Global Capital Flows and National Policy Choices

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Abstract

This paper studies whether changes in global financial environment have induced governments to pursue better policies (the "discipline effect").The evidence indicates that financial globalization has induced countries to pursue lower inflation rates, but not succeeded in lowering budget deficits. So the strength of the discipline effect various across different public policies.

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Key Words: Discipline effect, capital flows, mood swings, inflation, deficit.

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1. Introduction

The word "globalization" has been both over-used and misused. A clear fact, however, is a rapid surge in cross-border capital flows over the last three decades, including those from industrial to developing countries. This phenomenon is sometimes called financial globalization. Obviously, one reason for this surge is that many national governments have, over time, made themselves more friendly to global capital. However, advances in telecommunications, improvement in the technology used in managing cross-border financial transactions, and even reduction in the cost of merchandise trade, have also played important roles. An intriguing possibility is that this change in the global finance may, by itself, have induced national governments around the world to behave better[1]. This view that global finance is an agent for positive policy change (rather than just a passive consequence of the latter) has received very little rigorous examination. The objective of this paper is to fill this void.

A broad range of government policies could be affected by the global financial environment, including national competition policy, attitudes toward privatization, regulatory rules on publicly listed companies, regulation of banks, equity and labor markets, and monetary and fiscal policies. In addition, Stulz (2005) discussed how financial globalization may induce governments to reduce expropriation of firms and corporate insiders to reduce expropriation of minority shareholders. Unfortunately, in many such areas, precise measures of policy changes over multiple time periods for many countries either do not exist or are severely deficient to permit a rigorous test. In this paper, we focus on national monetary and fiscal policies, an area in which relevant measurement is conceptually straightforward and relevant data are generally available.

At a first glance, macroeconomic policies around the world have improved over time. For example, the average government deficit as a share of GDP among developing countries declined from 6% in the early 1980s to 2% in the late 1990s. A similar decline can be observed among developed countries as well. Changes in monetary policies as measured by inflation rates are less monotonic. Even so, the average inflation rate among

[1] This possibility was emphasized by Thomas Friedman in his best-selling book, "The Lexus and The Olive Tree: Understanding Globalization."

developing countries came down from 41% in the early 1980s to 13% towards the end of 1990s. The average inflation rate for developed countries declined more noticeably from 12% in the early 1980s to 2% in the late 1990s[2].

It seems logical to expect financial globalization to have played a crucial role here: if international capital flows become more important for national economic development, and if they respond negatively to bad monetary and fiscal policies, governments may be induced to conduct better policies. This is a point apparently agreed upon by Fischer (1998), Obstfeld (1998), and Stiglitz (2000); although, to our knowledge, the logic has not been formalized.

As it is sometimes the case, what is logically possible and what is true in reality are not necessarily the same thing. For example, financial globalization has the potential to raise economic growth rates and lower consumption volatility in theory, but has not quite delivered on these dimensions empirically (See Prasad, Rogoff, Wei and Kose, 2003, for a review of the recent literature and the papers cited therein, and Stulz, 2005, for an explanation from a finance perspective). Similarly, the belief in the disciplinary effect of financial globalization on national macroeconomic policies is not always unqualified or unchallenged. For example, Fischer (1998) stated, "*normally, when the market's judgment is right, this discipline is valuable, rewarding good policies and penalizing bad. ... However, markets are not always right"*.

A booming industry of behavioral finance research over the last two decades has provided plenty of reasons for why global capital flows do not respond only to economic fundamentals - A survey of this literature by Barberis and Thaler (2003) listed more than two hundred papers. It is perhaps not surprising that some economists have strongly dismissed the validity of the "disciplinary effect." For example, Rodrik (2001) made the following claim. *"Perhaps, the most disingenuous argument in favor of liberalizing international capital flows is that the threat of massive and sudden capital movements serves to discipline policy makers in developing nations who might otherwise manage their economies irresponsibly. ... In practice, however, the discipline argument falls*

[2] The same pattern applies to median deficit and inflation rates as well. The details of the sample used in these calculations are explained later in the text (Section 4) and summarized in Table 2.

apart. Behavior in international capital markets is dominated by mood swings unrelated to fundamentals."

The empirical literature on the discipline effect is thin. The only paper we could find is by Kim (2003) on linkages between capital account liberalization and fiscal deficit. His work is a good start, but still incomplete in a number of dimensions. First, he employed *de jure* rather than *de facto* measures of financial openness, but laws and regulations in the book may not always be well enforced on the ground, especially in developing countries. Second, he did not look at monetary policies, an area that the theory has a stronger prediction than fiscal policies as we will discuss later.

In this paper, we undertake a systematic examination of the relationship between international capital flows and domestic macroeconomic policies. In addition to being one of the first tests of the discipline effect, the paper has two innovations. First, it recognizes potential endogeneity of the observed capital flows in any given country with respect to the nature of macroeconomic policies in that country, and proposes an instrumental variable approach to correct it. Second, the paper recognizes some inherent discreteness in defining good versus bad macroeconomic policies. Specifically, it allows for the possibility that low inflation rates (or budget deficits) are better than very high inflation rates (or deficits), but does not impose the assumption that one low inflation rate (deficit) is necessarily better than another low inflation rate (deficit).

The methodology developed in this paper is relevant in a variety of context. For example, financial globalization may have induced private companies to choose better protection of outside investors, or otherwise improve corporate governance, as Stulz (2005) argued. Financial globalization may have induced governments to alter anti-trust policies, and regulatory policies concerning equity and labor markets. Once appropriate measures of these policies are constructed, the same approach can be applied to test discipline effects in these areas.

The rest of the paper is organized as follows: Section 2 presents a simple model. Section 3 describes the data. Section 4 shows the benchmark results from a linear system of equations. Section 5 employs a transition matrix specification to allow more dynamics and to introduce discrete ways to classify macroeconomic policy stances. Finally, Section 6 concludes.

2. An Illustrative Model

Even though the paper is primarily empirical, this section provides a simple model that formalizes the logic behind the basic hypothesis. At the same time, it suggests some factors that may weaken the discipline effect.

2.1 Economic Environment

Consider a small open economy with one domestic firm, and n foreign firms. Each uses one input, capital, to produce a homogenous good. The production functions for all firms are identical and given by the following form.

(1) $Y_d = AK_d^{\beta}$

for the domestic firm, and

(2) $Y_f = AK_f^{\beta}$

for each of the foreign firms.

For simplicity, we assume that domestic capital stock is fixed (i.e., unresponsive to domestic policies). Let $K_d^{\beta} \equiv X$, which is fixed.

The productivity parameter, A, can take only two values, depending on government policy, which also takes only two values.

(3) A = 1 if government policy is good, and
= 0 if government policy is bad.

n, the number of foreign firms in the economy, is taken as an index of the depth of the global financial environment, with $n \in [0, N]$.

Government moves first, choosing q, the probability of pursuing a good policy (while taking into account the possible reaction from the foreign investors). Foreign investors move second (but simultaneously among themselves) by choosing an

appropriate level of investment, K_f, in the country, while taking government's policy rule, q, as given.

The central question that the model addresses is whether, q, the probability of good policy, would increase as financial globalization deepens (i.e. as n increases). We will then examine what factors may influence the responsiveness of q to a change in n.

We solve the problem by backward induction, starting with foreign investor's optimization problem first.

2.2 Foreign investor's optimization problem

A representative foreign investor solves the following problem.

$$(4) \qquad \max E(\Pi) = E(Y_f) - r K_f$$
$$= q K_f^{\beta} - r K_f$$

where E(.) is expectation operator, and r is the marginal opportunity cost of investing in the host country (or the worldwide interest rate).

The first order condition yields

$$(5) \qquad K_f^{1-\beta} = (\beta q)/r$$

Of course, by construction, the problem is concave so that the second order condition for the maximization problem is satisfied.

For illustrative purpose, we pick a particular value $\beta = ½$.[3] Hence,

$$(5') \qquad K_f^{1/2} = q/(2r)$$

Note that all foreign investors solve their optimization problems simultaneously. By construction, there is no strategic substitution or complementarity among them.

[3] The more general model with an unrestricted β is analyzed in Appendix 1.

2.3 Host government's problem

The host government chooses the probability of pursuing good policy, q, in order to maximize an objective function that increases with total output but decreases with the disutility associated with pursuing the good policy.

(6) $$\max E(W) = E\{ Y_d + n \ Y_f \} - \tfrac{1}{2} b q^2$$

Mechanically, the disutility of pursuing the good policy is introduced here in order to generate an interior solution. Economically, bad government policies such as large government fiscal deficits presumably allow the bureaucrats to enrich their families and/or benefit their friends and cronies. It is in this sense that pursing better policies may be privately painful to the bureaucrats.

Making use of the solution to the foreign investor's problem, the government objective function can be rewritten as

(6') $$E(W) = q [X + (nq)/(2r)] - \tfrac{1}{2} b q^2$$

We will assume that b is sufficiently large, in particular, $b > N/r$. If b were very small, the objective function would have been convex, in which case, the government would always want to pursue the good policy, or $q = 1$. This would not be very interesting. If b is assumed to be sufficiently large, then the government's optimization problem has an interior solution derived from the first order condition:

(7) $$q = \frac{xr}{br - n}$$

Note that since q is limited between 0 and 1, the constraint on b is, in fact, $b \geq X + N/r$.

