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Learning and Economic   
Policy Choices:   
a Bayesian approach

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Learning and Economic Policy Choices: a Bayesian approach

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## ABSTRACT

In this paper, I explore whether governments have embarked in market-oriented reforms as a result of learning. I assume that governments are rational learners, that is, that they update their initial beliefs about the effectiveness of alternative policies with all available experience in the past and elsewhere. I also assume that governments choose policies on the basis of their updated beliefs. This model of learning is applied to four policy choices: the decision to grant independence to central banks, the decision to liberalize trade, the decision to privatize and the decision to enter into agreements with the IMF. I further explore whether convergence toward neo-liberal economic policies resulted from external imposition or simple emulation. I find that learning, in isolation or in combination with the other mechanisms, explains the decision to liberalize trade, to privatize and to enter into agreements with the IMF. However, none of the mechanisms of convergence explains why governments granted independence to central banks.

## 1. INTRODUCTION<sup>1</sup>

In much of the developing world, the 1980s and 1990s were decades of radical economic change. Whereas in the 1960s and 1970s the prevailing model of development was based on state intervention and inward-looking policies, the 1980s and 1990s were years characterized by the advocacy of market-oriented reforms. These reforms, packaged under the so-called Washington Consensus, aimed at opening up the national economies and at reducing the role of the state in the economy.<sup>2</sup> The extent of the consensus became so broad that some described the new state of the debate on development as one of “universal convergence”<sup>3</sup> (Williamson, 1990, 1994; Biersteker, 1993; Rodrik, 1996: 9).

A widespread argument to explain the recent wave of economic reforms is that governments learned from the contrasting experiences under alternative models of development. This learning would have entailed a change in the mapping from policies to economic outcomes, and a change in beliefs about the consequences of actions and the optimal strategies in a changing economic environment (Kahler, 1990, 1992; Haggard and Kauffman, 1992; Hall, 1993; Biersteker, 1993; Tommasi and Velasco, 1995; Haggard and Webb, 1994; Maravall, 1997; Krueger, 1997).

Yet, the learning hypothesis remains untested. Hence, the question: did governments switch to market-oriented policies as a result of learning?

The story of the “universal convergence” could be told along the following lines:

The model of inward-oriented industrialization, epitomized by the experience of many Latin American countries in the 1960s and 1970s, resulted

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<sup>2</sup> The Washington Consensus comprises ten policy prescriptions: fiscal discipline, adjustment of public expenditure priorities, tax reform, financial liberalization, exchange rate adjustment, trade liberalization, promotion of foreign direct investment, privatization, deregulation and support of property rights (Williamson, 1990, 1994). For stylistic reasons, I refer to these measures as “market reforms” and “neo-liberal programs”.

<sup>3</sup> John Williamson acknowledges the existence of broad areas of disagreement in the Washington Consensus. See Williamson (1993) for a discussion. Also, note that this global trend toward market-oriented policies has not precluded the existence of differences in the timing of reforms, in their speed and intensity as well as in their fate.

in a resounding failure. The bias against exports caused enormous balance of payments crises. Devaluations, inflation and fiscal indiscipline became common. Governments borrowed massively from abroad to close the external and fiscal gaps. At the beginning of the 1980s, Mexico's debt moratorium alarmed foreign creditors, who cut off lending. Without credit to finance the pervasive fiscal deficits, governments resorted to the printing press, which eventually resulted in hyperinflation and economic stagnation. Moreover, proliferation of controls and protection of industries and sectors were an invitation to evasion, rent-seeking and corruption (Tommasi and Velasco, 1995: 1-3; Krueger, 1993, Krueger, 1995).

In clear contrast, Chile and the East Asian tigers (Korea, Singapore, Hong Kong and Taiwan) achieved phenomenal rates of growth by relying on market mechanisms and a greater integration into the world economy. The hallmark of this strategy was an export promotion policy, taken to be the quintessential illustration of the virtues of a small state. At the end of the 1980s, the collapse of communist rule in Eastern Europe provided the final blow to the idea that state intervention was a requisite for development. By mid 1980s, also these countries became intrigued by market-oriented reforms.

These changes in the South and the East took place amidst a neo-liberal revolution in the North. At the beginning of the 1980s, Conservatives in Great Britain and Republicans in the U. S. launched a campaign against "big government". The neo-liberal revolution put an end to the Keynesian Consensus, which dominated public affairs since World War II.

Thus, governments would have observed those contrasting experiences and changed their beliefs about the economic consequences of alternative models. Even shortsighted politicians could not have avoided the conclusion that the old policies had failed and that the new orthodoxy had produced economic success (Kahler, 1990: 33). To give just one example, Moisés Naím, former Venezuelan Minister of Finance, explains how Carlos A. Pérez's vision was influenced by the governing experiences of two of his closest personal and political friends (1994: 46)

"...the catastrophic failure of President Alán García in Peru and the successful reforms of Felipe González in Spain. Pérez was able to follow the policies and performance of these two governments very closely and his privileged vantage point allowed him to judge the consequences of the two radically different approaches"

Bad experiences discredited a particular course of action and successful experiences gave credit to an alternative one. How those contrasting experiences were interpreted was crucial: the diagnostic of the cases of success (less state intervention and outward-oriented policies) was exactly the opposite of the

diagnostic of the cases of failure (too much state involvement and inward-oriented development). Lessons were drawn somewhat selectively on the basis of geographic propinquity or linguistic and cultural similarities (Robinson, 1995; Hacking, 1997; Ramamurti, 1999). As a result of this learning process, switches to market-oriented policies occurred.

In order to test this story, one needs an operational concept of learning. Although the discussion about learning has been prolific, it has focused more on definitional questions than on empirical issues or theory building (Hecló, 1974; Odell, 1984; Sabatier, 1987; March y Olsen, 1989; Rose, 1991; Bennett and Howlet, 1992; May, 1992; Hall, 1993; Pearson, 1993; Levy, 1994; Adler y Haas, 1997; Stone, 1999).

To fill the gap on empirics, I assume that governments act as rational (Bayesian) learners: governments update their initial beliefs about the expected results of alternative policies with all available information about policy outcomes in the past and elsewhere. After updating their beliefs, governments choose the policy that is expected to yield the best growth results. Hence, the model I test is one in which politicians first learn in the light of experience and then make rational choices on the basis of what they learned. Having been exposed to the same information, governments will converge in their beliefs, hence, in their choices. This is a model in which governments' preferences for market-reforms are endogenous and dynamic. It is the experience under alternative policies what determines the evolution of preferences overtime.

The paper proceeds as follows. In section 2, I make a case for an explanation of policy choices based on learning. In section 3, I present the Bayesian model of learning and the choice problem. In section 4, this model is tested on a set of developed and non-developed countries over the period 1950 through 1990 and for four market-oriented policies – Central Bank Independence (CBI), privatization, trade liberalization and agreements with the International Monetary Fund (IMF). In section 5, I present an extended model of learning that includes imitation and coercion as two alternative mechanisms of policy convergence. Finally, I conclude in section 6 with a reassessment of the lessons about learning provided by this study.

## 2. ABOUT POLICY CHOICES

The studies about why governments engage in market-oriented policies are innumerable.<sup>4</sup> In general, calls for these policies have been based on some

<sup>4</sup> See Nelson (1990), Grindle and Thomas (1991), Przeworski (1991), Haggard and Kaufman (1992), Bates and Krueger (1993), Krueger (1993), Harberger (1993), Taylor (1993), Harrison (1993), Haggard and Webb (1994), Smith et. al. (1994), Nelson (1994), Williamson (1994),

elaborated economic idea supported by the experience of daunting state failures in economic management and some exemplar performance attributed to the working of the market. Economic considerations usually fall short to provide a good explanation as to why governments adopt policies that typically entail costs, at least in the short run, and strong popular opposition. Moreover, it has frequently been the case that market-oriented policies have failed to provide the expected economic benefits or have yielded them only after long lags. This makes adoption even more puzzling. Thus, given that economics alone cannot explain this decision, models incorporate political as well as economic factors to explain why governments have adopted these policies.

However, extant models face a challenge: they normally focus on *domestic* political and economic conditions as determinants of reforms, thereby explaining why some countries embarked in these policies while others did not and why some governments succeeded in carrying them through while others failed. Thus, these models are better suited to explain divergent choices and outcomes.

Think about Central Bank Independence. CBI had a theoretical justification, namely, that if the public is rational, governments' attempt to stimulate the economy by introducing inflation by surprise, will only create higher inflation with no output benefits. This is because the public anticipates the government's incentive to cheat in its inflation announcements.<sup>5</sup> Moreover, in many developing countries, governments have resorted to the printing press whenever wanted and needed with inflationary consequences. Hence, the recommendation followed suit: in order to keep inflation under control, governments were encouraged to "tie their hands" by delegating the control of monetary policy. The good inflation performance in countries with a long history of strong anti-inflation preferences, notably Germany, did the rest. Yet, we now know that CBI keeps inflation under control only in developed countries<sup>6</sup> and has no proved effects on growth (Eijffinger and de Haan, 1995, 2000). True, governments could have granted independence to their central banks following political rationales such as to prevent a contending party from engaging in an unwanted monetary policy, to avoid bearing the political costs of an unpopular monetary policy and other stories of that sort.<sup>7</sup> But the stories that place the locus of the decision on domestic politics only cannot account for the

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Tommasi and Velasco (1995), Rodrik (1996), Maravall (1997), Weyland (1996, 1998), Sturzenegger and Tommasi (1998) and Drazen (2000) among others.

