin (1993) has argued in favor of gradualism on the grounds that there could exist a congestion externality in the form of a limited capacity of absorption of the labor market. This externality can be accommodated into the general equilibrium framework described in the previous subsection. The advantage of this procedure is to consider explicitly unemployment as the cost of radical reform. This is in agreement with the factual observation of increased unemployment during radical reform processes and the common perception of this unemployment as a cost of those processes (see, e.g., Przeworski 1993).

Consider a general equilibrium model with the production functions described in the previous subsection and the same three types of agents. It is still assumed that workers end up paying or receiving each period the current public deficit or surplus, but no restriction is imposed about the number of bureaucrats necessary to administer tariffs or subsidies. The other institutional rules described in the previous subsection ((a) and (c)- (e)) are still binding, so that the government is a benevolent agenda-setter and each group of agents has veto power. A simple way of introducing a congestion externality is by postulating that the export sector (which is to grow under the reforms) has a maximum capacity of labor absorption per period given by K_x which will be assumed to take a value of 0.12.

As in the previous example, we have three periods. In the initial situation (period 0), there is a tariff $\tau = 0.2$ and bureaucratic employment $L_b = 0.2$ that should be eliminated. Payoffs for each group of agents in period zero appear in table 3.3 as column O. A gradualist strategy would consist of reducing bureaucratic employment to zero (reform F) in period 1 and removing the tariff (reform T) in period 2. Payoffs corresponding to period 1 and period 2 under the gradualist strategy are described by columns Ia and II in table 3.3. It is easy to check that

	O	**Ia**	**Ib**	**II**
s	0	0	0	0
τ	0.2	0.2	0	0
L_b	0.2	0	0	0
U	0	0	0.0118	0
I_l	0.6772	0.7576	0.7023	0.7071
I_x	0.2389	0.2667	0.3347	0.3536
I_y	0.3436	0.3481	0.3676	0.3536
I	1.2597	1.4084	1.4046	1.4143

Table 3.3: Payoffs under different policy scenarios.-

the constraint in the absorption capacity of the exports sector is not binding so that the model is solved as described by equations (3.1) - (3.7) in the previous subsection and no unemployment arises ($U = 0$). The problem with gradualism is that, as seen in table 3,.3, it is not politically feasible: Once reform F is undertaken, workers and owners of importables firms will veto a further move to free trade (remember the assumption that workers perceive any fiscal surplus). Notice, anyway, that a truncated gradualist strategy (staying in column Ia forever) is still Pareto improving.

Alternatively, the government can decide to follow a radical strategy, adopting reforms F and T simultaneously in period 1. As a result, too many workers will look for jobs in the exporters sector in relation to the capacity of absorption of this sector. Hence, the economy cannot jump instantaneously to the situation described by column II. The transition period is described by column Ib. Workers leaving the bureaucratic sector as a consequence of the closing of state firms will look for jobs in the exports sector until the point were the wage in that sector multiplied by the probability of finding a job is equal to the wage in the importables sector (The probability of finding a job will be equal to the constrain

K divided by the number of searchers):

$$\frac{K}{S_x} w_x = w_y.$$

Assuming that wages are still given by marginal productivity, and using the fact that the employment in X in period 1 is given by the previous period's employment plus K, the previous equation gives as a quadratic expression in S_x with a solution in $S_x = 0.1318$. Hence, some workers looking for jobs in sector X will remain unemployed during the transition period. Moreover, during the transition period aggregate income is lower with radical reform than with gradualism.

However, a government interested in maximizing aggregate income will promote a radical reform because it entails a larger income than a truncated gradual reform (assuming no discounting) and because it is politically feasible.

Different values of the initial distortions (τ and L_b) and different institutional rules (which group of workers is represented in the veto game at each stage) are likely to make different outcomes politically feasible.

3.4 Some evidence

Poland. Perhaps the best example of radical reform is the one undertaken by Poland under Deputy Prime Minister Leszek Balcerowicz. Poland's strategy was to introduce economic liberalization, macroeconomic stabilization, and privatization as rapidly as possible. Substantial steps toward the first two objectives were given in a single package or "big bang" on January 1, 1990. Crucial decisions with respect to free trade, market pricing, end of state orders and central planning, key aspects of commercial law, large cuts in budget subsidies, higher tax collections, wage controls, and a sharp devaluation of the currency occurred in the space of a few weeks at the end of 1989 and beginning of 1990 (Sachs 1992). A privatization law was put in place in June 1990. Since then, privatization has gone slowly in