From the optimal policy rule, one can easily work out the policy response to an increase in financial globalization.

(8) $$\frac{dq}{dn} = \frac{xr}{(br-n)^2} > 0$$

In other words, as n or financial globalization increases, government responds by raising the probability of pursuing the good policy. The comparative static in (8) is what underlines the "discipline hypothesis."

2.4 Mood swings in international capital flows

Motivated by the behavioral finance literature, we now introduce possible mood swings in international capital flow into the model. We do so by letting the opportunity cost of capital, r, be subject to a random shock.

(9) $r = m\, r^*$

where m is a random variable whose property will be explained below, and r* is the world interest rate.

We assume that the host government does not observe m when it decides on the policy rule, q, (though it understands the distribution of m), but foreign investors observe m perfectly when solving their respective optimization problems.

The representative foreign investor's investment rule is simply a modification of the one given in (5'), which is now

(10) $K_f^{1/2} = q/(2mr^*)$

For convenience, we assume that m follows a binary distribution in such a way that

(11) $K_f^{1/2} = 0$ with probability s

$= q/(2r^*)$ with probability 1-s

This amounts to assuming that m=-∞ with probability s, and m=1 with probability 1-s. s can be interpreted as the probability of "sudden stops[4]." The economics behind this assumption is that for a positive probability s, international capital flows can leave the host country for reasons entirely unrelated to the country's economic or policy fundamentals (represented here in the model by q). It is in this sense that the shock to capital flow, m, is termed as the investor's "mood swings."

We now turn to the host government's policy choice in face of possible sudden stops in international capital flows. The objective function, modified from (6'), now becomes,

(12) $\max E(W) = q \{X + [n(1-s)q]/(2r^*) \} - \frac{1}{2} b q^2$

The optimal policy rule is given by

(13) $$q = \frac{xr^*}{br^* - n(1-s)}$$

It is easy to verify that there continues to be a "discipline effect" from more financial globalization to better economic policies, as long as mood swings do not completely overwhelm the underlying determinants of capital flows[5]:

(14) $$\frac{dq}{dn} = \frac{(1-s)xr^*}{[br^* - n(1-s)]^2} \geq 0$$ for $0 \leq s \leq 1$ where the equality holds when $s = 1$.

When mood swings constitute the entire drive force underlying the capital flows, that is, when s=1, then the expression in (14) holds in equality, which means a complete lack of the disciplinary effect.

[4] The term "sudden stop" was used in Calvo and Reinhart (2002) and Calvo and Mendoza (2000).
[5] We continue to maintain the assumption that $b \geq X + N/r$.

When s <1, it is still interesting to ask what the possibility of a sudden stop in capital flows does to the discipline argument. This can be checked by taking the derivative of dq/dn with respect to s:

$$(15) \qquad \frac{d^2q}{(dn)(ds)} = -\frac{xr^*\left[br^* + n(1-s)\right]}{\left[br^* - n(1-s)\right]^3} < 0$$

The expression in (15) implies that as the probability of a sudden stop in capital flows increases, the host government's policy responsiveness to financial globalization declines. In other words, **mood swings in international capital flows weaken the discipline effect on the host government**.

We might also note that different government policies may be associated with different levels of disutility of moving from bad to good policies. For example, it may be politically more painful for the host government to reduce government deficit than to reduce inflation rate[6]. This can be represented by a higher value of b for a better fiscal policy than for a better monetary policy. So it may be of interest to check whether the strength of the discipline effect also depends on the nature of the policy, represented here by b.

$$(16) \qquad \frac{d^2q}{(dn)(db)} = -\frac{2x\left(r^*\right)^2(1-s)}{\left[br^* - n(1-s)\right]^3} < 0$$

The expression in (16) suggests that as the disutility of policy effort, b, increases, the government's policy responsiveness to financial globalization also declines. In other words, **the disciplinary effect of capital flows might be weaker on government fiscal deficit than on inflation.**

To summarize, the model illustrates the logic behind the discipline effect. At the same time, it suggests that if international capital movement is subject to mood swings, then the discipline effect is weakened. In addition, government policies that are

[6] The political business cycle literature reports a robust positive association between fiscal deficit and re-election probability (see Drazen (2001) for a survey), whereas the association between inflation and re-election probability is weaker or even negative.

politically more costly to improve (e.g. reducing fiscal deficits) may also be less affected by the disciplinary effect of financial globalization.

3. The Data

In this section we explain the definitions and the sources of the main variables. We will link macroeconomic policies to measures of countries' degree of financial integration and other control variables. Our choice of control variables is guided by the relevant theories as will be explained below.

Macroeconomic Policy Stance

We use annual data for 62 countries - 22 industrial and 40 developing - over the period from 1975 to 1999 (the sample countries are listed in Table 1). Our sample includes most of the countries for which the data on foreign assets and liabilities were compiled by Lane and Milesi-Ferretti (2001).[7] In order to smooth out short-term fluctuations and to dampen serial correlation in variables, we average our data over five-year non-overlapping sub-periods: 1975-79, 1980-84, 1985-89, 1990-94, and 1995-99.

We judge the potential disciplining effects on national policies by the outcomes of these policies across countries. In other words, we define the overall stance of macroeconomic policies in terms of actual inflation and the budget deficit. We measure inflation as an annual percentage change in consumer prices and the fiscal deficit as the ratio of central government budget deficit to GDP, both as reported in the IMF's *International Financial Statistics*.[8] We realize that judging monetary and fiscal policies solely on the basis of, respectively, inflation rates and budget deficits is a simplification. This is especially true in the case of fiscal policy: the size of the public debt and the structure of public spending are also essential for policy evaluation. However, combining these multiple indicators into a comprehensive measure of policy is not easy. We eschew

[7] We excluded the following countries from the original Lane and Milesi-Ferretti dataset: Kuwait, Oman, and Saudi Arabia (as major oil producers), Taiwan POC (for lack of macroeconomic data), and Singapore (as an outlier with respect to the amount of capital flows).

[8] The fiscal deficit data were supplemented by the corresponding data from the IMF's *Government Finance Statistics* for Jamaica, Japan, and Mexico and from the IMF's *World Economic Outlook* for Algeria, Cote D'Ivoire, and Trinidad and Tobago.

the issue in this paper and focus on inflation and the deficit in an effort to gain initial insight into the disciplining effect of financial globalization.

International Financial Linkages

We measure exposure to financial globalization by total actual foreign assets and liabilities as a share of GDP, as derived by Lane and Milesi-Ferretti (2001). While most studies of capital account liberalization use the so-called *de jure* measures based on legal restrictions on capital account transactions (Eichengreen, 2001), these measures may not adequately reflect actual or *de facto* exposure of countries to international capital markets. Indeed, Edison, Klein, Ricci, and Slok (2002) argue that capital controls lose their effectiveness over time and tend to be circumvented, especially in developing countries, which, as a result, have experienced much larger capital flows than would have been consistent with their officially imposed capital account restrictions. With this in mind, we focus on actual (*de facto)* stocks of foreign assets and liabilities. However, as a robustness check, we also look at the binary *de jure* measure of capital account restrictions, as reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions.

The dataset compiled by Lane and Milesi-Ferretti (2001) provides estimates of foreign assets and liabilities and their subcomponents based on balance of payments data. This dataset extends the data on international investment positions (IIP), which have been published by the IMF for most industrial and some developing countries typically starting in the late 1970s or early1980s. In particular, the dataset provides estimates of the stocks of foreign direct investment and portfolio equity based on the cumulative flow data, adjusted to reflect changes in exchange rates and market prices. We construct our measure of financial openness using these adjusted series and the debt stock measures as reported in the IIP, whenever the latter are available. We realize that this may introduce certain distortions in our measure of financial openness due to the limited coverage of the debt stock data. Therefore, we also check robustness of our results using only the adjusted data on foreign direct and portfolio investment and excluding the debt stocks.

We propose an instrumental variable for the international financial linkage at the country-period level to be explained later.

4. Basic Analysis: A System of Linear Equations

In this section, we adopt a straightforward linear specification that simply treats lower inflation (or deficit) as better than higher inflation (or deficit). In the next section, we will move to a Markov transition matrix specification that recognizes the discreteness in the quality of macro policies. In addition to a measure of financial globalization, we have a number of control variables grounded in theories that are allowed to affect inflation rates or fiscal deficits.

To gain some intuition and visual impression, we start with summary statistics and scatter plots between financial globalization and macroeconomic policies. Then we proceed to estimate a liner system for inflation and fiscal deficit, controlling for other determinants of macroeconomic policies based on economic theories. Finally, we report a set of robustness checks of our findings.

Summary Information and Visual Inspection

Table 2 shows summary statistics for the main variables of interest. Average gross foreign assets and liabilities show a dramatic increase over the sample period for both developing and industrial countries. The increase is especially spectacular for industrial economies, where the stock of foreign capital reached the average level of 165 percent of GDP by the end of the period, which is four times the average level across developing countries. This capital consists predominantly of foreign liabilities (over 50 percent of the total stock across industrial countries and over 90 percent across developing countries, on average), even though the share of foreign assets rose throughout the sample period.

The inflation rates were lower in the late 1990s than in the late 1970s for both developing and developed countries. The exact dynamics were somewhat different between the two country groups: inflation was on the rise across developing countries in the 1970s and 1980s before declining during the 1990s, while in industrial countries it was much lower to begin with and it steadily declined throughout the sample period.