<sup>5</sup> This is the so-called time inconsistency of monetary policy.

<sup>6</sup> The positive effects of CBI on inflation in less developed countries are contingent on the indicator of CBI used.

<sup>7</sup> See Maxfield (1997) for an excellent review of the literature on the determinants of CBI.

wave of statutory changes to grant CBI observed in the early 1990s (Maxfield, 1997; Maxfield and Pastor, 1999).

Something similar applies to privatization, a policy that according to many analysts, has "swept the world". In this case, the theoretical rationale for privatization is based on principal-agent theory. Ill-defined property rights weaken mechanisms of control of the agent (officials) by the principal (the public). This opens the door for shirking and for the pursuing of private ends, which generally do not coincide with those of the public. Private ownership, it is argued, guarantees that there is a residual claimant to profits and, hence, an incentive to maximize them. Yet, we now know that obtaining the benefits of privatization usually entails more, not less, government regulation (Pitelis and Clarke, 1994; Rowthorn and Chang, 1994; Parker, 1998; Ramamurti, 1999; Hodge, 2000). It is also known that privatization itself has too frequently been a fertile ground for the corruptive practices it was supposed to combat<sup>8</sup>. There is a more urgent, pragmatic economic rationale for privatization: it provides fast cash for governments seeking to reduce large budget deficits, cut taxes and finance public spending. In addressing these needs, efficient state-owned enterprises (SOEs) have frequently been liquidated along with inefficient ones. Thus, efficiency and pragmatic motives to divest are only part of the story. Other part has to do with ideological considerations and with political opportunity. Ideology is reflected in deliberate attempts at shifting the boundary between the public and the private sphere in favor of the latter. Conservatives in Britain, the French right and Augusto Pinochet in Chile epitomized those attempts. Political opportunity refers to the existence of a popular demand for privatization or, at least, not a strong resistance to it. Hence, one can tell a story of privatization around the world as resulting from a blend of pragmatism, ideology and political opportunity. Such accounts can well address differences in intensity of the privatization process (Vickers and Wright, 1989; Suleyman and Waterbury, 1990; Baer and Birch, 1994; Lieberman, 1994; World Bank, 1995; OECD, 1996; Parker, 1998; Manzetti, 1999; Ghosh, 2000; Birch and Haar, 2000). However, the variation in motives these stories entail are too important to explain an otherwise "sweeping" trend.

Equally sweeping has been the thrust to open up the national economies, that is, to eliminate quantitative restrictions, reduce tariffs, adopt unified and realistic exchange rates, remove the permanent protection to infant industries

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<sup>8</sup> For example, Jan Olszewski, one of the many Polish Prime Minister stated before the Sejm that "we've learned that the invisible hand of the market is the hand of the swindler, garnering funds from the public trust". In India, the privatization of telecommunications was thwarted by corruption. And in Mexico, the privatization of the banking system allowed drug traffickers to buy bank stocks and seek election to bank boards (Celarier, 1997: 533, 537; Kauffman and Siegelbaum, 1996)

and actively promote exports. Countries have been strongly encouraged to adopt an export-oriented model of development (EO) on two grounds: state failures are worse than market failures and export orientation yield better performance than import substitution (IS). The first lesson was extracted from the collapse of IS in Latin America. The second lesson found its living example in the performance of the East Asian tigers and, in the late 1980s, Chile. Hence, in order to grow at East Asian rates, all that was needed was to adopt those same policies. This was taken to be equivalent to a withdrawal of the state in favor of the market. Yet, a second look at the East Asian reveals that this experience was largely misinterpreted and considerably oversimplified: the East Asian miracle was only possible because states engaged in a policy of selective intervention and infant industry promotion (Haggard, 1990; Wade, 1990; Westphal, 1990; Rodrik, 1996). Also, the constellation of conditions under which East Asian governments adopted EO (cheap and educated labor, a disciplined and cohesive bureaucracy, availability of U.S. aid, particular colonial legacies, autonomous decision-making processes, state command of particular policy instruments, so on and so forth) makes untenable the claim that these policies can be copied *in toto* with the same results<sup>9</sup> (Haggard, 1990). Moreover, since “all countries cannot simultaneously have a positive balance of payments” (Przeworski, 1992: 55), some countries have to lose as a consequence of trade liberalization. As a matter of fact, one observes that growth under EO exhibited an enormous variation within and among regions.<sup>10</sup> Thus, the adoption of this policy in a wave-like fashion in the 1980s and 1990s is, again, puzzling.

Central bank independence, privatization and trade liberalization fall into the category of structural policies. These are policies aimed at revamping the institutional framework of the economy. They take time to implement and their effects on growth are expected sometime in the future. In contrast, IMF agreements stress short-run stabilization<sup>11</sup> to address balance of payments and foreign reserve crisis. But stabilization is not a goal in itself. Eventually, these austerity programs are viewed as a precondition for growth (Michel Camdessus, quoted in Przeworski and Vreeland, 2000: 385). Yet, IMF agreements do not promote growth (Vreeland, 2000; Przeworski and Vreeland, 2000). Moreover, closer scrutiny reveals that governments may turn to the Fund for a host of reasons not strictly related to the state of their external accounts. They may need money, they may want the conditions attached to the loans and need a scapegoat

<sup>9</sup> However, what we do not know is whether countries like Brazil and Mexico could have improved their impressive performance during the 1960s had they followed an EO strategy.

<sup>10</sup> Performance under alternative trade regimes has also been the object of a voluminous research. Summaries can be found in Edwards (1989) and Levine and Renelt (1991a and 1991b). A critical contribution is Harrison and Revenga, 1995. On Latin America and Africa, see Nogues and Gulati, 1994 and Shafaeddin, 1995 respectively.

<sup>11</sup> Tight fiscal and monetary policies and currency devaluation.

to get around political responsibility or they may want both the money and the conditions. One wonders why governments may want to have conditions imposed on them that actually do not benefit their economies. Living up to policies generally regarded as good may be just one explanation (see below).

Overall, it should be clear from the discussion above that explanations based on local economic and political conditions are not well equipped to explain why the adoption of neo-liberal economic policies occurred *en masse*. As Barbara Stallings suggests (1992: 43), international variables seem to be better equipped to explain why the thrust of economic policy, especially in the developing world, has been so different in the 1980s and 1990s than in the 1970s. Consequently, attention has recently shifted to the role that several mechanisms of diffusion may have played in the adoption of these policies. What these works reveal is that factors of diffusion clearly outstrip domestic factors when it comes to explaining policies (Garrett and Brune, 2000; Simmons and Elkins, 2000).

One of these mechanisms is learning from others. Discussing development strategies, Bhagwati (1985: 41) states that “many developing countries learned the hard way by following IS policies too long and seeing the fortunate few pursuing the [export oriented] strategy do much better. Perhaps learning from others doing and one’s undoing is the most common form of education”. In his account of privatization, Manzetti contends that, in Argentina, “[t]he positive results evidenced by privatization policies in a number of European countries, Mexico and neighboring Chile may also have had some impact on Menem’s pragmatic considerations”. And he adds that “although the Argentine and Peruvian presidents were far from being true believers [in privatization], they turned out to be quick learners” (1999: 229). In the same vein, Tommasi and Velasco argue (1995: 17-18) that “crisis (...) contribute to Bayesian learning about the “right” model of the world. A period of intense economic disarray leads to a reassessment of the mapping from policies to outcomes, in particular, to a realization of how costly some previous policies were”. Eventually, Stiglitz holds (1999), we are all Bayesians.

The next sections provide a test of this contention:

### 3. RATIONAL LEARNING AND RATIONAL CHOICE<sup>12</sup>

While the theoretical discussion about learning has been prolific, the empirical treatment of the learning hypothesis seems to be confined to an always “to be tackled” research agenda. Given that learning is an elusive concept, this is not surprising.

The first step to test the learning hypothesis is to come up with an operational definition of learning. The second step is to relate learning with the choices actually observed and analyze whether learning has any impact on policy choices.

I assume that politicians are Bayesian learners: policy is chosen under uncertainty. Governments do not know what performance will follow the application of alternative policies. However, they have some prior beliefs about outcomes based on historical experience and/or their ideas. Governments observe own past experience with policies and the experience of others. In the light of new information, politicians update their beliefs. The combination of prior beliefs and available information produces posterior beliefs. Governments choose policy on the basis of these posteriors, which become priors in the next period. New information is gathered, new posteriors are obtained and a new choice is made. The updating process proceeds sequentially.

Bayesian learning is an intuitive and appealing mechanism, but it is mathematically involved. In the presentation that follows, I focus on concepts leaving the more technical details for the Appendix A.I. However, some notational complexity is unavoidable.

Suppose that governments want to learn about the rate of growth that would follow the application of two alternative policies, A and B. Governments are uncertain about what outcomes will result from each policy. But they have some prior beliefs about expected results. There may be, of course, other outcomes of policies politicians would want to learn about, for instance, the rate of unemployment or inflation. The model extends easily to those cases. Yet, the crucial test of market-oriented reforms is whether they succeed in resuming growth (Bresser et. al., 1993).

<sup>12</sup> This section is based on Berger (1985), Leamer (1991), Gelman et. al. (1995) and West and Harrison (1997), Lee (1997). On Bayesian decision theory, see De Groot (1970), Winkler (1972), Raiffa (1972), Coyle (1972), Gardenfors and Sahlin (1997) and Pericchi (n. d.). Interesting applications to Political Science and Sociology are Western and Jackman (1994), Gerber and Green (1998), Western (1998) and Breen (2000).