the case of the largest firms, but small and medium- sized businesses has been privatized with great success. Sachs (1992) characterizes the first two years as an end to inflation and shortages, a slight decline in average consumption, an increase in the quality and variety of goods available, and a sharp increase in the unemployment rate (Although he attributes the rise in unemployment at least partially to the breakdown of trade relations with the former Soviet Union). Not surprisingly, given his role as advisor to the Polish government during 1990-1991, Sachs considers that the consistency and boldness of the reforms may have eased the "valley of tears" unavoidable after a profound economic transformation. What is surprising is that an overwhelming proportion of the population supported the government in spite of the painful first months. Przeworski (1991, p.165) offers some evidence in this regard. It seems clear that a more paused stance would have hardly mustered as much political support as the radical program did, at least during the launching of the program.

Bolivia. Another clear example of radical reform was the Bolivian package of August 1985. The stabilization program, destined to stop a skyrocketing hyperinflation, relied on exchange-rate unification, supported domestically by tight monetary and fiscal policies and externally by a significant debt alleviation. The program included an abrupt liberalization of credit and goods markets and deregulation of the labor market. Most price controls and other interventions were dismantled and significant layoffs occurred in the public sector, particularly in the state mining enterprises (Morales 1991). The reforms were undertaken during the Paz-Estenssoro government. While the labor movement had been effective in vetoing previous reform plans, it was unsuccessful in organizing opposition to the Paz-Estenssoro reforms. The government obtained the support of the two main political parties, which facilitated the approval of the program by the Congress.

Peru. On August 8, 1990, ten days after its inauguration, the newly elected President Fujimori departed from his campaign promises by producing a shock-treatment stabilization package, while announcing his intention to launch major economic reforms. Main components of the *paquetazo* were huge increases in prices of publicly provided goods and services and other measures destined to put an end to the fiscal origin of hyperinflationary monetary emission. During the following months, and particularly during March of 1991, rapid and extensive liberalization of foreign trade and the capital account, and reduction of public sector employment were undertaken. Paredes (1991) argues that the simultaneous introduction of these reforms probably increased the short-term costs of the program in relation to a well-designed (i.e. piece-meal) stabilization program. He is particularly critic of the opening of the foreign trade before tax reform, needed to insure fiscal stability, was completed. An example of the difficulties associated with the adoption of far-reaching reforms before stabilization is secure were the difficulties of exporters and producers of importable goods in the face of an overvalued currency.

Fujimori's popularity declined temporarily after he embraced a bitter- pill strategy. However, the orientation of his economic program has remained widely accepted. (See Przeworski 1991, p. 165 for survey data on the popular confidence on the minister of the economy after the shock.)

Argentina. Contrary to the case under Alfonsin, Argentina under Menem is an example of orthodox and synoptic path of economic liberalization (Armijo 1992). Stabilization was undertaken in March 1991 with the Convertibility Plan. An ambitious fiscal reform, including a significant reduction of public employment, allowed the government to double its real revenues from 1989 to 1991. On the trade front, the average tariff has been reduced from 28% in 1985-87 to 15% in 1991-92. In the same period, the maximum import tariff has fallen from 55% to

22%, and the coverage of non-tariff barriers has gone from 32% to 8%. Deregulation was also pervasive: In 1991, one single piece of legislation (the possibly unconstitutional "Derogation Act") cleaned out an entire range of limitations to free-market activities, such as regulations of professional activities, of transportation and telecommunications, of retail hours (stores in Argentina used to be forbidden from operating during great part of the weekend), etc. But perhaps the most impressive record of the government is on the privatization issue. From 1992 on, privatization has proceeded at breakneck speed. Without much regard for price, the government has sold airlines, steel companies, part of the state oil exploitations, oil refineries, public services such as phone, water, and electricity distribution in major cities, and even military production facilities. The list for 1993 includes major savings institutions.

Some of the costs of such a speedy process have been related to not taking advantage of a possible process of "learning by privatizing." Privatization of public utilities was implemented even before developing an adequate regulatory framework. Another major cost of simultaneous reforms is the current account deficit induced by an overvalued currency (fixed nominal exchange rate and low but positive inflation). In spite of these difficulties (plus a few corruption scandals) the Menem administration seems to be doing quite well in terms of its popularity.

3.5 Conclusions

An understanding of the conditions under which political considerations induce biases toward radical reform is essential in order to evaluate recent experiences in Latin America and in terms of the design of new reform programs.