The average budget deficit exhibits a decline in both sets of countries, from about 5 percent of GDP, on average, in the late 1970s to about 2 percent of GDP in the late

1990s. Interestingly, the average deficit was very similar in industrial and developing countries and in fact lower in developing countries since the mid-1980s (although the dispersion was generally higher across the latter group).

To see if financial globalization and macroeconomic policies are at all related to each other, it is useful to start with some simple, bivariate scatter plots. Figure 1 presents a set of six scatter plots of inflation rate (in logarithmic form) against a measure of financial globalization for each five-year period as well as for the whole sample. There is apparently a negative relationship between inflation and financial globalization in the whole sample as well as in each of the sub-periods.

Figure 2 presents a similar set of scatter plots of fiscal deficit against financial globalization. The relationship between these variables is markedly weaker than between inflation and financial globalization.

Of course, these scatter plots reflect only bivariate correlations. They do not reveal what the true relationships are, conditional on other variables that would affect macroeconomic policies. Furthermore, they do not provide a clue on the direction of causality. For these issues, we turn to more formal statistical analyses.

Regression Analysis

Simple correlations between the variables of interest (see Table 3) confirm that the negative link with exposure to financial globalization is stronger for inflation (-0.39) than for the budget deficit (-0.12). For a more rigorous assessment of the effect of financial openness on macroeconomic policies, we estimate a system of simultaneous equations for inflation and the budget deficit by adopting the following specification:

$$\begin{aligned} \textit{Log Inflation}_{it} = {} & \beta_i + \beta_t + \beta_1\, \textit{Budget Deficit}_{it} + \beta_2\, \textit{Financial Openness}_{it} + \\ & \beta_3\, \textit{Exchange Rate Flexibility}_{it} + \beta_4\, \textit{Central Bank Governors}_{it} \\ & + \beta_5\, \textit{Trade Openness}_{it} + \beta_6\, \textit{Industrial Countries}_{i} + u_{it}, \end{aligned}$$

$$\begin{aligned} \textit{Budget Deficit}_{it} = {} & \alpha_i + \alpha_t + \alpha_1 \textit{ Log Inflation}_{it} + \alpha_2 \textit{ Financial Openness}_{it} + \\ & \alpha_3 \textit{ Government Changes}_{it} + \alpha_4 \textit{ Government Coalitions}_{it} + \\ & \alpha_5 \textit{ Trade Openness}_{it} + \alpha_6 \textit{ Industrial Countries}_{i} + \varepsilon_{it}, \end{aligned}$$

where i stands for countries and t stands for five-year periods. α_i and β_i denote regional dummies, while α_t and β_t are time dummies. The time dummies are to mop up any coincidental common trends in macroeconomic policies and financial globalization. We choose log inflation as the dependent variable in the first equation due to the presence of a number of high inflation observations in our sample (but no deflation observations). We realize that while this improves the statistical properties of our estimation, the coefficients in the inflation equation become somewhat more difficult to interpret. For this reason, we provide a check on our results in the following subsection using the method of Least Absolute Deviations (LAD), which is more robust to outlying observations than Ordinary Least Squares.

The system specification allows for two-day feedbacks between fiscal deficits and inflation. In addition, we use a number of other control variables, which are grounded in the literature on determinants of inflation and the fiscal deficit. Specifically, in the inflation equation, we use exchange rate flexibility, central bank independence, and trade openness as determinants of the monetary policies. In the deficit equation, we use government fragility and polarization as determinants of the fiscal policies.

It may be useful to present a brief motivation for these control variables. Since a fixed exchange rate serves as a nominal anchor for monetary policy, countries with more flexible exchange rates should have higher inflation rates than those with more fixed regimes. We use the index of exchange rate flexibility compiled by Reinhart and Rogoff (2002). This classification of exchange rate regimes is based on market-determined, rather than official exchange rates, and thus reflects *de facto* exchange rate arrangements better than most existing categorizations.

It is well established in the literature on monetary policy that central bank independence reduces inflationary bias under a discretionary monetary regime by alleviating the time inconsistency problem. We control for *de facto* central bank independence using the turnover rate of central bank governors from Ghosh, Gulde, and

Wolf (2003). The argument for using this proxy is that a high turnover of central bank governors reflects low independence from the government and hence should be associated with higher inflation rates. Other measures of central bank independence are not available for a large set of countries as the case of our sample.

In the inflation equation, we also control for trade openness, measured by the total volume of trade relative to GDP from the IMF's *International Financial Statistics*. Countries that are more open to trade are typically more competitive, which should dampen inflationary pressures. In addition, the benefits of a monetary expansion tend to be smaller in more open economies, given the relatively smaller size of the domestic sector and the potential feedback effects of exchange rate depreciation into domestic prices (Rogoff, 1985 and 2004; and Romer, 1993). Trade also tends to create winners and losers, thus prompting governments to spend more on compensation of the disadvantaged segments of the economy (Rodrik, 1998). In addition, countries that are more open to trade may also be more open to foreign capital, so including a measure of trade openness helps us to isolate policy effects due specifically to financial globalization.

Alesina and Tabellini (1990) argue that a government may intentionally overspend and accumulate debt in order to limit spending choices of the rival party that may take over the office in the next period. This reasoning implies that frequent government changes should be associated with higher fiscal deficits. To control for this, we include the number of government changes per year constructed from the data in the Cross-National Time Series Data Archive (Banks, 1979 and updated). This indicator combines the number of executive changes, cabinet changes, and coups d'etat per year.

Alesina and Drazen (1991) propose an explanation for delayed fiscal adjustments based on distributional conflict within a coalition government. The argument is that if the burden of stabilization is unequally distributed among the coalition members, it makes sense for each party to resist the adjustment hoping that other parties would concede first. This theory predicts that countries with polarized coalition governments should run higher fiscal deficits. To take this into account, we control for the number of coalition governments per year available in the Cross-National Time Series Data Archive (Banks, 1979 and updated).

We estimate the baseline specification of our system using Three-Stage Least Squares (3SLS). In the first stage, this approach produces predicted values for the endogenous variables from their regressions on all exogenous variables in the system. In the second stage, 2SLS residuals from each equation are used to obtain consistent estimates of the error covariance matrix. The third stage is a Generalized Least Squares (GLS) estimation using the instruments for the endogenous variables obtained in the first stage and the error covariance matrix obtained in the second stage. The 3SLS approach produces more efficient estimates than single-equation 2SLS, since it utilizes the information about cross-equation correlations of the disturbance terms.

These results are reported in the first two columns of Table 4. We find that exposure to financial globalization has a small but significant and negative effect on inflation, but no effect on the budget deficit. This is consistent with the unconditional plots in Figures 1-2, which suggested a weak association between capital flows and budget deficits, but a strong association between capital flows and inflation.

Instrumental Variable Approach

This simple approach, however, may produce biased estimates for several reasons. First, the causality may run not from capital flows to macro policies, but in the reverse direction. In other words, it may not be the exposure to foreign capital that disciplines national policies, but rather foreign investors may be channeling their funds to countries where inflation and the fiscal deficit are already low. Second, the capital flows variable may be measured with errors especially due to the difficulty in capturing capital gains (see Lane and Milesi-Ferretti, 2001, for a discussion). The measurement errors could induce an attenuation bias that would push the estimated coefficient toward zero.

We attempt to obtain more consistent estimates in a second version of our approach by allowing the capital flows variable to be endogenous and adding a third equation to our original system to explain financial openness. On the right hand side of this equation we include a weighted average of gross foreign assets and liabilities as a percentage of GDP in other countries in the same geographic region, with the weights inversely related to the distances from a given country.

It may be useful to explain in some more detail the idea behind this instrumental variable approach. The basic assumption is that the fluctuations of capital outflows from a given source country to all recipient countries have sizable common components. However, due to geography, history, and other factors, recipient countries in different parts of the world may have different levels of relative dependence on different source countries. For example, Latin American countries may depend relatively more on capital inflows from the United States. Asian countries may depend disproportionately more on capital flows from Japan. Countries in Central and Eastern Europe may receive more capital from Germany than developing countries in other regions. Our proposed instrumental variable measures the common component of capital flows to countries in the same region (similar to an increase in n, the number of potential foreign firms that could invest in the country, in the theoretical model in Section 2). Empirically, this variable is indeed strongly correlated with capital flows in a given country (the overall correlation is 0.58 and it increases over the sample period), but it is much less likely to be the result of domestic macroeconomic policies of the country in question. Also, averaging across capital flows into the neighboring countries should reduce the measurement error associated with the capital flows variable and therefore help to correct the possible attenuation bias.

Our estimation results with endogenous financial openness are presented in the middle three columns of Table 4[9]. We again find that an increase in financial globalization has a small but significantly negative effect on inflation, but no effect on the budget deficit. The coefficient on financial globalization in the inflation equation is larger than in the uninstrumented regression in the first column of Table 4. This suggests that the attenuation bias resulting from measurement error in the capital flows variable is probably more important than the endogeneity bias[10].

A possible concern with our instrumental variable approach is that economic policies of economically large economies could spill over to affect the economic conditions and hence macroeconomic policies of their neighboring countries. This gives

[9] Note that factors common to all source-recipient pairs are absorbed by the time dummies and would not affect the slope estimates.