The distinctive feature of Bayesian statistics is the operationalization of prior beliefs in a probability distribution.<sup>13</sup> Prior beliefs are especially relevant when decisions are made about “unique” events, that is, events whose repetition under the same circumstances is unfeasible. This is the case in most political phenomena.

I assume that governments can express their initial uncertainty about the expected results of alternative policies,  $j = \{A, B\}$ , by means of a probability distribution. Growth,  $X$ , is assumed to be a random variable, normally distributed, with an unknown mean,  $M$ , and an unknown variance,  $V$ . Governments learn about these two unknown parameters, which are random variables themselves. It is realistic and conceptually interesting to assume that governments learn from average growth results and from the variability of results. Politicians can infer the impact of a certain policy on the outcomes by looking at the variance. A high variability of results may be interpreted as outcomes driven by underlying conditions and not by policy. Hence, the variability of results is taken here as a proxy of the responsibility of a particular policy for observed outcomes.

In their prior specification, the conditional distribution of the mean is normally distributed. The marginal distribution of the variance follows an *Inverse- $\chi^2$*  distribution. In this conjugate prior<sup>14</sup> *Normal/Inv- $\chi^2$* , the distributions of the mean and the variance are interdependent, being  $\tau_j$  the parameter that accounts for that interdependence. Thus, for  $j = \{A, B\}$

$$X_j \sim N(M_j, V_j) \quad (1)$$

$$M_j | V_j \sim N(\mu_j, \sigma_j^2 / \tau_j)$$

$$V_j \sim Inv - \chi^2(v_j, \sigma_j^2)$$

At time  $t$ , governments observe the performance of policies A and B. Suppose that  $n_A$  countries followed policy A and that  $n_B$  countries followed policy B. Hence, the following information becomes available at time  $t$ .

<sup>13</sup> This is a major point of departure from classical statistics, which is based on a frequentist approach to probability.

<sup>14</sup> Conjugacy entails selecting prior distributions such that the posterior distribution belongs to the same class of prior distributions. Natural conjugate priors arise by taking the class of prior distributions to be the set of all densities having the same functional form as the likelihood (Gelman et. al., 1995: 37)

$$X_j^i = x_{i,1}^A, x_{i,2}^A, \dots, x_{i,nA}^A, x_{i,1}^B, x_{i,2}^B, \dots, x_{i,nB}^B; j = \{A, B\} \quad (2)$$

These new data are drawn from normal distributions as in (1). Also, it is assumed that these observations are independent and identically distributed (i.i.d.).<sup>15</sup> The sample means,  $\bar{x}_j$ , and the sample sum of squares,  $S_j$ , are sufficient statistics to summarize available data.

New information combined with prior beliefs yield posterior beliefs, that is, updated beliefs embodying evidence. The useful feature of Bayesian statistics is that it offers a mechanism of rational learning based on Bayes's theorem. The expression below states that beliefs conditional on data – posterior beliefs – are proportional to prior beliefs times the likelihood.

$$p(\theta_j | X_j) \propto p(\theta_j) p(X_j | \theta_j); \theta_j = M_j, V_j; j = \{A, B\} \quad (3)$$

In words, governments start with some prior beliefs about average growth and variability of growth for policies A and B. Information is gathered and, at the end of the year, governments update their beliefs about policies A and B. These posteriors become priors the following year. Based on posterior beliefs, policy is chosen. Under the assumption that samples gathered consecutively are independent, rational updating of beliefs proceeds sequentially.

With a *Normal/Inv- $\chi^2$*  prior and a normal likelihood, the posterior value of the mean (4) and the posterior value of the variance (5) have the following shapes. For each country  $i$ , time  $t$  and  $j = \{A, B\}$

$$\mu_{i,t} = \frac{\tau_{i,t-1}}{\tau_{i,t}} \mu_{i,t-1} + \frac{n}{\tau_{i,t}} \bar{x}_{i,t} = \rho \mu_{i,t-1} + (1 - \rho) \bar{x}_{i,t}; 0 \leq \rho \leq 1 \quad (4)$$

$$s_{i,t}^2 = \frac{\mathbf{S}_{i,t}}{v_{i,t}} \quad (5)$$

with

<sup>15</sup> In the Bayesian jargon, this property is called exchangeability

$$\tau_{i,t} = \tau_{i,t-1} + n \quad (6)$$

$$v_{i,t} = v_{i,t-1} + n \quad (7)$$

$$\mathbf{S}_{i,t} = S_{i,t-1} + S_{i,t} + \frac{\tau_{i,t-1} n (\bar{x}_{i,t} - \mu_{i,t-1})^2}{\tau_{i,t}} \quad (8)$$

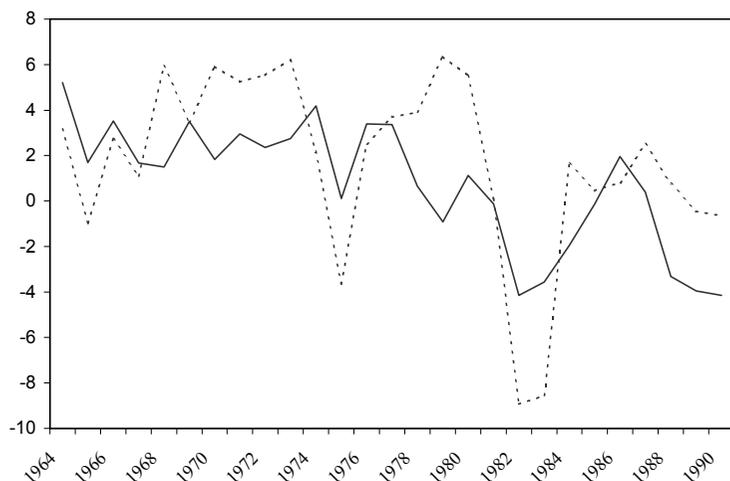
where  $n$  is the sample size,  $S_{i,t}$  is the observed sample sum of squares,  $\mathbf{S}_{i,t}$  is the posterior sum of squares,  $v_{i,t}$  is the posterior for the degrees of freedom, and  $\tau_{i,t}$  is the posterior for the factor that relates the prior variance of the mean with the sampling variance.

Equation (4) implies that posterior beliefs are a compromise between prior beliefs and sample information. It is important to note that the bigger the sample size,  $n$ , the more weight sample information receives in forming posteriors. In turn, if governments have very precise beliefs about the outcomes of policies, that is, if  $\tau$  is small, the contribution of experience to posterior beliefs will be minor. Also, note that the observed variability of results affects the posterior value of the variance through (5).

The following illustration may clarify how Bayesian updating operates.

Figure 1 shows the average rates of GDP per capita under Export Orientation (break line) and under Import Substitution in Latin America in the period 1964 through 1990 (solid line). These figures do not include Costa Rica, which is the country whose choices I study.

**Figure 1. Average Regional Rates of Growth in Latin America (1964-1990)**



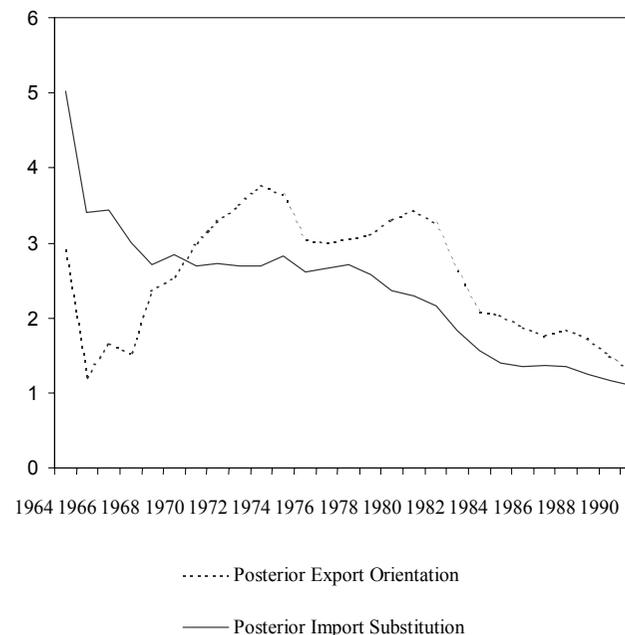
*A priori*, it is sensible to expect that governments choose the policy that performs better. Had the Costa Rican governments used this criterion of choice, they would have embarked in Export Orientation in 1968, again between 1970 and 1973 and again in the periods 1977-1981, 1984-1985, 1987-1990. These are the spells in which, in Latin America, average rates of growth under Export Orientation were greater than the average rates of growth with Import Substitution. Thus, Costa Rica would have changed its development strategy nine times. According to my data, Costa Rica changed it only twice: it switched to Import Substitution in 1974 and liberalized in 1986.

It is known that policy changes are rare and that policy persistence is more the rule than the exception. Therefore, the comparison of observed rates of growth under alternative policies seems not to be a good characterization of the policy choice process.

Does the comparison of posterior beliefs provide a more realistic portrait? Figure 2 below shows the posterior beliefs about average growth for both Export Promotion and Import Substitution in Latin America. As it is possible to see, the posterior series are much smoother than the original ones, which means that learning takes place at a fast pace at the beginning of the updating process.

However, as experience accumulates, beliefs become enduring. This feature poses a legitimate concern: whether such a low receptivity to new information makes Bayesian learning useless to predict policy changes. As long as policy choice is modeled as a comparative exercise, the answer is no.