From a positive point of view, the question is why Latin American countries that failed when implementing gradualist programs in the early 1980s have been

relatively successful later in undertaking more comprehensive attempts at reform. This is somewhat surprising given the increased economic and administrative costs of such attempts in relation to more paused reform processes. A key element seems to have been the building of political support through a wider scope of the reform process. Thus, reform has been usually accompanied by political realignment. Since no sector of society wants to be the first in renouncing to its apportionment of special privileges, reformist governments felt necessary to cut through the Gordian knot of government-created rents. By providing an explanation for this behavior, we will make progress in answering the more general question of why political leaders in some countries have been able (and willing) to win popular support for market-based policies whereas interventionist programs still prevail in other countries. As noticed by Bates (1990), investigating a question like this will lead us closer to the Smithian root of development studies: The political introduction of markets.

From a normative point of view, the main point of this chapter is that even in circumstances in which economic reasoning indicates that reforms should be made sequentially, political considerations can make them "complementary." In implementing reform programs, policymakers should be aware of these considerations. This result stands in contrast to Rodrik's (1989) recommendation of undertaking deep reforms with a narrow scope. On the other hand, we agree with Roger Douglas (1990) reflections on the principles of politically successful structural reform, inspired by his experience as New Zealand's Finance Minister: "Large packages provide the flexibility to ensure that losses suffered by any one group are offset by gains by the same group in other areas [...] It is uncertainty, not speed, that endangers structural reform programs." With respect to the role of international agencies in promoting the use of markets in developing countries, it is clear that

these agencies should carefully assess political restrictions when assisting countries undertaking liberalization processes. Optimistically, international agencies might play a role as commitment devices to permit the implementation of reforms with lower transition costs. The perspective of the approval of the NAFTA agreement, for instance, might have played the role of a commitment device in the case of Mexico, allowing the government more flexibility in choosing the pace of reform.

The model intends to portray the case of a country in a political deadlock about specific reform proposals that hurt strong organized interests. It predicts that, in such cases, under more or less "democratic" conditions, only far reaching reforms accompanied by major political realignments have hope of success. Wei (1992) constructs a case (with ex-ante uncertainty and majority voting) where a gradualist approach is more sustainable. Clearly, a more general model is needed in order to identify the conditions under which different sequencing strategies are optimal in a politico-economic sense.

Figure 3.1: The game of reform

Chapter 4

Reputation and Credit Terms in New Markets: An Example

4.1 Introduction

Liberalizing economic reform entails, almost by definition, the creation of new markets and the deregulation of already operating markets. One clear example are financial markets, which are typically heavily regulated and so are bounded to experience drastic changes in the regulatory environment as a result of liberalization. Imperfect information problems are likely to be pervasive after deregulation because economic agents have had little or no time to accumulate experience and observations about each other. The main point of this chapter is to show that at least some of the difficulties associated with liberalization are due to the pervasiveness of information problems such as adverse selection and moral hazard. At the same time, this chapter intends to show how the existence of mechanisms such as reputation building can allow free markets to overcome these difficulties as time goes on.

I have concentrated on a loan market to provide an example of that larger point. In many occasions the immediate consequences of financial liberalization have been extremely high interest rates, a number of business failures and even

financial collapse. Diaz-Alejandro (1985) contains a vivid account of the pitfalls of financial reform in Latin America in the late 1970s and early 1980s. In a less dramatic form, some of these difficulties have reemerged in more recent episodes. Policy mistakes in the early phases of liberalization have usually carried the blame as sources of trouble (Diaz Alejandro 1985, McKinnon 1991). This chapter intends to show that there is a sound microeconomic explanation for at least some of the difficulties associated with the opening of new loan markets. Imperfect information about the pool of borrowers (which is likely to be high in new credit markets), combined with the lack of effective monitoring technologies, are part of this explanation. These elements are indeed present in the current credit crunch in liberalizing Eastern European economies: "Most banks are not prepared to deal with private costumers, since they have dealing only with state enterprises all this time. The private business have no track records or experience, and the presentation of their product is usually primitive" (Raphael 1993).