[10] In fact, we do not find any evidence of reverse causation in the equation of financial globalization: both inflation and the budget deficit come out insignificant.

rise to the possibility that capital flows to small and medium-sized countries are the result of the macroeconomic policies of the economically large economies in the region. To minimize any contamination of our inference from this possibility, we exclude economically large countries from our instrument for financial openness.[11] The results from using this modified instrument are presented in the last three columns of Table 4. As one can see, they are very similar to our baseline findings. Therefore, our findings do not appear to depend on the potential policy contagion from large neighboring countries.

Finally, it may be worth noting that the coefficients on all of our control variables have expected signs and most of them are statistically significant. For example, an increase in central bank independence – measured by a reduction in the turnover rate of central bank governors – is associated with a reduction in inflation rates (as predicted by Kydland and Prescott, 1977; Barro and Gordon, 1983; Rogoff, 1985; and a large literature that followed). An increase in trade openness is also associated with a lower inflation rate (as predicted by Romer, 1993). Frequent changes in governments are associated with an increase in fiscal deficit (as predicted by Alesina and Tabellini, 1990). These results are broadly consistent with the prior literature on the determinants of inflation and fiscal deficits.

Robustness Checks and Extensions

We check robustness of our findings in several ways (see Table 5). First, in order to circumvent the need for a semi log specification of the inflation equation, we employ the Least Absolute Deviations (LAD) approach, which is less sensitive to outliers than the OLS. The LAD estimator is a special case of the quantile regression that estimates the median regression. The results (the first two columns of Table 5) are consistent with our baseline findings: the coefficient on financial openness is negative and statistically significant in the inflation equation and insignificant in the deficit equation.

Second, we use a restricted measure of financial openness that excludes debt stocks, since those are not available for a number of countries in our dataset. Excluding debt stocks does not alter our baseline results (see the middle two columns of Table 5). In

[11] We exclude Argentina, Australia, Belgium, Brazil, Chile, China, Colombia, France, Germany, India, Indonesia, Italy, Japan, Korea, Mexico, Netherlands, Peru, South Africa, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States, and Venezuela.

fact, the association between financial openness and inflation becomes somewhat stronger. This finding perhaps reflects the possibility that foreign direct investments (and maybe portfolio equity investments) are less subject to mood swings than foreign loans. In this sense, this result is in line with our theoretical model in Section 2.

Third, using a *de jure* measure of financial openness (a binary indicator reported in the IMF's Annual Report of Exchange Arrangements and Exchange Restrictions) also produces similar results, with a significant negative effect on inflation and an insignificant effect on the deficit (see the last two columns of Table 5).

In sum, we find that financial openness has a small statistically significant effect on inflation but no effect on the budget deficit. Instrumenting financial openness by a weighted average measure of financial openness across neighboring countries reinforces these results and produces a larger negative effect on inflation. We interpret the increase in the coefficient on financial openness after instrumenting as reflecting a smaller attenuation bias due to a reduction in measurement errors in international capital flows. Our findings are robust to an alternative estimation approach and two alternative measures of financial openness.

5. Transition Matrix Specification

While the linear specification is a useful starting point, it may not be the most effective one for analyzing determinants of overall soundness of macroeconomic policies. It is well established in the literature that inflation has substantial adverse effects on the economy only beyond a certain threshold level (see, for example, Bruno and Easterly (1995), Khan and Senhadji (2000), and Fischer, Sahay, and Vegh (2002)). Similarly, budget deficits are problematic only if they are sufficiently large, so as to threaten overall macroeconomic stability (the Maastricht criteria set thresholds on deficit and debt, though the exact levels are controversial). Since there are threshold effects in the impact of macroeconomic variables on welfare, there is inherent discreteness in defining good versus bad macroeconomic policies.

Furthermore, since small fluctuations in budget deficits or inflation rates do not necessarily reflect any changes in government attitudes towards maintaining fiscal

prudence and price stability, a threshold-based approach is better suited for analyzing the discipline effect of financial globalization on the underlying macroeconomic policy stance. In addition, since the effect of financial globalization on the transition to better policies need not be the same as that on the transition to worse policies, an approach that differentiates between episodes of policy improvement and deterioration would be more appropriate for our analysis than a simple linear model.

With this in mind, we now go beyond the linear model and focus our attention on an alternative methodology based on Markov chains with variable transition probabilities. This approach allows us to incorporate threshold effects in inflation and the fiscal deficit and to determine whether the potential discipline effect is effective in inducing policy shifts from the "bad" to the "good" territory.

Analytical Background

The transition matrix approach provides a natural framework for an analysis of the dynamics across discrete states and allows one to assess the distribution across these states that would prevail in the long run, if the underlying model remains unchanged[12]. It allows one to capture performance of countries relative to each other by studying how the whole distribution evolves over time. The transition matrix approach can also be extended to analyze factors that affect probabilities of regime shifts across countries and over time[13]. We use this method to study the evolution of macroeconomic policies and to analyze the role of international financial integration in triggering shifts of policy stance.

The simplest empirical model underlying the transition matrix approach is a first-order stochastic difference equation describing the evolution of a sequence of discrete distributions: $\pi_{t+1} = \pi_t P$. The approach is based on the theory of first-order Markov chains, i.e., discrete stochastic processes with the property that given the current realization, future realizations are independent of the past. Under certain reasonably unrestrictive regularity conditions, the sequence of transition matrices converges to a

[12] This approach has been traditionally used in studies of economic growth and convergence (originally by Quah, 1993 and, more recently, by Kremer, Onatski, and Stock, 2001).
[13] This approach was recently employed in studies of "hollowing out" in exchange rate regimes (see Masson, 2001 and Masson and Ruge-Murcia, 2002).

limiting matrix and there exists a unique long run, or ergodic, distribution π_e for all initial probability distributions over a given state space.

Transition probabilities can be allowed to vary across time and countries by means of a nonlinear re-parameterization in terms of a set of explanatory variables. In particular, a convenient re-parameterization involves using logit functions under the appropriate constraints on transition probabilities (see Masson and Ruge-Murcia, 2002). The constraints are: (a) transition probabilities are bounded between zero and one and (b) each row of the transition matrix sums to one. A model of this type can be estimated by maximum likelihood to obtain (asymptotically) efficient and consistent estimates of the coefficients on explanatory variables.

The re-parameterization just described can be expressed as follows:

$$p_{ii}(X_t) = 1/(1+\sum_{k\neq i}\exp(\beta'_{ik}\, X_t)),$$
$$p_{ij}(X_t) = \exp(\beta'_{ij}\, X_t)/(1+\sum_{k\neq i}\exp(\beta'_{ik}\, X_t))\ \textit{for}\ i \neq j,$$

where $p_{ij}(X_t)$ denotes the transition probability (conditional on a set of explanatory variables X_t) and β_{ik} is a vector of coefficients on that set of variables. We can now construct the likelihood function for every country as the probability of observing a given sequence of states. Since transition probabilities in a first-order Markov chain are independent of past history, the likelihood function for country k is as follows:

$$L(k) = \pi_{0k}\prod_i\prod_j (p_{ijk}(X_t))^{Nijk},$$

where $Nijk$ is the number of times a transition from state i to state j in country k occurs. The log likelihood function for the full sample is obtained by taking logs of the likelihood functions for each country and summing up over all the countries:

$$Log\ L = \sum_k \ln(\pi_{0k}) + \sum_k\sum_i\sum_j Nijk \ln(p_{ijk}(X_t)).$$

This log likelihood function can be maximized numerically to obtain estimates of the coefficients on the explanatory variables.

We estimate the effects of financial globalization on monetary and fiscal policies, both jointly and separately. As it turns out, relatively little information is lost if the two

effects are estimated separately. For expositional convenience, we report the results on inflation first, and follow with those on budget deficits. We describe the results when inflation and budget deficits are estimated jointly at the end as a robustness check.

Analysis of Inflation

We start with a discussion of the effect of financial globalization on monetary policies, represented by levels of inflation. In order to separate cases of low, moderate, and high inflations, we impose two thresholds on inflation rates. We set the lower threshold at 10% per year, which is approximately equal to the median inflation rate across our sample. The 10% threshold is broadly consistent with the result in Khan and Senhadji (2000) that inflation beyond the level of 7-11% hurts growth in developing countries. Following Bruno and Easterly (1995), we set the upper threshold at 40% per year. This allows us to analyze separately any possible discipline effect of financial openness in high-inflation countries[14]. These thresholds divide our sample into three groups according to their monetary policy states: Low (inflation less than 10% per year), Moderate (inflation between 10% and 40% per year), and High (inflation over 40% per year).

Table 6a shows transition probabilities among these states over five five-year sub-periods, calculated as the number of transitions between a pair of states relative to the number of countries in the initial state, over the whole sample. In other words, cell (i, j) in the transition matrix shows transitions from state i to state j relative to the number of countries initially in state i. We see that the low inflation state is the most persistent, so that 84% of countries that start in that state in one five-year period remain there over the following five-year period. We also see that switches between very low and very high inflation states are infrequent: the probabilities of transitions between the low and high inflation states are not significantly different from zero.