**Figure 2. Posterior beliefs based on Regional Experience**



Under the assumption that Costa Rican governments compare those posterior beliefs and choose the policy whose posterior is larger, a switch to Export Orientation would have occurred in 1970, remaining under that policy thereafter. Note that the dynamics involved in Bayesian learning resembles better the kind of behavior one observes in reality: one of continuity, change and continuity again. Note also that the high receptivity to new information at the beginning of the updating process guarantees that the influence of prior beliefs vanishes rapidly, thus invalidating one of the main critiques Bayesian analysis stands. Hence, regardless of initial beliefs, if exposed to the same information, governments will eventually converge to the same choices.

So far, I have assumed that governments rationally learn from experience. But this model has no implications about how governments choose policies. I portray governments as actors that ‘invest’ in policies. Having observed the experience with possible alternatives in the past and elsewhere, governments will opt for the policy that, according to their updated beliefs, is expected to yield the best outcome with the least variability. Thus, a decision problem can be specified in which every period, governments maximize the utility from alternative policies, with utility being a function of posterior beliefs about average results and about variability of results.

Suppose that government  $i$  derives utility from growth. For policies,  $j = \{A, B\}$ , utility has the following shape

$$U_{i,t}^j(\mu, s) = \beta_1 \mu_{i,t}^j + \beta_2 s_{i,t}^j + \varepsilon_{i,t}^j; j = \{A, B\} \quad (9)$$

where  $\mu_{i,t}$  is the posterior belief about average results,  $s_{i,t}$  is the posterior belief about variability of results and  $\varepsilon_{i,t}$  is a stochastic component<sup>16</sup>. Thus, utility is a function of the posterior average and the posterior standard deviation, which vary from government to government and over time. The choice is also a function of unobservable components such as reputation, credibility or political will captured by  $\varepsilon_{i,t}$ <sup>17</sup>.

Government  $i$  faces a choice at  $t$  between policy A and policy B. Decision-maker  $i$  will choose policy A if and only if the utility from option A is greater than the utility from option B.

$$U_{i,t}^A \geq U_{i,t}^B \quad (10)$$

which implies

<sup>16</sup> It is assumed to be normally distributed and independent over time and among governments.

<sup>17</sup> There is an extensive debate about the conditions that are necessary for a Mean-Standard deviation preference function to yield the same ranking of preferences as the expected utility criterion. These conditions are a quadratic utility function and normally distributed alternatives. However, recent research contends that the only requirement is that the alternatives should have distributions that differ in their location and scale parameters. The shape of the utility function in (9) allows a more intuitive interpretation of results than a quadratic utility function. Moreover, models were estimated using the latter specification with minor qualitative changes in the results. On this topic, see for instance Meyer (1987) and Frankfurter and Phillips (1995).

$$\beta_1 \mu_{i,t}^A + \beta_2 s_{i,t}^A + \varepsilon_{i,t}^A \geq \beta_1 \mu_{i,t}^B + \beta_2 s_{i,t}^B + \varepsilon_{i,t}^B \quad (11)$$

Rearranging terms

$$\beta_1 (\mu_{i,t}^A - \mu_{i,t}^B) + \beta_2 (s_{i,t}^A - s_{i,t}^B) \geq -(\varepsilon_{i,t}^A - \varepsilon_{i,t}^B) \quad (12)$$

To simplify, let

$$\begin{aligned} \mu_{i,t}^A - \mu_{i,t}^B &= \boldsymbol{\mu}_{i,t} \\ s_{i,t}^A - s_{i,t}^B &= \boldsymbol{s}_{i,t} \\ \varepsilon_{i,t}^A - \varepsilon_{i,t}^B &= \boldsymbol{\varepsilon}_{i,t} \end{aligned} \quad (13)$$

Hence, the probability that policy maker  $i$  chooses policy A at  $t$  is:

$$\begin{aligned} P(A_{i,t}) &= P(U_{i,t}^A \geq U_{i,t}^B) = P(\boldsymbol{\varepsilon}_{i,t} \geq -(\beta_1 \boldsymbol{\mu}_{i,t} + \beta_2 \boldsymbol{s}_{i,t})) = 1 - F[-(\beta_1 \boldsymbol{\mu}_{i,t} + \beta_2 \boldsymbol{s}_{i,t})] = \\ &= F(\beta_1 \boldsymbol{\mu}_{i,t} + \beta_2 \boldsymbol{s}_{i,t}) \end{aligned} \quad (14)$$

This set up gains in realism by adding a modification to account for dependency of choices over time. Since policy choices tend to be highly inertial, it is more realistic to assume that the probability that decision-maker  $i$  switches to policy A depends on past policy status. Recall that the ultimate goal of this modeling process is to relate learning from experience with policy choices actually observed. A dynamic probit model (Appendix A. II) allows estimating the probability of transitions between policies as well as the probability of continuing under the same policy. The dynamic model is

$$P(A_{i,t} | S_{i,t-1}) = F(\beta' \boldsymbol{Y}_{i,t-1}) + F(\alpha' \boldsymbol{Y}_{i,t-1}) A_{i,t-1}$$

With  $\boldsymbol{Y}_{i,t-1} = \text{CONSTANT}, \boldsymbol{\mu}_{i,t-1}, \boldsymbol{s}_{i,t-1}$

and  $\boldsymbol{\mu}_{i,t-1}, \boldsymbol{s}_{i,t-1}$  defined as in (13).

The comparison of a politician choosing between policies with an investor choosing among risky assets is intuitive. However, assuming that a politician will show an unequivocal preference for a policy that unanimously performs

better is only a conjecture. It could be the case that governments are guided by miraculous performances instead of average performance. If that is the case, a high variability of results could be positively related to the probability of a switch. Also, even if a policy performs comparatively worse, it may not be abandoned if the policy is ideologically preferred, the policy is imposed on politicians or there is some exogenous and/or ideational justification for those poor results.

As a matter of fact, the main task in the next section is to provide empirical information about those coefficients,  $\beta'$  and  $\alpha'$ , by applying this model of rational learning and rational choice to the decision to grant independence to central banks, to privatize, to liberalize the trade regime and to enter into agreements with the IMF.

#### 4. EMPIRICAL TEST.

##### 4. 1. About the Data.<sup>18</sup>

In order to test the learning model, one needs, first, a dichotomous indicator of observed policy choices and this for each of the four policies under scrutiny.

Regarding Central Bank Independence (CBI), I relied on Cukierman et. al. (1992) and Cukierman and Webb (1995) data on political transitions and on Central Bank governor appointments for 66 developed and developing countries and for the period 1962 through 1990. I constructed the dependent variable using some of the authors' findings, namely, that a new governor appointment was more likely to happen within six months following a political transition and that short tenure in office discourages independent monetary policy. Hence, I matched the information on political transitions and on CB governor turnover, coding as independent those governors that survived in office for at least six months after a political transition.<sup>19</sup> According to this behavioral index of CBI,

<sup>18</sup> Codebooks are available from the author.

<sup>19</sup> A strict application of this criterion proved to be sensible in general although it is not free from caveats. There were cases in which a governor did survive a political transition but her term in office was very short and/or was removed immediately after the next political transition. I have coded such governors as dependent. The reverse of the situation happens in particular cases in which governors had long terms but they did not survive at least one political transition. This happens in most authoritarian regimes but also in some democracies. A strict application of the survival rule would codify these governors as non-independent. This is not so problematic for authoritarian regimes. However, some extra judgment was required in particular cases. According to Cukierman and Webb's data, a new central bank governor was appointed in March 1982 in Belgium and a new one was appointed in July 1989. The 1982 governor did not survive any political transition; yet his term in office lasted for more than seven years. Actually, I found out that the 1982 governor simply reached his

1492 country-year observations (68% of the total) correspond to independent CBs. More than half of these observations falls in the OECD cluster. The remaining 679 country-year observations are dependent CBs.

Regarding trade liberalization, I gathered data for 51 developing countries and for the period 1964 through 1990 using several ready-made lists: the *World Bank Development Report* (1987), the *1992 IMF Report on Issues and Developments in International Trade Policy* and the 1994 World Bank Discussion Paper on *Trade Policy Reform in Developing Countries since 1985*. Countries that fell in the strong or moderate outward oriented category were coded as having a liberal trade regime whereas countries in the strong or moderate inward-oriented category were coded as having a closed regime.<sup>20</sup> The database comprises a total of 1341 country-year observations of which 957 fall under the Import Substitution category and 384 fall under the Export Oriented one, the latter clearly concentrated in the 1980s.

As for privatization, I used data for 37 OECD and Latin America countries between 1980 and 1997 based on the *World Bank Privatization Data*, the Garrett, Guillen and Kogut (2000) database *Privatization around the World* and the 1990-2000 Privatization Yearbooks.<sup>21</sup> The information contained in those sources was complemented with case study accounts in Vickers and Wright (1989), Suleyman and Waterbury (1990), Baer and Birch (1994), Wright (1994), Lieberman (1994), World Bank (1995), OECD (1996), Parker (1998) and Ghosh (2000). According to my data, 308 country-year observations of the total 660 correspond to years of privatization activity, which clearly gathered

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age of retirement. When possible, I have gathered the necessary information to proceed to a correct coding of these cases, which were exceptional.