The model presented here relates to Sobel (1985) and Diamond's (1989) work on reputation acquisition. Adverse selection problems are likely to be strong after a liberalization: Among borrowers (potential investors) which are observationally equivalent, there could be many which only have access to excessively risky projects ("bad" borrowers), so that they have a high probability of defaulting . High interest rates will be required to guarantee a competitive return to lenders. If borrowers are patient enough, those of them who have access to sound investment projects ("normal" borrowers) will avoid undertaking excessively risky projects in order to keep their access to the loan market in the future. If borrowers are not patient enough, credit limits (limits to the amount lent to each individual borrower) will serve to reduce the gains of choosing excessively risky projects in the present, in relation to the value of staying in the market, in which the amount lent is ex-

pected to increase and interest rates are expected to decline. Lower interest rates obtain as borrowers who default are recognized as the bad ones and excluded from future lending. While in Diamond's (1989) model normal borrowers select sound projects only after interest rates become low enough, here they do so from the opening of the market. The key difference is that I allow projects to be divisible, so that it is possible to realize investments of different sizes. Other difference is that, for simplicity, I use an infinite horizon and hence do not require the existence of a group of "honest" borrowers (always committed to choose sound projects) to sustain the equilibrium. Reputation here simply means the probability of a borrower not being a bad one.

A feature of the example is that, in equilibrium, the interest rate depends purely on adverse selection considerations (the probability of a borrower being bad), while credit limitations are a result of moral hazard (the need to provide incentives for the borrowers to repay). Credit limits are a substitute for patience: If the borrowers' discount rate approaches one, credit limitations become less restrictive. Impatience can result for instance, from political instability and the threat of closing financial markets. Under these conditions, credit limits are an optimum mechanism to counteract moral hazard. The one-period version of the model is similar to Stiglitz and Weiss (1981); however, in Stiglitz and Weiss lenders are scarce and credit rationing as discrimination among observationally equivalent borrowers emerges because lenders cannot raise the rate of interest without exacerbating adverse selection and moral hazard problems. Here borrowers are scarce, and there is no discrimination among them if they are observationally equivalent. The assumption that borrowers are scarce would be valid, for instance, in a small economy with private access to international capital markets which is a net receiver of capital.

As time goes on, the pool of borrowers gets rid of intrinsically bad borrowers, the number of defaulters decreases, and the interest rate goes down. Or, in the small economy interpretation, the risk premium paid by domestic firms over the international risk-free interest rate goes down. Since smaller rates of interest mean higher profits, this increases the benefits for the borrowing firms of keeping a reputation and, therefore, larger loans are made to individual firms. As in Sobel (1985), then, the stakes of cooperative behavior increase over time, and higher stakes (larger loans) are offered when lenders can be sure that the other party is interested in cooperation. Hence, this is an extension of Sobel's loan model to a market setting, in the sense that the interest rate is not exogenously given. The upward sloping tilt of the firm's profit over time provides a penalty for cheating, much as in the efficiency wage literature an upward tilt in the age-earning profile is useful to deter workers from cheating. (See Lazear 1981 and the introduction to Akerlof and Yellen 1986.) This relates to the more general point this chapter intends to illustrate: Similar mechanisms must be operating in different new markets in which agent specific information is important.

The picture that emerges from the model is one of a gradual improvement of credit conditions due to reputation building as the market's self- correcting mechanism. This spontaneous evolution, however, will be hindered if adverse selection is so severe that interest rates attractive to lenders are excessively high for normal borrowers.

Clearly, models of asymmetric information between borrowers and lenders, or, in general, between borrowers and sellers, give us only part of the story behind the difficulties associated with liberalization programs. A good deal of the difficulties can also be associated to imperfect credibility of the policymakers and also to plain policy mistakes along the reform path. But beginning to understand the

problems introduced by asymmetric information can help to design better policies for the transition period.

Sections 4.2 and 4.3 present with the model. Section 4.4 deals with possible extensions. Section 4.5 offers concluding remarks.

4.2 The model

There is an infinite sequence of dates indexed by $t = 0, 1, \ldots$. There are two different sets of players: lenders and borrowers (or firms). Borrowers are relatively scarce. (To be formal, there is a continuum of agents distributed over the interval [0,1] with Lebesgue measure λ. Let S be the set of $j \in [0, 1]$ that are borrowers, then $\int_S d\lambda(j) < 1/2 - \epsilon$ for some $\epsilon > 0$.) Lenders are born each period with an endowment of 1 unit of input and a constant returns to scale technology that yields r units of the consumption good at the end of the period. Lenders survive only one period.

Borrowers receive no endowment, but have access to investment projects each period. There are two types of projects: "safe" (or "good") and "risky" (or "bad"). Safe projects have a return of min $[Gy, G]$, where y is the amount invested and $G > r$. Risky projects obtain By with probability π and 0 with probability $1 - \pi$. It is assumed that $B > G$ but $\pi B < r$. Borrowers can operate only one project per period. There are two types of borrowers: "Normal" borrowers have their choice of project each period, while "bad" borrowers have access only to risky projects. Borrowers are infinitely-lived. All agents are risk-neutral and have a discount factor of $\beta \in (0, 1)$.