The last row of the matrix contains the ergodic distribution, or the distribution that would prevail in the long run provided that transition dynamics remain unchanged. We see that 70% of countries converge over time to the low inflation state, while only 4%

[14] There is an insufficient number of hyperinflationary episodes (over any five-year period) to make it a separate state in the transition matrix.

converge to the high inflation state. Compared with the actual sample proportions shown in the preceding row, the gradual move toward lower inflation is evident in our sample. Table 4b presents some examples of countries in various categories of transition across inflation states.

Our next step is to determine whether exposure to financial globalization that took place over the same period exerted any influence on the observed move toward low inflation across countries. We accomplish this by conditioning the transition probabilities on exposure to financial globalization and a set of control variables. In order to increase the efficiency of our estimates, we impose zero restrictions on those transition probabilities that turned out statistically insignificant (see Table 6a). Like in the linear case, we run two alternative versions of this estimation: first, with exogenous financial globalization and, second, with financial globalization instrumented by the weighted average of the external financial stocks among neighboring countries. The first version is estimated by maximum likelihood as explained above, while the second version involves a two-stage instrumental variables procedure. At the first stage, we obtain predicted values for the exposure to financial globalization from a least-squares regression of exposure to financial globalization on the full set of instruments. At the second stage, we use these predicted values in place of the original financial openness variable and estimate the transition matrix using maximum likelihood.[15]

Table 7 presents our findings.[16] The rows of this table show the estimated coefficients on the explanatory variables, with the columns corresponding to different transition probabilities. In the first (uninstrumented) version of the estimation, we find that exposure to financial globalization has a negative and statistically significant effect on the probability of transitions from low to moderate inflation. In other words, countries that are more exposed to financial globalization are less likely to move from low to medium inflationary states. This is consistent with the disciplinary hypothesis. However, exposure to financial globalization does not have statistically significant effects on other transition probabilities.

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[15] Note that we report the standard errors from the second stage, hence they do not account for the fact that predicted values for financial openness are used in place of the original variable.

[16] Since this approach allows us to capture sample heterogeneity by running the estimations separately for each country group defined by a different policy state, we omit time and country controls.

The statistical significance of financial globalization improves after instrumenting the capital flows variable (reported in the lower panel of Table 7). Thus, in the second (instrumented) version of the estimation we find, in addition, that exposure to financial globalization has a positive and statistically significant effect on the probabilities of transitions from high inflation to moderate and from moderate to low. We interpret this as supporting the attenuation bias story: in the absence of instrumenting, measurement error in the capital flows variable pushes the corresponding coefficients toward zero, while with instrumenting the absolute values of the affected coefficients tend to increase by more than their standard errors.[17] This attenuation bias is strong enough that it seems to outweigh any potential endogeneity bias that would have pushed the coefficients in the opposite direction. The coefficients on the control variables have expected signs and offer some support to the view that exchange rate anchors matter in stabilizations and that central bank independence plays a role in low and moderate inflation countries.

Overall, there is some support for the view that exposure to financial globalization provides a disciplinary effect on monetary policies: With a higher level of financial openness, countries with low inflation levels are less likely to increase them; countries with medium or high inflation levels are more likely to lower them.

Analysis of Deficits

We now turn to an analysis of the effect of financial globalization on a government's budget deficit. Consistent with our analysis of inflation, we impose two thresholds on deficit levels that separate cases of low, moderate, and high deficits. We set the lower threshold at 3% of GDP, which is approximately equal to the median deficit in our sample and which also coincides with the Maastricht Treaty criterion. We set the upper threshold at 8% of GDP. This upper threshold defines a similar proportion of "extreme" or high-deficit countries, as the 40% inflation threshold.

These two thresholds divide our sample into three policy states: Low Deficits (less than 3% of GDP), Moderate Deficits (between 3% and 8% of GDP), and High

[17] Note also that since measurement error in one variable can bias the coefficients on the other variables, the coefficients on the control variables may change as a result of instrumenting the capital flows variable.

Deficits (over 8% of GDP). Table 8a shows transition probabilities among these states and the long run (ergodic) distribution.

As in the case of inflation, the low deficit state is the most persistent. Unlike in the case of inflation, however, dramatic switches between very low and high deficits do take place: the probability of transitions from the high deficit state to the low deficit state is statistically significant. As with inflation, a comparison of the ergodic distribution and the actual sample proportions shows the gradual move toward lower deficits in our sample. For concreteness, Table 8b gives some examples of countries that have made various transitions.

In Table 9, we report the results from the transition matrix analysis, in which the transition probabilities are conditioned on exposure to financial globalization and other control variables. In contrast to inflation, we do not find any evidence of the influence of financial globalization on the observed tendency of diminishing deficits. We do not find any statistically significant effects of financial globalization on the probabilities of shifts in fiscal policy with or without instrumenting (reported in the lower and upper panels of Table 9, respectively). There are only two statistically significant coefficients in this table, both on the number of government changes, which suggest that government fragility hinders stabilizations from high deficit levels.

Overall, there is no support for the view that exposure to financial globalization exerts a disciplinary effect on government budget deficits.

Robustness Checks

We checked robustness of our findings in several ways. First, we ran our estimations with different threshold levels and found that such perturbations did not alter our main findings.[18]

Second, we combined inflation and deficit states in a single transition matrix framework (i.e. classifying policies into the low inflation and low deficit state, the high inflation and high deficit state, and other intermediate states) and obtained qualitatively similar results. We also found that analyzing monetary policy transitions and fiscal policy

[18] Specifically, we varied the policy thresholds around their baseline levels: for inflation, we varied the first threshold from 5% to 15% and the second one from 30% to 50%; for fiscal deficit, we varied the first threshold from 2% to 4% and the second one from 7% to 9%.

transitions independently from one another does not lead to a significant loss of information.[19]

Third, we re-estimated our equations for inflation and budget deficits using a more conventional probit approach and obtained similar results. We found that greater exposure to financial globalization lowered the probability of moderate/high (over 10% per year) and high (over 40% per year) inflations, but that it did not have any effect on the probability of high deficits at the ten percent significance levels. We also found that greater exposure to financial globalization lowered the probability of moving to higher inflation states (i.e. from low to moderate/high or from moderate to high inflation), but had no effect on the dynamics of fiscal deficits.[20] These results are in line with our findings based on the transition matrix specification, and hence are not reported here to save space. The transition matrix approach is considerably more informative than probit estimations, since it allows us to analyze specific policy transitions in different country groups and to calculate the associated ergodic distributions.

In sum, our results from the transition matrix specification are in line with our results from the linear regressions: exposure to financial globalization may have exerted some disciplining effect on inflation, but none detectable on the budget deficit.

6. Conclusions

This paper studies whether financial globalization has helped to induce governments to pursue better policies at home (the "discipline effect"). We present a simple theoretical model that formalizes the logic behind this effect. Within the same model, we demonstrate how mood swings in international capital flows and the nature of

[19] Specifically, we estimated a system of equations for the combined transition probabilities and found that we could not reject the hypothesis of equal coefficients between the equations describing transitions from low to high inflation (or reverse) in low deficit countries and in high deficit countries. Similarly, we could not reject the hypothesis of equal coefficients between the equations describing transitions from low to high deficits (or reverse) in low inflation countries and in high inflation countries.

[20] To get these results, we first defined high inflations and high deficits as zero/one variables and ran them on our set of control factors. Then we constructed a set of binary variables describing transitions up or down across inflation and deficit states. We set these variables to equal one if there occurred a transition to a higher state (i.e. from Low to Moderate/High or from Moderate to High) and zero otherwise, and likewise for transitions to lower states. We ran these variables on our set of controls to get the effects on dynamics.

policies may influence the strength of the discipline effect from financial globalization.

While the discipline effect could apply to a variety of government policies, obtaining a cross-country time series measure of many such policies is a challenging if not infeasible task. For this reason, we choose to test the hypothesis in the area of national monetary and fiscal policies, whose measures are conceptually straightforward and available from standard sources.

Our results suggest that the strength of the discipline effect may vary across different government policies. There is some evidence that financial globalization may have induced countries to pursue low-inflation monetary policies, but no evidence that it has encouraged lower budgetary deficits.

Future research could develop a panel measure of government policies in other areas, such as regulation of equity and labor markets, and anti-trust policies, and then apply the methodology developed in this paper to these policies. Furthermore, financial globalization can induce private companies to pursue better corporate governance. So the methodology is also useful in that context as well.