<sup>20</sup> Since I needed a dichotomous indicator, I clustered in one the strong and moderate categories of the 1987 WB report and the control and open categories of the 1992 IMF report. For instance, according to my data, Madagascar carried out a moderate inward oriented policy between 1963 and 1973. Between 1974 and 1986, it engaged in a strongly inward oriented strategy. In my coding, Madagascar appears as having engaged in an Import Oriented strategy all throughout the period. When it comes to placing countries under one and the other alternative, the 1987 WB and the 1992 IMF listings were highly consistent except for Tunisia. Another somewhat surprising classified is Brazil, which appears as moderately outward oriented in the WB Report.

<sup>21</sup> The World Bank database has information on approximately 8,000 transactions in low and middle- income countries during the period 1988-98. Garrett, Guillen and Kogut (2000) database has information on more than 4,300 privatization transactions also for developing, transition and OECD countries. Despite providing a rich amount of information, comparison of different sources revealed missing transactions for some countries and years. I took some arbitrary decisions about where to place the beginning of the privatization process. In most cases, I have placed that beginning coinciding with the existence of a systematic and deliberate program at slimming down the state sector.

momentum at the beginning of the 1990s. The dependent variable was coded one for those countries and years carrying out some divestiture.

Finally, I used Vreeland (2000) database on IMF agreements, referring to 135 developed and developing countries between 1951 or the year of independence through 1990.<sup>22</sup> The dependent variable was coded 1 if a particular country a particular year had an agreement with the IMF regardless of type of agreement.<sup>23</sup> It was coded 0 otherwise.

Figure 3 shows the proportion of countries under each of those policies.

As it is possible to see, the proportion of countries with an independent CB has been high throughout the period under study. There is no evidence, though, of an increase in that proportion with the passage of time. If at all, what one observes is actually a slight decrease in that proportion from the 1980s on. Hence, regarding CBI, there are no signs of convergence in policy choices.

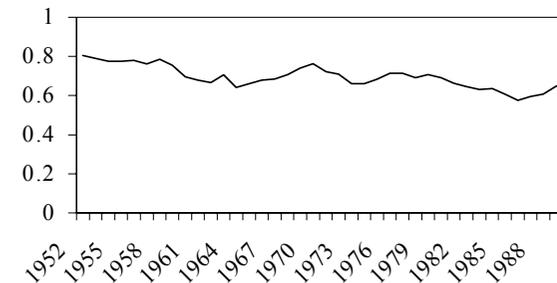
On the contrary, the increase in the proportion of countries that liberalized their trade regimes and that privatized over the period under scrutiny is unambiguous. Note also that the pattern of convergence has been fast (especially for privatizers) but gradual. As for the pattern of choices regarding IMF agreements, the increase in participants appears concentrated around specific moments in time, notably, the outburst of the debt crisis. Yet, the pattern of policy choices is clearly less consistent than for privatization or for trade liberalization.

<sup>22</sup> Due to limited experience with IMF programs prior to 1960, I used data only from that year on.

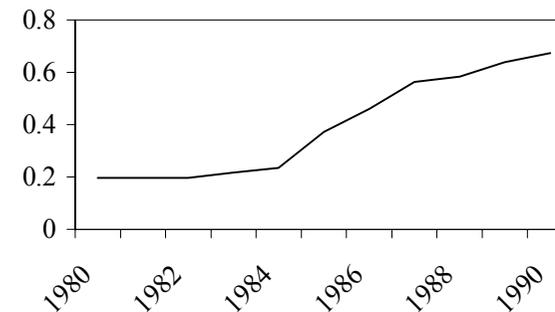
<sup>23</sup> 88% of agreements in the database are Stand By agreements.

**Figure 3.**

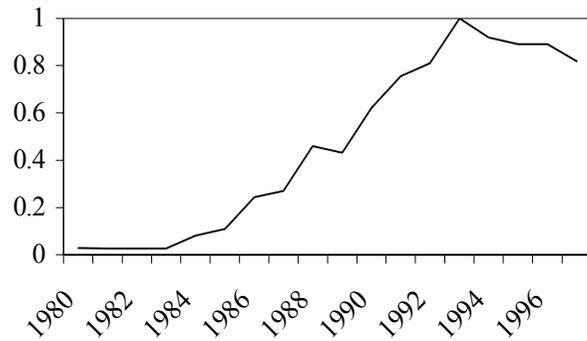
**Figure 3. 1. Proportion of countries with Independent Central Banks (1952-1990)**



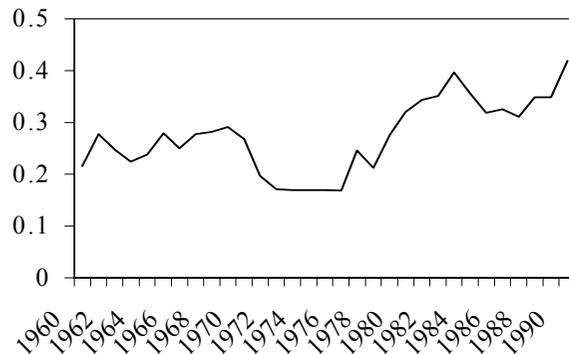
**Figure 3. 2. Proportion of Trade Liberalizers (1980-1990)**



**Figure 3. 3. Proportion of Privatizers (1980-1997)**



**Figure 3. 4. Proportion of Countries under IMF Agreements (1960-1990)**



## 4. 2. Results

Recall that the purpose of this analysis is to find out whether learning from others explains the observed patterns of policy choices, hence, whether governments have switched to those market-oriented reforms after updating their beliefs about outcomes based on experience.

First, using Bayesian updating, posterior beliefs have been calculated for each alternative policy status (having or not an independent central bank, being or not under an IMF agreement, having or not a liberal trade regime and privatize or not).<sup>24</sup> Second, those posterior beliefs have been compared. And third, the differences in posterior beliefs under each status have been used as independent variables to explain observed choices.

Available experience has been structured at three levels: own experience, the experience in the region a country belongs to and the experience in the world. Thus, if governments discriminate information on the basis of experience, one should observe that own past experience with policies is more informative than the experience of other countries, especially those outside their region.

Finally, recall that learning is about the performance of policies in terms of growth per capita and that I have assumed that both average rates of growth and variance of results are of interest for politicians.

Table 1 shows the results of the dynamic probit estimation for the four policy choices.

<sup>24</sup> Data on GDP growth per capita are from Alvarez et. al (1997).

**Table 1.**  
**Dynamic Probit Test. Probability of Transitions to several policies**

<b>Dependent V=Policy</b>	<b>CBI</b>	<b>Export Orientation.</b>	<b>Privatization</b>	<b>IMF Agreements</b>
<b>Lagged Policy</b>	-1.27*** (-10.22)	-3.96*** (-5.69)	-1.58*** (-6.02)	-1.19*** (-11.20)
<b>Own Experience</b>	-0.01 (-0.51)	0.04 (1.04)	0.16** (2.35)	0.02*** (3.09)
Average Results				
Variability of Results	-0.09** (-2.04)	-0.10* (-1.94)	0.57 (1.43)	-0.02 (-0.79)
<b>Regional Experience</b>				
Average Results	0.0001 (0.003)	0.19 (1.45)	0.35*** (2.88)	-0.02 (-0.98)
Variability of Results	-0.09 (-1.59)	-0.48*** (-2.75)	-0.05 (-0.18)	0.05* (1.72)
<b>World Experience</b>				
Average Results	0.08 (0.65)	-0.22 (-1.62)	0.19* (1.77)	0.21*** (2.66)
Variability of Results	0.28*** (2.91)	-0.99*** (-3.43)	-0.82** (-2.42)	0.19*** (3.32)
<b>p-value for F</b>	0.00	0.00	0.00	0.00
<b>Observations</b>	2105	1171	623	3488

Note: \*p<.10, \*\*p<.05, \*\*\*p<.01. t-test in parenthesis

The impact of learning on the decision to switch varies across policies (results differ by rows) but it is consistent within policies (results are coherent by columns). In other words, own, region and world experiences, when significant, operate in the same direction. Governments have been consistently risk averse in their decision to liberalize trade, they have consistently learned from average results when they have privatized and they have been consistently risk-prone to enter into agreements with the IMF. Finally, learning seems not to have had any influence in the decision to adopt an independent monetary authority.

It is not surprising that learning turned out to be insignificant to explaining why governments have granted independence to Central Banks. Neither in theory nor in practice is there a clear relationship between an independent monetary authority and economic growth.<sup>25</sup> Also, according to my informal (as opposed to legal) indicator of CBI, there is no evidence of policy convergence prior to the 1990s. Given this pattern of choices, it seems that domestic economic and political factors, rather than diffusion effects, can explain better the decision to adopt this institutional device.

Regarding the decision to liberalize the trade regime, governments have learned from the variability of results that the gains of free trade are very unevenly distributed. Results under Export Orientation have exhibited a remarkable variation among and within regions. As a matter of fact, growth in East Asia countries outstripped growth in any other region and this regardless of the strategy followed. For instance, in 1986, rates of growth under EO ranged from 8.29% in Taiwan and 9.6% in Korea to -4.56% and -6.01% in Bolivia and Mexico respectively. The learning model reveals that governments have been clearly risk averse in their decision to switch to EO, precisely because a high variability of results implies the existence of winners but also losers under this development strategy.

The learning model fits very well the decision to privatize. Governments' updated beliefs about the effectiveness of privatizing with regard to not doing so is positively related to the probability of a switch and this for the three sources of information (own, region and the world). This result is consistent with previous studies that already detected the existence of diffusion effects in the decision to privatize but could not pinpoint at the specific mechanism of diffusion at work (Brune and Garrett, 2000; Simmons and Elkins, 2000). This illustration showed that rational learning is, at least in part, responsible for that diffusion.