Firms must borrow from lenders to finance investment. Each borrower's type is private knowledge. In addition, the return on a project is private information. Lenders, however, can commit to use a liquidation technology that destroys the

output of a firm if she defaults. The contracts between borrowers and sellers are assumed to be debt contracts. (Townsend (1979) shows that debt contracts are optimal in single-period principal-agent environments with similar information asymmetries.) A contract will be a pair (R_t, L_t), specifying the amount to be borrowed by a firm or loan size at time t (L_t) and the amount to be repaid at the end of time t ($L_t R_t$). We will call R_t the interest rate at time t. At the beginning of each period, a borrower offers a debt contract to a lender. (Actually, who offers the contracts is immaterial. Since borrowers are on the short side of the market, they will appropriate all expected rents.) The lender will decide whether to take it or leave it. If he does not accept it, the borrower can offer the same contract to other lender. If the lender accepts it, he will proceed to lend L_t units of the input to the borrower. At the end of the period, borrowers will proceed to repay $L_t R_t$ units of output (keeping any remaining return from the investment project chosen by them); those who don't will be subject to the liquidation technology in which case borrowers and lenders involved end up with 0 units of output. Lenders will make use of their storing technology to obtain r units of output from whatever units of input have not being lent.

The population of borrowers have a fraction p_0 of the normal type. (Or, being N the set of $j \in [0,1]$ that are normal borrowers, $\int_N d\lambda(j) = p_0 \int_S d\lambda(j)$.) Each borrower's history of defaults becomes common knowledge. This information allows lenders to update their beliefs about each borrower's type.

Some remarks about the assumptions are in order. Linear returns to investment in both types of projects have been assumed for simplicity and could clearly be dropped in favor of a more general form. McKinnon's (1973) insistence on the importance of increasing returns at the level of individual firms in developing countries could be easily accommodated.

In the model it is assumed that, when behaving honestly, firms only undertake projects that entail no risk. Thus, the only function of financial markets in the model is to channel resources from the agents who wish to save to the agents with productive opportunities. In the real world, of course, main functions of financial markets are risk sharing and risk spreading. Hence, it is interesting to ask what happens if a richer menu of investment projects is allowed; in particular, what happens when the project with the highest mean return involves some risk. This extension will be considered in more detail later.

Finally, the assumption that borrowers are long-lived but lenders live only one period is intended to focus the attention on borrowers' reputation as the only link between the present and the future. Really what the assumption does is to point at the impossibility of signing multi-period contracts between borrowers and lenders due to the lack of a commitment technology beyond the simple liquidation technology mentioned earlier. The role of reputation is also magnified by the absence of possibilities of collaterizing the loans in the economy described by the model. More secure property rights allowing for collaterization and a safer legal environment allowing for more complex contracts are likely to reduce the importance of the reputation mechanism. Other kinds of "collateral" such as family links are going to be important in the meantime.

4.3 Competitive equilibrium

Since they are in the short side of the market, borrowers will offer contracts that maximize their (expected) utility subject to the restriction that the contract terms are acceptable for lenders.[1] Since they are risk neutral, lenders born at time t will

[1]Besides the equilibrium we are about to describe, there are other sequential equilibria for the model. If lenders expect normal borrowers to offer contracts that are suboptimal for them, borrowers will have to validate these expectations in order to avoid being identified as bad borrowers. These (unreasonable) equilibria are disposed of by the intuitive criterion of Cho and

accept any contract terms such that:

$$r \geq R_t[p_t(1 - d_t^N) + (1 - p_t)(1 - d_t^B)]. \tag{4.1}$$

The RHS represent the expected payoff of lending one unit of input; the term in brackets is the probability that the loan will be repaid. The terms d_t^N and d_t^B represent the probabilities with which normal and bad borrowers, respectively, will default, and p_t is the probability of a borrower being normal. Bad borrowers can only undertake risky projects; hence, for any $R_t \in (0, B]$, they will default with probability $1 - \pi$. Since the maximum interest rate they could credibly offer is B and πB is smaller than r, bad borrowers will not want to be identified as such and hence in equilibrium they will offer the same contract terms that normal borrowers offer.