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Figure 1: Log Inflation and Financial Globalization, by time period

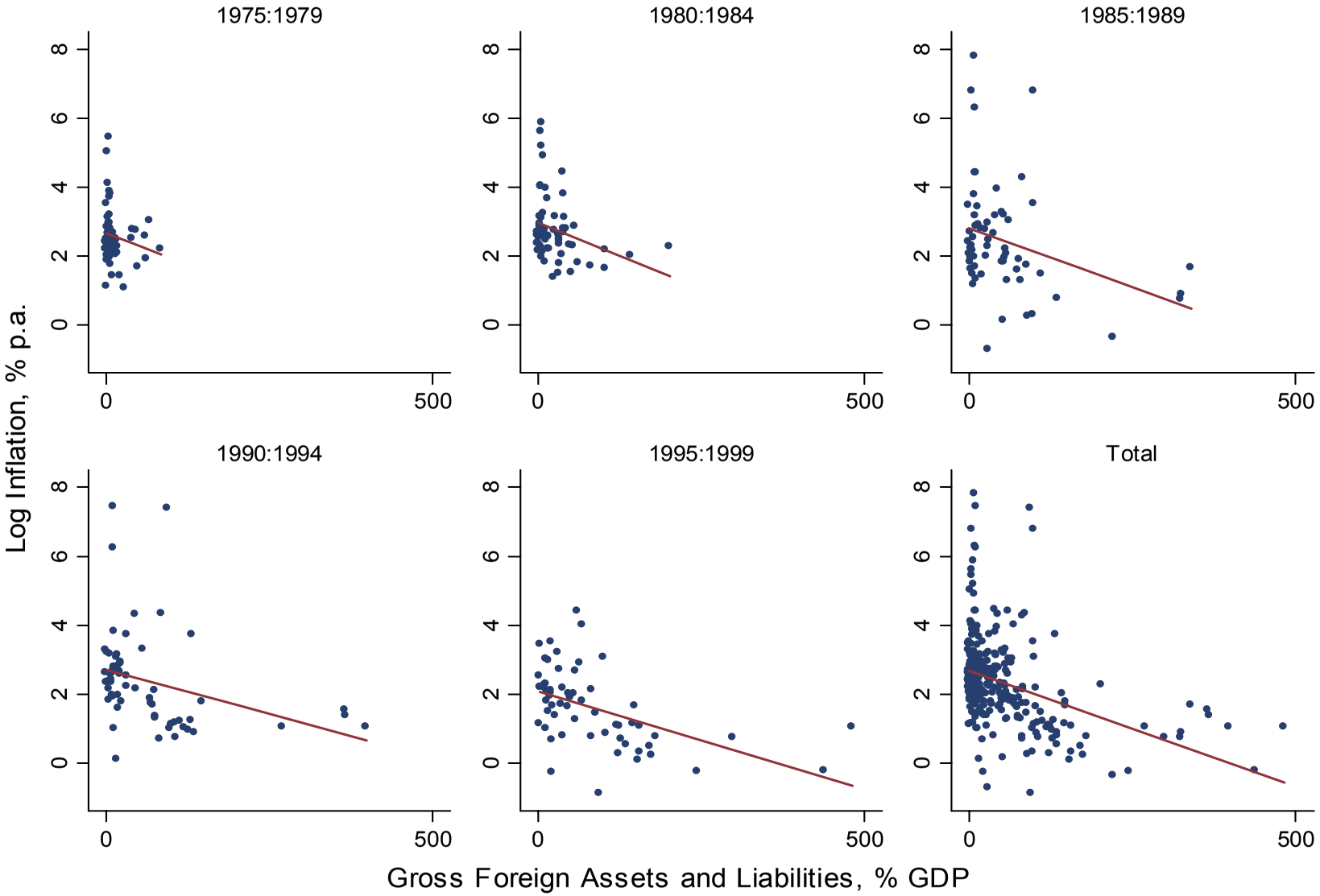

Figure 2: Budget Deficit and Financial Globalization, by time period

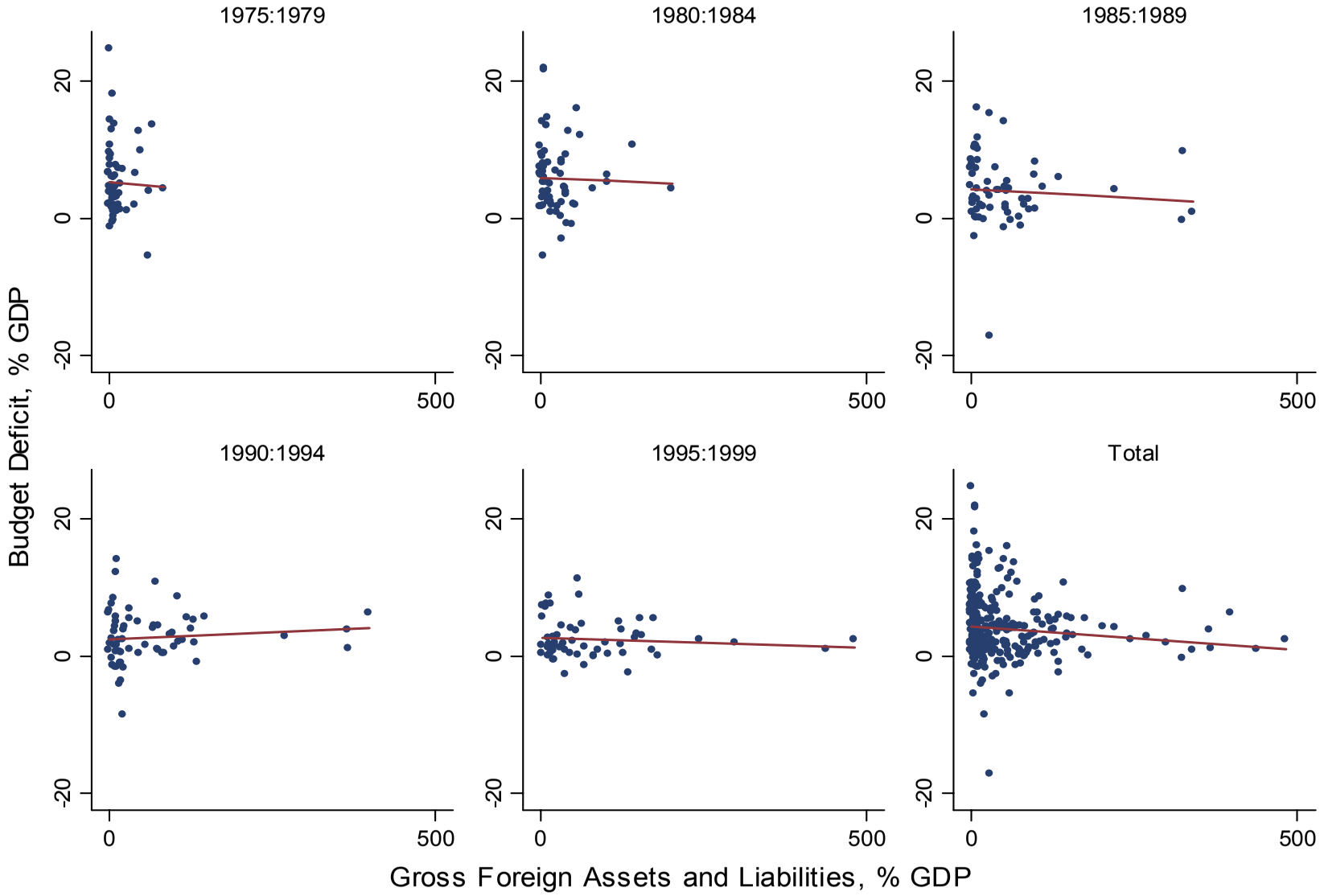

Table 1: Sample countries

Industrial Countries	*Developing Countries*	
1. Australia (AUS)	1. Algeria (DZA)	23. Mauritius (MUS)
2. Austria (AUT)	2. Argentina (ARG)	24. Mexico (MEX)
3. Belgium (BLX)	3. Bolivia (BOL)	25. Morocco (MAR)
4. Canada (CAN)	4. Botswana (BWA)	26. Pakistan (PAK)
5. Denmark (DNK)	5. Brazil (BRA)	27. Panama (PAN)
6. Finland (FIN)	6. Chile (CHL)	28. Paraguay (PRY)
7. France (FRA)	7. China (CHN)	29. Peru (PER)
8. Germany (DEU)	8. Colombia (COL)	30. Philippines (PHL)
9. Greece (GRC)	9. Costa Rica (CRI)	31. South Africa (ZAF)
10. Iceland (ISL)	10. Cote D'Ivoire (CIV)	32. Sri Lanka (LKA)
11. Ireland (IRL)	11. Dominican Republic (DOM)	33. Syria (SYR)
12. Italy (ITA)	12. Ecuador (ECU)	34. Thailand (THA)
13. Japan (JPN)	13. Egypt (EGY)	35. Trinidad and Tobago (TTO)
14. Netherlands (NLD)	14. El Salvador (SLV)	36. Tunisia (TUN)
15. New Zealand (NZL)	15. Guatemala (GTM)	37. Turkey (TUR)
16. Norway (NOR)	16. India (IND)	38. Uruguay (URY)
17. Portugal (PRT)	17. Indonesia (IDN)	39. Venezuela (VEN)
18. Spain (ESP)	18. Israel (ISR)	40. Zimbabwe (ZWE)
19. Sweden (SWE)	19. Jamaica (JAM)	
20. Switzerland (CHE)	20. Jordan (JOR)	
21. United Kingdom (GBR)	21. Korea (KOR)	
22. United States (USA)	22. Malaysia (MYS)	