Finally, learning also explains the decision to enter into agreements with the IMF. The distinctive result provided by this illustration is that governments seem to have been risk-prone in their decision to enter into agreements. Governments seek the IMF when the overall economic situation deteriorates as to place decision-makers in the domain of losses. In this domain, governments' exhibit a risk-prone behavior. Many governments have granted independence to CBs or have privatized without facing poor economic prospects. However, no country with an *overall* buoyant economic situation has ever turned to the Fund.

In sum, have governments learned from experience?

<sup>25</sup> The model was also run using inflation outcomes. But learning from inflation experience does not explain this policy decision either.

Rational learning is significant to explain the decision to switch to three of the four policies analyzed in this paper. These were precisely the policies in which, in the period under scrutiny, policy choices showed some sign of convergence.

Average experience was crucial in the decision to privatize. Governments adopted a risk-prone behavior and turned to the IMF. However, governments observed the existence of losers under trade liberalization and exhibited a risk-averse behavior. Yet, during the 1980s, more and more countries did make steps to liberalize their trade regimes. This suggests that diffusion mechanisms other than learning may have played a role. In next section, I survey whether imposition by third parties and/or imitation played a role in the decision to switch.

##### 5. EXTENDED LEARNING MODEL: ALTERNATIVE HYPOTHESIS.

One widespread alternative explanation of policy convergence is that governments have stabilized and have adjusted their economies under the pressure of International Financial Institutions (IFIs). The mechanism of imposition is epitomized by conditionality. The latter implies exchanging policies for loans. Trade liberalization is usually part and parcel of standard reform packages and privatization is indirectly promoted via the requirement of reducing public deficits. Hence, if the hypothesis of imposition holds, the switches to these policies should be positively related to the presence of these conditional packages.

Foreign aid has been crucial in promoting policy change in a number of successful reformers. For instance, Korea was a major recipient of foreign aid in the 1960s. Indonesia received very important financial help and debt relief in the 1960s and also during the adjustment period in 1982. During the years 1983-1985, Chile received funds amounting to over 4% of GNP. At the beginning of the 1990s, Poland got a \$1 billion stabilization loan to launch the Balcerowicz Plan. Finally, Turkey avoided negative transfers before 1983 thanks to massive support received in the period 1979-1981. In all cases, the aid was "highly conditional" (Haggard and Williamson, 1994: 567).

However, the presence of conditionality does not always imply that policies are imposed. Exploring those cases in which loans were needed and yet non-existent and those cases in which loans were not needed and yet were in place reveals that governments' decision to turn to the IMF is a combination of economic needs and political calculus. Domestic forces have frequently been

aligned with the posture of the IMF. Most authors agree that overt "leverage" has been a less important channel of influence than the mechanism of "linkage". The latter refers to "tacit and explicit alliances across the negotiating table created by policy dialogue, technical assistance, and other avenues of influence in the policy process" (Kahler, 1992: 94).<sup>26</sup> In Chile and Colombia, "[t]he IMF and the World Bank helped nudge the governments in this direction [adjustment], but political leaders were already inclined to move" (Stallings, 1992: 75). Kahler refers to Turkey and Indonesia as cases in which "alignment of interests [domestic and international] was so close that external influence was hardly required" (1992: 131). The Fund provided financial assistance and exerted influence through dialogue and persuasion; but imposition was not an issue.<sup>27</sup> Thus, even if the presence of a program has a positive impact on policy switches, imposition may not always be the correct interpretation.

It should also be noted that the adoption of programs is a poor predictor of its implementation. In fact, empirical studies show that implementation has been dismal. Kahler's (1992) survey of the record of nineteen governments during the 1980s reveals that only nine implemented coherent stabilization programs and only five implemented structural reforms. Another study by Stephan Haggard on Extended Fund Facility programs showed that out of thirty cases, twenty-four were not implemented in their original forms and sixteen were canceled (in Kahler, 1992: 97). Hence, being under an IMF agreement may not have an impact on policies simply because the program is not carried through.

I test the hypothesis of imposition by adding a dummy variable to the baseline model of learning. This variable accounts for the existence of an IMF agreement in a particular country, a particular year. Note that, even if IMF programs turn out to have a positive impact on the decision to switch to market-oriented policies, the subtle question as to whether the mechanism of influence is leverage or linkage cannot be addressed by this procedure.

Finally, note that external imposition is not confined to IFIs' activities. Especially in the area of trade policy, there is an extensive repertoire of international arrangements with a clear policy content. The World Trade Organization (WTO), Mexico's free trade agreement with the United States and

<sup>26</sup> This kind of elite networking epitomized by epistemic communities (see Haas, 1992, 1995, 1997) is for some a source of social learning (for instance, Kahler, 1992: 123-131) and for others, it is a source of social emulation (Simmons and Elkins, 2000: 7). This is only an example of how murky the discussion can be as to what learning is vs. imposition and vs. emulation.

<sup>27</sup> Of course, this does not mean that there have not been cases of overt leverage, prominently in Africa (Ghana under Rawlings and Zambia under Kaunda are examples). Also in the Philippines under Marcos and in some Latin American countries (Jamaica under Seaga and the Dominican Republic under Blanco) the Fund strongly influenced the direction of policy.

Canada or membership in the European Union (EU) have entailed the prospect of trade concessions from important partners. A more outward-oriented trade policy has been a requisite to enjoy those concessions (Haggard and Webb, 1994: 27). Due to data availability, the empirical test accounts for IMF influence only.

Emulation is an alternative mechanism of policy choice under uncertainty. In the case of emulation, and contrary to learning, governments do not choose policies due to an improved understanding of the consequences of their choices. Emulation “entails adoption of policy ideas without such understanding” (May, 1992: 333; also Rose, 1991; Bennett, 1991; Biersteker, 1995). However, a modicum of *perceived* success is necessary to spur mimicry. Discussing privatization, Ikenberry (1990), asserts that “[a]ll states are interested in doing better rather than worse; they prefer economic and political success to any alternatives (...). The watchword is “copy what *seems* to work” (p.103; emphasis added).

The rationales driving emulation are several. First, governments may emulate the policies of high status countries on the belief that they know better. Ikenberry contends that “the political debates over “industrial policy” in the early 1980s and the current rhetoric of “competitiveness policy” exemplify efforts to emulate the Japanese success” (p. 102).

Second, imitation may be “competitive”. Governments adopt the policies of their competitors due to fear that non-adoption may cause flows of economic activity outside the country. The adoption of particular policies by a competitor may undermine the efficacy of the policies in another country, thereby creating incentives to converge (Simmons and Elkins, 2000).

And third, reputation and credibility may motivate countries to subscribe policies broadly endorsed elsewhere. Kurt Weyland (2000: 24) asserts that “the imitation of innovative practices developed by higher status countries may be driven less by a careful effort to improve policy programs than by the desire to demonstrate ‘modernity’ and attract favorable attention from international public opinion”. In the same vein, discussing Central Bank Independence, Bagheri and Habibi (1998: 190) contend that “many developing countries imitate the financial laws of the Western industrial countries for the sake of prestige and international approval”. In turn, credibility and reputation can help countries to gain leverage internationally and domestically.

Internationally, adoption of policies generally regarded as “good” may be understood as a signal of commitment to sound economic policy, which enhances a country’s creditworthiness in a context of increased competition for

capital (Maxfield, 1997). Domestically, the argument that particular policies are “good” as reflected in a high number of advocates may provide a powerful argument for governments committed to unpopular policies. By reducing sovereignty costs, the number of countries participating in IMF agreements had a positive influence in the probability that a particular country entered into agreements (Vreeland, 2000). Although sovereignty costs may not be such a visible issue in the adoption of an independent Central Bank, trade liberalization and privatization<sup>28</sup> may raise nationalist concerns and accusations of selling-out to foreign interests. In this context, endorsing the policies the majority does may serve to legitimate their adoption and curb opposition.<sup>29</sup>

I test the hypothesis that emulation has driven the choice of policies by adding to the baseline models a variable that accounts for the number of other countries engaged in a particular policy, a particular year. This variable serves as a proxy for the general climate of opinion regarding the policy in question (as in Broz, 1999). I expect this variable to have a positive effect on the probability to switch to market-oriented policies. Note that this measure is also rough. Emulation may matter but this proxy cannot pinpoint at the particular channel of emulation at work.

Table 2 summarizes the results of adding these alternative mechanisms to the learning models. In a nutshell, the decision to liberalize trade has been the outcome of learning, imposition and emulation. Privatization was spurred by learning from others and also by emulation. Finally, learning is the only mechanism of diffusion that has influenced the decision to enter into IMF agreements.

<sup>28</sup> Depending on whether foreign capital is allowed to participate and to what extent.

<sup>29</sup> For instance, in Australia, reforms were adopted under the Labor government of Bob Hawke. These reforms garnered the support of business groups, natural constituency of the conservative parties, and even of some leading conservative representatives. This resulted in a deep division in the opposition parties (Garnant, in Williamson, 1994: 69).