Normal borrowers cannot credibly offer to repay any R_t larger than G. If normal borrowers undertake risky projects, $d_t^N = 1 - \pi$, and the RHS of equation (4.1) becomes smaller than r (because $\pi G < \pi B < r$), so the market cannot open. Hence, in equilibrium, normal borrowers must be at least indifferent between choosing safe projects or choosing risky ones. If normal borrowers choose safe projects, $d_t^N = 0$, and anybody defaulting will be identified as a bad borrower and excluded from credit thereafter. Thus, the condition for choosing safe projects, in terms of the value function, is:

$$V(p_t) = L_t(G - R_t) + \beta V(p_{t+1}) \geq \pi(L_t(B - R_t) + \beta V(p_{t+1})). \tag{4.2}$$

An equilibrium consists of loan sizes $L_t = L(p_t)$ and interest rates $R_t = R(p_t)$ such that $V(p_t)$ is maximized under the constrains (4.1) and (4.2) for $d_t^B = 1 - \pi$ and $d_t^N = 0$, and reputation p_t (the state variable) is updated by Bayes' Rule. The program just described maximizes the utility of normal borrowers ($\sum_{t=0}^{\infty} L_t(G - R_t)$)

Kreps (1987) or the strong communication proof criterion of Riley (Hirshleifer and Riley 1992).

under the constraints, according to Bellman's Principle of Optimality. (Bellman's Principle of Optimality applies because $L_t(G - R_t)$ is bounded and $\beta \in (0, 1)$.)

The following propositions use equations 4.1 and 4.2 to characterize the equilibrium. If the market opens, equilibrium interest rates will be initially high but declining. Credit limits will loosen over time, and will no longer be binding after the interest rate becomes lower than some threshold value $\tilde{R}$. (That is, $L_t < 1$ for $R_t > \tilde{R}$ and $L_t = 1$ for $R_t \leq \tilde{R}$.) As time goes by, the number of defaults will decline, and the interest rate will approach asymptotically from above the default-free competitive rate r. Firms will undertake larger projects as time goes on. In we interpret the model as a small, open, liberalizing economy, then what the model predicts is that new firms in need of building a reputation to gain access to loan markets will be initially severely finance constrained and will face active interest rates with severely high risk premia. Both problems will lose importance as time goes on if required interest rates for the lenders to lend are not impossible to repay for borrowers. Of course, if we have different firms which are not observationally equivalent, they will face different credit conditions, and it would be entirely possible that credit for some groups of firms which are potentially viable as good creditors will remain closed as credit for other groups of firms improves over time.

Proposition 4.1 *In equilibrium, lenders will only accept contracts from borrowers who have never defaulted. Normal borrowers will always undertake safe projects. Equilibrium interest rate will be given by:*

$$R_t = \frac{r}{p_t + \pi(1 - p_t)}. \tag{4.3}$$

If the market opens at period t $(L_t > 0)$ *then:*

$$p_{t+1} = \frac{p_t}{p_t + \pi(1 - p_t)}. \tag{4.4}$$

Proof: The behavior of agents follows from the previous discussion. It is clear that R_t as given above is the minimum interest rate compatible with equation (4.1), and a lower interest rate increases more the RHS than the LHS of the inequality in (4.2). Equation (4.4) is obvious given the equilibrium strategies.

There is a one-to-one relationship between p_t and R_t. Hence, we can take R_t as the state variable. Notice also that R_t is strictly declining and approaches r from above as long as the market remains open. From (4.3) and (4.4), it is clear that, given R_t, the entire sequence $\{R_{t+i}\}_{i=1}^{\infty}$ obtains. It is useful to define $\tilde{R}$ as the solution to:

$$\tilde{R} = \frac{G - \pi B}{1 - \pi} + \frac{\beta}{1 - \beta} G - \sum_{i=1}^{\infty} \beta^i (R_{t+i} \mid R_t = \tilde{R}). \tag{4.5}$$

This will be, as shown below, the maximum interest rate at which normal borrowers will have an incentive to undertake safe projects even if they receive the loans of size 1. Notice that, given $\tilde{R} < G$, $R_t \leq \tilde{R}$ implies $R_{t+i} < G$. Differentiating (4.5) completely,

$$\frac{\partial \tilde{R}}{\partial \beta} = \frac{\dfrac{\partial}{\partial \beta} \left\{ \dfrac{\beta}{1 - \beta} G - \displaystyle\sum_{i=1}^{\infty} \beta^i (R_{t+i} \mid R_t = \tilde{R}) \right\}}{1 + \dfrac{\partial}{\partial \tilde{R}} \left\{ \displaystyle\sum_{i=1}^{\infty} \beta^i (R_{t+i} \mid R_t = \tilde{R}) \right\}} > 0.$$

That is, if borrowers are more patient, they will be willing to undertake sound projects at a higher interest rate.