Table 2: Summary statistics

Period	*1975:1979*	*1980:1984*	*1985:1989*	*1990:1994*	*1995:1999*
	Inflation (% p.a.)				
Mean					
Developing Countries	24.80	40.87	135.52	111.87	12.79
Industrial Countries	12.25	12.40	6.25	4.38	2.00
Median					
Developing Countries	11.84	14.39	15.24	13.83	7.99
Industrial Countries	10.01	9.66	4.63	3.27	1.95
Standard Deviation					
Developing Countries	42.57	72.86	421.40	363.09	15.06
Industrial Countries	7.90	10.73	5.58	3.14	1.15
	Budget deficit (% GDP)				
Mean					
Developing Countries	5.22	5.98	3.90	1.85	2.49
Industrial Countries	5.07	5.41	4.10	4.29	2.05
Median					
Developing Countries	4.00	4.60	3.11	1.46	1.63
Industrial Countries	3.80	5.17	3.92	3.90	1.73
Standard Deviation					
Developing Countries	5.80	5.77	5.35	3.80	2.98
Industrial Countries	3.43	3.80	4.38	3.44	2.58
	Exposure to Financial Globalization: Gross foreign assets and liabilities (% GDP)				
Mean					
Developing Countries	10.55	16.78	26.72	26.22	41.02
Industrial Countries	19.82	49.91	102.70	137.18	164.86
Median					
Developing Countries	6.36	9.92	12.73	16.87	28.27
Industrial Countries	9.28	33.76	67.07	106.71	136.27
Standard Deviation					
Developing Countries	14.97	16.57	29.05	29.35	35.92
Industrial Countries	21.70	50.06	104.18	111.10	118.71

Table 3: Correlation matrix

	Log Inflation	***Budget Deficit***	**Financial Openness**	***Exchange Rate Flexibility***	**Central Bank Governors**	***Number of Government Changes***	**Number of Coalition Governments**
Budget Deficit	0.22						
Financial Openness	-0.39	-0.12					
Exchange Rate Flexibility	0.41	-0.02	-0.08				
Central Bank Governors	0.48	0.07	-0.18	0.14			
Number of Government Changes	0.16	0.22	-0.12	-0.02	0.28		
Number of Coalition Governments	-0.14	0.06	0.13	-0.07	-0.06	0.15	
Trade Openness	-0.34	-0.07	0.21	-0.37	-0.26	-0.18	0.22

Table 4: Linear system specification for log inflation and the budget deficit: 3SLS estimation

	Financial Openness Exogenous		*Financial Openness Endogenous*			*Financial Openness Endogenous, Instrumented Excluding Large Countries*		
	Log Inflation	**Budget Deficit**	**Log Inflation**	**Budget Deficit**	**Financial Openness**	**Log Inflation**	**Budget Deficit**	**Financial Openness**
Log Inflation (% p.a.)		0.08		0.28	0.44		0.19	0.69
		(0.62)		(0.78)	(9.25)		(0.70)	(9.09)
Budget Deficit (% GDP)	0.08		0.01		-3.61	0.03		-4.35
	(0.06)		(0.07)		(3.78)	(0.06)		(4.00)
Financial Openness (% GDP) †	-0.25***	0.09	-1.43***	4.75		-1.10**	3.34	
	(0.09)	(0.48)	(0.55)	(3.08)		(0.50)	(2.84)	
Exchange Rate Flexibility	0.12***		0.11***			0.12***		
	(0.02)		(0.02)			(0.02)		
Central Bank Governor Turnover	0.81***		0.87***			0.85***		
	(0.25)		(0.27)			(0.26)		
Number of Government Changes		1.50***		1.78***			1.68***	
		(0.45)		(0.54)			(0.51)	
Number of Coalition Governments		0.21		0.35			0.34	
		(0.62)		(0.71)			(0.69)	
Trade Openness (% GDP) †	-0.40**	-0.26	-0.05	-1.62	33.67**	-0.18	-1.21	35.36**
	(0.17)	(1.01)	(0.29)	(1.34)	(14.22)	(0.25)	(1.28)	(14.79)
Industrial Countries (dummy)	-0.89***	-1.48	-0.29	-3.86*	48.26**	-0.49	-3.14	46.69**
	(0.28)	(1.41)	(0.48)	(2.14)	(19.61)	(0.42)	(2.03)	(20.11)
Financial Openness in Neighboring Countries †					49.58***			82.44***
					(17.11)			(28.00)
Region dummies	yes	yes	yes	yes	yes	yes	yes	yes
Period dummies	yes	yes	yes	yes	yes	yes	yes	yes
N	272	272	272	272	272	267	267	267
"R2"	0.91	0.55	0.84	0.39	0.57	0.88	0.47	0.54
First Stage F-test for Financial Openness			10.04	10.04		9.16	9.16	
			[0.00]	[0.00]		[0.00]	[0.00]	
First Stage F-test	5.01	30.64	5.71	27.53		5.14	28.90	
	[0.01]	[0.00]	[0.00]	[0.00]		[0.01]	[0.00]	
Overidentification Chi2-test	0.22	0.52	0.47	0.39	0.39	0.72	0.42	0.25
	[0.64]	[0.47]	[0.49]	[0.53]	[0.82]	[0.40]	[0.52]	[0.88]

† For clarity, the coefficient and the standard error on this variable are multiplied by 100.
Region dummies: Asia and Pacific, Middle East and North Africa, Sub-Saharan Africa, Latin America, North America, and Europe.
Period dummies: 1975~1979, 1980~1984, 1985~1989, 1990~1994, and 1995~1999.
*, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively. Standard errors in parentheses. P-values in brackets. All variables are 5-year averages.

Table 5: Robustness checks: on the estimation approach and measures of financial openness

	Least Absolute Deviations (LAD)		*Restricted Financial Openness*		*De Jure Financial Openness*	
	Inflation	**Budget Deficit**	**Log Inflation**	**Budget Deficit**	**Log Inflation**	**Budget Deficit**
[Log] Inflation (% p.a.)		0.004***		0.09		-0.04
		(0.001)		(0.62)		(0.67)
Budget Deficit (% GDP)	0.32***		0.05		0.08	
	(0.09)		(0.06)		(0.06)	
Financial Openness (%GDP) †	-1.48**	0.16	-0.79***	0.89	-67.70***	-91.04
	(0.59)	(0.52)	(0.27)	(1.51)	(14.32)	(91.21)
Exchange Rate Flexibility	1.10***		0.12***		0.12***	
	(0.13)		(0.02)		(0.02)	
Central Bank Governor Turnover	8.60***		0.83***		0.65***	
	(1.74)		(0.25)		(0.24)	
Number of Government Changes		1.53***		1.53***		1.42***
		(0.51)		(0.45)		(0.44)
Number of Coalition Governments		-0.38		0.26		0.40
		(0.74)		(0.63)		(0.63)
Trade Openness (% GDP) †	-1.81	-0.25	-0.34*	-0.40	-0.34**	-0.21
	(1.24)	(0.95)	(0.18)	(1.01)	(0.16)	(0.99)
Industrial Countries (dummy)	-6.63***	-1.53	-0.86***	-1.62	-0.73***	-1.08
	(2.00)	(1.60)	(0.28)	(1.42)	(0.27)	(1.39)
Region dummies	yes	yes	yes	yes	yes	yes
Period dummies	yes	yes	yes	yes	yes	yes
N	273	296	272	272	273	273
"R2"	0.07	0.13	0.91	0.55	0.91	0.55
First Stage F-test			5.14	30.55	4.87	29.52
			[0.01]	[0.00]	[0.01]	[0.00]
Overidentification Chi2-test			0.29	0.48	0.12	0.46
			[0.59]	[0.49]	[0.73]	[0.50]

† For clarity, the coefficient and the standard error on this variable are multiplied by 100.
Region dummies: Asia and Pacific, Middle East and North Africa, Sub-Saharan Africa, Latin America, North America, and Europe.
Period dummies: 1975~1979, 1980~1984, 1985~1989, 1990~1994, and 1995~1999.
*, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively. Standard errors in parentheses. P-values in brackets. All variables are 5-year averages.

Table 6a: Transition and long run probabilities across inflation states

Policy State	*L (< 10%)*	*M (10% - 40%)*	*H (> 40%)*
L (< 10%)	**.84**	**.16**	.00
M (10% - 40%)	**.42**	**.52**	**.06**
H (> 40%)	.06	**.28**	**.66**
Sample average	.52	.37	.11
Long Run (ergodic)	.70	.26	.04

Transitions are over 5-year periods (1975~79, 1980~84, 1985~89, 1990~94, 1995~99).
Bold indicates statistical significance at 1% level.

Table 6b: Examples of actual country transitions across inflation states

Policy State	*L (< 10%)*	*M (10% - 40%)*	*H (> 40%)*
L (< 10%)	Australia Austria Belgium Canada Germany Denmark Finland France Italy Japan Jordan Korea Malaysia Mauritius Morocco Netherlands Norway Panama Spain Sweden Switzerland Thailand Tunisia UK USA	India Indonesia Sri Lanka Sweden Venezuela	
M (10% - 40%)	Bolivia Botswana Chile Egypt El Salvador Greece Guatemala India Indonesia Ireland Israel Italy Korea Mauritius Norway Pakistan Philippines South Africa Spain Sri Lanka	Chile Colombia Costa Rica Dominican Rep. Egypt El Salvador Greece Italy Jamaica New Zealand Paraguay Portugal South Africa Syria Zimbabwe	Bolivia Mexico
H (> 40%)		Chile Ecuador Israel	Argentina Brazil Israel Peru Turkey Uruguay

Table 7: Maximum likelihood estimation of variable transition probabilities for inflation

Policy Transitions	*L → M*	*M → L*	*M → H*	*H → M*
1) Financial Globalization Exogenous				
Exposure to Financial Globalization (%GDP)	-0.10** (0.05)	0.01 (0.01)	0.02 (0.02)	-0.01 (0.01)
Budget Deficit (% GDP)	-0.005 (0.09)	-0.05 (0.05)	-0.03 (0.11)	-0.13 (0.10)
Exchange Rate Flexibility	0.06 (0.14)	-0.12 (0.08)	0.02 (0.17)	-0.37 (0.31)
Central Bank Governor Turnover	4.13* (2.12)	-1.88* (1.10)	1.21 (1.82)	1.15 (1.74)
Trade Openness (% GDP)	-0.002 (0.014)	0.003 (0.009)	-0.019 (0.023)	0.04 (0.03)
2) Financial Globalization Instrumented				
Exposure to Financial Globalization (%GDP)	-0.06** (0.03)	0.02* (0.01)	-0.02 (0.05)	0.11* (0.06)
Budget Deficit (% GDP)	-0.06 (0.08)	-0.05 (0.05)	-0.07 (0.13)	0.05 (0.13)
Exchange Rate Flexibility	0.04 (0.13)	-0.16* (0.09)	0.10 (0.19)	-0.79** (0.39)
Central Bank Governor Turnover	2.56 (2.05)	-1.71 (1.13)	1.00 (1.97)	1.61 (1.79)
Trade Openness (% GDP)	0.0004 (0.015)	-0.002 (0.010)	-0.006 (0.028)	-0.001 (0.034)

All variables are 5-year averages (1975~79, 1980~84, 1985~89, 1990~94, 1995~99).
*, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.
Standard errors in parentheses. Coefficients on the constant not reported.