**Table 2.**  
**Extended Dynamic Probit Test. Probability of Transitions to several policies**

<b>Dependent V=Policy</b>	<b>CBI</b>	<b>Export Orientation.</b>	<b>Privatization</b>	<b>IMF Agreements</b>
<b>Lagged Policy</b>	-1.81*** (-2.69)	-4.99*** (-5.96)	-2.70*** (-5.67)	-1.19*** (-8.61)
<b>Own Experience</b>				
Average Results	-0.01 (-0.39)	0.02 (0.53)	0.16** (2.23)	0.02*** (3.08)
Variability of Results	-0.08* (-1.87)	-0.07 (-1.17)	-0.28 (-0.58)	-0.02 (-0.79)
<b>Regional Experience</b>				
Average Results	0.0001 (0.003)	0.32** (1.98)	0.23* (1.65)	-0.02 (-0.98)
Variability of Results	-0.09 (-1.60)	-0.29 (-1.53)	0.26 (0.70)	0.05* (1.72)
<b>World Experience</b>				
Average Results	0.10 (0.77)	0.002 (0.01)	0.22* (1.72)	0.21*** (2.66)
Variability of Results	0.27*** (2.74)	-0.68** (-2.15)	-0.12 (-0.77)	0.19*** (3.21)
<b>Number of other countries</b>	0.13 (0.84)	0.63*** (3.95)	0.75*** (3.89)	0.0005 (0.012)
<b>IMF Agreements</b>	-0.07 (-0.45)	0.46** (2.22)	0.19 (0.66)	
<b>p-value for F</b>	0.00	0.00	0.00	0.00
<b>Observations</b>	2105	1171	586	3488

Note: \*p<.10, \*\*p<.05, \*\*\*p<.01. t-test in parenthesis

None of the mechanisms of diffusion could explain the decision to grant independence to Central Banks. Since these mechanisms did not operate, policy choices did not converge overtime. Hence, this result is coherent with the

observed pattern of policy choice (see figure 3) and it confirms the argument that domestic political and institutional variables can explain better the decision to grant CBI before the 1990s. One crucial test of the model will be to extend the sample to include the 1990s, the decade in which many governments changed the status of their CBs to increase independence.

Regarding trade liberalization, results change considerably when I consider imposition and emulation as explanations. Recall that rational learning entailed that the view of losers under EO induced a risk-averse behavior negatively related to the decision to adopt this policy. Yet, the fact is that choices converged overtime. After controlling for the alternative mechanisms of diffusion, risk-aversion in the view of high variability of results in the world still holds. However, the most interesting result is that both imposition and emulation are strongly significant in the decision to liberalize the trade regime. This is the only policy in which having an IMF agreement seems to have played a role in promoting policy change. And trade liberalization has also been the result of emulation, probably of the competitive type.

As for privatization, the result that learning is a powerful explanation of switches is robust to the inclusion of my alternative hypothesis. Whereas policy emulation seems to have played a role in the decision to privatize, imposition turned out not to be significant. I expected this result taking into account that, in OECD countries (which constitute 62% of the sample), IMF agreements have been the exception and nonetheless, these countries privatized. Finally, this result is consistent with previous research that found IMF agreements irrelevant in the decision to divest (see Brune and Garrett, 2000).

Lastly, emulation pales as an explanation of the decision to enter into agreements with the IMF. The inclusion of this control variable leaves unaffected the impact of learning on the decision to enter into contracts.

I do not report the results concerning the decision to switch to these market-oriented policies. The dynamic probit model also gives information as to whether governments have continued under these policies as a result of learning. The persistent results one gets is that neither learning nor the other mechanisms of convergence seem to have played any role in that decision. On the contrary, when it comes to continuing under market-oriented reforms, inertia is all that matters<sup>30</sup>.

<sup>30</sup> Results are available from the author.

## 6. CONCLUSIONS

This paper had two major objectives: on the one hand, to test a widespread contention in the literature of economic reforms, namely, that governments engaged in structural adjustment following a learning process. Testing this hypothesis entailed exploring the possibility of making the concept of learning operational so as to make it amenable to empirical test. This was actually the second goal of this research: to contribute to the vast literature on learning in public policy by providing a first empirical approach to this concept.

Discussions on learning became recently a booming industry, especially in the fields of Public Policy Analysis and International Relations. In their thorough review of available notions of learning, Bennett and Howlett (1991) concluded: "there is no shortage of theorization. Our review suggests that, if anything, the concept has been overtheorized and underapplied" (1992: 280). In the same vein, Bennett (in Stone, 1999: 52) pointed at "the paucity of systematic research that can convincingly make the case that cross-national policy learning has had a determining influence on policy choice". These statements are certainly an accurate description of the state of the art.

Bennett and Howlett (1992) review the concepts of political learning (Hecló, 1974), policy-oriented learning (Sabatier, 1987), lesson-drawing (Rose, 1991), governmental learning (Etheredge, 1981) and social learning (Hall, 1993). The notions of learning do not end up here. May (1992) adds the notion of instrumental learning and Levy (1994) contributes with his distinction between causal and diagnostic learning.

As the reviewers thoroughly discuss, all notions entail an improved understanding of cause and effect relationships in the view of experience. However, definitions frequently overlap and concepts vary in the subject (who learns) and the object of learning (about what). Also, different concepts entail different consequences. For instance, sometimes learning is merely procedural. It refers to changes in the policy process or in the capacity of policy advocates to advance their ideas (Etheredge's governmental learning or May's definition of political learning). Other times learning is about policy contents, ranging from learning about particular policy instruments (Rose's lesson-drawing) to learning about the ultimate goals of policies and the terms of the policy discourse (Hall's social learning). Finally, some definitions of learning entail a change in behavior (for instance in Hecló and Hall's versions of the concept) whereas others define learning as a change in beliefs that may or may not induce a behavioral change (as in Levy).

Miles Kahler (1992: 124) posed the knotty problems involved in testing the hypothesis that learning caused the shift to economic liberalism. He qualified as "demanding the empirical task of demonstrating that a particular behavioral change is the result of a clearly specified cognitive alteration at one level or another". And he added

The investigation of shared beliefs is not an impossible empirical task but, once again, it has rarely been attempted in a rigorous fashion. Nor have alternative explanations for policy change been carefully compared to an explanation based on change in ideology or beliefs.

None of the notions of learning mentioned above were amenable to address these conundrums. Even the more appealing notion of social learning is ruled out since, by definition, social learning cannot be observed in isolation of the change requiring explanation<sup>31</sup>. The awareness of these methodological problems pervades most works. As a result, the empirical test of learning has been a persistent pending task.

To overcome these difficulties, I assumed that politicians are rational learners. Bayesian learners have some prior beliefs about the outcome of policies and they update them making use of all available information. Prior beliefs are updated using Bayes' rule. This rule implies that average experience with policies is positively weighted by the "volume" of that experience and negatively weighted by the variability of it. Hence, in this model of learning, there are some prior beliefs, there is some experience, there is an operational mechanism of learning, Bayes's rule, and there are some posterior beliefs, combination of prior beliefs and experience. This notion of learning overcomes the operationalization conundrum.

Bayesian learning has no implications for policy change. Learning is from experience and it implies a change in beliefs. Filling the gap that goes from belief updating to policy change requires a model of how governments choose policies<sup>32</sup>. Because noise is an indicator of the responsibility of policies on observed outcomes, governments prefer the policy that yields the best results with the least noise. Governments choose policies by comparing their updated beliefs about alternative policies.

According to this model of rational learning and rational choice, different governments analyze experience in the same way. Thus, the model predicts that choices, hence policies, converge as long as governments are exposed to the

<sup>31</sup> Peter Hall states that "learning is indicated when policy changes as the result of such process [in response to past experience and new information]" (p. 278).

<sup>32</sup> Bayesian learning is not dissimilar from Levy's notion of learning in this respect.

same information. Using an appropriate statistical technique, I tested whether policies changed and remained because governments learned, thereby solving the causality conundrum.

Finally, I included other possible explanations for policy convergence. Policies might have converged because governments copied each other. Alternatively, policies might have converged because governments were coerced to adopt the same policies. Hence, I compared an explanation of policy change based on learning to alternative explanations of change, tackling another of Kahler's objections.

The application of the rational learning model to the decisions of granting independence to Central Banks, to liberalize trade, to privatize, and to enter into agreements with the IMF provided the following results:

First, learning in isolation or in combination with the alternative mechanisms of emulation and imposition can explain the decision to liberalize trade, to privatize and to enter into agreements with the IMF. Second, neither learning nor emulation or coercion could explain the decision to grant independence to Central Banks. This is the only policy in which choices did not converge overtime. Third, there is no evidence that own experience is more relevant than the experience of others in the decision to switch to these market-oriented policies. However, the trade liberalization illustration showed that a close outstanding performance exerted strong demonstration effects. And fourth, rational learning cannot explain why governments remain under market-oriented reforms after they adopt them.

Note that these policies differ not only in their patterns of convergence, but also in their visibility, in the timing of expected outcomes, in the size of the groups they affect and the number of potential and immediate beneficiaries. For example, CBI, trade liberalization and privatization can be characterized as "normal" policies as opposed to IMF agreements, which could be better described as "exceptional" economics. Normal and exceptional policies differ in at least two dimensions: their expected duration and the timing of expected results. CBI, trade liberalization and privatization have frequently been undertaken at governments' own initiative as part of long-term projects of economic transformation that are meant to endure. The belief that results will be ripped some time in the future is central to these policies. However, IMF agreements are generally regarded as transitory and, at least in their stabilization version, they aim at relatively quick results (in one or two years). Also, IMF agreements are highly visible and their adoption entails greater sovereignty costs. These facts may well be the reason of the difference in results.