Proposition 4.2 *Equilibrium loan sizes are given by:*

$$L_t = \begin{cases} 0 & if\ R_t > G\ or\ \tilde{R} < r \\ \dfrac{\beta V(R_{t+1})}{R_t - \frac{G - \pi B}{1 - \pi}} & if\ G \geq R_t > \tilde{R} > r \\ 1 & otherwise. \end{cases} \tag{4.6}$$

Where $V(R_t)$, the value function for the normal borrower, is given by:

$$V(R_t) = \begin{cases} 0 & if\ R_t > G\ or\ \tilde{R} \leq r \\ \left[G - \dfrac{G-\pi B}{1-\pi}\right] R_t - \dfrac{G-\pi B}{1-\pi}\ \beta V(R_{t+1}) & if\ G \geq R_t > \tilde{R} > r \\ \dfrac{1}{1-\beta} G - \sum_{i=0}^{\infty} \beta^i R_{t+i} & otherwise. \end{cases} \tag{4.7}$$

Proof: If the interest rate is higher than G, no lending should occur because normal borrowers undertaking safe projects will not be able to repay. Then, $L_t = 0$. But then, since there is no updating of beliefs, $L_{t+i} = 1$, $i = 0, 1, \ldots$ and $V_t = 0$. This gives a (partial) explanation of the first line of equations (4.6) and (4.7).

From the equality in equation (4.2), the maximum possible value for $V(R_t)$ obtains by setting $L_{t+i} = 1$ for $i = 0, 1, \ldots$:

$$\bar{V}(R_t) = \frac{1}{1-\beta} G - \sum_{i=0}^{\infty} \beta^i R_{t+i}.$$

If the interest rate is smaller than $\tilde{R}$, the inequality in equation (4.2) will be satisfied for $V(R_{t+i}) = \bar{V}(R_{t+i})$ for $i = 0, 1, \ldots$. Then, as long as it is profitable for lenders to lend ($G \geq R_t$), $V(R_t) = \bar{V}(R_t)$ and $L_t = 1$. This gives us the third line of equations (4.6) and (4.7).

Otherwise, the borrowers will ask for the largest loan compatible with equation (4.2). From the inequality in equation (4.2), this loan is: $\beta V(R_{t+1})/(R_t - \frac{G-\pi B}{1-\pi})$. This gives us the second line of equation (4.6). The second line of equation (4.7) follows from substituting this value for L_t in the equality in (4.2).

It remains to be argued that, if $\tilde{R} \leq r$, then the market will not open. It is easier to proceed by contradiction. Suppose the market opens and $\tilde{R} \leq r$. Then, R_t will get arbitrarily close to r without ever reaching $\tilde{R}$. This means that the market will always be constrained, even if adverse selection vanish. Borrowers will

choose safe projects each period only because they expect an ever increasing loan (as in a bubble). But since L_t is bounded by one, this is impossible.

Finally, the next result is also useful:

Proposition 4.3 *If the market opens,*

i) V_{t+1} *is a strictly decreasing function of* R_t*, and*

ii) L_t *is a strictly decreasing function of* R_t *as long as* $R_t > \tilde{R}$*.*

Proof: (i) follows from equation (4.7) and Proposition 4.1. Now, from $R_t > \tilde{R}$ and (4.6),

$$L_t = \frac{\beta V_{t+1}}{R_t - \dfrac{G - \pi B}{1 - \pi}}.$$

This expression is strictly increasing in V_{t+1} and strictly decreasing in R_t. From (i), it follows that L_t must be strictly decreasing in R_t.

It is convenient to summarize the results:

- The market will not open if there is too much adverse selection ($G < R_t$), or if borrowers are so impatient that they would only chose safe projects at a rate of interest below the competitive rate ($\tilde{R} < r$).

- If the market opens, interest rates will be initially high, due to adverse selection (a large expected proportion of defaults). As bad borrowers incur in default, they are identified as such, and the remaining pool of borrowers confronts declining interest rates.

- If normal borrowers are not patient enough to undertake safe projects when offered full-size loans, because interest rates are high for the time being ($R_t > \tilde{R}_t$), borrowing limits ($L_t < 1$) will serve as a way to reduce the gains of defaulting. Borrowing limits will be relaxed over time until they are no longer binding ($L_t = 1$).