Table 8a: Transition and long run probabilities across budget deficit states

Policy State	*L (< 3%)*	*M (3% - 8%)*	*H (> 8%)*
L (< 3%)	**.80**	**.17**	.03
M (3% - 8%)	**.37**	**.52**	**.11**
H (> 8%)	**.14**	**.41**	**.45**
Sample average	.48	.37	.15
Long Run (ergodic)	.62	.29	.09

Transitions are over 5-year periods (1975~79, 1980~84, 1985~89, 1990~94, 1995~99).
Bold indicates statistical significance at 1% level.

Table 8b: Examples of actual country transitions across budget deficit states

Policy State	*L (< 3%)*	*M (3% - 8%)*	*H (> 8%)*
L (< 3%)	Algeria Australia Botswana Chile Colombia Germany Denmark Dominican Republic El Salvador Guatemala Indonesia Korea Mauritius Paraguay Philippines Switzerland Thailand Uruguay Venezuela	Colombia El Salvador Japan Norway Philippines Spain Uruguay	
M (3% - 8%)	Canada El Salvador Iceland Indonesia Malaysia Netherlands Norway Philippines Thailand Tunisia UK Uruguay USA	Austria Canada India Netherlands Pakistan Tunisia Turkey South Africa Spain USA Zimbabwe	Greece Mexico Sweden Turkey
H (> 8%)	Mexico Sweden	Bolivia Brazil India Italy Malaysia Pakistan Portugal	Egypt Greece Ireland Italy Portugal Sri Lanka

Table 9: Maximum likelihood estimation of variable transition probabilities for budget deficit

Policy Transitions	*L → M*	*M → L*	*M → H*	*H → M*	*H → L*
1) Financial Openness Exogenous					
Exposure to Financial Globalization (%GDP)	0.002 (0.004)	0.005 (0.005)	-0.02 (0.02)	0.01 (0.01)	0.005 (0.015)
Inflation (% p.a.)	-0.004 (0.007)	0.0004 (0.001)	-0.0004 (0.002)	0.007 (0.007)	0.003 (0.010)
Number of Government Changes	0.62 (0.62)	-0.13 (0.49)	-0.21 (0.64)	-1.85** (0.92)	-4.73** (2.21)
Number of Coalition Governments	-0.15 (0.63)	0.69 (0.54)	0.64 (0.79)	0.40 (0.95)	0.59 (1.29)
Trade Openness (% GDP)	-0.009 (0.012)	0.007 (0.008)	-0.002 (0.013)	-0.01 (0.01)	-0.01 (0.02)
2) Financial Openness Instrumented					
Exposure to Financial Globalization (%GDP)	0.007 (0.009)	0.005 (0.007)	-0.03 (0.03)	0.01 (0.01)	0.02 (0.01)
Inflation (% p.a.)	-0.004 (0.007)	0.0005 (0.001)	-0.0003 (0.002)	0.007 (0.007)	0.004 (0.010)
Number of Government Changes	0.66 (0.63)	-0.13 (0.50)	-0.42 (0.69)	-1.98** (0.97)	-5.30** (2.37)
Number of Coalition Governments	-0.33 (0.70)	0.66 (0.54)	0.70 (0.79)	0.64 (0.91)	0.44 (1.32)
Trade Openness (% GDP)	-0.01 (0.01)	0.007 (0.008)	0.004 (0.015)	-0.006 (0.013)	-0.02 (0.02)

All variables are 5-year averages (1975~79, 1980~84, 1985~89, 1990~94, 1995~99).
*, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.
Standard errors in parentheses. Coefficients on the constant not reported.

Appendix 1: Solution of the Model for the General Case with Unrestricted β

In the general case, the objective function of the host government takes the following form:

(A1) $$EW = q\left[X + n\left(\frac{\beta q}{r}\right)^{\frac{\beta}{1-\beta}}\right] - b\,q^{\frac{1}{1-\beta}}$$

Assuming that b is sufficiently large, so that $b > N(\beta/r)^{\frac{\beta}{1-\beta}}$, the government's maximization problem has an interior solution:

(A2) $$q = \left[\frac{X(1-\beta)}{b - n(\beta/r)^{\frac{\beta}{1-\beta}}}\right]^{\frac{1-\beta}{\beta}}$$

Since q is limited between 0 and 1, the constraint on b becomes: $b \geq (1-\beta)X + N(\beta/r)^{\frac{\beta}{1-\beta}}$.

The policy response to an increase in n, or financial globalization, is now given by:

(A3) $$\frac{dq}{dn} = \frac{1}{\beta X}\left(\frac{\beta}{r}\right)^{\frac{\beta}{1-\beta}}\left[\frac{X(1-\beta)}{b - n(\beta/r)^{\frac{\beta}{1-\beta}}}\right]^{\frac{1}{\beta}} > 0$$

In other words, as financial globalization increases, the government responds by raising the probability of pursuing the good policy.

Introducing investors' mood swings into the model modifies the optimal policy rule as follows:

(A4) $$q = \left[\frac{X(1-\beta)}{b - n(1-s)(\beta/r^*)^{\frac{\beta}{1-\beta}}}\right]^{\frac{1-\beta}{\beta}}$$

The effect of an increase in s, or the probability of sudden stops in capital flows, on the government's responsiveness to financial globalization is given by:

(A5) $$\frac{d^2q}{(dn)(ds)} = -\frac{1}{\beta^2 X}\left(\frac{\beta}{r^*}\right)^{\frac{\beta}{1-\beta}}\left[\frac{X(1-\beta)}{b - n(1-s)(\beta/r^*)^{\frac{\beta}{1-\beta}}}\right]^{\frac{1}{\beta}}\left[\frac{b + ns(\beta/r^*)^{\frac{\beta}{1-\beta}}}{b - n(1-s)(\beta/r^*)^{\frac{\beta}{1-\beta}}}\right] < 0$$

In other words, mood swings in international capital flows weaken the discipline effect.

The effect of an increase in b, or the disutility of policy effort, on the government's responsiveness to financial globalization is given by:

(A6) $$\frac{d^2q}{(dn)(db)} = -\frac{1}{\beta^2 X}\left(\frac{\beta}{r^*}\right)^{\frac{\beta}{1-\beta}}\left[\frac{X(1-\beta)}{b - n(1-s)(\beta/r^*)^{\frac{\beta}{1-\beta}}}\right]^{\frac{1}{\beta}}\left[\frac{1-s}{b - n(1-s)(\beta/r^*)^{\frac{\beta}{1-\beta}}}\right] < 0$$

In other words, political and other costs of policy effort weaken the discipline effect.

Appendix 2: List of Variables with Descriptions and Data Sources

Variables	***Descriptions***	***Data Sources***
Inflation	Change in consumer prices, percent per annum.	IMF, International Financial Statistics
Budget Deficit	Central government deficit, percent of GDP.	IMF, International Financial Statistics
Financial Openness	Total gross actual foreign assets and liabilities, percent of GDP.	Lane and Milesi-Ferretti (2001)
Restricted Financial Openness	Total gross actual foreign direct and portfolio investment, percent of GDP.	Lane and Milesi-Ferretti (2001)
De Jure Financial Openness	1 if capital account transactions unrestricted, 0 otherwise.	IMF, Annual Report on Exchange Arrangements and Exchange Restrictions
Distance	Great circle distance.	CIA, The World Factbook
Exchange Rate Flexibility	Index of de facto exchange rate flexibility.	Reinhart and Rogoff (2002)
Central Bank Governor Turnover	Turnover rate of central bank governors.	Ghosh, Gulde, and Wolf (2003)
Number of Government Changes	Number of government changes per year, including executive changes, cabinet changes, and coups d'etat.	Cross-National Time Series Data Archive (Banks, 1979 updated)
Number of Coalition Governments	Number of coalition governments per year.	Cross-National Time Series Data Archive (Banks, 1979 updated)
Trade Openness	Total volume of trade (exports and imports), percent of GDP.	IMF, International Financial Statistics