As a first cut to an elusive topic, this work has considerable room for improvements both in method and in substance. First, I assumed that governments evaluate policies only on economic terms but it is quite clear that political calculations must also enter the picture. And second, the analysis should be extended to include the 1990s and hopefully, new policy illustrations. As a matter of fact, the collapse of communist rule has probably entailed a crucial turning point by showing that no other alternative was possible. It may not be by chance that the learning model appears the most robust precisely in the illustration that includes the 1990s.

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## APPENDIX

### Appendix A.I

#### Conjugate Families for Samples from a Normal Distribution. Sampling from a Normal Distribution with Unknown mean and Unknown Precision.

Based on De Groot (1970), Gelman et. al. (1995), Lee (1997) and Zellner (1997). Proofs available in those texts.

Suppose growth,  $X$ , is a random variable that follows a normal distribution with an unknown value of the mean,  $\mu$ , and an unknown value of the variance  $\sigma^2$ . Suppose that their prior joint conjugate distribution is as follows: the conditional distribution of  $\mu$  given  $\sigma^2$  is a normal distribution. The marginal distribution of  $\sigma^2$  is scaled inverse- $\chi^2$ . With this specification, the marginal distribution of  $\mu$  follows a t-Student distribution.

Thus,

$$\mu | \sigma^2 \sim N(\mu_0, \sigma_0^2 / \tau_0)$$

$$\sigma^2 \sim \text{Inv-}\chi^2(v_0, \sigma_0^2)$$

or

$$(\mu | \sigma^2, \sigma^2) \sim N\text{-Inv-}\chi^2(\mu_0, \sigma_0^2 / \tau_0; v_0, \sigma_0^2)$$

The parameters are the location and the scale of  $\mu$  and the degrees of freedom and scale of  $\sigma^2$  respectively. Note that this specification implies that  $\mu$  and  $\sigma^2$  are dependent in their prior specification. If  $\sigma^2$  is large, a high variance prior distribution is induced for  $\mu$ . Prior beliefs about  $\mu$  are calibrated by the scale of measurement of  $X$  and is equivalent to  $\tau_0$  prior measurements on this scale (Gelman, et. al, p. 71).

Suppose now that a sample,  $x_n$ , of  $n$  i.i.d observations on growth also normally distributed is gathered.

#### 1. The joint posterior distribution, $p(\mu, \sigma^2 | x_n)$ .

The posterior parameters for the location and scale of the mean and the degrees of freedom and scale of the variance are as follows:

$$\mu_n = \frac{\tau_{i,t-1}}{\tau_{i,t}} \mu_{i,t-1} + \frac{n}{\tau_{i,t}} \bar{x}_{i,t} = \rho \mu_{i,t-1} + (1 - \rho) \bar{x}_{i,t}; 0 < \rho < 1$$

$$s_{i,t}^2 = \frac{\mathbf{S}_{i,t}}{v_{i,t}}$$

$$\tau_{i,t} = \tau_{i,t-1} + n$$

$$v_{i,t} = v_{i,t-1} + n$$

$$\mathbf{S}_{i,t} = \mathbf{S}_{i,t-1} + S_{i,t} + \frac{\tau_{i,t-1} n (\bar{x}_{i,t} - \mu_{i,t-1})^2}{\tau_{i,t}}$$

where  $v_0$  are the prior degrees of freedom,  $S_0$  is the prior sum of squares and  $\mathbf{S}_t$  is the sample sum of squares.

#### 2. The Marginal Posterior Distribution of $\sigma^2$ , $p(\sigma^2 | x_n)$

$$\sigma^2 | x_n \sim \text{Inv-}\chi^2(v_n, \sigma_n^2)$$

with  $v_n$  and  $\sigma_n^2$  as in (4) and (2).

#### 3. The Conditional Posterior Distribution of $\mu$ , $p(\mu | \sigma^2, x_n)$

$$\mu | \sigma^2, x_n \sim N(\mu_n, \sigma^2 / \tau_n)$$

with  $\mu_n, \tau_n$  as in (1) and (3). One normal way to proceed to sample from the joint posterior distribution is to draw  $\sigma^2$  from its marginal posterior distribution as in (6) and then draw  $\mu$  from its normal posterior distribution, using the simulated value  $\sigma^2$ .

#### 4. The Marginal Posterior Distribution of $\mu$ , $p(\mu | x_n)$

$$\mu | x \sim t_{v_n}(\mu_n, \sigma_n^2 / \tau_n)$$

with  $v_n, \mu_n, \sigma_n^2$  and  $\tau_n$  as in (4), (1), (2) and (3) above.

### 5. Specifying the prior parameters.

Since  $\sigma^2$  follows an  $\text{Inv-}\chi^2$ , the following formulas apply.

$$E(\sigma^2) = \frac{S_0}{(v_0 - 2)} \quad (6)$$

$$\text{Var}(\sigma^2) = \frac{2S_0^2}{(v_0 - 2)^2(v_0 - 4)} \quad (7)$$

Thus, after specifying values for the mean of the variance and the variance of the variance, prior values for S and v can be obtained solving those equations. Also, since  $\mu$  marginally follows a t-Student distribution

$$E(\mu) = \mu_0 \quad (8)$$

$$\text{Var}(\mu) = \frac{S_0}{v_0 \tau_0} \quad (9)$$

From which  $\tau_0$  can be obtained after specifying the variance of the mean and having obtained  $S_0$  and  $v_0$ .

## Appendix A.2

### Dynamic Probit Model

When it is considered that the decision taken by country i at time t is related to the decision that same country took at time t-1, the model to be used is a dynamic probit model (discrete state, discrete time model or Markov model. See Amemiya, 1985)

Let  $S_{i,t-1}$  denote policy status of country i at time t-1. That status can be "A" if country i chose policy A at time t-1 ( $A_{i,t-1}$ ). Alternatively, it can be "B" if country i chose policy B at time t-1 ( $B_{i,t-1}$ ).  $A_{i,t-1}$  is equal to 1 if country i chose A at time t-1 and 0 otherwise. Similarly,  $B_{i,t-1}$  has value 1 if country i chose B at time t-1 and 0 otherwise

The general specification is

$$\begin{bmatrix} p(A_{it} | S_{i,t-1}) \\ p(B_{it} | S_{i,t-1}) \end{bmatrix} = \begin{bmatrix} P_{AA,it} & P_{BA,it} \\ P_{AB,it} & P_{BB,it} \end{bmatrix} \begin{bmatrix} A_{i,t-1} \\ B_{i,t-1} \end{bmatrix}$$

Where participation status at time t conditional on past status - left hand side - is made equal to a transition probability matrix times lagged participation status. The transition probability matrix contains the following information:  $p_{AA,it}$  denotes the probability that country i chooses policy A at time t while  $p_{AB,it} = 1 - p_{AA,it}$  denotes the probability that country i switches to policy B at t. Similarly,  $p_{BA,it}$  denotes the probability that country i switches to policy A at time t. The probability that country i goes chooses to continue B at time t is  $p_{BB,it} = 1 - p_{BA,it}$

Under this setting, the probability of choosing A at time t is the following

$$P(A_{it} | S_{i,t-1}) = p_{AA,it} A_{i,t-1} + p_{BA,it} B_{i,t-1} = p_{BA,it} + (p_{AA,it} - p_{BA,it}) A_{i,t-1} \quad (1)$$

The same goes for  $P(B_{it} | S_{i,t-1})$

In a Univariate Dynamic Probit setting, there is a theory on transitions and on continuities. Transitions and continuities are a function of the same set of lagged regressors. In other words, the same theory is used to explain both phenomena.

$$P_{BA,it} = F(\beta' Y_{i,t-1}) \quad (2)$$

$$(3) \quad P_{AA,ii} = F(\gamma' Y_{i,t-1})$$

where  $F(\cdot)$  is the CDF of the standard normal distribution.

For convenience, let  $\gamma = \alpha + \beta$ . Then, even if the explanatory theory is the same, its impact on probabilities differs as reflected in different coefficients.

$$(4) \quad P_{AA,ii} = F(\gamma' Y_{i,t-1}) = F[(\alpha + \beta)' Y_{i,t-1}] = F(\alpha' Y_{i,t-1} + \beta' Y_{i,t-1})$$

Using (2) and (4) in (1) and rearranging terms

$$(5) \quad P(A_{ii} | S_{i,t-1}) = p_{BA,ii} + (p_{AA,ii} - p_{BA,ii}) A_{i,t-1} = F(\beta' Y_{i,t-1}) + [F(\alpha' Y_{i,t-1}) - F(\beta' Y_{i,t-1})] A_{i,t-1}$$

Hence

$$(6) \quad P(B_{ii} | S_{i,t-1}) = 1 - [p_{BA,ii} + (p_{AA,ii} - p_{BA,ii}) A_{i,t-1}] = 1 - [F(\beta' Y_{i,t-1}) + [F(\alpha' Y_{i,t-1}) - F(\beta' Y_{i,t-1})] A_{i,t-1}]$$

The likelihood function can be obtained using equations (5) and (6) above

$$L = \prod_{i,T,N} [F(\beta' Y_{i,t-1} + F(\alpha' Y_{i,t-1}) A_{i,t-1})]^{A_{i,t-1}} [1 - F(\beta' Y_{i,t-1} + F(\alpha' Y_{i,t-1}) A_{i,t-1})]^{1 - A_{i,t-1}}$$

Note that because the influence of the variables determining actors' decisions to remain under is determined by  $\gamma = \alpha + \beta$ , the relevant z-statistic has the following shape

$$Z = \frac{\alpha + \beta}{\sqrt{\sigma_\alpha^2 + \sigma_\beta^2 + 2 \text{cov}(\alpha, \beta)}}$$

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