- More patient borrowers (higher β) will confront less restrictive borrowing limitations (higher L_t) and a sooner end to these limitations (lower $\tilde{R}$).

4.4 Discussion

Proposition 4.1 has a strong (and unrealistic) implication: Once R_t is known, the entire sequence $\{R_{t+i}\}_{i=0}^{\infty}$ is known. This follows from the assumption that agents know very precisely the riskiness of bad borrowers and the fraction of the borrowers' population constituted by bad borrowers. It is more reasonable to allow agents to observe π_t very imperfectly, if at all, and to have imprecise prior beliefs about the initial contingent of bad borrowers. If agents expect to learn about aggregate variables in the future, the interest rate will no longer follow a deterministic process. In fact, with some modifications, Propositions 4.2 and 4.3 can go through if R follows a supermartingale process, i.e. a stochastic process satisfying $E_t(R_{t+1} \mid \Im_t) < R_t$, where $\Im_t$ is the information set about aggregate conditions at time t. (In equations (4.5) to (4.7), it is necessary to introduce the expectation operator before $V(R_{t+1})$ and $\sum_{i=0}^{\infty} \beta^i R_{t+i}$, and condition the expectation on the information set $\Im_t$. $\tilde{R}$ may no longer be a constant.)

An interesting question to ask is what happens if a richer menu of investment projects is allowed. In particular, if the project with the highest mean return involves some risk, it is possible that in equilibrium normal borrowers default. In this case, it seems likely to have an equilibrium with excusable default. In such an equilibrium, the probability of each firm being a normal borrower (its credit rating) will be updated according to its past record of defaults; in turn, credit ratings will affect the interest rates that different borrowers can offer to lenders. (Eaton (1990) offers a similar result in two-period model of international debt.) Too low a credit rating will lead to a permanent exclusion from the credit market.

The difference with the previous section is that a normal borrower could end up being excluded from credit with positive probability.

Introducing different types of borrowers may open interesting possibilities. (For instance, an agent could enter the market as a borrower only with the intention of building a good reputation.) As mentioned earlier, "honest" borrowers (firms who always choose safe projects) could also be introduced; this would reduce interest rates and would increase loan sizes in equilibrium. In a finite horizon version of the model, a positive fraction of honest borrowers would be required to sustain any lending, as in Diamond's (1989) work, itself based on Kreps-Wilson's (1982) analysis of the reputation paradox.

The approach followed thus far has been to try to describe the equilibrium path very precisely. As different borrowers' types are allowed, and the menu of projects increases, the calculation of the equilibrium (or the equilibrium set) becomes more complex. In more complex situations, the Fudenberg-Levine (1989, 1992) approach becomes useful because it allows to calculate bounds of the long run player's payoff (the borrower's payoff) that hold uniformly over all the Nash equilibria of the game.

4.5 Concluding remarks

To represent some of the difficulties surrounding the process of opening credit markets, this paper develops a simple model in which trust between lenders and borrowers is slow to develop, and the stakes offered in each round of transactions rise accordingly over time. In a process of transition to a market economy, there may well be many other markets and institutions whose working is to some extent impaired by the need of acquiring more information about potential partners. The accumulation of information capital is likely to be costly. (In the example pre-

sented, it requires to accept a large number of defaults when the market opens.) To some extent, these costs can be part of the explanation of tendencies leading towards output decline following large-scale economic reform. Atkinson and Kehoe (1993) have built a model in which initial output decline results from the accumulation of other form of information capital, namely, information about new technologies of production.

Clearly, models of asymmetric information between borrowers and sellers give us only part of the story behind the difficulties associated with financial liberalization. They can help to explain high interest rates, widespread initial defaults, and scarcity of working capital; but they can hardly explain other factors conducting to crises in recently liberalized markets, like the liberality with which banks lent to some economic groups in Latin American experiences in the 1970's or the extent of inter-enterprise credit in Eastern Europe. Implicit government insurance seems a salient explanation for the latter. This leads us back to the other part of the story: Explicit or tacit government interventions. As Calvo and Frenkel (1991) remind us, politicians involved in liberalization processes have short track records, too. Government's credibility problems are likely to enhance the difficulties of new credit markets, since political instability introduces more risk and lowers the agents' regard for the future. An understanding of the forces that govern policy making is necessary to understand each episode; focusing exclusively on the difficulties created by the credit market itself is a first step. A similar observation may extend to problems arising in other markets.

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